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TITLE: Evaluation of Role 2 (R2) Medical Resources in the Afghanistan Combat Theater: Past, Present and Future

PRINCIPAL INVESTIGATOR: LTC Christopher VanFosson

CONTRACTING ORGANIZATION: The Geneva Foundation, Tacoma, WA

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14. ABSTRACT There exists a continued lack of evidence about the impact of Role 2 (R2) medical resources in the combat theater. Although a R2 registry has been in place since 2008, no systematic evaluation for these data has been conducted. Without analysis of this information, military planners and medical leaders will be unable to best allocate R2 resources in future operations. Furthermore, the clinical competencies required for each medical team member to function optimally in this environment have yet to be clearly defined or systematically supported across the Tri-Services. Objective: Describe and understand impact of R2 utilization during OEF and beyond, with emphasis on patient outcomes and provider competency Aim 1: Descriptive study of all available information for combat casualties in Afghanistan Aim 2: Identify the ideal provider training and competency assessment, sustainment and evaluation for medical staff (physicians, nurses, other licensed professionals, medics) deployed to R2 environment					
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1. INTRODUCTION: There exists a continued lack of evidence about the impact of Role 2 medical resources in the combat theater. Although a Role 2 database has been in place since 2008, no systematic evaluation for these data has been conducted. Without analysis of this information, military planners and medical leaders will be unable to best allocate Role 2 resources in future operations. Furthermore, the clinical competencies required for each medical team member to function optimally in this environment have yet to be clearly defined or systematically supported across the Tri-Services.

2. KEYWORDS:

Battlefield
Combat Casualty Care (C3/CCC)
Competency
Dashboard
Department of Defense Trauma Registry (DoDTR)
Military Treatment Facility (MTF)
Operations
Role 2 (R2)
Role 3 (R3)
Standardized
Sustainment
Training
Tip-Top
Tri-Services

3. ACCOMPLISHMENTS:

What were the major goals of the project?

CY19 Goal - Evaluate long-term outcomes of patients treated at R2 facilities. Post-performance assessment dashboard and standardized competency implementation.

What was accomplished under these goals?

For this reporting period, the study progress and accomplishments directly aligned with the SOW deliverables.

Specific Aim 1 – Initiate R2 Registry (R2R) analysis and conduct comprehensive review of training literature, individual experiences, and Tri-Service training resources.

Subtask 1: Submit documents for HRPO approval. All protocols and amendments were routed to HRPO for 2nd level review/approval. During this reporting period, “The R2 Experience: Comparing the JTS R2 Registry and Surgeon Case Logs from 2008 to 2017” protocol was selected and reviewed by the Army Human Research Protections Office (September 2020). Their inspection was successful and the USAISR received their assurance.

Subtask 2: Identify sources and initiate process to obtain data other than R2R. Our team continues to collaborate with other investigators to identify additional data sources. An example of the ongoing collaborations includes the Role 2 ocular analysis and poster previously presented at MHSRS 08/2019. The ocular analysis provided preliminary data for future research in collaboration with Walter Reed Ocular Trauma Database, Theater Medical Data Store, and Defense and Veterans Eye Injury and Vision Registry.

Subtask 3: Describe all data available in R2R, conduct gap analysis. This research project has generated multiple publications and described trends/gaps. The research team will continue to disseminate research findings/gaps and collaborate with the Joint Trauma System to improve the R2R (now part of the DoDTR).

Subtask 4: Compile and analyze all “lessons learned” regarding R2 operations during OEF and OIF. The research team continues works alongside the Joint Trauma system (via data sharing agreement) to help improve the missing data in the DoDTR. The research team helped identify gaps in the current data variables within the Role 2 Registry (now in the DoDTR) and data collection processes required for enhanced future analysis. Several manuscript publications produced from this grant have described the ‘lessons learned’. To identify gaps in the data collection processes we began a feedback loop with the JTS on DoDTR data quality. Our research team sends implausible values for DoDTR records to the abstractors at JTS, who update DoDTR records and adjust business rules for data entry accordingly. Specific examples of improvements to data collection can be found in the appendix titled ‘JTS feedback loop- implausible values for medications and doses within the DoDTR’.

Subtask 5: Describe all training assets available for R2 team members. Completed protocol H-16-022 “Evaluation of Healthcare Systems Training for Combat Casualty Care Skills” and published manuscript associated with this deliverable entitled “An assessment of pre-deployment training for Army Nurses and Medics. Military Medicine” (October 2020).

Subtask 6: Conduct survey of deployed R2 members for personal training experience, confidence upon deployment. Our H-16-022 research protocol and survey (referenced above) aimed to address subtask 6. As mentioned above, we completed the initial survey and published the survey manuscript. In addition, the research team is currently working on a subsequent analysis/manuscript, and will take a deeper dive into the survey, specifically the medic’s responses.

Subtask 7: Based on literature review, recommend best practice for R2 training. The implementation of the pre-deployment readiness training (pilot program) in the Army Burn Center/BAMC Level 1 Trauma Center was completed.

Specific Aim 2 - Develop R2R Performance Assessment Dashboard

Subtask 1: Create metrics to evaluate R2 outcomes and team performance.

Subtask 2: Develop DoDTR report for near-real time feedback to deployed teams.

Subtask 3: Track training and sustainment programs for R2 members. Subtasks 1-3. The Elsevier learning management System (available Tri-Service) will create and track pre-deployment training. Leadership determined that the DHA Nursing Readiness Working Group would be the best platform to continue these efforts. The DHA Nursing Readiness Working Group will identify champions, metrics, and process for data acquisition. This deliverable is completed.

Specific Aim 3 – Expand R2 database to all deployed units to OEF/OIF

Subtask 1: Obtain all identified data other than R2R. Continue working on protocol (H-18-001) to expand the R2 dataset. Currently, we have 28,707 subjects in our retrospective dataset.

Ongoing protocol/deliverable.

Subtask 2: Create repository within DoDTR for these data. The DoDTR merged with the Role 2 database; therefore, this deliverable was completed. Ongoing collaborations with JTS.

Subtask 3: Conduct analysis and contrast by R2 unit and phase of conflict (entry, surge, and sustainment). This deliverable is ongoing. The research team is currently working on the

protocols associated with this deliverable (H-16-023 and H-18-001), and plan to complete the data analysis and manuscript during the next reporting period/calendar year.

Specific Aim 4 – Implement Tri-Service training and sustainment standard

Subtask 1: Crosswalk all training programs for R2 team members

Subtask 2: Develop and validate knowledge assessment tool for combat-related skills

Subtask 3: Generate universal combat casualty skills for each provider type

Subtask 4: Develop and implement metrics for evaluating skill and knowledge retention

Completed subtasks 1-4 and the research team published their findings in the Delphi manuscript during the previous reporting period.

Specific Aim 5 – Implement Tip Top Pilot study at a military treatment facility (MTF)

Subtask 1: Determine the number of preceptors and nurse trainees

Subtask 2: Identify and train 100% current nursing preceptors (n = x preceptors) on Tip-Top

Subtask 3: Identify and orient all new nurses on Tip Top (n = x nurse trainees)

Subtask 4: Collect data/outcome measures on completeness of the employee CAF folder, duration of preceptorship, and variation in competency

Subtask 5: Perform data analysis to evaluate critical thinking, reduce documentation burden, and increase the accuracy and completeness of competency documentation.

Subtask 6: Troubleshoot the transition program or process

Completed subtasks 1-6. The research team accomplished these aim and subtasks, and collaborators at the USAISR and BAMC have continued using the tools and transition program from the Tip-Top pilot study.

Specific Aim 6 - Evaluate long-term outcomes of patients treated at R2 facilities post. Performance Assessment Dashboard and Standardized Competency implementation

Subtask 1: Compare outcomes for patients treated at Role 2s.

Subtask 2: Continue cleaning and analyzing the Role 2 and DoDTR datasets for ongoing research efforts. Continue collaborating with SMEs to improve data collection in collaboration with JTS.

Subtask 3: Finalize data analysis, dissemination efforts, and manuscript submissions.

Subtask 4: Remove identifiers from data and/or delete/archive identifiable datasets as required by the protocol/DHA.

Subtask 5: Closeout all ongoing research protocols as required by the institute, IRB, and DHA.

Subtasks 1-5 will be the primary focus during the next reporting period and no cost extension period.

What opportunities for training and professional development has the project provided?

The research team attended training and professional development opportunities during the reporting period. These included in person (prior to COVID-19) conferences, seminars, virtual workshops, virtual educational courses, virtual study groups, and individual study. The research team attended educational courses/instruction utilizing live zoom, and the course titles included Survival Analysis and Missing Data courses through Statistical Horizons, and Data Analytics and Visualization Boot Camp through UT Austin.

How were the results disseminated to communities of interest?

We disseminated our research findings through presentations and manuscript publications as mentioned below (section 6).

What do you plan to do during the next reporting period to accomplish the goals?

During the next reporting period, the research team will continue working on CY19/20 goals under the no cost extension. The primary focus will include Specific Aim 3 (subtask 3) and Specific Aim 6 (subtasks 1-5). The research team will continue to work on the research protocols, data analysis, and manuscript writing. Upon completion of the studies, the research team will begin closing and archiving the five (5) primary USAISR research protocols during the final year and/or no cost extension period.

4. IMPACT:

What was the impact on the development of the principal discipline(s) of the project?

If there is nothing significant to report during this reporting period, state “Nothing to Report.”

What was the impact on other disciplines?

Our research results have had a positive impact on improved data collection by the Joint Trauma Systems (JTS) Department of Defense Trauma Registry (DoDTR). As a part of our research methods, our team utilized very large/robust DoDTR datasets. After our team cleaned and analyzed this retrospective dataset, we were able to identify gaps that contributed to the JTS DoDTR movement to improve future data capture regarding accurate injury severity and times of treatment and transport. Additionally, we feel that our ongoing research efforts and collaborations with the JTS have helped inspire updates to the DoDTR data dictionary.

Additionally, our research team previously launched a DoD approved survey to over 23,000 military nurses and medics to ask about their pre-deployment training experiences. The results from our study/survey resulted in a manuscript recently published during this reporting period (October 2020). Our research determined that most nurse and medic respondents were satisfied with the quality of their training and were prepared/confident to provide care. We anticipate our recommendations and results from this study will have a positive impact on military leadership.

What was the impact on technology transfer?

Nothing to Report

What was the impact on society beyond science and technology?

Nothing to Report

5. CHANGES/PROBLEMS:

Changes in approach and reasons for change

The PI and research team anticipated submitting a no cost extension during this reporting period due to previous delays with obtaining retrospective data under the Defense Health Agency (DHA) Data Sharing Agreement (DSA) process implemented 2018/2019. This change was a new requirement for data requests requiring the research team to complete the DSA and obtaining approval prior to receiving retrospective data. During this reporting period, the research team renewed the DHA DSA.

Actual or anticipated problems or delays and actions or plans to resolve them

During this reporting period, the coronavirus (Covid-19) pandemic had a significant and unanticipated global impact. In an effort to help stop the spread and quarantine it, the hospital and institute had urgent and immediate requirements to socially distance, cancel conferences, and work remotely as required by the Commander. Despite the challenges, our research team was fully equipped and prepared to work remotely. Our research team previously received DoD issued laptops and access to VPN. Therefore, our team was able to assist others and help mitigate additional potential research-related and technology delays.

Changes that had a significant impact on expenditures

During this reporting period, the research team continue to increase productivity due to the ongoing collaborations. The research team has continued to accomplish the project deliverables, ongoing dissemination efforts, and continues to work with subject matter experts and collaborators across the DoD. Due to the additional savings, the research team will be able to continue working the SOW deliverables, ongoing research efforts, publications, and dissemination efforts during the no cost extension period.

Significant changes in use or care of human subjects, vertebrate animals, biohazards, and/or select agents

Nothing to report.

Significant changes in use or care of human subjects

Nothing to report.

Significant changes in use or care of vertebrate animals

Nothing to report.

Significant changes in use of biohazards and/or select agents

Nothing to report.

6. PRODUCTS:**Publications, conference papers, and presentations****Journal publications.**

1. Staudt, A. M., Suresh, M. R., Gurney, J. M., Trevino, J. D., Valdez-Delgado, K. K., VanFosson, C. A., Butler, F. K., Mann-Salinas, E. A., & Kotwal, R. S. (2020). Forward surgical team procedural burden and non-operative interventions by the US military trauma system in Afghanistan, 2008-2014. *Military Medicine*, 185(5/6), e759-e767. doi: 10.1093/milmed/usz402 PMID: 31863088; Acknowledgement of federal support: Yes
2. Suresh, M. R., Valdez-Delgado, K. K. VanFosson, C. A., Trevino, J. D., Mann-Salinas, E. A., Shackelford S. A., & Staudt, A. M.(2020). Anatomic injury patterns in combat casualties treated by forward surgical teams. *Journal of Trauma and Acute Care Surgery*, 89(2,

Supplement 2), S231-S236. doi: 10.1097/TA.0000000000002720 PMID: 32282757;

Acknowledgement of federal support: Yes

3. Suresh, M., Valdez-Delgado, K., Staudt, A., Trevino, J., Mann-Salinas, E., & VanFosson, C. An assessment of pre-deployment training for Army Nurses and Medics. *Military Medicine*. doi: 10.1093/milmed/usaa291; Acknowledgement of federal support: Yes
4. MAJ Ian L. Hudson, MC, USA; Megan B. Blackburn, PhD; Amanda M. Staudt, PhD; Kathy L. Ryan, PhD; Elizabeth A. Mann-Salinas, PhD. Analysis of Casualties That Underwent Airway Management Before Reaching Role 2 Facilities in the Afghanistan Conflict 2008–2014. *Military Medicine*. 185, S1:10, 2020; Acknowledgement of federal support: Yes
5. Gurney J, Staudt A, Cap A, Shackelford S, Mann-Salinas E, Le T, Nessen S, Spinella P. Improved survival in critically injured combat casualties treated with fresh whole blood by forward surgical teams in Afghanistan. *Transfusion*. 2020 Jun;60 Suppl 3:S180-S188. Acknowledgement of federal support: Yes

Books or other non-periodical, one-time publications.

Nothing to report.

Other publications, conference papers and presentations.

- 2020 Committee on Surgical Combat Casualty Care (CoSCCC)
 - 4th quarter abstract selection
- 2020 National Museum of Health and Medicine Science Café slides show presentation (Nov. 2020)
- 2020 Defense Health Agency Nurses' Week Celebration (online webinar)
 - Continuing Education Presenter, "Improving Nurse Readiness for Combat Casualty Care 4-12 May 2020"
- 2020 ABA Call for Abstracts
 - "Incidence of Bone Fracture Rate Post-Burn and Trauma in Role 2 and 3 Treatment Centers"
- 2020 Tri-Service Nursing Research Symposium (pre-recorded virtual presentations)
 - "Anatomic Injury Patterns in Combat Casualties Treated by Forward Surgical Teams"
 - "Combat Casualty Care Readiness Following a Level 1 Trauma Clinical Exposure Training"
- 2020 Military Health Systems Research Symposium (call for abstracts)
 - "Characteristics and Resource Consumption of Burn Casualties Treated at Role 2 Facilities in Afghanistan"
 - "A Deeper Dive into the Pre-Deployment Practices for Medics assigned to Point of Injury Care"
 - "Forward Surgical Team Outcomes in Afghanistan, 2006-2015"
- 2020 SHOCK Call for Abstracts (call for abstracts)
 - "Incidence of Bone Fracture Rate Post-Burn and Trauma in Role 2 and 3 Treatment Centers"
- 2020 Southern Region Burn (call for abstracts, virtual conference)
 - "Characteristics and Resource Consumption of Burn Casualties Treated at Role 2 Facilities in Afghanistan"
- 2020 Western Trauma Association (in-person presentation)

- “Whole Blood at the Tip of the Spear: Analysis of Fresh Whole Blood Resuscitation Versus Component Therapy in Severely Injured Combat Casualties” February 28, 2020
- USAISR Scientific Seminar (in-person presentation)
 - “Whole Blood at the Tip of the Spear: Analysis of Fresh Whole Blood Resuscitation Versus Component Therapy in Severely Injured Combat Casualties” WTA presentation plus “Roles of Care” February 12, 2020

Website(s) or other Internet site(s)

Nothing to report.

Technologies or techniques

Nothing to report.

Inventions, patent applications, and/or licenses

Nothing to report.

Other Products

Nothing to report.

7. PARTICIPANTS & OTHER COLLABORATING ORGANIZATIONS

- LTC Christopher VanFosson
- COL (Ret.) Elizabeth Mann-Salinas
- Amanda Staudt, PhD
- Jennifer Trevino, MBA
- Krystal Valdez-Delgado, BSN, RN
- COL Jennifer Gurney, MD
- Mithun Suresh, MD
- COL (Ret.) Russ Kotwal, MD
- Susan Boyer, DNP
- Richelle Power, BSN, RN
- Andrea Parodi, PhD
- Nadine Baez
- Col. Stacy Shackelford
- Tuan D. Le, MD, Dr. PH
- Kirby Gross
- Jeff Bailey
- Timothy Hodgetts
- Ian Lane
- Rory Rickard
- Kyle Remick
- John Oh
- David Cannon
- Avi Benov
- Jacob Chen
- Ariel Furer
- Matt Borgman
- Zsolt Stockinger
- Linda Sousse
- Ben Antebi
- Patrick Reeves
- Christina Hahn
- Jessica Rivera
- Daniel Stinner
- James Blair
- Joseph Wenke
- Michael Charlton
- John F. Kragh
- Shawn Nessen
- Andrew Cap
- Brian Eastridge
- Eric Epley
- Geir Strandenes
- Philip Spinella
- Jeffrey Dawley
- Sharon Smith
- Monica Phillips
- Ian Hudson
- LTC Mazuchowski
- Patrick Mason
- LTC Edwards
- Eric Elster
- Meredith Hettinger
- CPT Christy Lang
- Deborah del Junco
- Julie Rizzo

Has there been a change in the active other support of the PD/PI(s) or senior/key personnel since the last reporting period? Nothing to report.

What other organizations were involved as partners? Nothing to report.

8. SPECIAL REPORTING REQUIREMENTS

COLLABORATIVE AWARDS: Nothing to report.

QUAD CHARTS: Attached.

9. APPENDICES:

- Abstracts, presentations, CoSCCC selection, and twitter advertisement
- Appendix: Medication Dose Units
- Curriculum Vitae (PI)
- Manuscripts (5)