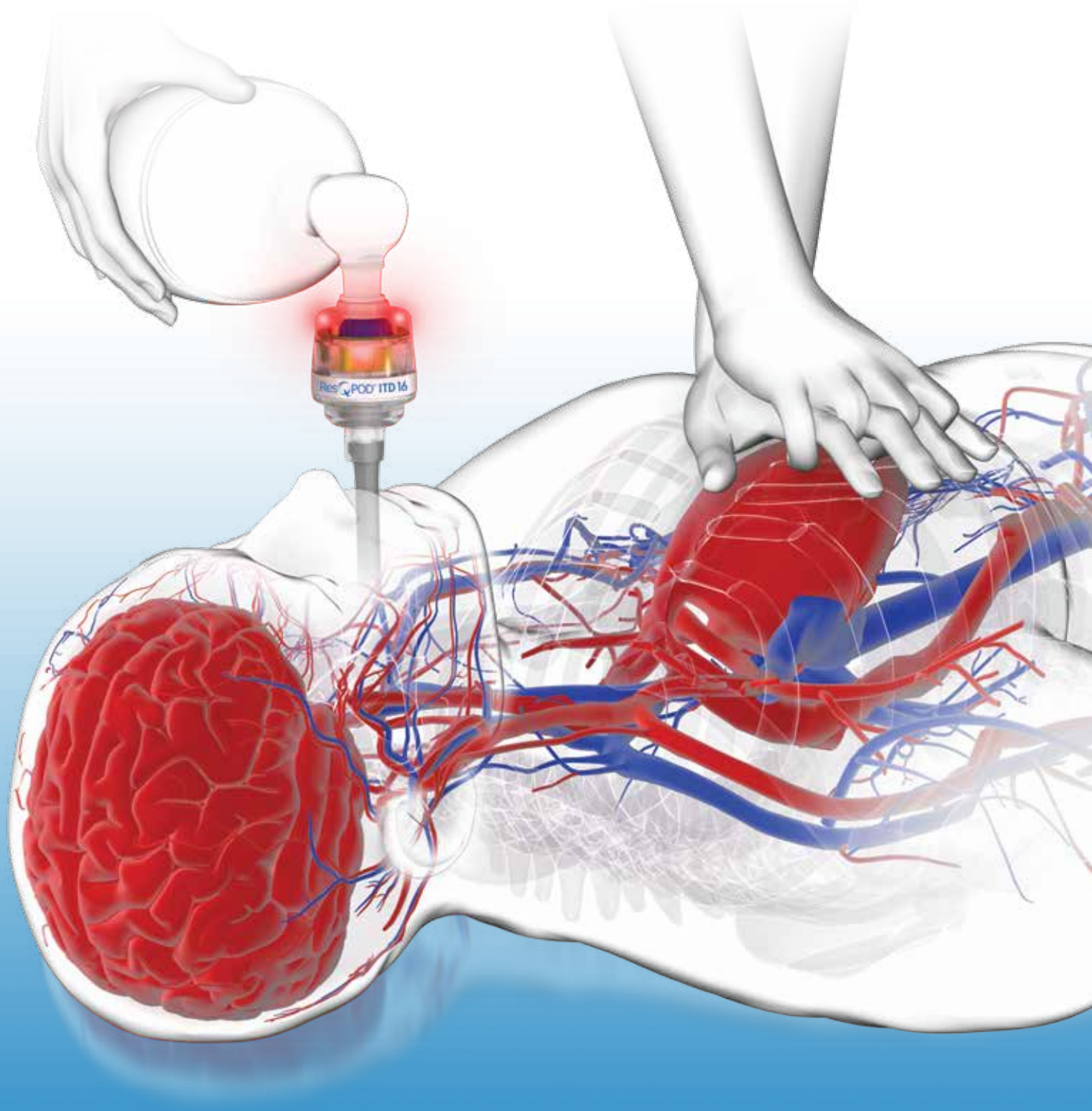
ResQPOD® ITD 16

ZOLL®




# **More** Than A Heartbeat


ResQPOD ITD 16

# Improve Perfusion During CPR

*Today, only a small number of out of hospital cardiac arrest victims survive. A focus on high-quality CPR and adoption of new techniques and technologies to facilitate it are helping many systems improve their outcomes. Cardiac arrest survival rates can be improved.*

## The ResQPOD® ITD 16 Increases Perfusion During CPR

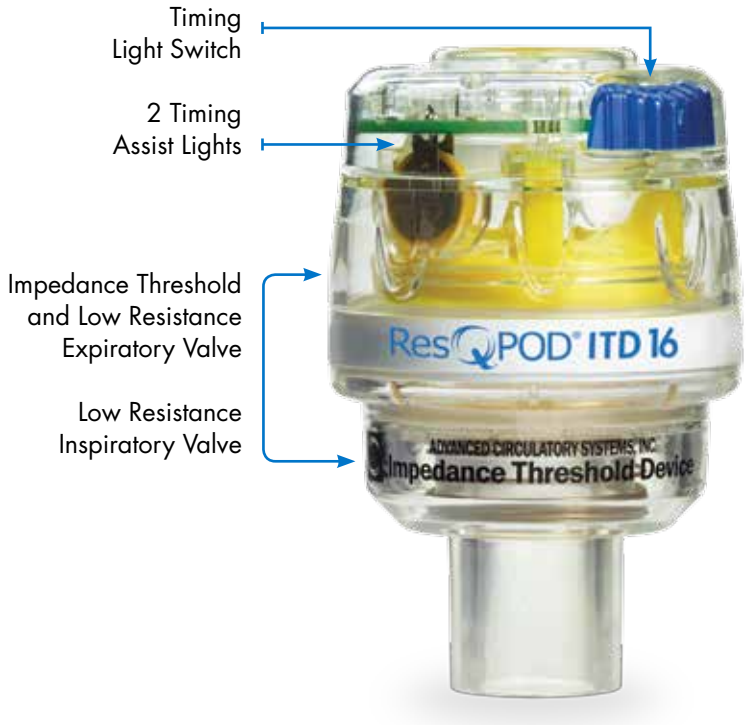
The ResQPOD Impedance Threshold Device (ITD) is a simple, non-invasive device that delivers Intrathoracic Pressure Regulation (IPR) Therapy during basic or advanced life support CPR to improve perfusion. The ITD lowers intrathoracic pressure during the recoil phase of CPR by selectively restricting unnecessary airflow into the chest. This vacuum increases preload, lowers ICP, and improves blood flow to the brain and vital organs. Pre-clinical studies have shown that the ResQPOD ITD 16:

- Doubles blood flow to the heart[1]
- Increases blood flow to the brain by 50%[2]
- Doubles ETCO2.[3]

**When used with high-quality manual CPR, the ITD has been shown in clinical studies to improve survival by 25% or more.[4-9]**

# A Simple Solution for **More Effective Resuscitation**

Attached to a facemask or other airway adjunct, the ResQPOD ITD contains airway pressure-sensing valves to selectively prevent air from entering the chest during chest wall recoil. This enhances the vacuum that pulls blood back to the heart, increasing preload. Patient ventilation and exhalation are not restricted. Timing lights flash at 10 per minute and guide ventilations at the guidelines recommended rate to discourage hyperventilation.




ResQPOD® ITD 16

## ResQPOD Features and Benefits

- Easy to integrate into resuscitation protocols
- Can be used during BLS and ALS care
- Compatible with all airway adjuncts and ventilation sources
- Timing lights guide ventilations at 10/minute
- Compatible with automated CPR devices
- Cost effective


ResQCPR™

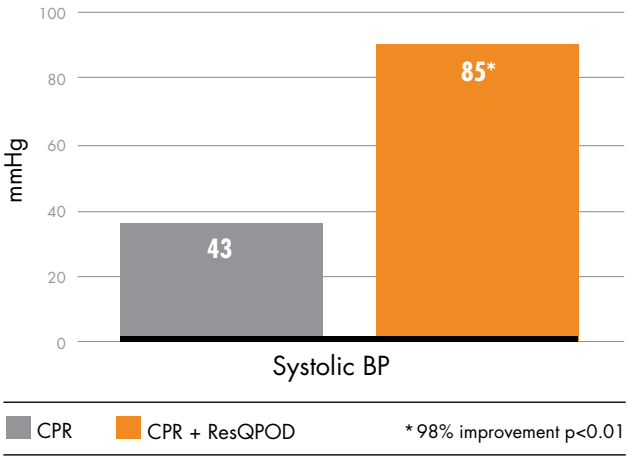
## ResQCPR™ – A SYSTEM FOR SURVIVAL

ResQCPR™ involves use of the ResQPOD Impedance Threshold Device (ITD) in combination with Active Compression Decompression CPR (ACD-CPR), performed with the CardioPump. ACD-CPR actively lifts the chest during chest wall recoil to further enhance negative intrathoracic pressure. The device combination works synergistically to optimize the vacuum and improve hemodynamics. ResQCPR has been shown to improve long-term survival with favorable neurologic outcome by 53%.[11]

# Studies Support Use of the ResQPOD ITD

## Improved Blood Pressure with an ITD

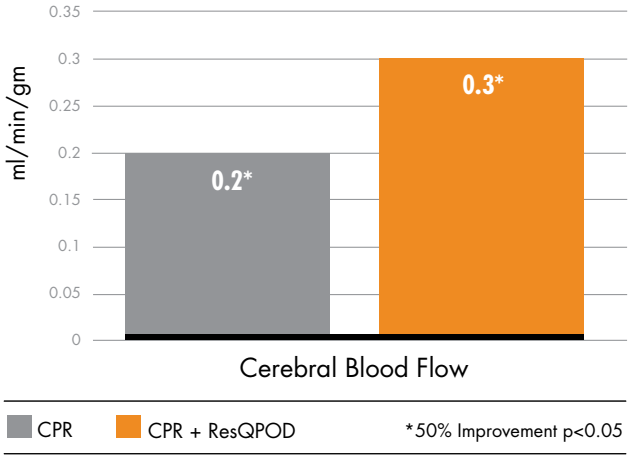
**A CLINICAL STUDY SHOWED A 98% INCREASE IN SYSTOLIC BP WHEN AN ITD IS USED.**




Pirrallo et al. Resuscitation 2005;66:13-20

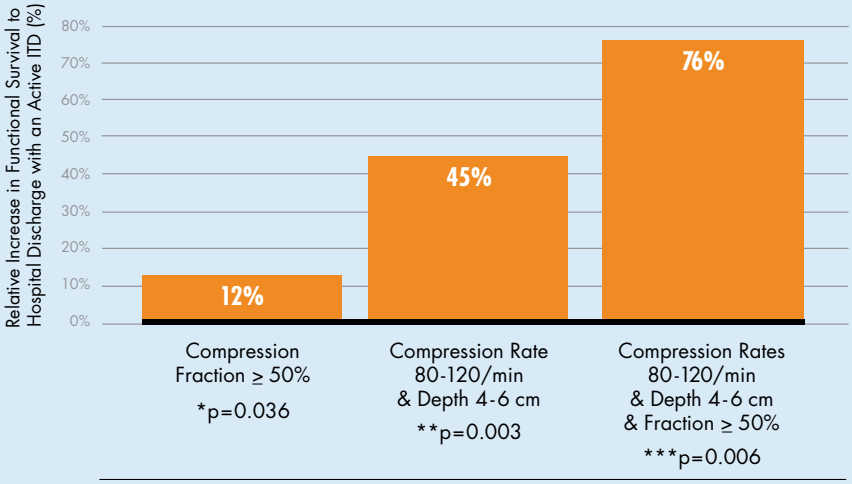
## Improved Blood Flow to the Brain with an ITD

**PRE-CLINICAL DATA SHOWED A 50% INCREASE IN BLOOD FLOW TO THE BRAIN WHEN AN ITD IS USED.**




Lurie et al. Chest 1998;113:1084-1090.

# Relative Increase in Survival with Active ITD



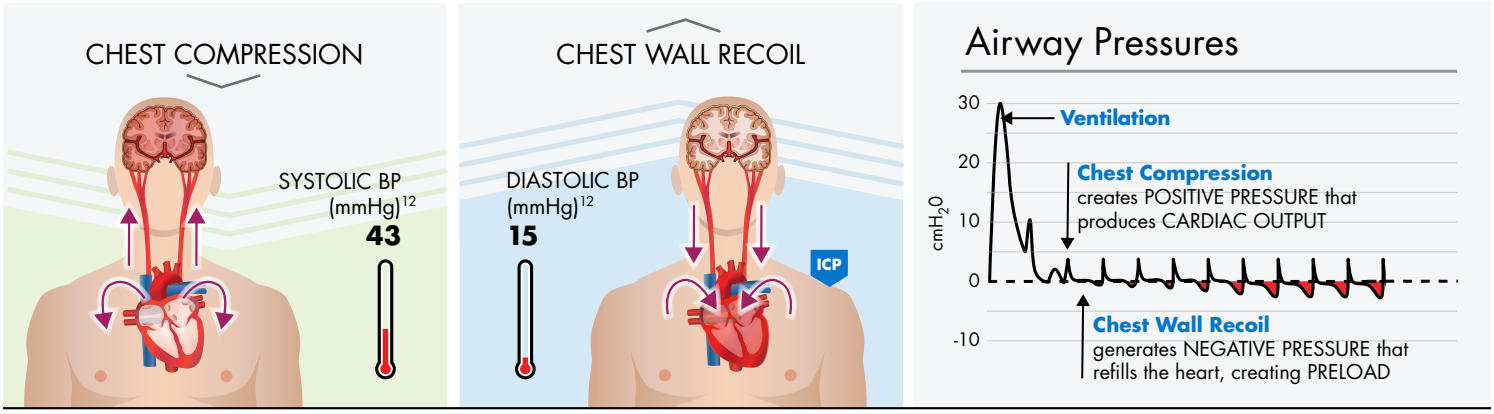

Yannopoulos et al. Circulation 2014;130:A9.

An analysis of the ROC PRIMED data by Yannopoulos et al showed that when an ITD was used, survival rates improved as the quality of CPR improved. Performance of CPR at a rate of 80-120 compressions per min, a compression depth of 4-6 cm, with a fraction of ≥ 50% resulted in the highest survival rates when an ITD was used compared to a sham ITD.

# Enhancing Perfusion During CPR

The ResQPOD Impedance Threshold Device (ITD) enhances circulation during basic or advanced life support CPR. This simple, non-invasive device regulates pressures in the chest and improves blood flow to the heart and brain.

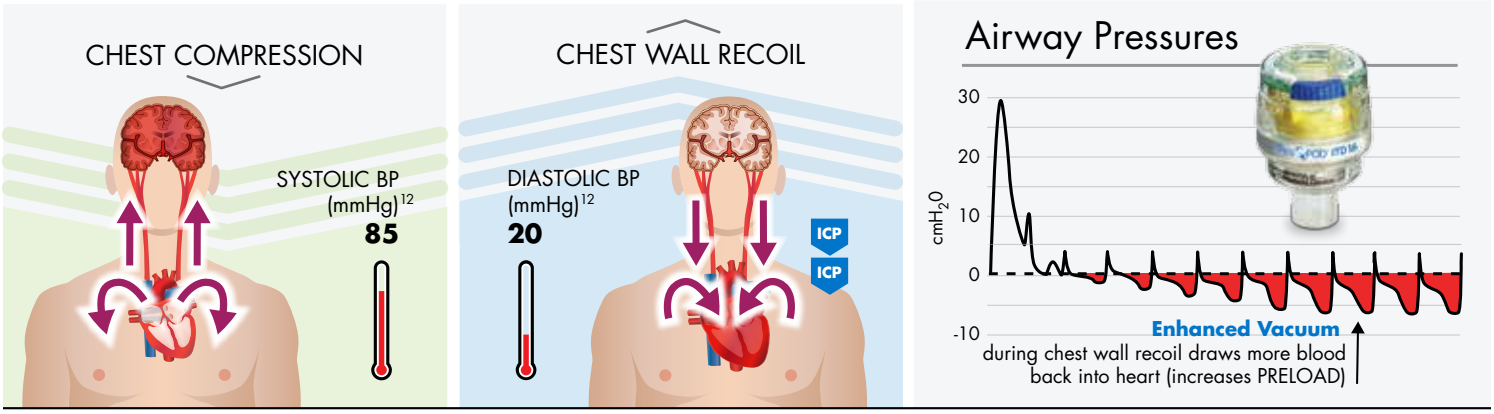
## Conventional CPR




### Conventional CPR – Limited Blood Flow

Even though high-quality CPR has been shown to increase survival, it only provides 25-40% of normal blood flow to the heart and brain.[13] Limited blood flow is due, in part, to the open airway. During chest wall recoil, air is drawn in and wipes out the vacuum (negative pressure) that is needed to fill the heart. This limits cardiac output and blood circulated with compressions.

## CPR with ResQPOD® ITD 16

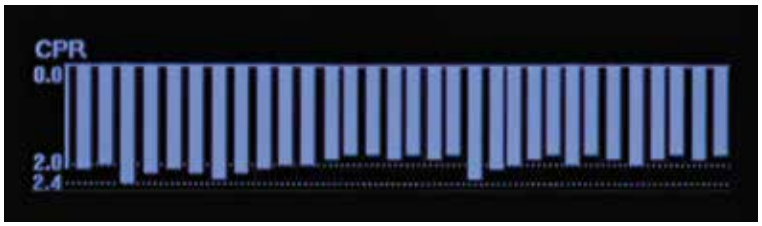



### CPR with the ResQPOD ITD – More Blood Circulated

Attached to a facemask or other airway adjunct, the ResQPOD selectively prevents air from entering the lungs during the chest wall recoil phase (except when intended with ventilations). This enhances the vacuum, which pulls more blood back into the heart and lowers intracranial pressure (ICP).[14] As a result, more blood is circulated to the brain and vital organs until the heart can be restarted. In studies, use of the ResQPOD with high-quality CPR improved survival 25% or more compared to high-quality CPR without an ITD.[4-5,7-8,14]

# ZOLL CPR Quality Tools

ZOLL's CPR technology can help you achieve the highest quality CPR and ensure your patients get the full benefit of the ResQPOD ITD. This easy-to-use technology works seamlessly with ZOLL monitors and provides real-time feedback on CPR quality.

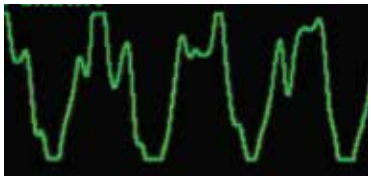



## Real CPR Help®

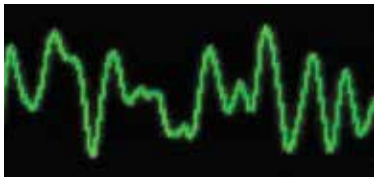
Real CPR Help® alerts rescuers when compressions fall out of range. When medics are fresh and delivering good compressions, it is silent. As fatigue sets in and compression quality erodes, prompts gently guide them back to high-quality compressions.


## CPR Dashboard™

The CPR Dashboard™ is a real-time window that gives team leaders an at-a-glance look at the quality of CPR compressions.



Unfiltered ECG signal during CPR



Signal filtered by See-Thru CPR

## See-Thru CPR®

See-Thru CPR® reduces the length of interruptions with a filter that lets responders see underlying organized rhythms during compressions.

## ZOLL AutoPulse®

Automated CPR is a simple and reliable way to achieve and maintain high-quality CPR. The ZOLL AutoPulse® is a device that moves more blood, more consistently than is possible with manual compressions.[15-17] Easy to use and battery operated, its load-distributing LifeBand® squeezes the entire chest, delivering high-quality CPR both at the scene and on the move.

1. Langhelle A, Stromme T, Sunde K, et al. Inspiratory impedance threshold valve during CPR. Resuscitation 2002;52:39-48.
2. Lurie KG, Mulligan KA, McKnite S, Detloff B, Lindstrom P, Lindner KH. Optimizing standard cardiopulmonary resuscitation with an inspiratory impedance threshold valve. Chest 1998;113(4):1084-1090.
3. Yannopoulos D et al.Critical Care Med 2006;34(5):1444-1449.
4. Yannopoulos D, Abella B, Duval S, Aufderheide T. The effects of CPR quality: a potential confounder of CPR clinical trials. Circulation 2014;130:A9.
5. Thigpen K, Davis SP, Basol R, et al. Implementing the 2005 American Heart Association guidelines, including use of an impedance threshold device, improves hospital discharge rates after in-hospital cardiac arrest. Respir Care 2010;55(8):1014-1019.
6. Thayne R, Thomas DC, Neville JD, Van Dellen A. Use of an impedance threshold device improves short-term outcomes following out-of-hospital cardiac arrest. Resuscitation 2005;67(1):103-108.
7. Aufderheide TP, Yannopoulos D, Lick CJ, et al. Implementing the 2005 AHA guidelines improves outcomes after out-of-hospital cardiac arrest. Heart Rhythm 2010;9(10):1357-1364.
8. Lick CJ, Aufderheide TP, Niskanen RA, et al. Take Heart America: a comprehensive, community-wide, systems-based approach to the treatment of cardiac arrest. Crit Care Med 2011;39(1):26-33.
9. Idris AH, Guffey D, Pepe PE, et all. The interaction of chest compression rates with the impedance threshold device and association with survival following out-of-hospital cardiac arrest. Circulation 2012;126:LBBS-22813-AHA.
10. Aufderheide TP, Frascone RJ, Wayne MA, et al. Standard cardiopulmonary resuscitation versus active compression-decompression cardiopulmonary resuscitation with augmentation of negative intrathoracic pressure for out-of-hospital cardiac arrest: a randomised trial. Lancet 2011;377:301-11.
11. ResQCPR System Summary of Safety and Effectiveness Data approved by Food & Drug Adminstration 2015.
12. Pirrallo RG, Aufderheide TP, Provo TA, Lurie KG. Effect of an inspiratory impedance threshold device on hemodynamics during conventional manual cardiopulmonary resuscitation. Resuscitation 2005;66:13-20.
13. Andreka P, Frenneaux MP. Haemodynamics of cardiac arrest and resuscitation. Curr Opin Crit Care 2006;12:198-203.
14. Aufderheide TP, Alexander C, Lick C, et al. From laboratory science to six emergency medical services systems: new understanding of the physiology of cardiopulmonary resuscitation increases survival rates after cardiac arrest. Crit Care Med 2008;36(11):S397-S404.
15. Halperin HR, Paradis N, Ornato JP, et al. Cardiopulmonary resuscitation with a novel chest compression device in a porcine model of cardiac arrest: improved hemodynamics and mechanisms. J Am Coll Cardiol 2004;44(11):2214-20.
16. Ikeno F, Kaneda H, Hongo Y, et al. Augmentation of tissue perfusion by a novel compression device increases neurologically intact survival in a porcine model of prolonged cardiac arrest. Resuscitation 2006;68(1):109-18.
17. Timerman S, Cardoso LF, Ramires JA, et al. Improved hemodynamic performance with a novel chest compression device during treatment of in-hospital cardiac arrest. Resuscitation 2004;61(3):273-80.


Studies available upon request. The generally cleared indication for the ResQPOD ITD available for sale in the United States (U.S.) is for a temporary increase in blood circulation during emergency care, hospital, clinic, and home use. Research is ongoing in the US to evaluate the long-term benefit of the ResQPOD for other specific indications. The studies referenced here are not intended to imply specific outcomes-based claims not yet cleared by the US FDA.

## Products

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|---|---|---|
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