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SUBJECT: Defense Health Board Annual Review of Department of Defense Deployment Health Centers 2012-02

Executive Summary

The Health Care Delivery Subcommittee of the Defense Health Board (DHB) conducted program reviews of the Deployment Health Clinical Center (DHCC), Armed Forces Health Surveillance Center (AFHSC), and Naval Health Research Center (NHRC) in December 2011 and January 2012. The consolidated findings of the Subcommittee members and recommendations for each site, as endorsed by the Board, are presented in this report.

The initial concept for the Department of Defense (DoD) Deployment Health Centers, issued by the Assistant Secretary of Defense (Health Affairs) (ASD(HA)) on September 30, 1999 indicated that the goal of creating the centers would be to improve DoD's ability to identify, treat, and minimize or eliminate the short- and long-term adverse effects of military service on the physical and mental health of veterans.[1] The DHB's 2012 review of the Centers indicates that significant advances in achieving this goal have been made; however, there may be opportunities to further optimize the Centers' activities. As such, the DHB offers the following overarching recommendations:

1. Health Affairs should conduct a performance review of DoD Deployment Health Centers' activities, projects and programs to ensure that funding levels are aligned with current operational priorities.

2. Periodic review of strategic goals, funding, and performance should be conducted within each Center and reported to the ASD(HA). The DHB recommends that Health Affairs:

    a. Review the mission and vision of the Centers at least every three years, to ensure alignment with the overarching needs of DoD.

    b. Outline metrics-driven strategic plans for each Center at least every three years.

    c. Annually confirm budgeting resources to ensure that resource allocation is adequately linked to performance as defined by strategic plans and ongoing assessment of return on investment to DoD.

3. Although each program is unique, there are common elements across programs and centers. Ongoing structured interchange between each Center would enable leveraging common programmatic strengths, reduce redundancy, and gain greater efficiencies.

Background

History and Charge

On September 17, 2002, the ASD(HA) issued a memorandum to the Armed Forces Epidemiological Board (AFEB) requesting that the AFEB perform an ongoing program review and serve as a public health advisory board for the DoD Research and Clinical Centers for Deployment Health.[2] This included the Deployment Health Clinical Center (DHCC) and Naval Health Research Center (NHRC). The AFEB determined that reviews be conducted on an annual basis and appointed a subcommittee to conduct the reviews.[3]

In 2006, the AFEB and its taskings were absorbed into the DHB. Subsequently, two reviews were conducted by the DHB's Military Occupational/Environmental Health and Medical Surveillance Subcommittee. Further reviews were postponed due to the restructuring of DHB subcommittees in accordance with the Secretary of Defense Efficiencies and delays in reappointments of subcommittee members. The Armed Forces Health Surveillance Center was created and established as a DoD Deployment Health Center in 2008, and had yet to be reviewed.

To comply with the original tasking, while awaiting subcommittee member reappointments, the Board elected to seek out Board members with the necessary academic and operational expertise to conduct the reviews. Dr. George Anderson and Dr. Eve Higginbotham were selected and agreed to conduct the reviews, via the Healthcare Delivery Subcommittee.

Review Process and Outcomes

The Health Care Delivery Subcommittee convened a teleconference on September 29, 2011 at which time the date and scope of the reviews was identified for each of the three DoD Deployment Health Centers

- December 19, 2011: Deployment Health Clinical Center, Silver Spring, MD
- December 20, 2011: Armed Forces Health Surveillance Center, Silver Spring, MD
- January 23, 2011: Naval Health Research Center, San Diego, CA

Center leadership was provided with a list of requested information from the Subcommittee members in advance of each site visit. Agendas for the visits were developed by the Centers and approved by the Board Subcommittee members. Following visits to the DHCC, follow-up information was requested by DHB staff on behalf of the Subcommittee members.

Utilizing a modified, abbreviated version of the Organizational Performance Driver Model™,[4] members examined five key drivers of organizational performance in its review of the Centers. These drivers are strategy, process, structure, culture and people. This report stratifies the collective findings and recommendations according to this model. Of note, ranking of program value and priority is outside the scope of the report.

The consolidated Subcommittee members' findings from visits and proposed recommendations were presented to the Defense Health Board on February 21, 2012 in San Antonio, Texas. With a slight change to the overarching recommendations, Board members voted unanimously to forward the recommendations to the ASD(HA).

Armed Forces Health Surveillance Center

Overview

AFHSC was formally established in 2008, and was designated to serve as the single source for DoD health surveillance information to unify surveillance efforts across the Military Health System. Legacy agencies which were combined to form the AFHSC include the Defense Medical Surveillance System (DMSS), Global Emerging Infections Surveillance (GEIS), and the DoD Serum Repository. A detailed conceptual framework containing the vision, mission, scope and functions of the organization was developed as the foundation and continues to guide the work of the Center today.[5] AFHSC is led by an experienced Active Duty Service member selected from a Tri-Service pool of nominees who has the necessary qualifications to lead this organization. AFHSC operations are divided into four divisions, each of which is overseen by an experienced Chief who is either an Active Duty Service member or DoD civilian. The divisions include:

- Data Management and Technical Support
- Epidemiology and Analysis
- Communications, Standards and Training
- GEIS Operations

The Force Health Protection Integration Council (FHPIC), chartered by the ASD(HA), serves as the advisory Board of Governors for AFHSC. The Undersecretary of Defense (Personnel and Readiness) (USD(P&R)), via the ASD(HA) and FHPIC provides policy guidance and functional support, whereas the Secretary of the Army serves as the DoD Executive Agent (EA) for the AFHSC, providing administrative oversight.

Key Observations and Findings

1. Strategy

Mission and Strategic Goals: Prior to its establishment, a comprehensive conceptual framework outlining guiding principles, the vision, mission, scope of work and essential functions, as well as the way ahead was defined for the AFHSC. AFHSC leadership has succeeded in ensuring that Center operations and outputs are within this pre-defined scope of work and that all activities seek to achieve the Center's mission and vision.

Financial Management and Budget: AFHSC's funding is largely provided by the Defense Health Program (DHP), although some funding is provided by the Army, Navy, Air Force and Overseas Contingency Operations. As is the case for all DoD organizations, funding is allocated

on a yearly basis, presenting an ongoing risk to the organization's sustainability. As the EA for AFHSC, all funds allocated to AFHSC are provided to and retained by the U.S. Army Public Health Command.

Monitoring: AFHSC is subject to administrative oversight from the Army, since the Army serves as the EA. Additionally, functional oversight is provided to AFHSC by the USD(P&R) via the ASD(HA) and FHPIC. The AFHSC provides an annual report (a requirement of all DoD Deployment Health Centers), and is subject to periodic review by the DHB (although this is the first such review).

2. Processes

Communication: Regularly scheduled meetings between AFHSC Division Chiefs ensure that all Center programs are coordinated and that Center leaders continue to work toward interrelated objectives. Detailed organizational charts indicate that research, operations, communications and analytical staff members are mentored and receive instruction from more experienced members. Reporting structures are clearly defined.

External communication with the Services is enhanced by the Service liaisons. Service liaisons have an essential role in ensuring that the needs of each Service are met and pertinent information is transmitted to the Services in the most efficient manner. A limiting factor is periods of time that the Service liaisons may not be available due to deployments. Communication with Line components such as the Combatant Commands (COCOMs) and Joint Staff is hampered due to incompatible information technology (IT) systems. AFHSC usually shares information via non-classified IT (NIPRnet) systems in order to promote the widest possible dissemination of information and increase transparency. The Line components, to include the Joint Staff and COCOMs use a classified IT system (SIPRnet) for routine messaging. To mitigate this gap and enhance communication with those who use SIPRnet as their primary IT system, the AFHSC is installing SIPRnet capability.

AFHSC has built strategic relationships with other health surveillance and intelligence agencies such as the National Center of Medical Intelligence (NCMI) and Centers for Disease Control and Prevention (CDC). AFHSC leadership has indicated that AFHSC has made efforts to share data with the Department of Veteran's Affairs (VA), but that VA has been reticent to reciprocate. Furthermore, collaboration with other agencies collecting biosurveillance information, such as the Defense Threat Reduction Agency (DTRA) (specifically, it's Cooperative Biological Engagement Program) has been challenging due to some of their information or sources being classified as SECRET or above.

Quality Assurance and Data Integrity: AFHSC has established a detailed process for receiving and assessing requests for epidemiologic analysis. A critical aspect of this process is review by a board within AFHSC consisting of leaders and staff epidemiologists. This interdisciplinary board ensures that sufficient scientific rigor is maintained and that personally identifiable information (PII) and protected health information (PHI) is kept confidential. Significant

precautions are taken to ensure that PII and PHI are not contained in AFHSC's external database, and its internal database is securely protected from any external use.

3. People and Culture

Culture, Skills, Experience and Qualifications: AFHSC leadership and staff are highly qualified, and possess significant operational military experience, as well as academic expertise and credentials. AFHSC's leadership (Directors, Chiefs and Assistant Chiefs) includes representation from Army, Navy, Air Force, and Department of Homeland Security (Coast Guard), as well as civilians. Furthermore, researchers at the Center possess significant academic expertise and qualifications. The leadership supports an open, collaborative culture, which is promoted by the physical office space setup.

Service liaison staff members enable improved communication and collaboration between the Services and AFHSC. The Services' willingness to continue to fill these billets and limit absences due to deployments is necessary to maintain this collaborative communication and to provide Tri-Service representation.

Human Resources: Due to uncertain funding streams, the significant proportion of staff members who are contractors represents a vulnerability to the organization unless secure funding can be maintained to support the current staffing infrastructure. Generally, contractors fill support staff and researcher positions; however, it should be noted that the Deputy Director position is currently held by a contractor. AFHSC contract staff members are divided between five contracts held by five different companies, although a significant proportion of staff are employed by the Henry M. Jackson Foundation (HJF). The contracts all operate on a different schedule and are therefore due for renewal at different times throughout the year, mitigating some risk. In addition to the five contracts, Health Affairs also provides and funds three contract staff members to AFHSC. It is possible that in the future AFHSC will have to absorb these costs should budget constraints limit Health Affairs support.

4. Structure and Programs

Organizational Structure: Each division has adequate staff support for its operations; the Center does not appear to have any manning shortfalls. Active Duty personnel are spread across leadership positions, and provide oversight of staff within the four divisions. Divisions are each broken into sections and junior staff are supervised by experienced, qualified researchers. AFHSC provided the DHB with clear, complete organizational charts for its organization as a whole, as well as for each division, encompassing all personnel. Roles and responsibilities appear to be well understood.

Data Management and Technical Support: The Data Management and Technical Support (DMTS) division is responsible for managing both an internal and an external (via the internet) longitudinal database of Service members' health information, as well as the largest Serum Repository in the world. The external database does not contain PII or PHI, and when appropriate, is made available to requestors within DoD for independent analysis. The internal

database, DMSS, is more comprehensive, contains PII and PHI, and is not available to those outside of the AFHSC; access to this database is limited to epidemiologists in the Epidemiology and Analysis division who conduct analyses based on internal and external requests. With the exception of theater deployment health information, the information in the primary internal database is comprehensive. Many of the data feeds have been collected since 1985. As information systems advance, DMTS continues to identify new sources of data to incorporate into its databases.

Epidemiology and Analysis: The Epidemiology and Analysis division is responsible for reviewing and responding to requests for information. Some of the products produced by this division include public health practice analyses, special studies and focused periodic reports (such as those included in the *Military Surveillance Monthly Report* (*MSMR*)). This division plays a critical role in the mission of AFHSC by providing the expertise required to interpret and analyze the data stored in DMSS, which is then used by key DoD decision makers and providers.

Communications, Standards and Training: The Communications, Standards and Training division is responsible for managing and distributing all products deliverable to the public, to include publication of *MSMR*. It also develops and revises standard surveillance and analysis case definitions, and organizes and manages training opportunities around the world. Of note, the *MSMR* was recently designated for inclusion in MEDLINE, the online database of peer-reviewed articles maintained by the U.S. National Library of Medicine.

Global Emerging Infections Surveillance Operations: The GEIS system was established in 1997 in response to the 1996 Presidential Directive (NSTC-7).[6] As a legacy organization absorbed by AFHSC, the GEIS division had its own mission and vision. Upon its transition into AFHSC, the mission was modified slightly to reflect its position as a component of the AFHSC. GEIS conducts a number of research activities and monitors emerging infections worldwide through a network of laboratories that are widely recognized as not only a significant DoD asset but one with both national and international importance. The GEIS epidemiologists are divided into the following categories: respiratory infections, gastrointestinal infections, febrile and vector-borne infections, antimicrobial resistance, and sexually transmitted diseases. Among its many successes, GEIS partner laboratories are attributed with identifying the first four cases of the 2009 H1N1 influenza pandemic strain and subsequently were the first to identify the emergence of this virus in 14 countries, including the United States. During the pandemic, GEIS proved to be a critical component in DoD for the national and international tracking of the progression of this disease. Due to the global footprint of the GEIS laboratory network, key leaders around the world have access to critical data that would otherwise not have been available.

Recommendations

1. Strategy

The AFHSC maintains a strong focus on its mission and commitment to keeping its projects within the scope of its operations. The DHB affirms the vision and mission of AFHSC and recognizes the importance of limiting its activities to those within its scope.

Staffing vulnerability may be reduced by transitioning contract positions to DoD civilian positions. Ongoing funding to ensure the AFHSC may continue to meet its mission is needed. The uncertainty associated with one-year funding streams is not optimal considering the Center's ongoing mission requirements. Long term funding to AFHSC should be secured within the Program Objective Memorandum (POM) for greater stability and security.

2. Processes

Communication: AFHSC is in the process of acquiring the capability to send messages via the DoD SIPRnet. To enable open communication with entities within DoD that primarily use classified IT systems for all communications, the AFHSC needs to acquire this capability. Although AFHSC has a strong established relationship with NCMI, greater collaboration with DTRA and others engaged in international medical intelligence gathering is needed to ensure that health surveillance activities are comprehensive. Furthermore, cooperation in information sharing by the VA should be a priority, given the importance of streamlining health information for Service members and Veterans.[†] Communication with operational components of the Department should continue to be enhanced. However, the AFHSC must carefully balance this need to communicate with such agencies against the need to maximize transparency so that all DoD providers have the necessary surveillance information to promote public health.

Quality Assurance and Data Integrity: DHB affirms AFHSC's processes for assuring the highest standards of quality and integrity in its data collection, maintenance and analysis procedures. This should continue to be a high priority for AFHSC, and should be periodically reviewed for any potential improvements, based on the availability of new scientific knowledge and technological advancements.

3. People and Culture

AFHSC's staff members are one of its greatest assets, as they possess significant skills, credentials and experience. Without such a highly talented workforce, the quality and scientific rigor of AFHSC's work would suffer. It is imperative that this be preserved. The current staffing structure has ensured that critical health surveillance information is transmitted in a

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[†] Of note, the original establishing memorandum indicated that the Deployment Health Centers would coordinate activities with the Joint Staff and Military and Veterans Health Coordinating Board to ensure integration of efforts with agencies including the VA; however, it is not clear that the VA has made any such effort to collaborate.[1]

timely manner. As such, DHB recommends that the current staffing levels are, at minimum, maintained. The collaborative culture supported by AFHSC's leadership should be applauded and continuously monitored and enforced. Due to the Tri-Service nature of AFHSC's mission, Service liaisons are critical to the success of the organization, and are responsible for streamlining communications with the Services. The DHB asserts that these positions must be guarded from deployments.

Contract staff agreements should be comprehensively examined to ensure that the current arrangements are the most cost effective and provide the greatest amount of stability to the organization. If possible to transition some positions to civilian, especially critical leadership roles (such as the Deputy Director), this should be considered. Alternatively, if budget limitations dictate that positions must be eliminated at AFHSC, cuts should be made to contract positions only, as civilian and Active Duty positions provide AFHSC with greater operational experience and understanding.

4. Structure and Programs

Data Management and Technical Support: The DHB commends AFHSC for its excellent work collecting and maintaining a vast database of information for DoD. In particular, the Center is to be commended for the massive undertaking of storing sera from millions of Service members. The Serum Repository should be considered a national treasure. Mechanisms to maintain confidentiality should be controlled and routinely assessed to ensure compatibility with DoD PII/PHI requirements, the Health Insurance Portability and Accountability Act and other applicable industry standards.

AFHC's external web-based database, Defense Medical Epidemiology Database (DMED) provides a unique opportunity for DoD end-users who are competent in analysis to have immediate access to a wealth of health surveillance information. AFHSC should continue to maintain this database, while also continuing to carefully screen and consider anyone requesting access. DHB recommends that the process for determining access be part of future DHB reviews to ensure that opportunities to contribute to the pathophysiology of disease are appropriately balanced against the priorities of DoD.

Deployment health data are lacking from AFHSC's databases. This is primarily due to a lack of consistent in-theater data collection processes across the Services. To ensure that AFHSC's databases are comprehensive, DoD and the Services must collaborate to ensure that theater data collection processes are streamlined, and that adequate and complete theater data is supplied to AFHSC.

Epidemiology and Analysis: The DHB is impressed with AFHSC's comprehensive process for receiving and reviewing requests for epidemiological analysis. This process adequately ensures that a high level of scientific rigor is maintained. Furthermore, the time in which AFHSC is able to respond to requests and provide data as well as the high volume of requests that AFHSC responds to each year is impressive. The clear processes and highly qualified staff clearly enable the success of this AFHSC division.

Communications, Standards and Training: DHB commends AFHSC for its continued commitment to increasing transparency in health surveillance and transmitting relevant, actionable health surveillance information in a timely manner through its Web site and in *MSMR*. DHB also applauds AFHSC for instilling scientific rigor into its analyses and as a result, achieving peer reviewed journal status and indexing in MEDLINE.

Global Emerging Infections Surveillance Operations: DHB recognizes that GEIS plays an integral role in advancing public health and stopping the spread of disease both in the military population and around the world by monitoring emerging infections. GEIS laboratory partnerships around the world are a critical component of these surveillance efforts and should be preserved.

Deployment Health Clinical Center

Overview

DHCC was founded in 1991 as the Gulf War Health Center.[7] In 2001, the Center was formally transitioned into the DHCC, as directed by the ASD(HA) and in accordance with the 1999 Strom Thurmond National Defense Authorization Act. The ASD(HA) provided a broad concept of operations containing three separate missions, undefined evaluative measures, and a detailed staffing structure.[1, 7]

In 2008, the Defense Centers of Excellence for Psychological Health and Traumatic Brain Injury (DCoE) was established, and DHCC was named a component center of DCoE. DHCC is segmented into four programmatic areas, with administrative and operations staff separated. These divisions include:

- Re-Engineering Systems of Primary Care in the Military (RESPECT-Mil)
- Tri-Service Intensive Outpatient Programming Synchronization (TrIOPS)
- Health Systems Research and Evaluation
- Education and Outreach

DHCC's mission and goals have changed since its inception. The organizational realignment under DCoE may be ideal, given DHCC's current mission, which may prove to dovetail well with the mission of its parent organization. Support responsibility for DCoE will be transferred from TRICARE Management Authority to the U.S. Army Medical Research and Materiel Command (MRMC) by October 2012.

Key Observations and Findings

1. Strategy

Mission and Strategic Goals: At its inception, DHCC was provided with three separate missions, a broad list of goals, a staff support plan and proposed budget. The Center was not provided with a scope statement or vision.[1]

The ASD(HA) memo establishing the Center indicated that the DHCC would emphasize the following missions:

1. *Clinical Care:* Development of effective integrated, multidisciplinary, and multimodal health care delivery strategies, clinical risk-communication strategies, and methods of secondary prevention (reduction of illness duration) and tertiary prevention (reduction of illness-related morbidity) of deployment related health concerns and conditions.

2. *Clinical Research:*
   - Develop, implement, and sustain the capability for assessment of biomedical treatments, service strategies, and health care technologies potentially helpful for ameliorating the impact of deployment-related health concerns and conditions.

   - Maintain, explore, and improve the use of health information systems to create a population-based continuum of stepped deployment-related health care (e.g., Comprehensive Clinical Evaluation Program).

3. *Continuing Education:* Assist in developing, implementing, and sustaining an evidence-based military continuing medical education program for dissemination of clinically and militarily relevant deployment health medical research evidence to military health care providers, previously deployed military personnel, and others with deployment-related health concerns.[1]

DHCC's current mission statement is "to improve deployment-related healthcare through caring assistance and health advocacy for military personnel and families, while simultaneously serving as a military health system resource center and catalyst for deployment-related healthcare innovation, education and research." DHCC leadership and staff acknowledge that its current mission has deviated from the organization's initial mission. DHCC's Director indicated that he envisioned that DHCC would become a center of coordination with an emphasis on consensus building, program implementation and quality assurance; however, its broad mission, goals and objectives have not been comprehensively reexamined or rewritten. DHCC does not have a strategic plan. The Center's activities suggest a project-based focus, rather than a comprehensive systems approach. Projects are focused entirely on mental health issues.

Financial Management and Budget: Operational funding requests from DHCC are reviewed by DCoE. Funding is administered by DCoE and provided through the DHP. DHCC recently established a five-year POM with DCoE and meets often with DCoE Resource Management to

review funding issues. A significant proportion of DHCC's research and clinical trial funding is extramurally derived. For example, DHCC has received a $15 million grant for its "STEPS-UP" clinical trial from the Congressionally Directed Medical Research Program, and $1.3 million from the Defense Medical Research and Development Program to conduct a clinical trial of telephonic psychotherapy services.

Monitoring: In 2008, DHCC was repositioned as a component of DCoE. DCoE has since experienced significant changes in its structure and leadership, and will be realigned within the U.S. Army's MRMC by October 2012. Current plans indicate that technical oversight will continue to be provided by the ASD(HA). The potential effects of this realignment on DHCC remain to be realized but given the focus of DHCC programs and products, this realignment appears to be appropriate.[1] According to DHCC's director, DHCC has limited direct interaction with DoD leadership and policymakers. Monitoring activities include a review of annually submitted reports, a requirement of all DoD Deployment Health Centers, as well as periodic reviews by the DHB. Since DHCC became a component center of DCoE in 2008, DHCC leadership report that it has submitted numerous reports on its activities to DCoE, in addition to its annual report, and an annual executive summary. DHCC participates in a weekly staff meeting with DCoE that includes all of the DCoE's component centers thereby facilitating a bidirectional common operating perspective. Additionally, DHCC attends periodic meetings with DCoE targeting its business line activities, challenges and overall accomplishments. Any reporting to the ASD(HA) and higher levels of DoD, including the submission of annual reports, is conducted through DCoE. DHB notes that DHCC's annual reports are not consistently updated on its Web site, and in two instances, two years were combined into one report. Furthermore, DCoE has recently come under scrutiny by Congress and the Government Accountability Office (GAO).[8, 9, 10] In the first GAO report concerning DCoE, GAO recommended that the Director of TRICARE Management Authority work with the Director of DCoE to establish a process to regularly collect and review data on component centers' funding and obligations, and expand its review and analysis process to include component centers.[9] As such, DCoE oversight of DHCC may be a more recent phenomena following this recommendation (which the ASD(HA) concurred with). GAO also notes that although DoD prepares mandated and ad hoc reports on psychological health (PH) and traumatic brain injury (TBI) expenditures which outline PH and TBI activities and accomplishments, DoD is not required to report separately on DCoE.[9] As such, higher level monitoring of DHCC may be limited.

2. Processes

Communication: Communication lines within DHCC are unclear; however, the DHCC Director appears to exercise a significant amount of influence over and involvement in all project activities. Staff are divided between two offices; one in Silver Spring, MD and the other at Walter Reed National Military Medical Center (WRNMMC) with shuttle service provided between each location. Since Walter Reed Army Medical Center (WRAMC) was closed in August 2011(staff based there were relocated to WRNMMC), staff at the Silver Spring, MD office are operating by virtual private network (VPN). As IT support is transitioning from WRAMC to WRNMMC, staff have experienced connectivity challenges with the VPN

connection. This represents a communication challenge between the two sites. DHCC leadership indicated that they are coordinating with the WRNMMC IT support team to develop a viable solution. External communication with the Services is limited by a lack of representative Service liaisons. DHCC has a strong relationship with the Army; as such, pilot research projects are primarily conducted with the Army. DHCC has also collaborated with the VA on a number of clinical practice guidelines, and is fortunate to have two U.S. Public Health Service members on its staff.

Quality Assurance and Data Integrity: Although DHCC collects and maintains many output data pertaining to its activities, staff provided limited outcomes data relating to DHCC's educational outreach activities, clinical programs, and research projects. Following its educational outreach activities, DHCC distributes, collects and analyzes surveys to determine satisfaction. Evaluative measures for RESCPECT-Mil include the number of screenings it conducts and the proportion who screen positive for suicidal ideation or other mental health disorders. Comparison data from the population that is not screened is either unavailable or not being sought by DHCC. The lack of baseline data may likely represent a systemic Departmental liability that is not limited to DHCC alone. Furthermore, DHCC was unable to provide any data on the cost effectiveness of its projects and programs.

3. People and Culture

Culture, Skills, Experience and Qualifications: DHCC staff members are passionate about their respective research areas and projects and convey a high degree of commitment to them. Furthermore, research staff are highly qualified, with nearly two-thirds of all staff possessing a Master's degree or higher (one-third of all staff possess a doctorate). Staff structure primarily consists of researchers with a background in psychiatry or psychology, and although some senior leadership members have deployment experience, overall military operational experience is lacking among DHCC senior staff.

Staff members regularly publish research findings and have presented at a number of conferences. Although slightly reduced this year, the number of papers published in peer reviewed academic journals continues to validate the programs' clinical value in certain circumstances. However, evidence of benefits or enhancements to health delivery at the systems level is lacking.

Human Resources: DHCC is primarily staffed by contractors from HJF. Specifically, out of 53 staff members, one is a civilian, two are from the Public Health Service, and three are military Service members. This high proportion of contract staff, especially as all contract staff operate under one contract, presents a potential for significant staff loss should contract funding be eliminated or with the transition to an different contractor. The DHCC staff commented that HJF has met their requirements and has provided a stable workforce with a high retention rate.

The Air Force and Army have each billeted a psychologist to the Center. The Navy has not provided any support. The lack of complete representation from the Services within the Center may limit or impede Tri-Service communications and collaboration.

4. Structure and Programs

Organizational Structure: Leadership within DHCC has been held by an Army billet since the Center was opened as the Gulf War Health Center in 1994. This may account for the Army-centric focus of the Center's projects and priorities. Since the majority of DHCC's staff are contractors, and extramural funding brings in additional contract staff, a clear reporting and organizational structure should be defined to avoid confusion. Furthermore, the projectized nature of DHCC's overarching organizational structure may create silos within the organization.

Specialized Care Programs: The program offers a three-week intensive outpatient group therapy program for Service members experiencing medically unexplained symptoms or post-traumatic stress disorder (PTSD). DHCC has surveyed participants at the start of the program, immediately following, and at one-month and three-months following participation. Although these data suggest that the program is successful, nearly two-thirds of participants were lost to follow up at the one-month and three-month points. DHCC is currently transitioning its Specialized Care Programs (SCP) to the National Intrepid Center of Excellence (NICoE). NICoE appears to be a logical fit for SCP as DHCC moves away from direct care provision and since it falls within the scope of NICoE's clinical mission. NICoE's current care model is also a three-week multidisciplinary treatment program; however, it focuses only on patients with TBI and provides individualized patient care (versus the SCP group therapy model).

NICoE is a new organization (that opened in the fall of 2010), and as such, has not completed hiring its entire staff, particularly its operations and support staff.[11] The transition of eight full-time equivalent DHCC contract staff members supporting the SCP to NICoE, an organization that does not utilize contractors, has not yet been resolved; however, the intention is for the staff to be hired as government civilians. Although this transition may take a significant amount of time, it will result in a more stable work force and mitigate potential vulnerabilities associated with contract staff in the face of fiscal restraint.

DHCC leadership expressed a concern that the conceptual understanding of the program may be compromised in the transition. Additionally, although the current program houses SCP participants in a hotel close to WRNMMC, DHCC staff indicated that it would be preferable to house participants in NICoE's Fisher House on campus, as this would facilitate increased supervision, would be more convenient for program participants, and would be more cost effective. Fisher House has the capacity to house up to 20 participants for all of its programs at any time.

TrIOPS: The general concept of this program is to determine best practices regarding intensive outpatient psychiatric (IOP) services for patients with PTSD. Presently, DHCC staff are collaborating with 12 Army IOPs. DHCC has not yet developed a comprehensive project management plan for its TrIOPS project. The Director of TrIOPS indicated that there is a lack of visibility regarding what programs are available anywhere in DoD and that the process of identifying counterparts in the Air Force and Navy has been initiated; however, specific partnerships have not been formed.

DHCC has defined its measure of success for TrIOPS as becoming the "preeminent consultative consortium for all DoD IOP programs," but has not yet defined any measurable outcomes. The Center is currently developing the evaluation strategy and plans to use data collected from SCP as a precursor. The project is expected to continue through Fiscal Year 2017.

RESPECT-Mil: Since its inception as a pilot program in 2005, RESPECT-Mil has performed over one million screenings and has trained over 4,000 providers on the recognition and management of PTSD and depression. Following the pilot, the Surgeon General of the U.S. Army issued an Operational Order (OPORD) to expand the program to 15 Medical Treatment Facilities (MTFs) throughout the U.S. Army Medical Command, including outside the continental U.S. (OCONUS); an additional OPORD issued in February 2010 directed that the program be expanded to additional MTFs.[12, 13] As a result, the program has significantly expanded, to include implementation at 85 clinics on 35 military installations.

Providers receive interactive on-line training. Inter-tester variability and retention over time are not determined. Variability in the care provided at the different clinic sites may limit inter-tester reliability over time. DHCC collects and analyzes outcome data on those who are screened; however, no evaluation is conducted on the trained providers' perceptions of the quality of the training program or the effectiveness of the training in increasing clinicians' knowledge and skills pertaining to PTSD and depression.

As part of RESPECT-MIL, DHCC is also piloting a project titled the Reengineering Healthcare Integration Program (RE-HIP), which integrates aspects of the patient-centered medical home model (PCMH). The pilot will combine characteristics of the Air Force Behavioral Health Optimization Program and Navy Behavioral Health Improvement Program. It is not clear how this program would be scaled to a Department-wide level without ensuring ongoing certification of staff.

Health Systems Research and Evaluation: The research portfolio of DHCC's Health Systems Research and Evaluation team is strongly driven by extramural funding interests. Current extramurally funded projects include "STEPS-UP," a study of acupuncture for the treatment of trauma survivors, a randomized trial of telephonic psychotherapy for combat-related PTSD, development of a self-management tool for PTSD, and an initiative to develop a single-item PTSD screening tool.

The "STEPS-UP" clinical trial will evaluate an enhanced model of the RESPECT-Mil program, and is currently scheduled to begin enrolling participants in early January 2012. It has taken the research staff 2.5 years to achieve the necessary DoD Institutional Review Board (IRB) approvals to begin the study. Although DoD IRB requirements are known to be time consuming, DHCC may have failed to use a centralized IRB program that may have sped the process.

Education and Outreach: In addition to its clinical research activities, DHCC engages in a number of outreach activities. In 2011, DHCC sponsored three community theater/arts events that included interactive panels. Outreach staff state that positive reviews of these events were received in evaluations. DHCC also maintains two separate telephone helplines for providers

and patients. DHCC's Web site serves as a resource of patient education materials targeted to Service members and provider education materials for clinicians treating Service members with post-deployment psychological health issues. DHCC is launching a redesigned Web site in early 2012, which will be easier for its target audience (Service members, veterans, and clinicians) to navigate. Furthermore, the technology used in the Web site redesign process will enable the Web site to be easily adapted and updated frequently without major overhaul. In order to provide outreach to the academic community, DHCC sponsors a deployment healthcare track at the Armed Forces Public Health Conference, and travels to many conferences throughout the year to showcase its work.

Recommendations

1. Strategy

DHCC has not re-evaluated the broad multi-tiered mission it was prescribed at its inception, and suffers from "mission slip." Although Center leadership communicate a desire to evaluate comprehensive post-deployment health systems, its activities reflect a narrow psychological health project focus, and are largely limited to pilot projects. DHCC's establishing memorandum indicates the inclusion of population health and risk characterization activities and staff.[1] However, the Center has focused its hiring efforts on psychological health experts, limiting activities to issues within this domain. Given its repositioning as a DCoE component center, limiting its scope to psychological health issues may be appropriate; however, DHB recommends that the organization develop a comprehensive strategic plan with a clearly defined scope that would either be limited to psychological health issues or be broadened to reflect a health systems approach. Alternatively, if a broader scope is defined for the Center, DHB recommends expanding its activities to include comprehensive systems-based research projects and programs.

As a DCoE component center, DHCC is monitored almost exclusively by DCoE. DCoE must ensure that adequate reporting and evaluation procedures are in place and are followed. Funding should be provided based on the achievement of target performance metrics, and should be frequently re-evaluated. In January 2012, GAO recommended that a coordinating authority be established for DCoE.[10] Although DCoE appears to be working toward this already with its targeted realignment under MRMC, the DHB recommends that DoD carefully monitor this transition to ensure that DCoE is able to competently monitor its component centers (including DHCC) and ensure adequate oversight of component center budgets.

2. Processes

To enhance communication and collaboration with all the Services, liaisons from all Services must be included within the DHCC staff and leadership. DHB recommends that the Navy begin engagement at the DHCC, and that the Air Force expand its involvement. The DHCC should endeavor to expand its Army-centric focus to include the other Services. DHB commends DHCC for its collaboration with the VA on the establishment of clinical practice guidelines, and encourages the Center to continue this type of collaborative work.

In order to ensure that DHCC research and activities maintain a high level of rigor, the DHB recommends that formal processes for assessing projects be developed and followed. It is essential that cost effectiveness and scalability studies be conducted. Such studies should be conducted throughout the lifecycle of projects so that activities with little evidence of cost savings, effectiveness, or scalability can be ended prior to major investment. The DHB iterates the importance of measurable outcomes to determine program cost effectiveness and subsequent system-wide implementation.

3. People and Culture

If possible, DHB recommends that a greater number of positions, especially leadership positions for each of the respective project divisions, be military and civilian positions. Although the academic credentials of research staff is impressive, the proportion of staff with deployment and/or operational experience should be increased. The ongoing structure of having one contract with 46 contractors may be costly and might not be sustainable; DHB recommends that the contract be carefully studied to determine where it may be possible to obtain any cost savings; alternatives should be considered. Additionally, as previously stated, the Services should make a greater effort to contribute staff to cut contract costs and increase Tri-Service communication and collaboration.

DHCC has limited the scope of its operations by primarily hiring researchers with experience and interest in psychological health issues only. Following the development of a strategic plan and a redefined or clarified scope statement, DHB recommends that DHCC adjust its staff composition, if appropriate, in accordance with its defined strategic goals. The memorandum establishing DHCC outlines a very broad population health research staff structure;[1] if DHCC will truly be a Center focused on broad, systems-level deployment health issues, then this structure should serve as the foundation.

4. Structure and Programs

Organizational Structure: DHCC's realignment as a component center within DCoE, and planned realignment under Army MRMC, should be comprehensively examined, in accordance with an assessment of the Center's mission and strategic goals. If a narrow psychological health scope is to be defined for the Center, then its continued placement as a component center of DCoE is appropriate. However, should DoD seek to broaden DHCC's mission and scope to broad deployment and post-deployment health system-level issues, then the DHB recommends it be repositioned outside of DCoE.

Regardless of how DHCC's mission may be redefined, it is clear that its focus will include the health of military members and families across the Services. Therefore, DHB recommends that a greater effort be made to include a broader representation of the Services among its staff, and particularly its leadership. Greater Tri-Service representation should effectively broaden DHCC's traditionally Army-centric activities.

Specialized Care Programs: The DHB affirms the transition of the Specialized Care Programs to NICoE. Further, DHB agrees that if there is space, the proposed use of Fisher House to house program participants would be preferable to housing in a hotel off of the WRNMMC campus. Although DHB recognizes the administrative limitations in transitioning contract staff to civilian positions, it recommends that the transition be implemented as quickly as possible to ensure that the program may continue and that best practices from prior implementation under DHCC are adequately transferred. DHB also recommends that following the transition, NICoE comprehensively review the current evaluation plan for measuring the outcomes and effectiveness of this program, with a focus on developing strategies to increase follow-up.

TrIOPS: The DHB is concerned about the scalability of this project, and therefore recommends that greater effort be made to build partnerships with the other Services prior to continuation. The DHB acknowledges the importance of the coordination of care across the Services. This exploratory project should strive to account for complete ascertainment across all Service lines. The DHB recommends that DHCC define measurable outcomes and obtain partnership agreements from all Services at the onset of this project.

RESPECT-Mil: DHB commends DHCC for coordinating this extensive project with the Army. However, the DHB strongly recommends that a more rigorous approach to assessing the effectiveness and efficacy of the program be employed, to include cost effectiveness studies and the determination of the sensitivity, specificity and positive and negative predictive values of the screening tool. Further, if the program is cost effective, it should be expanded to other Services. Additional outcome measures should be collected as well. With regard to provider training, DHB recommends that DHCC develop outcome measures to assess clinicians' knowledge of PTSD as well as depression recognition and management before and after undergoing the training. The DHB also recommends that DHCC develop outcome measures and a survey to assess clinicians' overall satisfaction with the training program. DHB recommends DHCC carefully assess programs to ensure consistency in delivery across sites.

Health Systems Research and Evaluation: The DHB expresses concern that DHCC's research portfolio is primarily focused on pilot studies with few pilots that have evolved to DoD-wide implementation. Further, DHB recommends that DHCC re-examine its data collection processes and outcome measures to ensure that the benefit of all projects outweigh their costs and that Center deliverables are performance-based. With respect to the "STEPS-UP" trial, DHB commends DHCC for its efforts to receive IRB approval for this study. The DHB recognizes that this project is important, but emphasizes the need for the Center to clearly define performance measures prior to the initiation of participant enrollment.

Education and Outreach: DHCC's Web site contains a wealth of patient and provider educational materials, and is to be commended for these resources. Furthermore, as technology advances, keeping up with changes is critical. DHB recommends that following the roll out of DHCC's new Web site, it ensure that all information is updated regularly to include recent annual reports and other information to increase the transparency of the organization. DHCC's helplines for patients and clinicians are a valuable resource for its target audiences. Additionally, the community outreach that DHCC engages in is creative and unique. DHCC should continue

to evaluate these activities as it has been, using evaluations to expand and develop new outreach activities. Conference participation and presentations are a strategic mechanism for DHCC to raise awareness of its resources and research among clinicians treating Service members returning from deployment. The Deployment Healthcare track at the Armed Forces Public Health conference is a smart way for DHCC to network with other Services and build collaborations, as well as share information with other key DoD stakeholders.

Naval Health Research Center

Overview

The Naval Health Research Center, located in San Diego, California, was initially founded in 1959. In 2001, the Center was formally appointed as the DoD Deployment Health Research Center by the ASD(HA), in accordance with the Strom Thurmond National Defense Authorization Act for Fiscal Year 1999.[1] NHRC is primarily funded and overseen by the Naval Medical Research Center in Silver Spring, Maryland, which falls under the Navy Bureau of Medicine and Surgery (BUMED). NHRC manages and executes expeditionary operational medical research, development, test, and evaluation programs for the Navy. The ASD(HA) indicated that as part of its designation as the DHRC, NHRC would conduct epidemiological studies investigating the longitudinal health experience of previously deployed military personnel, and would engage in the development and evaluation of appropriate health surveillance strategies.[1] Following its designation as the DHRC, NHRC added a department to focus on deployment health research. Altogether, NHRC is divided into the following departments:

- Medical Modeling, Simulation and Mission Support
- Warfighter Performance
- Behavioral Sciences and Epidemiology
- Deployment Health Research
- Human Immunodeficiency Virus (HIV)/Acquired Immunodeficiency Disorder (AIDS) Programs
- Operational Infectious Diseases

In addition to these departments, NHRC maintains a Science Support Office which is responsible for contract acquisitions and logistics and provides research and development oversight.

Key Findings and Observations

1. Strategy

Mission and Strategic Goals: Upon its designation, NHRC was provided with a revised mission focus and a detailed concept of operations, outlining specific areas for inclusion in its research portfolio and detailed staffing and capability requirements. NHRC has successfully incorporated all requirements outlined in the founding concept of operations into its organizational structure. Its mission is "to conduct health and medical research, development, testing, evaluation, and

surveillance to enhance deployment readiness of DoD personnel worldwide." The Center's operations are well within its pre-defined scope of operations and are in accordance with its mission. Furthermore, the Center is successful in achieving its vision of "world-class health and medical research solutions, anytime, anywhere."

Financial Management and Budget: NHRC receives funding from a wide variety of sources. Very little of its funding is provided through the POM, with the exception of funding for the Millennium Cohort Study and infectious disease surveillance (as a partner laboratory in the GEIS network, the Operational Infectious Disease laboratory at NHRC receives some funding through AFHSC). The Center applies for competitive funding for specific research projects.

Monitoring: NHRC's reporting structure has changed over time. Prior to January 2011, NHRC reported to Navy Medicine Support Command, and was responsible for providing oversight to several CONUS and OCONUS Navy laboratories. More recently, NHRC and the laboratories it previously oversaw report to Naval Medical Research Center (NMRC), which reports to BUMED. NHRC leadership indicated that BUMED is presently considering another organizational realignment and funding structure; however, it is unclear how this would affect NHRC.

2. Processes

Communication: NHRC's base in San Diego, California is at the heart of Naval operations, training and recruitment. NHRC is located less than ten miles away from the Marine Corps Recruit Depot (MCRD) and Naval Amphibious Base-Coronado, 40 miles away from Camp Pendleton and is co-located with surface and submarine fleet elements. It is also centrally located with respect to a number of world-class research universities and institutes, military medicine facilities and biotechnology and industry headquarters with which it holds strong partnerships. These partnerships strengthen communication with key stakeholders.

Within NHRC, communications appear to be strong as well. Although departments are segregated by location in separate buildings on base, staff appear to have a strong awareness of their relevancy within the organization and collaborate with each other when possible. For example, a study on PTSD may bring staff together from the Behavioral Sciences and Epidemiology, Medical Modeling and Simulation, and Warfighter Performance departments. Joint publications provide evidence of these collaborations.

Although the longitudinal cohort studies conducted by NHRC have their own well developed Web sites, NHRC's Web site (hosted by the Navy) contains limited information about the current research and activities at the Center. It briefly describes the mission of each NHRC department, and provides limited contact information.

Quality Assurance and Data Integrity: NHRC maintains several databases and datasets. The Deployment Health Research Department collects and maintains data for the Millennium Cohort Study and Millennium Cohort Family Study. The Behavioral Sciences and Epidemiology department maintains Career History Archival Medical and Personnel System (CHAMPS) for

research purposes. Lastly, the Medical Modeling and Simulation department houses a data warehouse containing logistics and manpower information, casualty injury data and rates, operational characteristics, deployment and personnel history, clinical treatment data and casualty outcome data. NHRC appears to follow procedures to adequately manage and mine this data. Additionally, safeguards are in place to adequately protect the data.

3. People and Culture

Culture, Skills Experience and Qualifications: NHRC staff are highly experienced and possess noteworthy credentials in their respective study areas. Staff are passionate about their research. They appear to feel a connection to their work and collaborate well with coworkers. Departments, although operating primarily independent of each other, find opportunities to partner and publish findings together. Furthermore, the expanded concept of operations provided by the ASD(HA) upon the establishment of the NHRC as the DHRC outlined many diverse staff expertise and capability requirements, all of which NHRC has met. Recent enhancements especially in the oversight and advisory structure of the Millennium Cohort Study further encompass these requirements, especially those related to survey development and implementation strategies.

Human Resources: NHRC leadership members possess significant operational military and civilian experience. Outside of leadership, the staff is primarily (over 70 percent) composed of contractors, most of whom are employed by HJF. Contract staff are divided by a number of contracts, many of which are pre-competed. NHRC holds a number of Broad Agency Announcements with university partners to enable a short execution time when needed. Additionally, NHRC's university partnerships enable it to host interns. The majority of interns are public health students from the University of San Diego. Collaborative research projects with VA and CDC result in the provision of additional staff officers at NHRC. For example, later this year, three VA personnel may be stationed at NHRC for a collaborative project to integrate 60,000 patient records from a VA longitudinal cohort study with the Millennium Cohort Study.

4. Structure and Programs

Organizational Structure: NHRC falls under the Navy and is staffed accordingly. Although NHRC primarily collaborates with the Navy over other Services, its long-term epidemiological studies, medical modeling and infectious disease surveillance activities are inherently Tri-Service and receive input from all of the Services. Recent changes in the organizational structure within BUMED have repositioned NHRC, while potential future changes may reposition NHRC again. NHRC seems to adapt well to the change, and its leadership is prepared to manage new changes, especially those which may result in budget cuts in an increasingly limited fiscal environment. The organizational structure within NHRC dictates division by research departments, with significant oversight by experienced leaders with relevant research and development experience. A separate Scientific Support Office provides essential assistance with special projects and in obtaining competitive funding. Additionally, this office manages contracting and outsourcing and ensures compliance requirements are met.

Medical Modeling, Simulation and Mission Support: The Medical Modeling and Simulation (M&S) department conducts analyses and develops models to provide medical decision support to DoD medical planners, operational commanders, medical logisticians, and field medical personnel, as they seek to determine the resources required to support combat and peacetime deployments. The M&S department collaborates with medical planners, providers and logisticians to develop projects that assist in field medical services planning, systems analysis, and operational risk assessment, as well as to determine the best course of action for treating a particular patient stream using available resources. Products developed by this department are used for joint medical planning factor analysis, expeditionary medical resource projection, casualty mortality and morbidity estimation, and joint casualty medical intelligence surveillance. The M&S department currently uploads comprehensive casualty data to the DoD classified internet on a weekly basis for review by DoD trauma stakeholders around the world.

Tools developed by the M&S department have benefitted a number of DoD stakeholders, including:

- ASD(HA)
- Defense Logistics Agency
- Air Force Medical Logistics Agency
- Headquarters Marine Corps
- Naval Medical Logistics Command
- Marine Corps Systems Command
- Marine Corps Combat Development Command
- Marine Corps Warfighting Laboratory
- Chief of Naval Operations
- Commander, Naval Air Force
- U.S. Pacific Fleet
- Navy Warfare Development Command

As the drawdown of troops from current conflicts is executed, M&S tools will prove to be key assets in the care and rehabilitation of Wounded Warriors from the previous ten years of overseas contingency operations.

Warfighter Performance: The Warfighter Performance department is the only human performance laboratory conducting research on the measurement, restoration, and optimization of physical and mental combat readiness for the Navy and Marine Corps. The mission of this department is to leverage science and technology with operational knowledge to improve the mission-specific performance of the warfighter, now and in the future. The lab has five focus areas with highly qualified, experienced staff for each area. These include stress physiology, environmental physiology, load carriage, cognitive sciences, and physical and cognitive operational research. The lab features highly advanced technology, including one of only three Computer Assisted Rehabilitation Environment (CAREN) virtual reality systems in DoD. Numerous collaborations with operational (Navy and Marine Corps) as well as medical, academic and scientific partners are developed and maintained to design and implement research studies. Partners include Naval Medical Center San Diego, University of California San Diego,

San Diego State University, University of California Los Angeles, U.S. Army Research Institute of Environmental Medicine, and the Olympic Training Center. With these partners, staff have published many articles in peer-reviewed journals.

Warfighter Performance lab research informs physical fitness standards and body composition analysis techniques and standards for the Navy and Marine Corps. Although focused on Navy and Marine populations, findings often have Tri-Service applicability. Staff are presently studying Navy SEALS, Service members and recruits who have suffered heat stroke. After undergoing a heat acclimation program, some study participants were able to withstand thermal stress without recurrence and have subsequently been cleared for return to duty. If statistical significance is achieved, this study could result in significant cost savings for DoD.

Behavioral Sciences and Epidemiology: The Behavioral Sciences and Epidemiology department at NHRC conducts focused research on behavioral trends that impact warfighter readiness. Research activities include cross sectional and longitudinal studies to address an array of outcomes related to combat and operational stress, PTSD, misconduct, substance abuse, and suicide as well as career-span health and wellness issues. The department has developed key collaborations with Line leadership and resource sponsors within the Navy and Marine Corps to develop focused interventions and training tools, and shape personnel policies that improve the readiness of operating forces. Staff have developed an impressive cadre of educational psychological health and health promotion messages and tools in diverse formats, including a graphic novel, a workbook and video messages. The department has developed strategic partnerships with universities and industry partners to assist in the creation of these tools. Its graphic novel, "The Docs" has become the most requested item on the Marine Corps behavioral health web clearinghouse, far exceeding anticipated requests based on the target population. A proposal has recently been submitted to evaluate the use and impact of these materials. Because the products are being adopted by unknown organizations, a true estimate of effect may be difficult to determine.

The Behavioral Sciences and Epidemiology department also conducts behavioral health surveillance and resiliency activities for the Navy and Marine Corps. Findings from these surveillance activities have resulted in changes in Service mental health policies. The department also maintains an epidemiological database for DoD. CHAMPS contains substantial military personnel health data that mirrors that of AFHSC's DMSS; however, the use of this dataset appears to vary with additional focus areas such as career outcomes and the effects of training and decompression programs on clinical outcomes. Furthermore, the AFHSC uses the DMSS as a surveillance tool whereas the NHRC uses CHAMPS for research. The capability to integrate pharmaceutical utilization into the CHAMPS database is currently being developed, although staff noted that proposed changes to TRICARE Management Authority data access requirements may hamper this initiative.

Deployment Health Research: Created to assist the NHRC in its mission as the DoD DHRC, the Deployment Health Research department conducts epidemiological studies on the health of Service members and their families. Staff members in this department possess significant experience and credentials, and have expertise in biostatistics, epidemiology, medicine,

psychology, reproductive health, complex data management, large mail and telephone surveys, and occupational health. This wide range of expertise is in accordance with the staffing structure outlined by the ASD(HA) in 1999.[1] Dr. Crum-Cianflone was recently appointed as the department head, bringing operational and infectious disease expertise to the department. The core programs of the department are the Millennium Cohort Study, Millennium Cohort Family Study, Recruit Assessment Program (RAP), DoD Birth and Infant Health Registry, and post-vaccination studies including the ACAM2000® (smallpox vaccine) Myopericarditis Registry. Research priorities in the department are determined in collaboration with NHRC, NMRC, BUMED, and the Army, as well with sponsors to include the Military Vaccine Agency, Military Operational Medicine Research Program (MOMRP) and Office of Naval Research. The department has published many articles in peer-reviewed journals, especially since 2006 (when data was first available from the Millennium Cohort). Furthermore, the rate that these products have been cited in other publications has increased substantially. In addition to peer-reviewed journal publications, the department also responds to internal DoD requests for information on emerging health issues and keeps key DoD stakeholders informed with key findings prior to publication to inform policy development processes. For example, the department is assisting DoD in assessing potential occupational exposure outcomes following Operation Tomodachi.

Millennium Cohort Study: The department is best known for its management and execution of the Millennium Cohort Study, a unique prospective longitudinal study launched in 2001 to study the effects of military service, including deployments and other occupational exposures, on long term health. Participants include Active Duty and Reserve/Guard members who agreed to participate well past their time in Service, and are re-surveyed every three years. More than 40 percent of survey participants have served in the Global War on Terror (GWOT). The study has enrolled four cohort panels totaling approximately 200,000 participants; response rates for the first panel are stable at 55 to 60 percent; however, response rates for subsequent panels are lower. Surveys are completed both through the traditional paper route, and more recently through a secure Web site.[14] The study is currently funded for 21 years; however, the Army (the study sponsor) is currently considering extending the study to 60 years.

Most recently, the oversight and advisory structure of the Millennium Cohort Study was restructured to enhance outreach to potential participants and retention of current study enrollees. The External Advisory Board (EAB) consists of experts in survey methodology and other key research areas, as well as Active Duty and retired military members with operational experience. It meets annually at NHRC, but has the ability to meet on an ad hoc basis to address issues as they arise. For example, the EAB recently met to consider potential changes to the survey questions. With added expertise in survey distribution methodology, the EAB, is also addressing the issue of lower response rates.

Additional oversight for the study is provided annually by its IRB and MOMRP (via its Task Area M Committee) and the Integrating Integrated Product Team; monthly by the Task Area M Committee, and triennially by the Office of Management and Budget (OMB) and the Report Control Symbol. Although the study's oversight has changed recently, the department head indicated that all previous reviewers have been invited to participate as a member of the EAB.

Numerous complementary data sources supplement analysis of Millennium Cohort Study data, although study investigators note that access to VA data is currently a missing link which has proven challenging to obtain.

Millennium Cohort Family Study: The Family Study recently received IRB approval as a separately funded, sub-study of the Millennium Cohort. It is the first of its kind, using a large, population-based cohort to assess the impact of military service on the health of Service members, their spouses and co-resident children. The study is designed as a cross-sectional study that is funded through Fiscal Year 2013; however, the principal investigators (PIs) hope to receive additional funding to change the study to a longitudinal study that would run for the same term as the Millennium Cohort. The Millennium Cohort will enroll approximately 62,500 new members who will be asked to grant permission for their spouses to be surveyed. The team estimates that about 10,000 spouses will be enrolled in the Family Study. No target enrollment has been set for children. Children are enrolled as part of the spousal enrollment process. In addition to the support provided by the Millennium Cohort PIs and monitoring organizations, the Family Study has additional PIs and receives guidance from Tri-Service, VA and academic partners with expertise in psychology, medicine and sociology.

Initial recruitment has been through online surveys[15] from the fourth panel of Millennium Cohort participants which has resulted in a 34 percent spousal enrollment rate. Study staff noted that enrollment will increase once they are able to begin processing paper surveys and reach out to spouses later this year. Recent changes in the methodology for reaching out to participants and potential enrollees are also expected to improve response rates (for both the Family Study and the Millennium Cohort as a whole). Staff also noted the possibility for non-response bias, which will be addressed early in the study. Although IRB approval has been obtained to begin enrollment, delays in approval for the study from OMB limit the ability to include Veterans in the study.

Recruit Assessment Program: The Recruit Assessment Program (RAP) was established as a pilot at MCRD in San Diego. Since 2001, all recruits at MCRD are given the opportunity to complete a questionnaire capturing pre-existing health data. This data is used to understand pre-existing health risks and how service-related exposures affect health, and to develop early intervention and prevention programs to protect health and readiness. Of note, such a military recruit assessment program was called for by the DHB's predecessor, the AFEB, as well as a Presidential Review Directive and the Institute of Medicine.[16, 17, 18] To date, nearly 130,000 Marines have completed the RAP survey. In combination with complementary data sources, NHRC researchers are able to draw conclusions on Marines' health and behaviors. A number of articles have been published in peer-reviewed journals utilizing this data. The success of RAP has resulted in a call by the ASD(HA) to plan DoD-wide implementation of the program, assisted by NHRC staff.

DoD Birth and Infant Health Registry: Established in 1998 by the ASD(HA) to conduct surveillance for birth defects among DoD healthcare beneficiaries, the registry comprehensively captures live births among DoD beneficiaries by utilizing diagnosis codes captured in the DoD Medical Data Repository. NHRC collaborates with a wide range of academic partners as well as

the CDC in the analysis of these data. Data from the registry have been used in a number of peer-reviewed publications by NHRC. A key finding is a comparable prevalence rate of birth defects among DoD beneficiaries with the U.S. civilian population.

HIV/AIDS Prevention Program: The DoD HIV/AIDS Prevention Program (DHAPP) was created to reduce the impact of HIV/AIDS among uniformed personnel worldwide. DHAPP receives funding from the President's Emergency Plan for AIDS Relief (PEPFAR) and DoD to serve as the EA in the development and implementation of mil-to-mil, culturally focused HIV prevention, care and treatment programs. To ensure the success of this program, a Memorandum of Agreement exists between the Department of State, Office of the Global AIDS Coordinator (OGAC) and DoD. DHAPP develops and maintains relationships with U.S. embassies abroad, nongovernmental agencies, and United Nations programs. DHAPP provides direction to assist foreign militaries in over 70 countries worldwide, in the form of technical assistance, capacity building, training and education, operational and field support, and leadership development. DHAPP publishes in peer-reviewed journals, and provides quarterly updates to Naval Medical Support Command, in addition to an annual report to the ASD(HA). The program's success is measured by a standard and comprehensive set of indicators specified by OGAC.

Operational Infectious Diseases: The Operational Infectious Diseases (OID) department serves as the U.S. Navy's premier laboratory for the diagnosis and characterization of infectious pathogens of operational concern. OID has developed a portfolio of basic and applied biomedical research projects to address infectious diseases threats that afflict military personnel. The primary focus of this work is an in-depth population-based surveillance for respiratory and enteric pathogens at eight DoD recruit training sites, on the U.S./Mexico border and on 20 large platform Navy ships. OID's laboratory is credited with identifying the first two cases of the 2009 novel influenza A (H1N1) pandemic virus. The lab has the ability to quickly identify unknown pathogens via its TIGER assay. It has a close relationship with DoD infectious disease surveillance assets as well as with civilian public health community. The OID is one of the major data contributors to the FDA and CDC for the determination of the components of the yearly influenza vaccine as well as other vaccine and therapeutics research. Funding is generally obtained on a project-by-project basis; however, funding to maintain its Biosafety Level-3 (BSL-3) laboratory for influenza and other infectious disease surveillance is obtained from AFHSC's GEIS network as part of its POM-derived funding.

Recommendations

1. Strategy

NHRC has been extremely successful in ensuring its activities are in accordance with its mission and vision. Upon its designation as the DoD DHRC, NHRC added a deployment health research department, and ensured that the experience and expertise of its staff matched the requirements outlined in the concept of operations provided by the ASD(HA). This strategy is central to the Center's success, and the DHB affirms this as a continued strategy. The budget appears to be managed very well, with the Scientific Support Office playing a critical role in securing ongoing funding for its activities. As funding becomes more limited, DHB recommends that DoD

recognize the importance of the research activities at NHRC, and continue to provide funding for its activities to the greatest extent possible. Furthermore, sustainment of AFHSC GEIS funding to maintain NHRC's BSL-3 lab as well as funding for the Millennium Cohort Study should be considered imperative. Additionally, NHRC appears to be functioning optimally within its current organizational structure. DHB recommends that as much stability as possible be maintained for NHRC through any potential reorganization by BUMED.

2. Processes

The NHRC has developed many impressive partnerships and collaborations with academia, industry, and operational partners. The Center has successfully leveraged these partnerships to maximize available resources to achieve its mission. Improved visibility on the internet by redesigning NHRC's Web site may help solicit additional interest from potential research partners and sponsors. The DHB notes that although some departments conduct substantial Tri-Service research, and that all departments are strongly embedded in Navy and Marine Corps operations, communications may be able to be expanded with the Army and Air Force in some departments. Where NHRC has been successful in implementing pilot studies and outreach activities in the Navy and Marine Corps, efforts should be made to expand these activities to other Services, as is presently being done with the RAP, for example.

3. People and Culture

The staff members at NHRC are one of the Center's strongest assets. Of note, the experience and credentials of research staff are broad and span many areas, ensuring that the research capabilities of NHRC encompass all fields outlined in the establishing conceptual framework put forth by the ASD(HA) in 1999. The DHB commends NHRC for its efforts to achieve this diverse and experienced staff composition.

4. Structure and Programs

Organizational Structure: To the extent possible, BUMED should limit the reorganization of NHRC within the Navy, as this may reduce stability and hamper critical research efforts. NHRC's internal organizational structure is effective in facilitating high quality research activities and products and should therefore be maintained. NHRC leadership, to include department leaders, possess significant operational and research experience and are highly competent leaders. The DHB affirms the effectiveness of NHRC's current organizational structure and recommends that it be maintained.

Medical Modeling and Simulation: The DHB commends NHRC for its medical modeling and simulation research and tools, and recognizes the importance of maintaining funding for this department, even during the drawdown of troops. The tools developed by this department have utility both in and out of wartime and will be especially helpful in the care and rehabilitation of Wounded Warriors from the current conflict.

Warfighter Performance: The novel technological assets of the Warfighter Performance department at NHRC such as the CAREN virtual reality system should be protected. Furthermore, DHB applauds NHRC for its cutting edge research in this area. The research being conducted by this department is essential to the health and operational capacity of the U.S. Armed Forces and should be used to inform practices and policies across all the Services. The potential for significant cost savings to DoD as a result of NHRC's warfighter performance research should not go unrecognized. The DHB is especially intrigued by the department's heat stress study and looks forward to receiving an update on whether this study achieves statistical significance, which would mean that the Services could substantially change policies related to Service following a diagnosis of heat stroke.

Behavioral Sciences and Epidemiology: The DHB is impressed by the quality of educational psychological health and health promotion products developed by NHRC's behavioral health experts. Furthermore, the studies being conducted by the Center are especially important given the number of Service members and Veterans who have served in GWOT and are experiencing combat stress, PTSD and other psychological health issues. Although the DHB recognizes that a true estimate of the use and impact of NHRC's educational and health promotion products may not be determinable, DHB recommends that the proposal recently submitted by this department to assess the use and impact of these tools be accepted, as even a rough estimate will help to inform further distribution of these products and future development of similar tools.

The Behavioral Sciences and Epidemiology department's epidemiological database, CHAMPS, contains much of the same data that is compiled into AFHSC's DMSS database. Although CHAMPS appears to contain more focused data and is instantly available to NHRC staff for analysis, the DHB questions whether it is necessary for NHRC to maintain a separate database. In its founding concept of operations, the ASD(HA) indicated that NHRC will have access to DMSS data; however, this document preceded the establishment of AFHSC.[1] Upon AFHSC's founding, it was designated to serve as the single source of medical surveillance data for DoD.[5] Therefore, DHB recommends that AFHSC and NHRC discuss whether there is a more efficient way for AFHSC to maintain and supply NHRC research staff with unrestricted access to required data. Lastly, NHRC staff indicated that the capability to add TRICARE pharmaceutical utilization data to CHAMPS is currently being considered; however, a potential change to the TRICARE data use agreement policy would make this information difficult to obtain. The DHB recommends that this pharmaceutical utilization be a required data feed to CHAMPS, or be provided to NHRC via an AFHSC data feed when pharmaceutical data is added to DMSS.

Deployment Health Research: The DHB commends NHRC for establishing this department upon its designation as the DoD DHRC. The research conducted by this department fills a critical gap in DoD public health research.

Millennium Cohort Study: There is no comparable prospective long-term Tri-Service study of the effects of deployments and other occupational exposures on health anywhere else in DoD. The Millennium Cohort Study should be guarded as a critical DoD asset. Recent changes in the Deployment Health department leadership have resulted in changes to the structure of the study oversight. The DHB notes that these changes appear to add advisory expertise in areas where the

study clearly needs improvement (i.e. effective survey distribution methods). The DHB recommends approval for the funding request that the study be extended for a total of 60 years. Additionally, the study staff are currently collaborating with VA to obtain access to data from a VA study similar to the Millennium Cohort Study; if the VA grants approval, three VA Service Officers will be temporarily stationed at NHRC to facilitate the sharing of data. The DHB iterates the importance of information sharing between DoD and VA to improve the health of Service members and Veterans, and recommends that the ASD(HA) encourage VA to share this information with NHRC. Study staff indicated that delays in receiving approval to move forward on study phases by OMB have resulted in delays in NHRC's ability to enroll Veterans. The DHB recommends that DoD work with OMB to streamline these processes.

Millennium Cohort Family Study: The Millennium Cohort Family Study aims to address a critical gap in the Millennium Cohort Study by assessing the health of military family members. DHB recommends that funding be secured to make the Family Study a longitudinal study, to run for the same term as the Millennium Cohort. The DHB is concerned that the study PIs have not set a target enrollment for children, and that children are only enrolled as part of the spousal enrollment process. The DHB recommends that this process be reassessed to determine whether there is a better strategy for the comprehensive inclusion of children in the study and generation of a larger enrollment population to strengthen the generalizability of subsequent data.

Recruit Assessment Program: The DHB applauds the efforts of NHRC to implement RAP, as previously recommended by the AFEB, and affirms the importance of implementing a similar collection of baseline health data across the Services. The DHB recommends that long-term funding be secured for these programs in each of the Services, and that these programs be implemented expeditiously.

DoD Birth and Infant Health Registry: The DHB commends NHRC for maintaining this comprehensive long term database. In addition to its role in the ongoing assessment of birth defects and infant health among DoD beneficiaries, the Birth and Infant Health Registry is an important source of information for ad hoc operational health assessments. It plays an important role in the current assessment of any health effects among children born to DoD beneficiaries in Japan during OPERATION TOMODACHI.

HIV/AIDS Programs: Although DHAPP may not have a strategic fit as a department of NHRC, the NHRC staff operating this program have developed specialized expertise to run the program and maintain partnerships with embassies, COCOMS, and other high-level DoD and Department of State representatives. As a result of this specialized expertise, NHRC leaders feel that DHAPP is well positioned at NHRC. DHB commends DHAPP for its success in managing this important program, and recommends that it be maintained due to its operational relevance to DoD. The DHB recommends that should the program be realigned within DoD, its leadership accompany this transition to the extent possible.

Operational Infectious Diseases: The DHB commends the OID department for its work in identifying the first two cases of the 2009 novel influenza A (H1N1) pandemic virus, and for its ongoing efforts to conduct surveillance on Navy Fleets and along the U.S./Mexico border, as

well as conducting training for surveillance partners. The high technology assets and capabilities of the Infectious Diseases laboratories at NHRC enable both ongoing infectious disease surveillance and rapid response. The DHB recognizes the central role of this lab in the prevention and control of pandemic outbreaks.

DHB Reviews: Recommendations for the Way Ahead

The Board recommends that the Healthcare Delivery Subcommittee revisit the NHRC and AFHSC again in two years, and the DHCC in one year. Following, the DHB would report findings and provide recommendations to the ASD(HA).

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