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Office of Epidemiology & Community Health Monitoring



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More Push, Less Breath

It is well known that out-of-hospital sudden cardiac death is a leading public health problem. In the absence of early defibrillation, survival rates of persons with out-of-hospital cardiac arrest (OHCA) in most areas of the world are dismal (*Circulation* 2007;116:2894-2896). In the US, approximately 450,000 deaths occur each year from OHCA and the probability of OHCA survival remains <5%.

In 2005, the American Heart Association (AHA)/International Liaison Committee on Resuscitation (ILCOR) revised its guidelines for responding to OHCA (*Circulation* 2005;112 (Supp IV):IV-19-IV-34). Those guidelines essentially advocate the same basic approach for 2 entirely different conditions: respiratory arrest in which severe arterial hypoxia and hypotension eventually lead to secondary cardiac arrest and primary cardiac arrest in which the arterial blood is fully saturated with oxygen at the time of arrest. Mouth-to-mouth ventilations, although appropriate for respiratory arrest, are not essential for survival in the vast majority of OHCA cases. It is believed that maintaining arterial perfusion pressures via chest compressions is key to enhancing survival and maintaining neurologic function in OHCA (*Circulation* 2006;114:2760-2765; *Am J Cardiol* 2006;98:497-499).

On April 1, 2006, the Emergency Physician Advisory Board and the Director, Kansas City Health Department approved a new paramedic protocol for OHCA. This protocol does not conform to the 2005 AHA/ILCOR guidelines. It is used by Metropolitan Ambulance System Trust (MAST) and Kansas City Fire Department. The protocol was designed to improve coronary perfusion pressure through near continuous chest compressions. Also, it was designed to remove delays in starting chest compressions and to remove interruptions to chest compressions. Aggressive ventilation of the person is deemphasized. Also, the protocol removes delays to defibrillation in certain cases.

Known as the Time Phase Model of Cardiac Arrest, the protocol calls for 200 chest compressions followed by one defibrillation shock followed by another 200 chest compressions. If the patient has no pulse following the second set of chest compressions, the process is repeated once or twice more. The initial 200 chest compressions may be omitted if there is a reliable history of adequate chest compression.

As part of its oversight of EMS operations in Kansas City, the Health Department reviewed the records of all witnessed adult OHCA. Two outcomes were monitored: return to spontaneous circulation (ROSC) as measured by a pulse in the field and at delivery to the hospital; and, discharge from the hospital. The results showed that ROSC increased significantly from 30.4% to 51.3% and being discharged alive from the hospital increased significantly from 21.3% to 44.2%. Thus, the implementation of the new resuscitation protocol for adult OHCA in Kansas City has made significant improvements in OHCA patient survival.

In Kansas City, nearly 75% of bystander witnessed OHCA episodes do not have any form of CPR done prior to the arrival of medical assistance. Ideally, the CPR should consist of continuous chest compressions or a mixture of breaths/chest compressions at a 2:30 ratio. CPR that consists of only mouth-to-mouth ventilations is clearly inappropriate, but it has been reported that up to 17% of bystander initiated CPR for OHCA is done this way (*Circulation* 2007;116:2908-2912). As of November 2005, MAST's CPR instructions to callers regarding OHCA include only continuous chest compressions.

Questions regarding the protocol should be directed to the Emergency Medical Services program, Kansas City Health Department—816.513.6262.

Arthritis in Children

Estimates of arthritis in children have varied widely because it is an umbrella term for which there are many definitions and because it is a relatively uncommon condition. Recently, the Centers for Disease Control and Prevention (CDC) published on the prevalence of pediatric arthritis and the number of annual ambulatory health care visits for pediatric arthritis and other rheumatologic conditions in the US (*Arthritis Care Res* 2007;57:1439-1445). Using physician office visit, outpatient department visit, and emergency department visit data from the 2001-2004 National Ambulatory Medical Care Survey and National Hospital Ambulatory Medical Care Survey, CDC estimated that 294,000 children have significant pediatric arthritis and other rheumatologic conditions (SPARC). Further, it was estimated there were 827,000 ambulatory visits each year because of SPARC, including 83,000 emergency department visits.

Arthritis is a general term for 100 different conditions that cause joint pain and inflammation. The CDC study and other evidence suggest that between 50,000 and 100,000 children suffer from juvenile rheumatoid arthritis, which if untreated can destroy the cartilaginous tissue that protects the joints. Without timely diagnosis, perma-

nent joint damage can ensue.

The study estimated that 5,700 children in Missouri and 2,800 in Kansas are living with some form of arthritis. In one sense, these children are lucky because pediatric rheumatologists practice in these states, although significant distances may need to be traveled to see the physicians. According to the study, about 15,000 children with SPARC live in 11 states that do not have any pediatric rheumatologists.

Between 2001 and 2005, children (0-19 years of age) living in Kansas City made 456 emergency department visits for arthritis. Non-Hispanic white children made 165 visits (36.2% of the total) while non-Hispanic black children had 218 visits (47.8% of the total). Of the 456 visits, 238 (52.2%) were made by females and 218 (47.8%) by males.

Unfortunately, the data available to the Kansas City Health Department does not permit identification of multiple visits by a single individual. Therefore, the actual number of children who made the 456 visits cannot be determined. The children making the visits came from 39 different zip codes across the City.

The Rise in Alzheimer's Disease Deaths

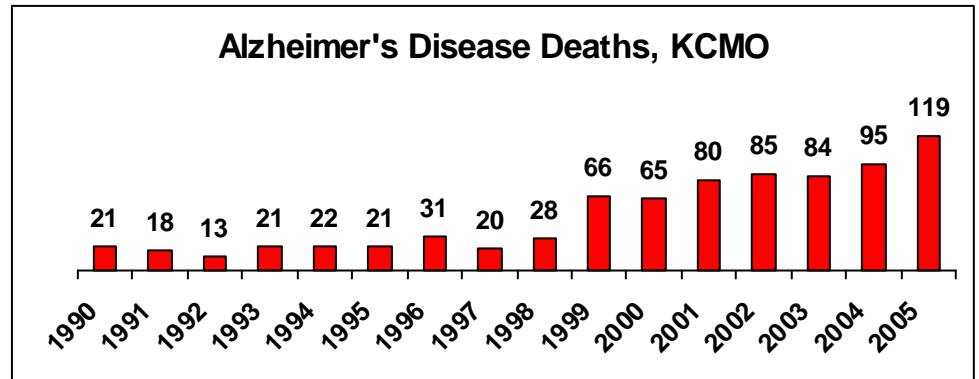
Alzheimer's disease is a progressive and fatal brain disease and the most common cause of dementia. More than 5 million Americans now have Alzheimer's disease. The disease destroys brain cells, causing problems with memory, thinking and behavior severe enough to affect work, lifelong hobbies or social life. Alzheimer's gets worse over time and is fatal.

According to the National Center for Health Statistics, in 2004, Alzheimer's disease was the 7th leading cause of death in the United States and accounted for 2.5% of all deaths in the country. It also was the 10th leading cause of death for men, but the 5th leading cause for women. From 1999 through 2003, it was the 8th leading cause of death. Prior to 1999, Alzheimer's disease was ranked as the 12th leading cause of death in the nation.

The graph on the next page shows deaths among Kansas City residents attributed to Alzheimer's disease. In 1999 the number of recorded deaths doubled and has been steadily increasing since. It became the 8th leading cause of death among city residents starting in 2002 and advanced to the 6th leading cause by 2005. In 2005, it was the 9th leading cause of death for persons 65-74 y old, 5th leading cause for those 75-84 y old, and 4th leading cause for individuals ≥ 85 y. Both nationally and locally, the numbers of deaths from Alzheimer's disease are expected to continue to increase as the population ages.

So what happened between 1998 and 1999 that led to the significant number of deaths being attributed to Alzheimer's disease? The most likely culprit was a change in the way deaths are coded on death certificates. Prior to

1999, the International Classification of Disease (ICD) version 9 was used for this purpose. Starting with 1999, the ICD-9 was replaced by the ICD-10 which brought substantial changes to the coding and selection rules for Alzheimer's disease.



Diabetes during Pregnancy & Infant Macrosomia

Prepregnancy diabetes type 1 or type 2 accelerates maternal diabetes complications and increases risk for spontaneous abortions and birth defects. Gestational diabetes can lead to pregnancy associated hypertension, fetal macrosomia, and cesarean delivery. Glucose levels can vary during pregnancy by the type of diabetes making it difficult to maintain treatment target levels, particularly among those women with type 1 diabetes (*Diabetes Care* 2007;30:2785-2791).

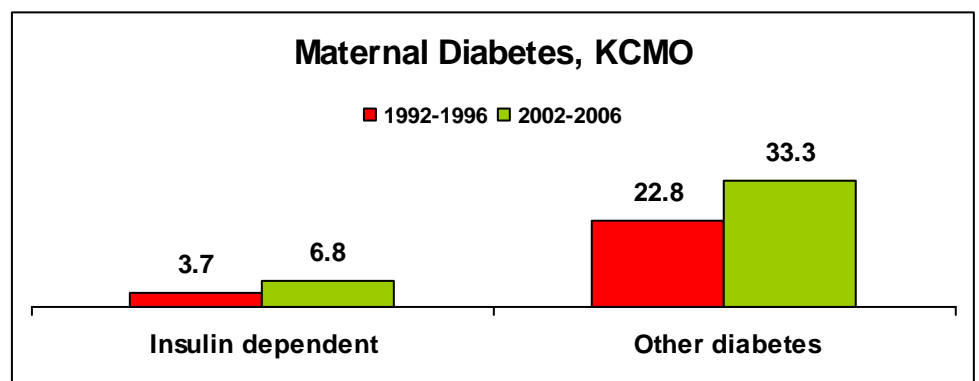
In 1995, 2 out of every 3 cases of prepregnancy diabetes in the US were type 2. This proportion has likely increased because obesity and type 2 diabetes prevalence have grown among women of childbearing age. For example, in Minnesota between 1993 and 2003, significant increases occurred in the rates of prepregnancy and gestational diabetes (*Am J Public Health* 2007;98:5-8). Prepregnancy diabetes rates rose from 2.6 per 1,000 live births to 4.9, while gestational diabetes rates rose from 25.6 to 34.8.

Missouri's birth certificate asks whether the pregnant woman had insulin dependent diabetes or other diabetes. In Kansas City, in a comparison of singleton births for 1992-1996 and 2002-2006, the prevalence of maternal insulin dependent diabetes rose 82% (see graph), while that for non-insulin dependent diabetes rose 47%.

Among women with insulin dependent diabetes, the rates per 1,000 live

births significantly increased between the two time periods (3.7 to 6.8) and for all groups except Native Americans. In 2002-2006, Asians had the highest rate (12.6 per 1,000 live births) for maternal insulin dependent diabetes and it was significantly higher than that for Native Americans (7.7), non-Hispanic whites (6.9), non-Hispanic blacks (6.3), and Hispanics (6.3). While the rates increased significantly based on the mother's country of origin and on her parity status, during 2002-2006 the differences in rates based on country of origin (US born 6.7, foreign born 7.2) or parity (nulliparous 6.4, parous 7.0) were not significantly different from each other. Women ≥ 35 y of age had a significantly higher rate than younger women (13.7 and 6.0, respectively). The rates increased significantly as the mother's educational level of attainment increased: 5.3 for those with < 12 y education, 6.8 for those with 12 years, and 7.7 for those with ≥ 13 years.

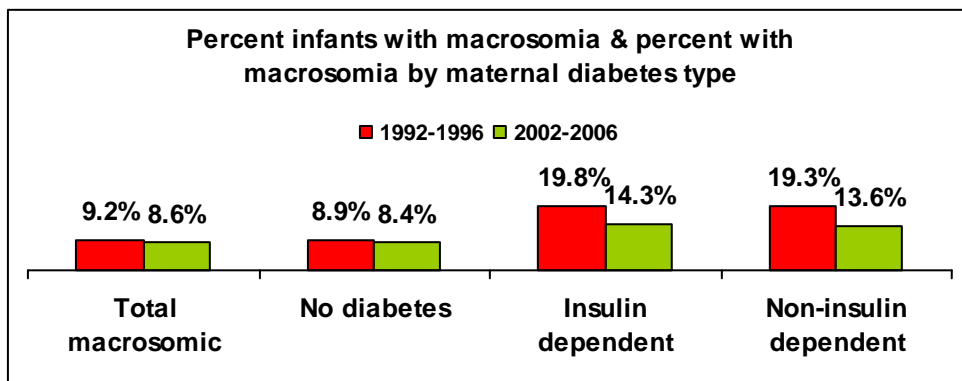
Also, for women with non-insulin diabetes, the rates significantly increased between the two time periods (22.8 to 33.3) and for all groups except Native Americans. In



2002-2006, Asians had the highest rate (66.4) for maternal non-insulin dependent diabetes and it was significantly higher than that for Hispanics (40.3), non-Hispanic blacks (32.8), Native Americans (30.6), and non-Hispanic whites (29.6). The rates increased significantly based on the mother's country of origin and on her parity status. During 2002-2006 the differences in rates based on

country of origin (US born 30.7, foreign born 44.6) and parity (nulliparous 26.9, paraous 37.6) were significantly different from each other. Women ≥ 35 y of age had a significantly higher rate than younger women (68.6 and 29.3, respectively). The rates increased significantly as the mother's educational level of attainment increased: 30.6 for those with < 12 y education, 32.6 for those with 12 years, and 34.8 for those with ≥ 13 years.

While there is a variety of adverse outcomes associated with maternal diabetes, let us take a quick look at two in Kansas City – infants with macrosomia and infant mortality. Infants with macrosomia are those with birth-weights $\geq 4,000$ grams (8 lb 13 oz). Diabetes that is poorly controlled in pregnancy is the greatest risk factor for fetal macrosomia. This is believed to be partially explained by excessive growth due to elevated maternal plasma glucose



levels and resulting elevated insulin and insulin-like growth factor levels, which stimulate glycogen synthesis, fat deposition, and fetal growth.

Between 1992 and 1996, 9.2% of all singleton births in Kansas City were involved infants with macrosomia; this decreased to 8.6% between 2002 and 2006 (see graph above) Between the two time periods, the percent of infants with macrosomia born to women who did not have maternal diabetes declined from 8.9% to 8.4%, while for women with diabetes the rate declines were more substantial. Among women with insulin dependent diabetes the percent of infants with macrosomia declined from 19.8% to 13.6%, and among those with non-insulin dependent diabetes the percentages declined from 19.3% to 13.6%.

Potpourri

ELEVATED SERUM total cholesterol is a major and modifiable risk factor for heart disease. Reducing average total serum cholesterol levels among adults to < 200 mg/dL, and reducing the proportion who have levels of 240 mg/dL to $< 17\%$ are national Healthy People 2010 objectives.

According to the National Center for Health Statistics, for 2005-2006, 16% of adults had serum total cholesterol levels of 240 mg/dL or greater (*NCHS Data Brief 2007, #2 www.cdc.gov/nchs*). The average serum cholesterol level in the adult population was 199 mg/dL, a decrease from the previous average of 204 mg/dL. The decline occurred among men ≥ 40 y of age and women ≥ 60 y. There was little change for other sex-age groups.

THE FOOD FLAVORING AGENT diacetyl has been removed from all major brands of microwaveable popcorn (*USA Today 12/17/07, 6D*). Diacetyl has been associated with the development of bronchiolitis obliterans in workers at microwave popcorn production facilities (*Community & Hospital Letter 2007;26(11)*). Although no known cases of illness have been reported among consumers, an alleged case has been reported to the FDA.

MALES AND FEMALES with severe psoriasis died 3.5 and 4.4 years younger, respectively, than those without psoriasis (*Arch Dermatol 2007;143:1493-1499*). Mild psoriasis was not associated with an increased risk of death.

Healthy People, Healthy Communities

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