

RESQPOD BIBLIOGRAPHY

STUDIES THAT INCLUDED AN IMPEDANCE THRESHOLD DEVICE DURING THE PERFORMANCE OF ALL CPR METHODS

Clinical (Human) Studies

1. Adabag S, Hodgson L, Garcia S, Anand V, Franscone R, et al. Outcomes of sudden cardiac arrest in a state-wide integrated resuscitation program: Results from the Minnesota Resuscitation Consortium. *Resuscitation* 2017;110:95-100.
2. Hopkins C, Burk C, Moser S, Meersman J, Baldwin C, Youngquist C. Implementation of pit crew approach and cardiopulmonary resuscitation metrics for out-of-hospital cardiac arrest improves patient survival and neurological outcomes. *J Am Heart Assoc* 2016;5(1):1-10.
3. Sporer K, Jacobs M, Derevin L, Duval S, Pointer J. Continuous quality improvement efforts increase survival with favorable neurological outcome after out-of-hospital cardiac arrest. *Prehosp Emerg Care* 2016;1-6.
4. Duval S, Pepe P, Goodloe J, Sugiyama A, Yannopoulos D. The CPR "sweet spot": A target combination of optimal chest compression rate and depth to achieve survival with favorable neurological function after out-of-hospital cardiac arrest. *Circulation* 2016;AHA ReSS Abstract #307.
5. Sugiyama A, Duval S, Nakamura Y, Yoshihara K, Yannopoulos D. Impedance threshold device combined with high-quality cardiopulmonary resuscitation improves survival with favorable neurological function after witnessed out-of-hospital cardiac arrest. *Circulation* 2016;80(10):2124-2132.
6. Debaty G, Labarere J, Frascione RJ, et al. Gasping during cardiopulmonary resuscitation is associated with a higher likelihood of one year survival after cardiac arrest. *Circulation* 2016;134:A19029.
7. Sporer KA, Jacobs MJ, Derevin L. Resuscitation bundle of care for out-of-hospital cardiac arrest improves survival with favorable neurologic outcome. *Prehosp Emerg Care* 2016;19(1):1-6.
8. Idris AH, Guffey D, Pepe PP, Brown SP, Brooks SC, Callaway CW, Christenson J, Davis DP, Daya MR, Gray R, Kudenchuk PJ, Larsen J, Lin S, Menegazzi JJ, Sheehan K, Sopko G, Stiell IG, Nichol G, Aufderheide TP; for The ROC Investigators. Chest compression rates and survival following out-of-hospital cardiac arrest. *Crit Care Med* 2015;43(4):840-846.
9. Wang CH, Tsai MS, Chang WT, Huang CH, Ma MH, Chen WJ, Fang CC, Chen SC, Lee CC. Active compression-decompression resuscitation and impedance threshold device for out-of-hospital cardiac arrest: a systematic review and meta-analysis of randomized controlled trials. *Crit Care Med* 2015;43(4):889-96.
10. Yannopoulos D, Abella B, Duval S, Aufderheide T, et al. The effects of CPR quality: a potential confounder of CPR clinical trials. *Resuscitation* 2015;94:106-113.
11. Driver BE, Debaty G, Plummer DW, Smith SW. Use of esmolol after failure of standard cardiopulmonary resuscitation to treat patients with refractory ventricular fibrillation. *Resuscitation* 2014;85:1337-1341.

12. Raubenolt A, Mastenbrook J, Franklin K, Fales W. Comparison of standard CPR versus CPR with an intrathoracic pressure regulator versus active compression decompression CPR plus an impedance threshold device during out-of-hospital cardiac arrest. *Prehosp Emerg Care* 2014;18(1):155.
13. Debaty G, Aufderheide T, Swor R, Frascone R, Wayne M, Domeier R, Olinger M, Mahoney B, Yannopoulos D. The paradoxical association between pulmonary edema and survival with favorable neurological function after cardiac arrest. *Circulation* 2014;130:A248.
14. Youngquist S, Burk C, Reilly D, Baldwin C. The adoption of multiple best practices to improve out-of-hospital cardiac arrest in Salt Lake City, Utah. *Circulation* 2014;130:A204.
15. Biondi-Zoccai G, Abbate A, Landoni G, Zangrillo A, Vincent JL, D'Ascenzo F, Frati G. An updated systematic review and meta-analysis on impedance threshold devices in patients undergoing cardiopulmonary resuscitation. *Heart, Lung and Vessels* 2014;6(2):105-113.
16. Frascone RJ, Wayne MA, Swor RA, Mahoney BD, Domeier RM, Olinger ML, Tupper DE, Setum CM, Burkhardt N, Klann L, Salzman JG, Wewerka SS, Yannopoulos D, Lurie KJ, O'Neil BJ, Holcomb RG, Aufderheide TP. Treatment of non-traumatic out-of-hospital cardiac arrest with active compression decompression cardiopulmonary resuscitation plus an impedance threshold device. *Resuscitation* 2013;84:1214-1222.
17. Schultz JC, Caldwell E, Sarraf M, Kolbeck J, Yannopoulos D. Prolonged adult cardiac arrest with enhanced cardiopulmonary resuscitation and sodium nitroprusside: a case series. *Circulation* 2013;AHA ReSS Abstract #248.
18. Satterlee PA, Boland LL, Johnson PJ, Hagstrom SG, Page DI, Lick CJ. Implementation of a mechanical chest compression device as standard equipment in a large metropolitan ambulance service. *J Emerg Med* 2013;45(4):562-569.
19. Escott MEA, Jenks SP, Traynor KM, Vartanian L, Miller C, Kuo DC. External cardiac bypass? A case series: hemodynamics of LUCAS Device plus an ITD in cardiac arrest. *Prehosp Emerg Care* 2014;18(1):156.
20. Thigpen K, Simmons L, James Z, Neely C. Breaking the 30% survival rate window: impact of the 2005 and 2010 American heart association guidelines on in-hospital cardiac arrest survival with favorable neurological function. *Circulation* 2013;AHA ReSS Abstract #164.
21. Chase D, Salvucci A, Hadduck K, Merman N, Marino R, Blickenstaff J, Robles J, Wroblewski J. Effect of early use of a King airway and impedance threshold device on circulation, survival and neurologic outcome in out-of-hospital cardiac arrest. *Prehosp Emerg Care* 2012;16(1):178.
22. Frascone RJ, Wayne M, Mahoney B, Swor R, Domeier R, Olinger M, Tupper D, Yannopoulos D, Holcomb R, Aufderheide T. Active compression decompression cardiopulmonary resuscitation and augmentation of negative intrathoracic pressure is neuro-protective in patients with an out-of-hospital cardiac arrest. *Prehosp Emerg Care* 2012;16(1):178.
23. Yannopoulos D, Holcomb R, Frascone RJ, Mahoney B, Wayne MA, Swor RA, Domeier RM, Olinger ML, Tupper DE, Aufderheide TP. Determinants of ventricular fibrillation incidence as first recorded rhythm during out-of-hospital cardiac arrest and association with long term neurological outcomes. Observations from a large randomized clinical study. *Circulation* 2012;126:A296.

24. Aufderheide TP, Frascone RJ, Wayne MA, Mahoney BD, Swor RA, Domeier R, Olinger ML, Holcomb RG, Tupper DE, Yannopoulos D, Lurie KG. Standard cardiopulmonary resuscitation versus active compression-decompression cardiopulmonary resuscitation with augmentation of negative intrathoracic pressure for out-of-hospital cardiac arrest: a randomized trial. *The Lancet* 2011;377:301-11.
25. Aufderheide TP, Nichol G, Rea TD, Brown SP, Leroux BG, Pepe PE, Kudenchuk PJ, Christenson J, Daya MR, Dorian P, Callaway CW, Idris AH, Andrusiek D, Stephens SW, Hostler D, Davis DP, Dunford JV, Pirralo RG, Stiell IG, Clement CM, Craig A, Van Ottingham L, Schmidt TA, Wang HE, Weisfeldt ML, Ornato JP, Sopko G for the ROC investigators. A trial of an impedance threshold device in out-of-hospital cardiac arrest. *NEJM* 2011;365:798-806.
26. Lick CJ, Aufderheide TP, Niskanen RA, Steinkamp JE, Davis SP, Nygaard SD, Bemenderfer KK, Gonzales L, Kalla JA, Wald SK, Gillquist KL, White LJ, Sayre MR, Osaki Holm SY, Oakes DA, Provo TA, Racht E, Olsen JD, Yannopoulos D, Lurie KG. Take Heart™ America: a comprehensive, community-wide, systems-based approach to the treatment of cardiac arrest. *Crit Care Med* 2011;39(1):26-33.
27. Wayne M, Tupper D, Swor R, Frascone R, Mahoney B, Olinger M, Domeier R, Yannopoulos D, Aufderheide T, Burkhart N, Setum C, Holcomb R, Lurie K. Improvement of long-term neurological function after sudden cardiac death and resuscitation: impact of CPR method and post-resuscitation care. *Resuscitation* 2011;82;Suppl 1:S3.
28. Aufderheide TP, Yannopoulos D, Lick CJ, Myers B, Romig LA, Stothert JC, Barnard J, Vartanian L, Pilgrim AJ, Benditt D. Implementing the 2005 American Heart Association guidelines improves outcomes after out-of-hospital cardiac arrest. *Heart Rhythm* 2010;7(10):1357-1362.
29. Dailey M, Politis J, Provo TA. Implementation of the AHA guidelines with a systems-based approach improves survival to hospital discharge following cardiac arrest. *Circulation* 2010;122:A51.
30. Hinchey PR, Myers JB, Lewis R, De Maio VJ, Reyer E, Licatase D, Zalkin J, Snyder G, for the Capitol County Research Consortium. Improved out-of-hospital cardiac arrest survival after the sequential implementation of the 2005 AHA guidelines for compressions, ventilations and induced hypothermia: the Wake County experience. *Ann Emerg Med* 2010;56(4):358-361.
31. Saussy JM, Elder JE, Flores CA, Miller AL. Optimization of cardiopulmonary resuscitation with an impedance threshold device, automated compression cardiopulmonary resuscitation and post-resuscitation in-the-field hypothermia improves short-term outcomes following cardiac arrest. *Circulation* 2010;122:A256.
32. Thigpen K, Davis SP, Basol R, Lange P, Jain SS, Olsen JD, Erickson BR, Schuchard TN, Aufderheide TP. 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.
33. Thigpen K, Simmons L, James Z, Neely C. Implementation of the 2005 American Heart Association guidelines improves in-hospital cardiac arrest survival rates in a community hospital: a 5-year case series. *Circulation* 2010;122:A48.
34. Aufderheide TP, Lurie KG, Yannopoulos D, Allen SG, Pirralo RG, Dye AM, Klein JP, Provo TA. Ventilation rate and use of the impedance threshold device are correlated with hemodynamics during CPR in humans. *Circulation* 2009;120:S-669.

35. Aufderheide TP, Alexander C, Lick C, Myers B, Romig L, Vartanian L, Stothert J, McKnite S, Matsuura T, Yannopoulos D, Lurie K. 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:S397-S404.
36. Cabrini L, Beccaria P, Landoni G, Biondi-Zoccai GGL, Sheiban I, Cristofolini M, Fochi O, Maj G, Zangrillo A. Impact of impedance threshold devices on cardiopulmonary resuscitation: a systematic review and meta-analysis of randomized controlled studies. *Crit Care Med* 2008;36(5):1625-1632.
37. Lurie K, Schnettler P, Steinkamp J, Hellie J, Basol R, Davis S. Level one cardiac arrest centers are clinically and cost effective. *Circulation* 2008;118:S1486.
38. Lurie KG, Lick C, Aufderheide T, Sayre M, White L, Racht E, Gonzalez L, Nygaard S, Niskanen R. Take Heart America™: a community-based sudden cardiac arrest survival initiative is saving lives by implementing the most highly recommended 2005 American Heart Association guidelines. *Circulation* 2008;118:S1464.
39. Aufderheide TP, Pirralo RG, Provo TA, Lurie KG. Clinical evaluation of an inspiratory impedance threshold device during standard cardiopulmonary resuscitation in patients with out of hospital cardiac arrest. *Crit Care Med* 2005;33:734-740.
40. Pirralo 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.
41. Plaisance P, Soleil C, Lurie KG, Vicaut E, Ducros L, Payen D. Use of an inspiratory impedance threshold device on a facemask and endotracheal tube to reduce intrathoracic pressures during the decompression phase of active compression-decompression cardiopulmonary resuscitation. *Crit Care Med* 2005;33(5):990-994.
42. 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.
43. Plaisance P, Lurie KG, Vicaut E, Martin D, Gueugniad P-Y, Petit J-L, Payen D. Evaluation of an impedance threshold device in patients receiving active compression-decompression cardiopulmonary resuscitation for out of hospital cardiac arrest. *Resuscitation* 2004;61:265-271.
44. Wolcke BB, Mauer DK, Schoefmann MF, Teichmann H, Provo TA, Lindner KH, Dick WF, Aeppli D, Lurie KG. Comparison of standard cardiopulmonary resuscitation versus the combination of active compression-decompression cardiopulmonary resuscitation and an inspiratory impedance threshold device for out-of-hospital cardiac arrest. *Circulation* 2003;108(18):2201-2205.
45. Plaisance P, Lurie KG, Payen D. Inspiratory impedance during active compression-decompression cardiopulmonary resuscitation: a randomized evaluation in patients in cardiac arrest. *Circulation* 2000;101(9):989-994.

Animal Studies

1. Bartos JA, Matsuura TR, Sarraf M, Youngquist ST, McKnite SH, Rees JN, Sloper DT, Bates FS, Segal N, Debaty G, Lurie KG, Neumar RW, Metzger JM, Riess ML, Yannopoulos D. Bundled

- postconditioning therapies improve hemodynamics and neurologic recovery after 17 min of untreated cardiac arrest. *Resuscitation* 2015;87:7-13.
2. Debaty G, Matsuura TR, Bartos JA, Rees JN, McKnite SH, Lick M, Boucher F, Yannopoulos D. Sodium nitroprusside-enhanced cardiopulmonary resuscitation facilitates intra-arrest therapeutic hypothermia in a porcine model of prolonged ventricular fibrillation. *Crit Care Med* 2014.
 3. Debaty G, Lurie K, Shin SD, Metzger A, Ryu HH, Kim T, Rees J, McKnite S, Matsuura T, Lick M, Yannopoulos D. Gravity-assisted head up cardiopulmonary resuscitation improves cerebral blood flow and perfusion pressures in a porcine model of cardiac arrest. *Prehosp Emerg Care* 2015;19(1):155. AND Debaty G, Shin SD, Metzger A, Ryu HH, Kim T, Rees J, McKnite S, Matsuura T, Lick M, Yannopoulos D, Lurie K. Gravity-assisted head up cardiopulmonary resuscitation improves cerebral blood flow and perfusion pressures in a porcine model of cardiac arrest. *Circulation* 2014;130:A88.
 4. Debaty G, Shin SD, Metzger A, Kim T, Ryu HH, Rees J, McKnite S, Matsuura T, Lick M, Yannopoulos D, Lurie K. Tilting for perfusion: head-up position during cardiopulmonary resuscitation improves brain flow in a porcine model of cardiac arrest. *Resuscitation* 2014;87:38-43.
 5. Debaty G, Segal N, Matsuura T, Fahey B, Wayne M, Mahoney B, Frascone R, Lick C, Yannopoulos D. Hemodynamic improvement of a LUCAS 2 automated device by addition of an impedance threshold device in a pig model of cardiac arrest. *Resuscitation* 2014;85:1704-1707.
 6. Debaty G, Metzger A, Rees J, McKnite S, Puertas L, Yannopoulos D, Lurie K. Enhanced perfusion during advanced life support improves survival with favorable neurological function in a porcine model of refractory cardiac arrest. *Circulation* 2014;130:A89.
 7. Rees J, Puertas L, Metzger A, McKnite S, Sloper D, Yannopoulos D, Lurie K. The product of end tidal carbon dioxide and an electroencephalogram measurement correlates with cerebral perfusion pressure during cardiopulmonary resuscitation in a swine model of cardiac arrest. *Prehosp Emerg Care* 2014;18(1):155. AND Puertas L, Rees J, Metzger A, McKnite S, Sloper D. The product of end tidal carbon dioxide and an electroencephalogram measurement correlates with cerebral perfusion pressure during cardiopulmonary resuscitation in a swine model of cardiac arrest. *Circulation* 2013;AHA ReSS Abstract #161.
 8. Sideris G, Magkoutis N, Sharma A, Rees J, McKnite S, Caldwell E, Sarraf M, Henry P, Lurie K, Garcia S, Yannopoulos D. Early coronary revascularization improves 24 hour survival and neurological function after ischemic cardiac arrest. A randomized animal study. *Resuscitation* 2014;85(2):292-298.
 9. Matsuura T, Bartos J, Sarraf M, Houang E, McKnite S, Rees J, Sloper D, Caldwell E, Bates F, Metzger J, Yannopoulos D. Poloxamer 188 improves intra-CPR hemodynamics and post-resuscitation LV function in a pig model of prolonged cardiac arrest. *Circulation* 2013;AHA ReSS Abstract #282.
 10. Matsuura TR, Yannopoulos D, Aldakkak M, Bienengraeber M, Sarraf M, Bartos JA, Aufderheide TP. Anesthetic postconditioning with sevoflurane during cardiopulmonary resuscitation improves cardiac mitochondrial function in a pig model of cardiac arrest. *Circulation* 2013;AHA ReSS Abstract #150.

11. Buckley GJ, Shih A, Garcia-Pereira FL, Bandt C. The effect of using an impedance threshold device on hemodynamic parameters during cardiopulmonary resuscitation in dogs. *J Vet Emerg Crit Care* 2012;22(4):435-440.
12. Burnett A, Salzman JG, Segal N, Frascone RJ, McKnite S. Potential negative effects of epinephrine on carotid blood flow and ETCO₂ during active compression-decompression CPR utilizing an impedance threshold device. *Resuscitation* 2012;83(8):1021-1024.
13. Metzger A, Herman J, McKnite S, Tang W, Yannopoulos D. Improved cerebral perfusion pressures and 24-hr neurological survival in a porcine model of cardiac arrest with active compression-decompression cardiopulmonary resuscitation and augmentation of negative intrathoracic pressure. *Crit Care Med* 2012;40(6):1851-1856.
14. Pantazopoulos IN, Xanthos TT, Vlachos I, Troupis G, Kotsiomitis E, Johnson E, Papalois A, Skandalakis P. Use of an impedance threshold device improves survival rate and neurological outcome in a swine model of asphyxial cardiac arrest. *Crit Care Med* 2012;40(3):861-868.
15. Schultz J, Segal N, Kolbeck J, McKnite S, Caldwell E, Yannopoulos D. Sodium nitroprusside enhanced cardiopulmonary resuscitation (SNPeCPR) improves vital organ perfusion pressures and carotid blood flow in a porcine model of cardiac arrest. *Resuscitation* 2012;83:374-377.
16. Yannopoulos D, Segal N, McKnite S, Aufderheide TP, Lurie KG. Controlled pauses at the initiation of sodium nitroprusside-enhanced cardiopulmonary resuscitation facilitate neurological and cardiac recovery after 15 minutes of untreated ventricular fibrillation. *Crit Care Med* 2012;40(5):1562-1569.
17. Metzger A, McKnite S, Yannopoulos D, Lurie K. Potential mechanism for improved neurological survival after cardiac arrest after treatment with active compression-decompression cardiopulmonary resuscitation combined with augmentation of negative intrathoracic pressure. *Circulation* 2011;124:A190.
18. Schultz J, Segal J, Kolbeck J, Caldwell E, Thorsgard M, McKnite S, Aufderheide T, Lurie KG, Yannopoulos D. Sodium nitroprusside enhanced cardiopulmonary resuscitation prevents post-resuscitation left ventricular dysfunction and improves 24-hour survival and neurological function in a porcine model of prolonged untreated ventricular fibrillation. *Resuscitation* 2011;82S:S35-S40.
19. Schultz J, Segal J, Caldwell E, Kolbeck J, McKnite S, Lebedoff N, Zviman M, Aufderheide T, Yannopoulos D. Sodium nitroprusside-enhanced cardiopulmonary resuscitation improves resuscitation rates after prolonged untreated cardiac arrest in two porcine models. *Crit Care Med* 2011;39(12):2705-2710.
20. Yannopoulos D, Matsuura T, Schultz J, Rudser K, Halperin HR, Lurie KG. Sodium nitroprusside enhanced cardiopulmonary resuscitation improves survival with good neurological function in a porcine model of prolonged cardiac arrest. *Crit Care Med* 2011;39(6):1269-1274.
21. Yannopoulos D, Wilson RF, Halperin H, Aufderheide TP, Lurie KG. Effects of epinephrine and sodium nitroprusside on left ventricular wall thickness and cavity size and carotid blood flow during cardiopulmonary resuscitation. *Circulation* 2010;122:A72.
22. Yannopoulos D, Matsuura T, McKnite S, Becker L, Aufderhiede T, Zviman M, Lurie KG, Halperin HR. Sodium nitroprusside CPR improves vital organ perfusion and resuscitation outcomes in a porcine model of ischemia-induced pulseless electrical activity. *Circulation* 2010;122:A163.

23. Lurie KG, Yannopoulos D, McKnite SH, McKnite SH, Herman ML, Idris AH, Nadkarni VM, Tang W, Gabriellei A, Barnes TA, Metzger AK. Comparison of a 10-breaths-per-minute versus a 2-breaths-per-minute strategy during cardiopulmonary resuscitation in a porcine model of cardiac arrest. *Respir Care* 2008;52(7):862-870.
24. Matsuura T, McKnite S, Metzger A, Yannopoulos D, Aufderheide TP, Lurie KG. An impedance threshold device combined with an automated active compression decompression CPR device (LUCAS) improves the chances for survival in pigs in cardiac arrest. *Circulation* 2008;118:S1449-1450.
25. Mader TJ, Kellogg AR, Smith J, Hynds-Decoteau R, Gaudet C, Caron J, Murphy B, Paquette A, Sherman LD. A blinded, randomized controlled evaluation of an impedance threshold device during cardiopulmonary resuscitation in swine. *Resuscitation* 2008;77:387-394.
26. Alexander C, Yannopoulos D, Aufderheide T, McKnite S, Matsuura T, Metzger A, Lurie K. Dual mechanism of blood flow augmentation to the brain using an impedance threshold device in a pediatric model of cardiac arrest. *Circulation* 2007;116(16):II-433.
27. Yannopoulos D, Halperin HR, Lurie KG. Lower extremity counterpulsation during the decompression phase of CPR improves hemodynamics and provides continuous forward carotid blood flow. *Circulation* 2007;116(16):II-485.
28. Menegazzi JJ, Salcido DD, Menegazzi MT, Rittenberger JC, Suffoletto BP, Logue ES, Mader TJ. Effects of an impedance threshold device on hemodynamics and restoration of spontaneous circulation in prolonged porcine ventricular fibrillation. *Prehosp Emerg Care* 2007;11:179-185.
29. Yannopoulos D, Aufderheide TP, Gabriellei A, Beiser DG, McKnite SH, Pirralo RG, Wigginton J, Becker L, Vanden Hoek T, Tang W, Nadkarni VM, Klein JP, Idris AH, Lurie KG. Clinical and hemodynamic comparison of 15:2 and 30:2 compression-to-ventilation ratios for cardiopulmonary resuscitation. *Crit Care Med* 2006;34(5):1444-1449.
30. Metzger AK, Herman ML, McKnite SH, Yannopoulos D, Lurie KG. Effect of an impedance threshold device and a novel active compression decompression cardiopulmonary resuscitation device on cerebral perfusion pressures and 24-hour neurological survival in a porcine model of cardiac arrest. *Circulation* 2006;114(18):II-554.
31. Srinivasan V, Nadkarni VM, Yannopoulos D, Marino BS, Sigurdsson G, McKnite SH, Zook M, Benditt DG, Lurie KG. Rapid induction of cerebral hypothermia is enhanced with active compression decompression plus inspiratory impedance threshold device cardiopulmonary resuscitation in a porcine model of cardiac arrest. *J Am Coll Cardiol* 2006;47(4):835-841.
32. Zhong J-Q, Hu X, Hare GM, Mazer CD, So PP, Debicki D, Dorian P. Effect of an automated ventilator and the impedance threshold device on coronary perfusion pressure and cerebral blood flow during cardiopulmonary resuscitation in pigs. *Circulation* 2006;114(18):II-553.
33. Dorph E, Wik L, Stromme TA, Eriksen M, Steen PA. Oxygen delivery and return of spontaneous circulation with ventilation:compression ratio 2:30 versus chest compressions only CPR in pigs. *Resuscitation* 2004;60:309-318.
34. Yannopoulos D, Sigurdsson G, McKnite S, Benditt D, Lurie KG. Reducing ventilation frequency combined with an inspiratory impedance device improves CPR efficiency in a swine model of cardiac arrest. *Resuscitation* 2004;(61):75-82.

35. Lurie KG, Barnes TA, Zielinski TM, McKnite SH. Evaluation of a prototypic inspiratory impedance threshold valve designed to enhance the efficiency of cardiopulmonary resuscitation. *Respir Care* 2003;48(1):52-57.
36. Bahlmann L, Klaus S, Baumeier W, Schmucker, Raedler C, Schmittinger CA, Wenzel V, Voelckel W, Lindner KH. Brain metabolism during cardiopulmonary resuscitation assessed with microdialysis. *Resuscitation* 2003;59(2):255-260.
37. Langhelle A, Stromme T, Sunde K, Wik L, Nicolaysen G, Steen PA. Inspiratory impedance threshold valve during CPR. *Resuscitation* 2002;52:39-48.
38. Lurie KG, Zielinski T, McKnite S, Aufderheide T, Voelckel W. Use of an inspiratory impedance valve improves neurologically intact survival in a porcine model of ventricular fibrillation. *Circulation* 2002;105(1):124-129.
39. Raedler C, Voelckel WG, Wenzel V, Bahlmann D, Baumeier W, Schmittinger CA, Herff H, Krismer AC, Lindner KH, Lurie KG. Vasopressor response in a porcine model of hypothermic cardiac arrest is improved with active compression-decompression cardiopulmonary resuscitation using the inspiratory impedance threshold valve. *Anesth Analg* 2002;95(6):1496-1502.
40. Voelckel WG, Lurie KG, Sweeney M, McKnite S, Zielinski T, Lindstrom P, Peterson C, Wenzel V, Lindner KH. Effects of active compression-decompression cardiopulmonary resuscitation with the inspiratory threshold valve in a young porcine model of cardiac arrest. *Pediatr Res* 2002;51(4):523-527.
41. Lurie KG, Voelckel WG, Zielinski T, McKnite S, Lindstrom P, Peterson C, Wenzel V, Lindner K, Samniah N, Benditt D. Improving standard cardiopulmonary resuscitation with an inspiratory impedance threshold valve in a porcine model of cardiac arrest. *Anesth Analg* 2001;93(3):649-655.
42. Voelckel WG, Lurie KG, Zielinski T, McKnite S, Plaisance P, Wenzel V, Lindner KH. The effects of positive end-expiratory pressure during active compression decompression cardiopulmonary resuscitation with the inspiratory threshold valve. *Anesth Analg* 2001;92(4):967-974.
43. 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.
44. Lurie KG, Ingbar D, Sweeney M, Mulligan KA, Brain C, Cahill B, McKnite S. Potential role of the vocal cords during cardiopulmonary resuscitation. *Circulation* 1998;98(17):I-478.
45. Lurie KG, Coffeen P, Shultz J, McKnite S, Detloff B, Mulligan K. Improving active compression-decompression cardiopulmonary resuscitation with an inspiratory impedance valve. *Circulation* 1995;91(6):1629-1632.

Manikin/Bench Studies

1. Genzwuerker HV, Gernoth C, Hinkelbein J, Schmidbauer W, Kerner T. Influence of an impedance threshold valve on ventilation with supraglottic airway devices during cardiopulmonary resuscitation in a manikin. *Resuscitation* 2010;81:1010-1013.
2. Babbs CF. Effects of an impedance threshold valve upon hemodynamics in standard CPR: studies in a refined computational mode. *Resuscitation* 2005;66(3):335-345.

3. Sugiyama A, Lurie KG, Maeda Y, Satoh Y, Imura M, Hashimoto K. Utilization of a model lung system to assess the effects of an inspiratory impedance threshold valve on the relationship between active decompression and intra-thoracic pressure. *Resuscitation* 1999;42(3):231-234.

The generally cleared indication for the ResQPOD ITD available for sale in the United States (US) 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.