



US ARMY
INSTITUTE OF SURGICAL RESEARCH

“Research for the Soldier”
Combat Casualty Care

“Taking Care of the Soldier”
Trauma, Burn, and Critical Care

Name of Briefer
Date



A photograph of a soldier in full combat gear, including a helmet and goggles, kneeling on the ground. He is looking towards the camera. In the background, another soldier is lying on the ground, and there is a bright orange flag or marker. The scene is set in a dusty, outdoor environment, likely a battlefield.

A Long History of Research-Clinical Collaboration



Established as Surgical Research Unit at Halloran General Hospital, Staten Island, New York 1943 - 1947

Moved to BAMC 1947; Mission Expanded in 1949 to Encompass the Study of Thermal Injury; Assigned to USAMRDC in 1958; Renamed US Army Institute of Surgical Research in 1970

SRU / USAISR
1947 - 1970



Army Burn Unit
Brooke General Hospital
1949 - 1996

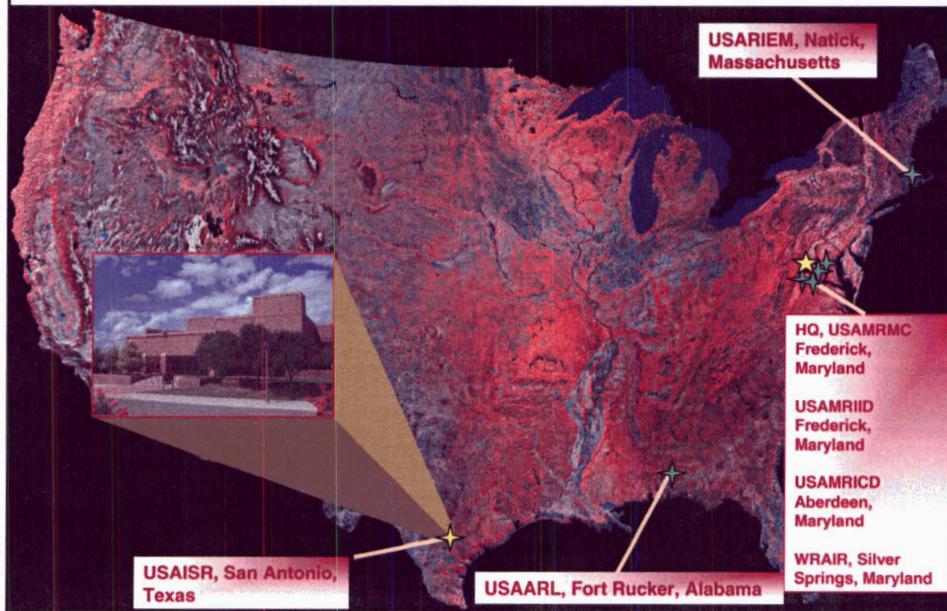


USAISR OPCON to BAMC in April 2002; Incorporated the Trauma Division in May 2003
USAISR Mutual Support to BAMC in Jun 2005

U.S. Army Institute of Surgical Research
at Brooke Army Medical Center
1996 to Present

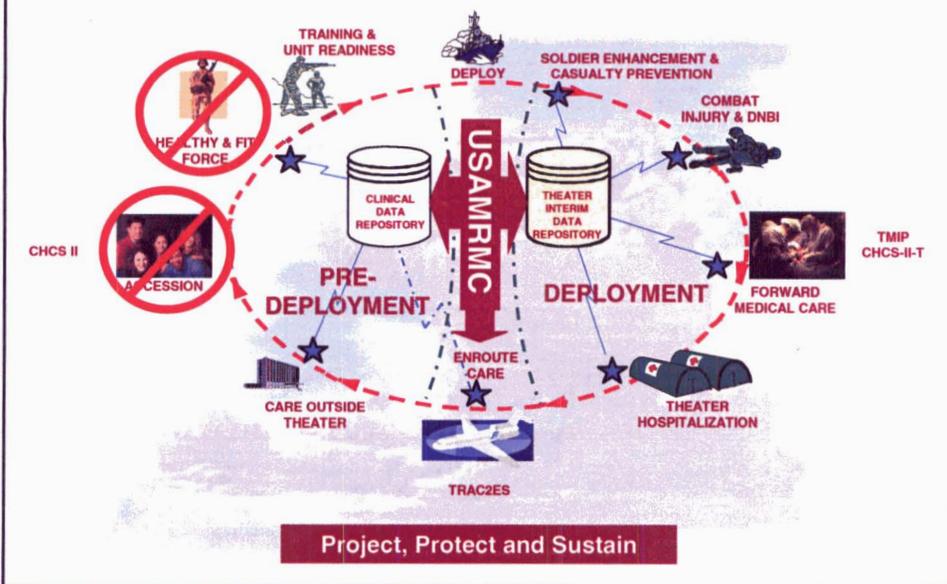


Subordinate Command of U.S. Army Medical Research and Materiel Command



USAMRMC Health Service Support Integration

Concept Development/Technology Insertion * Force Trainer * Force Provider





Mutual Support Relationship



MVMC VISION: Deliver the best medical solutions to enhance, protect, and treat the warfighter on point for the Nation – Today and Tomorrow.

BAMC VISION: Be the premier DOD Center of Excellence in health care, education and training, and its research as a national asset crucial to the direct support of our Armed Forces' total readiness mission.



MISSION



- Provide requirements driven combat casualty care medical solutions and products for injured soldiers from self-aid through definitive care across the full spectrum of military operations

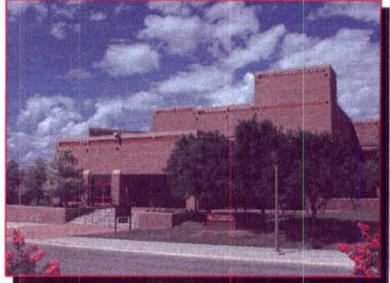
- Provide state-of-the-art burn, trauma, and critical care to DOD beneficiaries around the world

- Provide Special Medical Augmentation Response Teams (SMART) - Burn and Trauma





VISION



To be the DOD's premier Combat Casualty Care Research, Trauma, Burn, and Critical Care Center in support of the medical needs of the warfighter and our beneficiaries.



GOALS



- 1. Ensure the Institute is flexible and capable of responding to the warfighters' combat casualty care needs from self-aid to definitive care across the full spectrum of military operations.**
- 2. Capitalize on advances in science and technology that will ensure the operational force is equipped with significantly advanced combat casualty care systems.**
- 3. Empower our people to act on the mission/vision; keep our people competent and relevant; recruit and retain highly qualified people; promote leadership and leadership teams.**



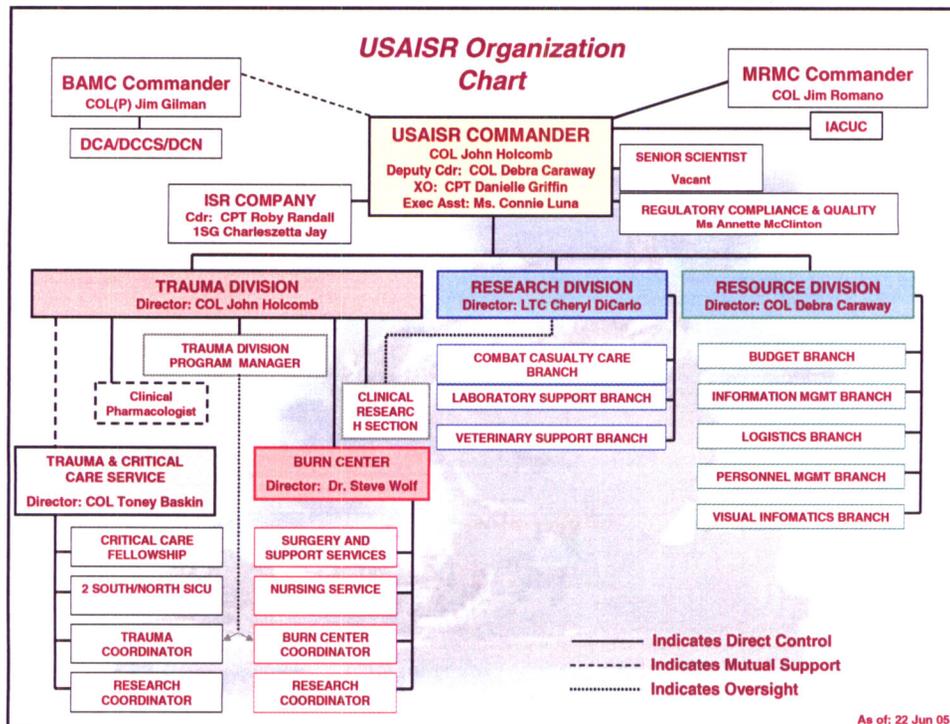
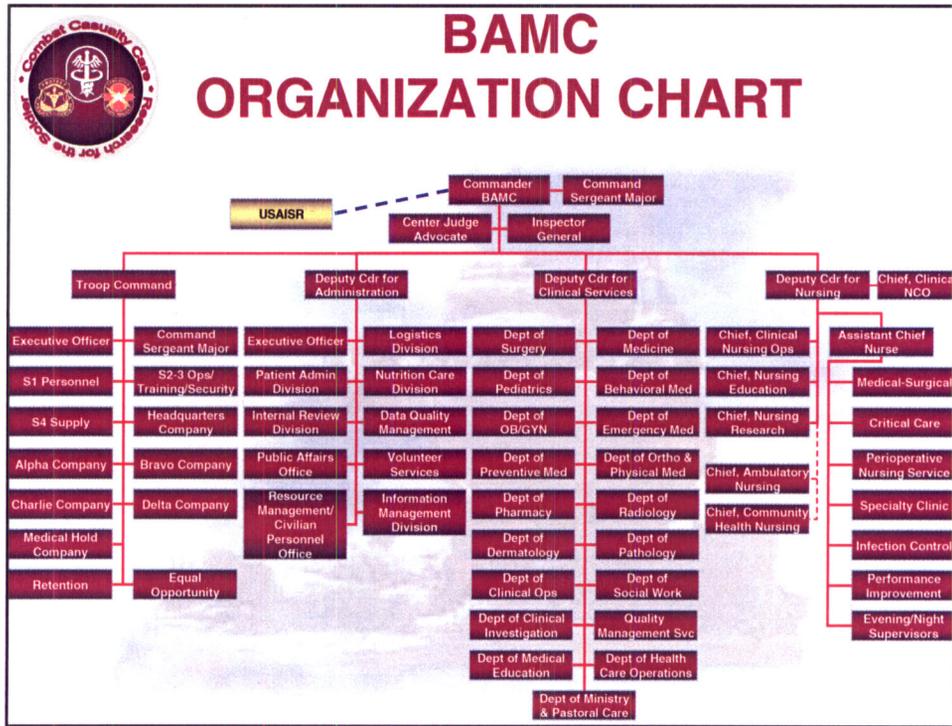


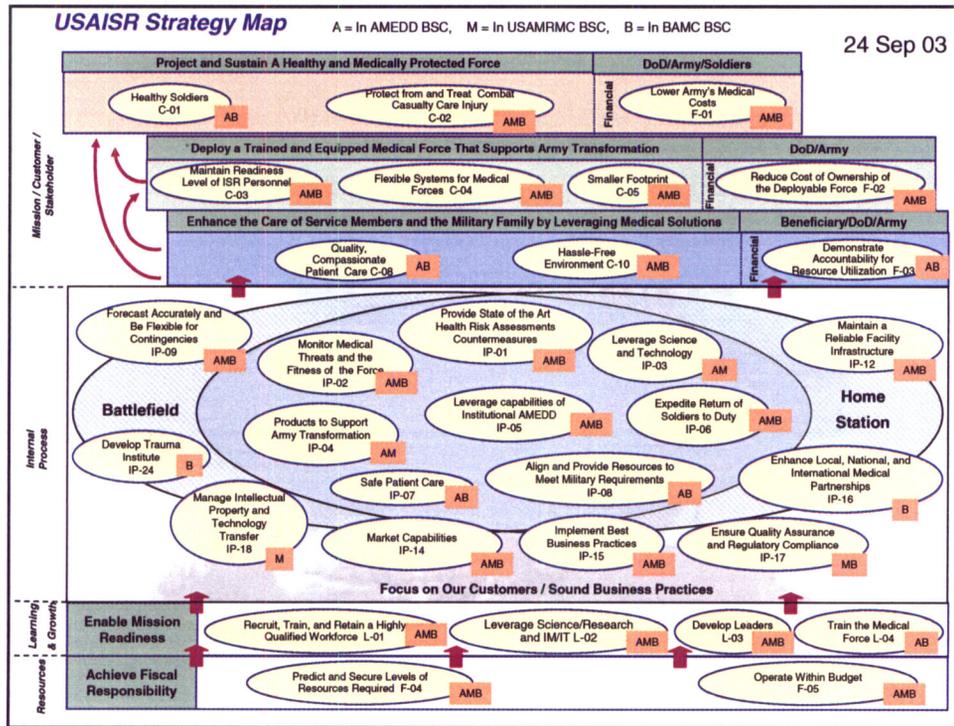


Mutual Support Relationship

- Military**
 - 38% of ISR personnel
 - BAMC administers limited personnel and training actions
 - PROFIS - select deployment of ISR personnel
- Civilian - Lab Demo**
 - 21% of ISR personnel
 - Not managed through BAMC
 - Not included in Collective Bargaining Unit
- Contract**
 - 40% of ISR personnel
 - Challenges due to regulatory requirements
- P6 (Research) vs P8 (Medical) TDA**
 - DMHRS counts P6 as borrowed
 - Conversion to P8 not possible
 - Research Division: Auth 68 – Assigned 115 (69% over TDA auth)
 - Burn Center: Auth 116 – Assigned 200 (72 % over TDA auth)
- P6 Budget**
 - Combination of Research funds and extramurals
 - Research expenses and ISR overhead
- P8 Budget**
 - Combination of BAMC DHP funds and OTSG funds
 - Direct patient care expenses

As of: 22 Jun 05







Level I Trauma Center

- American College of Surgeons, Committee on Trauma Verified
- Verification standards
 - Patient volumes (1200 minimum and 240 ISS > 15)
 - Continuity of care
 - Rehabilitation Services
 - Performance Improvement
 - Education/Outreach
 - Injury Prevention
 - Research
- Commitment to Trauma as a Regional Resource



Trauma Division

- DOD's only comprehensive trauma, burn, and surgical/critical care service
 - Burn Center admits ~ 400 burn patients annually
 - Trauma Center admits ~ 1200 patients annually
 - 240 with ISS > 15 Required for Verification
 - Burn and trauma training for physicians, nurses and all allied health professionals
- Prospective Clinical Trauma Research Program:
 - HBOC - First prospective community consent protocol in DOD, BAMC IRB approved - process ongoing
 - Improved wound Dressing – Ongoing prospective random study
 - NIRS protocol - Non invasive monitoring in SICU
- 1 year Trauma Research Fellowship
- 1 year Surgical/Critical Care Fellowship } Only ones in DOD



Trauma Critical Care Service

Personnel = 10

Located on 2d Floor

- 1 - Trauma and Critical Care Surgeon
- 1 - Medical Intensivist
- 1 - Surgical Critical Care Fellow
- 1 - Trauma Social Worker
- 1 - Trauma Program Manager
- 1 - Trauma Division Program Manager



Located on 4th Floor, Burn Center

- 2 - Trauma Nurse Coordinators
- 2 - Trauma Registrars



TRAUMA CRITICAL CARE SERVICE



- Level 1 Trauma Center
- 20 Surgical Critical Care Beds (Largest SICU in DOD)
 - 1,127 Critical Care admissions (Jun 04- May 05)
 - (25-30% Trauma)
 - 1,162 Trauma admissions (Jun 04- May 05)
 - 238 with ISS > 15
 - 103 OIF Trauma patients – mostly ortho (Jun 04- May 05)
- ACS verified - Oct 04; State designated - Mar 03
- Follow-up Civilian Outpatient Visits managed through Civilian Care Coordination Office (CCCO)

As of: 8 Jun 05



TRAUMA CRITICAL CARE SERVICE

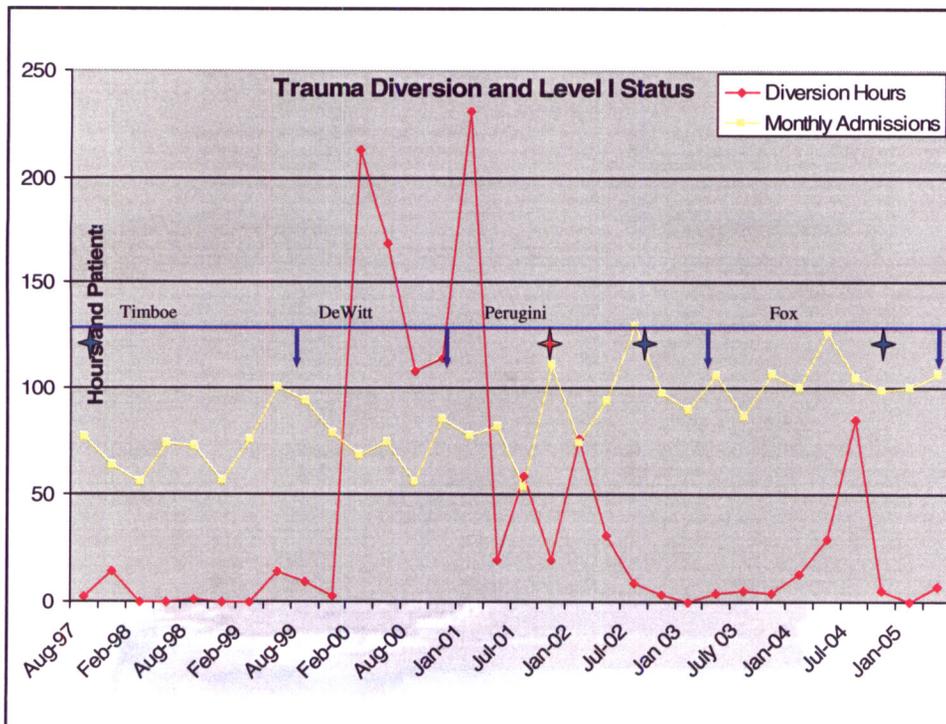
- **Ten Trauma Division personnel recently served in key positions in OIF/OEF**
 - **Current DCCS of the 86th and 228th CSH are from BAMC/ISR**
- **911 Funds – Sep 04 BAMC received \$28 K**
- **Texas Uncompensated Care Reimbursement**
 - **HB 3588 – Driver Responsibility Program**
 - **Generate \$1 billion over the first five years**
 - **96% of revenue is for designated trauma centers**
 - **BAMC received \$1.6 million in the last 2 years**
 - **EMS/Trauma Care System Account**
 - **Received \$22K last year**

As of: 8 Jun 05



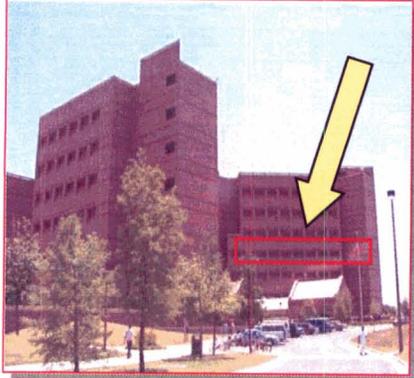
Trauma Division Wartime Benefits

- Daily stream of Trauma Patients
 - Creates Subject Matter Experts
 - GME with military application
 - 35% of all General Surgery cases related to Trauma
 - Annual training product – best trained trauma residents---all specialties
- Trauma Critical Care Fellowship
 - CSH's want this capability
- Combat Casualty Research
 - Utilize trauma patients for CCC directed research, only place in DOD
- Cost/Benefit Ratio is favorable
 - Consultant view of Operation Iraqi Freedom
 - Interviews with Deployed BAMC trained Surgeons



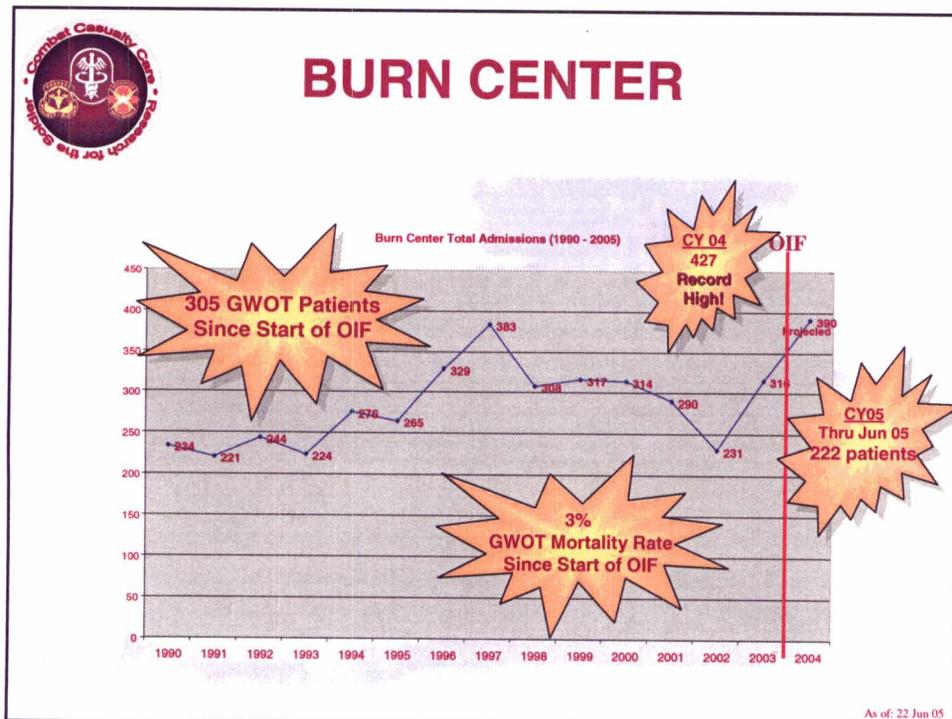


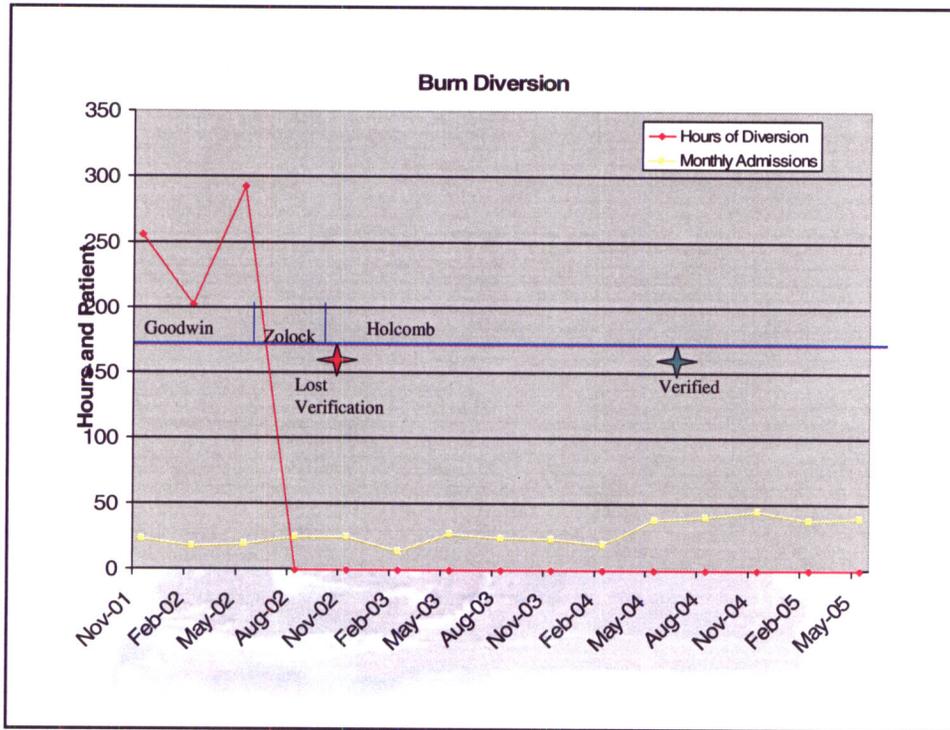
BURN CENTER



- ABA Verified in Aug 2004
- 12-bed ICU (+2 intermediate)
- 24-bed Ward
- Capacity = 38 beds
- Outpatient Burn Clinic
- CY04 = 427 admissions
- CY05 = 222 admissions
- GME rotations various sources
 - Army, USAF, Civilian
- Non-BAMC surgical resident rotations
 - WBAMC and TAMC
 - Navy starts Summer 2005

As of: 22 Jun 05







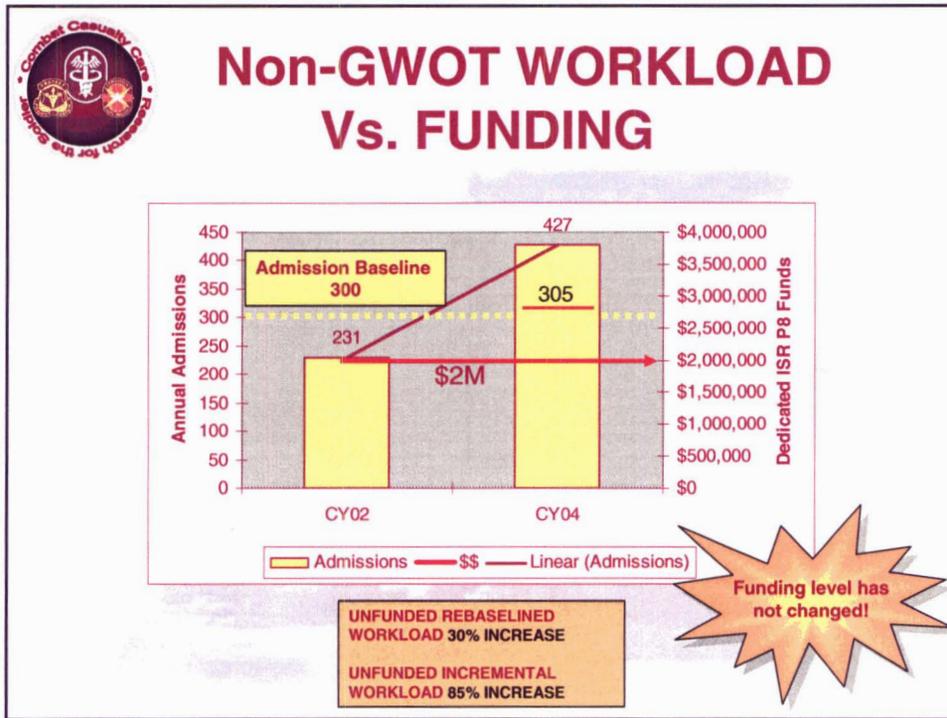
GWOT ADMISSIONS

- **2003**
 - 89 admissions (22 ICU)
 - Average burn size 11.9 ± 1.2% TBSA
 - Average ICU days 20 ± 16
 - Overall LOS 23.1 days (3.0 days / % TBSA burn)

- **2004**
 - 124 admissions (20 ICU)
 - Average burn size 16.7 ± 1.8% TBSA (p=.05)
 - Average ICU days 14 ± 16
 - Overall LOS 15.5 days (2.4 days / % TBSA burn)

- **2005 (Jan 05 – Jun 05)**
 - 92 admissions
 - Average burn size 15.9% TBSA
 - Average ICU days 21.77
 - Overall LOS 17.59 days

As of: 22 Jun 05



FY 05 BURN CENTER FUNDING (P8)

TOTAL FY 05 COST FOR BURN CENTER \$18,162,000

DESCRIPTION	ALLOCATION
BAMC CORE FUNDS	\$5,162,000
OTSG MIPR TO ISR	\$2,000,000
FY 05 GWOT COST TRANSFER	\$11,000,000



SMART BURN & TRAUMA

Special Medical Augmentation Response Teams for Burn and Trauma

- Domestic and international disaster response, especially terrorism and weapons of mass destruction
- World class burn, trauma triage, resuscitation, treatment, and evacuation



Worldwide Mission




Concept of operations for HQDASG/USAMEDCOM Special Medical Augmentation Response Teams (SMART), 18 FEB 98

CY 03-05 GWOT
Flight Missions
42
147 Patients
As of: 27 Jun 05



SMART based on 54 years of ISR Burn Flight Team experience, 1951-Present



THEATER TRAUMA SYSTEM

ULTIMATE GOAL
Improve routing of injured soldiers to the MTF -- right place at the right time

Components

- Leadership
- Clinical Practice Guidelines
- Coordination of pre-hospital care
- Morbidity & Mortality review (QA/PI)
- Communication
- Information System (trauma registry & decision support)
- Research



THEATER TRAUMA SYSTEM Continued

Development in Iraqi Theater of Operations

- Trauma director and team of trauma coordinators
- Campaign plan includes:
 - Develop clinical practice guidelines
 - Reliable chart transfer with patient
 - Adapt ACS Goldbook to a DOD manual
 - Improve evacuation/patient management
 - Populate trauma registry
 - Morbidity & Mortality (PI) between MTFs to include both Div & Non-Div
 - Education & training programs
 - Conduct trauma care research



MRMC RESEARCH FOCUS

Focus on Threats to Soldier Health
and Performance



Endemic Disease Threats

- Parasitic Diseases
- Bacterial Diseases
- Viral Diseases

Operational Stressors

- Sleep Deprivation
- Traumatic Stress and Situational Stressors
- Physical Workload
- Cognitive Burden and Operational Complexity

Chemical/Biological Warfare Threats

- Bacterial Threats
- Viral Threats
- Toxin Threats
- Nerve Agents
- Vesicant Agents
- Blood Agents

Combat Injuries

- Hemorrhage
- Tissue Injury and Trauma
- Resuscitation
- Medical Devices
- Clinical Research

Environmental Hazards

- Heat and Cold
- Altitude
- Toxic Industrial Chemicals and Materials

Systems Hazards

- RFR
- Laser
- Blast
- Biomechanical Insults and Stresses



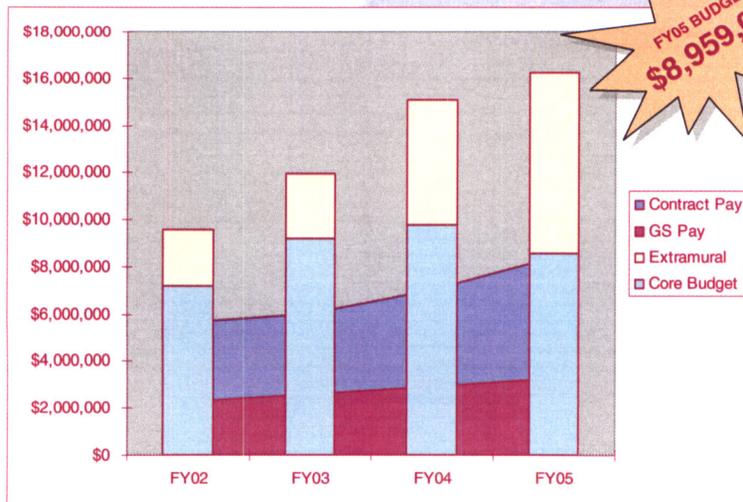


TASK AREAS

- **A Hemorrhage Control**
- **D Remote Triage**
- **F Battlefield Treatment of Fractures**
- **E Battlefield Pain Control**
- **I Translational Research and Clinical Trials**
- **R Optimal Parameters for the Battlefield Resuscitation of Combat Casualties**
- **S Soft Tissue Trauma**



RESEARCH FUNDING (P6)



As of: 22 Jun 05

**COMBAT CASUALTY CARE RESEARCH**
6 BASIC RESEARCH AREAS

Hemostasis

- Hemostatic field dressings
- Tourniquet use guidelines for compressible bleeding
- Intracavitary agents to stop non-compressible bleeding
- Injectable drug to enhance or restore hemostatic function
- New devices to stop severe internal bleeding



Resuscitation

- Evaluate when, how, and what kind of resuscitation fluids to use on the battlefield
 - Hextend / HBOC
- Standardization of treatment by the medic
 - Optimal endpoints—hypotensive
- Reduce the amount of fluid the medic has to carry without reducing care



**COMBAT CASUALTY CARE RESEARCH** Continued
6 BASIC RESEARCH AREAS

Bone Tissue Injury

- Antimicrobial bone replacement material
- Wound irrigation techniques
- Improved light-weight, fast-curing polymer splints/casts
- Stabilize and treat fractures while reducing the demands of cube and weight carried by the combat medic



Soft Tissue Injury

- Antimicrobial polymer bandages
- Improved field tourniquet
- Antibiotics for far-forward use
- Reduce the impact of tissue injuries
- Enable the soldier to continue on with their mission





COMBAT CASUALTY CARE RESEARCH Continued

6 BASIC RESEARCH AREAS



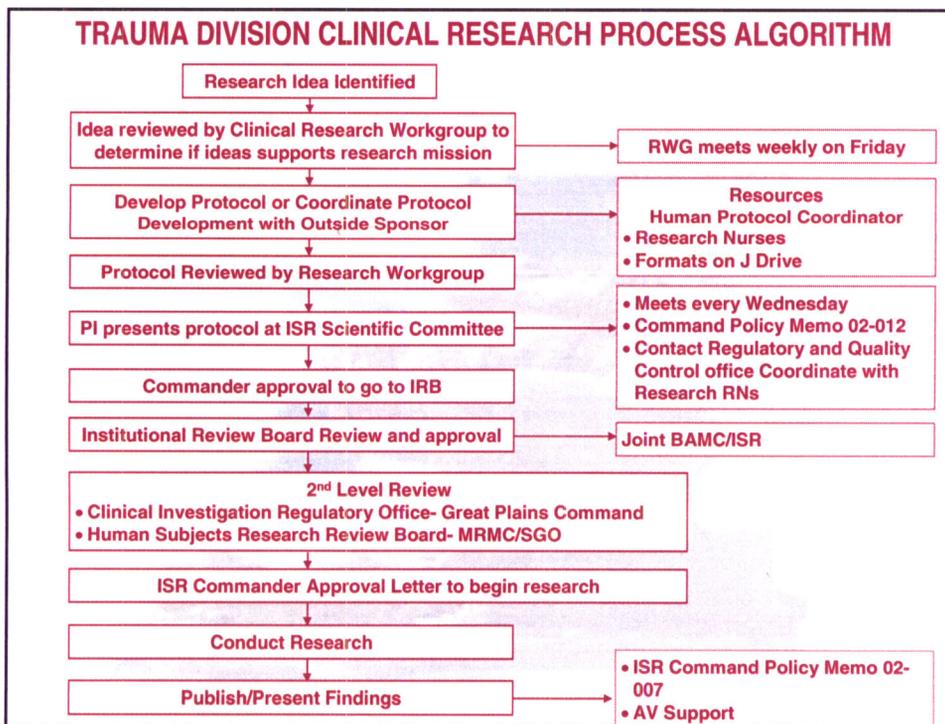
Trauma Informatics

- What to measure and how
- Develop remote triage algorithm
- Providing critical real-time information about the severity of wounds and mortality
- Assist the medic in determining the best strategies and need for an LSI



Clinical Trauma

- Examine combat casualty care problems in trauma and burn patients
 - Improved pain control
 - Wound dressings
 - Resuscitation with HBOC
 - Closed loop resuscitation
 - Non-invasive triage algorithm
 - Use of rFVIIa





RESEARCH VET AND LAB SUPPORT

Animal OR and ICU

- 4 fully functional operating rooms
- 4 bed animal ICU
- 16 Slice CT Scanner
- Climate controlled housing of all animals

Labs – Basic Lab Capability Plus:

- Genomics & gene array thru long-term survival studies
- Human Physiology Lab
 - Lower Body Negative Pressure
- Animal Histology, Vet Pathology
- Research Microbiology
- Research Biochemistry
 - Mass Spec/HPLC & Coagulation Lab
- Ballistics Chamber



ISR PERSONNEL

TDA EDATE: 3 Oct 04	HQ		SUPPORT		BURN		RESEARCH		TRAUMA		Total	
	AUTH	OH	AUTH	OH	AUTH	OH	AUTH	OH	AUTH	OH	AUTH	OH
OFFICERS	3	4	0	0	34	28	3	6	3	2	41	40
ENLISTED	2	3	2	0	69	62	29	29	0	0	101	94
GS/LAB DEMO	2	1	10	9	13	30	24	27	3	6	49	73
ISR CONTRACT	0	1	13	11	0	0	12	51	0	0	25	63
IPA	0	0	0	0	0	2	0	2	0	0	0	4
BAMC CONTRACT	0	0	0	0	79	78	0	0	0	0	79	78
TOTAL	7	9	25	20	116	200	68	115	6	8	216	352

CLINICAL GWOT HIRES

- | | |
|---------------|----------------------|
| 40 x RNs | 3 x COTA |
| 14 x LVNs | 2 x Occ Therapist |
| 1 x CNAs | 3 x Ward Clerks |
| 3 x OR Techs | 1 x Burn Coordinator |
| 1 x Anes Tech | 1 x Anesthesiologist |
| 1 x PTA | 3 x PA |
| 7 x RT | |



As of: 21 Jun 05



LOGISTICS

MISSION

- Receive and issue supplies/equipment
- Process excess and unserviceable turn-ins
- Coordinate the reutilization of excess equipment
- Maintain temporary storage areas
- Manage facility maintenance services

Key Ongoing Actions

- Facility Master Plan
- Military Construction
- BRAC Construction



As of: 22 Jun 05



INFORMATION MANAGEMENT

- Clinical/Research Oracle Database Support
- Technical Support of Clinical/Research IT Equipment
- Systems Analysis, Integration, and Database Support
- Technical Research Support for Clinical/Research Instrumentation, Data Acquisition Integration, and Synchronization Processes
- Data, Network, and VTC Communication Coordination
- IM/IT Planning and Information Security/Risk Management
- Workflow Performance Improvement Activities and Development of Technical Solutions



VISUAL IMAGERY

- **Authorized IAW AR 25-1, Army Information Management**
 - GO-GO activity
 - DVAIN A-1903
- **Visual Documentation of Research**
 - Still & video digital imagery including medical
 - Products: Posters, Displays, Prints
 - Visual Information Management
- **Provide Imagery Publication of Research**
 - Electronic imagery submissions, various formats
 - High resolution hard copy submissions
- **Provide Visual Information Support**
 - AKO development/maintenance
 - Web development
 - AV Equipment management
 - CD/DVD mastering
 - Computer projection
 - Teaching of VI related subjects
 - VTC / Teleconferencing support



Initiatives - Focus Areas

- **Implement CHCS-II**
- **Billing and Coding Procedures Review**
- **Mentoring of Military and Civilian Personnel**
- **Fully exploit Activities Based Costing**
- **Explore new markets to create collaborative research efforts**



CURRENT ISSUES

1. **Factor VIIa.** The company funded, IND, multi-center, prospective, randomized in a blinded trauma trial protocol. Approved by the FDA, pending protocol approval, currently in use in theaters of operation. This is critical study for our soldiers. USAISR will be one of the participants in the study.
2. **Amending the language in 10 USC 980,** specifically the intent to benefit issue, which impacts on the approval of research using surrogate consent within the DOD arena. As currently written, 10 U.S.C. 980 only allows a legal representative to consent to a patient's participation in a research project if the research is intended to be beneficial to the patient. This has precluded the use of surrogate consent as well as many placebo-controlled trials in the emergency department, intensive care unit, and other studies on trauma victims.



CURRENT ISSUES Continued

3. **Polyheme study.** This multi-center, pre-hospital, waiver of consent with community consultation study approved by SECARMY Harvey. USAISR will be one of the participants in the study.
4. **Approval process for conducting in-theatre protocols.** There Currently exists no approval process or mechanism for IRB approval of in-theatre. This is a critical need in order to verify the performance of doctrine and products in a combat environment and capture the many opportunities for research that exist there. MPMC (HSSRB) is working.



CURRENT ISSUES Continued

5. Requirement for contracting through USAMMRA. Recommend use of Non-USAMRAA contracting by the USAISR. The co-location with BAMC allows for rapid local contract responsiveness using, in many cases local vendors. The patient care portion of the Institute requires much of our contracting to pass through the local GPRMC. Administratively it is more efficient to piggyback our P6 contracting through GPRMC as well, requiring coordination with only one organization vice two.

**6. Sustain the tremendous support for the Burn Center
- increase resources**



CURRENT ISSUES Continued

7. Critical personnel actions:

- Contracted PA was mobilized for reserve duty –rehire pending**
- Trauma service physician staff – ongoing action to hire an intensivist and trauma surgeon**
- Funding of clinical fellows – ongoing action to specify utilization and funding source**



BRAC

- **Creation of Joint Center of Excellence for Battlefield Health and Trauma Research**
- **Gaining Six Activities: Army, Air Force and Navy**
- **All combat casualty care research missions and functions**
- **Expanded trauma care and training missions**
- **Expanded research capability**
- **Construction and facility integration**



Accomplishments



Hemostasis

- Chitosan Hemostatic Dressing
- Selected by DA as one of the Top Ten U.S. Army Greatest Inventions for 2004
- Testing and Evaluation Recombinant Factor VIIa
- Clinical studies underway (Multi-center/Multi-national studies)

Resuscitation

- Fluid Therapy Selection Research
- PolyHeme studies recently approved by Sec.of Army for waver of consent
- Hextend fielded to SOF, reduces the amount of fluid the medic carries without reducing care (1:1 replacement)
- Evaluated commercially available fluid warmers to support Combat Developer's fielding of fluid warmers at different echelons of care.
- Development of a universal hypothermia policy for DoD



Accomplishments Continued

Bone and Soft Tissue Injury

- Tourniquet testing, fielding and selection with guidelines for Use, selection determined DOD wide distribution
- Oral antibiotics for far forward use

Remote Triage

- Trauma Vitals Database
 - Aids in determining priority of treatment and remote triage
- Joint Theater Trauma Registry
 - Captures injury and outcomes of all seriously wounded



Tactical Combat Casualty Care

- Lead training site for SOF
- Scientific basis for recommendations

Clinical Research Group

- Research application of preclinical studies



SUMMARY

STRENGTHS

- Consolidated Trauma Division
 - ABA-Verified Burn & Level 1 Trauma Center
 - Trauma / Critical Care and Burn Synergy
 - Only one in DoD & 1 of 5 in the Nation
- State of the art pre-clinical research facility allowing a focus on Combat Casualty Care research problems
- Collocation with AMEDD C&S allows collaboration between training and doctrine and medical R&D
- Mutual support relationship maximizes efficiencies for both BAMC and ISR
 - Leverage specialties between organizations



SUMMARY Continued

CHALLENGES

- **Funding to support Burn Center's mission**
- **TDA BCA Project – Secure authorizations to support re-baseline admission rate of 300 patients per year**
- **Financial aspects of Trauma/Critical Care and Burn - P6 \$\$ vs. P8 \$\$**
- **Defense Medical Human Resources System (DMHRS) – Borrowed Military Manpower status**



Questions