If physicians more aggressively diagnosed a common breathing disorder called sleep apnea, they could prevent 567,000 vehicle crashes that cause 980 deaths a year and save $11.1 billion in related costs.

That's according to a new study by researchers from UCSD, Canada and Colorado, who calculated how much suffering, loss and death from vehicle collisions could be avoided if patients received treatment to get a full night's rest.

"Ours is the first study that really shows the large magnitude of this problem," said Dr. Alex Sassani of UCSD, the study's principal investigator, who analyzed numerous papers correlating sleep apnea and traffic collisions.

"Most physicians and patients must be made more aware of this major, major disorder because it's very silent, and we're only now just beginning to realize its impacts," Sassani said.

Dr. Terence Davidson, who directs the UCSD Nasal Dysfunction Clinic and is the report's senior author, said the condition keeps people from getting enough sleep because in effect, "they are being awakened every few seconds like a water torture."

He said many of his patients "are ultimately and absolutely exhausted but because they slip into the condition slowly, they don't know it's not normal. They don't know they're tired. But five minutes in the car and they start dozing off."

Sassani suggested in an interview that physicians should ask not just their patients about sleeping problems, but their patients' sleep partners, as well, especially if they are overweight, over age 40, snore and do a lot of driving.

"Do they snore or wake up a lot at night, or do they get tired at inappropriate times during the day?" Sassani asked.

Sassani's and Davidson's report was published in this month's issue of the journal *Sleep*.

Obstructive sleep apnea, in which a person's normal breathing rhythm is interrupted for about 10 seconds from five to 60 times an hour during sleep, affects an estimated 4 percent of middle-aged men and 2 percent of middle-aged women, or about 4.7 million people in the United States. Published studies say about 75 percent of people with severe forms of sleep apnea are not aware they have it.

The disorder occurs when the throat muscles and tongue relax during sleep and block the airway. Breathing then becomes noisy and difficult with disruptive snoring.

In people who are overweight, excess tissue can make the problem worse, thus provoking the nickname "Pickwickian syndrome," after an overweight character in Charles Dickens' *Pickwick Papers* whose loud snoring disrupted meetings.

However, patients with normal weight also can have severe sleep apnea.
In a second, less common type, called central sleep apnea, the brain fails to convey prompt messages to the respiratory system muscles to initiate breathing.

The physical and metabolic consequences can be severe, with fluctuations in blood pressure and heart rate, excessive daytime sleepiness, poor oxygen intake to the bloodstream and brain, mood disorders, depression, memory problems and, in some severe cases, hypertension, heart disease and stroke. Several researchers believe people with severe sleep apnea have a shortened life span.

Dr. James Skatrud, associate director of the University of Wisconsin Comprehensive Sleep Disorders Center in Madison, agreed that physicians need to be more diligent in asking their patients about their sleep habits.

"There certainly has been an under recognition of sleep disorders by physicians because it wasn't encountered in medical school until a few years ago," Skatrud said.

He said that is starting to change as epidemiological studies and internationally publicized mishaps point to the potentially disastrous consequences of not getting proper sleep.

Skatrud and his Wisconsin colleagues estimated in a recent issue of the *Journal of the American Medical Association* that severe apnea would be found in one in every 15 adults and more mild forms in one in five.

Yvonne Fernandes of University Heights knew her snoring was loud, but she never linked it to extreme daytime fatigue. When a worried houseguest mentioned it, she underwent testing at UCSD and discovered her sleeptime breathing stopped for periods as long as 110 seconds, and as many as 100 times an hour.

"What I find amazing is that none of my doctors diagnosed it before," she said.

Cheryl Spinweber, clinical director of the Scripps Mercy Sleep Disorders Center in Hillcrest, said many of her patients went for years with undiagnosed apnea, sometimes with tragic consequences.

"One patient was a man whose wife was killed in a car accident because he fell asleep while driving," she said.

Other patients say, "I'm here because I almost fell asleep driving or I have fallen asleep driving," she said. "The sleepiness is overwhelming."

Patients are usually diagnosed through sleep lab "polysomnography" machines or through a sleep test machine they take home. The tests measure oxygen levels in the blood, motion of the thorax or chest and amounts of exhaled carbon dioxide.

Diagnosed patients are then treated with a fitted mask attached to a machine called a Continuous Positive Airway Pressure device, or CPAP, that forces air through nasal passages to prevent the throat and tongue from blocking the airway.

The researchers analyzed reports prepared over the past quarter century that examined the relationship between people with sleep apnea and motor vehicle collisions. In their conclusion, the authors blamed 4.2 percent of all collisions on sleep apnea and said drivers with sleep apnea are 2.5 times more likely than normal drivers to be involved in a collision.

Other studies considered in their report include a comparison paper that found patients with sleep apnea performed as poorly on simulated steering and reaction time tests as legally intoxicated persons.

After determining the percentage of traffic accidents that occur among drivers with sleep apnea, the researchers factored in the cost and success rate of sleep apnea treatments to determine how many collisions could be prevented with proper diagnosis.

They calculated the cost of screening and treating adults over a certain age who show symptoms of sleep apnea,
including four out of five who wouldn't qualify. A routine, two-night course of testing was estimated to cost about $2,200, and the cost of the CPAP machine for those who met the criteria was about $500 per year.

The authors concluded, based on year 2000 figures from the National Safety Council, that sleep apnea costs $15.9 billion annually in medical expenses, lost productivity, administrative costs, damage to vehicles and cost to employers, and is the cause of 1,400 vehicle crash deaths and 810,000 collisions a year.

Screening possible patients and treating those diagnosed would cost $3.2 billion. It would avoid 980 collision fatalities and 567,000 vehicle collisions a year. For every $1 spent on diagnosis and treatment, society would save $3.49, the researchers concluded.

The report was funded by a $2,000 educational grant from ResMed Corp., a Poway-based company that makes sleep apnea testing and treatment devices, to Sassani while he was a UCSD medical student. Davidson is a member of the ResMed board of directors.

Sassani and Davidson's report was praised in an accompanying editorial as "an important start" to attempt to quantify the consequences of sleep apnea, but the editorial also had several criticisms.

Allan I. Pack and Dr. Grace W. Pien of the Division of Sleep Medicine at the University of Pennsylvania wrote that while the authors factored in a 30 percent dropout rate for people who do not continue the treatments in quantifying CPAP success rates, "it is doubtful that increased crash risk should be entirely mitigated by therapy" because therapy does not help some patients.

They emphasized that those sleep apnea patients at greater risk of being involved in a vehicle crash are probably those with the most severe form – in which they stop breathing 33 or more times per hour rather than five or 10 times. That would reduce the benefit of therapy.

However, they and the authors agree that more research funded by the federal government is needed to get objective conclusions.

Still, co-author Dr. Larry J. Findley of the Sleep Disorders Center of Northern Colorado said the continuous positive airway pressure devices have been proven to help.

"If you can use the machine, you will be less sleepy, perform better on driving simulations, and accidents will be significantly decreased to a level equal to that of non-apnea drivers," Findley said. "We know it works."