

ResQGARD®

Medical Simulator
EMERGENCY RESPONSE

ZOLL®



RAPID, NON-INVASIVE TREATMENT
FOR LOW BLOOD PRESSURE

The consequences of poor perfusion are well known and documented.

Consider these statistics:

- Emergency department (ED) patients with hypotension are 2.5 times more likely to die in the hospital and 10 times more likely to have a sudden or unexpected death, compared with patients who do not become hypotensive.¹
- For every 10 mmHg decrease in systolic blood pressure, mortality in hypotensive patients increases almost 5%.²
- Hypotension accounts for nearly 20% of all hospital admissions from the ED.¹

For decades, conventional treatment has included fluids and medications, but these therapies have inherent side effects, and they are not always practical or effective.

There is a better way

The ResQGARD® impedance threshold device (ITD) is clinically proven to be a safe, simple, and convenient alternative to treating spontaneously breathing patients with hypotension from a variety of causes, including:

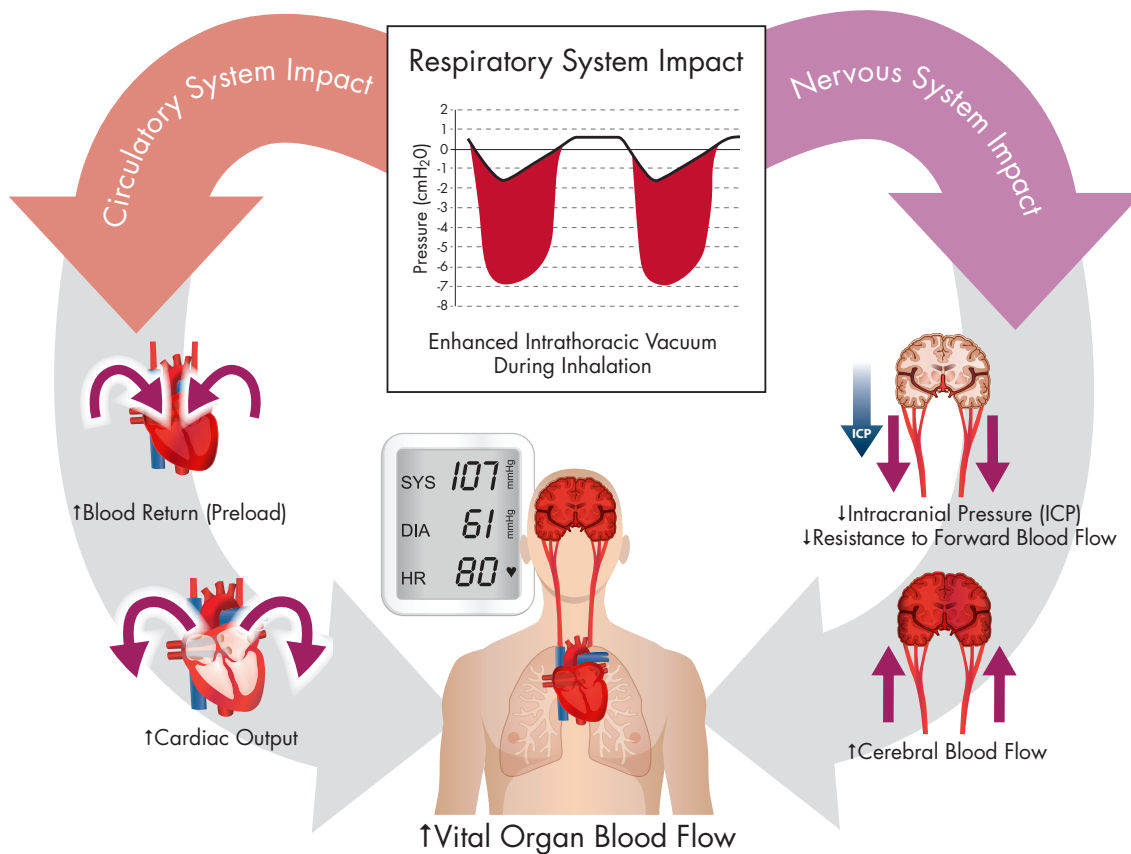
- Blood loss or blood donation
- Dehydration
- Early sepsis
- Drug overdose
- Heat shock
- Renal dialysis
- Orthostatic intolerance
- Anesthesia and analgesia

“ResQGARD has been shown in studies to rapidly and non-invasively improve blood pressure by up to 30%.”³

The ResQGARD Solution

- Rapidly and non-invasively increases blood pressure by up to 30%
- Effective by itself or complements other therapies
- Provides an alternative treatment option when IV or IO access is not practical or possible
- Effective alternative for caregivers not trained to administer fluid therapy
- Easy to rapidly establish and discontinue (“ON/OFF” therapy)
- Complements the “permissive hypotension” approach to hemorrhagic shock management⁸





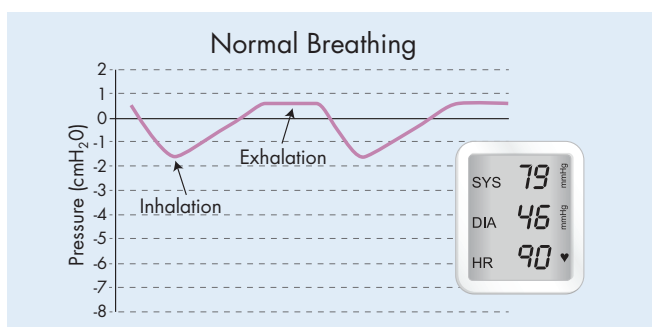
How ResQGARD Works

The Problem: Hypotension

During normal inhalation, the chest expands and the diaphragm moves down, creating a slight negative pressure (or vacuum) inside the chest. This vacuum pulls air into the chest and helps return some blood back to the heart.

During exhalation, the chest comes in and the diaphragm moves up, creating a slight positive pressure that forces air out of the chest.

As shock develops, eventually the body is no longer able to compensate and blood pressure drops.



The ResQGARD Solution

The ResQGARD ITD optimizes the relationship between the respiratory, circulatory, and nervous systems to enhance circulation during states of poor perfusion.¹⁻⁷

The ResQGARD creates a slight amount of therapeutic resistance only while the patient inhales, enhancing the vacuum in the chest. This enhanced vacuum:

- Draws more blood back to the heart. When preload is increased, it results in improved cardiac output on the subsequent contraction of the heart.
- Lowers intracranial pressure (ICP), which decreases resistance to forward blood flow to the brain, and results in increased cerebral blood flow.

The net result of both of these mechanisms is improved blood pressure and blood flow to vital organs.

SEEING IS BELIEVING

ResQGARD users share
their experience.

“The first time I tried it, my patient’s systolic blood pressure was in the 60s, but **after applying the ResQGARD, it went up to about 110 mmHg.** I was admittedly a little skeptical so I removed the ResQGARD, and her systolic pressure went back down—into the 80s. I quickly put it back on, and her pressure came right back up. **It was simply remarkable.**”

Dave Page, NREMT-P
Allina Medical Transportation
St. Paul, Minn.

“The ResQGARD is a great bridge therapy for hypotensive patients. We have deployed it to all of our first responders because it’s such a **simple and effective tool** to raise blood pressure before paramedics arrive on scene. Prior to IV therapy, patients can experience the benefits of improved blood pressure within minutes. This simple and effective technology has strong buy-in from our staff. **We use the ResQGARD almost daily in our EMS system.**”

Brent Parquette, NREMT-P
Lucas County EMS
Toledo, Ohio



Features

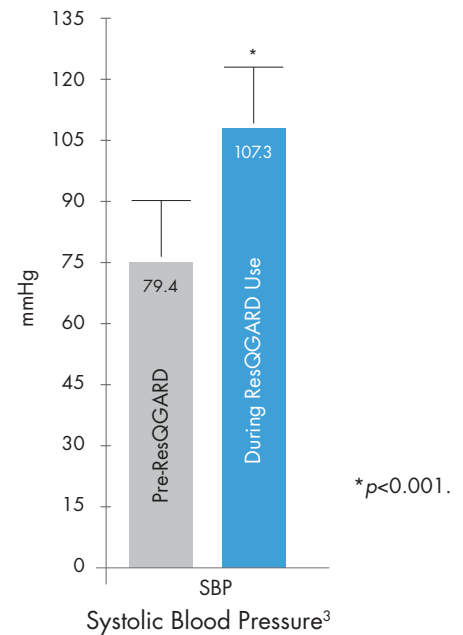
- Compatible with facemask or mouthpiece
- Allows for administration of supplemental oxygen
- Latex-free
- Single-patient use



Backed by Years of Research

The ResQGARD has been evaluated in over 30 animal and clinical studies, many done in collaboration with, and supported by, the US Department of Defense. This research has shown that the ResQGARD^{3,9}:

- Increases systolic and diastolic blood pressure by up to 30%
- Complements a permissive hypotension approach in trauma without exceeding pressures typically associated with “popping the clot”
- Increases stroke volume, cardiac output, and cerebral blood flow
- Lowers intracranial pressure during inspiration
- Is well tolerated by most patients
- Does not compromise oxygen saturation or reduce hematocrit
- “Buys time” until definitive therapy can be provided



In 2008, the ResQGARD received the US Army's SBIR Achievement Award for the technology's application in the non-invasive treatment of hemorrhagic shock.

¹ Jones, et al. *Chest*. 2006;130:941-946.

² Eastridge, et al. *J Trauma*. 2007;63:291-299.

³ Smith, et al. *J Emerg Med*. 2011;41(5):549-558.

⁴ Convertino, et al. *Respir Care*. 2011;56(6):846-857.

⁵ Suresh, et al. *Prehosp Emerg Care*. 2012;16(1):173.

⁶ Convertino, et al. *Crit Care Med*. 2007;35(4):1145-1152.

⁷ Cook, et al. *J Trauma*. 2006;60(6):1275-1283.

⁸ Metzger, et al. *Prehosp Emerg Care*. 2012;16:174.

⁹ Yannopoulos, et al. *Crit Care Med*. 2006;34(12):S495-500.

The generally cleared indication for the ResQGARD is for a temporary increase in blood circulation during emergency care, hospital, clinic, and home use. Research is ongoing to evaluate the benefit of the ResQGARD for indications related to specific etiologies. The studies listed here are not intended to imply specific outcome-based claims not yet cleared by the US FDA.