

## Health Effects of Enhanced Blast (Thermo baric) Munitions

**Purpose:** Determine the protective effect of body armor against thermo baric weapons and characterize the natural evolution of injury following blast exposure for survivors. Develop means to detect casualties subject to life threatening latent effects

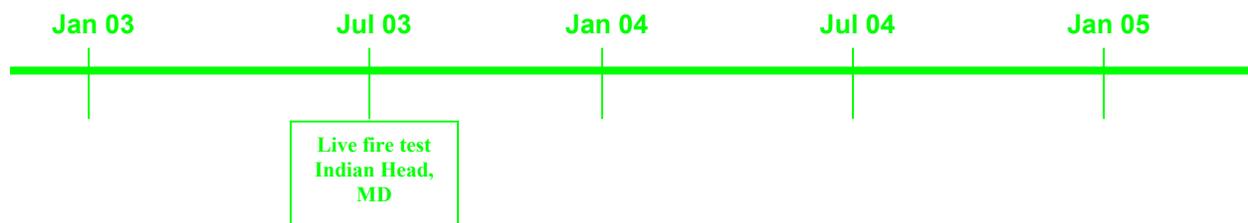
**Background:** Thermo baric weapons are specifically designed to amplify the blast and thermal energy directed against personnel and structures beyond more conventional high explosive blast weapons. The effects are even more pronounced when employed within confined spaces. Evidence indicates these weapons have a greater potential to more severely injure the brain and nervous system when compared to more conventional high explosives. This suggests a different injury mechanism exists for these weapons. Injury mechanisms resulting from thermo baric weapons have not been previously studied and no information is available in the medical literature describing the injuries produced by these weapons. Past studies and field experience indicates that soft body armor may in fact exacerbate primary blast injuries, though the exact reasons are a matter of debate. These findings may seem confusing and call the effectiveness of the armor into question. Testing is required to establish whether primary blast injury from thermo baric weapons is made worse by wearing body armor, and to what degree. Even if primary blast injury is made worse, the threat from casing fragments, secondary projectiles, and small arms fire may remain the overwhelming risk. To further complicate the question of armor effectiveness, studies also indicate that armor systems with ceramic or metal ballistic plates may not exacerbate primary blast injury, but rather, due to the increased acoustic impedance of these systems, they may provide superior blast protection when compared to no armor or soft armor alone. Delayed effects of thermo baric weapons exposure can appear days after exposure and can lead to death. Injury can occur with no easily recognizable visible signs. Early detection and proper treatment is essential to avoid latent manifestations of injury. Of particular importance are the early indicators of exposure.



**Description:** The Lab is supporting a Marine Corps Systems Command effort to determine the effects of thermo baric weapons so they can be prioritized against the risks from fragmenting weapons and small arms fire and a general policy on armor use can be developed. Additionally, the Lab will assess materials and methods to mitigate blast injury caused by these weapons.

**Deliverable Products:** Assessment reports and tactics, techniques and procedures.

### Milestones:



Action Officer: (703) 784-3208