

# Blast Overpressure Provider Support Tool

Traumatic Brain Injury Center of Excellence

## What Is Blast Overpressure?

Blast overpressure is [defined](#) as the sudden onset of a pressure wave, above normal atmospheric pressure, which occurs from blast, such as explosions and weapons firing events. The pressure wave is caused by the energy released during explosions and weapons firing.

## What Are the Types of Blast Overpressure?

**High-Level Blast** is overpressure generated by incoming munitions, such as improvised explosive devices or rocket-propelled grenades, primarily in combat environments. HLB exposure may result in acute injury, such as traumatic amputation, TBI, or auditory injury. If concussion, or mild TBI, is suspected, refer to [Health.mil/TBIProviders](https://www.health.mil/TBIProviders).

**Low-Level Blast** is overpressure generated by firing weapon systems or detonating explosives, such as 0.50 caliber weapons or breaching charges, in training or combat environments. LLB exposure does not typically result in [mild TBI](#). However, service members who are exposed may experience symptoms such as:

- Concentration problems
- Headaches
- Slowed reaction time
- Difficulty hearing
- Irritability
- Slowed thinking
- Dizziness
- Memory problems
- Tinnitus
- Fatigue
- Sleep problems

## What Should Medical Providers Do to Address LLB Exposure?

### Document

- Document in the medical record:
  - Estimated total of LLB exposures, including duration, number of blasts, and type of [weapon system\(s\)](#)
  - Occupational specialty
  - Number of years in [high-risk occupational specialty](#), assigned units, or duties
  - Symptoms associated with LLB exposure
- Access Individual Longitudinal Exposure Record (ILER) through MHS GENESIS to identify any additional LLB exposure.

### Manage

- Symptoms typically resolve with time. If indicated, further management includes the following:
  - Review the [What You Should Know About Blast Overpressure Service Member Fact Sheet](#) with the patient.
  - Conduct a thorough patient history and assess for comorbid conditions.
  - Refer to Symptom Guided Management Table (see pages 3–4) for initial treatment and referral recommendations.
  - Screen for PTSD using the [PCL-5](#), especially for individuals in [high-risk occupational specialties](#), and refer as appropriate.

### Code

- Record the ICD-10 code(s) for the presenting condition(s) first in the coding sequence.
- Assign the applicable Y code\* next in the coding sequence:
  - **Garrison:**
    - **Y37.A1** LLB overpressure in military operations
    - **Y37.A2** HLB overpressure in military operations
  - **Deployed:**
    - **Y36.A1** LLB overpressure in war operations
    - **Y36.A2** HLB overpressure in war operations

\* Available Oct. 1, 2025

*Research is still emerging on the full impact of BOP on brain health and performance outcomes.*



## What Occupational Specialties or Assigned Units and Duties Can Increase Risk of LLB Exposure?

- Armor, Artillery, and Gunnery
- Combat Engineer
- Explosive Ordnance Disposal
- Infantry
- Medical Assets Attached to Expeditionary Units
- Military Training Instructors
- Special Operations Forces

*Terminology may vary by service*

## What Weapon Systems Can Increase Risk of LLB Exposure?

[Reports](#) indicate that acute exposure to BOP above 4 pounds per square inch may cause adverse health effects. These weapon systems are known to produce BOP exceeding 4 psi.

Category	Weapon System
Breaching Explosives	<ul style="list-style-type: none"><li>• Trinitrotoluene (TNT)</li></ul>
Shoulder Mounted	<ul style="list-style-type: none"><li>• M3, multi-role anti-armor or anti-personnel weapon system (MAAWS)</li><li>• M136, light anti-tank weapon (AT4)</li><li>• M72, light anti-armor weapon (LAW)</li></ul>
0.50 Caliber Gun/Rifle	<ul style="list-style-type: none"><li>• M107, sniper rifle</li><li>• M2A1, machine gun</li><li>• MK15, sniper rifle</li><li>• GAU21, machine gun</li></ul>
Indirect Fire System	<ul style="list-style-type: none"><li>• Howitzers (all platforms): 105 mm, 155 mm</li><li>• Mortars (all platforms): 120 mm, 81 mm, 60 mm</li></ul>

## What Is the DOD Doing to Better Understand BOP?

In response to Section 734 of the National Defense Authorization Act of Fiscal Year 2018, researchers expanded efforts to understand the effects of low-level blast exposure. The [DOD Warfighter Brain Health Research Strategy](#) remains focused on blast overpressure effects to the brain.

The DOD continues to prioritize research efforts focused on understanding the effects of LLB exposure on brain health and performance outcomes, such as reaction time, memory, and balance. Current studies aim to characterize objective biological correlates, such as biomarkers, neuroimaging, or neurosensory function, which have not exhibited clear trends in response to acute or chronic LLB exposure.

Studies also seek to determine how various blast-related variables, such as weapon type, number, duration, and frequency of exposure, influence the incidence or severity of any resultant brain health and performance outcomes. Findings from ongoing research will aid the operational and medical communities in optimizing prevention, identification, monitoring, and management of LLB exposure.

# Blast Overpressure Provider Support Tool

This table provides treatment recommendations and referral guidance for symptoms that may be associated with LLB exposure. Service members with persistent or functionally limiting symptoms despite initial management strategies may benefit from referral to specialty care.

## Symptom-Guided Management Table

Symptom Category	Signs and Symptoms	Evaluation	Initial Management Strategies	Specialty Referral Consideration
<b>Behavioral</b>	<ul style="list-style-type: none"> <li>• Anger</li> <li>• Anxious mood</li> <li>• Depressed mood</li> <li>• Irritability</li> </ul>	<ul style="list-style-type: none"> <li>• <a href="#">NSI</a> questions 17–22</li> <li>• <a href="#">GAD-7</a> ≥ 10</li> <li>• <a href="#">PHQ-9</a> ≥ 10</li> <li>• <a href="#">PCL-5</a> ≥ 31</li> </ul>	<ul style="list-style-type: none"> <li>• Refer immediately to Behavioral Health for any concerns about harm to self or others</li> <li>• Non-pharmacologic: mindfulness, deep breathing and relaxation, pleasurable activities, exercise (if appropriate)</li> <li>• <a href="#">PHCoE Primary Care Behavioral Health Clinical Pathways</a></li> <li>• <a href="#">VA/DOD Clinical Practice Guideline for Management of Posttraumatic Stress Disorder and Acute Stress Disorder</a></li> </ul>	<b>Behavioral Health</b> <ul style="list-style-type: none"> <li>• Evaluation of new or premorbid behavioral health conditions</li> <li>• Consider early referral</li> </ul>
<b>Cognitive</b>	<ul style="list-style-type: none"> <li>• Concentration problems</li> <li>• Memory problems</li> <li>• Slowed reaction time</li> <li>• Slowed thinking</li> </ul>	<ul style="list-style-type: none"> <li>• Standard cognitive exam, such as the MMSE</li> <li>• <a href="#">NSI</a> questions 13–16</li> </ul>	<ul style="list-style-type: none"> <li>• For concerns about cognition, confirm patient report of symptoms and performance with third party when possible.</li> <li>• Physical, sleep, and mood-related symptoms may impact cognitive function. Identify and treat contributing conditions.</li> </ul>	<b>Speech Language Pathology</b> <ul style="list-style-type: none"> <li>• Cognitive rehabilitation and organizational strategies</li> </ul> <b>Occupational Therapy</b> <ul style="list-style-type: none"> <li>• Strategies for daily living and functional cognition interventions</li> </ul> <b>Neuropsychology</b> <ul style="list-style-type: none"> <li>• Formal evaluation for persistent cognitive symptoms</li> </ul>
<b>Dizziness and Balance</b>	<ul style="list-style-type: none"> <li>• Dizziness/vertigo</li> <li>• Disequilibrium/imbalance</li> </ul>	<ul style="list-style-type: none"> <li>• <a href="#">NSI</a> questions 1–3</li> <li>• <a href="#">VOMS</a> Abnormal Vestibulo-Ocular Reflex or Visual Motion Sensitivity testing</li> </ul>	<ul style="list-style-type: none"> <li>• If appropriate, evaluate and treat benign paroxysmal positional vertigo.</li> <li>• <a href="#">Hearing Center of Excellence (HCE) Provider Resources: Aural Blast Injury/Acoustic Trauma Clinical Practice Guideline</a></li> </ul>	<b>Vestibular Therapy</b> <ul style="list-style-type: none"> <li>• Specialized physical or occupational therapy to alleviate dizziness and other problems associated with vestibular disorders</li> </ul> <b>Vestibular Audiology</b> <ul style="list-style-type: none"> <li>• Diagnostic vestibular evaluation to objectively assess patient function</li> </ul>

## Symptom-Guided Management Table (Continued)

Symptom Category	Signs and Symptoms	Evaluation	Initial Management Strategies	Specialty Referral Consideration
<b>Headache</b>	<ul style="list-style-type: none"> <li>Auras</li> <li>Numbness, tingling, weakness</li> <li>Phonosensitivity</li> <li>Photosensitivity</li> </ul>	<ul style="list-style-type: none"> <li><a href="#">NSI</a> questions 4–7, 9, 11</li> <li><a href="#">HIT-6</a> <math>\geq 50</math></li> </ul>	<ul style="list-style-type: none"> <li>Non-pharmacologic: traditional Chinese or medical acupuncture</li> <li>Pharmacologic: acetaminophen or NSAIDs as needed; avoid tramadol, combination acetaminophen/caffeine/butalbital, and opioids</li> <li><a href="#">VA/DOD Clinical Practice Guideline on Management of Headache</a></li> </ul>	<p><b>Neurology</b></p> <ul style="list-style-type: none"> <li>Assessment of persistent headaches when: <ul style="list-style-type: none"> <li>The diagnosis is not clear.</li> <li>Headaches do not respond to traditional treatment or prevention strategies.</li> <li>A significant unresolved disability is due to headache.</li> <li>A prolonged or persistent aura is present.</li> <li>Headaches are accompanied by motor weakness.</li> </ul> </li> </ul> <p><b>Physical Medicine and Rehabilitation</b></p> <ul style="list-style-type: none"> <li>Assessment of persistent headaches with comorbid chronic pain, or persistent headache secondary to musculoskeletal dysfunction</li> </ul> <p><b>Neuro-Optometry</b></p> <ul style="list-style-type: none"> <li>Evaluation of headaches secondary to visual changes or eye strain</li> </ul>
<b>Hearing Loss and Tinnitus</b>	<ul style="list-style-type: none"> <li>Aural fullness</li> <li>Muffled hearing</li> <li>Tinnitus (ringing, buzzing, humming in ears or head)</li> <li>Sensitivity to noise</li> </ul>	<ul style="list-style-type: none"> <li><a href="#">NSI</a> questions 8–9</li> </ul>	<ul style="list-style-type: none"> <li><a href="#">Hearing Center of Excellence (HCE) Provider Resources: Aural Blast Injury/Acoustic Trauma Clinical Practice Guideline</a></li> <li><a href="#">VA/DOD Clinical Practice Guideline for Tinnitus</a></li> </ul>	<p><b>Audiology and ENT</b></p> <ul style="list-style-type: none"> <li>Urgent referral is recommended for sudden hearing loss or tinnitus following LLB, especially for symptoms that persist more than 72 hours after acute injury.</li> </ul> <p><b>Audiology</b></p> <ul style="list-style-type: none"> <li>Routine referral is recommended for hearing difficulty or tinnitus that persists more than six weeks after acute injury.</li> </ul>
<b>Sleep</b>	<ul style="list-style-type: none"> <li>Fatigue</li> <li>Sleep problems</li> </ul>	<ul style="list-style-type: none"> <li><a href="#">ESS</a> <math>\geq 11</math></li> <li><a href="#">ISI</a> <math>\geq 12</math></li> <li><a href="#">NSI</a> questions 17–18</li> </ul>	<ul style="list-style-type: none"> <li>Sleep disruption can exacerbate other symptoms.</li> <li><a href="#">VA/DOD Clinical Practice Guideline on The Management of Chronic Insomnia Disorder and Obstructive Sleep Apnea</a></li> </ul>	<p><b>Behavioral Health</b></p> <ul style="list-style-type: none"> <li>Evaluation of behavioral health conditions that may impact sleep</li> </ul> <p><b>Sleep Medicine</b></p> <ul style="list-style-type: none"> <li>Evaluation of persistent or chronic sleep disturbance</li> </ul>

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