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Review

# Wolf Creek XVII Part 2: The origin, evolution, and impact of the Wolf Creek Conference

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**Abstract**

The Wolf Creek Conference is a seminal meeting of resuscitation researchers that has significantly influenced scientific advances and patient care in the field of cardiac arrest resuscitation over nearly half a century. Originating in 1975 at the Wolf Creek Lodge in Georgia, the conference was founded by Drs. James Elam, James Jude, and Peter Safar with the aim of improving clinical practices in cardiopulmonary resuscitation (CPR) by stimulating laboratory and clinical research. Over 17 conferences to date, the scope has broadened to encompass the growing field of resuscitation science, participation has expanded to include thought leaders and scientists from both academia and industry, and the proceedings have catalyzed numerous innovations in field. This narrative review highlights the genesis, objectives, proceedings, and impact of the Wolf Creek Conference from 1975 to the present.

**Keywords**: Cardiac arrest, Cardiopulmonary resuscitation, Defibrillation, Post-cardiac arrest syndrome

## Conference origins

The modern era of cardiopulmonary resuscitation (CPR) emerged in the late 1950s and 1960s with the nearly simultaneous discovery of mouth-to-mouth ventilation, external chest compressions, and external defibrillation.[1–3] This body of techniques became known as the ABCs of CPR - airway, breathing, and circulation support. In the 1960s, the American Heart Association (AHA) formed a committee chaired by James Elam, Archer Gordon, James Jude, and Peter Safar to establish the first national CPR training guidelines.[4] Concurrently, Sam Seely of the National Academy of Sciences presided over committees developing recommendations for emergency medical services and ambulance design.[5]

By the 1970s, revolutionary developments in CPR knowledge, techniques, teaching, and practice had yielded some successes in reversing sudden cardiac arrest. However, opportunities to implement new knowledge on a wider scale were complicated by rigid teaching protocols and politics that diverged from evidence-based concepts and techniques.[6] To address these limitations and plot future directions, Drs. Elam, Jude, and Safar assembled colleagues for the first small group Wolf Creek Conference of resuscitation researchers in 1975.

## Wolf Creek Conference I

The inaugural 2-day conference was hosted by Dr. Jude at his Wolf Creek Lodge in Blairsville, Georgia in October 1975. Approximately 20 participants included first generation CPR researchers along with representatives from the AHA, American Red Cross, and innovators in CPR training aids. The informal discussions ranged from efficacy of maneuvers for foreign body airway obstruction to cerebral resuscitation after cardiac arrest. Select researchers presented synopses, but the focus was on cross-fertilization of ideas rather than formal presentations. Objectives centered on appraising the state of knowledge, controversies in resuscitation science, and shaping future research priorities. Proceedings were published in 1977 as a monograph entitled Advances in Cardiopulmonary Resuscitation, co-edited by Safar and Elam.[6]

## Wolf Creek Conferences II, III, and IV

The next Wolf Creek Conference was held in December 1980 in Key West, Florida, chaired by Dr. Joseph Redding.[7] Several new subjects were discussed, including lessons from the first prospective randomized Brain Resuscitation Clinical Trial (BRCT) on pharmaco-

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https://doi.org/10.1016/j.resplu.2023.100505

logical neuroprotection after cardiac arrest. By 1985, the third conference took place near Chicago, convened by Drs. Nicholas Bircher, Mickey Eisenberg, and Charles Otto.[8] Discussions continued on research controversies like buffer use during cardiac arrest. After a hiatus, the fourth conference occurred in April 1996 in Palm Springs, California. Organized under the Institute of Critical Care Medicine chaired by Dr. Max Harry Weil, the 38 participants included fewer original researchers but welcomed newer generation experts and industry representatives.[9,10] Proceedings addressed automatic external defibrillation, chest compression techniques, research barriers, and examination of cardiac arrest pathophysiology at the molecular level.

## Wolf Creek Conferences V to XI

The next seven Wolf Creek Conferences from 1999 to 2013 were again hosted by the Institute of Critical Care Medicine and chaired by Drs. Max Harry Weil and Wanchun Tang in both Palm Springs and Rancho Mirage, CA. Those conferences expanded international participation to over 70 experts while retaining an intimate atmosphere conducive to debate. Proceedings shifted focus to broader concepts of reanimation encompassing trauma, shock, post-cardiac arrest care, and bridging engineering with medicine. Key discussions catalyzed adoption of mild therapeutic hypothermia for neuroprotection after cardiac arrest, impedance threshold devices to enhance venous return during CPR, dispatch-assisted CPR, and public access defibrillation. The 2011 conference was dedicated to the memory of Dr. Max Harry Weil, a pioneering critical care researcher who co-chaired the conferences from 1996 to 2011.[11–17] The concept of emergency coronary artery intervention during CPR and immediately following resuscitation was introduced during Wolf Creek XII in 2013.

## Wolf Creek XIII to XVI

The 2015 Shanghai conference (Wolf Creek XIII) emphasized globalization, including speakers from China, Taiwan, Singapore and Japan. Extensive communications were made between the eastern and western medical societies regarding CPR. Locations returned to the United States for the fourteenth conference in 2017, hosted by the Weil Institute of Emergency and Critical Care Research at Virginia Commonwealth University. Chaired by Drs. Wanchun Tang, Joseph Ornato, and Mary Ann Peberdy, the objectives expanded to community resuscitation perspectives like statewide cardiac arrest registries. Wolf Creek XV in 2019 continued to push forward disruptive resuscitation strategies such as selective aortic arch perfusion and extracorporeal techniques. The COVID-19 pandemic catalyzed the first virtual Wolf Creek XVI Conference in April 2021, featuring increased participation by international experts and early career investigators with scientific presentations that spanned the translation spectrum.

## Wolf Creek XVII

Wolf Creek XVII was hosted by the Max Harry Weil Institute for Critical Care Research and Innovation on June 15–17 at the University of Michigan in Ann Arbor, MI, USA. Chaired by Robert Neumar, the conference maintained the tradition of providing a forum for international thought leaders and scientist from academia and industry to identify, debate, and prioritize knowledge gaps, barriers to translation and research priorities in the field of cardiac arrest resuscitation.[18] Areas of focus included automated cardiac arrest diagnosis, amplifying bystander response, mobile AEDs, physiology-guided CPR, mechanical circulatory support and neuroprotection. Wolf Creek XVII was the site of the inaugural Wolf Creek Innovator in Cardiac Arrest and Resuscitation Science Award competition that recognizes early career investigators who are challenging current paradigms in resuscitation science. Details and output of the conference proceedings are provided in Parts 3–9 in this special edition of Resuscitation Plus.[19–25]

Over 17 conferences to date, the Wolf Creek Conference has convened dynamically evolving objectives, participants, locations, sponsors, and proceedings while retaining its essence as an intimate think tank for advances in resuscitation. Future conferences promise to build on this legacy.

## Impact

The Wolf Creek Conference has significantly shaped the scientific basis and clinical practice of resuscitation over nearly half a century. Early conferences critiqued the gaps between accumulating evidence and guidelines recommendations, spurring renewed emphasis on grounding CPR protocols in research.[6] The informal, collegial atmosphere has catalyzed innovative thinking, controversies, and priorities in resuscitation medicine.

Proceedings have directly impacted techniques for airway management during cardiac arrest, public access defibrillation, dispatcher-assisted CPR, impedance threshold devices for circulatory support, mild hypothermia for neuroprotection after cardiac arrest, and waveform analysis to guide CPR interventions.[11,13,15–17] The conferences have also highlighted neglected areas warranting further investigation, including pathophysiologic mechanisms of injury and protection during dying and reperfusion. Published proceedings have informed the work of the International Liaison Committee on Resuscitation (ILCOR) and global resuscitation guidelines.

Beyond scientific impact, the Wolf Creek Conference cultivated multigenerational camaraderie among global resuscitation researchers. Legendary innovators like James Elam, James Jude, Peter Safar, Asmund Laerdal, and Max Harry Weil have connected with and inspired early career investigators and trainees at the conferences. The informal social interactions, humorous historic storytelling, and dedicated tributes to deceased colleagues have contributed to the ethos of the Wolf Creek Conference as both a scientific think tank and community. This spirit promises to shape the next era of advances in resuscitation research and practice worldwide.

## Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

## Acknowledgements

During the preparation of this work the authors used Calude.Ai in order to summarize the published proceedings and agendas of pre-

vious Wolf Creek Conferences. After using this tool/service, the authors reviewed and edited the content as needed and take full responsibility for the content of the publication.

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