Harvard Center for Risk Analysis

*Using Decision Science to Empower Informed Choices about Health, Safety, and Environmental Risks*

July 2000

Volume 8
Issue 6

# Risk in Perspective

## CELLULAR PHONES AND DRIVING: WEIGHING THE RISKS AND BENEFITS


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*"While the decision to use a cellular phone while driving creates risks to the driver and occupants of the vehicle, and to pedestrians, bicyclists, and motorists in other vehicles, these risks are small in probability. These risks should be weighed against the benefits that such communications provide to users, families, social networks, businesses, and community."*

The cellular phone has rapidly become part of the daily lives of millions of Americans. Concern has been raised that use of cellular phones while driving threatens public safety. Four municipalities (Brooklyn, Ohio; Hilltown, Conshohocken, and Lebanon, Pennsylvania) have already passed laws banning the use of hand-held (but not hands-free) cellular phones while driving. New York City prohibits the use of both types of cellular phones by cab and car service drivers. Among the 29 developed nations belonging to the Organization for Economic Cooperation and Development (OECD), about a quarter of its members – Australia, Japan, France, Italy, Portugal, Spain, Sweden, and Switzerland – have restricted hand-held phone usage while driving. A number of municipalities across the U.S. are considering similar restrictive legislation.

AT & T Wireless Communications commissioned the Harvard Center for Risk Analysis to conduct an independent, comprehensive risk-benefit analysis of the use of cellular phones while driving. After a thorough review of existing scientific data and independent focus groups with cellular phone users and emergency services personnel in Springfield, Massachusetts and Los Angeles, California, we find:

- Cellular phone use while driving poses a risk to the driver, to other motorists, and to pedestrians.

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- The risks appear to be small compared to other daily risks but are uncertain because existing research is limited and of uneven quality.

- Little previous work has been done to identify and assess the benefits of the use of cellular phones in motor vehicles.

We conclude that although there is evidence that using a cellular phone while driving poses risks to both the driver and others, it may be premature to enact substantial restrictions at this time. We simply do not have enough reliable information on which to base reasonable policy. Industry, government, and academia should rapidly enhance the knowledge base on cellular phone use by motorists and, in the interim, should encourage more selective and prudent use of cellular phones while driving.

## Cellular Phone Facts

- Introduced in 1983, 94 million Americans now have cellular phone service.

- 27% of U.S. households report that at least one member owns a cellular phone.

- Between 1990 and 1998, the fraction of owners who use these devices primarily for personal/family purposes rather than for business purposes increased from 40% to 61%.

- Several surveys have found that 80-90% of cellular phone owners use these devices while driving at least some of the time. The length of the average call while driving varies.

### Cellular Phone Call Duration While Driving

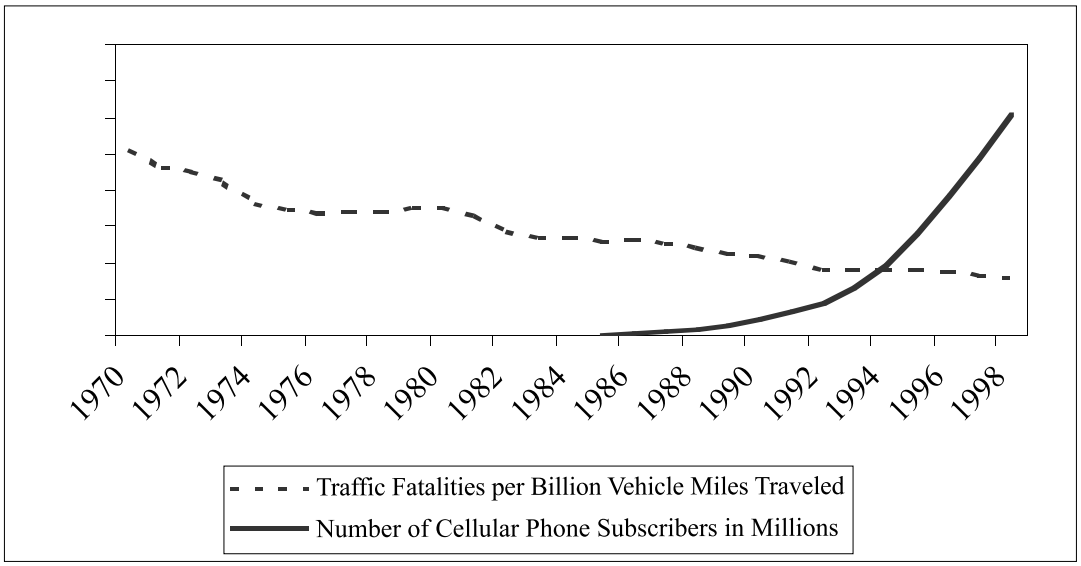
| Call Duration While Driving | Percentage of Respondents (%) |
|---|---|
| Less than 30 seconds | 23 |
| 30 seconds – 2 minutes | 37 |
| 2 – 5 minutes | 18 |
| More than 5 minutes | 4 |
| Do not use while driving | 10 |
| No response | 8 |

*Source: Personal Communications Industry Association (PCIA), 1999*

## The Risks

- The adverse effect of cellular phone use on traffic safety is not sufficiently large to be detected in overall counts of fatalities. While cellular phone use has grown 17-fold between 1990-1998, U.S. traffic fatalities have continued a steady decline that began more than 30 years ago.

## U.S. Traffic Fatalities per Billion Vehicle Miles Traveled and U.S. Cellular Phone Subscribers in Millions, 1970-1999




- Based on reasonable assumptions and the available reliable research, we estimate that the voluntary risk (the risk the driver voluntarily incurs) of fatality for the user of a cellular phone while driving is about 6 chances in a million per year. The estimated risk is uncertain because it is based on limited data and depends on a number of assumptions.

### Voluntary Risk Comparison

| Risk Factor | Annual Fatalities per Million Drivers |
|---|---|
| Driving while using a cellular phone | 6.4 |
| Driving with a blood alcohol concentration at the legal limit of 0.10% for one-half hour, 12 times per year (hypothetical) | 30.9 |
| Driving without wearing a lap and shoulder belt (assumes vehicle has airbags) | 49.3 |
| Driving in a small car instead of a large car (1,000 pound difference in weight) | 14.5 |
| Driving 60 miles once per year on a non-interstate rural roadway rather than on a rural interstate highway | 1.5 |

- The involuntary risk that someone (e.g. pedestrians or other motorists) will be killed by a driver using a cellular phone is about 1 chance in a million per year. This probability is smaller than the risk of being killed by a drunk driver.

## Involuntary Risk Comparison

| Risk Factor | Annual Fatalities per Million Individuals in the U.S. Population |
|---|---|
| Motorist struck and killed by driver using cellular phone | 1.5 |
| Sober driver struck and killed by driver with a non-zero blood alcohol concentration | 17.6 |
| Motorist struck and killed in crash with large truck | 16.8 |
| Person struck and killed on ground by crashing airplane | 0.013 |
| Pedestrian struck and killed in motor vehicle crash | 22.2 |

- Accidents associated with cell phone use while driving are more likely to be non-fatal because a significant percentage of cellular phone calls are made from vehicles during rush hour, when traffic conditions reduce the risk that an accident will cause death.

- Research is insufficient on whether hands-free cellular phones are safer than hand-held devices.

## The Benefits

The benefits of cellular phone use while driving were compiled primarily from focus groups. Three groups were conducted in each city. One included emergency personnel and police dispatchers. One was a group of commuters who use cellular phones, defined by time spent driving to and from work. One was a group of non-commuters who use cellular phones.

## Individual/Family Benefits

- Peace of Mind
- Reducing the number and duration of trips
- Expanding productive time
- Contacting emergency services
- Strengthening social networking

## Community Benefits

- Decreased accident response times
- Improved knowledge about emergencies for emergency response teams (e.g., how to get to the scene, what equipment to bring)
- Improved life-saving outcomes
- More effective apprehension of criminals (such as drunk drivers)

Economic studies suggest that the monetary value of using a cellular phone while driving exceeds the costs, even when those costs include safety risks expressed in dollar units. Compared to several other ways of improving traffic safety, restrictions on the use of cellular phones while driving appear to be inefficient. That is, they cost more than other safety measures to produce similar safety outcomes.

## Cost-Effectiveness of Selected Highway Safety Investments

| Intervention | Target Population | Net Cost Per Life-Year* Saved |
|---|---|---|
| Lap/shoulder belts (assuming 50% use) | Front-seat occupants | < $0 |
| Daytime running lights | All motor vehicles | < $0 |
| Front-crash airbags | Drivers only | $24,000 |
| Front-crash airbags | Front-right passengers | $61,000 |
| Side door beams | Light trucks | $53,000 |
| 55 MPH speed limit (compared to 65 mph) | Rural interstate travelers | $82,000 |
| Add shoulder belts to lap belts in back seat (assuming 9% use) | Passengers in rear outboard seats | $160,000 |
| Cellular phone restrictions | All drivers | $700,000 |
| Add shoulder belts to lap belts in back seat (assuming 9% use) | Passengers in rear center seats | > $2,400,000 |

* Life-years saved have been adjusted to account for both longer life expectancy and improvements in quality of life due to reductions in functional impairment due to trauma. The adjustments are based on the quality-adjusted life year (QALY), a preference-based system that accounts for trauma severity and the subjective health preferences of consumers for quality of life.

## Recommendations

Before major policy decisions are made about cellular phones, government and industry should work together to produce a richer body of knowledge on both the risks and benefits of using cellular phones while driving. Efforts to make public policy now, based on modest scientific evidence, are likely to produce ill-informed decisions that may do society more harm than good. Restrictions imposed now will be difficult to reverse, and drastically limit the ability for research to quickly produce superior scientific information comparing risks and benefits, which would empower more fully informed, reasonable policy.

Government and industry should collect better scientific information on risks and benefits, and in the interim, should encourage more selective and prudent use of cellular phones while driving through vigorous public education programs.

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**FURTHER READING:**

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## Summary

While the decision to use a cellular phone while driving creates risks to the driver and occupants of the vehicle, and to pedestrians, bicyclists, and motorists in other vehicles, these risks are small in probability. These risks should be weighed against the benefits that such communications provide to users, families, social networks, businesses, and community. Many of these benefits offer potential improvement in public health and safety. These possible benefits, and the magnitude of the risks, must be quantified in future research, and balanced against one another, before informed, rational policy regarding cellular phone use by motorists can be made.

A full copy of the report is available from the Harvard Center for Risk Analysis.

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