Establishing a Statewide Cardiac Arrest Reporting and Educational Network: The Arizona Experience

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SHARE — Save Hearts in Arizona Registry & Education

BACKGROUND

Cardiovascular disease is the leading cause of death in the United States, with sudden out-of-hospital cardiac arrest (OHCA) claiming 400,000-460,000 lives each year (1-5). Despite periodic updates of national and international guidelines and tremendous efforts in the area of resuscitation care for trained medical professionals, survival remains dismal. (3) A few large cities have published their OHCA survival statistics using the Utstein reporting method. (6) To date there has been no published data of OHCA for a state.

OBJECTIVE

Determine survival rates for OHCA victims in Arizona. Create a functional statewide prehospital provider resuscitation network capable of collecting accurate data, disseminating information, and assuring quality OHCA resuscitation.

METHODS

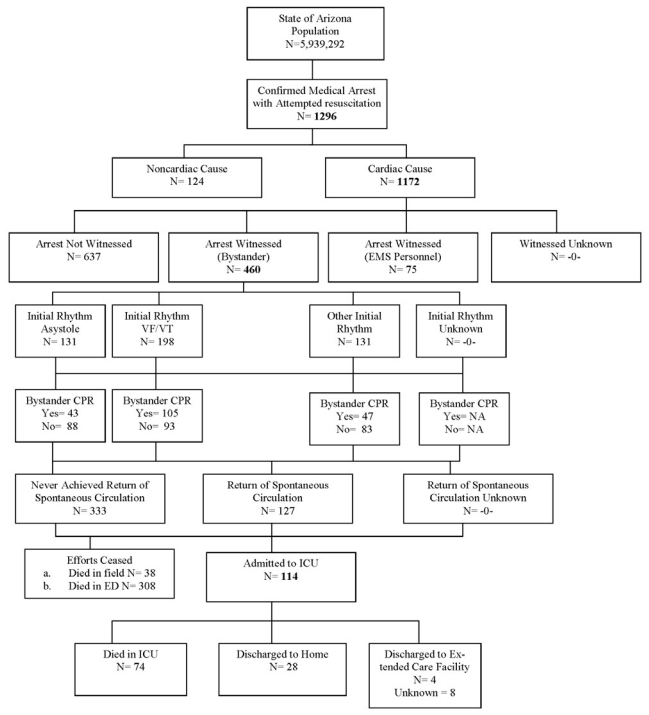
Arizona's Bureau of Emergency Medical Services (EMS) initiated a statewide, prospective observational cohort review of all non-traumatic arrests who received resuscitation in the field. Our analysis included the review of EMS first care reports voluntarily submitted by 30 municipal fire departments in Arizona. Entry criteria included time intervals and nodal events conforming to the Utstein template recommendations. Data was collected between January 1, 2005 and April 1, 2006.

RESULTS

Total OHCA reported statewide were 1,296, of which 1,097 were adult, of cardiac etiology and occurred prior to EMS arrival. There were 460 (41.9%) bystander witnessed arrests, and 637 (58.1 %) were not witnessed. Witnessed arrest provided an odds ratio of 9.1 for survival [95% CI 3.8-21.7].

RESULTS *(continued)*

Bystander CPR was provided in 410 (37.3 %) of all arrests. In the 410 arrests receiving bystander CPR, 183 (44.3%) were off-duty medical personnel. The incidence of layperson CPR was 227 (20.6%). Bystander CPR provided an odds ratio of 2.2 for survival [95% CI 1.2-4.1]. Initial rhythm of ventricular fibrillation (VF) was 300 (27.3%), 248 (22.6%) had an initial rhythm of PEA, 542 (49.5%) the initial rhythm was asystole and 6 (0.5%) the initial rhythm was other. Outcomes in 1066 patients were obtained. Thirty-five (3.3%) of the 1,066 adult cardiac arrest victims survived to hospital discharge. Twenty (7.0%) of the 286 adult VF cardiac arrest victims survived to hospital discharge. Age, race, and gender were not significant predictors of survival.



DISCUSSION

In 2006, OHCA continues to present a tremendous challenge and opportunity to public health officials. The enormous human and financial impact caused by sudden cardiac arrest mandates a coordinated and concerted plan by both the scientific and public health communities.

Our data showed an incidence of approximately 0.44 cardiac arrests per 1000 persons per year in Arizona. This was similar to the previously estimated annual incidence of 0.55 cardiac arrests per 1000 population in North America. (7,8)

The overall (3%) and ventricular fibrillation (7%) survival found in Arizona are in line with previously reported survival rates for adult OHCA.

An informal survey distributed to all state EMS State Directors revealed that only one other state (Maryland) maintains a statewide prehospital cardiac arrest and an AED registry linked to patient outcomes. We believe this is the first time OHCA incidence and survival has been reported on a statewide basis.

One of the other significant findings in this project was the extremely low rate (37%) of bystander CPR in Arizona. Thirty-eight percent of those performing bystander CPR had CPR as part of their job description, therefore the percentage of true layperson CPR we observed was a mere 23%. This suggests that new and innovative strategies aimed at improving the performance of bystander CPR are urgently needed.

There is significant public health utility in maintaining a statewide OHCA database. A robust, uniform statewide prehospital cardiac arrest databases allows public health officials to assess and improve systems of emergency medical care delivery.

LIMITATIONS

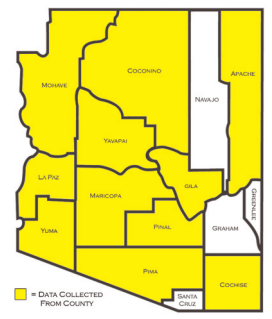
Our method of data collection did not capture all of the cardiac arrests for each EMS agency in Arizona. Some EMS systems use sophisticated electronic record keeping mechanisms while others reviewed each paper report by hand.

LIMITATIONS *(continued)*

While this certainly is a potential source of data omission, it also represents the challenges faced with prehospital data collection. Our data collection did not measure in-hospital post resuscitative care that may contribute to overall chances of survival to hospital discharge.

CONCLUSION

It is feasible for a public health agency to implement a voluntary, statewide database to determine survival from OHCA. Such a database serves EMS and public health agencies as a baseline for CQI along with assessment of new OHCA protocols. Current overall survival from OHCA in a statewide database utilizing standard resuscitation protocols is dismal.



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