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OCCUPANT RESTRAINTS AND  
TRAFFIC CRASH LOSS REDUCTION

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## **ABSTRACT**

Automobile seat belts, child restraints, and motorcycle helmets have the demonstrated potential to prevent fatalities, reduce the severity of injuries, and reduce overall losses associated with traffic crashes. Modern restraints are inexpensive, widely available, and minimally inconvenient to the user, yet in spite of these attributes, most American travelers fail to take advantage of them. This is especially true with respect to seat belts and child restraints in passenger cars, where usage rates have consistently remained below 20 percent.

Many nations have responded to the problem of nonuse of restraints by enacting laws requiring their use. Belt-use laws, which are common in Europe, Canada, and Australia, have not, so far, been politically feasible in the United States. Nevertheless, policymakers in both the public and private sectors have at their disposal a wide range of strategies other than comprehensive, mandatory belt-use laws. Legislation requiring certain classes of operators or occupants, especially motorcyclists and small children, to use restraints, enjoys popular acceptability. Regulations requiring restraint use while performing governmental business, and similar on-the-job regulations in private industry, are increasingly common. Information and education programs, directed at the general public and at such intermediate audiences as employers, physicians, and schoolteachers, may increase restraint use over a long period of time. Economic incentives for individuals who use restraints, or for those who actively promote restraint use by others, may lead to increased usage. This paper presents some promising alternatives to mandatory belt-use legislation that can be implemented in the immediate future to reduce traffic crash losses.



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## OCCUPANT RESTRAINTS AND TRAFFIC CRASH LOSS REDUCTION

### INTRODUCTION

Since the automobile was introduced into American society, several strategies have been employed to reduce the number of traffic crashes and the magnitude of losses associated with them. Some of those strategies have been aimed at eliminating factors—such as impairment by alcohol and other drugs—that increase the risk of a crash. Other strategies—such as improved road design and production of more "crashworthy" vehicles—seek to reduce the damage that occurs in a traffic crash.

Two driver-oriented strategies have the demonstrated potential to reduce the losses associated with the crashes that inevitably will occur. The first of these is the lowering of speeds, for example, through the imposition and enforcement of the 55-mph national maximum speed limit. Slower speeds mean that there is less energy to be dissipated in a crash and absorbed by the crashed vehicle and its occupants; the result is a lessened chance of a fatal or other serious injury. The second strategy is the promotion of universal use of occupant restraints. By "occupant restraints" we mean lap and shoulder belts for adults and approved child restraint systems for small children traveling in automobiles, and crash helmets for motorcycle riders. These devices redistribute and absorb energy in crashes that otherwise would be absorbed by the driver or passenger, and thus reduce the risk of death or serious injury. Unlike reduced speeds, however, a condition even approaching universal restraint use has yet to be achieved. Widespread nonuse of restraints in effect imposes needless taxes on citizens who must bear the added cost of social programs to compensate and rehabilitate crash victims and their dependents. Universal use of restraint systems that are widely available and minimally inconvenient could cut the annual highway death toll by as much as one-fourth and reduce the social costs of traffic crashes by billions of dollars annually.

So far, however, progress has not been made in inducing American

travelers to use their restraints regularly. Noncoercive campaigns such as multimillion-dollar advertising "campaigns" have largely failed to produce significant and lasting increases in restraint usage rates. Past experience with coercive measures suggests that there is strong public resistance to enforced self-protection. Conceding the poor prospects for enactment of mandatory restraint-use laws in the United States, policymakers and researchers have begun to explore alternative means of increasing restraint use.

This paper describes the development of the principal occupant restraints as well as the legal climate in which each evolved; describes the scope of the social problem (or the wasted opportunity) represented by restraint nonuse; and presents suggested approaches for solving the problems of widespread nonuse and resistance to compulsory-use strategies. We admit at the outset that a solution to this problem cannot easily be found; however, we believe that a number of possible strategies exist that may have some impact on the level of casualties and financial losses associated with traffic crashes.

### **OCCUPANT RESTRAINTS: A HISTORICAL PERSPECTIVE**

The chief occupant restraint system in use in the United States and elsewhere in the industrialized world is the lap-and-shoulder assembly in passenger automobiles. In the United States, nearly 100 percent of the nation's passenger car fleet is equipped with these restraints. In addition to passenger cars, upwards of five million motorcycles are registered nationwide, and more than 4,000 motorcycle-related deaths occur each year. Thus motorcycle helmets are of interest in society's efforts to reduce crash losses. Finally, some 15.6 million Americans are children under the age of five years (U.S. Department of Commerce 1980), and some one thousand young children are killed annually in traffic crashes. Because adult passenger restraints provide less than full protection for small children, the use of special child-restraint devices is also an essential part of a loss-reduction program involving occupant restraints. Where special devices are not available, children old enough to sit up by



themselves are safer with a lap belt fastened snugly than unrestrained.

### **Automobile Seat Belts**

Air passengers have used seat belts for decades, but automobile seat belts have been introduced only recently. Prior to 1955, when Ford and Chrysler introduced seat belts as optional equipment, such restraints were used only in automobile races. Public acceptance of the newly introduced seat belts was minimal, and the number of vehicles equipped with belts remained small.

Governmental involvement in the promotion of universal restraint use began with state legislation requiring the installation of seat belts or seat belt anchorages on new vehicles. Wisconsin, in 1962, was the first state to pass a law requiring anchorages on new vehicles sold within that state; a number of other states shortly followed Wisconsin's lead. By 1966 American automakers, cognizant of the legislative trend, began to install lap belts in all vehicles on a voluntary basis (Ames 1972).

The federal government, through a regulation of the U.S. Department of Transportation, promulgated Federal Motor Vehicle Safety Standard (FMVSS) Number 208 in 1968. FMVSS 208, which became effective in April 1967, required lap belts at all seating positions and lap-and-shoulder assemblies at the two front outboard positions on newly manufactured vehicles. That standard, which has remained in effect, has resulted in nearly all vehicles being equipped with belt systems.

In 1977 NHTSA conceded that mandatory seat belt use legislation was unlikely and that voluntary measures were unlikely to increase low belt usage rates. As an alternative, NHTSA promulgated an amendment to FMVSS 208 that would require the installation of "passive" or automatic restraints that the driver does not have to activate. Automatic restraints include air cushion restraints ("air bags") and automatic seat belts. These devices are now offered by some manufacturers as optional equipment and a relatively small number of vehicles are equipped with these devices. Currently, the automatic-restraint requirements are scheduled for phasing-in beginning with the 1983 model year for larger vehicles. That standard,

however, is undergoing congressional and administrative review, and its future is considered uncertain.

### **Motorcycle Helmets**

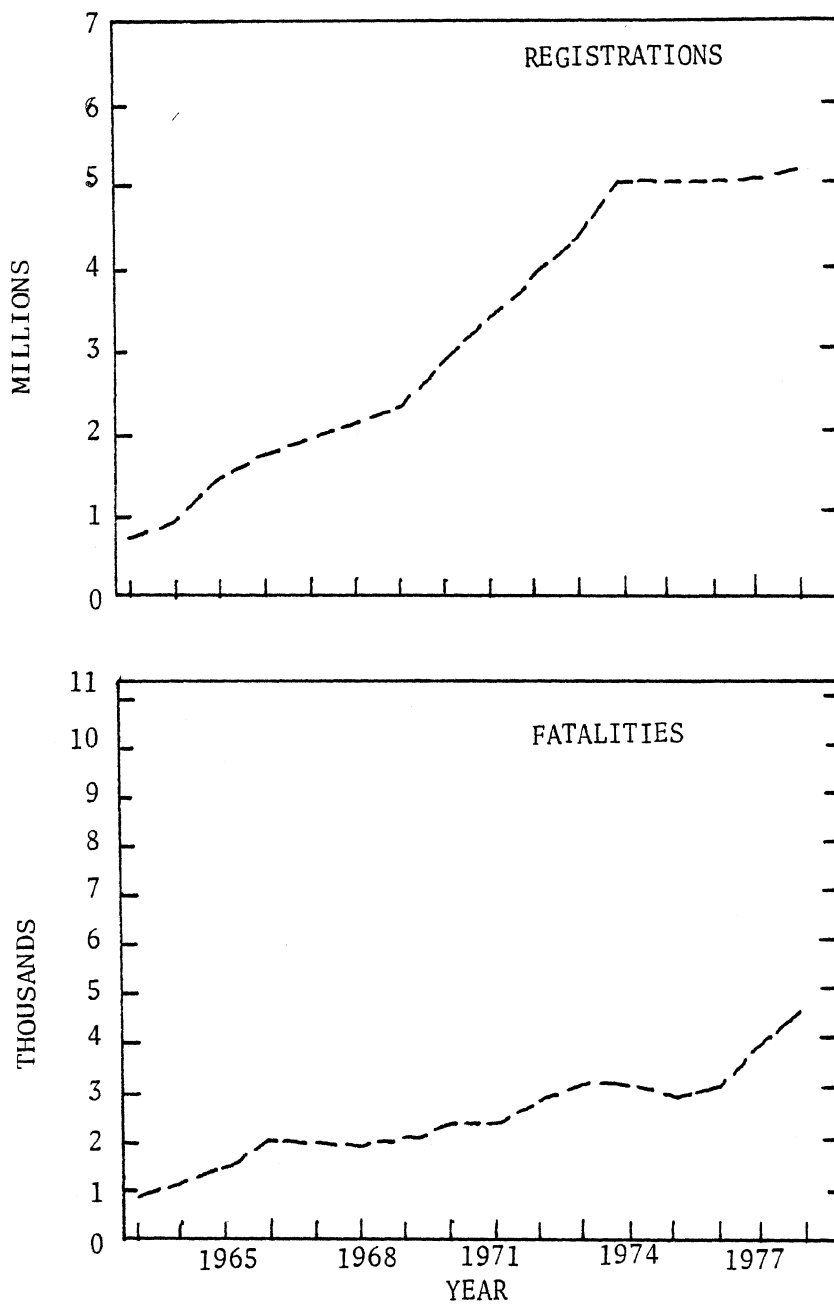
Protective helmets have a longer history than automobile seat belts. Protective helmets have been used at least since ancient Greece, and the ancestors of protective goggles date back as early as the fifteenth century (Ellis 1964). Armies have long used helmets in battle, and helmets were used in such sports as auto racing and football years before the motorcycle achieved its current popularity. As motorcycle registrations and fatalities increased, especially after 1960 (see Figure 1), research into crash helmets and public pressure for laws requiring helmet use and eye protection for cyclists both increased. Unlike automobile seat belts, the use of which is generally not required in the United States, motorcycle helmet use is required in a considerable number of states. Research and development work on helmets continues, and Federal Motor Vehicle Safety Standard Number 218 codifies the widely adopted Standard Z90.1 of the American Standards Testing Institute as the performance standard for helmets.

### **Child Restraints**

Small children riding in automobiles present a special safety problem. They are especially likely in a crash or during sudden deceleration to become free-flying "missiles" inside the vehicle, a circumstance that results in the child's head absorbing most of the impact energy. The added forces on the child's head increases the risk of his or her being killed or seriously injured (Dye 1962). Automobile belts, while they provide better protection than no restraints, are not completely satisfactory as child restraints: the child's pelvis is not sufficiently developed to absorb the forces of a lap belt; the child's body structure and center of gravity are such that he or she may fly loose from the lap belt; and the child's thorax is too flexible for the loads presented by adult shoulder harnesses (Roberts 1972).

Car seats for children have existed for years. Research on child restraints was reported as early as 1959, when Moore and associates

FIGURE 1  
MOTORCYCLE REGISTRATION AND  
FATALITY TRENDS, 1963-78



SOURCE: Dart (1980)

studied the crash experience of child passengers in a set of traffic crashes during 1959. Dye (1962) reported an evaluation of then-existing restraints and set out criteria for evaluating future child restraints. Developmental work took place during the 1960's, and by 1970 both Ford and General Motors had developed, mass produced, and widely promoted their versions of child restraint devices. Other manufacturers also marketed their products; however, many then-existing devices were shown to have design and performance deficiencies (Robbins, Henke, and Roberts 1970). Criticism of available restraints led to the National Highway Traffic Safety Administration's (NHTSA) promulgating Federal Motor Vehicle Safety Standard Number 213 in 1971. There has been criticism that FMVSS 213 has not been effective and that it has not kept substandard devices from appearing on the market; in response to the criticism, NHTSA amended the standard to require dynamic testing (crash testing involving dummies) of devices. Presently a wide variety of devices produced by automakers and other manufacturers are available, and a number of devices already on the market have been crash-tested (Physicians for Automotive Safety 1980).

#### **RESTRAINT USE IN THE UNITED STATES**

No nation has more registered motor vehicles than the United States, and no population logs more vehicle miles than the American motoring public. Thus, even though the crash and death rates per mile of travel are lower in the United States than anywhere else in the world, millions of crashes and injuries occur annually. While, on any given trip, the probability of being involved in a crash is extremely low, current population and crash data show that a typical American faces a one-in-six chance of being involved in a traffic crash, and almost a one-in-100 chance of suffering a serious injury during a given year. In a typical lifespan of 75 years the average person is almost certain to be involved in at least one traffic crash, and can expect to experience about six crashes; and faces about a 50 percent probability of suffering a disabling injury and one chance in fifty of becoming a traffic fatality (National Safety Council 1980; U.S. Department of Commerce 1980). On the basis of conditional

hazard rates, motor vehicle travel is about as risky as skiing or hunting; that is, the probability of being killed on a one-day auto trip is about the same as the probability of suffering a fatal injury while on a one-day skiing or hunting trip. In fact, a one-day auto trip is only slightly less dangerous than one day spent on a military assignment during the Vietnam war (Starr 1969).

Thus a traffic crash, while unlikely on any particular trip, is a foreseeable event over the long run. It is therefore prudent to take reasonable steps to reduce the consequences of crashes that are almost certain to occur. In spite of doubts expressed earlier about the effectiveness—and even the possible danger—of automobile seat belts and motorcycle helmets, scientific evidence has clearly established that these devices prevent far more losses than they cause (National Highway Traffic Safety Administration 1973).

Nevertheless usage rates for the most common occupant restraint system, automobile lap-and-shoulder belts, has been and remains low. A 1979 National Highway Traffic Safety Administration survey found that 11 percent of all drivers and even fewer passengers made regular use of the devices. This figure represented a decline from NHTSA's estimate of the previous year's usage rate, 13 percent. The Opinion Research Corporation (1978) found that 14 percent of all drivers used their belts regularly, and 45 to 50 percent of occupants used belts occasionally or under special driving conditions. One of the arguments raised by NHTSA in support of its automatic-restraint requirement is that belt usage rates have consistently remained below 20 percent, a figure not inconsistent with the results of various restraint-use surveys reported by Grimm (1980). The portion of small children who are restrained is even smaller; observational studies reported by Grimm (1980) reported usage rates as low as two percent. A study conducted by Williams in 1974 and reported in 1976 is typical; in automobiles observed leaving amusement areas and shopping areas in three states, only seven percent of the children under age ten were restrained. Usage rates for motorcycle helmets are considerably higher than for adult or child restraint systems in automobiles. One major

reason is that helmet use was required for a decade in almost all states, and their use is still required in nearly half the states. In states that have mandatory headgear laws, almost 100 percent of motorcycle riders and passengers wear helmets; in jurisdictions without helmet laws (at least for adult riders), helmet-use rates are on the order of 50 percent, a figure that is still considerably higher than for automobile restraints (Tsongos 1980).

Widespread nonuse of restraints is not exclusively an American phenomenon. Ten years ago, the substantial majority of Canadian, Australian, and European motorists failed to use their belts—a phenomenon that has been lessened in many countries by legislation requiring the use of belts. The value of occupant restraints lies not in preventing traffic crashes but in minimizing their effects when they occur. Therefore, when a substantial part of the nation's motoring population fails to take advantage of available restraints, some of the deaths, casualties, and economic losses attributable to traffic crashes are unnecessarily incurred. Estimates of the number of preventable deaths and personal injuries are necessarily imprecise, since some degree of speculation is involved. Nevertheless, a good "ball park" estimate is provided by NHTSA: 12,000 of the nearly 52,000 fatalities that occurred in 1979 could have been averted had all the victims been using seat belts at the time they crashed (Transportation Research Board 1980). Research studies examined by Jones, Franson, and Joscelyn (1980) indicate that nonfatal injuries could be reduced by 20 to 50 percent through universal restraint use. Economic losses attributable to the nonuse of restraints are even more difficult to estimate. Methods of scaling injuries and measuring the economic impacts of fatalities differ from study to study. Examining prior research into the economic costs of restraint nonuse (e.g., Ontario Ministry of Transportation and Communications 1977; Faigin 1976), Jones, Franson, and Joscelyn (1980) made a conservative estimate that the total costs of nonuse total \$10 billion annually, and may range as high as \$15 billion. Much of this total represents loss of productivity resulting from the death or incapacitation of a working citizen. Other substantial costs include such costs as medical

and hospital bills, professional fees, welfare payments, funeral expenses, and legal costs. It is difficult to determine who pays the \$10-15 billion annual bill for preventable crash-related costs. Not all "direct" costs are necessarily borne by the victims and their families, while, on the other hand, not all lost productivity is spread across society as a whole. It is safe to assume, though, that much of the added cost of restraint nonuse is "passed on" to individual citizens in the form of higher taxes and insurance premiums and, even more indirectly, in the form of inflation and diminished purchasing power.

In sum, available occupant restraints, if universally used, could bring about a large reduction in the total social costs attributable to traffic crashes. However, despite their low cost and comparatively minimal inconvenience as well as their familiarity to the American traveling public, usage rates--especially for adult and child restraints in passenger cars--remain low. In many other nations government has responded to this problem of restraint nonuse by enacting laws requiring their use, and the data (e.g., Ziegler 1977) show that mandatory restraint-use laws are the most effective means of increasing usage rates.

#### **CURRENT STRATEGIES FOR INCREASING RESTRAINT USE**

Data gathered from other nations indicate that mandatory belt-use laws have brought about the most significant and lasting increases in belt usage rates. In this country, when state laws required the wearing of motorcycle helmets and eye protection, observed usage rates in those jurisdictions approached 100 percent (Tsongos 1980). Nevertheless, the idea of applying mandates to personal behavior is not popular in the United States; the experiences of the seatbelt-interlock and continuous buzzer devices in 1974 and motorcycle helmet laws since 1976 are illustrative. Therefore, alternative points of influence on restraint-use behavior--including variations on comprehensive belt-use laws--much be considered and attempted.

A committee of the Transportation Research Board (TRB) (1980) identified four categories of societal action aimed at changing individual

attitudes--and ultimately individual behavior--regarding the use of safety belts: **prescription**, that is, laws, regulations, and judicial decisions requiring restraint use or penalizing nonuse; **economic incentives**; **changing perceptions** about safety belt use; and **personal and community influence**, especially involving health-care professionals. The TRB approach recognizes that societal mechanisms other than the formal structures of the legal system can be brought to bear on the risk of traffic crashes and traffic crash losses, and that decisions regarding safety can be influenced by means other than penalizing those who make unsafe decisions. A companion paper, Managing the Traffic Crash Risk (Joscelyn and Jones 1981), discusses more fully the range of risk-management forces in existence in society and the range of strategies available for influencing individual choices.

#### **Prescription: Coercive Strategies to Promote Restraint Use**

In the United States and other countries the earliest laws concerning occupant restraints required the **installation** of seat belts at the time of manufacture. Those regulations remain in existence and appear in Federal Motor Vehicle Safety Standard Number 208. Federal and state legislation has resulted in almost universal **installation** of lap-and-shoulder belt assemblies in passenger cars, but legislation does not deal with the use of available restraints. In the United States, belt usage rates have remained below 20 percent and there are indications (e.g., Insurance Institute for Highway Safety 1980) that usage rates are declining. Surveys taken five to ten years ago in other countries found comparable results. Ziegler (1977) reported survey results showing usage rates of eight to 40 percent in selected Western nations prior to the passage of mandatory belt-use laws.

**Mandatory Belt-Use Laws.** In many other nations the response to low usage levels has been legislation requiring the use of restraints. Beginning in the Australian state of Victoria in 1969, all or part of nearly thirty nations have mandated seat belt use. These laws typically provide for



modest fines or civil penalties on nonusers. Enforcement is usually carried out as an adjunct to general law enforcement; for example, a driver stopped for speeding who is discovered not wearing a seat belt will be cited for that offense as well. Most seat belt legislation has been accompanied by public information campaigns prior to their effective date to increase public awareness of and support for the law, and most jurisdictions continue to publicize their restraint-use legislation and enforcement of it. In many countries public acceptance was above the fifty percent level before laws were enacted. Table 1 compares the major features of selected nations' seat belt use legislation. Mandatory belt-use laws have been proved effective. Usage rates after their passage ranged from 32 to 92 percent. Fatality reductions of ten to 46 percent, and injury reductions of 15 to 46 percent, have been reported in crash data supplied by nations that have enacted seat-belt laws. Table 2, prepared by Ann Grimm of The University of Michigan, Highway Safety Research Institute, summarizes the effectiveness of belt-use laws in selected nations.

In the United States no direct attempt comparable to congressional 55-mph speed limit legislation has been made to impose a mandatory seat belt use law. In 1972 NHTSA indirectly attempted to mandate belt use by requiring the installation of seat belt-interlock or continuous buzzer systems in passenger cars, beginning with the 1974 model year. Interlock systems prevent operation of the vehicle, and continuous buzzer systems produce a continuous warning signal, until the front seat occupants fasten their restraints. These systems proved politically unpopular and an act of Congress (Public Law 93-492) specifically forbade NHTSA to impose interlock and continuous-buzzer requirements. Consequently, only 1974 model year vehicles and some 1975 vehicles were produced with such systems. At about the same time (1973), Congress appropriated funds to support incentive grants to states that adopted mandatory belt-use laws. Only the Commonwealth of Puerto Rico responded by enacting such a law, and appropriations for the incentive program were discontinued the following year (Wilson 1979). The most recent federal attempt to achieve universal occupant restraint use focuses on manufacturers of vehicles

TABLE 1  
SAFETY BELT USAGE LAWS AROUND THE WORLD

| Country                   | Effective Date of Law | Penalty for Noncompliance | Enforcement | Public Information Program |
|---------------------------|-----------------------|---------------------------|-------------|----------------------------|
| Australia<br>(all States) | 1-1-72                | Max<br>\$20               | 1           | Yes                        |
| Belgium                   | 6-1-75                | \$1.50-\$15.00            |             |                            |
| Canada<br>(Ontario)       | 1-1-76                | \$20-100                  | 1           | Yes                        |
| Canada<br>(Quebec)        | 8-15-76               | \$10-20                   | 0-1         | None                       |
| Czechoslovakia            | 1-1-69                | Max \$10                  | *           |                            |
| Finland                   | 7-1-75                | None                      | 3           | Yes                        |
| France                    | 7-1-73(1)             | \$10-20                   | 1           | Yes                        |
| Israel                    | 7-1-75(3)             | Max \$110                 | 3           | Yes                        |
| Japan                     | 12-1-71               | None                      | 0           | None                       |
| Luxembourg                | 6-1-75                | \$5-12.50                 |             |                            |
| Netherlands               | 6-1-75                | 20¢-\$120                 |             |                            |
| New Zealand               | 6-1-72                | Max \$200                 | 1           |                            |
| Norway                    | 9-1-75                | None                      | 0           | Yes                        |
| Puerto Rico               | 1-1-74                | \$10                      | 0-1         | Yes                        |
| Spain                     | 10-3-74(2)            | \$15                      |             |                            |
| Sweden                    | 1-1-75                | Max \$100<br>Usual \$10   | 1           | Yes                        |
| Switzerland               | 1-1-76                | \$8                       | 1-2         | Yes                        |
| USSR                      | 1-1-76                | \$1.50                    | 1           | None                       |

- |   |                                  |
|---|----------------------------------|
| 0 - Essentially none                          | (1) On roads outside city limits |
| 1 - When motorist stopped for another purpose | 1-1-75 usage required on city.   |
| 2 - Strict (when observed not wearing belt)   | (2) Usage not required in cities |
| 3 - Only requested to "buckle up" by official | (3) Urban roads exempt           |

NOTE: Blanks indicate no information available.

SOURCE: Ziegler (1977). Data prepared by National Highway Traffic Safety Administration

TABLE 2

JURISDICTIONS WITH RESTRAINT USE LAWS/FATALITY & INJURY  
REDUCTIONS/USAGE RATES/CHILD RESTRAINT PROVISIONS  
(Current as of July 1981)

| <u>Jurisdiction</u> | <u>Date of Law</u>                    | <u>Fatality - Injury Reduction</u> | <u>Usage Rate</u> | <u>Notes</u>    | <u>Child Restraint Law?</u>                                   |
|---------------------|---------------------------------------|------------------------------------|-------------------|-----------------|---|
| Australia           | 1/1/72                                | 5.7% (70-77)                       |                   |                 |   |
| Victoria            | 12/22/70                              |                                    | 85%               | Melbourne-7/78  | } under 8 - special restraint<br>over 8 - adult restraints    |
| N.S. Wales          | 10/1/71                               | 37% 48% (17-29 yrs)                | 94%               | Sydney - 11/75  |   |
| Queensland          | 1/1/72                                |                                    | 84%               | Brisbane - 5/74 |   |
| S. Australia        | 11/29/71                              |                                    | 82%               | Adelaide - 2/78 |   |
| W. Australia        | 12/24/71                              |                                    | 87%               | Perth - 5/74    |   |
| Tasmania            | 10/13/71                              |                                    | 69%               | Hobart - 5/73   |   |
| Canberra            | 1/1/72                                |                                    | 83%               | 3/78            |   |
| N.W. Territory      | 1/1/72                                |                                    |                   |                 |   |
| Austria             | 7/15/76                               | 13.6% (76) 28% (77)                | 50%               | hwys - 10/78    | under 12 in rear seat   |
| Belgium             | 6/1/75                                | 18% (76) 18% (76)                  | 76%               | rural - 1980    | under 12 exempt   |
| Bulgaria            | 7/76                                  |                                    |                   |                 |   |
| Canada              |                                       |                                    |                   |                 |   |
| Brit. Columbia      | 10/1/77                               |                                    | 73%               | drivers - 3/78  | } under 5 exempt<br>required 6/30/80                          |
| Ontario             | 1/1/76                                | 16.1% (76) 13.7% (76)              | 81%               | 3/76            |   |
| Quebec              | 8/15/76                               | 18% (75-77)                        | 60%               | rural - 1980    |   |
| Saskatchewan        | 7/1/77                                | 23% (78)                           | 60%               | 5/78            |   |
| Czechoslovakia      | 7/23/75                               | 55% (78) 25% (78)                  | 66%               | rural           | under 12 in rear seat   |
| Denmark             | 1/1/76                                | 30% (77)                           | 70%               | 1980            | under 5 in rear seat  |
| Finland             | 7/1/75                                |                                    | 88%               | hwys - 12/75    | under 15 exempt   |
| France              | 7/1/73 (rural)<br>10/1/79 (all)       |                                    | 95%               | hwys - 1980     | under 12 exempt   |
| Greece              | 12/16/79                              |                                    |                   |                 |   |
| Hungary             | 7/77                                  |                                    |                   |                 |   |
| Ireland             | 2/79                                  |                                    |                   |                 | under 12 - "suitably restrained"                              |
| Israel              | 7/1/75                                | 14% (74-77)                        | 80%               | 7/76            |   |
| Japan               | 12/1/71                               |                                    | 21%               | hwy driver-'79  |   |
| Luxembourg          | 6/1/75                                |                                    |                   |                 | under 10 in rear seat   |
| Malaysia            | 4/1/79                                |                                    |                   |                 | none  |
| Netherlands         | 6/1/75                                |                                    | 75%               | hwys - 1980     | under 6 in rear seat; 6-12 in front with child restraint only |
| New Zealand         | 6/1/72                                | 27% (driv.) 12% (drivers)          | 85%               | 1979            | under 8 exempt  |
| Norway              | 9/1/75                                |                                    | 88%               | hwys - 1980     | under 15 exempt   |
| Puerto Rico         | 1/1/74                                |                                    | 6%                | 1979            | under 8 exempt  |
| South Africa        | 12/77                                 |                                    | 62%               |                 | none  |
| Spain               | 4/22/74                               | 59% (76) 11% (76)                  | 67%               | 1980            | front only if can use adult belt                              |
| Switzerland         | 1/1/76 to<br>10/5/77 &<br>11/30/80 on | 12% (76) 9.6% (76)                 | 92%               | hwys            | under 12 in rear seat   |
| Sweden              | 1/1/75                                |                                    | 90%               | rural - 1979    | under 15 exempt   |
| USSR                | 4/75                                  |                                    |                   |                 |   |
| West Germany        | 1/1/76                                |                                    | 85%               | hwys - 1979     | under 12 in rear seat   |
| *Brazil             | 1977                                  |                                    |                   |                 |   |
| *Ivory Coast        | 1970                                  |                                    |                   |                 |   |
| *Yugoslavia         | 1/1/77                                |                                    |                   |                 |   |

SOURCE: Ann C. Grimm, Librarian, Highway Safety Research Institute,  
The University of Michigan

REFERENCES: American Seat Belt Council (1981); Johannessen and Pulley  
(1977); Mackey (1981).

rather than their users. In 1977, NHTSA adopted an amendment to FMVSS 208 that requires the installation of "passive" or automatic restraints on passenger vehicles. As of this writing, the passive-restraint standard is now scheduled to be phased in by the 1984 model year beginning with large 1983 model year vehicles. The new NHTSA administration took this step to delay for one year the first phase of the original schedule. Meanwhile, legislation that would prevent or further delay imposition of the automatic-restraint requirement is being considered in Congress.

At the state level, no jurisdiction other than Puerto Rico has enacted a comprehensive seat belt use law. Wilson (1979) reports that between 1972 and 1977, mandatory belt-use legislation was introduced in thirty-two states; however, only a handful of bills passed even one chamber of the legislature, and by 1977 interest in seat belt laws had diminished to the point that only six legislatures considered them. In 1979 the National Committee on Uniform Traffic Laws and Ordinances added a mandatory belt-use law to its model legislation, the Uniform Vehicle Code. The Code provision (reproduced in Figure 2) is not binding on any state but in the past the Code has been both persuasive and highly regarded in the traffic-law field.

**The "Seat-Belt Defense".** A legal approach that in effect penalizes those who fail to use available restraints exists in several states. The penalty is imposed on the crash victim who is injured as the result of another's careless operation of a vehicle and who sues the negligent operator to recover the damages that were suffered. It is applied as follows: the victim must bear the cost of any injuries that would have been avoided had he or she been using available seat belts at the time the crash occurred. This principle is sometimes called the "seat-belt defense." So far it has been rejected in the majority of courts that considered whether to adopt it (Donelson 1980). There are several legal and policy-based reasons why this is so. In essence, a negligent driver who raises the seat belt defense is arguing that the injured victim was either negligent or not acting with due care for his or her own well-being; or failed to take

FIGURE 2

UNIFORM VEHICLE CODE PROPOSED BELT-USE LEGISLATION

**Sec. 12-412—Lap and shoulder belts required**

(a) Every passenger car manufactured or assembled after January 1, 1965 shall be equipped with lap belt assemblies for use in the driver's and one other front seating position.

(b) All motor vehicles made after January 1, 1968 shall be equipped with any lap or shoulder belt required at the time the vehicle was made by standards of the United States Department of Transportation; provided that nothing in this subsection shall affect the requirement in subsection (a) for a lap belt in the driver's seating position.

(c) The commissioner may except specified types of motor vehicles or seating positions within any motor vehicle from the requirements imposed by subsections (a) and (b) when compliance would be impractical.

(d) No person shall install, distribute, have for sale, offer for sale or sell any belt for use in motor vehicles unless it meets current minimum standards and specifications (approved by the commissioner) (of the United States Department of Transportation).

(e) Every owner shall maintain belts and assemblies required by this section in proper condition and in a manner that will enable occupants to use them. (SECTION REVISED, 1975.)

**Sec. 12-412.1—Driver must use lap belt**

(a) Every driver shall wear a properly adjusted and fastened lap belt.

(b) Subsection (a) shall not apply to:

(1) A driver in a seating position that is not equipped with a lap belt;

(2) A driver frequently stopping and leaving the vehicle or delivering property from the vehicle so long as the speed of the vehicle between stops does not exceed 15 miles per hour;

(3) A driver possessing a written indication from a physician that he is unable for medical or physical reasons to wear a lap belt; or

(4) A driver possessing a certificate or license endorsement issued by the department, or a similar agency in another state or country, indicating he is unable for medical, physical or other valid reasons to wear a lap belt. (NEW SECTION, 1979.)

**Sec. 12-412.2—Driver must use shoulder belt**

(a) Every driver shall wear a properly adjusted and fastened shoulder belt.

(b) Subsection (a) shall not apply:

(1) To a driver in a seating position that is not equipped with a lap belt or a usable lap belt;

(2) To a driver in a seating position that is not equipped with a shoulder belt or with a usable shoulder belt;

(3) To a driver frequently stopping and leaving the vehicle or delivering property from the vehicle so long as the speed of the vehicle between stops does not exceed 15 miles per hour;

FIGURE 2 (Cont'd)

UNIFORM VEHICLE CODE PROPOSED BELT-USE LEGISLATION

(4) To a driver possessing a written indication from a physician that he is unable for medical or physical reasons to wear a lap belt or a shoulder belt;

(5) A driver possessing a certificate or license endorsement issued by the department, or a similar agency in another state or country, indicating he is unable for medical, physical or other valid reasons to wear a lap belt or shoulder belt; or

(6) When use of the shoulder belt would interfere with operation of the vehicle. (NEW SECTION, 1979.)

**Sec. 12-412.3—Passengers must use lap and shoulder belts**

Every passenger other than the driver shall wear a properly adjusted and fastened lap belt, or a properly adjusted and fastened lap belt and shoulder belt if his seating position is so equipped, unless such use is not possible, physical or occupational reasons under rules adopted by the department. (NEW SECTION, 1979.)

**Sec. 12-412.4—Effect of nonuse in civil litigation**

Failure to use any belt in violation of this Act shall not diminish recovery for damages arising out of the ownership, maintenance or use of a motor vehicle. (NEW SECTION, 1979.)

appropriate steps to mitigate (keep to a minimum) the damages resulting from the crash. The first argument—that an unbelted driver is negligent on account of not using restraints—is seriously undercut by the widespread nonuse of belts. If fewer than twenty percent of all occupants use seat belts, it is difficult to argue that society considers the use of restraints an essential element of due care. The second argument—that failure to use seat belts is a failure to mitigate damages—is countered by a more technical argument: the opportunity to mitigate occurs after another's negligence occurs. With respect to restraints, since the decision whether to wear a belt occurs before the crash, most courts have concluded that wearing the belt is not a mitigation of damages (which is legally required) but instead constitutes anticipating the negligence of other drivers (which is not legally required). The logical basis of the courts' reasoning with respect to the mitigation-of-damages argument is open to question. The court decisions are not only poor policy, but the courts' reliance on the anticipation-of-negligence theory in this class of cases has been criticized by the leading scholar in the area of tort law (Prosser 1972). Rejecting the traditional arguments against the seat-belt defense, courts in seven states—including California, Illinois, New York, and Pennsylvania—have allowed for its use in cases where appropriate expert testimony establishes a clear connection between certain injuries and the nonuse of available restraints. There are some indications that other courts may relax their opposition to the seat belt defense. In the past decade the rules for apportioning damages in negligence cases have shifted from an "all or nothing" approach (formerly, the injured party was either free of fault and collected the entire amount of damages, or was "contributorily negligent" and collected nothing) to a comparative approach that requires each party to bear that part of the loss that was attributable to his or her fault. The seat-belt defense is more consistent with the comparative-fault approach. More generally, doubts about the effectiveness of seat belts have been dispelled by statistical and other evidence (National Highway Traffic Safety Administration 1973) and their loss-reduction benefits are widely known. This is significant, because some of the early, widely

followed court decisions that rejected the seat-belt defense expressed doubts about the effectiveness of belts.

### **Selective Restraint-Use Legislation**

Comprehensive belt-use laws have not been enacted in the United States at either the federal or the state level, and the prospects for their passage in the near future are generally regarded as poor. However, occupant restraint legislation in the form of statutes and regulations directed at specific classes of vehicles or occupants does exist in many jurisdictions. The rationale for these selective prescriptions is similar to that for comprehensive restraint-use laws, except that the relative political power of the target group is small, or the target population is considered in need of greater protection than occupants in general.

The most widely adopted selective laws apply to helmet usage by motorcycle riders and passengers. Children, especially the youngest age groups, represent another class of occupants subject to protective legislation. Other target groups include commercial drivers and persons operating vehicles for business purposes.

**Motorcycle Helmet Laws.** In the United States the first motorcycle helmet laws were enacted in 1966 in Massachusetts, Michigan, and New York. The following year, the U.S. Department of Transportation included helmet-use legislation as one item that states were required to include in their highway safety programs as a condition of receiving federal highway-safety funds. Federal compulsion resulted in the enactment of helmet legislation in all but a few states. These laws were unpopular with a vocal minority of motorcyclists who challenged their constitutionality in the courts. A number of early decisions in the lower courts declared helmet laws unconstitutional because they found no public benefit supporting the restriction on liberty that they imposed. However, later decisions almost uniformly upheld their constitutionality by finding a variety of social benefits to justify them—such as avoiding crashes in which a helmetless cyclist loses control of the vehicle; reducing welfare



payments and costs of treating or rehabilitating injured cyclists; and maintaining a healthy and productive population (Ruschmann 1977). After failing in the courts, helmet-law opponents induced Congress in 1976 to remove the Department of Transportation's authority to penalize states that failed to enact helmet laws for cyclists aged 18 years and above. Within three years half the states either had no helmet law at all, or one that did not apply to adult riders and passengers. The trend toward repeal or weakening of helmet laws apparently has subsided, although helmet legislation remains a controversial topic in most legislatures (Ruschmann 1980). Although there are comparatively few reported cases on the subject, the "motorcycle helmet defense" has been considered by some courts. In general, courts are more likely to entertain this defense when an injured cyclist rides without headgear in violation of the state's helmet law, although a few states have language in their helmet laws that specifically prohibits courts from considering the issue of helmet nonuse in negligence suits.

**Child Restraint Laws.** Tennessee, in 1978, became the first American jurisdiction to enact child-restraint legislation. Rhode Island enacted such a law in 1980, and at least ten other states followed in 1981. Similar legislation was considered or is pending in over thirty other states (Transportation Research Board 1980). The Tennessee law, as originally enacted, applied to children aged four and under; these children must be properly secured in an appropriate child-protection device or held in the lap of an adult. Holding a child in another's lap is not effective in preventing injuries, and that provision has since been deleted from the Tennessee law. Other legislation—current and proposed—varies slightly with respect to the age and size of the children they cover, and whether an adult's lap is a legally acceptable substitute for a child restraint device. The Tennessee and Rhode Island laws, and most proposed statutes, impose a modest penalty on operators who violate them; frequently the penalty is refundable if the operator can prove he or she has acquired a child restraint. A model state child-restraint law is reproduced in Figure 3.

FIGURE 3

PROPOSED MODEL LAW FOR MANDATED CHILD  
PASSENGER PROTECTION

**A. Model Law**

SECTION 1. Every driver transporting a child under the age of five (5) years in a motor vehicle registered in this state and operated on the roadways, streets or highways of this state, shall provide for the protection of the child by properly using a child passenger restraining system meeting applicable federal motor vehicle safety standards. provided that in no event shall failure to wear a child passenger restraining system be considered as contributory negligence, nor shall such failure to wear said child passenger restraint system be admissible as evidence in the trial of any civil action.

SECTION 2. A person found to be in violation of Section 1 shall be subject to a civil fine not to exceed \$25.

SECTION 3. The bill will take effect 180 days after enactment.

SOURCE: Michigan Office of Highway Safety Planning (1980)

**Other Specialized Restraint-Use Legislation.** A variety of statutes and administrative regulations require other specific subpopulations to use occupant restraints. Regulations of the Bureau of Motor Carrier Safety requires operators of heavy trucks and intercity buses to wear belts. Drivers of school buses are required in at least four states to use their belts, and one state, Maine, requires belt use by school bus passengers when belts are available. California law requires occupants of driver-training vehicles to wear their restraints (Transportation Research Board 1980). Some federal agencies and a number of states have enacted regulations requiring belt use while operating government-owned vehicles or while traveling on official business. A few states, such as Michigan, mandate child restraint use through regulations that apply to child-care providers such as day care centers (Treat and Ruschmann 1980). More generally, many industrial corporations, utilities, and units of local government (for example, police departments) have adopted mandatory belt-use policies for their employees.

The current status of mandatory occupant protection measures is that comprehensive legislation or regulation requiring all occupants to be properly restrained is unlikely in the near future and that the prospects for acceptance of the "seat-belt defense" in the courts remain uncertain. On the other hand, legislation requiring the protection of specific populations--chiefly motorcycleists, small children, and persons using vehicles as part of their official business--has achieved some degree of public acceptance in the United States.

### **Nonprescriptive Strategies**

The three other strategies identified by the TRB panel do not involve legislation that requires occupants to use restraints. It is conceivable, though, that some activity in these areas may lead to compelled restraint use in at least some settings. Although the categories cited by the TRB panel are somewhat arbitrary, three major classes of nonprescriptive strategies--economic incentives, information and education, and personal

and community influence—are included.

**Economic Incentives.** Economic incentive approaches are "positive" in nature. They are based on increasing the utility of a decision to act safely—in effect, rewarding those who choose safety. These approaches are the counterpart of prescriptive measures that are "negative" and that impose additional disutilities on those who decide to follow an unsafe course of conduct. Positive strategies are not widely used, primarily because society relies so heavily on punishment, especially legal sanctions, to control traffic crash losses and other social risks. The TRB panel described two forms of economic incentives. **Direct incentives** focus on influencing an individual's decision whether to use occupant restraints. These include reductions of insurance premiums and tax incentives. (They are not, however, very widely used.) **Indirect incentives** are directed at persons who are in a position to influence others' decisions about the use of restraints. One indirect strategy used today is developing data about the economic costs of traffic crashes and disseminating it to employers with the intent that it will spur employers to adopt mandatory belt-use policies and other programs to increase employees' restraint usage. State governments are also the targets of economic incentive programs. During fiscal 1979 Congress mandated that two percent of state highway-safety funds be directed to belt-usage programs. This raised \$3.5 million for state-level programs.

**Information and Education.** Persistently low belt usage rates in the United States have frustrated public and private safety organizations, and attempts have been made to discover why people do not use available restraints. In a NHTSA survey of public attitudes toward safety belts, two major reasons cited for nonuse are the discomfort and inconvenience associated with wearing restraints (Transportation Research Board 1980). Implicit in this finding is that most occupants do not consider the consequences of a traffic crash serious enough, or the probability of a crash great enough, to outweigh the inconvenience and discomfort of belt

use. A perception so widely held suggests that societal action is needed to change the respective perceived costs of belt nonuse and crash involvement. To date, millions of dollars have been spent on mass media public service announcements, safety literature, and demonstrations such as the "Seat Belt Convincer" to induce greater use of restraints. Most of these efforts appear to have been unsuccessful. For example a costly mass media campaign with an emotional approach and the theme "Somebody Needs You" was conducted in Michigan; however, observational studies showed that only a modest increase in restraint use followed the campaign (Motorists Information, Inc. 1978).

**Personal and Community Influence.** In the highway safety process, both formal and informal entities act to control traffic crashes and their losses. Informal risk-management systems include professional and social groups, family structures, customs, and traditions. Some information and education programs attempt to enlist specialized audiences--such as physicians and schoolteachers--who are credible and who are in a position to impart traffic safety information to vehicle occupants. While it is difficult to measure the influence of informal risk-management forces, the contribution of another's personal influence to a decision whether to use restraints cannot be overlooked.

This is the dilemma facing those in traffic safety in the United States: the only strategy that has proven value in increasing seat belt usage is legislation requiring occupants to use them; however, comprehensive belt-use legislation is not considered politically feasible. Narrower coercive strategies, and a range of noncoercive strategies involving incentives, information and education, and social influence, are available and should be examined.

#### **ALTERNATIVE MEANS OF PROMOTING RESTRAINT USE**

It has been established that regular use of occupant restraints by the American motoring population could substantially reduce traffic-related casualties and the losses associated with crashes. However, with the

exception of motorcycle headgear, existing occupant restraints are used regularly by only a small minority of the American traveling public. People, however, are aware of the value of occupant protection; nearly half of all occupants make at least occasional use of seat belts (Transportation Research Board 1980; Opinion Research Corporation 1978). Since the introduction of seat belts, attempts have been made by governmental and private entities to induce higher restraint usage rates. Strategies that do not involve compulsion have apparently not succeeded; compulsive strategies have proved unacceptable to the public. The lack of success to date should not lead to abandonment of all efforts to encourage greater use of restraints; voluntary approaches may have a long-run, cumulative effect on restraint use, and might be important components of a series of strategies that might successfully increase usage rates (Transportation Research Board 1980).

Overcoming the public's apparent apathy or even antipathy toward occupant restraints will require a combination of strategies applied in a coordinated fashion over a considerable period of time. A special committee convened by the Transportation Research Board developed a set of six recommended strategies to increase belt usage rates without resorting to comprehensive mandatory belt-use legislation. These recommendations, which are reproduced in Appendix A and summarized in Figure 4, provide the starting point for recommended future state and local government policy.

### **Selective Restraint-Use Legislation**

The first two recommendations of the TRB committee call for mandatory restraint-use legislation on a less than comprehensive basis. They reflect the committee's realization that while European-style legislation has been politically infeasible in the United States, the public is more receptive to legislation directed at specific subgroups. Small children, especially, have historically been the target of special protective measures, such as child-labor and vaccination laws. The "freedom of choice" argument often raised in opposition to comprehensive belt-use laws

FIGURE 4

STRATEGIES RECOMMENDED BY THE TRANSPORTATION  
RESEARCH BOARD FOR INCREASING SEAT BELT USAGE

- State legislation requiring minors under age 18 to use restraints
- Federal regulations requiring restraint use when operating vehicles on official business
- More detailed federal guidelines governing the use of federal set-aside funds for state safety belt programs
- Identify and publicize the economic costs of nonuse of safety belts
- Encourage employers to adopt mandatory belt-use policies
- Treat traffic crashes and crash losses as a major public health problem, and promote greater involvement of health-care personnel in traffic safety efforts.

has little force when applied to persons too young to understand, let alone make an intelligent decision about, risks. On the other hand, adolescents have been given some degree of legal autonomy about accepting certain risks, depending on the person's age and the risk involved. Some persons under age 18 may, for example, consent to medical treatment, have sexual intercourse, leave school, and—in most states—drive. Thus the "youth-protection" laws advocated by the TRB panel may encounter greater political resistance than laws to protect only infants and small children. A possible approach may be to require belt use by drivers under age 18 who hold restricted licenses or learners' permits. Such an approach might not encounter as much political resistance and would not impose upon parents the burden of ensuring that their older children are restrained.

Another approach is to focus on those whose calling is transporting children or caring for them. Many children and adolescents are transported in vehicles owned by schools, child-care centers, and camps. While only some large school buses are equipped with seat belts (Federal regulations do not require their installation, and there is no conclusive proof that belts are effective on those vehicles), most smaller buses, vans, and passenger cars are so equipped. A promising avenue for achieving greater restraint use among minors would be legislation, similar to Michigan's regulations governing child-care facilities, calling for the driver and all occupants to use available belts in vehicles operated by transporters of minors (Treat and Ruschmann 1980). At least nine states have legal requirements for the use of appropriate restraints by day care providers (Lawrence Johnson and Associates 1978).

The TRB committee did not consider restraints other than automobile passenger restraints and thus did not discuss motorcycle helmet laws. Since 1976, when Congress returned the issue of helmet legislation to the states, more than half the states have repealed or weakened their laws. Arguments based on free choice and individual liberty, combined with possible resentment of federal compulsion, proved more forceful than arguments stressing loss reduction and cost savings. Nevertheless, public support for helmet legislation is strong, and the legislative trend toward



repealing or weakening these laws appears to have subsided. Interestingly, the same reasons the public cites for supporting helmet legislation apply to other forms of occupant-restraint legislation. This suggests that members of the driving public may favor occupant restraint legislation directed at others but not at themselves.

The committee did not discuss the "seat belt defense" in civil cases involving automobile negligence. Adoption of this defense in the courts would reduce the losses of large fleet owners whose vehicles are frequently involved in traffic crashes, and road authorities who are increasingly sued by injured travelers alleging that defective roads caused their injuries. It would also indicate to the public that restraint usage is considered an integral part of prudent conduct on the highway. Because of the weight of precedent rejecting the seat belt defense in courts, legislation may be necessary in many states to authorize its use. The prospects for such legislation are uncertain: at present five states have statutes that expressly prohibit courts from considering the seat belt defense (Donelson 1980), and legislators might consider a seat belt defense statute an imposition on the authority of the courts or a "bootstrap" approach that artificially creates a legal duty to use seat belts.

None of the selective approaches will bring about universal belt use; in fact, a combination of these approaches may produce only a modest increase. Nonetheless, an increase in usage is likely to occur. This, in turn, will increase the number of occasions where a belt user can influence another person, such as a spouse or child, or another member of a carpool, to use restraints as well.

Adults who are hostile to seat-belt legislation may be more receptive to safety regulations imposed in the workplace--for example, policies requiring the use of hard hats, goggles, or safety shoes. Thus the potential exists for promoting belt use by those who operate vehicles while on business through the enactment of employee belt-use policies.

The TRB committee reported that at least 19 states as well as several agencies of the federal government have enacted some form of mandatory belt-use policy for employees traveling on official business, using

government-owned vehicles, or using personal transportation for work-related travel. The panel also mentioned that several large industrial firms and public utilities, especially those that have thousands of vehicles in use, have adopted belt-use policies.

These policies are admittedly difficult to enforce. Still, conducting "spot checks" of vehicles entering or leaving company premises, and relying on police reports of traffic crashes, may provide enough enforcement to "remind" drivers of the applicable work rules and thus bring about a significant increase in restraint usage. Some "naturally law-abiding" drivers will obey the belt-use rules regardless of how unlikely it is that they will be caught and disciplined. The experience of other nations in enforcing their comprehensive belt-use laws is relevant: while only a modest number of citations are written, this gives the law enough credibility to induce high levels of compliance.

Some resistance to on-the-job belt-use policies may occur, but this is not an insurmountable obstacle. When hard-hat requirements were first imposed at construction sites there was employee hostility toward this policy. Today, the use of hard hats is universal and in fact has become the symbol of the construction trade (Wilson 1979). Belt-use rules can be "sold" to employees rather than imposed by fiat. To induce employee acceptance, restraint-use rules could be inserted into collective bargaining agreements in exchange for expanded health-care benefits for employees, and the link between increased belt usage and a decrease in health insurance and workers' compensation premiums could be explained during contract negotiations.

Restraint use could be required on military installations and other government-owned property, such as national or state parks. Restraint-use provisions also could be inserted in government contracts and could apply to all vehicles operated in connection with publicly funded programs. Again, enforcement may be difficult but a large number of naturally law-abiding occupants are likely to comply with such a policy without regard to the level of enforcement. Although occupant restraint regulations covering these areas would require government action, that action could be

carried out through administrative bodies less subject to political pressures against belt-use requirements.

Because government is a major employer, there is some overlap between occupant restraint legislation and employee belt-use policies. Likewise, because employers must be given persuasive reasons to adopt and enforce restraint-use policies for their work force, this strategy overlaps public information and education efforts designed to increase restraint use.

### **Information and Education**

In the past most efforts to educate the public about the benefits of occupant restraint use have been media "campaigns," often using an emotional theme or a creative slogan or symbol. Usage rates over the years appear to indicate that these mass-media efforts have largely failed. While this may be true, one should not dismiss the possibility that media efforts have a long-term effect on behavior. Smoking is closely analogous to nonuse of seat belts: both are prevalent in society, both produce adverse consequences, and the adverse consequences are not immediately experienced. In the last twenty years an intense antismoking campaign has been waged through the media by the government and by private health groups. Smoking, especially among young adults, has declined, and in some jurisdictions, public hostility to smoking has taken the form of legislation restricting smoking in public places. It is possible that a similar, long-term change in behavior may occur in other areas of public health and safety, including restraint use.

The TRB committee recommended targeting employers and health-care practitioners for education and information efforts. Employers who learn how much traffic casualties cost them, and physicians who are made aware that traffic crashes are one of the nation's leading public health problems (see Hartunian, Smart, and Thompson 1980), may in turn attempt to induce greater use of occupant restraints by employees and patients, respectively. With respect to employers, the goal is some form of restraint-use policy applicable to employees. In the case of health-care practitioners, such a response is not possible; there are no legal or employment-related sanctions

for those who fail to follow "doctor's orders." However, physicians—especially pediatricians, family practitioners, and those associated with prevention-oriented programs such as health maintenance organizations—have the opportunity to influence their patients' attitudes toward restraint use and towards traffic safety in general. Schoolteachers can exert a like influence on students in health education classes and especially on novice drivers enrolled in driver-education programs. Other individuals who are both credible and in a position to influence choices regarding the use of occupant restraints, such as automobile dealers and members of social or fraternal organizations, could be targets of public information and education efforts.

The TRB committee alluded to other situations, such as stopping at a toll booth or for periodic vehicle inspections, as opportunities for government or private safety organizations to inject a message about the value of occupant restraints. Even in the absence of a restraint-use law, the public can be given the impression that restraint usage is a matter of interest to law-enforcement authorities (Transportation Research Board 1980). These efforts can be reinforced by including belt use information in accounts of fatal and serious traffic crashes. The Ann Arbor News regularly reports whether fatally injured crash victims had been wearing their seat belts (cooperation of police authorities was obtained and is necessary), and traffic crash reports by automobile clubs and safety organizations could emphasize how many traffic deaths that could have been averted through the use of restraints.

While the current political climate is one of hostility toward government in general and regulation in particular, it is also one of thrift and economy-consciousness. Thus the public, as well as legislators, administrators, and employers, may be receptive to a restraint-use campaign stressing the unnecessary cost of nonuse—estimated to be \$50 to \$100 per year per motorist (based on Jones, Franson, and Joscelyn 1980). A similar approach could portray nonuse of belts by employees as a needless item of overhead that industry now bears.

One approach mentioned by the TRB panel focuses on the "messages"

given audiences by television and motion pictures. A voluntary effort on the part of filmmakers and broadcasters to portray safer transportation behaviors may help eliminate the impression that traffic crashes are humorous events and that crashed occupants are seldom injured. Such efforts may induce so-called "script followers" to imitate the restraint-use habits of their favorite entertainers.

### **Incentives**

In our companion paper, Managing the Traffic Crash Risk, we pointed out that society relies heavily on negative strategies, especially imposing legal sanctions on unsafe drivers, to control the traffic crash risk, and that alternative strategies--including the use of incentives--ought to be considered. The TRB panel concluded that incentive programs would be too difficult to implement and might not induce significant behavioral changes; that compliance with the terms of incentive programs would be too difficult to monitor; and that the benefits of restraint use are too small and too indirect to support financial incentives. Even though using belts "is its own reward," several approaches tied to rewarding those who use restraints or who promote restraint use are feasible.

One strategy identified by the panel was to impose smaller fines or fewer violation points against drivers who were using belts at the time they committed a traffic offense. Although it is possible that a driver could fasten the restraint after being stopped but before being seen by the officer, this may not happen as frequently as is feared. In jurisdictions such as Ontario, where enforcement of belt-use laws commonly occurs in connection with police stops for violations, police apparently are able to detect many instances in which the driver buckles up after the fact (Wilson 1979). A variation of the "mitigating circumstances" approach is for a court or licensing authority to agree to reduce a driver's punishment in exchange for a promise to use belts regularly for a specified period of time. Violation of the agreement could be grounds for imposition of a license suspension or some other penalty otherwise authorized by law.

A surer way of ensuring belt use is to reintroduce the seatbelt-interlock

or continuous-buzzer system, but this time on an optional basis. Owners who have such a system installed on their vehicles could be eligible for reduced insurance rates or perhaps reduced licensing and registration fees. Car rental companies, corporate fleet owners, and owners with dependent children could thus increase restraint usage in their vehicles without spending a great deal of time and effort enforcing belt-use policies.

A prior study indicates that the public perceives current restraint systems as inconvenient and uncomfortable. Both mechanical modification of belts, and information and education programs on how to adjust and wear belts and reminding drivers that restraint use is much more comfortable than the consequences of an unrestrained crash, could bring about greater public receptivity to available restraints.

Employers and other fleet owners also could be given incentives tied to their adoption of belt-use policies. Tax credits for the purchase of interlock systems, reduction in workers' compensation premiums, or reduced health insurance premiums, combined with an education effort pointing out the costs of traffic crashes to a particular firm, could be used to promote private industry belt-use policies.

## **RECOMMENDATIONS FOR ACTION**

Policymakers in state and local government, and in the private sector, can take immediate action that is politically and administratively feasible to increase restraint use. Available strategies range from the traditional legal approach of prescribing a standard of behavior and punishing those who violate it, to innovative strategies such as financial rewards and informal means of influencing behavior such as using peer influence. Promising strategies found in or suggested by the highway safety literature include the following:

- **Enact selective restraint-use statutes that are as broad as politically feasible.** Public antipathy to mandatory universal restraint use does not preclude narrower prescriptive strategies. Two specific and familiar legislative proposals in this area are motorcycle helmet-use and child restraint laws. If your state's

legislature is considering such laws, the cost savings as well as the reduction in casualties associated with them should be stressed. Those who oppose such laws as infringements on liberty should be persuaded that the infringement is relatively small. To minimize resentment toward these laws, violations should be made noncriminal infractions punishable by modest civil penalties.

● **Use administrative regulations, work rules, and contract provisions to increase restraint use in government-related travel.** Restraint-use laws, comprehensive or selective, require legislative action to empower government. On the other hand, some administrative agencies may already have power to require restraint use in certain situations. Agencies could, for example, require those who apply for public funds to adopt restraint-use policies as a condition of receiving them; mandate restraint use by governmental employees traveling on official business as part of the applicable work rules; and require restraint use on military bases, parklands, and other government property.

● **Encourage private employers to prescribe restraint use as part of their work rules for employees.** A portion of the nation's traffic crashes losses involves business travelers such as utility company employees and members of corporate sales forces. Crash losses incurred by these individuals also generate costs, especially insurance costs, for their employers. Thus an employee belt-use policy is analogous to other on-the-job health and safety rules with which employee compliance is likely to occur. One major reason for employer's reluctance to impose belt-use requirements is that they are unaware of how much traffic crashes cost them, and how much of those costs could be avoided by universal restraint use. Available data relating to crash losses should be disseminated, and efforts to develop more specific and usable data should continue.

● **Select specific targets for information and education programs that maximize the potential for personal influence.** Traditional mass media "campaigns" are too costly for units of state

or local government to conduct. Instead, existing mass media efforts should be supplemented by specialized information and education programs designed to enlist the support of physicians, schoolteachers, and employers—people who deal with drivers on a personal basis and who are influential enough to persuade them to use restraint systems. Appeals to all groups should be accompanied by data showing the costs—social and economic—of traffic crashes involving unrestrained occupants.

● **Enlist the aid of the news media and the entertainment industry in encouraging occupant restraint use.** The mass media play a subtle but nonetheless real part in shaping public perceptions toward occupant restraints in particular and traffic safety in general. Today many people perceive traffic crashes as extremely unlikely events and view restraints as inconvenient and uncomfortable. News accounts of crashes that stress the link between restraint use and loss reduction, television programming that depicts traffic crashes as costly rather than humorous events, and motion picture scripts that call for respected performers to use belts on the screen, help create a public frame of mind that is more receptive to belt use.

● **Consider the feasibility of using incentives to reward those who make use of occupant restraints and who promote the use of restraints.** Directly rewarding individuals and businesses makes the point more clear that restraint use lessens crash losses. This strategy also may be more attractive than traditional negative strategies for encouraging safe behavior. At the individual level, possible incentives include reductions in fines and violation points for minor violators who were using restraints; tax credits; reducing insurance rates; and reducing license or registration fees. At the corporate level, tax credits and reductions in unemployment or workers' compensation premiums are possible categories of incentives. One frequently voiced objection to incentive programs is that compliance cannot be monitored, and that dishonest motorists



would collect incentives and still refuse to wear restraints. Interlock systems, similar to those used in 1974, are a possible solution that is inexpensive and technically feasible. This approach appears especially promising for monitoring employee compliance with on-the-job restraint-use policies.

In conclusion, a combination of coordinated strategies should be applied over a long period of time. Those that we have identified are representative of the range of available and feasible strategies, and other strategies may successfully be pursued in your state or locality. No single strategy will be as effective in promoting restraint usage as a comprehensive mandatory belt-use law; in fact, it is conceivable that even a combination of strategies will not produce usage rates as high as those found in Europe, Canada, or Australia. But because of the prevailing political and social climate in the United States, alternatives to mandatory belt-use laws represent a feasible immediate approach that society can take. We believe that the alternatives described here can produce significant increases in restraint usage and can lead to substantial decreases in crash losses. They are also likely to lead to greater public acceptance of the value of restraint use and may assist in creating the necessary climate for broader legislative initiatives.



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