



## OMAHA FIRE DEPARTMENT RESQPOD IMPLEMENTATION PROJECT SUMMARY

### INTRODUCTION

The Omaha (NE) Fire Department is a full-time, professional fire department with 23 stations and firefighters who are cross-trained as paramedics and EMTs. In the fall of 2004, the Omaha Fire Department trained EMS personnel in the use of the ResQPOD® for use during cardiac arrest with the intent to prospectively evaluate the effect the device might have on outcomes during the first year of implementation. The following is summary of those data compared to what occurred historically in the year prior to ResQPOD implementation.

### METHODS

The department prospectively elected to use ResQPODs on patients in cardiac arrest meeting the following criteria:

- Age:  $\geq 13$  years
- Weight:  $\geq 100$  pounds
- Intubated with an endotracheal (ET) tube
- Cardiac arrest of presumed non-traumatic etiology

The historical period (prior to ResQPOD implementation) occurred from November 1, 2003 – October 31, 2004 and included 151 cases that met the same criteria listed above. The prospective period (following ResQPOD implementation) occurred from November 1, 2004 – October 31, 2005 and included 157 cases that met the criteria listed above. Data were compiled and summarized based upon an intent-to-treat analysis. It was prospectively decided that return of spontaneous circulation (ROSC) would be the primary evaluation endpoint as there would likely be insufficient numbers of patients to evaluate longer-term endpoints in this implementation project; however, fire department personnel attempted to get follow-up hospital information from as many patients as possible who survived to hospital admission.

### RESULTS

The groups were similar with respect to age, sex, weight, EMS response time, witnessed arrest, bystander CPR and initial cardiac arrest rhythm.

Survival Endpoint	Historical Period (n = 151)	Prospective Period (n = 157)	% Increase
ROSC	36/151 (23.8%)	58/157 (36.9%)	55% <sup>1</sup>
Hospital Admission	30/133 (22.6%)	43/151 (28.5%)	26%
Hospital Discharge	10/131 (7.6%)	21/150 (14.0%)	84%
Patients Discharged with Neuro Score of 5 <sup>2</sup>	1/10 (10%)	7/21 (33%)	230%

In the tables above, when the denominator for any given data element is less than 151 (historical) or 157 (prospective) it is due to the fact that in some cases data were unavailable.

<sup>1</sup> P=0.012 (Chi-Square analysis)

<sup>2</sup> Complete neurologic recovery



## **COST VS. BENEFIT EVALUATION**

The cost for using ResQPODs on 157 patients is less than \$14,000 (\$89 each). Twenty-one patients were discharged from the hospital, resulting in a cost per life saved of less than \$670, compared to a cost per ROSC of \$2,224 for early defibrillation technology.<sup>3</sup>

## **CONCLUSIONS**

Implementation of the ResQPOD resulted in a significant (55%) increase in ROSC, proportionally similar to results reported by Aufderheide et al<sup>4</sup> and Thayne et al<sup>5</sup>. There were no significant adverse events or outcomes reported with ResQPOD use and the fire department continues to use the ResQPOD. It is currently considering placing the ResQPOD earlier (on the facemask) so that the benefits of the impedance threshold technology can be administered earlier. The survival to hospital discharge rate in this prospective group of patients (who did not benefit from early defibrillation) was 14%, which compares very favorably with the average national survival rate of approximately 5%.

## **THANKS**

We would like to thank the members of the Omaha Fire Department for their dedication to improving the opportunity for survival by implementing and evaluating this technology; in particular:

- Captain Scott Muschall
- Captain Melanie Bates
- Carol Gupton
- Assistant Chief James Love
- EMS Medical Director Joseph Stothert, MD

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<sup>3</sup> A complimentary standard of care technology, early defibrillation, is also used by the Omaha Fire Department, which encounters ventricular fibrillation as an initial arrest rhythm in approximately 40% of cases. The department has 35 AEDs in use at a cost of approx. \$2500 per unit; resulting in an annual capital equipment expense of approx. \$21,875 (\$87,500 depreciated over 4 years) per year. In the prospective implementation year, 206 patients were candidates for AED analysis (206 x \$45/set of defib pads) resulting in disposable expenses of \$9,270/year. Thus, the estimated cost of providing early defibrillation to the citizens of Omaha is approximately \$31,145 per year. In the prospective period, it appears that 14 patients benefited from this electrical therapy. Given this assumption, the expense was approximately \$2,224/ROSC.

<sup>4</sup> Aufderheide et al. Care Med 2005;33(4):734-40.

<sup>5</sup> Thayne et al. Resuscitation 2005;67(1):103-8.