



Community & Hospital Letter

Volume 26, Issue 3 October 2005

Protecting Pedestrians during Collisions with Cars

YOU MAY HAVE NOTICED that some new car advertisements for European made vehicles have been emphasizing enhanced safety features of the car's hood for the victims of vehicle-pedestrian collisions. That is because these cars must comply with the first phase of the European Union's (EU) pedestrian safety directive which comes into effect in October.

When a car hits someone the bumper sweeps their legs from under them. Their upper torso pivots onto the leading edge of the car's hood, and their head comes crashing down on the upper part of the hood or the windshield. These head injuries cause about 80% of the pedestrian deaths.

The first phase of the EU's legislation requires a bumper that absorbs some of the energy of the impact; meaning bumpers will be taller and deeper, designed to cushion the impact without transferring the force of the impact to the knee. Also, a crumple zone on the hood will help to absorb the energy of any impact and cut the severity of head injuries. In most cars this crumple zone can be created by designing a 4 inch space between the hood and the engine. This space allows the hood to bend and absorb some of the energy. In low slung cars such a space may be impractical so a computer controlled hood linked to the bumper may rise up 4 inches to achieve the same effect in the event of an impact.

The problem for Americans, however, is that current federal requirements require bumpers on cars that withstand 2.5 miles per hour crash into a solid object. This vehicle protection standard unfortunately is not pedes-

trian friendly. And, the EU legislation is designed to protect pedestrians in collisions up to 18 miles per hour. Therefore, given the global market, car manufacturers will have find it difficult to design a bumper that meets both US and EU legislation and helps protect pedestrians during a collision.

Walking is the most dangerous mode of travel per mile in the US. Although only 8.6% of all trips are made on foot, 11.4% of all traffic deaths are pedestrians (www.trasact.org). While, in 2003, only 0.9% of motor vehicle accidents involved pedestrians, 7.3% of fatal accidents involved a pedestrian. That year 80 pedestrians were killed in Missouri and 1,461 were injured by motor vehicles; 264 accidents involving pedestrians and 12 deaths occurred in Kansas City.

Nationally, in 2001, the fatality rate per 100 million miles traveled was 0.75 for public transit riders, 1.3 for drivers and their passengers, 7.3 for passengers of commercial airliners (includes passengers who died during September 11th terrorist attacks), and 20.1 for walkers. For 2002-2003, the Pedestrian Danger Index (rate of pedestrian deaths relative to the amount that people walk in a given metropolitan area) was 100.3 for the Kansas City MO-KS metropolitan area, ranking 15th in the nation. This was the highest index for any metropolitan area in Missouri; the St Louis MO-IL index was 95 (17th in the nation). In addition, the Kansas City metropolitan area spent the lowest amount per person on pedestrian/bicycle facilities and safety at \$1.03. Columbia spent the most at \$3.32 and also had the lowest Pedestrian Danger Index at 22.8.

The Kansas City Health Department and the Neighborhoods & Community Services Department have released the 5th edition of *Rabies & Animal Bite Investigation*. The manual is available at www.kcmo.org/health. It will also be available in hospital emergency departments in Kansas City and some adjoining jurisdictions.

Injuries & Deaths from Falls among Kansas Citians

“FALL DOWN. GO BOOM!” is familiar phrase spoken by very young children and their parents. Falling down is a necessary phase of learning to walk, to ride a bike, etc. It is a rite of passage for many of life’s activities. Hopefully, with age one experiences unintentional falls with decreasing frequency, although there certainly are activities where falling down is expected.

Unintentional and unexpected falls, unfortunately, can be major causes of injuries or even deaths. Between 2000 and 2003, 167 Kansas City residents died as the result of falls (*Community Health Assessment 2005*, www.kcmo.org/health). And, each year, approximately 12,000 Kansas Citians sought medical attention at a hospital as the result of a fall; many arrived in a MAST ambulance (12,369 transports for falls/back injuries/trauma during 2000 to 2003).

During this time period, women had higher overall annual rates for emergency department visits (343 per 10,000 population vs 307) and hospitalizations (66.1 vs 39.7) resulting from falls than did men (Table 1). The overall death rates from falls, however, were similar, 0.9 for women and 1.0 for men. There were differences by age groups. For emergency department visits, men had a higher rate than women among 0-19 y olds, but women had higher rates in each succeeding age group. For hos-

pitalizations, rates were higher for men 0-19 and 20-45 y old, with women having the higher rates among those 46-65 and >65 y old. While 76% of all deaths attributed to falls occurred among individuals >65 y old, the fall associated death rate for males was 1.8 times that for women.

White women >65 y old, had annual rates for emergency department visits and hospitalizations, 1.17 and 1.67 times higher, respectively, than those for black women.

The identified actions that led to the falls, as captured in the hospital discharge data, are shown in Tables 2 and 3. The highest rates for falls resulting in emergency department visits were among persons >65 y of age for women and among men 0-19 y old. The highest rates for a specified antecedent cause were the result of falls on the same level from slipping, tripping or stumbling. As might be expected, this category also had the highest rates for hospitalizations. Women had higher rates of emergency department visits from falls involving steps and stairs than did men, whereas men had higher rates for falls from ladders, scaffolding, and buildings/structures. For both men and women, the total number of falls involving stairs/step, ladders/scaffolding, and from one level to another was not appreciably different from that resulting from falls on the same level as the result of slipping, tripping, or stumbling.

Table 1. Injuries and deaths resulting from falls, Kansas City, Missouri, residents, 2000-2003*

Age (yrs)	Emergency Department Visits				Hospitalizations				Deaths			
	Male	Annual rate**	Female	Annual rate	Male	Annual rate	Female	Annual rate	Male	Annual rate	Female	Annual rate
0-19	11,371	453	8,978	370	211	8.4	126	5.2	1	0.04	0	0.0
20-45	8,399	264	10,004	273	708	19.7	441	12.0	15	0.42	1	0.03
46-65	3,696	222	5,651	385	813	48.8	816	55.6	12	0.72	10	0.68
>65	2,710	354	6,740	428	1,655	215.9	4,657	295.6	60	7.83	67	4.25
Total	26,176	307	31,373	343	3,387	39.7	6,040	66.1	88	1.0	786	0.9

* Counts include only cases where age information was recorded

** Falls per 10,000 population based on Census 2000

Table 2 Annual rates per 10,000 population for emergency department visits due to falls among Kansas City, Missouri, residents, by sex and age

		Annual rates by age groups				
		0-19	20-45	46-65	>65	Total
Male	Fall on or from stairs or steps	41.2	36.5	29.2	30.1	35.4
	Fall on or from ladders or scaffolding	2.1	13.6	16.9	12.4	10.8
	Fall from or out of building or other structure	3.6	4.5	2.4	0.6	3.5
	Fall into hole or other opening in surface	2.3	3.8	1.8	0.7	2.7
	Other fall from one level to another	125.5	23.7	22.6	41.1	55.0
	Fall on same level from slipping, tripping or stumbling	102.5	118.0	63.9	125.8	81.5
	Fall on same level from collision, pushing by another person	20.3	3.8	0.8	0.3	7.8
	Fracture, cause unspecified	3.9	2.0	1.4	1.3	2.4
	Other and unspecified fall	181.5	81.4	82.9	141.3	116.6
Female	Fall on or from stairs or steps	44.7	40.4	66.5	33.8	55.6
	Fall on or from ladders or scaffolding	0.8	3.2	5.8	1.7	2.7
	Fall from or out of building or other structure	2.3	0.9	0.7	0.4	1.2
	Fall into hole or other opening in surface	3.0	4.7	3.1	1.0	3.4
	Other fall from one level to another	96.3	17.0	27.2	48.6	45.2
	Fall on same level from slipping, tripping or stumbling	83.4	91.6	219.8	155.0	110.0
	Fall on same level from collision, pushing by another person	6.0	1.1	0.7	0.8	2.3
	Fracture, cause unspecified	1.9	1.4	1.8	2.9	1.8
	Other and unspecified fall	131.5	85.3	127.2	193.6	121.3

Because falls, particularly among the elderly and among workers on-the-job, are a significant cause of injury and death, there is considerable literature on the subject as well as federal safety requirements for certain professions. Yet despite that literature, little attention has been given to young and middle-aged adults where falls represent a risk for injury with related expenses and potential interference with work and family.

A study (BMC Public Health 5:86, 2005) looking at falls among Baltimore’s Longitudinal Study of Aging participants found that young adults reported injuries from falls most frequently to the wrist/hand, knees and ankles, while middle aged adults tended to injure their knees. Senior citizens reported more head and knee injuries.

Women had a higher percentage of injuries in all age groups. Ambulation was cited as the cause of fall most frequently regardless of age or sex. The survey did not find any difference in severity of injury.

Falling often results from multiple concurrent problems including environmental and behavioral factors as well as disease processes. For example, middle aged adults progressively start to show higher incidences of diseases and medication use, along with lower levels of physical activity, and physiological changes that begin to alter posture stability. Events in this group are likely to predispose individuals for the higher risks that lead to falls in later years.

Table 3 Annual rates per 10,000 population for hospitalizations due to falls among Kansas City, Missouri, residents, by sex and age

		Annual rates by age groups				
		0-19	20-45	46-65	>65	Total
Male	Fall on or from stairs or steps	0.7	2.0	3.7	12.1	2.9
	Fall on or from ladders or scaffolding	0.2	2.5	4.3	5.9	2.4
	Fall from or out of building or other structure	0.8	2.2	1.8	2.9	1.7
	Fall into hole or other opening in surface	0.2	0.3	0.0	0.7	0.2
	Other fall from one level to another	2.5	3.6	6.2	18.5	5.9
	Fall on same level from slipping, tripping or stumbling	1.9	3.7	10.3	44.3	8.6
	Fall on same level from collision, pushing by another person	0.8	0.2	0.1	0.3	0.3
	Fracture, cause unspecified	0.2	0.3	1.3	3.9	0.8
	Other and unspecified fall	1.4	4.8	21.2	115.7	5.3
Female	Fall on or from stairs or steps	0.8	2.4	7.0	17.3	5.3
	Fall on or from ladders or scaffolding	0.0	0.2	1.0	1.1	0.4
	Fall from or out of building or other structure	0.4	0.2	0.3	0.1	0.3
	Fall into hole or other opening in surface	0.1	0.1	0.4	0.3	0.2
	Other fall from one level to another	1.5	1.2	5.4	22.7	6.5
	Fall on same level from slipping, tripping or stumbling	1.1	3.5	17.0	82.4	18.6
	Fall on same level from collision, pushing by another person	0.0	0.1	0.1	6.8	0.2
	Fracture, cause unspecified	0.3	0.4	1.4	8.0	1.8
	Other and unspecified fall	0.9	4.0	23.0	158.0	32.8

Dangerously Golden

THE PATHOGENIC BACTERIUM *Staphylococcus aureus* has a colorful resistance mechanism (J Exper Med 202:194, 2005). The characteristic gold color of *S aureus* sets it apart from its avirulent cousins, which are mostly unpigmented. The color reflects the production of anti-oxidant molecules (carotenoids). Despite the connection between color and virulence of *S aureus*, a functional link had never been investigated.

A new study, however, has demonstrated that these pigmented molecules defuse the reactive oxygen species (ROS) that normally help neutrophils kill bacteria (J Exper Med 202:209-214, 2005). Expression of these pig-

ments rendered the normally colorless *Streptococcus pyogenes* golden and more virulent. And, *S aureus* that were altered so they could not make carotenoids could no longer resist neutrophil attack and were less pathogenic in mice.

The protective effect of the carotenoids on the bacteria is a function of their antioxidant activity. Golden *S aureus*, for example, had no advantage over carotenoid deficient bacteria in mice whose neutrophils lacked the ROS-producing machinery. This suggests that drugs that inhibit carotenoid synthesis might be useful in treating *S aureus* infections which are often antibiotic resistant.