

## Statistical Fact Sheet — Miscellaneous 2008 Update

### Out-of-Hospital Cardiac Arrest — Statistics

There is a wide variation in the reported incidence and outcome for out-of-hospital cardiac arrest. These differences are in part due to differences in definition and ascertainment of cardiac arrest data, as well as differences in treatment after its onset.

Cardiac arrest is defined as cessation of cardiac mechanical activity, and confirmed by the absence of signs of circulation. Available epidemiological databases do not adequately characterize cardiac arrest or the subset of cases that occur with sudden onset. Therefore, surrogate data are often used for epidemiological purposes to estimate the incidence of cardiac arrest, especially in the out-of-hospital setting. The following information summarizes representative data from several sources in an attempt to characterize the incidence and outcome of out-of-hospital cardiac arrest and demonstrate the need for a comprehensive system of capturing more meaningful data. (*Circulation*. 2004; 110: 3385–3397.)

- According to NCHS Data Warehouse mortality data, 310,000 CHD deaths occur out of hospital or in hospital emergency departments annually (2004) (ICD-10 codes I20–I25). (*Vital Statistics of the U.S., Data Warehouse, National Center for Health Statistics*. Available at: <http://www.cdc.gov/nchs/datawh.htm>. Accessed October 25, 2006.)
- The annual incidence of out-of-hospital cardiac arrest in North America is about 0.55 per 1000 population. With an estimated U.S. population of 302,196,872 ([www.census.gov](http://www.census.gov) accessed June 27, 2007), this implies that about 166,200 out-of-hospital cardiac arrests occur annually. (*Vaillancourt C, Stiell IG, Canadian Cardiac Outcomes Research Team. Cardiac arrest care and emergency medical services in Canada. Can J Cardiol*. 2004; 20: 1081–1090; ;*Rea TD, Eisenberg MS, Sinibaldi G, White RD. Incidence of EMS-treated out-of-hospital cardiac arrest in the United States. Resuscitation*. 2004; 63: 17–24.)
- About 60 percent of unexpected cardiac deaths are treated by emergency medical services (EMS). (*Chugh SS, Jui J, Gunson K, Stecker EC, John BT, Thompson B, Ilias N, Vickers C, Dogra V, Daya M, Kron J, Zheng ZJ, Mensah G, McAnulty J. Current burden of sudden cardiac death: multiple source surveillance versus retrospective death certificate–based review in a large U.S. community. J Am Coll Cardiol*. 2004; 44: 1268–1275.)
- In a population aged at least 20 years, incidence of out-of-hospital cardiac arrest treated by EMS is 36/100 000 to 81/100 000. (*Chugh SS, Jui J, Gunson K, Stecker EC, John BT, Thompson B, Ilias N, Vickers C, Dogra V, Daya M, Kron J, Zheng ZJ, Mensah G, McAnulty J. Current burden of sudden cardiac death: multiple source surveillance versus retrospective death certificate–based review in a large U.S. community. J Am Coll Cardiol*. 2004;44:1268–1275; *Cobb LA, Fahrenbruch CE, Olsufka M, Copass MK. Changing incidence of out-of-hospital ventricular fibrillation, 1980–2000. JAMA*. 2002;288:3008–3013.)
- Of these, 20 percent to 38 percent have ventricular fibrillation or ventricular tachycardia as the first recorded rhythm. (*Vaillancourt C, Stiell IG, Canadian Cardiac Outcomes Research Team. Cardiac arrest care and emergency medical services in Canada. Can J Cardiol*. 2004; 20: 1081–1090; *Cobb LA, Fahrenbruch CE, Olsufka M, Copass MK. Changing incidence of out-of-hospital ventricular fibrillation, 1980–2000. JAMA*. 2002; 288: 3008–3013. )
- The incidence of cardiac arrest with an initial rhythm of ventricular fibrillation is decreasing over time. However, the incidence of cardiac arrest with any initial rhythm is not decreasing. (*Cobb LA, Fahrenbruch CE, Olsufka M, Copass MK. Changing incidence of out-of-hospital ventricular fibrillation, 1980–2000. JAMA*. 2002; 288: 3008–3013. *Vital Statistics of the U.S., Data Warehouse, National Center for Health Statistics*. Available at: <http://www.cdc.gov/nchs/datawh.htm>. Accessed October 25, 2006.)

- The median reported survival to discharge after out-of-hospital cardiac arrest with any first recorded rhythm is 6.4 percent. (Nichol G, Stiell IG, Laupacis A, Pham B, De Maio V, Wells GA. A cumulative meta-analysis of the effectiveness of defibrillator-capable emergency medical services for victims of out-of-hospital cardiac arrest. *Ann Emerg Med.* 1999; 34: 517–525)
- The average proportion of cases of out-of-hospital cardiac arrest that receive bystander cardiopulmonary resuscitation is 27.4 percent. (Nichol G, Stiell IG, Laupacis A, Pham B, De Maio V, Wells GA. A cumulative meta-analysis of the effectiveness of defibrillator-capable emergency medical services for victims of out-of-hospital cardiac arrest. *Ann Emerg Med.* 1999; 34: 517–525.)
- The incidence of lay responder defibrillation is low (2.05 percent in 2002) but increasing over time. (Culley LL, Rea TD, Murray JA, Welles B, Fahrenbruch CE, Olsufka M, Eisenberg MS, Copass MK. Public access defibrillation in out-of-hospital cardiac arrest: a community-based study. *Circulation.* 2004; 109: 1859–1863.)
- The reported incidences of out-of-hospital pediatric cardiac arrest vary widely (from 2.6 to 19.7 annual cases per 100 000). (Donoghue A, Nadkarni V, Berg RA, Osmond MH, Wells GA, Nesbitt L, Stiell IG, CanAm Pediatric Cardiac Arrest Investigators. Out-of-hospital pediatric cardiac arrest: an epidemiologic review and assessment of current knowledge. *Ann Emerg Med.* 2005; 46: 512–522.)
- Because there are 72,293,812 individuals under age 18 in the United States, this implies that there are 1,900 to 14,200 pediatric out-of-hospital cardiac arrests annually from all causes (including trauma, sudden infant death syndrome, respiratory causes, cardiovascular causes, and submersion). (Monthly Postcensal Resident Population (8/1/2005): U.S. Census data. Available at: <http://www.census.gov>. Accessed October 19, 2005.) In 2004, 5,891 people died from unintentional choking or suffocation. Of these, 725 were under age 1. (NCHS)
- Ventricular fibrillation is an uncommon cause of cardiac arrest in children, but it is observed in approximately 5 percent to 15 percent of children with out-of-hospital cardiac arrest. (Mogayzel C, Quan L, Graves JR, Tiedeman D, Fahrenbruch C, Herndon P. Out-of-hospital ventricular fibrillation in children and adolescents: causes and outcomes. *Ann Emerg Med.* 1995; 25: 484–491.)

### Pediatric/Children

- Studies that document voluntary reports of deaths among high school athletes suggest that the incidence of out-of-hospital cardiac arrest ranges from 0.28 to 1.0 deaths per 100 000 high school athletes annually nationwide. Although incomplete, these numbers provide a basis for estimating the number of deaths in this age range. (Luckstead EF, Patel DR. Catastrophic pediatric sports injuries. *Pediatr Clin North Am.* 2002; 49: 581–591; Maron BJ, Gohman TE, Aeppli D. Prevalence of sudden cardiac death during competitive sports activities in Minnesota high school athletes. *J Am Coll Cardiol.* 1998; 32: 1881–1884)
- The reported average survival to discharge after pediatric out-of-hospital cardiac arrest is 6.7 percent. (Donoghue A, Nadkarni V, Berg RA, Osmond MH, Wells GA, Nesbitt L, Stiell IG, CanAm Pediatric Cardiac Arrest Investigators. Out-of-hospital pediatric cardiac arrest: an epidemiologic review and assessment of current knowledge. *Ann Emerg Med.* 2005; 46: 512–522.)
- For adults, the reported incidence of cardiac arrest in hospital, was 0.17 +/- 0.09 per bed per year. (Peberdy MA, Kaye W, Ornato JP, Larkin GL, Nadkarni V, Mancini ME, et al. Cardiopulmonary resuscitation of adults in the hospital: A report of 14, 720 cardiac arrest from the National Registry of Cardiopulmonary Resuscitation. *Resuscitation.* 2003;58:297-308.)
- The rates of survival to discharge after in-hospital cardiac arrest are 27 percent among children and 18 percent among adults. (Nadkarni VM, Larkin GL, Peberdy MA, Carey SM, Kaye W, Mancini ME, Nichol G, Lane-Truitt T, Potts J, Ornato JP, Berg RA, National Registry of Cardiopulmonary Resuscitation Investigators. First documented rhythm and clinical outcomes from in-hospital cardiac arrest among children and adults. *JAMA.* 2006; 295: 50–57.)

**For additional information see the Heart Disease and Stroke Statistics – 2008 Update, published in Circulation, available on our Web site.**

**Abbreviations Used:**

**CHD** – Coronary heart disease

**NCHS** – National Center for Health Statistics.