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Blast Exposure and Related Injuries

David W. Chandler, Ph.D.
Department of Veterans Affairs
Mechanisms of Blast Injury

<table>
<thead>
<tr>
<th>Category</th>
<th>Characteristics</th>
<th>Injury / Body Part Affected</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary</td>
<td>Impact of overpressure wave</td>
<td>Gas-filled organs, GI tract, TBI, solid organs</td>
</tr>
<tr>
<td>Secondary</td>
<td>Shrapnel, debris</td>
<td>Whole body – Blunt trauma, penetrating, laceration, amputation</td>
</tr>
<tr>
<td>Tertiary</td>
<td>Projection of individual</td>
<td>Whole body – Fracture blunt trauma, amputation</td>
</tr>
<tr>
<td>Quarternary</td>
<td>Other injuries, illnesses</td>
<td>Whole body – Oxygen depletion, burns</td>
</tr>
</tbody>
</table>

Post-Concussive Syndrome

- PCS = persistent non-focal, neurologic symptoms one\(^1\) to three\(^2\) months post-injury
  - Dizziness
  - Headache
  - Cognitive deficits (attention, memory, judgment)
  - Behavioral changes (irritability, depression, nightmares)
  - Sleep disturbance
- Symptoms seen in PCS are present in 15% to 50% of persons with mild traumatic brain injury (TBI)
- Symptoms rapidly resolve by 2-4 weeks post-injury in >90% individuals

\(^1\text{WHO-ICD-10; 1992}\)
\(^2\text{DSM-IV; 1994}\)
Common Sequelae of Blast Injury

- Brain injury
- Amputation
- Fractures
- Psychological-PTSD
- Crush injuries
- Burns
- Auditory / vestibular
- Speech / cognitive

- Eye, orbit, face,
- Dental
- Renal
- Respiratory
- Cardiac and vascular
- Gastrointestinal
- Chronic pain
- Peripheral nerve

Blast Injury of the Ear

- Blast Trauma
  Single event, duration > 1.5 ms
  Levels exceed 185 dB PPL
  Usually bilateral
  Frequent middle ear trauma

- Ear is typically most affected organ

- Damage varies with proximity, orientation to blast, environment

- Symptoms include:
  Ruptured tympanic membrane  Pain
  Hearing impairment / distortion  Tinnitus
  Vestibular problems  Aural fullness
  Higher level cognitive problems  Hyperacusis
Different Paradigm of Care

- Blast injuries differ from other injuries and causes of polytrauma
  - Latent sequelae and hidden wounds
  - May not be readily detected with conventional diagnostic testing
  - Co-morbidity of emotional, other considerations
- Current research guiding best approach to clinical practice is limited in scope and evidence
- Paradigm of interdisciplinary care required
  - Team effort to address multiple complex injuries
  - Coordinate, sequence and integrate evaluations and interventions across multiple disciplines
PHYSICS OF A BLAST

EXPLOSION

- High temperatures
- Massive shock
- Loud acoustic noise
- Blast wave
  - High pressure gases
  - Positive pulse/Shock wave
    - Faster than the speed of sound
    - Shatters all objects in its path
  - Short positive pressure/Blast wind
  - Negative pressure phase
    - Air pulled toward blast point
    - Weaker than positive
    - Three times longer
PRIMARY BLAST INJURIES (PBI)

- Definition: Overpressure trauma sustained as shock wave hits the body
- Blast loading
  - Pressure differential at body surface
  - Stress wave runs through underlying soft tissue
  - Rapid implosion/re-expansion of gas-filled organs
    - Ears
    - Lungs
    - Bowels
- Order and depth of injuries depends
  - Power of blast
  - Susceptibility of tissues

ORDER OF OPERATIONS

- Subsequent injuries
  - More severe
  - Result in multisystem trauma/Casualty
- ABC! Subsequent injuries more severe and result in multisystem trauma
  - Airway
  - Breathing
  - Circulation

PBI OFTEN OVERLOOKED
### AUDITORY INJURY MODULE - JTTR

**AIM data from JTTR**

<table>
<thead>
<tr>
<th>Injury Year</th>
<th>Unique Patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>2001</td>
<td>1</td>
</tr>
<tr>
<td>2002</td>
<td>73</td>
</tr>
<tr>
<td>2003</td>
<td>841</td>
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<tr>
<td>2004</td>
<td>1263</td>
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<td>2007</td>
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<td>2008</td>
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<td>1857</td>
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<td>2700</td>
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<td>2011</td>
<td>2366</td>
</tr>
<tr>
<td>2012</td>
<td>1571</td>
</tr>
<tr>
<td>2013</td>
<td>754</td>
</tr>
<tr>
<td>2014</td>
<td>40</td>
</tr>
<tr>
<td><strong>Total Pt Injury</strong></td>
<td><strong>18147</strong></td>
</tr>
</tbody>
</table>

**INPATIENT CARE**

Medevac system
Blast Injury

---

### AUDITORY SYSTEM INJURY

**Source:** VBA Awards Data

**Hearing Loss**

- Air Force
- Army
- Navy
- Marine Corps

**Total Awards:** 774,384
### MILD TBI AFTER BLAST SYMPTOMS DISTRIBUTION

<table>
<thead>
<tr>
<th>Group</th>
<th>Dizziness</th>
<th>Vertigo</th>
<th>Hearing Loss</th>
<th>Headache</th>
<th>PTSD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute</td>
<td>98%</td>
<td>4%</td>
<td>33%</td>
<td>72%</td>
<td>2%</td>
</tr>
<tr>
<td>Sub-acute</td>
<td>76%</td>
<td>47%</td>
<td>43%</td>
<td>76%</td>
<td>20%</td>
</tr>
<tr>
<td>Chronic</td>
<td>84%</td>
<td>36%</td>
<td>49%</td>
<td>82%</td>
<td>44%</td>
</tr>
</tbody>
</table>

Blast exposure: vestibular consequences and associated characteristics
Otolaryngology 2010 Feb;31(2):232-6

### PRIMARY, SECONDARY, TERTIARY, QUATERNARY INJURY

- Round Window Reflex
POSSIBLE POST-BLAST PATHOPHYSIOLOGY

EXTERNAL EAR

- **No PBI**
- **Secondary blast** injuries
  - Flying debris may damage pinna
  - Amputation in close proximity
  - Laceration
- **Tertiary**
  - Abrasion
  - Contusion
- **Quaternary** blast injuries
  - Burn damage
- Otorrhea/Bleeding
- EAC stenosis

LATE SEQUELAE OF EAC INJURY
**TYMPANIC MEMBRANE (TM)**

- PBI
- Air-filled ME
- Stretched/displaced
- Perforation
  - Almost certain
  - Punched out
  - Ragged
  - Linear
  - Multiple
  - Occasional complete destruction
- Hemotympanum

**MIDDLE EAR**

- Cholesteotoma – Propulsion of TM tissue into ME space
- Ossicular Damage
  - Dislocation of incudo-stapedial joint (most common)
  - Total functional disruption of ossicular chain
  - Larger blasts = Higher incidence
**PRIMARY BLAST INJURY**

**INNER EAR**

- Damage to sensory epithelium
- Mechanical injury
- **Cochlear Damage**
  - Excessive displacement of basilar membrane
  - Detachment of sensory cells
- **Vestibular Damage**
  - Perilymphatic Fistula
  - Superior Canal Dehiscence (inciting incident)
  - BPPV – Detachment of otoconia from otoliths following trauma
  - Acute trauma to otoliths
  - Central function secondary to mTBI
- **Skull fracture** – Secondary or tertiary blast injury
  - Blunt trauma from debris
  - Trauma upon landing
OUTER HAIR CELL DAMAGE

Normal Outer Hair Cells

When Stereocilia Are Gone, Cells Often Gone

Picture from Auditory Disease, Hear & Now, May 4, 1990

Picture from Auditory Disease, Hear & Now, May 4, 1990

Note: The text includes references to outer hair cell damage and diagrams illustrating the auditory system, especially focusing on the inner and outer hair cells and their stereocilia.
NEURONAL DEGENERATION

Neurosensory Degeneration

Hair Cell loss
Spiral Ganglion Cells

TEMPORAL/PETROUS BONY ANATOMY
SKULL FRACTURE

Longitudinal Fracture

Mixed Fracture

Transverse Fracture

SPINAL STRUCTURES

• Tertiary blast injury
  – Result of whiplash
  – Cervical spine
  – Suboccipital muscles
BLAST-INDUCED TRAUMATIC BRAIN INJURY

- Primary transduction pathway not well understood
- Theories
  - Direct transcranial propagation
  - The vascular system
  - Cerebrospinal fluid
- Physical results are neuronal, axonal, and glial injuries
  - Apoptotic and necrotic pathways
  - Activation of microglia pathways = inflammatory process

Brain coordinates sensory input with motor output
SYMPTOMS POST BLAST

- Tinnitus
- Otalgia
- Hearing loss
- Vertigo
- Head Ache

HEARING LOSS

- **Conductive:**
  - TM perforation
    - Heal spontaneously in 50-80% of acute acoustic trauma cases
    - Correlated to care provided at initial injury
      - Of those patched immediately, 84% healed
    - Correlated to size and location
      - Large and centrally located (involving annulus)
      - Fewer heal spontaneously
    - If unhealed for > 3 months, require surgical intervention
  - Total disruption of ossicular chain: Air conduction loss >50 dB

- **Mixed loss**
  - TM perforation and/or ossicular chain disruption
  - Cochlear damage from noise and blast loading
HEARING LOSS

- **Sensorineural loss**
  - Temporary Threshold Shift (TTS)
    - Hearing loss present immediately post-blast
    - Recovers in some patients
    - Related to distance from blast
  - Permanent Threshold Shift (PTS)
    - In as many as 50% of victims of explosive blast
    - Not necessarily isolated to high frequency loss (such as 4kHz loss seen in noise induced hearing loss)

TINNITUS

- Often resolves as hearing recovers
- May persist for some patients
VERTIGO

- BPPV
  - Result of canalithiasis
- Perilymphatic Fistula (not as common)
  - Present with sensorineural hearing loss
    - Unstable
    - Fluctuating
    - Worsening
    - Strain induced symptoms
- Acute trauma to the utricle and/or saccule
- Cervicogenic vertigo
- Superior Semicircular Canal Dehiscense Syndrome
  - Inciting event

PREVALENCE OF ABNORMAL VESTIBULAR TESTS

- 7-30% test positive for horizontal semicircular canal abnormalities
  - VNG/Calorics
  - Rotary chair
    - Abnormal low frequency phase lead
- 45% show abnormalities in ocular motor testing
- 47% have abnormal gait test results
- Sensory Organization Test worsens with time in subgroups (Post-Blast Dizziness and Vertigo)
- 17-50% of patients test positive for otolith dysfunction
  - Subjective visual vertical
  - C-Vemp /O-Vemp
  - Few studies to date (2 studies + 1 report)
POSSIBLE BIOMARKERS FOR B-TBI

- Occulomotor dysfunction as neurobehavioral marker
- Alpha-spectrin degradation as biochemical marker
- Neuro-specific enolase - Marker for neuronal damage
- Myelin basic protein - Marker for injury to compact myelin
- Neuroimaging with use diffusion tensor imaging
  - Detects white matter damage

Diffusion tensor images and three-dimensional reconstruction tractography depict white matter fiber tracts in a patient with a history of recurrent mild traumatic brain injury (lower) whose images show thinning of the corpus callosum (lower left) and fewer callosal fiber tracts (lower right) compared with the healthy control (upper).

SUMMARY

[Continued]
SUMMARY

- Proper management of Veterans may require referrals to other specialists
- Blast injuries can occur at any point along the auditory/vestibular pathway, both central and peripheral
- Injuries and wounds are not always visible

REFERENCES

Vertigo

Vestibulo-ocular reflex/Cervico-collic reflex
- Postural proprioception
- Transmits erroneous information

B-TBI Symptoms

- Presentation of symptoms can be
  - Staggered in onset
  - Fluctuating in severity
  - Triggered after injury by other life events
- Amnesia
- Confusion
- Attention/Concentration deficits
- Headache
- Sleep pattern alterations
- Anxiety
Potential causative factors for blast

- Noise Trauma
- Emotional trauma (fear)
- Somatosensory Activation
- Brain injury (concussion)
- Neck injury
- Individual susceptibility (genetic) Tra
- Transmission characteristics of the middle ear
Disclaimer

The opinions expressed herein are solely those of the author and do not necessarily reflect the views or official policies of the United States Government or the Department of Veterans Affairs (VA).

Course Overview

• This session will provide:
  – An introduction to VA health care
  – Demographics of Operation Enduring Freedom (OEF), Operation Iraqi Freedom (OIF), and Operation New Dawn (OND) Veterans
  – Overview of non-VA care
Serving America’s Veterans...

Veterans Health Administration
Veterans Benefits Administration
National Cemetery Administration

- Largest integrated health care system in the US with nearly 9 million enrollees.
- Compensation & pensions: Monthly disability payments, pensions and survivor payments to more than 4 million people.
- GI Bill: Eighth largest life insurance program; education assistance to nearly 1 million students; and mortgage guarantees to 1.87 million homeowners.
- Military cemeteries: Largest cemetery system in the nation, maintaining 3.3 million gravesites.
- Largest medical education program in the US, partnering with 107 medical schools, 55 dental schools and 1,200 other schools. Over 109,000 health care professionals in over 40 professions train in VA each year.

The Veterans We Serve...

- All Veterans
  - 22.2 million Veterans and 27.1 million spouses, dependents, and survivors
  - 49.3 million people or 15.5% of US population are eligible for VA benefits and services
  - Vietnam Era Veterans are the largest group (7.5 million), followed by the Gulf War Veterans (6.2 million)
  - Women comprise 8.1% of Veterans
- VA Health Care in FY13:
  - 8.9 million Veterans enrolled, of whom 6 million actively use VA services
  - 86.4 million outpatient visits
  - 694,700 inpatient admissions
  - 268.6 million prescriptions dispensed (30-Day equivalent)
  - 15.9 million prosthetics services performed.
VHA’s Mission and Vision

Mission:
Honor America’s Veterans by providing exceptional health care that improves their health and well-being.

Vision:
VHA will continue to be the benchmark of excellence and value in health care and benefits by providing exemplary services that are both patient-centered and evidence-based.

This care will be delivered by engaged, collaborative teams in an integrated environment that supports learning, discovery and continuous improvement.

It will emphasize prevention and population health and contribute to the Nation’s well-being through education, research and service in national emergencies.

VA Health Care System

- VHA core missions:
  - Health Care
  - Graduate Medical Education
  - Research
  - Emergency Preparedness

- The largest integrated health care system in US (1,700 sites of care organized into 21 service networks):
  - 151 hospitals and medical centers
  - 135 community living centers
  - 370 veterans counseling centers
  - 985 outpatient clinics
VA Health Care Services

VA ensures that all eligible Veterans have access to all the health care services necessary to promote, preserve and restore their health.

Services include:
• Primary Care
• Mental Health Care
• Preventive Care
• Specialty Care
• Rehabilitation
• Social Work & Case Management
• Inpatient and Outpatient Pharmacy
• Women’s Health Care
• Geriatrics & Palliative Care
• Long Term Services & Support

Reaching Rural Veterans

Approximately 3.1 million Veterans enrolled in VA health care live in rural areas.

VA continues to expand health access to rural Veterans through:
• Community Based Outpatient Clinics
• Non-VA Medical Care
• Home-Based Telehealth
• Mobile Health Clinics
• Rural Health Care Partnerships
• Telehealth Outreach Clinics
**VA Health Care Enrollment**

- **Who is eligible:** A person who served in the active military, naval, or air service and who was discharged or released under conditions other than dishonorable may qualify for VA health care benefits.
  - Reservists and National Guard members may also qualify for VA health care benefits if they were called to active duty (other than for training only) by a Federal order and completed the full period for which they were called or ordered to active duty.
- **Like most health care systems, VA requires most Veterans to enroll for health care services.** Veterans are exempt from enrollment:
  - Veterans seeking care only for their service-connected conditions
  - Veterans rated at 50% or more for disability
  - VA encourages all Veterans to enroll for planning and budget purposes
- **VA applies a financial assessment (means test) to determine enrollment eligibility. Veterans are placed in one of eight enrollment priority groups.**
- **Most Veterans have other insurance such as Medicare or TRICARE. VA bills private insurance, but does not collect from Medicare.**

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**Veterans Benefits**

- **Disability Compensation:** Disability compensation is a tax-free benefit paid to a Veteran for disabilities that resulted from or were aggravated by injuries or diseases that happened during military service.
- **Disability Pension:** This income-based benefit is paid to Veterans with honorable war-time service who are permanently and totally disabled due to nonservice-connected disabilities or who are 65 or older.
- **Other benefits:**
  - Vocational Rehabilitation
  - Home Loan Programs
  - Educational Benefits (Montgomery GI Bill)
  - Life insurance for Service Members and Veterans
  - Burial and Memorial Benefits
  - Transition Programs

Benefits for OEF/OIF/OND Veterans

- Service members are eligible for up to a maximum of $400,000 in life insurance under Servicemembers’ Group Life Insurance (SGLI). Spousal coverage is available up to a maximum of $100,000 while children are automatically covered for $10,000 at no cost.
- Education benefits are available to active duty and full-time National Guard personnel who have served for at least two years and have contributed $1200 under the Montgomery GI Bill, and members of the Selected Reserve (includes National Guard) that are certified as eligible under the Montgomery GI Bill.
- Persons on active duty are eligible for a VA home loan guaranty after serving on continuous active duty for 90 days.
- VA health care facilities are available to active duty service members in emergency situations and upon referral by military treatment facilities through sharing agreements or under TRICARE.
- **Combat Veterans:** VA provides free health care for Veterans who served in a theater of combat operations after November 11, 1998, for any illness possibly related to their service in that theater. If discharged from active duty on or after January 28, 2003, **Veterans have five years of eligibility.**

War-Related Conditions

**Most common conditions for all conflicts:**
- Musculo-skeletal injuries with pain
- Hearing loss/tinnitus
- Mental health conditions
- Scars
- Dental problems

**Conditions unique to particular conflicts:**
- **WW I:** poison gas; trench warfare with artillery blast exposure
- **WW II:** Cold injury (European); Infectious diseases (Pacific); Pulmonary and GI complaints
- **Korean War:** Cold injury
- **Vietnam War:** Agent Orange conditions (Chloracne, sarcoma, lymphoma, diabetes, etc)
- **Persian Gulf War I:** Unexplained medical symptoms (Gulf War Syndrome)
- **Persian Gulf War II (OEF/OIF/OND):** TBI, polytrauma, blast-related injuries
Auditory Disabilities

<table>
<thead>
<tr>
<th>Condition</th>
<th>Number of Veterans</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tinnitus</td>
<td>971,990 (6.3% of all conditions)</td>
<td></td>
</tr>
<tr>
<td>Hearing loss</td>
<td>774,384 (5.2% of all conditions)</td>
<td></td>
</tr>
</tbody>
</table>

- For the first time, more Gulf War Era Veterans received compensation benefits than any other period of service.
  - 602,375 OEF/OIF/OND Veterans have service-related disabilities.
  - Tinnitus was the most common disability among GWOT Veterans (259,640 veterans) and 93,579 veterans had hearing loss disabilities.

- 168,816 audiology C&P exams performed for 163,847 Veterans in FY13.
  - Second most requested exam.
  - 36,732 C&P exams performed for OEF/OIF/OND Veterans


The Signature Injury

- The incidence of blast exposure has significantly increased in the patient population of the Departments of Defense (DoD) and VA as a result of injuries during recent military and combat operations.

- Message—While VA and DoD are leaders in the care of blast injuries, the majority of Veterans will seek care in private sector health care facilities. Therefore, all audiologists should be familiar with:
  - Blast injuries and traumatic brain injuries
  - Typical symptoms and manifestations
  - Pathophysiology and natural history
  - Clinical practice guidelines for evaluation and management
Opportunities for Collaboration

• Only 8.9 million Veterans are enrolled for health care and only 6 million actively use VA care out of the current 22 million veterans.
• Of the 1.7 million OEF/OIF/OND Veterans, only 612,299 (36%) actively use VA care.
• The majority of Veterans are not treated at VA or military facilities.
  — Some are not eligible for VA health care because they do not have disabilities or other circumstances that entitle them to care or are not eligible for VA health care due to their income.
  — Some Veterans are eligible for care at military facilities and elect to use military facilities. Some Veterans receive co-managed care at VA and DoD facilities.
• Lesson: Private-sector audiologists should be familiar with Veteran health issues and VA health and benefits systems.

Purchased Care

• VA has an extensive system of non-VA (purchased) care.
• So far in Fiscal Year 2014, VA has paid over $3.3 billion for over 10 million outpatient visits, including $4.6 million for hearing services and $4.5 million for ear- and hearing-related diagnostic services.
• Audiologists may register with the as non-VA care providers. When a Veteran needs care that VA cannot provide in a timely manner, or when a veteran is not able to travel for medical reasons, VA will authorize non-VA care services.
• VA authorizes audiologists to provide services and reimburses at established rates based on Medicare fee schedule, VA fee schedule, or usual and customary rates, depending on type of service.
  — Non-VA care reimbursement is negotiated with local medical center
  — PC3 rates are established by national contracts.
Benefits of Becoming a Non-VA care Provider

• Opportunity to actively show support to our nation’s Veterans and their families as a Non-VA community provider by providing needed audiology services.
• Opportunity to contribute to the well-being of Veterans and their right to receive the best possible health benefits and services.
• Opportunity to work with audiologists and other health care providers in the VA and DOD health care systems.

http://www.nonvacare.va.gov/docs/provider-resources/ISMP_Becoming_a_Non-VA_Community_Provider.pdf

http://www.nonvacare.va.gov/docs/providers/ProvidersGuide.pdf

Opportunities for Collaboration

• Private-sector audiologists can Honor Veterans by collaborating with VA in several ways:
  – Diagnostic audiology services
  – Disability services (fee for service or contracted)
  – Hearing aid services
• Audiology services—Local VA facilities make arrangements with community audiologists to provide audiology services. Fees are negotiated with the local VA Business Office.
• Compensation & pension services—Local VA facilities or the VA Regional Office make arrangements for Veterans and service members to get disability exams. Examiners must follow special procedures.
• Hearing aid services—VA facilities make arrangements with community audiologists to provide hearing aid services. Hearing aids are limited to VA contract makes and models unless available devices do not meet the Veteran’s needs.
Patient-Centered Community Care (PC3)

- Patient-Centered Community Care is a new VA program to provide eligible Veterans access to health care through a comprehensive network of community-based, non-VA health care professionals.
- Two national contracts have been awarded: Health Net Federal Services and TriWest Healthcare Alliance
- PC3 is the preferred mechanism for non-VA care.
- Audiologists may register as providers to provide care to Veterans.

https://www.hnfs.com/content/hnfs/home/va/home/provider.html
https://vapccc.triwest.com/PCCCWeb/index.html#/provider-home

PC3 Regions

VETERANS HEALTH ADMINISTRATION

66
How Can I Become a Non-VA Care Provider?

• **Contact your local VA Non-VA Care Office** – Speak to the vendor point of contact. Let them know you are interested in providing care to veterans and your specialty [http://www.va.gov/directory](http://www.va.gov/directory)

• **Get on the list of available Non-VA Community Providers** – When you call, request to be added to a local VAMC’s list of Non-VA Community Providers, which is given to a veteran when he receives a Non-VA care authorization. VA cannot direct a veteran to a certain provider.

• **Provide key information** - You will need to provide information for your vendor file, including name, address, tax ID number, Medicare ID number, SSN, DEA # for individual (not facility), NPI number, type of business (e.g., small, large, Veteran-owned, woman-owned). This information will be kept at the Financial Services Center and local VAMC Non-VA Care Office.

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How Can I Become a Non-VA Care Provider?

• **Ensure Continuity of Care** - The standard transactions that are included within HIPAA regulations consist of standard electronic formats for enrollment, eligibility, payment and remittance advice, claims, health plan premium payments, health claim status, referral certification and authorization.

• **Register in the payment system** - Register in the payment system in order for the VA to process payments for services. To register, complete **Standard Form 3881 and Form W-9**. Providers must also register in the federal Central Contractor Registration Database. Once completed, return them to your local VA Medical Center (VAMC) via mail where they upload your information into their computer system.
  - FF3881 for payment ([http://www.va.gov/hac/forms/forms/3881-FSC.pdf](http://www.va.gov/hac/forms/forms/3881-FSC.pdf))
Thanks for Listening

With malice toward none, with charity for all, with firmness in the right as God gives us to see the right, let us strive on to finish the work we are in, to bind up the nation’s wounds, to care for him who shall have borne the battle and for his widow and his orphan, to do all which may achieve and cherish a just and lasting peace among ourselves and with all nations.

*Abraham Lincoln, Second Inaugural Address, March 4, 1865*
Specialty Care Services

VA provides a wide range of medical and surgical specialty care services including:

- Anesthesiology
- Bariatric Surgery
- Cardiology
- Chaplain (spiritual support)
- Critical Care Specialty
- Dermatology
- Diabetes and Endocrinology
- Geriatrics & Palliative Care
- Gynecology Care
- Infectious Disease
- Nephrology
- Neurology
- Mental Health
- Oncology
- Optometry & Ophthalmology
- Orthopedic Surgery
- Pacemaker
- Pain Management
- Podiatry
- Pulmonary
- Rehabilitation & Prosthetics
- Robotic-Assisted Surgery
- Spinal Cord Injury
- Transplant Surgery
- Urology
- Vascular Surgery

Veteran-Focused Services

In addition to providing specialty health care services, VA focuses on providing highly specialized health care services that are uniquely related to Veterans’ health and special needs.

- Post-Traumatic Stress Disorder (PTSD) Care
- Substance Abuse Care
- Military Sexual Trauma Counseling
- Readjustment Counseling
- Spinal Cord Injury Care
- Post-Deployment Health Care
- Environmental Exposure Care
- Amputation Care
- Disability & Medical Assessment
Rehabilitation & Prosthetics

VA focuses on providing specialized rehabilitation and prosthetics services that promote wellness, independence, and quality of life.

- Audiology and Speech Pathology
- Blind Rehabilitation
- Chiropractic Care
- Physical Medicine and Rehabilitation
- Prosthetics and Sensory Aids
- Recreation Therapy
- Polytrauma & Traumatic Brain Injury (TBI) System of Care
- Amputation System of Care
- Blind Rehabilitation Care Continuum
- Collaboration with Department of Defense Centers of Excellence

Allied Health Media

Blast Exposure Webinar Series

Presented in partnership with the Defense Hearing Center of Excellence, supported by the Department of Veterans Affairs and the Department of Defense

- Review of Blast Injury, Its Effects on the Ear, and Assessing Patients Who are Veterans
- Comprehensive Management of Blast-Exposed Patients, Including Mental Health Implications
- Audiological Intake Process, Auditory and Vestibular Assessment
- Central Auditory System Implications

Access courses in the AudiologyOnline course library under the topic “Blast Exposure”