Combat Casualty Care Panel

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Lt Col Jennifer Hatzfeld

Combat Casualty Care Research Program

US Army Medical Research and Materiel Command

24 March 2015

Panel Members

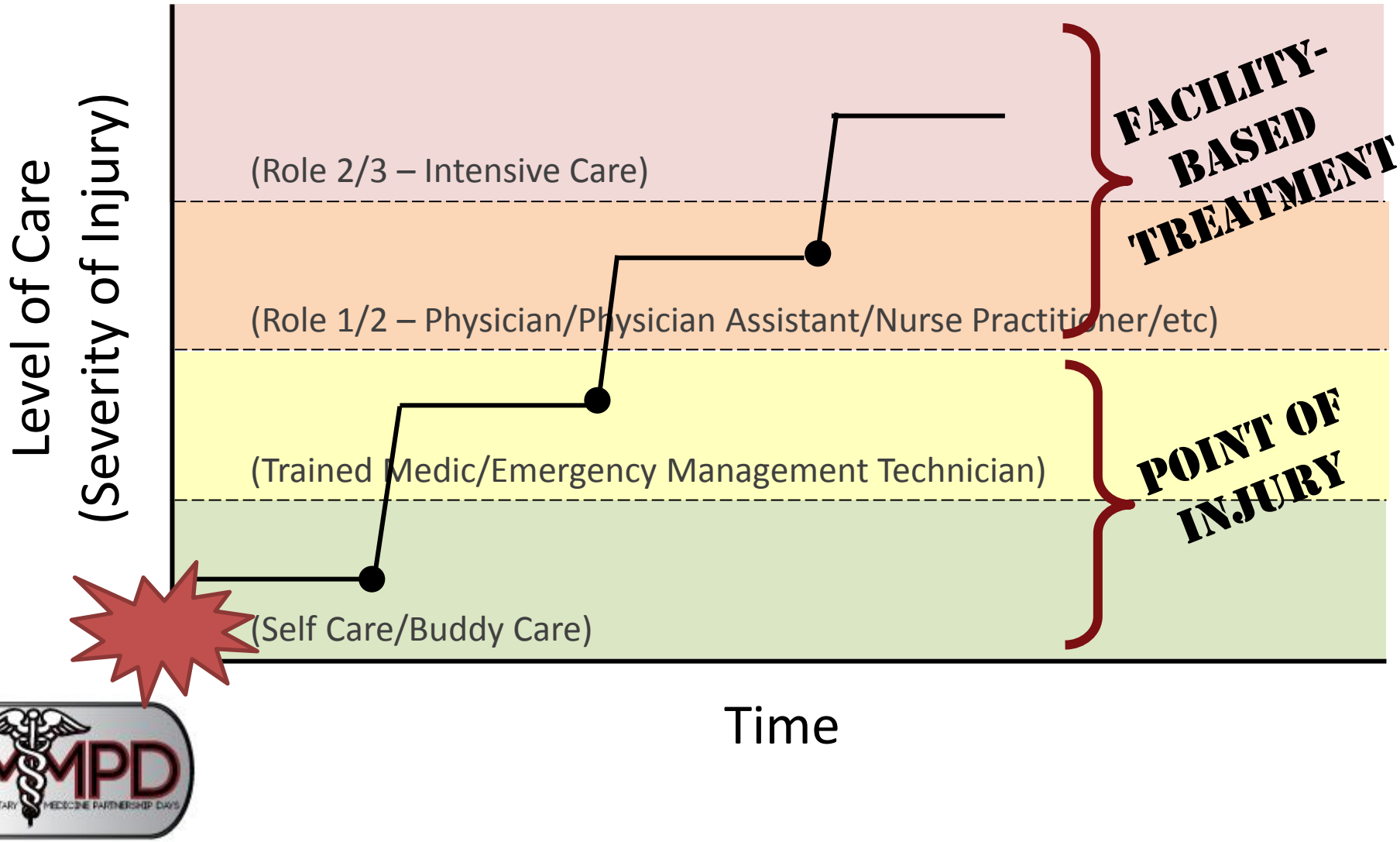
- **Lt Col Jennifer Hatzfeld** – Combat Casualty Care Overview
- **Dr. Carmen Hinojosa-Laborde** – Point of Injury
- **Dr. Robert Christy** – Facility Based Treatment
- **Ms. Kristy Pottol** – Tissue Injury and Regenerative Medicine
- **Mr. Daniel Kennedy** – Medical Device Advanced Development
- **Dr. Victor Macdonald** – Blood Product Advanced Development
- **Ms. Nita Grimsley** – Funding Opportunities

Purpose of Panel Discussion

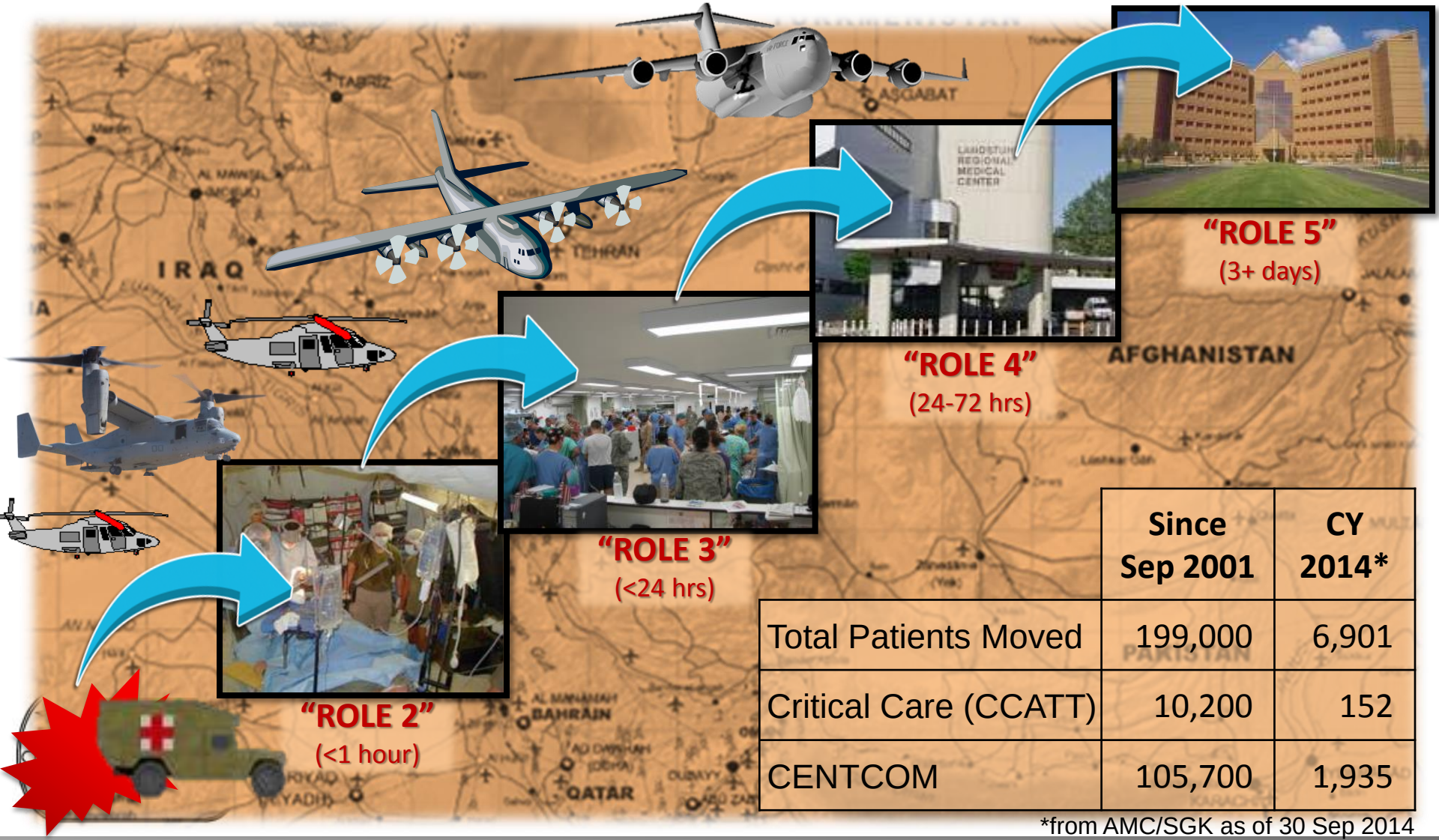
To increase understanding about Combat Casualty Care research focus areas and priorities.

1. Reduce the mortality and morbidity associated with combat-related trauma
   - *Continuum of Care*
   - *Future Operations*
2. Identify and develop medical techniques and materiel for early interventions
   - *Point of Injury*
   - *Form/Fit Factor*
3. Translate military-relevant basic and preclinical trauma research into clinical practice
   - *Facility-Based Treatment*
   - *Clinical Relevance*

Continuity of Care



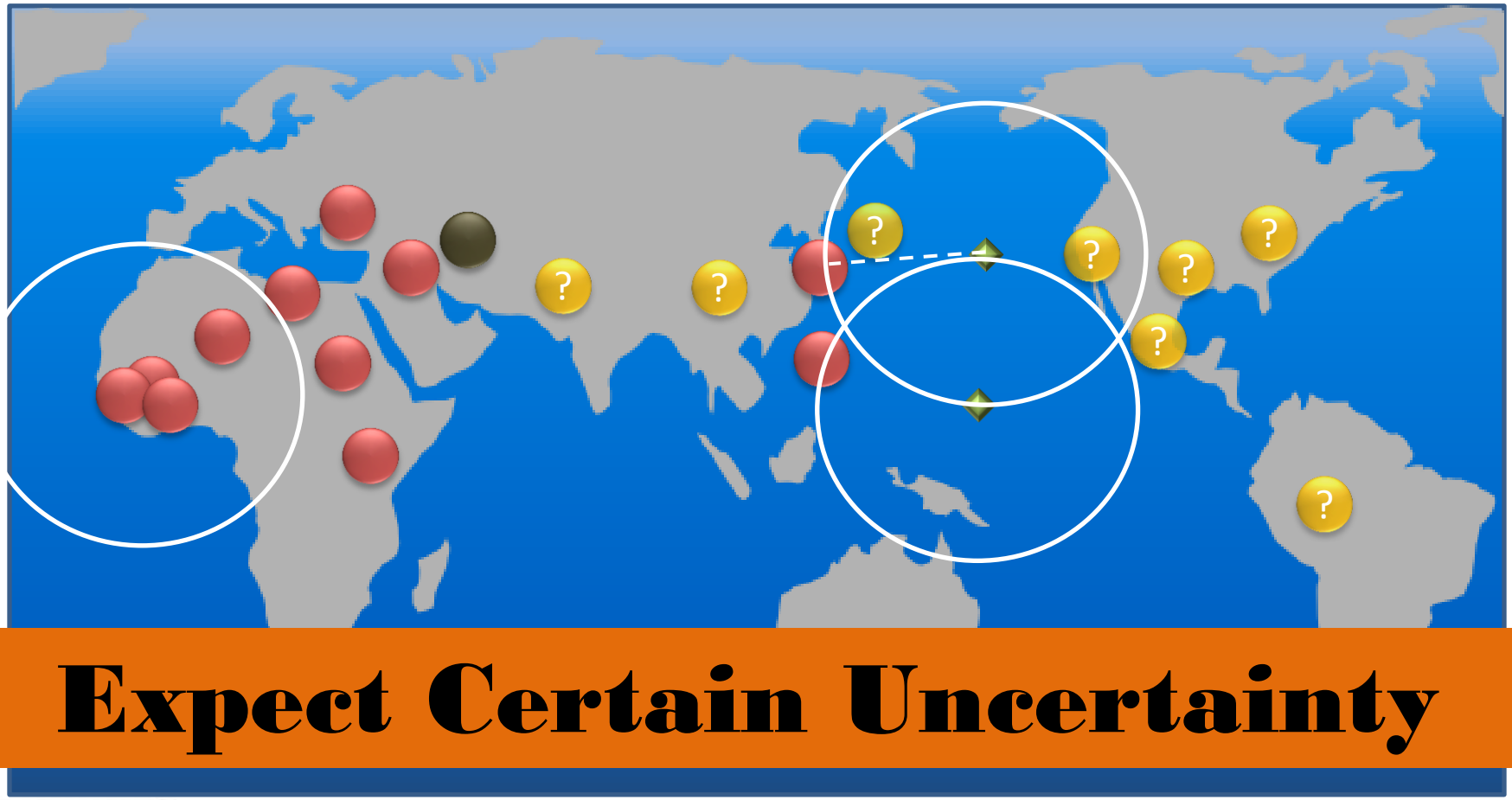
Current Operations:
A Seamless Continuum of Care



	Since Sep 2001	CY 2014*
Total Patients Moved	199,000	6,901
Critical Care (CCATT)	10,200	152
CENTCOM	105,700	1,935

*from AMC/SGK as of 30 Sep 2014

Future Operations



Expect Certain Uncertainty

Note: map is not to scale; for notional purposes only

Point of Injury

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Dr. Carmen Hinojosa-Laborde

Tactical Combat Casualty Care Research

US Army Institute for Surgical Research

24 March 2015

Tactical Combat Casualty Care

- Airway
- Breathing
- Bleeding
- IV access (if needed)
- Fluids/whole blood (keep SBP 80-90 mmHg)
- Prevent hypothermia
- Monitor
- Inspect/dress wounds
- Manage Pain
- Splint Fractures
- Antibiotics
- Document

(from TCCC Guidelines, 2 Jun 2014)

*Additional tasks may be appropriate, depending on the nature of the injury.

Monitoring Capability

- Pulse-oximetry
- Manual blood pressure cuff
- Medic's assessment skills
  - Level of consciousness
  - Palpated pulse (radial/brachial/inguinal)
  - Active bleeding

Form/Fit Factor

- Incorporate into current practices
  - Easily transportable (i.e., small, lightweight, and durable in extreme environments and handling)
  - Easy to use, low maintenance
  - Does not require refrigeration or other special handling
- Challenges
- Recommendations

Point of Injury: Future Gaps

- Prolonged Field Care
- Provide physiologically-based capability (not time-based)
- Telementoring (reach-back capability)
- Anticipate point of injury needs to meet Army's "Force 2025 and Beyond" (http://www.arcic.army.mil/Initiatives/force-2025-beyond.aspx)

Facility Based Treatment

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Dr. Robert Christy

Extremity Trauma and Burns

US Army Institute for Surgical Research

24 March 2015

Treatment Capabilities *(from JP 4-02)*

- **Forward Care Capability**
  - Advanced emergency medical treatment located as close to the point of injury as possible
  - Focus on stabilizing the patient, providing lifesaving and limb-saving medical treatment.
  - Surgical services: trauma, general, thoracic, and orthopedic surgery capabilities.
- **Theater Hospitalization Capability**
  - Deploy as modules or multiple individual capabilities that provide incrementally increased medical services.
  - Focus on return the patient to duty and/or stabilization to ensure the patient can tolerate evacuation to a definitive care facility.
  - Includes primary inpatient and outpatient care, emergent care, and enhanced medical, surgical, and ancillary capabilities.
  - Can vary according to the regional infrastructure, operational area, and tempo of operation; may include additional surgical capabilities for eye, maxillofacial, and neurosurgery.

Treatment Capabilities

- **Intensive Care Unit Capability**
  - Continuous stabilization the patient, optimized trauma and burn care
  - Implementation of definitive treatment and monitoring
  - Including continuous monitoring systems and intensive care specialists
  - Provide instrumentation for detection and definitive treatment of organ failure (e.g. lung, kidney) using extracorporeal organ support.
  - Point of care laboratory based results to provide improved diagnosis capabilities

Patient Treatment Gaps

- **Equipment, diagnostics and therapies**
  - Adapt modular equipment to integrate with other monitors/devices/accessories in closed-loop systems
  - Point-of-care clinically relevant (trauma) biomarker diagnostics
  - Stem cell based acute trauma therapies
  - Immunoregulatory treatments to reduce organ damage/failure
  - Treatments to reduce pain

- **Trauma patient clinical outcomes**
  - Validated trauma/burn patient clinical trials
  - Can be incorporated into clinical practice guidelines
  - Allows for cost/benefit analysis

Treatment: Challenges

- Tri-service (Army, Air Force, Navy) solutions
- Anticipate requirements to meet Army's "Force 2025 and Beyond" (http://www.arcic.army.mil/Initiatives/force-2025-beyond.aspx)
- Providing current hospital based treatments on the battlefield

Treatment: Goal

- Show measurable improvement in outcomes
  - Mortality and Morbidity
  - Reconstruction and Regeneration
  - Rehabilitation
  - Reintegration

"Until there are ZERO deaths, ZERO pain, and ZERO scars…"
– S.W

Tissue Injury and Regenerative Medicine

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Kristy Pottol
Tissue Injury and Regenerative Medicine
Project Management Office
US Army Medical Research and Materiel Command
24 March 2015

Tissue Injury and Regenerative Medicine

To build industrial capacity, reduce barriers to entry, and decrease cost of goods sold for:

- *Vascular defects*
- *Tissue injury wound management*

Key Objectives

1. Enabling technology for vascular injury
   - *Tissue preservation*
   - *Bridging gaps for vascular defects greater than 2.5 centimeters*

2. Tissue injury / wound management
   - *Optimize tissue healing environment*
   - *Control or modulate inflammatory response to trauma*
   - *Simplified solutions for use by untrained operators*

Advanced Development

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Dan Kennedy

PM Medical Devices

US Army Medical Research and Materiel Command

24 March 2015

Product Life Cycle

JPC1: Medical Simulation and Health Information Science

JPC2: Military Infectious Disease

JPC5: Military Operational Medicine

JPC6: Combat Casualty Care

JPC7: Medical Radiological Defense

JPC8: Clinical and Rehabilitative Medicine

BARDA, ISR
DARPA, TATRC,
CDMRP, Universities

S&T

Advanced Development

Sets, Kits & Outfits

Technology Transfer

6.1	6.2	6.3	6.4	6.5	Procurement
TRL 1-3	TRL 4-5	TRL 5-6	TRL 6-7	TRL 7-8	TRL 8-9
Discovery	Preclinical	Phase I-II	Phase II-III	Phase III	Production & Deployment
				Premarket approval process (PMA) or 510(k)	Phase FDA Approved

Highlights

- Advanced Developer early
- Requirement
- Funding
- IPT/Charter (industry partnership)
- Regulatory
- Contracting
- CRADA (Tech Transfer Laboratory)

Blood Products in Advanced Development

Decreasing Deaths Due to Hemorrhage

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Dr. Victor W. Macdonald

Pharmaceutical Systems Project Mgmt. Office, USAMMDA

US Army Medical Research and Materiel Command

24 March 2015

Purpose

Decrease battlefield hemorrhage deaths by promoting hemostasis with safer, more effective blood products.

- Risk to Soldiers:
  - From 2001-11, up to 26% (~1,075 deaths) of total Pre-MTF injury related combat deaths may have been preventable (KIA Level 1)
  - 91% of these deaths were due to hemorrhage (*24% of all total pre-MTF combat deaths*)
- Requirement:
  - Army ICD for TC3, Oct 2007: 7.b (3) Blood products: new or improved blood components, new or improved production, preservation and storage of blood components, and/or invention and production of blood component substitutes
- CONOPS:
  - Product will be deployed at ROC-3 and ROC-2, with potential for deployment farther forward

Blood Products

1. PLASMA
   - *Freeze-Dried Plasma*
   - *Spray-Dried plasma*
2. PLATELETS
   - *DMSO Cryopreserved Platelets*
   - *Freeze-Dried Platelets*
   - *Refrigerated Platelets*
3. RED BLOOD CELLS
   - *Extended Shelf-Life Liquid Stored Red Blood Cells*
4. WHOLE BLOOD
   - *Pathogen Reduction*

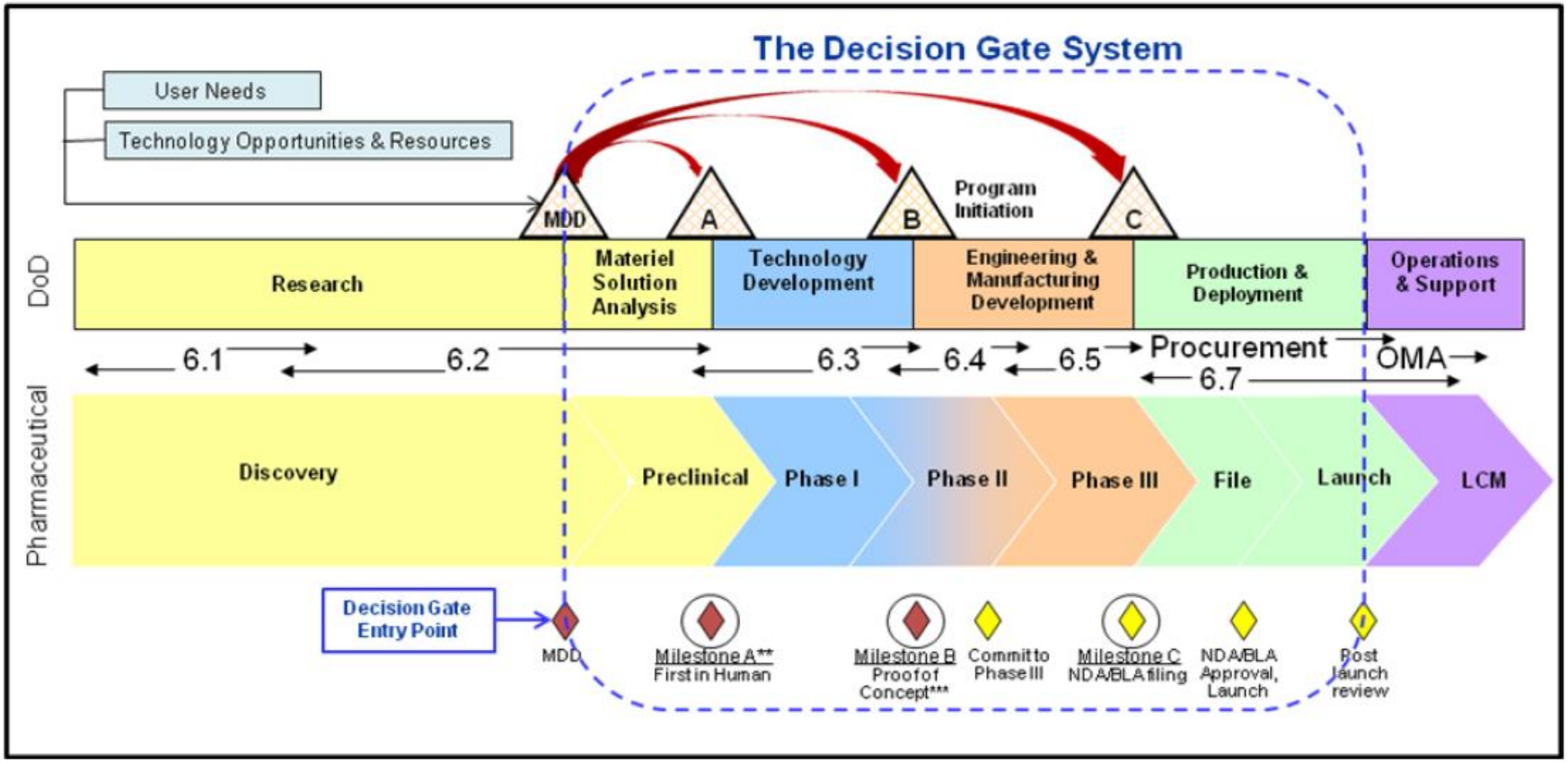
CCC Overall Product Context

Discovery-Knowledge (6.1/6.2/6.3) *Topic Areas* TRL 1-3	Discovery-Product (6.2/6.3) *Specific Candidate Concepts/Drugs/Devices* TRL 3-4	Late Discovery/Transition (6.3) Pre-clinical & Early Clinical Studies *on Selected Lead Concept/Drug/Device Expected Transition w/in 2 yrs* TRL 4-5	Full (Clinical) Development (6.4/6.5) *Specific Product* TRL 5-9
Coagulopathy of Trauma Exploratory animal and in vitro research for Hemostatic, Inflammatory, and Metabolic Modulation	<u>Improved Blood Products</u> Improved liquid stored platelets (refrigerated & new RT solutions) <u>Damage Control Resuscitation</u> Multifunctional Blood Substitute <u>Inflammatory Modulation</u> Prioritized list of molecules <u>Metabolic and Tissue Stabilization</u> Other approaches and molecules <u>Hemostatics</u> Hemostatic drugs; Hemostatic devices-use in prolonged evacuation	FTY720 C1-inhibitor Ethinyl Estradiol 3-Sulfate Perflourocarbon (Cross-over) Intracavitary Hemostatic (WSS) GroKlot ClotFoam	Spray-dried SD Plasma Platelet-derived Hemostatic Agent Valproic Acid Lyophilized Plasma Extended-Life Red Cells* Cryopreserved Platelets Whole Blood Pathogen Reduction Technology (WBPRT) Hemostatic Pellets*

<u>Knowledge Products To Support Clinical Practice</u>
Prehospital Use of Plasma for Traumatic Hemorrhage
Targeted Studies of Tranexamic Acid
Transfusion Ratios Study
Age of Red Cells
Frozen Red Cells in Trauma

***Recent FDA approval**

Product Development Stages



TRL: 1 2 3 4 5 6 7 8 9

Industry Participation

1. WHEN
   - *Anytime in the Development Process*
   - *Product Specific but the Earlier the Better*

2. WHY
   - *Manufacturing (cGMP) Development & Commercialization*
   - *Preclinical Testing (cGLP), Clinical Trials (GCP) - Phase 1, 2, 3*
   - *BLA Submission & FDA Approval*

3. HOW
   - *Contract*
   - *Cooperative Research And Development Agreement (CRADA)*
   - *Information Exchange & Control Thru IPT's.*

4. CONCERNS
   - *IP Protection*
   - *Access to Complete Tech Data Package or Drug Master File*
   - *Fielding of FDA Approved Products for the Warfighter*

Additional Funding Opportunities

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Ms. Nita Grimsley

Combat Casualty Care Research Program

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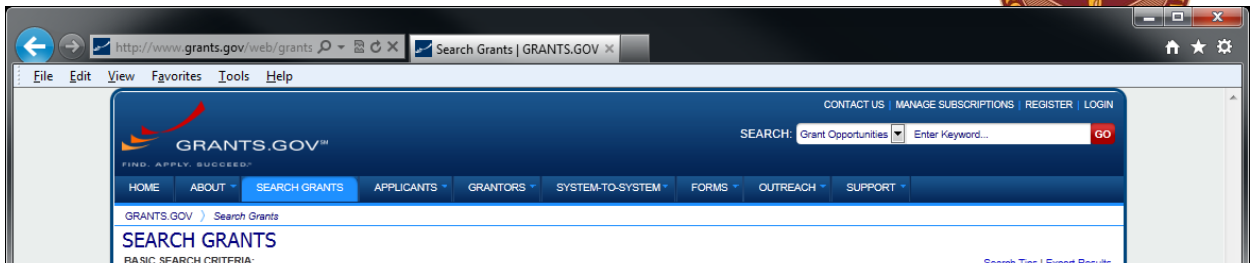
USAMRMC Broad Agency Announcement (1 of 2)

- Several funding streams programmed through the CCCRP.
- Historically Joint Program Committee (JPC) funding has been programmed solely through targeted solicitations (Program Announcements and Requests for Proposals)
- Recent change in approach has re-opened our use of the Request for Information and the Broad Agency Announcement (BAA)
- Two part application process: Pre-proposal and Full Proposal
  - Pre-proposal process located at the following location in a section titled 'New for Fiscal Year 2015': https://www.usamraa.army.mil/pages/Baa_Forms/index.cfm?
  - Pre-proposal submission site has changed. Applications are now submitted through the following link: https://eBRAP.org

USAMRMC Broad Agency Announcement (2 of 2)

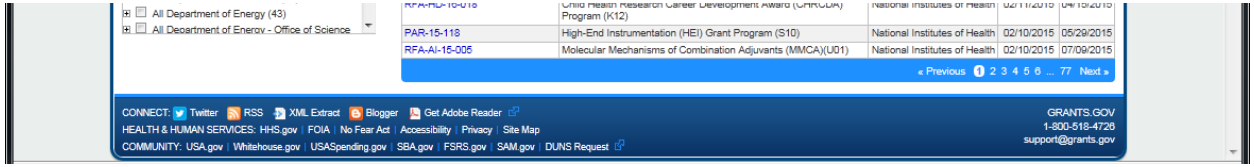
Located at:
http://www.grants.gov



General Information

Document Type:	Grants Notice
Funding Opportunity Number:	W81XWH-BAA-15-1
Funding Opportunity Title:	DoD USAMRMC FY15 Broad Agency Announcement for Extramural Medical Research
Opportunity Category:	Discretionary
Funding Instrument Type:	Cooperative Agreement Grant Procurement Contract
Category of Funding Activity:	Science and Technology and other Research and Development
Category Explanation:	
Expected Number of Awards:	
CFDA Number(s):	12.420 -- Military Medical Research and Development
Cost Sharing or Matching Requirement:	No

Posted Date:	Oct 1, 2014
Creation Date:	Sep 30, 2014
Original Closing Date for Applications:	Sep 30, 2015
Current Closing Date for Applications:	Sep 30, 2015
Archive Date:	Oct 30, 2015
Estimated Total Program Funding:	
Award Ceiling:	
Award Floor:	



Topics of Interest

- Areas of research should fall into the following categories as they relate to the immediate care, transport and early definitive care of the injured warfighter
  - Hemorrhage control and fluid resuscitation strategies and products
  - First responder care in addition to the control of bleeding
  - Traumatic brain injury care for both immediate diagnostics and treatment, and the reduction of long-term complications
  - Forward surgical and intensive care techniques, therapeutics and devices
  - Enroute care from point of injury to Level II/III and then prolonged transport back to CONUS
  - Advanced care throughout the continuum for organ support and treatment, and both hard and soft tissue injuries

Reference

- Current RFIs on Fed Biz Opps
  - **W81XWH-15-R-PREHOSPITALMORTALITY-0001:** Coordinated, multi-disciplinary, multi-institution, effort to improve the understanding of pre-hospital mortality from severe trauma or injury in the civilian setting (Response Date 13 APR, 2015)
  - **W81XWH-15-CLINCIALRESEARCHNET-0001:** Multicenter Clinical Research Network dedicated to military-relevant trauma and emergency care research (Response Date 03 APR, 2015)

Questions?

For additional questions after the conclusion of the conference, send an email message to usarmy.detrick.medcom-usamrmc.mbx.mmpd@mail.mil