



Development of an Inter-Service Complex Wound and Limb Salvage Center within the DoD

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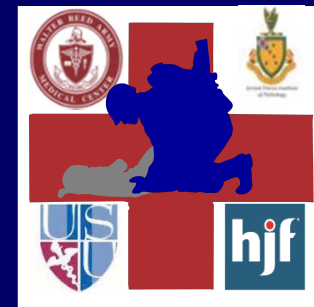
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*Translation of fundamental research into individualized treatments for patients through:
Advanced therapies, Bioinformatics, Tissue Banking, and Personalized Medicine*



Combat Wound Initiative Program

A Bench-to-Bedside Strategy for Wounded Warrior Research



- **Central proving ground** for emerging wound care technologies and treatments in support of wounded warriors
- **Biobanking**: Collection and storage of blood, wound fluid and tissue for translational research to advance complex wound care
- **Personalized medicine**: Development of predictive models to advance individualized wound therapy decisions
- **State-of-the-art care**: Complex Wound and Limb Salvage Center
- **Strategic private-public partnerships** to enhance the quality of care for wounded personnel

Combat Wound Initiative Program

Private-Public Partnership



- ❖ Walter Reed Army Medical Center
- ❖ Brooke Army Medical Center
- ❖ Armed Forces Institute of Pathology
- ❖ Johns Hopkins Bayview Wound Center and Burn Center
- ❖ University of Alabama at Birmingham
- ❖ University of Missouri
- ❖ University of Mississippi
- ❖ Hadassah Hebrew University Medical Center
- ❖ University of Pittsburgh Medical Center
- ❖ Baylor College of Medicine
- ❖ Unfallkrankenhaus Berlin, Zentrum für Schwerbrandverletzte mit Plastischer Chirurgie, Berlin
- ❖ Ludwig Boltzmann Institute for Experimental and Clinical Traumatology, Vienna, Austria
- ❖ AUVA Trauma Center Meidling, Vienna, Austria

Complex Wound and Limb Salvage Center Vision

*State-of-the-art wound assessment, testing and multi-disciplinary
evidence-based treatment of wounded warriors and
healthcare beneficiaries with acute and chronic wounds*



- **Background:** Un-met need for comprehensive, centralized outpatient complex wound care and limb salvage
- **Driving policy:** Integrated state-of-the-art care for wounded warriors and beneficiaries with acute and chronic wounds
- **Benchmarks:** Multi-disciplinary team established and clinic launched at WRAMC and NNMC March 2008

Complex Wound and Limb Salvage Center

State-of-the-art wound assessment, testing and multi-disciplinary evidence-based treatment of wounded warriors and healthcare beneficiaries with acute and chronic wounds



■ Supportive Data:

- Search period 6 months
- Complex wound & limb salvage – specific ICD9 codes
- 10,280 visits across 33 outpatient clinics (1,713 / month)
- 1,587 patients: 6.5 visits/patient over 6 – month period
- Average 50 patients/month leak to network across 40 clinics

■ Analysis:

- 1 visit / month inappropriate for most complex wound patients
- Visit frequency inadequate to meet rehabilitation needs
- Variable wound care presently spread over numerous clinics

Conclusion: Efficient, centralized, evidence-based, inter-disciplinary care team represents an un-met need

Complex Wound and Limb Salvage Center

Strategic Connection



- **Readiness:** reduced time to rehabilitation, return to duty
- **Research:** Inter-Service (Army-Navy) Translational Research program: Combat Wound Initiative Program (Private-Public Partnership)
- **Quality care:** multi-disciplinary team, evidence-based best practice protocols
- **Cost-effective care:** Reduced ER visits and re-admissions, focused management
- **Graduate Medical Education:** resident and staff education; recapture of patients lost to network and multi-service consultation supports GME mission

Complex Wound and Limb Salvage Center

State-of-the-art wound assessment, testing and multi-disciplinary evidence-based treatment of wounded warriors and healthcare beneficiaries with acute and chronic wounds



Multi-Disciplinary Team

- Wound specialist M.D.
- Vascular surgeon
- Orthetist
- Nutritionist
- General surgeon
- Plastic surgeon
- Trauma surgeon
- Infectious disease specialist
- Orthopaedist
- Pedorthetist
- Diabetologist
- Administrator
- Nurse practitioner
- Case manager
- Cast technician
- Receptionist
- Photographer
- Data manager
- Physical and occupational therapist
- Wound clinic manager
- Wound care nurse
- Healthcare specialist
- Medical records specialist/coder
- Clinical research nurse
- Research study assistant

Complex Wound and Limb Salvage Center

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Physical Plant

- Military Advanced Training Center
- Easy patient access
- Proximity to radiology, vascular testing, physical therapy, orthotic and prosthetic lab
- Multiple exam rooms with adequate lighting, exam tables, and surgical instruments
- Proximity to OR for surgical débridement

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Wound Care Encounters WRAMC: 2007-2009



Complex Wound and Limb Salvage Center

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Wound Care RVUs WRAMC: 2007-2009

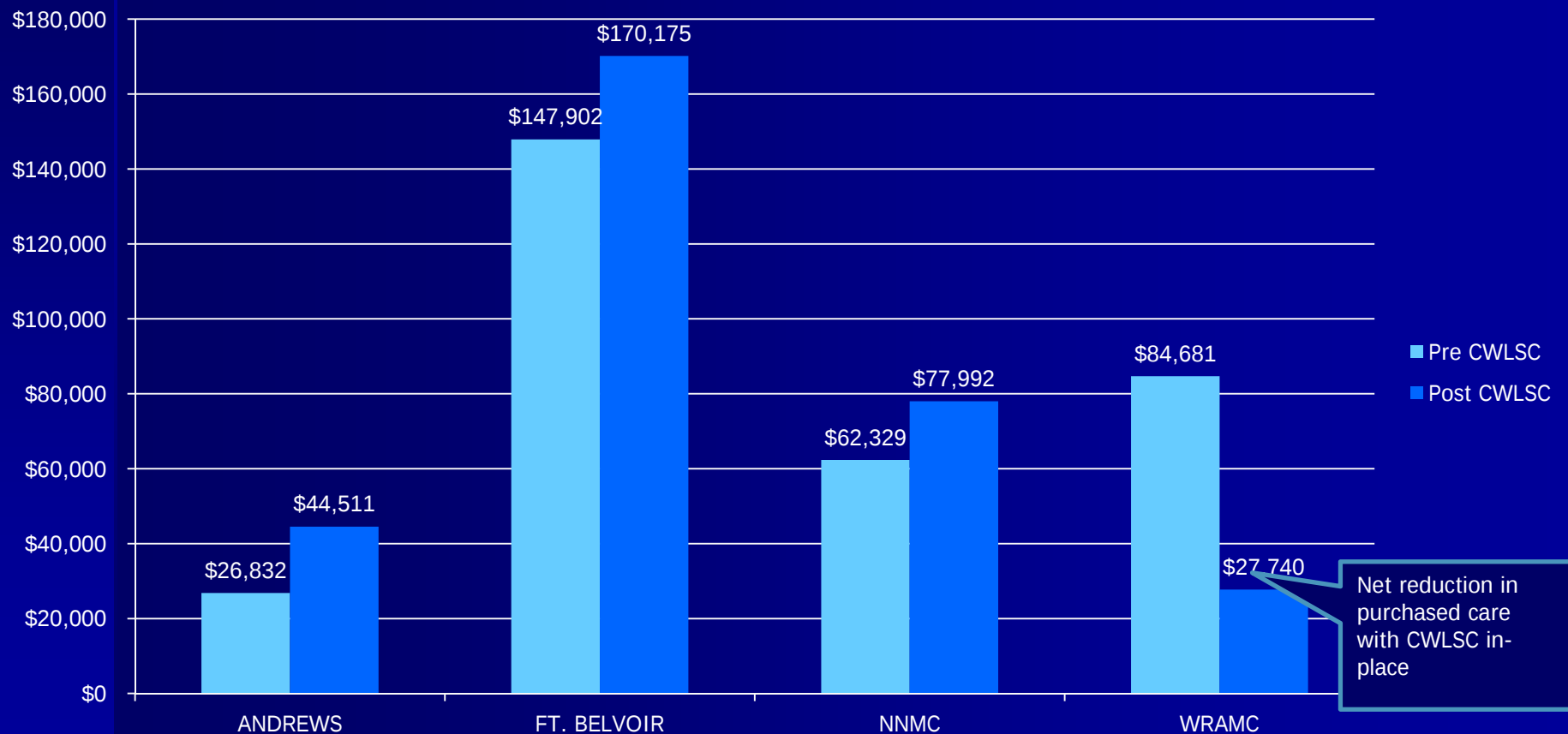


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TRICARE Payment of Wound Care Dollars NCA: 2007-2009

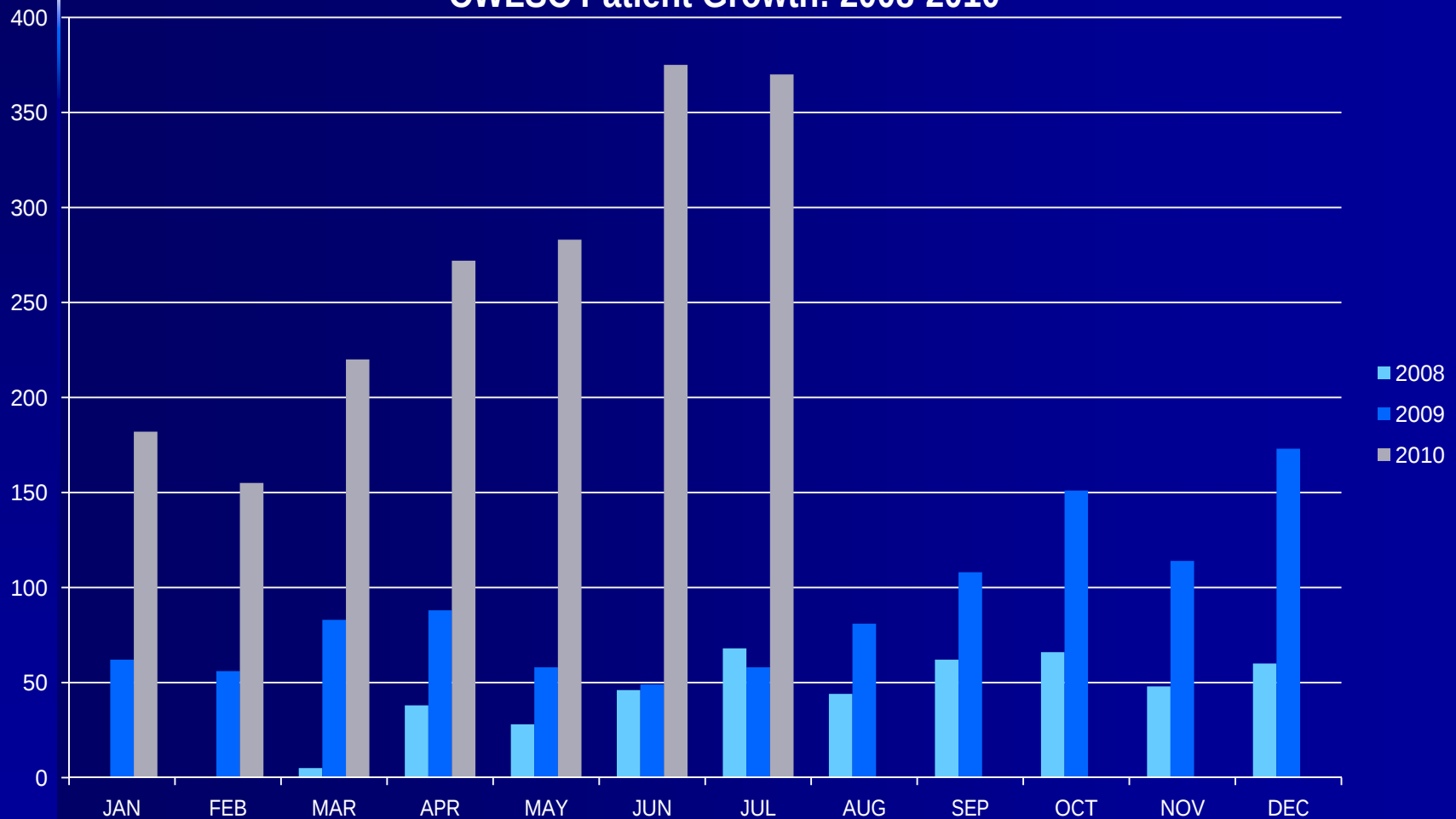


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CWLSC Patient Growth: 2008-2010



Complex Wound and Limb Salvage Center

Meeting Wound Care Educational Needs for Deployed Nurses



- Complex soft-tissue wound management in austere settings
- NPWT/VAC application and management
- Ostomy, fistula, and burn wound care
- Wound assessment and documentation
- Management of wound infections and pain
- Wound bed preparation
- Nutritional considerations in the wounded

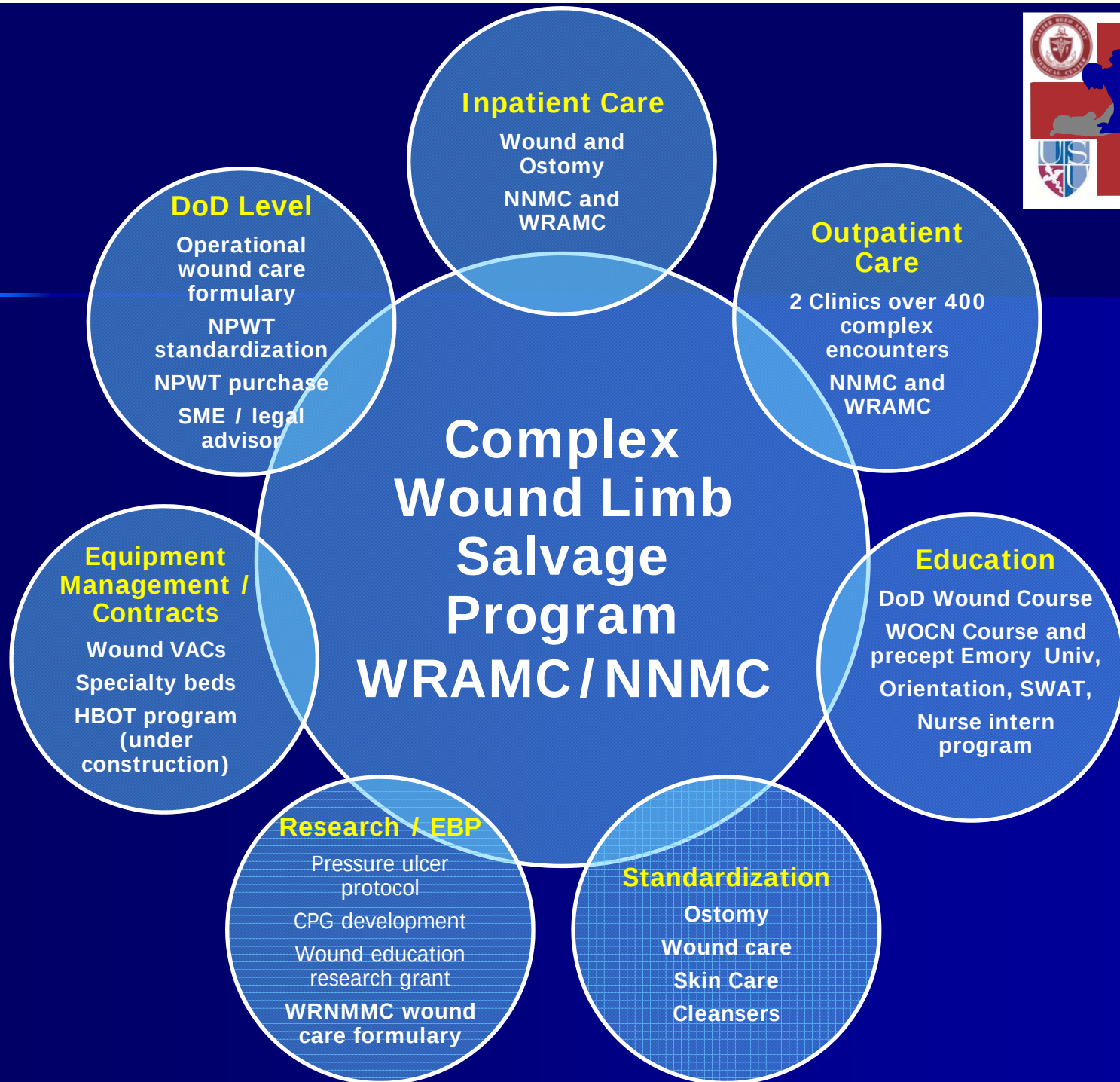
Complex Wound and Limb Salvage Center

State-of-the-art wound assessment, testing and multi-disciplinary evidence-based treatment of wounded warriors and healthcare beneficiaries with acute and chronic wounds



Current status

- Parallel Clinics at NNMC and WRAMC
 - Dedicated clinical space and personnel
 - Integrated SOPs
 - Common supply chain
- Forging relationship with multi-disciplinary team throughout the National Capitol Area
- Outreach program: On-campus, ER, in-patient services, other DoD facilities



Complex Wound and Limb Salvage Center

State-of-the-art wound assessment, testing and multi-disciplinary evidence-based treatment of wounded warriors and healthcare beneficiaries with acute and chronic wounds



Accomplishments

- DoD/VA Integrated Wound Care Symposium
- Standardized advanced wound care product lines at NNMC and WRAMC
- On-going evaluation of advanced wound care modalities
- Continued expansion of multi-disciplinary team
- Strategic private-public partnerships

Complex Wound and Limb Salvage Center

Product Standardization



NNMC & WRAMC Wound Dressing Selection Guide



Wound Appearance								
Description	Eschar* (Colors may vary)	Predominantly Slough (Infection may be present)	Granulating/ Mixed Wound Tissue	Fibrin (Appears yellow)	Granulating and/or Epithelializing	Skin Tear	Epithelializing	Healed Wounds, Skin at Risk or Closed Surgical Incisions
Exudate Level	Moderate to None	High	Deep/Shallow	Deep/Shallow	Deep/Shallow	Shallow	Shallow	None
Depth	Unknown	Deep	Deep/Shallow	Deep/Shallow	Deep/Shallow	Shallow	Shallow	Closed
Treatment Objective	Debride*	Cleanse, Debride, Absorb, Fill Dead Space	Cleanse, Debride, Absorb, Fill Dead Space	Cleanse, Debride, Absorb, Fill Dead Space	Protect, Hydrate, Fill Dead Space	Protect, Hydrate, Fill Dead Space	Protect, Hydrate, Fill Dead Space	Protect
Suggested Products and Change Rates	Carrasyn V Gel or Collagenase (needs Rx) (Daily) Cover choices: Alldress® or Mepilex® Border or Mepilex® Border Lite	Iodosorb Gel (daily) or Melgisorb® (Up to 4 days) or Aquacel Cover choices: Alldress® or Mepilex® or Mepilex® Border	<u>Deep</u> Iodosorb Gel (daily) or Melgisorb® (Up to 4 days) or Aquacel Cover choices: Alldress® or Mepilex® Border <u>Minimal Exudate</u> Mepilex® or Mepilex® Border Lite <u>Shallow</u> Alldress® or Mepilex® Border or Comfeel Plus	<u>Moderate Exudate</u> Iodosorb Gel (daily) or Melgisorb® (Up to 4 days) or Aquacel Cover choices: Alldress® or Mepilex® Border <u>Minimal Exudate</u> Alldress® or Mepilex® Border or Mepilex® Border Lite or Comfeel Plus <u>Contact layer</u> Mepitel® (Up to 10 days)	<u>Moderate Exudate</u> Melgisorb® (Up to 4 days) or Aquacel Cover choices: Alldress® or Mepilex® Border <u>Minimal Exudate</u> Alldress® or Mepilex® Border or Mepilex® Border Lite or Comfeel Plus <u>Contact layer</u> Mepitel® (Up to 10 days)	<u>Skin Tear Prevention</u> Tubifast® to upper and lower extremities as needed <u>Contact layer</u> Mepitel® (Up to 10 days) or Mepilex® Border or Mepilex® Border Lite or Mepilex® or Mepilex® Lite	Mepitel® (Up to 10 days) or Mepilex® or Mepilex® Lite or Mepilex® Border or Mepilex® Border Lite or Alldress® or Comfeel Plus	Mepilex® Border Lite or Mepilex® Lite or Apply 3M No-Sting Barrier (Daily) <u>Post Surgical</u> Mepilex® Border Post-Op <u>Radiation Dermatitis</u> Mepilex® Lite or Mepilex® Transfer
Consider using Mepilex® Ag or Aquacel Ag or Melgisorb® Ag when antimicrobial effect is desired								
Notations	- Use secondary dressing over Mepitel - Use Mepitac Tape on fragile skin. Secure dressings with Tubifast of roll gauze. - For complex wounds consult the Wound Care Team - Date and time ALL dressings.				- Utilize Mepilex Heel or Mepilex Border as needed for heel wounds and/or protection from shearing - Wear time for each dressing is up to 7 days unless otherwise noted - Cleanse wounds with normal saline or wound cleanser with each dressing change - Dressings with Safetac® technology do NOT require use of skin barrier products.			

Individuals with wound infection or those at high risk for infection may require more frequent changes as well as adjunctive antibiotic therapy. Before any healing process can begin, two critical steps must be taken as part of a well-defined management protocol:

1) The wound assessment and 2) Management of causative and contributing factors including unrelieved pressure, shear and friction, excessive moisture and altered nutritional status.

* Debridement of eschar may be contraindicated in some situations such as dry, fixed, stable eschar. Debridement is indicated if signs/symptoms of infection are present.

‡ Creams or ointments may be applied over Mepitel as indicated. Mepitel may be left in place during wound cleansing and irrigation. Change secondary dressings as needed.

This tool has been provided by means of an educational grant to NNMC by Mölnlycke Health Care.

The suggested topical management options and change rates are the treatment choice of NNMC and may not reflect the opinions of Mölnlycke Health Care



Complex Wound and Limb Salvage Center

State-of-the-art wound assessment, testing and multi-disciplinary evidence-based treatment of wounded warriors and healthcare beneficiaries with acute and chronic wounds



Joint Operational Wound Care Formulary

- Joint Wound Care Advisory Team established
- Current advanced wound care needs in operational environment established
- Standardized, evidence-based advanced wound care formulary and educational guide
- User provided with ordering information (NSNs, Prime vendor numbers)

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Joint Operational Wound Care Formulary

- Standardized, evidence-based advanced wound care formulary and educational guide
- Applied across the echelons of care from point of wounding to CONUS
- Expands capability to end user level to include medics, corpsmen, nurses and physicians who care for wounded in diverse operational environments

CONTACT LAYERS

Indications for Use:

- Primary dressing intended for direct use on wound
- Superficial wounds and skin tears
- Partial and full thickness skin grafts
- Skin abrasions and lacerations
- Second degree burns
- Silver form (Acticoat Flex) used underneath wound VAC foam for antimicrobial effect

Advantages:

- Silver form available
- Minimizes pain and trauma during dressing changes
 - Will not adhere to moist wound beds
 - Prevents secondary dressing from adhering to wound
- Conforms well
- Dressings are generally porous and allow fluid to be pulled through to the secondary dressing
- Can remain in place when changing secondary dressing – does not need to be removed with each dressing change

Disadvantages:

- Must use with a secondary dressing to absorb drainage
- Can't be used on wounds with tunneling, stage I pressure ulcers, or third-degree burns

Products Available

Mepitel® One 4"x7"; 6.8"x10"

- Transparent for easy wound inspection
- Silicone based
- May stay in place for up to 14 days
- Tacky side is placed on wound
- Quantity: 70 pieces per case (4"x7"); 40 pieces per case (6.8"x10")
- Manufacturer: Molnlycke Healthcare
- NSN: 6510015883378 (4"x7"); NSN: 6510015883349 (6.8"x10")
- Nomenclature: Dressing, Specialty, Wound, 4" x 7"; Dressing, Silicone, Non-Adherent, 6.8" X 10"
- Part Number: 289500 (4" x 7"); 289700 (6.8" x 10")
- O&M Prime Vendor Part Number: 0158289500 (4" x 7"); 0158289700 (6.8" x 10")
- Cardinal Health Prime Vendor Number: MHC289500 (4" x 7"); 289700 (6.8" x 10")



Xeroform™ Sterile White 9"x5"

- Petroleum mesh gauze
- Quantity: 50 pieces per box; 100 pieces per case
- Manufacturer: Covidien
- NSN: 6510013060898
- Nomenclature: Dressing, Petroleum, Mesh Gauze, 9" x 5"
- Part Number: 433605
- O&M Prime Vendor Part Number: 35838443605
- Cardinal Health Prime Vendor Number: 433605



CONTACT LAYERS

Instructions for Use

Mepitel® One, Xeroform™, Adaptic™

- Contact layer should be placed directly on wound or skin graft
- Contact layer should be cut to overlap wound edges by at least 2cm. Allow for more overlap with large wounds
- If used to secure skin grafts, dressing should not be changed for the first 5 days following application.
- Contact layer should always be used between a new skin graft recipient site and wound vac foam to prevent loss of graft when vac foam is removed (see example below)
- Mepitel® One can remain in place for maximum of 14 days
- Contact layers should be changed if pores become clogged with drainage
- Use a secondary dressing to secure contact layer.



Commonly used on:

- Skin tears, abrasions, surgical incisions, second degree burns, blistering, lacerations, diabetic ulcers, venous and arterial ulcers, partial and full thickness grafts



- Example of contact layer used over a new split thickness skin graft and under a wound vac



Acticoat® Flex 3

- Moisten dressing with water if wound is dry or has minimal exudate. Do not need to moisten if there is a high level of exudate. Do not moisten with normal saline as this will prevent silver ion release.
- Cut dressing to wound size and apply to wound bed without stretching.
- When covering a joint, apply Flex with the direction of the stretch running along the limb to allow movement
- Dressing may remain in place for up to 3 days



Over V.A.C. foam

Directly on wound bed

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Complex Wound and Limb Salvage Center

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Challenges

- Dedicated staff and patient work space
- Constant turnover of military personnel
- Transition to new integrated medical center

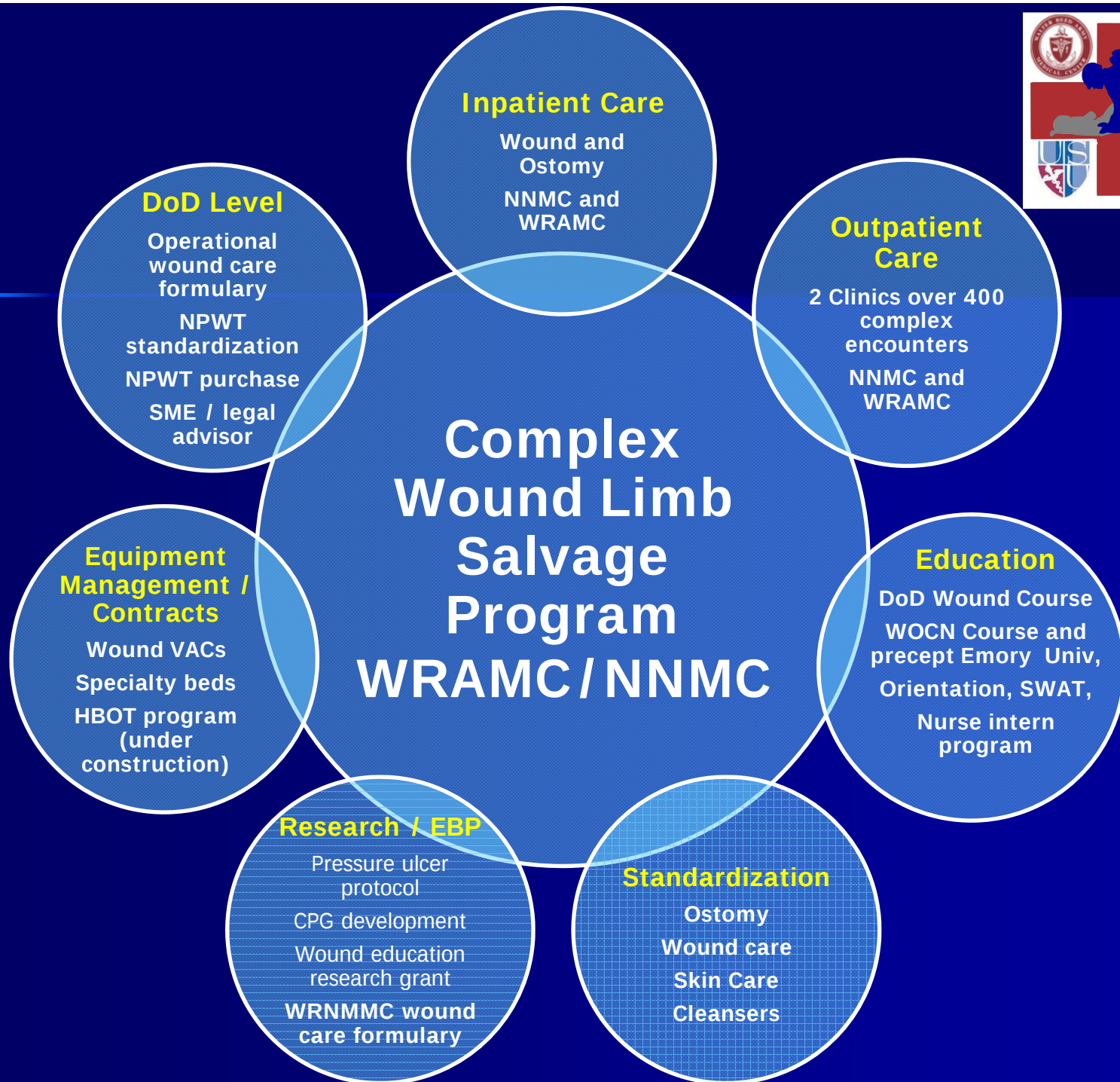
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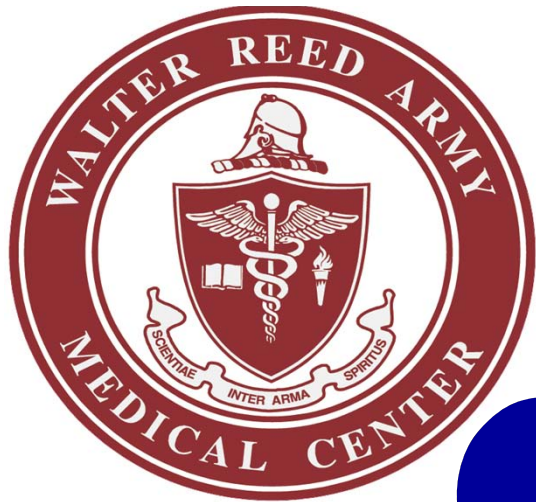
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Long-range goals

- Export concept and services
 - Model for other civilian and military institutions
- Expand translational research and biobanking to sub-acute and chronic wounds
- Further strategic connections and partnerships





Combat Wound Initiative Program Acknowledgement and Gratitude

The multidisciplinary care of our patients would not have been possible without the dedicated efforts of everyone at WRAMC and NNMC. Both civilian, Army and Navy military personnel have rendered skilled and compassionate care for these casualties of war.

We are also grateful to our colleagues at AFIP who continue to support this research collaboration.

Our deepest gratitude to Former Senator Max Cleland. His leadership and devotion to this research to improve the lives of those injured while sacrificing for our nation is an example that he has set for us all.