DEFENSE HEALTH BOARD
OPEN MEETING MINUTES

March 5, 2024
8111 Gatehouse Rd, Falls Church, Virginia 22042

1. **Attendees – Appendix One**

2. **March 5, 2024 – Opening Remarks**

CAPT Clausen welcomed the Defense Health Board (DHB) Members, Distinguished Visitors (DVs), and public attendees to the meeting and called the meeting to order. Dr. Guice welcomed the Members. The Members and DVs introduced themselves. CAPT Clausen provided administrative remarks.

3. **Decision Brief: Prolonged Theater Care**

Dr. Armstrong presented the decision brief for the first of two *Prolonged Theater Care* (PTC) reports. The Trauma and Injury (T&I) Subcommittee (SC) will present its second *PTC* report to the DHB in September. Please see read-ahead slide deck (Appendix 3) for more information. Dr. Armstrong reviewed report findings and recommendations. The Members deliberated and approved the findings and recommendations, with edits. Discussion points of note:

- Finding and Recommendation 1:
  - RADM (Ret.) Chinn expressed support for creating a registry for military-civilian and Department of Veterans Affairs trauma training partnerships (MCP). He asked for additional details on partnerships, such as who is trained and the training location. Dr. Armstrong stated existing registries are incomplete, citing training volume, program instruction, and other key variables are poorly recorded.
  - Dr. Berwick stated the report's findings convey a sense of "non-compliance" with training guidelines. He cited reference to "type unknown" in Table 3 of the report and asked how DoD can consider this categorization sufficient.
    - Dr. Armstrong explained this observation matches Finding 1, which highlights the insufficiency of the existing registry, and Recommendation 1 to ensure the registry is consistent with guidelines outlined in the National Defense Authorization Act (NDAA) for Fiscal Year (FY) 2017.
    - LTG Crosland addressed Dr. Berwick's "noncompliance" concern. She suggested reframing the topic as "what are we missing?" She emphasized that the Services are "federated," and PTC is in the context of their Service-specific needs rather than in whole-of-military terms. She stated the Services have a better understanding of their specific MCP outcomes than the Defense Health Agency (DHA).
    - Dr. Guice noted the 2017 NDAA changed some Service and DHA responsibilities, and that DoD is presently adjusting to these changes. LTG Crosland stated the 2017 NDAA added responsibilities to DHA but not to the

Services. She stated the Services' perspective has consequently, "not changed much." She noted the Services – not DHA – continue to provide trained and ready forces.

- Dr. Berwick further stated concerns regarding registries' vulnerability to cyberattacks and raised concerns as to unspecified "infrastructure" factors that may contribute to compliance with training standards. Dr. Armstrong stated the second report would address cyber vulnerability concerns.
- LTG Crosland asked if the T&I SC spoke to the Service Surgeons General. Dr. Armstrong stated the SC spoke to the Joint Staff Surgeon and to Joint Trauma System (JTS) representatives. He stated additional conversations are planned to support the second report. LTG Crosland urged the SC to hear the Service Surgeon General's perspectives on training requirements.
- Gen (Ret.) Chilton asked what the phrase "existing registry" refers to. Dr. Armstrong explained the JTS maintains a registry of MCPs, and that the SC reviewed and attempted to evaluate these data but found that it was inadequate. Gen (Ret.) Chilton asked who is responsible for the JTS registry. Dr. Armstrong stated the responsibility belongs to the DHA. He further noted challenges of data comparability and missing data. He stated poor data collection contributes to poor understanding of the PTC skill deficits.
- Dr. Alleyne asked whether Dr. Armstrong would characterize the report's findings and recommendations as "non-linear." Dr. Armstrong described the report's findings and recommendations as "nested." Dr. Alleyne asked if the T&I SC has an example of an optimal system it can use as a "guidepost." Dr. Armstrong stated the second report will include such examples, as well as list best practices and an overall needs assessment.
- Dr. Jacobs discussed the importance of the tasking, noting the need to plan and train for mass casualties in a near-peer conflict scenario. He reiterated the importance of practitioners training in advance of using their skills in such a scenario. LTG Crosland stated these concerns are shared by the Service Chiefs and that the DHB is not in isolation in addressing these issues.
- Dr. Valadka asked if the Services are tracking MCP data. CMSgt Johnson stated the Services track MCP data. Dr. Guice noted the T&I SC had uncovered instances of poor tracking by the Services. LTG Crosland stated the Services use different terms to measure knowledge, skills, and abilities (KSAs), but that these data should be comparable.
- Dr. Browne asked if the DHB should specify what information comprises a useful registry. Dr. Armstrong stated the DHA knows what a good registry looks like and the JTS has a good framework but the Service data inputs are lacking.
- Dr. Armstrong suggested language changes to Finding 1. Dr. Browne suggested language changes to Recommendation 1. The Members discussed the language recommendations, including language directing the recommendation to the ASD(HA) and language specifying reporting timelines.
- The Members unanimously voted to approve Finding 1 and Recommendation 1.

- Finding and Recommendation 2:
  - Dr. Parkinson asked whether the term "may" suggests the SC does not find its recommendation to be adequate. Dr. Armstrong stated the term "may" was carefully

chosen in response to "sensitivities around this issue." He stated the SC is being careful because it does not currently have full access to the relevant data. BG Collard stated this language is imprecise. He suggested omitting it if the SC lacks the data it needs to support a more definitive finding. Dr. Armstrong clarified that the SC has adequate data to establish the existence of the referenced problem but not to measure it because these data are classified.
    - Dr. Guice suggested adding the term "active duty" to Finding 2.
    - Dr. Jacobs again emphasized the urgency of the report.
    - RADM (Ret.) Chinn asked whether the report would address the possible insufficiency of the all-volunteer force in a near-peer conflict scenario. Dr. Armstrong stated it would not.
    - Dr. Guice suggested replacing "demands" with "requirements." Dr. Parkinson agreed with this suggestion. Dr. Guice suggested adding the term "evolving" to "requirements." Dr. Berwick suggested the terms "future" or "projected" rather than "evolving."
    - The Members unanimously voted to approve Finding 2 and Recommendation 2.
- Finding and Recommendation 3:
    - Dr. Guice stated enlisted personnel skills development in private-sector medicine is limited by scope of practice laws. She asked what the scope of practice barriers are for MCPs. There are MCPs that allow enlisted Service members (SM) to practice; however, these data are typically not recorded in the same way as for clinical staff. Level 1 and Level 2 trauma centers are certified by the American College of Surgeons, and this certification standard defines scopes of practice, given that it impacts trauma centers' financial viability.
    - Dr. Berwick stated Findings and Recommendations 3-6 implicate the Combatant Commanders (CCDRs). LTG Crosland stated the CCDRs do not determine readiness; rather, they "send the demand signal" – e.g., the need for additional trauma care capability. She stated the Joint Staff Surgeon then goes to the Services to provide the needed resources.
    - Dr. Parkinson asked if Recommendation 3 should be directed to DHA. Dr. Armstrong stated the T&I SC thought the recommendation needed to be directed to a higher level, given that it called for additional resources. Dr. Guice suggested directing the recommendation to the Office of Personnel and Readiness (P&R).
    - The Members unanimously voted to approve Finding 3 and Recommendation 3.
- Finding and Recommendation 4:
    - Dr. Parkinson asked if the Services' individual training requirements are inadequate or if the challenge is merely a "translation" challenge owing to the lack of a common lexicon. Dr. Armstrong stated there is a gap in the Services' capacities that a standardized program of instruction could help to resolve.
    - Dr. Jacobs stated the scale of combat operations in WWII necessitated standardization. Dr. Guice suggested adding a reference to "just in time training" to Recommendation 4.
    - CMSgt Wigington stated the Services have their own internal standardized processes. BG Collard added the Joint Staff Surgeon does not typically dictate standardized curricula. He further noted that directing this recommendation to the USD(P&R) is

unusual. Dr. Guice clarified that the DHB makes recommendations to which the Department can concur or non-concur.
    - The Members unanimously voted to approve Finding 4 and Recommendation 4.
- Finding and Recommendation 5:
    - LTG Crosland stated the Services, rather than the DHA, "owns" MCPs. The members discussed language additions. Dr. Guice asked if Recommendation 5 is consistent with current legal requirements. LTG Crosland stated she would need to investigate this. CAPT Clausen read from the applicable section of the 2017 NDAA. Dr. Guice stated Recommendation 5 must also be consistent with DoD Instruction. Dr. Armstrong stated the SC believes this issue requires a "higher look."
    - Dr. Bishop asked if the DHA is now responsible for defining readiness gaps. Dr. Armstrong stated DoD is a "complex ecosystem" and that DHA shares this obligation with the Services. He stated the 2017 NDAA contained a requirement to investigate readiness gaps. He stated the SC feels the issue needs to be elevated to the "DHA level" for it to be adequately addressed.
    - The Members unanimously voted to approve Finding 5 and Recommendation 5.
- Finding and Recommendation 6:
    - Dr. Guice asked where KSA efforts are housed. Ms. Mullen stated Health Affairs has regular meetings where KSAs are defined, and that these definitions are included in quarterly reports to the Deputy Secretary of Defense. LTG Crosland and Ms. Mullen stated Finding 6 is accurate.
    - The members discussed "joint" versus individual Service tracking of KSAs. Dr. Berwick asked how feedback loops would be addressed. Dr. Armstrong stated this topic would be addressed in the second report. CMSgt Johnson stated the secondary goal of Recommendation 6 is to build confidence. LTG Crosland suggested removing the word "joint." Gen (Ret.) Chilton suggested replacing "joint" with "single."
    - The Members unanimously voted to approve Finding 6 and Recommendation 6.

4. Tasker Update: Effective Public Health Communications Strategies with Department of Defense Personnel

Dr. Bishop updated the DHB on the Public Health (PH) SC's report, *Effective Public Health Communications Strategies with Department of Defense Personnel*. She discussed emerging report findings and areas for further investigation. Please see attached slides (Appendix 4) for more information. Discussion points of note:

- Dr. Parkinson asked where the "social media effect" on declining trust in institutions appears in the chart from Gallup. He additionally asked whether standard operating procedures have been developed for communicating health information.
    - Dr. Bishop stated the PH SC has reviewed health communications best practices but has not compiled them into a rubric. Dr. Alleyne stated such rubrics exist already, including guidelines for digesting social media content.
    - Dr. Alleyne suggested the DoD partner with civilian organizations to advance health messages. Dr. Alleyne and Dr. Medows discussed military "influencers" on TikTok.

- Dr. Caban Alizondo stated promoting health literacy can help to improve trust in health experts. She stated health care providers can help build trust in health experts by sharing information with patients and their families. Dr. Bishop agreed and emphasized the importance of supporting a culture of public health in DoD.
- Dr. Berwick asked whether Emerging Finding 2 would address tempo. He suggested the DHB could help to lay a foundation for future emergency communications. Dr. Maybank echoed this point. Dr. Bishop stated language referencing a "warm body of activity" speaks to preempting future crisis health communication challenges.
- Dr. Medows stated the report should also emphasize combatting misinformation. She suggested utilizing professionals who specialize in reputation and crisis management to promote trust in expertise within DoD. She stated rapidly responding to misinformation can help to preserve trust and that misperceptions are more difficult to correct once they have taken root. Dr. Bishop stated DoD health information posters could address misinformation.
- Gen (Ret.) Chilton asked whether SM trust in their superiors has declined. He stated, "you cannot surge trust" in response to crises. Dr. Parkinson agreed. Gen (Ret.) Chilton suggested reviewing the histories of anthrax and smallpox vaccinations. Dr. Alleyne agreed, stating these comparisons illustrate how trust in health experts has changed.
- The Members discussed their support for identifying trusted messengers and asked whether such messengers would include the Service Surgeons General. The Members discussed how health messages can be better aligned. Dr. Alleyne stated "technical exchange meetings" are useful in this regard.

5. Perspectives on Artificial Intelligence and the Opportunities and Risks in Health Care.

- Dr. David Barnes presented "Some AI Considerations" (Appendix 5). His presentation emphasized the limitations and risks associated with utilizing artificial intelligence (AI) programs, the unique capabilities AI offers, and concerns related to privacy and the "human element."
- Dr. Kenneth Goodman presented on "Ethics, Medicine, and Artificial Intelligence" (Appendix 6). His presentation emphasized AI concerns related to bias, safety, transparency, explainability, accountability, responsibility, and governance.
- Dr. Seth Schobel presented on the "Integration of Artificial Intelligence and Machine Learning into Clinical Workflows" (Appendix 7). His presentation discussed recent medical applications of AI programs involving electronic health records, surgical critical care, and predicting sepsis.

6. Panel Discussion on Artificial Intelligence

The Members discussed the implications of AI developments for MHS healthcare with Drs. Barnes, Goodman, and Schobel. Discussion points of interest:

- Dr. Valadka asked where the United States stands in relation to adversaries in terms of AI development and whether the U.S. and its allies are disadvantaged by their commitments to international law.

- Dr. Barnes stated the United Sates possesses some key AI advantages over its adversaries. He noted these adversaries also possess some advantages. For example, the fusion of China's business and government sectors allows for fewer opportunities for civilian AI developers to avoid supporting the Chinese military.
- Dr. Barnes further noted concerns related to Chinese companies stealing U.S. intellectual property, and that China possesses some data advantages due to its widespread surveillance of its people. He noted that China may be closing its research and development gap with the U.S. He clarified that the U.S. nonetheless has the advantage in AI development.
- Dr. Barnes cautioned against focusing on ethics to the point of becoming overly risk adverse. As an example, the Russian state is willing to incur greater personnel losses to secure its interests whereas the U.S. is constrained, both by its values and by the need to reintegrate SMs into society.
- Dr. Goodman stated open societies tend to be more innovative and that, in this respect, American values and institutions provide structural advantages for AI development.

- Dr. Alleyne asked for the panelists' thoughts on the Coalition for Health AI (CHAI). The panelists agreed that it is good to collaborate and learn best practices from other organizations, so groups like CHAI are useful.
  - Dr. Schobel discussed research involving "digital twins." He stated AI is only as good as its data inputs.
  - Dr. Goodman noted the military has historically performed better than other institutions where bias is concerned. Dr. Goodman stated AI program explainability is inherently challenging AI programs, given the complexity of the computations involved.
- Dr. Lazarus asked whether the U.S. would be obligated to share AI-enabled medical advances with its adversaries. Dr. Schobel suggested the U.S. would likely share such advances with its allies. Dr. Goodman stated he is unaware as to what the U.S. is currently sharing with its adversaries, but that published research is publicly available. Dr. Barnes asked whether the U.S. would utilize AI-enhanced medicine to treat enemy prisoners of war.
- Dr. Jacobs asked whether AI could assist medics and corpsmen rendering medical care. Dr. Barnes responded AI could help identify medical personnel and injured SMs on the battlefield. Dr. Goodman stated this question speaks to behavioral informatics in AI.
- Dr. Berwick asked the panel their thoughts on workforce dislocations due to AI.
  - Dr. Barnes noted an example of a company that used AI to replace 700 employees. He noted call centers are likewise replacing employees.
  - Dr. Goodman discussed how technology has contributed to job loss since the Industrial Revolution.
  - Dr. Schobel stated in the next 5-8 years most AI-related efforts will focus on incorporating AI programs into existing workforces to ease workloads. "Narrowly focused" AI could be used to replace existing positions, but AI programs are likely to augment the existing health workforce.

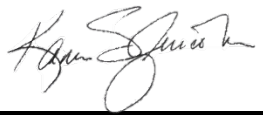
    - Dr. Barnes stated organizations should reexamine evaluating workforce productivity.
- Dr. Maybank expressed concerns related to AI's impact on racial equity. She stated the impact of decisions to exclude melanated populations reflect bias more than blind intention. Dr. Schobel listed AI equity initiatives at the Uniformed Services University of the Health Sciences and the U.S. Government that are working to decrease bias.
- Dr. McCaw asked whether AI could contribute to human skills degradation.
    - Dr. Barnes said it could and this risk is compounded by the technology's limits (i.e., the human skill loss may not be adequately replaced by AI). Dr. Goodman concurred this is a longstanding issue with technological development.
    - Dr. Schobel gave an example of an AI tool that contributed to improved skills among clinicians by encouraging them to focus on AI-identified metrics.
    - RADM (Ret.) Chinn provided an example of skill loss due to a non-AI technological development.
    - Dr. Barnes stated the question is often whether it is necessary for a human to possess a given skill. Dr. Schobel stated that AI use in radiology helps to sort images and reserves more difficult scans for the technician. Dr. Goodman stated existing specialties evolved independently rather than through careful, directed studies based on need. Dr. Browne noted an example of a doctor who "earned his pay everyday" by knowing when not to order (costly) tests.
- Dr. Alleyne raised the concern that malicious actors could "poison" AI systems to compromise readiness. Dr. Goodman noted hospitals face regular "bots" attacks.
- Dr. Jacobs stated AI is improving but that research shows patients relate better to providers who do not use tablets or computers during patient interactions. Dr. Goodman stated new technologies sometimes become ubiquitous not because the technology improves services in relation to the best human provider but because it improves services by the *median* provider. Dr. Schobel stated this is an area where AI can deliver "quick wins." He noted "passive AI" can take notes to free doctors to communicate better with patients. Dr. Goodman and Dr. Barnes discussed privacy implications of passive AI.
- Dr. Parkinson requested the panelists' thoughts on electronic medical records (EMRs). He stated EMRs did not improve private medicine but that AI could "unwind" poor quality EMRs. Dr. Goodman stated nomograms need to be able to read health providers' writing.
- Dr. Maybank stated the American Medical Association refers to AI as "augmented intelligence." She asked if this definition is better. Dr. Barnes stated "augmented intelligence" does not best describe the attributes of AI programs. Dr. Schobel noted the importance of the "marketplace of ideas" to free societies and raised concerns that AI could intervene in this marketplace at the behest of private interests.

7. Closing Remarks

CAPT Clausen and Dr. Guice thanked everyone for their attendance. CAPT Clausen adjourned the meeting.

8. Certification of Minutes

I hereby certify that, to the best of my knowledge, the foregoing meeting minutes are accurate and complete.



April 5, 2024

Karen Guice, MD, MPP
President, Defense Health Board

Date

APPENDIX ONE: MEETING ATTENDEES

BOARD MEMBERS			
TITLE	**FIRST NAME**	**LAST NAME**	**ORGANIZATION**
Dr.	Karen	Guice	*DHB President* Executive Director and Chief Medical Officer, Ernst & Young, Government and Public Sector Advisory Services
Dr.	Lenworth	Jacobs	*DHB First Vice President* Director, Trauma Institute, Hartford Hospital
Dr.	Jeremy	Lazarus	*DHB Second Vice President* Clinical Professor of Psychiatry, University of Colorado, Denver
Dr.	E. Oscar	Alleyne	Managing Director, Public Health Division, MITRE Corporation
Dr.	John	Armstrong	Professor of Surgery, University of South Florida
Dr.	Wilsie	Bishop	Vice Present of Health Affairs and Professor Emerita, East Tennessee State University
Dr.	Michael-Anne	Browne	Associate Chief Medical Officer, Stanford Children's Health
Dr.	Maria	Caban Alizondo	Director, Health Information Management Services, UCLA Health System
RADM (Ret.)	Colin	Chinn	Chief Medical Officer, Peraton
HON	Jackie	Clegg Dodd	Founder and Managing Partner, Clegg International Consultants, LLC
Dr.	Christi	Luby	Independent Consultant and Researcher
Dr.	Aletha	Maybank	Chief Health Equity Officer and Group Vice President, American Medical Association
Dr.	Brigid	McCaw	Senior Clinical Advisor, California Quality Improvement Learning Collaborative, University of California, San Francisco
Dr.	Rhonda	Medows	Chief Population Health Officer, Providence St. Joseph Health
Dr.	Michael	Parkinson	Principal, P3 Health, LLC
Dr.	Alex	Valadka	Professor and Director of Neurotrauma, University of Texas Southwestern Medical Center
DHB STAFF			
CAPT	Shawn	Clausen	Executive Director/Designated Federal Officer (DFO)
Ms.	Camille	Gaviola	Deputy Director/Alternate DFO
Dr.	Catherine	Zebrowski	Executive Secretary/Clinical Consultant/Alternate DFO
Ms.	Angela	Bee	Research Analyst, MicroHealth, LLC
Mr.	Tanner	Dean	Management Analyst (Office Support), BookZurman, Inc.
Mr.	Rubens	Lacerda	Management Analyst (Meeting Support), BookZurman, Inc.
Dr.	Keila	Miles	Associate Research Analyst, MicroHealth, LLC
Mr.	Paul	Schaettle	Alternate Project Manager/Senior Analyst, MicroHealth, LLC
Dr.	Chris	Schorr	Research Analyst, MicroHealth, LLC
Dr.	Clarice	Waters	Project Manager/Senior Analyst, MicroHealth, LLC
PUBLIC ATTENDEES			
LCDR	Ben	Archer	Director for Clinical Programs, Headquarters Marine Corps, Health Services
Dr.	Georges	Benjamin	Executive Director, American Public Health Association, DHB Public Health Subcommittee Member
Ms.	Shannon	Bocquet	Analyst, Systems Planning & Analysis, Support to Navy S&T Board
Mr.	Mario	Cabiao	Retired Air Force personnel
BG	Thad	Collard	Deputy Commanding General of Operations, Army Medical Command, Office of the Surgeon General

Mr.	Lowell	Collins	Program Manager, Diversity/Equity/Inclusion/Accessibility & Resiliency Programs, Force Resilience Office
LTG	Telita	Crosland	Director, DHA
Ms.	Meredith	Davis	Policy Account Partner, BetterUp for Government
Ms.	Monica	Dus	White House Fellow, Special Assistant to the Secretary, Office of the Secretary of the Navy
Dr.	Marion	Ehrich	Professor, Department of Biomedical Sciences and Pathobiology, Virginia-Maryland College of Veterinary Medicine; DHB Public Health Subcommittee Member
CPT(P)	Samuel	Emmerich	Epidemic Intelligence Service Officer, National Center for Health Statistics, CDC
Dr.	Ruth	Etzel	Senior Advisor, Office of Water, Environmental Protection Agency
Col	Maureen	Farrell	Chief, Public Health Branch, Air Force Medical Agency
Dr.	Tanisha	Hammill	Chief Scientist, Office of the Air Force Surgeon General
Dr.	Odette	Harris	Associate Professor of Neurosurgery & Director of Brain Injury, Stanford University School of Medicine
RADM	Denise	Hinton	Deputy Surgeon General, Department of Health and Human Services
CMSgt	Tanya	Johnson	Senior Enlisted Advisor, DHA
Ms.	Kate	Kaye	Deputy Director, World Privacy Forum
Lt Col	Samantha	Kelpis	MEDIC X Team Lead, AF Element Medical DoD
Ms.	Ellen	Milhiser	Editor, Synopsis
Mr.	Ed	Monachino	Senior Business Development Specialist, RTI International
Ms. (SES)	Seileen	Mullen	Principal Deputy Assistant Secretary of Defense for Health Affairs
Mr.	Tony	Peasant	President, Acquisition Consulting Professionals, LLC
Ms.	Melinda	Plaugher	Chief Growth Officer, ERP International
Mr.	Patrick	Ross	Associate Director, Federal Relations, The Joint Commission
Lt Col	David	Sayer	Chief USAF Deployment Health Programs, AFMRA
COL	Cleve	Sylvester	Senior Physician Assistant, FORSCOM
Dr	Gary	Timmerman	Professor and Chair, Department of Surgery, University of South Dakota Sanford School of Medicine
CMSgt	Thomas	Wigington	Senior Enlisted Advisor to the Joint Staff Surgeon, Office of the Joint Staff

APPENDIX TWO: MEETING CHAT

09:37:04 From Ellen Milhiser to Everyone:
This is a small change, but it is the Department of Veterans Affairs, not the Veterans Administration.
09:52:07 From Defense Health Board to Everyone:
Thank you and noted. We will bring it up as the Members go through the language of each Finding/Recommendation.
09:53:09 From CMSgt Thomas Wigington (OJSS) to Everyone:
OJSS Concurs with LTG Crosland.
10:55:52 From CMSgt Thomas Wigington (OJSS) to Everyone:
OJSS Concurs
10:57:43 From CMSgt Thomas Wigington (OJSS) to Everyone:
That is correct.
13:56:02 From Kenneth Goodman to Everyone:
https://www.healthit.gov/topic/laws-regulation-and-policy/health-data-technology-and-interoperability-certification-program

PRE-DECISIONAL DRAFT

Decision Brief: Prolonged Theater Care

John Armstrong, MD
Chair, Trauma & Injury Subcommittee
March 5, 2024

PRE DECISIONAL DRAFT

PRE DECISIONAL DRAFT

Overview / Agenda

- Membership
- Tasking
- Summary of Subcommittee Activities to Date
- Findings & Recommendations

PRE DECISIONAL DRAFT

Membership


Julie Freischlag, MD


Odette Harris, MD, MPH


Lenworth Jacobs, Jr, MD, MPH*

CHAIR
John Armstrong, MD*


Carla Pugh, MD, PHD


Gary Timmerman, MD

*Board Member

PRE-DECISIONAL DRAFT

PRE DECISIONAL DRAFT

Previous T&I Subcommittee Reports

Title	Year
Low-Volume High-Risk Surgical Procedures: Surgical Volume & Its Relationship to Patient Safety & Quality of Care (Parts 1 & 2)	2018 & 2019
Combat Trauma Lessons Learned from Military Operations of 2001 through 2013	2015
Battlefield Medical Research Development Training & Evaluation Priorities	2012
Management of Traumatic Brain Injury in Tactical Combat Casualty Care	2012
Needle Decompression of Tension Pneumothorax Tactical Combat Casualty Care Guideline Recommendations (update to 2011 report)	2012
Supraglottic Airway Use in Tactical Evacuation Care	2012
Prehospital Use of Ketamine in Battlefield Analgesia	2012
Needle Decompression of Tension Pneumothorax & Cardiopulmonary Resuscitation TCCC	2011

PRE-DECISIONAL DRAFT

PRE DECISIONAL DRAFT

Previous T&I Subcommittee Reports

Title	Year
Combat Ready Clamp Addition to the Tactical Combat Casualty Care Guidelines	2011
Addition of Tranexamic Acid to the Tactical Combat Casualty Care Guidelines	2011
Use of Dried Plasma in Prehospital Battlefield Resuscitation	2011
Tactical Evacuation Care Improvements within the Department of Defense	2011
Tactical Combat Casualty Care Training for Deploying Personnel	2011
Battlefield Trauma Care Research Development Test & Evaluation Priorities	2011
Tactical Combat Casualty Care Guidelines on the Prevention of Hypothermia	2010
Tactical Combat Casualty Care Guidelines on Fluid Resuscitation	2010
Tactical Combat Casualty Care Burn Management Guidelines	2010

PRE-DECISIONAL DRAFT

PRE DECISIONAL DRAFT

Tasking

On September 28, 2023, the Assistant Secretary of Defense for Health Affairs directed the Defense Health Board (DHB) to **recommend guidance on better integrating military-civilian training partnerships to improve prolonged field/in-theater care.**

PRE-DECISIONAL DRAFT

PRE DECISIONAL DRAFT

Prolonged Theater Care

- Principal Deputy Assistant Secretary of Defense for Health Affairs approved changing the name of the tasking from *Prolonged Field Care* to *Prolonged Theater Care* to better describe the spectrum of medical care provided in-theater
- Due to the urgency of the topic, findings & recommendations from Part 1 of the report would be deliberated in March 2024, followed by deliberation of Part 2 findings & recommendations in September 2024

PRE DECISIONAL DRAFT

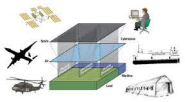
TOR Objectives & Scope

- ***Review the curriculum & experience*** of current military-civilian trauma training partnerships.
- ***Provide recommendations to best prepare DoD personnel*** at military-civilian trauma training partner sites for prolonged field care in near-peer conflicts. Comment on the curriculum, locations, frequency of training, occupational specialties of participating DoD personnel, & best use of selection & performance criteria outlined in the Blue Book.
- Provide recommendations ***to better integrate military-civilian partnerships*** with attention to Direct Care MTF staffing & Regional Medical Operations Centers.

PRE DECISIONAL DRAFT

Problem Statement: The Future of Warfare

- Large-Scale Combat Operations
  - Multiple domains
  - High rate of casualties
  - Contested freedom of movement
  - Constrained medical logistics
  - Change in injuries



PRE DECISIONAL DRAFT

Problem Statement: The Future of Warfare

- Peer/Near-Peer Conflict
  - Changing warfighter demographics
  - Delayed, complex, lengthy evacuations
  - Stress on continental US (CONUS) healthcare systems

PRE DECISIONAL DRAFT

Background: Definitions

- Prolonged Field Care (PFC)
  - Point of injury care in resource limited, austere environments
  - Evolved from medical observations by Special Forces & Marine Corps
- Prolonged Casualty Care (PCC)
  - Care delivered by medics & corpsmen (conventional forces)
  - Provision of Tactical Combat Casualty Care beyond the "Golden Hour"
- Tactical Combat Casualty Care (TCCC): operational trauma guidelines

PRE DECISIONAL DRAFT

Background: Definitions

- Prolonged Theater Care (PTC)
  - Full spectrum & continuum of medical care provided by military medical & non-medical personnel from point of injury to definitive care, including PFC, PCC, prolonged hospital care in the combat zone, & prolonged definitive care in OCONUS MTFs

PRE DECISIONAL DRAFT

Timeline Comparison

Legacy Planning

Future Planning

PFC → PCC

TCCC

PRE-DECISIONAL DRAFT 13

PRE DECISIONAL DRAFT

Military Civilian Training Partnerships (MCPs)

- MCPs intended to provide pre-deployment training
- MCPs aid in the sustainment of critical wartime skills to prevent the "peacetime effect" or "Walker Dip"
- GAO identified MCPs as an important adjunct to training enlisted medical personnel, who comprise 66% of the total medical force
- MCPs distinct from training agreements with civilian hospitals for initial clinical skills acquisition

PRE-DECISIONAL DRAFT 14

PRE DECISIONAL DRAFT

Summary of Activities to Date

Date	Meeting	Discussion Topics
Oct 11, 2023	T&I Meeting	TOR Overview, Objectives, Guiding Principles, Report Timeline
Oct 25, 2023	T&I Meeting	Brief on Integrated CONUS Medical Operation Plan Report Development: Report Outline, Subject Matter Experts
Nov 1, 2023	T&I Meeting	Brief on Strategic Priorities in Peer/Near-Peer Conflict Report Development: Report Outline
Nov 8, 2023	T&I Meeting	Brief on PFC/PCC in the Joint Trauma System
Nov 15, 2023	T&I Meeting	Brief on Walking Blood Bank Report Development: Report Outline

PRE-DECISIONAL DRAFT 15

PRE DECISIONAL DRAFT

Summary of Activities to Date

Date	Meeting	Discussion Topics
Nov 29, 2023	DHB Meeting	Tasker Introduction at DHB Meeting
Dec 13, 2023	T&I Meeting	Report Development: Report Outline, Review Information Brief, Report Timeline
Dec 20, 2023	T&I Meeting	Brief with Joint Staff Surgeon
Jan 10, 2024	T&I Meeting	Report Development
Jan 31, 2024	T&I Meeting	Report Development
Feb 7, 2024	T&I Meeting	Report Development
Feb 14, 2024	T&I Meeting	Report Development
Feb 21, 2024	T&I Meeting	Report Development

PRE-DECISIONAL DRAFT 16

PRE DECISIONAL DRAFT

Guiding Principles

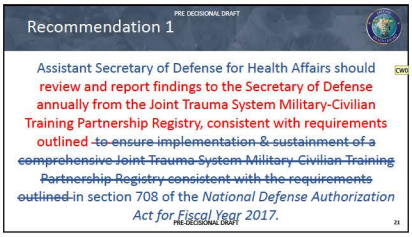
PRE DECISIONAL DRAFT 17

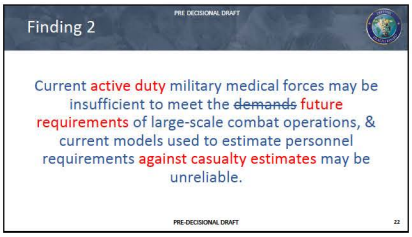
PRE DECISIONAL DRAFT

Guiding Principles

- Recommendations should be actionable & relate to a specific finding
- Recommendations should center on education & training as it relates to the care delivery paradigm in peer/near-peer conflict & the evacuation process, or in-theater care
- Recommendations should adhere to clear definitions of the setting/context of care
- Recommendations should identify/define all parties involved (i.e., who is being treated & who is providing the treatment)

PRE-DECISIONAL DRAFT 18





Slide 21

CW0 Suggested amendment: ASD(HA) should issue a report annually based on the needs of the DoD.
Clarice Waters, 2024-03-05T15:14:37.059

Recommendation 2

DoD should urgently update casualty flow models to determine the optimum size & structure of the active duty medical forces & rapidly recruit military personnel to meet these requirements.

Finding 3

Neither the Services nor the Joint Trauma System military-civilian training partnership registry adequately define, track, or assess wartime medical skills training for enlisted personnel at military-civilian trauma training partnerships.

Recommendation 3

Under Secretary of Defense for Personnel & Readiness, in conjunction with the Services, should oversee the standardization of the essential wartime medical skills of enlisted personnel & apply the requirements of section 708 of the *National Defense Authorization Act for Fiscal Year 2017* beyond combat casualty care teams to the wartime training of enlisted medical personnel.

Finding 4

Despite the potential demand for standardized, just-in-time training for Army combat medics, Navy corpsmen, & Air Force medical service specialists during large-scale combat operations, there are no plans in place to develop standardized, just-in-time training for enlisted personnel.

Recommendation 4

Under Secretary of Defense for Personnel & Readiness, in conjunction with the Services, should develop standardized just-in-time programs of instruction for scaling the training of ~~for~~ Army combat medics, Navy corpsmen, & Air Force medical service specialists to meet force flow & large-scale combat operations demands as reflected in military operational plans.

Finding 5

The Defense Health Agency does not define readiness gaps that should be filled by military-civilian trauma training partnerships through tracking of the clinical activity (relative to combat casualty & expeditionary medical care) of medical personnel at military treatment facilities.

PRE DECISIONAL DRAFT

Recommendation 5

The Director, Defense Health Agency, should develop a system to track skills related to combat casualty & expeditionary medical care acquired by credentialed & non-credentialed military medical personnel at military treatment facilities & use this information to support Service goals to guide entry into & sustainment of military-civilian trauma training partnerships.

PRE-DECISIONAL DRAFT 29

PRE DECISIONAL DRAFT

Finding 6

The Defense Health Agency & Services do not have a ~~joint~~ system for tracking the knowledge, skills, or ongoing clinical activity across the clinical readiness life cycle & are unable to aggregate data to provide a composite picture of individual & military medical readiness.

PRE-DECISIONAL DRAFT 30

PRE DECISIONAL DRAFT

Recommendation 6

Under Secretary of Defense for Personnel & Readiness should direct development of a ~~joint~~ system to track knowledge, skills, & ongoing clinical activity related to combat casualty & expeditionary medical care acquired by credentialed & non-credentialed personnel on an individual basis to inform the overall military medical readiness.

PRE-DECISIONAL DRAFT 31

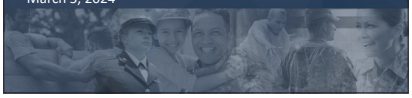
PRE DECISIONAL DRAFT

Questions

PRE DECISIONAL DRAFT 32

Effective Public Health Communication Strategies with Department of Defense Personnel

Wilsie Bishop, DPA
Chair, Public Health Subcommittee
March 5, 2024



1

Overview / Agenda

- Membership
- Tasking
- Objectives and Scope
- Report/ToR Crosswalk
- Background
- Guiding Principles
- Emerging Findings
- Way Forward
- Backup Slides: Summary of Subcommittee Activities to Date

2

Membership

CHAIR
Wilsie Bishop DPA, MPA*

Georges Benjamin, MD

John Clements, PHD

Marion Ehrich, PhD, MS

Ruth Etzel, MD, PHD

Christopher Johnson, PHD

*Board Member

3

Tasking

On May 12, 2023, the Assistant Secretary of Defense for Health Affairs directed the Defense Health Board (DHB) to **provide recommendations on how the DoD could better deliver health information within an environment of misinformation.**

4

Objectives and Scope

A. Identify lessons learned about DoD's vulnerabilities and capabilities in disseminating health information during the COVID pandemic.
B. Review DoD/DHA policies and processes used for health communications.
C. Review academic, commercial, and government research on best practices for health communications.
D. Provide recommendations for how the DoD could better deliver health information within an environment of misinformation and threats to credibility.

5

Report/ToR Crosswalk

Chapter	ToR Objective A	ToR Objective B	ToR Objective C	ToR Objective D
1	X		X	X
2			X	X
3		X		X

6

Background Preparing for Future Health Emergencies

- DoD must be proactive and maintain a state of readiness to combat future health emergencies
  - "warm body of activity"
  - Public Health input is needed from the policy level through implementation down to the deck plate
- DoD must clarify desired outcomes of health communication:
  - Number of messages sent?
  - Increased health behaviors? How to measure?

7

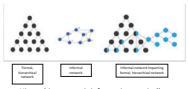
Background The International and National Context

- Complex national and international communication environments characterized by time lag resulting from (in part) sequential decision making; varied priorities impacting cohesion essential to coordinated response

8

Background Societal Trends

Features of the modern information environment impacts efforts by institutions (including DoD) to shape and direct information consumption.



Hierarchies transmit information vertically. Networks spread information horizontally and impact hierarchical communications.

Social media algorithmically sorts users into "echo chambers" and prioritizes user engagement over accuracy (and civility).

9

Background The COVID 19 Infodemic

"We're not just fighting an epidemic; we're fighting an infodemic."

-World Health Organization (WHO)
Director-General Tedros Adhanom Ghebreyesus

- Proliferation of misinformation and disinformation
  - Some intentionally directed to Service members to undermine readiness
- Politization of public health and science
- Decline in trust and willingness to take vaccines and adhere to non-medical interventions

10

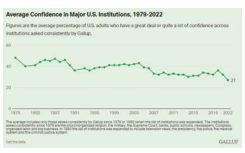
Background DoD's Vaccine Mandate and Recission

- December 11, 2020
  - FDA approves Emergency Use Authorization for Pfizer Vaccine
- August 23, 2021
  - FDA fully approves the Pfizer-BioNTech COVID-19 vaccine for all people ages 18 years and older
- August 24, 2021
  - DoD issues Coronavirus Disease 2019 requirement for Members of the Armed Forces *after vaccine was fully approved by the FDA
- January 10, 2023
  - DoD rescinds August 24, 2021 (and subsequent November 30, 2021) Coronavirus Disease 2019 vaccination requirement for Members of the Armed Forces, in accordance with 2023 National Defense Authorization Act

11

Background The State of Trust

- Trust in major institutions has declined.
- Trust in the military and in scientists has declined but remains high.



12

Guiding Principles

- Time is of the essence. DoD must prepare for the next health emergency now and sustain the infrastructure to ramp up as needed.
- DoD health communications are military-specific but occur within a complex and influential civilian communication environment. DoD health communications as a discipline must adapt to the current and future information environment.

13

Guiding Principles

- Trust is essential to messaging uptake and to successful misinformation and disinformation mitigation efforts. Leadership and trusted messengers play an essential role in creating and sustain trust.
- Cultural and political perspectives, personal experiences, and beliefs may affect perceptions of the legitimacy of the scientific process and public trust.

14

Guiding Principles

Communicating the underpinnings of public health decision making encourages partnership between experts and citizens.

Explain the role of uncertainty in the scientific process
Explain how/why scientists and officials coalesce around certain positions and not others

Communicators of health information must provide recommendations based on available evidence and facts at the time. They must be clear about what they know and what they don't and be honest about the scope of their expertise.

15

Emerging Findings

- Findings and Recommendations are coalescing into three areas:
  - Organizational
  - Societal and infodemic-related factors that impact the military and beneficiary population
  - Best practices in health communications

16

Emerging Findings

- FINDING: Communication challenges during the pandemic suggest that current DoD communication channels are not optimized for health information.
- FINDING: Delays in decision making and communication at the global and federal level in the early days of the pandemic impacted the timeliness of DoD's communication of Force Health Protection guidance.
- FINDING: The COVID-19 pandemic demonstrated that threats to public health can be threats to national security.

17

Emerging Findings

- FINDING: DoD is a heterogenous institution whose members may be influenced through multiple networks beyond the chain of command.
- FINDING: DoD guidance pertains to promoting routine MHS health care, not to managing a health care emergency.
- FINDING: Best practices and research findings can inform efforts to maximize messaging impact.

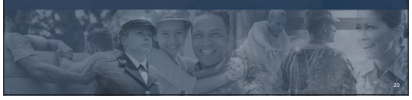
18

Way Ahead

- Continue report development with the Chair and Subcommittee
- Anticipated Decision Brief on June 4, 2024

19

Questions



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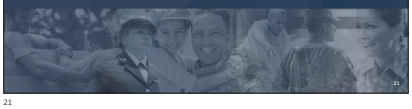
Back Up Slides



21

Summary of Activities to Date

Meeting Date	Discussion Topics
Jan 20, 2023: PH Meeting	Potential Health Communications tasking
Jun 14, 2023: PH Meeting	Health Communications report development overview
Jun 28, 2023: DHB Meeting	DHA Strategic Communications
Jul 24, 2023: PH Meeting	• Follow-up from DHA Strategic Communications • Public health response to COVID-19
Aug 25, 2023: PH Meeting	• Military culture • Misinformation and disinformation • A perspective on government censorship • Science of health communications • Informal military communications panel

22

Summary of Activities to Date

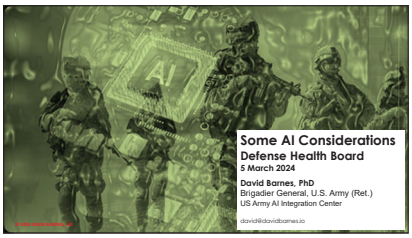
Meeting Date	Discussion Topics
Sep 19, 2023: PH Meeting	• DoD/DHA legal authorities • Report Development
Nov 29, 2023: DHB Meeting	Tasker Update

23

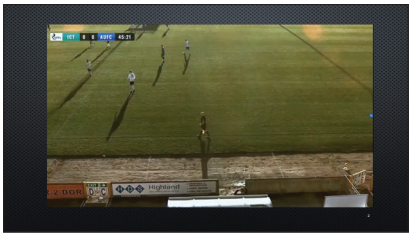
Summary of Activities to Date

Meeting Date	Discussion Topics
Dec 12, 2023: PH Meeting	• The deadly rise of anti-science • Report development discussion • Emergency communications and operations in the information environment
Jan 2, 2024: PH Meeting	• COVID-19 Learnings from the front lines • Report development discussion
Jan 16, 2024: PH Meeting	Report development discussion
Jan 30, 2024: PH Meeting	Report development discussion
Feb 27, 2024: PH Meeting	Report development discussion

24


Some AI Considerations
Defense Health Board
5 March 2024
David Barnes, PhD
Brigadier General, U.S. Army (Ret.)
US Army AI Integration Center
david@davidbarnes.io

1



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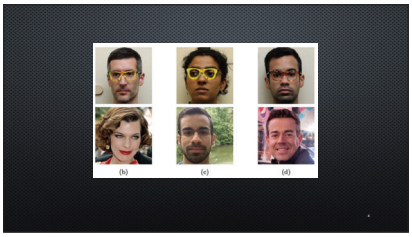
(b)
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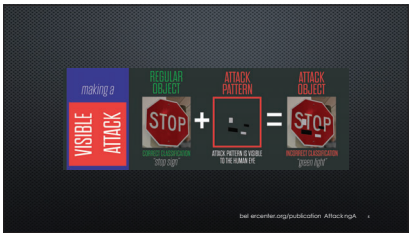
(d)

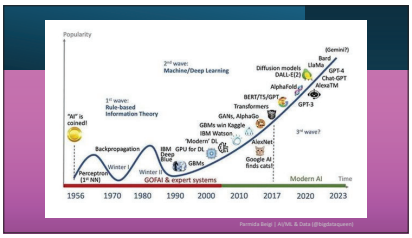
4


making a
VISIBLE ATTACK
REGULAR OBJECT
ATTACK PATTERN
ATTACK OBJECT
STOP
"stop sign"
ATTACK PATTERN IS VISIBLE TO THE HUMAN EYE
"green light"
bel.ercenter.org/publication Attack.ngA

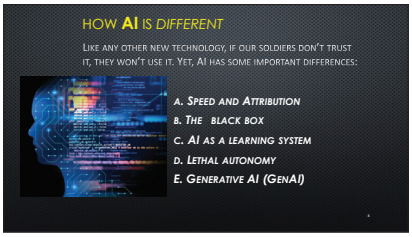
5


FILE
Google
self-driving
NOW
GOOGLE SELF-DRIVING CAR GETS INTO AN ACCIDENT INVOLVING INJURIES

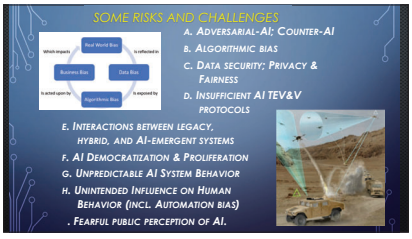
6


Popularity
1st wave: Rule-based Information Theory
"AI" is coined!
Backpropagation
Perceptron (1st NN)
Winter I
Winter II
2nd wave: Machine/Deep Learning
IBM Deep Blue
GBMs
GBMs win Kaggle
IBM Watson
'Modern' DL
GPU for DL
GANs, AlphaGo
BERT/T5/GPT Transformers
AlexNet
Google AI finds cats!
Diffusion models DALL-E(2)
AlphaFold 2
3rd wave?
(Gemini?)
Bard
LLaMa
GPT-4
Chat-GPT
AlexaTM
GPT-3
GOFAI & expert systems
Modern AI
Time
1956
1970
1980
1990
2000
2010
2017
2020
2023

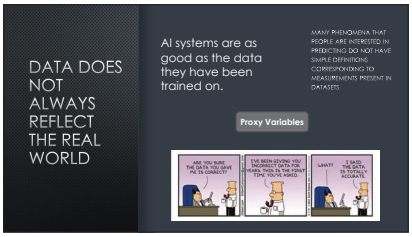
7


HOW AI IS DIFFERENT
LIKE ANY OTHER NEW TECHNOLOGY, IF OUR SOLDIERS DON'T TRUST IT, THEY WON'T USE IT. YET, AI HAS SOME IMPORTANT DIFFERENCES:
A. SPEED AND ATTRIBUTION
B. THE BLACK BOX
C. AI AS A LEARNING SYSTEM
D. LETHAL AUTONOMY
E. GENERATIVE AI (GENAI)

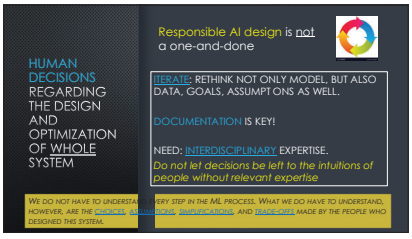
8


SOME RISKS AND CHALLENGES
A. ADVERSARIAL-AI; COUNTER-AI
B. ALGORITHMIC BIAS
C. DATA SECURITY; PRIVACY & FAIRNESS
D. INSUFFICIENT AI TEV&V PROTOCOLS
E. INTERACTIONS BETWEEN LEGACY, HYBRID, AND AI-EMERGENT SYSTEMS
F. AI DEMOCRATIZATION & PROLIFERATION
G. UNPREDICTABLE AI SYSTEM BEHAVIOR
H. UNINTENDED INFLUENCE ON HUMAN BEHAVIOR (INCL. AUTOMATION BIAS)
. FEARFUL PUBLIC PERCEPTION OF AI.
Real World Bias
Business Bias
Data Bias
Algorithmic Bias

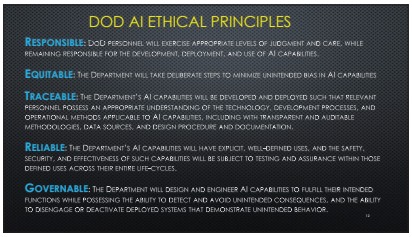
9


DATA DOES NOT ALWAYS REFLECT THE REAL WORLD
AI systems are as good as the data they have been trained on.
MANY PHENOMENA THAT PEOPLE ARE INTERESTED IN PREDICTING DO NOT HAVE SIMPLE DEFINITIONS CORRESPONDING TO MEASUREMENTS PRESENT IN DATASETS
Proxy Variables

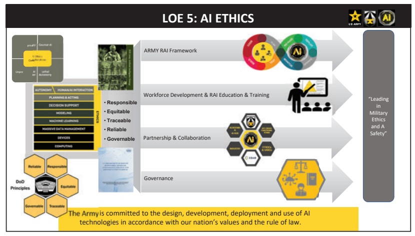
10


HUMAN DECISIONS REGARDING THE DESIGN AND OPTIMIZATION OF WHOLE SYSTEM
Responsible AI design is not a one-and-done
ITERATE: RETHINK NOT ONLY MODEL, BUT ALSO DATA, GOALS, ASSUMPTIONS AS WELL.
DOCUMENTATION IS KEY!
NEED: INTERDISCIPLINARY EXPERTISE.
Do not let decisions be left to the intuitions of people without relevant expertise
WE DO NOT HAVE TO UNDERSTAND EVERY STEP IN THE ML PROCESS. WHAT WE DO HAVE TO UNDERSTAND, HOWEVER, ARE THE CHOICES, ASSUMPTIONS, SIMPLIFICATIONS, AND TRADE-OFFS MADE BY THE PEOPLE WHO DESIGNED THIS SYSTEM.

11

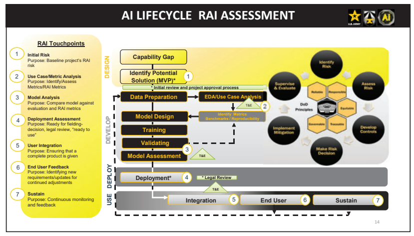

DOD AI ETHICAL PRINCIPLES
RESPONSIBLE: DOD PERSONNEL WILL EXERCISE APPROPRIATE LEVELS OF JUDGMENT AND CARE, WHILE REMAINING RESPONSIBLE FOR THE DEVELOPMENT, DEPLOYMENT, AND USE OF AI CAPABILITIES.
EQUITABLE: THE DEPARTMENT WILL TAKE DELIBERATE STEPS TO MINIMIZE UNINTENDED BIAS IN AI CAPABILITIES.
TRACEABLE: THE DEPARTMENT'S AI CAPABILITIES WILL BE DEVELOPED AND DEPLOYED SUCH THAT RELEVANT PERSONNEL POSSESS AN APPROPRIATE UNDERSTANDING OF THE TECHNOLOGY, DEVELOPMENT PROCESSES, AND OPERATIONAL METHODS APPLICABLE TO AI CAPABILITIES, INCLUDING WITH TRANSPARENT AND AUDITABLE METHODOLOGIES, DATA SOURCES, AND DESIGN PROCEDURE AND DOCUMENTATION.
RELIABLE: THE DEPARTMENT'S AI CAPABILITIES WILL HAVE EXPLICIT, WELL-DEFINED USES, AND THE SAFETY, SECURITY, AND EFFECTIVENESS OF SUCH CAPABILITIES WILL BE SUBJECT TO TESTING AND ASSURANCE WITHIN THOSE DEFINED USES ACROSS THEIR ENTIRE LIFE-CYCLES.
GOVERNABLE: THE DEPARTMENT WILL DESIGN AND ENGINEER AI CAPABILITIES TO FULFILL THEIR INTENDED FUNCTIONS WHILE POSSESSING THE ABILITY TO DETECT AND AVOID UNINTENDED CONSEQUENCES, AND THE ABILITY TO DISENGAGE OR DEACTIVATE DEPLOYED SYSTEMS THAT DEMONSTRATE UNINTENDED BEHAVIOR.

12



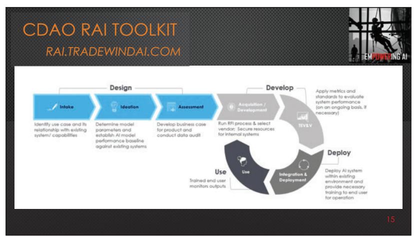
LOE 5: AI ETHICS
ARMY RAI Framework
Workforce Development & RAI Education & Training
Partnership & Collaboration
Governance
• Responsible
• Equitable
• Traceable
• Reliable
• Governable
AUTONOMY
HUMAN/AI INTERACTION
PLANNING & ACTING
DECISION SUPPORT
MODELING
MACHINE LEARNING
MASSIVE DATA MANAGEMENT
DEVICES
COMPUTING
ETHICS
DoD Principles
Reliable
Responsible
Equitable
Governable
Traceable
"Leading in Military Ethics and A Safety"
The Army is committed to the design, development, deployment and use of AI technologies in accordance with our nation's values and the rule of law.

13



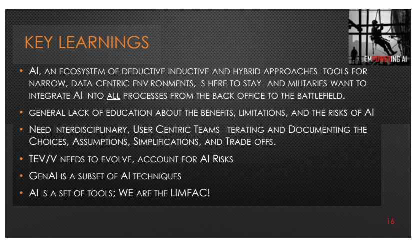
AI LIFECYCLE RAI ASSESSMENT
RAI Touchpoints
1 Initial Risk
Purpose: Baseline project's RAI risk
2 Use Case/Metric Analysis
Purpose: Identify/Assess Metrics/RAI Metrics
3 Model Analysis
Purpose: Compare model against evaluation and RAI metrics
4 Deployment Assessment
Purpose: Ready for fielding-decision, legal review, "ready to use"
5 User Integration
Purpose: Ensuring that a complete product is given
6 End User Feedback
Purpose: Identifying new requirements/updates for continued adjustments
7 Sustain
Purpose: Continuous monitoring and feedback
DESIGN
DEVELOP
DEPLOY
USE
Capability Gap
Identify Potential Solution (MVP)*
* Initial review and project approval process
Data Preparation
EDA/Use Case Analysis
T&E
Identify Metrics Benchmarks / Reproducibility
Model Design
Training
Validating
Model Assessment
Deployment*
* Legal Review
Integration
End User
Sustain
Identify Risk
Assess Risk
Develop Controls
Make Risk Decision
Implement Mitigation
Supervise & Evaluate
DoD Principles
14

14



CDAO RAI TOOLKIT
RAI.TRADEWINDAI.COM
EMPOWERING AI
Design
Intake
Identify use case and its relationship with existing system/ capabilities
Ideation
Determine model parameters and establish AI model performance baseline against existing systems
Assessment
Develop business case for product and conduct data audit
Develop
Acquisition / Development
Run RFI process & select vendor; Secure resources for internal systems
TEV&V
Apply metrics and standards to evaluate system performance (on an ongoing basis, if necessary)
Deploy
Integration & Deployment
Deploy AI system within existing environment and provide necessary training to end user for operation
Use
Trained end user monitors outputs
15

15



KEY LEARNINGS
EMPOWERING AI
• AI, AN ECOSYSTEM OF DEDUCTIVE INDUCTIVE AND HYBRID APPROACHES TOOLS FOR NARROW, DATA CENTRIC ENV RONMENTS, S HERE TO STAY AND MILITARIES WANT TO INTEGRATE AI NTO ALL PROCESSES FROM THE BACK OFFICE TO THE BATTLEFIELD.
• GENERAL LACK OF EDUCATION ABOUT THE BENEFITS, LIMITATIONS, AND THE RISKS OF AI
• NEED NTERDISCIPLINARY, USER CENTRIC TEAMS TERATING AND DOCUMENTING THE CHOICES, ASSUMPTIONS, SIMPLIFICATIONS, AND TRADE OFFS.
• TEV/V NEEDS TO EVOLVE, ACCOUNT FOR AI RISKS
• GENAI IS A SUBSET OF AI TECHNIQUES
• AI S A SET OF TOOLS; WE ARE THE LIMFAC!
16

16

Analytics
Human Input
Analysis
Decision
Action
Artificial Intelligence
Automation
Decision Automation
Prescriptive
What should I do?
Decision Support
Predictive
What will happen?
Diagnostic
Why did it happen?
Descriptive
What happened?
Difficulty
Value

17

Ethics, Medicine, and Artificial Intelligence

Defense Health Board
March 5, 2024

Kenneth W. Goodman, PhD, FACMI, FACE
Professor of Medicine and (emby of Philosophy, Public Health Sciences and Nursing
Director, University of Miami Miller School of Medicine Institute for Bioethics and Health Policy and
UM Institute for Data Science and Computing Program in Data Ethics + Society
kgoodman@med.miami.edu

"More and more the tendency is towards the use of mechanical aids to diagnosis; nevertheless, the five senses of the doctor do still, and must always, play the preponderating part in the examination of the sick patient. Careful observation can never be replaced by the tests of the laboratory. The good physician now or in the future will never be a diagnostic robot."

Scottish surgeon Sir William Arbuthnot-Lane (Lane, 1936)

The Story So Far

- Bias
- Safety
- Transparency
- Explainability
- Accountability
- Responsibility
- Governance

The Hard Problem

- The Parfait System: no bias, no confabulation, explainable to the satisfaction of all, designed by committed and responsible coders, manufactured by corporations dedicated to the common good …
- Affordable, reliable, easy to use
- Consistently more accurate than human experts

Hurray … or uh-oh?

- The data and information scraped from electronic health records, registries, etc. and used to train the Parfait System thus guides practice – and eventually replaces the data and information used to train future systems
- Future systems are thus trained on data and information derived from practice shaped or guided by computers
- Which data and information is used to train new systems
- Progress, or the systematic replacement of a store of human-acquired knowledge by machine intelligence?

In the Meantime…

- "Better than humans" is usually a good thing. Humans + tools are better than humans without tools,
- …which tend to be imperfect (sometimes because of humans).
- The more we look the more we find uncertainty if not error.
- This analysis and its findings will continue for the foreseeable future.

Source: Charles Friedman

We're Used to Error, Inaccuracy

- His prognosis is poo.
- Mr X was seen by himself in the hospital room today.
- I saw but didn't see the order placed. Thank you.
- I asked that her house Mr. H doing prior to come to the hospital.
- His current PPS 505% is more related to …
- Seen by Neurology, unable to do MRI due to penile metal prosthesis. Still minimally arousable.
- He initially presented by EMS, who report they found him on the side of the road stating he wished to diet.
- … is an 82 y.o. male admitted on 1/2/3 with a primary diagnosis of No primary diagnosis.

To Do

- Comparative outcomes and safety analysis research
- Consider health-ethics-and-informatics swat teams (HEISTs).
- Manage intellectual property issues.
- Manage privacy issues.
- Ensure – indeed, require – sharing.

Additional DOD Issues

- Familiar adoption issues
- Failure to adopt as potentially blameworthy
- Implementation as research
- EHR capacity, vendors, oversight
- Education

Standards

- Value-driven standards support ethically optimized products, processes, and actions
- They are public, transparent, and driven by transparent processes
- See https://www.hl7.org/, https://www.iso.org/standards.html, https://www.ieee.org/standards/#

https://pubmed.ncbi.nlm.nih.gov/?term=kenneth+W+goodman

- A and Big Data Resources, https://bioethics.miami.edu/informatics/computing-triage/ai-and-big-data-resources/index.html
- WHO, Ethics and governance of artificial intelligence for health: Guidance on large multi-modal models, Geneva 2023, https://www who.int/publications/i/item/9789240084759
- Advisor/contributor, 1998-1999, Institute of Medicine, "Strategies to Protect the Health of Deployed U S. Forces." (Document: LM. Joellenbeck, PK Russell, SB Guze, eds., Medical Follow Up Agency Institute of Medicine, *Strategies to Protect the Health of Deployed U.S. Forces: Medical Surveillance, Record Keeping, and Risk Reduction*, Washington, D.C.: National Academy Press, 1999.)
- Reviewer, National Academy of Sciences, Institute of Medicine, Committee on Battlefield Radiation Exposure Criteria, 1999. (Document: S Thaul , H O'Maonaigh, eds. *Potential Radiation Exposure in Military Operations*, Washington, D.C.: National Academy Press, 1999.)
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Thank you.

Integration of AI/ML into clinical workflows

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USU | SC2i

Disclaimer

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Overview of the Surgical Critical Care Initiative (SC2i)

Funded by DOD

Launched in 2013 and designated as a USU Center in 2016

A Federal / Non-Federal partnership

Biannual Oversight Meetings

Leveraging clinical and-omics data to develop 'precision' CDSTs in the acute care space

Improving outcomes and lowering costs in both military and civilian systems

elopm	pate deployment
AISE/AIDEx	FY23
WounDx™	FY24
VTE Dx	FY24
Pneumonia Dx	FY24
AKI Dx	FY24
OA Dx	FY25
Bacteremia Dx	FY25
sTBI Dx	FY25
HO Dx	FY26
ARDS Dx	FY26
SBO Dx	FY26

SC2i clinical research supported by:

- 2,400 + patients enrolled
- 86 million data elements
- 14.6 million molecular assay measurements
- 88,000 + biobank specimens

SC2i research products include at least 11 in-development and 3 deployed CDSTs, including AIDEx 1.0, MTP, and IFI

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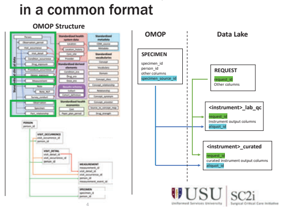
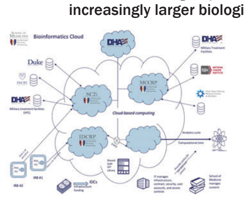
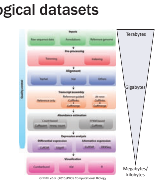
To efficiently utilize all of this information, the data must be in a common format

- In the process of converting our databases into a relational data in OMOP format
  - Large flat files are an inefficient way of storing data
  - Observational Medical Outcomes Partnership (OMOP) Common Data Model is a standardized way to structure data
    - Will allow for more easy integration of new datasets
- Developing a data lake for assay results
  - Will allow for the integration of new assay results into our datasets



Cloud solutions are being implemented to analyze the increasingly larger biological datasets





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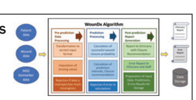
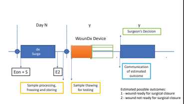
WounDx™ Purpose and Process

- WounDx™ is a device intended to assist surgeons in making decisions related to the timing of closure for traumatic extremity wounds
  - Following consultations with the FDA, this device classified as class II (moderate risk)
- WounDx™ is a combination product
  - Biomarkers (Cytokine Panel: IL-5, IL-7, IL-15, IL-17A, IL12/IL23p40, GMSCF)
  - Clinical factors (Wound size measurements, wound location, wound type)
  - Predictive algorithm
- Initial wound effluent samples collected upon enrollment + 12~24 hours prior to each debridement
- WounDx™ provides clinicians with a binary recommendation of whether the wound should be closed in the next 24 to 72 hour prior to next debridement





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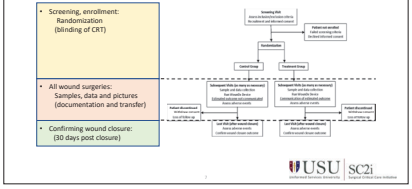
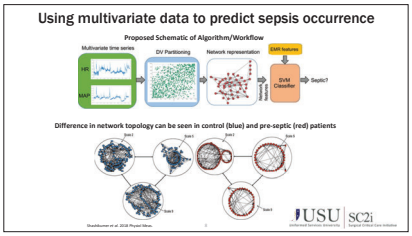
WounDx Trial Study Design/Phases

- Screening, enrollment: Randomization (blinding of CRT)
- All wound surgeries: Samples, data and pictures (documentation and transfer)
- Confirming wound closure: (30 days post closure)

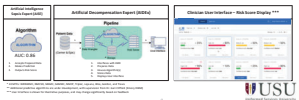


Using multivariate data to predict sepsis occurrence



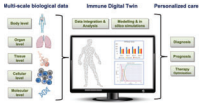
AIDEx in the MHS

- Artificial Intelligence Decompensation Expert (AIDEx) is a clinical decision support tool that identifies patients with sepsis on average 4-8 hours prior to clinician suspicion
  - Received DNA funding for integration at ten level 5 MTFs*
- AIDEx is composed of two key components:
  1. A location & EHR agnostic pipeline
     - Interfaces with a health system's EHR to provide the algorithm with real-time patient data; Provides clinicians with a user interface for interpreting the algorithm's predictions
  2. A machine-learning based sepsis prediction algorithm**



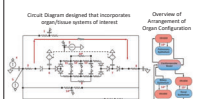
Limitations with AI/ML Modeling of Real World Data to predict hospital complications

- Machine Learning and Artificial Intelligence are being used for prediction of various complications including sepsis and multiple organ failure yet there are challenges to these approaches
  - Improving the actual predictive performance
  - Future robustness of models
  - One way to improve performance is generating more data for the selected features to train these models but the actual amount of data is limiting
- Synthetic datasets could be used to aid in training of the models
  - Has been done previously in image recognition/generation and text analysis/recognition
- Propose the need to generate synthetic multiplexed mediator time series data coincides with the advent of the concept of medical digital twins
  - Specifically related to interpretations of medical digits twins that hew closely to the original description and use of industrial digit twins
    - Involves generating multiple digital twins from a common computation model specification



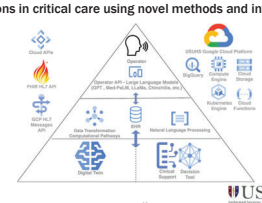
Laubenbacher et al. 2022 npj Digital Medicine

Plans to create a Post-Burn Sepsis Digital Twin to augment the development of ML-models to predict sepsis and MODS



Labeled Points of Interest on Circuit Diagram			
Number	Description	Number	Description
1	Myocardium	9	Shunt
2	Pericardium	10	Pulmonary Circulation
3	Vena Cava	11	Arteries
4	Bleeding	12	Capillaries
5	IV	13	Veins
6	Right Heart	14	Liver
7	Left Heart	15	Kidney
8	Aorta		

SC2i's innovations allow for the consortium to address complex questions in critical care using novel methods and infrastructure



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SC2i Scientific Meeting
Bethesda, MD
(2019)

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