May 1983
Final Report

DOT HS-806-424

U.S. Department
of Transportation

**National Highway
Traffic Safety
Administration**

RESTRAINT SYSTEM USAGE IN THE TRAFFIC POPULATION

I Automobile Safety Belts
II Child Restraint Seats
III Motorcycle Helmets

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Contract No. DTNH 22-80-C-07283
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Technical Report Documentation Page

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16. Abstract This report presents findings from six observation studies conducted for NHTSA.

Safety Belt Usage Among Drivers: The purpose of this study was to continue to monitor the use or non-use of safety belts by drivers in 19 U.S. cities. A total of 54,539 observations, collected during November 1980-October 1982, form the basis of this report. The study shows an increased use of safety belts by drivers. During 1979, the average usage rate was 10.9%. This compares with an average usage rate of 11.3% in 1982.

Use of Child Restraint Devices, Passenger Safety Belts and Position of Passengers in Cars: The main objectives were to assess the use of restraint devices for infants and small children, to monitor belt usage by sub-teen, teen and adult passengers, and to determine the extent of any "out of position seating" problem for all unrestrained passengers. Findings are based on a total of 106,365 observations collected in 19 U.S. cities during November 1980-October 1982. Use of restraint devices for infants and toddlers were: 40.4% for infants and 19.4% for toddlers. The percent of other passengers wearing a safety belt were: toddlers (2.8%), sub-teens (4.7%), teens (3.1%) and adults (7.4%). Motorcycle Helmet Usage: The main purpose was to ascertain the use of helmets by drivers and passengers of motorcycles in 19 U.S. cities. Findings are based on 51,905 observations collected from November 1980-October 1982. In cities with helmet laws, 92.9% of drivers and 91.9% of passengers used helmets. In cities with no or only limited laws, only 42.9% of drivers and 30.3% of passengers used helmets.

17. Key Words	18. Distribution Statement
Safety belt usage, shoulder harness, seat belts, automatic system, usage, use-inducing, drivers, passengers, restraint devices, child restraint seats, motorcycle helmets.	Document is available to the U.S. public through the National Technical Information Service, Springfield, Virginia 22161

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Also reported are restraint usage studies conducted in the first ten National Accident Sampling System areas and special studies conducted in California and Michigan.

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METRIC CONVERSION FACTORS

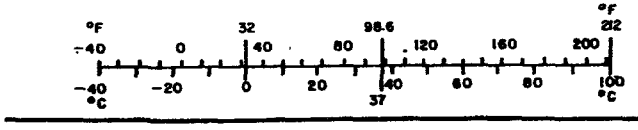
Approximate Conversions to Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
		LENGTH		
in	inches	*2.5	centimeters	cm
ft	feet	30	centimeters	cm
yd	yards	0.9	meters	m
mi	miles	1.6	kilometers	km
		AREA		
in^2	square inches	6.5	square centimeters	cm^2
ft^2	square feet	0.09	square meters	m^2
yd^2	square yards	0.8	square meters	m^2
mi^2	square miles	2.6	square kilometers	km^2
	acres	0.4	hectares	ha
		MASS (weight)		
oz	ounces	28	grams	g
lb	pounds	0.45	kilograms	kg
	short tons (2000 lb)	0.9	tonnes	t
		VOLUME		
tsp	teaspoons	5	milliliters	ml
Tbsp	tablespoons	15	milliliters	ml
fl oz	fluid ounces	30	milliliters	ml
c	cups	0.24	liters	l
pt	pints	0.47	liters	l
qt	quarts	0.95	liters	l
gal	gallons	3.8	liters	l
ft^3	cubic feet	0.03	cubic meters	m^3
yd^3	cubic yards	0.76	cubic meters	m^3
		TEMPERATURE (exact)		
°F	Fahrenheit temperature	5/9 (after subtracting 32)	Celsius temperature	°C

*1 in = 2.54 (exactly). For other exact conversions and more detailed tables, see NBS Misc. Publ. 286, Units of Weights and Measures, Price $2.25, SD Catalog No. C13.10:286.

Approximate Conversions from Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
		LENGTH		
mm	millimeters	0.04	inches	in
cm	centimeters	0.4	inches	in
m	meters	3.3	feet	ft
m	meters	1.1	yards	yd
km	kilometers	0.6	miles	mi
		AREA		
cm^2	square centimeters	0.16	square inches	in^2
m^2	square meters	1.2	square yards	yd^2
km^2	square kilometers	0.4	square miles	mi^2
ha	hectares (10,000 m^2)	2.5	acres	
		MASS (weight)		
g	grams	0.036	ounces	oz
kg	kilograms	2.2	pounds	lb
t	tonnes (1000 kg)	1.1	short tons	
		VOLUME		
ml	milliliters	0.03	fluid ounces	fl oz
l	liters	2.1	pints	pt
l	liters	1.06	quarts	qt
l	liters	0.26	gallons	gal
m^3	cubic meters	36	cubic feet	ft^3
m^3	cubic meters	1.3	cubic yards	yd^3
		TEMPERATURE (exact)		
°C	Celsius temperature	9/5 (then add 32)	Fahrenheit temperature	°F



FOREWORD

This report presents findings from the following observation studies conducted by Opinion Research Corporation under a contract with the National Highway Traffic Safety Administration.

- Safety Belt Use Among Drivers: The purpose of this study was to continue to monitor the use or non-use of safety belts by drivers in 19 U.S. cities for a period of 24 months (November 1980 - October 1982). Passenger vehicles of 1964 and later model years were observed. The study also includes observation of safety belt use by drivers in ten National Accident Sampling System areas (NASS) designated by NHTSA.

- Use of Child Restraint Devices, Passenger Safety Belts, and Position of Passengers in Cars: The main objective of this study was to assess the use of restraint devices for infants and toddlers and to monitor safety belt use or non-use by sub-teen, teen and adult passengers. Another objective was to determine the extent of any "out of position" seating problem for all unrestrained passengers. Observations were conducted in the same 19 U.S. cities and 10 NASS areas as in Study I.

- Special Studies: Restraint system usage studies both among drivers and passengers were conducted in two California cities -- Fresno and Bakersfield -- and in Midland and Portage, Michigan, to ascertain the impact of programs to encourage restraint use among motorists in Fresno and Midland. The cities of Bakersfield and Portage were used for control purposes.

- Motorcycle Helmet Usage: The purpose of this study was to observe the use or non-use of helmets by drivers and passengers of motorcycles and mopeds in the same 19 U.S. cities and 10 NASS areas covered in Study I.

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SUMMARY

Safety Belt Usage Among Drivers in 19 Cities*

Safety belt use by drivers of private passenger cars in 19 U.S. cities has increased since the low point reached in 1979. In 1978, the average annual usage rate was 13% and declined to 10.9% in 1979. In the current study, an average annual usage rate of 11.4% was attained in 1981 and continued at this level during 1982.

The automatic or so called "passive" restraint system led regular restraint systems when usage rates were compared. Among 366 cars observed with the automatic system, the usage rate for drivers was 84.7%. This compares with a usage rate of 11.9% for cars with the combination belt, 6.9% for cars with the two-piece belt, and 4.1% for cars which include only the lap belt.

Belt usage in newer models (1981-1983) was higher than usage in earlier models. Percent of drivers restrained was 16% for models 1981-1983; 13.6% for models 1979-1980; 12.5% for 1978 models; 10.6% for 1977 models, and 8.6% for models 1964-1976.

Usage rates were higher for women than men (12.2% vs. 10.8%). Usage differed significantly among three age groups. Usage was highest for drivers 50 years of age or over (12.3%), next highest for those 25-49 years (11.6%), and lowest for those under 25 years (9.9%).

Safety belt usage was highest in the West and lowest in the Southwest and Southeast regions. Among 19 cities, usage was highest in Seattle (21%) and lowest in Fargo/Moorhead (5.9%).

Among late-model cars (1976-1983), usage was highest for sub-compacts (18.5%), next highest for compacts (10.8%), and lowest for intermediate (8.0%) and full-size cars (5.7%).

Also, among recent models, the usage rate for sub-compact imports was almost twice the rate for domestic sub-compacts (22.1% vs. 12.3%). In compacts, the usage rate for imports was about two and one-half times the rate for domestic compacts (24.5% vs. 9.8%).

Factors such as primary roads vs. freeway exits, city vs. suburban driving, weekday vs. weekend driving, weather conditions and season of year appear to have little or no influence on the use of restraint systems.

*Usage data for drivers was based on 54,539 verified observations conducted for 24 months (November 1980-October 1982) unless specified otherwise in the report.

INTRODUCTION: BACKGROUND AND OBJECTIVES

Background

Virtually all passenger cars on the road today are equipped with manual safety belts, more than three-quarters of which are combination lap, shoulder belts. Despite the clearly established value of safety belts in reducing deaths and injuries, the data on their usage in the United States have not been encouraging. A national survey of drivers in 1971 found overall usage to be about 17 percent; during 1974, overall usage was estimated at more than 20 percent, mainly due to increased usage of the warning, interlock systems in 1974 model cars; in 1976 and 1977, usage slipped back to about 18 percent and, according to the 1979 survey, usage had continuted to decline to about 11 percent.

These surveys have provided invaluable data to NHTSA and have indicated clearly, among other data, the small fraction of American motorists who protect themselves on a voluntary basis. Such a finding indicates the importance of continuing efforts to increase use of safety belts. Previous related Federal efforts have been to require improved safety belt systems such as lap belt retractors, combination lap and shoulder belts, inertia shoulder belt retractors and various warning systems. Based on observations of belt usage, the effectiveness of these efforts were assessed and showed that some improvements in belt usage were obtained, but only for a short period of time.

A major campaign was initiated toward the end of 1981 and early 1982 to enlist all potential networks on a national level to participate in a program to encourage the use of restraint systems. These networks included all the school systems in the U.S., corporations, the medical profession, national clubs and associations, etc.

Objectives (Driver Study)

NHTSA has sponsored several studies in the past which have been directed to observe and record belt usage by drivers in cars equipped with different warning and hardware systems in 19 cities. The purpose of the current research effort is to continue observing and recording belt usage for a period of 24 months (November 1980 - October 1982) in these same 19 cities to determine the effectiveness of various older, as well as newer, safety belt systems in increasing belt usage.

METHODOLOGY

This study on safety belt usage is a follow-up to earlier studies of this type conducted for the National Highway Traffic Safety Administration (NHTSA). In the current study, safety belt usage was monitored on a continuous basis over a 24-month period (November 1980 - October 1982) by observing drivers of passenger cars as they stopped for a red light at traffic intersections in each of 19 major U.S. cities. Only passenger vehicles of 1964 and later model years were observed. Observation data were collected every other month in each of the 19 cities and in each of the 10 NASS areas. In the special studies conducted in the two California cities of Fresno and Bakersfield and the two Michigan studies of Midland and Portage, observation data were collected each month.

To meet survey objectives, the research design called for a number of tasks. The major tasks, in addition to the analysis and preparation of this report, were:

- Sample design
- Train observers
- Collect observation data
- Periodic field checks by supervisory personnel
- Verify license plate numbers through the respective state DMVs (Department of Motor Vehicles)

Sample Design -- 19-City Study

The research design detailed below was developed in response to the NHTSA requirement that direct observation of safety belt usage be carried out.

The 19 cities to be covered by the survey are the same cities observed in past NHTSA studies of safety belt usage. A regional breakdown of the 19 cities is presented below:

New England	Southwest
Boston	Houston
Providence	Dallas
Mid-Atlantic	**North Central**
New York	Minneapolis-St. Paul
Baltimore	Chicago
Pittsburgh	Fargo-Moorhead
Southeast	**West**
Atlanta	Seattle
Miami	San Francisco
Birmingham	San Diego
New Orleans	Phoenix
	Los Angeles

The 19 cities were purposively selected, and probability sampling within each of the cities was undertaken in order to select traffic sites that would provide representative and cost-effective data.

The major aim of the sample design was to allow for the estimation of the proportion of automobile drivers on the road who were wearing their safety belts.

NHTSA specified that, for each of the 19 cities in the survey, primary road intersections and freeway exits be selected for each month of the observation period, so that over the complete contract period these sites would provide aggregate data that is representative of the city.

For each city area (the corporate city, along with the contiguous suburban areas), detailed road maps were used. Each map was subdivided into a system of square grid areas.

The square grids on each map were then carefully examined and classified as being one of three stratam: (1) squares in open country areas containing few or no primary roads running through them; (2) squares containing one or more freeway exits; and (3) squares containing primary roads but no freeway exits.

Those squares in the first group were assigned a zero probability of being selected into the sample. The squares in the second and third groups were then ordered and 22 primary road squares and 11 freeway exit squares were systematically selected. This stratification procedure was carried out in order to ensure two different types of traffic -- high-speed automobiles exiting freeways, and slower moving traffic on primary urban and suburban roads.

The traffic sites selected for the current study were the same sites that were used in the 1978-79 study conducted by ORC. In each of 22 primary road squares and 11 freeway exit squares selected for each city, the ORC Sampling Department selected eight primary road intersections and two freeway exit sites -- a total of ten sites. The selected sites were sent to the observer each month that he was scheduled to visit a city. From the list of sites received, the observer selected two primary road sites and one freeway exit site that were suitable for observing belt usage among drivers (i.e., a curb to stand on, sufficient traffic, safety for the observer, no construction, etc.). Thus, in each city a total of approximately 36 sites were used for the driver study over the course of the study and considered representative of that city. During the period, November 1980 through January 1982, two additional primary road sites and one freeway site were also selected for the study of restraint system usage among passengers. Each time a city was visited, 2 days (5 hours each day) were used to observe drivers and 3 days (5 hours each day) were used to observe passengers. From February 1982 through October 1982, the passenger study was conducted at shopping malls. (A description of this procedure will be found on page 27.)

Observer Training

In October 1980, four full-time field observers were assigned to a full week of training at ORC's Princeton, New Jersey headquarters. The program was under the direction of the ORC Project Director assisted by two individuals designated as field supervisors. The CTM for NHTSA assisted in the training program. The first phase of the training included a two-hour classroom instruction period, during which the research objectives and data collection materials were explained. Each observer was provided with a training manual which covered procedures for site selection, traffic observation, and recording of data.

The second phase of the training program was carried out in the field under the direction of ORC supervisory personnel. These sessions were conducted in Trenton, New Jersey over a period of four and one-half days for at least six hours per day and consisted of training in site selection and data collection methods.

Observers collected and recorded safety belt data on a trial basis at a number of traffic intersections and freeway exit sites in the City. Each of the four field observers was "certified" as being ready to collect "real data" at the end of the training session. When a field observer had to be replaced by a new observer, the replacement was trained by an ORC supervisor in his "home base" city, in the same manner as described above.

Data Collection Procedures

Observation studies were conducted in 19 cities and 10 NASS areas for a period of 24 months. Half of the cities and NASS areas were assigned one month and the other half the next month. Thus, each city and NASS area was visited for a period of 12 months, on an every other month schedule.

As noted earlier, at the beginning of each month, the observer was furnished with a list of potential traffic observation sites for each of the cities and counties that had been assigned. Using the city or county map, he located the sites and identified them on the map. He was asked to drive to the first site on the list to determine if it was an appropriate site to work at. If it was not an acceptable site, he would go to the second site and so on, until he had selected the required number of acceptable sites.

Criteria for site selection would include:

- A traffic light or stop sign
- Traffic volume heavy enough to allow collection
- Safety, i.e., not located in a high-crime area, a safe curb to stand on, etc.
- No road construction or road work which delays traffic
- Sites that are not congested with buses or trucks

At the Site

The passenger cars to be selected for observations of drivers were those stopped at traffic lights or stop signs. Observations were made only of cars in the lane closest to the curb in order to obtain an unobstructed view of the driver's lap to ascertain belt usage. Observers were instructed to position themselves at the corner or curb in such a way that would permit them to see into the car to be able to observe all the data that was called for on the observation form.

The data collection assignments were rotated and covered four time segments -- 7 a.m. to 10 a.m., 10 a.m. to 1 p.m., 1 p.m. to 4 p.m., and 4 p.m. to 7 p.m. During winter months, visibility problems necessitated a change in the first and last time periods.

For the driver study, observers were required to collect data on the second car in line at a traffic light and then proceed to collect data on the third, fourth, etc., cars when time permitted. When only one car stopped at the light, he observed that car. (A copy of the observation form is appended to this report.) A flow chart to describe how safety belt use was observed for drivers is presented on page A-9 of the Appendix Section.

Eligible Vehicles

Cars eligible for observation include all passenger vehicles, including station wagons, registered in the state in which the observer was working. They were instructed not to observe trucks, vans, and any passenger cars used for commercial purposes, such as taxi cabs and company-owned cars. Company cars include all cars with a company name on the side panel or door and all cars with dealers' plates, diplomatic plates, and the like. Cars with out-of-state licenses were not observed.

The following items were provided observers, both for safety reasons and for identification purposes:

- A highly visible safety vest
- A sign on the back of a clipboard with the words "Traffic Survey" in English and Spanish
- An ORC identification card
- A letter from NHTSA describing the purpose of the study

ORC notified the local police department in each city to inform them of the continuation of the observation study.

Field Checks by Supervisory Personnel

Over the course of the study, each of the observers were visited by an ORC supervisor at least five times. During each visit the supervisor spent two days observing alongside the field observer at a primary road site or a freeway exit. At the end of each day, the supervisor would tally his data and compare it with the data collected by the observer. These field checks not only helped to ensure accurate data collection but served as a morale booster for the observer.

Specific Objectives of This Study Are:

1. To continue to monitor safety belt usage rates by drivers in all model year cars (model years 1964 through 1983)

2. Analyze usage data by:

   - Type of belt system
   - Age and sex of driver
   - Model year of car
   - Region of country
   - Type of road -- Primary vs. Freeway exit sites
   - Month of year
   - Car make and model
   - City
   - Size of car
   - Domestic vs. Import models
   - Weather conditions
   - Weekday vs. weekend driving
   - Season of year

Verification of Data Through DMV Search and Use of Vindicator Program

The "unvalidated" usage data collected by the field observers were sent to ORC on a monthly basis. Each month the data were keypunched on cards and the data transferred to computer tapes. After several months of data had been accumulated, the license plate numbers were sent to the respective state DMVs (Department/Division of Motor Vehicles) for further vehicle information, including car make, model year, and VIN (Vehicle Identification Number). Only cars whose observed make and recorded make agreed were retained in the "validated data" file. Using the Vindicator Program furnished by the Highway Loss Data Institute, Washington, D.C., data were further analyzed according to criteria available from the VIN code, such as model year, wheelbase length, and specific cars series.

A total of 54,539 verified observations, collected during the period November 1980 - October 1982, form the basis of the 19 City Driver Study.

I

Safety Belt Usage Among Drivers

Survey of Cars in the Traffic Population

19 City Study

19 CITY DRIVER STUDY

DETAILED QUANTITATIVE FINDINGS

The primary body of data reported in this section is based on the following number of verified observations:

All Model Years (1964-1983)	54,539
Newer Cars (1976-1983 Model Year)	37,576

Throughout the report, tests of statistical significance (at the 95-in-100 confidence level) have been applied. Thus, any statements to the effect that "A" is larger (or smaller) than "B" may be taken as having met the test of statistical significance.

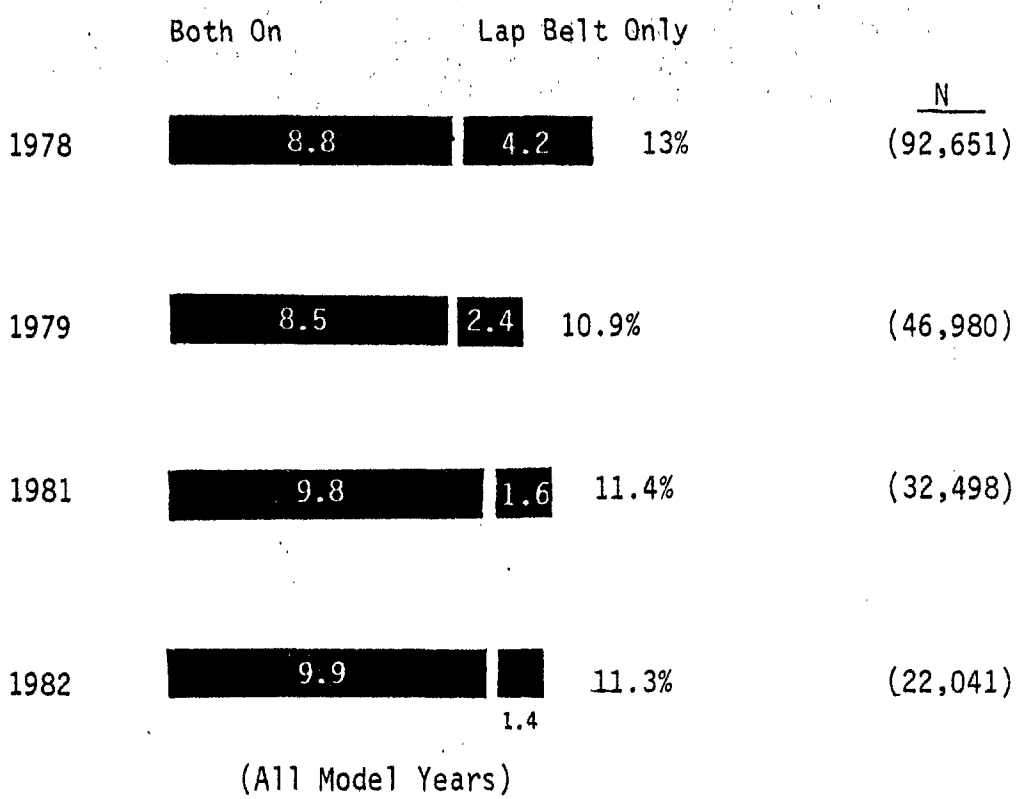
Safety Belt Usage by Drivers (1978-1982)

In the 19 city observation study, safety belt use by drivers in private passenger cars averaged 13% during 1978. The average annual usage rate declined to 10.9% during 1979. A modest but significant increase in belt use to 11.4% was recorded in 1981 and continued at about this level during 1982.

Table 1

(19 City, 1981-1982)

SAFETY BELT USAGE
AVERAGE ANNUAL USAGE RATES



(All Model Years)

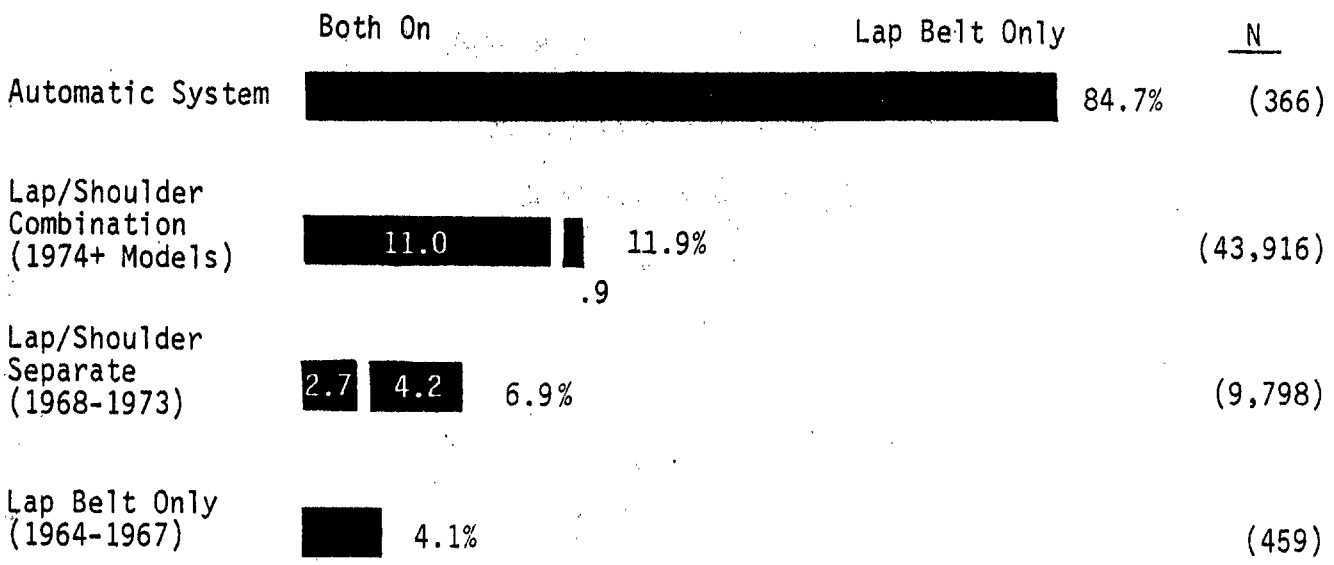
Safety Belt Usage by Type of System

Among different types of restraints, passenger cars with automatic belt systems were observed to have a usage rate of 84.7%. This compared with usage rates of 11.9% for cars with the combination belt, 6.9% for cars with the two-piece belt, and 4.1% for those which include only the lap belt. The usage rates for both of the older restraint systems are significantly below the usage rate for the combination belt.

Table 2

(19 City, 1981-1982)

USAGE BY TYPE OF BELT SYSTEM INSTALLED



(All Model Years)

Safety Belt Usage by Model Year

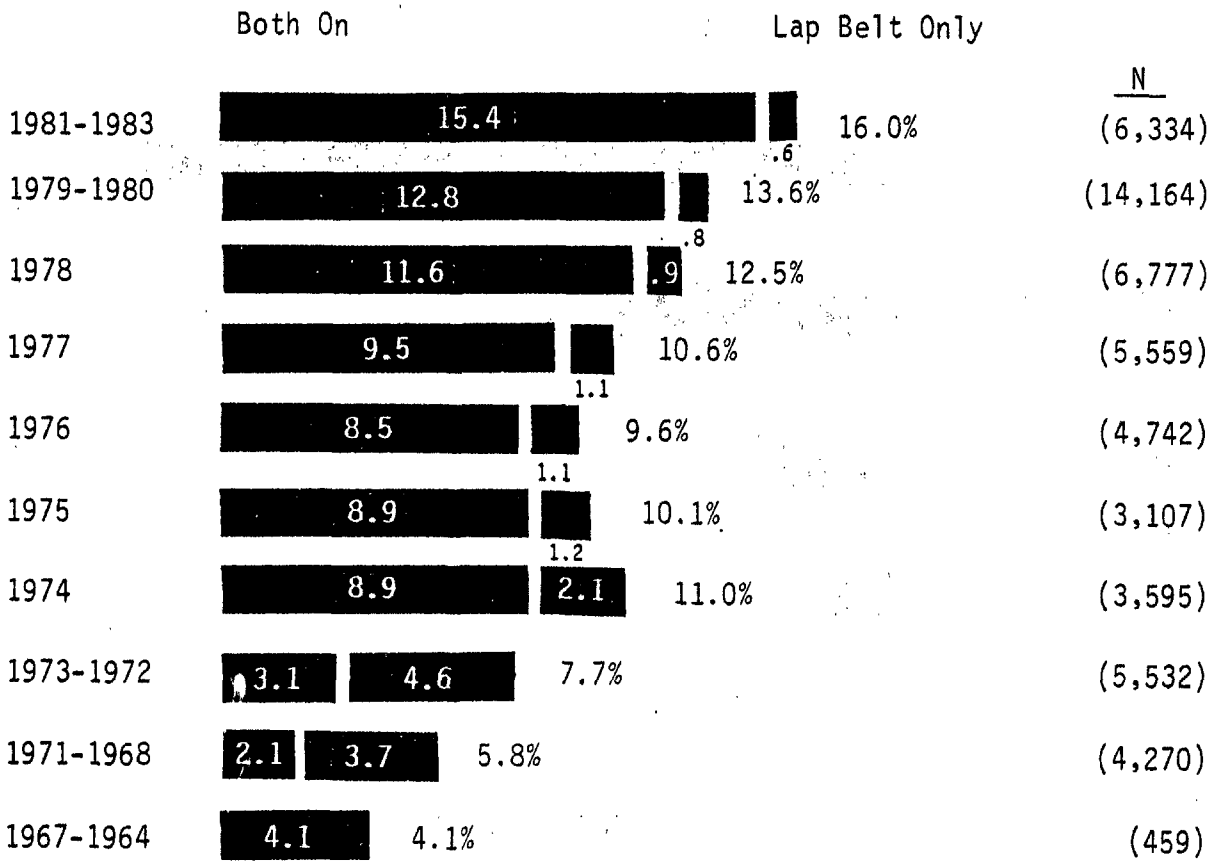
Safety belt usage is highest in newer model cars (Model Years 1981-1983) than in earlier model cars. Among drivers of 1981-1983 models, 16% were observed to be wearing the safety belt. This compares with a usage rate of 13.6% for 1979-1980 models; 12.5% for 1978 models; and 10.6% for 1977 models.

With few exceptions, the percent of drivers wearing the safety belt shows a steady decline all the way from the newer models to the oldest model years. Among cars that are now nine years or older, the highest usage rate is evident for the 1974 models which, when first introduced, were equipped with a continuous warning device and the starter interlock system.

Table 3

(19 City, 1981-1982)

USAGE BY MODEL YEAR



Safety Belt Usage by Sex and Age of Driver

Overall usage of safety belts is somewhat higher for women drivers than for men drivers (12.2% vs. 10.8%). Note, also, that almost twice as many women as men wear only the lap belt.

Among three age groups, observed usage is highest for drivers 50 years of age or over and lowest for drivers in the 24-years-or-under age group.

Table 4

(19 City, 1981-1982)

USAGE BY SEX AND AGE OF DRIVER

	Both On	Lap Belt Only		N
Men	9.6	1.2	10.8%	(31,625)
Women	10.2	2.0	12.2%	(22,914)
24 or Under	8.6	1.3	9.9%	(11,092)
25-49	10.3	1.3	11.6%	(31,995)
50 or Over	9.6	2.7	12.3%	(11,433)

(All Model Years)

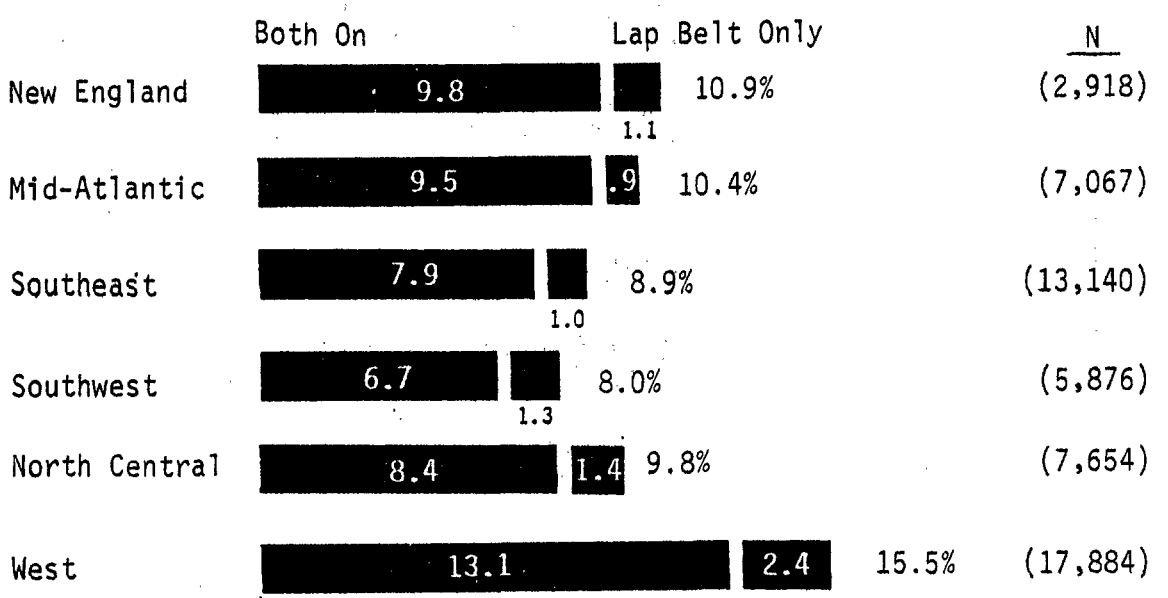
Usage by Region of Country

Safety belt usage is highest in the West; lowest in the Southwest and Southeast regions. In the three other regions -- New England, Mid-Atlantic, and North Central -- the proportions of drivers who wear their safety belts are quite similar.

Table 5

(19 City, 1981-1982)

USAGE BY REGION



(All Model Years)

Usage by City

In the 19 cities surveyed, safety belt usage among drivers is highest in Seattle (21%) and lowest in Fargo-Moorhead (5.9%). As shown in the table below, six cities have usage rates significantly above the average usage rate for the 19 cities and nine have usage rates significantly below the 19 city average.

Table 6

(19 city, 1981-1982)

USAGE BY CITY

	% Lap and Shoulder	% Lap Belt Only	% Total	N	
Seattle	17.7	3.3	21.0	3,634	*
Minneapolis-St. Paul	13.4	2.7	16.1	2,573	*
San Francisco	13.1	2.3	15.4	3,507	*
San Diego	12.7	2.5	15.2	4,015	*
Phoenix	11.3	2.6	13.9	2,719	*
Atlanta	11.1	1.5	12.6	3,609	*
Los Angeles	10.6	1.6	12.2	4,009	
Boston	10.9	1.2	12.1	1,698	
Baltimore	10.7	1.1	11.8	1,800	
19 CITY AVERAGE	9.8	1.6	11.4	54,539	
Pittsburgh	9.6	.8	10.4	3,398	
Providence	8.5	.8	9.3	1,220	**
Houston	7.7	1.4	9.1	3,074	**
New York	8.1	.8	8.9	1,869	**
Birmingham	7.3	1.1	8.4	2,462	**
Miami	6.7	1.2	7.9	1,869	**
Chicago	6.5	.8	7.3	2,621	**
Dallas	5.4	1.3	6.7	2,802	**
New Orleans	6.1	.4	6.5	3,787	**
Fargo-Moorhead	5.0	.9	5.9	2,460	**

(All Model Years)

*Significantly above 19 city average
**Significantly below 19 city average

Usage by Car Size (All Model Years)

Among all cars observed, drivers in subcompact cars and in compact cars are more likely to wear the safety belt than are drivers in cars in the heavier weight classes.

Table 7

(19 City, 1981-1982)

ALL MAKES
USAGE BY WHEELBASE

Wheelbase Inches		Both On	Lap Belt Only		N
⩽101	Subcompact	15.7	1.1	16.8%	(19,021)
>101⩽111	Compact	8.9	1.6	10.5%	(15,768)
>111⩽120	Intermediate	5.6	1.8	7.4%	(13,371)
>120	Full Size	2.8	2.6	5.4%	(6,244)

(All Model Years)

Usage by Car Size (1976-1983 Model Years)

The pattern of safety belt usage for new model cars is similar to that for all model year cars observed. Among late model cars (1976-1983), usage is highest for subcompact cars (18.5%), next highest for compact cars (10.8%), and lowest for intermediate (8.0%) and full-size (5.7%) cars.

Table 8

(19 City, 1981-1982)

ALL MAKES
USAGE BY WHEELBASE

Wheelbase Inches		Both On	Lap Belt Only		N
⩽101	Subcompact	17.7	.8	18.5%	(14,416)
>101⩽111	Compact	9.9	.9	10.8%	(11,943)
>111⩽120	Intermediate	7.1	.9	8.0%	(8,939)
>120	Full Size	4.8	.9	5.7%	(2,152)

(1976-1983 Model Years)

Usage by Car Size, Domestic Vs. Imports

Safety belt usage is considerably higher for import models than for domestic model cars. The usage rate for subcompact imports (22.1%) is almost twice the usage rate for domestic subcompacts (12.3%). In compact size cars, the usage rate for imports is about two and one half times the rate for domestic cars (24.5% vs. 9.8%).

Table 9

(19 City, 1981-1982)

DOMESTIC
USAGE BY WHEELBASE

Wheelbase Inches		Both On	Lap Belt Only		N
⩽101	Subcompact	11.7	.6	12.3%	(5,326)
>101⩽111	Compact	8.9	.9	9.8%	(11,134)
>111⩽120	Intermediate	7.1	.9	8.0%	(8,923)
>120	Full Size	4.8	.9	5.7%	(2,151)

(1976-1983 Model Years)

Table 10

(19 City, 1981-1982)

IMPORTS
USAGE BY WHEELBASE

Wheelbase Inches		Both On	Lap Belt Only		N
⩽101	Subcompact	21.3	.8	22.1%	(9,090)
>101⩽111	Compact	23.9	.6	24.5%	(809)

(1976-1983 Model Years)

Usage by Manufacturer (All Model Years)

Among all model years observed (1964-1983), manufacturers of foreign-made cars score higher in terms of their belt usage scores than do the four leading domestic manufacturers. Usage scores range from 28.2% for the VW Rabbit to 7.7% for Ford.

Table 11

(19 City, 1981-1982)

USAGE BY MANUFACTURER

	Both On	Lap Belt Only	Total	N
VW Rabbit (Regular)	27.5	.7	28.2	754
Miscellaneous Foreign	21.2	.8	22.0	4,676
Toyota	15.3	.9	16.2	3,617
Datsun	14.5	1.3	15.8	2,457
VW Other	12.3	1.2	13.5	1,581
Chrysler	8.1	2.6	10.7	4,934
GM	6.8	1.6	8.4	24,503
AMC	6.3	1.9	8.2	984
Ford	6.1	1.6	7.7	10,690

(All Model Years)

Note: Belt usage rates by specific car series or models will be found in the Appendix Section.

Usage by Manufacturer (1976-1983 Model Years)

The safety belt usage scores and rankings for 1976-1983 model cars are presented below.

Table 12

(19 City, 1981-1982)

USAGE BY MANUFACTURER

	Both On	Lap Belt Only	Total	N
VW Rabbit (Regular)	27.1	.7	27.8	687
Miscellaneous Foreign	22.2	.7	22.9	3,797
VW Other	20.6	.9	21.5	331
Toyota	16.7	.5	17.2	2,977
Datsun	14.9	1.0	15.9	1,913
Chrysler	10.8	.8	11.6	2,857
GM	8.5	.9	9.4	17,294
Ford	7.6	.8	8.4	6,853
AMC	8.1	.2	8.3	530

(1976-1983 Model Years)

Usage by Type of Road

In the 19 city study, drivers leaving freeway exits entering a city show a little higher safety belt use than do those observed at primary road intersections. No significant difference is evident, however, between people driving in the city and those driving in the suburbs.

Table 13

(19 City, 1981-1982)

USAGE BY ROAD TYPE

	Both On	Lap Belt Only		N
Primary Roads	9.5	1.7	11.2%	(36,195)
Freeway Exits	10.5	1.4	11.9%	(18,344)
City	9.9	1.6	11.5%	(40,971)
Suburb	9.6	1.5	11.1%	(13,517)

(All Model Years)

Usage by Weekday Vs. Weekend and by Weather Conditions

The observation data show somewhat higher use of safety belts by drivers on weekdays than on weekends (Table 14). In terms of weather conditions (Table 15) more drivers were observed to be wearing belts on dry roads than when the roads were wet or snow covered. Because of poor visibility, field personnel could not observe during heavy rain or snow conditions. Thus, the data may understate belt usage during inclement weather.

Table 14

(19 City, 1981-1982)

USAGE BY WEEKDAY VS. WEEKEND

	Both On	Lap Belt Only		N
Mon.-Fri.	10.0	1.7	11.7%	(42,246)
Sat.-Sun.	9.3	1.2	10.5%	(12,293)

(All Model Years)

Table 15

(19 City, 1981-1982)

USAGE BY WEATHER CONDITIONS

	Both On	Lap Belt Only		N
Rain	8.9	1.4	10.3%	(3,450)
Dry	9.9	1.6	11.5%	(50,016)
Snow, Ice	8.7	.7	9.4%	(1,073)

(All Model Years)

Usage by Season

The safety belt usage rates for drivers do not vary significantly from one season to the next. In each of the four seasons the usage rate is close to the average annual rate of 11.4%.

Table 16

(19 City, 1981-1982)

USAGE BY SEASON

	Both On	Lap Belt Only		N
Spring	10.1	1.5	11.6%	(14,613)
Summer	10.4	1.3	11.7%	(15,293)
Fall	9.6	1.6	11.2%	(10,352)
Winter	9.2	1.8	11.0%	(14,281)

(All Model Years)

SAFETY BELT USAGE AMONG DRIVERS

An Analysis of Key Variables Based on Multiple Regression Analysis, 19 Cities, 1981-1982

This presents a detailed analysis of the characteristics that affect individuals' usage of seat belts. The results are based on observations of drivers in 19 U.S. cities during the period November 1980 through October 1982.

BASIC QUESTION

The primary question we have addressed here is "What characteristics can explain the variation in people's use of seat belts?" We have identified the measure of seat belt usage as use of either the lap belt only or the combination belt.

In seeking to explain the impact of various characteristics on seat belt usage, multiple regression procedure was performed as a first step. A number of "predictor" characteristics were analyzed as to their impact on seat belt use, and results suggested that the impact of the following variables should be examined in greater detail:

- model year of car (1976-1983)
- make of car (domestic-foreign)
- size of car
- sex
- age
- region

To clarify the analysis of these key characteristics and their impact on seat belt usage, the variables were further examined with a "pairwise" cross-tabulation procedure. In this way, the joint effect of two variables on seat belt usage can be assessed simultaneously. Accordingly, the percentages in the following tables represent seat belt usage among the groups measured by the tables. For example, in Table 1, 9% of men, and 10% of women, who drive 1976 model cars use seat belts.

RESULTS

A. Model Year

Overall, there is a broad pattern of increased seat belt usage among individuals driving later-model cars; in particular, 1981-1983 models.

- To a roughly comparable degree among both sexes and among all age groups, those driving later-model cars are somewhat more likely to use seat belts than are those driving earlier-model cars (Tables 1 and 2).

- This same pattern holds for those driving domestic as well as foreign cars, and also holds equally for those from different regions of the country (Tables 3 and 4).

- Those persons driving later model sub-compact or compact cars are more likely to use seat belts than are those persons driving earlier model sub-compacts or compacts; among those driving intermediate or full-size cars, seat belt usage does not tend to vary by model year (Table 5).

Table 1

MODEL YEAR BY SEX

	1976	1977	1978	1979-1980	1981-1983
Male	9% (235)	10% (315)	12% (441)	13% (1081)	16% (625)
Female	10% (218)	11% (273)	14% (403)	14% (839)	16% (384)

Table 2

MODEL YEAR BY AGE

	1976	1977	1978	1979-1980	1981-1983
24 or under	10% (94)	10% (107)	12% (146)	12% (317)	16% (169)
25 - 49	9% (247)	10% (324)	13% (513)	14% (1216)	16% (655)
50 or over	11% (112)	12% (157)	13% (185)	14% (387)	15% (185)

(In this and the following tables, each percentage in the tables represents seat belt usage, and is based on the group defined by the intersection of the two variables.)

Table 3

MODEL YEAR BY MAKE OF CAR

	1976	1977	1978	1979-1980	1981-1983
Domestic	7% (247)	8% (336)	9% (467)	10% (986)	12% (540)
Foreign	20% (206)	21% (252)	23% (377)	22% (934)	24% (469)

Table 4

MODEL YEAR BY REGION

	1976	1977	1978	1979-1980	1981-1983
New England	7% (20)	10% (31)	11% (40)	12% (92)	14% (37)
Mid-Atlantic	7% (44)	9% (71)	13% (118)	11% (224)	15% (152)
Southeast	7% (72)	9% (120)	8% (140)	10% (372)	14% (243)
Southwest	5% (30)	7% (43)	8% (56)	11% (160)	15% (105)
North Central	9% (58)	10% (85)	10% (99)	12% (236)	15% (109)
West	16% (229)	15% (238)	18% (391)	19% (836)	20% (363)

Table 5

MODEL YEAR BY SIZE OF CAR

	1976	1977	1978	1979-1980	1981-1983
Subcompact	14% (226)	18% (270)	19% (424)	19% (1119)	20% (621)
Compact	8% (85)	9% (88)	10% (254)	11% (545)	13% (315)
Intermediate	8% (107)	8% (191)	9% (142)	8% (209)	9% (64)
Full size	5% (35)	8% (39)	6% (24)	5% (18)	6% (7)

B. Make of Car (Domestic vs. Foreign)

There is a clear pattern of more frequent seat belt usage among those persons driving foreign cars than among those persons driving domestic cars.

- To a comparable degree among both sexes, and among all age groups, those driving foreign cars are more likely to use seat belts than are those driving domestic cars (Tables 6 and 7).
- In all regions of the country, those driving foreign cars are markedly more likely than those driving domestic cars to use seat belts (Table 8).
- Those driving foreign subcompacts, compacts, or intermediate cars are more likely to use seat belts than are those driving domestic cars of equivalent sizes; however, too few foreign full-size cars were observed for comparison with full-size domestic cars (Table 9).

(For analysis of the joint effects of model year and make of car, see Section A.)

Table 6

MAKE OF CAR BY SEX

	Domestic	Foreign
Male	9% (1446)	22% (1251)
Female	10% (1130)	22% (987)

Table 7

MAKE OF CAR BY AGE

	Domestic	Foreign
24 or under	8% (362)	19% (471)
25 - 49	9% (1501)	23% (1454)
50 or over	11% (713)	25% (313)

Table 8

MAKE OF CAR BY REGION

	Domestic	Foreign
New England	8% (102)	19% (118)
Mid-Atlantic	9% (393)	20% (216)
Southeast	8% (575)	17% (372)
Southwest	7% (241)	24% (153)
North Central	9% (399)	23% (188)
West	13% (866)	25% (1191)

Table 9

MAKE OF CAR BY SIZE

	Domestic	Foreign
Subcompact	12% (654)	22% (2006)
Compact	10% (1089)	25% (198)
Intermediate	8% (710)	19% (3)
Full Size	6% (123)	-- (0)

C. Size of Car

As might be expected, there is a clear pattern of more frequent seat belt usage among those driving smaller cars, particularly subcompacts, than among those driving larger cars.

- To a comparable degree among both sexes, those persons driving smaller cars are more likely to use seat belts than are those persons driving larger cars (Table 10).
- Although belt usage is heavier for all age groups among those driving smaller cars (especially subcompacts), those small car drivers 24 years of age or under are somewhat less likely than are older small car drivers to use seat belts (Table 11).
- In all regions, belt usage is higher among those in subcompact cars; also, belt use is somewhat higher among those in compact cars in the Southwest, the North Central, and the West (Table 12).

(For analysis of joint effects of size of car and model year, and size of car and make of car, see Sections A and B.)

Table 10

SIZE OF CAR BY SEX

	Sub-compact	Compact	Inter-mediate	Full Size
Male	19% (1482)	11% (731)	7% (391)	6% (76)
Female	18% (1178)	11% (556)	9% (322)	6% (47)

Table 11

SIZE OF CAR BY AGE

	Sub-compact	Compact	Inter-mediate	Full Size
24 or under	16% (606)	8% (157)	6% (61)	4% (7)
25 - 49	19% (1676)	11% (799)	7% (401)	4% (52)
50 or over	21% (378)	12% (331)	10% (251)	8% (64)

Table 12

SIZE OF CAR BY REGION

	Sub-compact	Compact	Inter-mediate	Full Size
New England	18% (158)	6% (36)	6% (24)	1% (1)
Mid-Atlantic	18% (330)	8% (144)	8% (111)	6% (20)
Southeast	15% (468)	8% (263)	7% (183)	5% (27)
Southwest	16% (167)	9% (122)	7% (86)	5% (17)
North Central	17% (279)	11% (178)	7% (110)	6% (20)
West	22% (1258)	16% (544)	12% (199)	10% (38)

D. Sex

There is essentially no variation in seat belt usage by sex when region or age are examined (Tables 13 and 14).

(For analysis of joint effects of sex and model year, sex and make of car, sex and size of car, see Sections A, B, and C.)

Table 13
SEX BY REGION

	Male	Female
New England	12% (133)	11% (87)
Mid-Atlantic	11% (356)	12% (253)
Southeast	10% (496)	11% (451)
Southwest	10% (232)	9% (162)
North Central	11% (344)	13% (243)
West	17% (1136)	19% (921)

Table 14
SEX BY AGE

	Male	Female
24 or under	11% (390)	13% (443)
25 - 49	13% (1689)	13% (1266)
50 or over	13% (618)	14% (408)

E. Region

There is no clear pattern of seat belt usage, by age groups, in different regions of the country (Table 15).

- In New England and the Mid-Atlantic, those 50 years of age or over are more frequent users of seat belts than are younger persons.
- In the Southeast, North Central, and the West, seat belt usage is more or less comparable among all age groups.
- In the Southwest, those 24 years of age or under appear to be less likely to use seat belts than are older persons.

(For analysis of the joint effects of region and model year, region and make of car, region and size of car, and region and sex, see Section A, B, C, and D.)

Table 15

AGE BY REGION

	24 or Under	25-49	50 or Over
New England	9% (46)	10% (108)	19% (66)
Mid-Atlantic	12% (138)	10% (334)	16% (137)
Southeast	11% (282)	9% (540)	10% (125)
Southwest	5% (24)	10% (290)	10% (80)
North Central	11% (84)	13% (388)	9% (115)
West	16% (259)	19% (1295)	16% (503)

Conclusions

Of the variables examined in this analysis, model year of car, make of car, size of car, and region all seem to be related to seat belt usage in some degree. Sex and age alone seem to exert little impact on belt use.

II

Use of Safety Belt by Drivers in Ten National Accident Sampling System Areas

Safety Belt Usage by Drivers

in Ten NASS Areas

1981, 1982

Introduction

The main objective of this study was to assess the current use of safety belts for all drivers of private passenger cars in the first ten "National Accident Sampling System" areas. The areas selected are:

- Erie, Pennsylvania
- Chicago, Illinois
- Ft. Lauderdale/Hollywood, Florida
- Delaware County, Pennsylvania
- Muskegon County, Michigan
- Skagit/San Juan/Island Counties, Washington State
- Shelby/St. Clair Counties, Alabama
- Ulster County, New York
- Dallas County, excl. Dallas City, Texas
- Drew/Lincoln/Desha/Chicoti/Ashley Counties, Arkansas

Methodology

This observation study of drivers used basically the same sampling design as the one used for the 19 city study. Probability sampling within each of the ten NASS cities or counties was undertaken in order to select traffic sites that would provide representative and cost-effective data. As for the 19 city study, the aim of the sample design for the NASS study was to allow for the estimation of the proportion of drivers of private passenger cars on the road who were wearing their safety belts. For each NASS area to be studied, detailed road maps were obtained. Each map was subdivided into a system of square grid areas. Traffic sites within grids were then selected in a random fashion in order to provide a good geographic spread across the area. The actual traffic sites to be used were selected by the ORC Sampling Department and sent to each of the four field observers. Over a 24-month period, each of the ten areas was visited on an every-other-month basis. In each area, observations were conducted at approximately 48 different traffic sites spread across the city or county during the period of study.

Safety belt usage was monitored by observing drivers of passenger cars as they stopped for a red light or stop sign at the selected traffic sites in each of the ten NASS areas. Only passenger vehicles of 1964 and later models were observed. A total of 23,142 verified observations form the basis of this study.

The same traffic sites selected for the observation of drivers in each of the ten NASS areas were also used for the observation of the use of child safety seats by children 4 years or under, and the use of safety belts by older passengers in these areas. Findings from the passenger study are reported in Chapter III, page 59.

The ORC observation data on the use of child safety seats and the car safety belts in the above NASS areas provides data for people not involved in car accidents at the time of the study. This data can be compared with NHTSA data for people in the same ten areas who were involved in car crashes.

Summary

Safety belt usage by drivers of private passenger cars in the first ten NASS areas averaged 7.6% during the period November 1980 through October 1982. By comparison, belt usage by drivers in 19 U.S. cities averaged 11.4% during the same period.

In the ten NASS areas belt usage among drivers ranged from a high of 11.9% in the Washington State counties of Skagit, San Juan and Island down to a usage rate of 1.9% in the Arkansas Counties of Drew, Lincoln, Desha, Chicot and Ashley.

Belt usage rates are not significantly different between male and female drivers in the NASS areas covered (7.5% for male drivers and 7.8% for female drivers). Usage was significantly higher for drivers 25-49 years of age (7.9%) than for those under 25 years (6.3%). The usage rates between those 25-49 years of age and those 50 years or over were not significantly different (7.9% vs. 8.4%).

Restraint System Usage, NASS Areas Vs. 19 Cities

Restraint system usage scores for five age groups of passengers in the 19 cities study and for those in ten NASS areas study are shown in the table below. With the exception of infants, the usage scores for the groupings of older passengers in the NASS study are below the scores obtained in the 19 city study. Also, among drivers the NASS usage rate of 7.6% is significantly below the usage rate obtained for drivers in the 19 city study.

Table 1

Observed Use of Restraint System

by Car Occupant

19 City Study Vs. NASS Area Study

	19 City		NASS	
	N	Percent	N	Percent
Infants	2,405	40.4	853	39.3
Toddlers	12,290	22.2	5,939	17.4
Sub-Teens	12,035	4.7	6,893	3.2
Teens	14,426	3.1	6,092	2.0
Adults	65,209	7.4	27,994	5.0
Drivers	54,539	11.4	23,142	7.6

Detailed findings on the use of restraint systems by NASS area passengers are presented in chapter IV, page 59 of this report.

Usage by Area

In the ten NASS areas surveyed, safety belt usage among drivers is highest in Washington State counties of Skagit, San Juan and Island (11.9%) and lowest in the Arkansas counties of Drew, Lincoln, Desha, Chicot, and Ashley. As shown in the table below, three NASS areas have usage rates significantly above the average usage rate for the ten areas, and two have usage rates significantly below the area average.

Table 2

NASS Area Drivers

Safety Belt Usage by Area

1981-1982

	% Lap and Shoulder	% Lap Belt Only	% Total	N
Skagit/San Juan/Island, WA	10.1	1.8	11.9	2,251*
Delaware Co., PA	9.6	1.0	10.6	1,536*
Ft. Lauderdale/Hollywood FL	8.4	1.0	9.4	2,993*
Muskegon, MI	6.6	1.4	8.0	2,924
Ulster Co., NY	7.2	.6	7.8	1,215
NASS Area Average	6.6	1.0	7.6	23,142
Chicago	6.5	.8	7.3	2,621
Shelby/St. Clair, AL	6.5	.7	7.2	1,580
Dallas County, Excl. Dallas City	5.6	1.5	7.1	808
Erie, PA	5.0	.8	5.8	2,599**
Drew/Lincoln/Desha/Chicot/ Ashley Counties, AR	1.6	.3	1.9	1,830**

*Significantly above 10 area average
**Significantly below 10 area average

Usage by Sex and Age of Driver

Safety belt usage by male vs. female drivers in the NASS study is not significantly different (7.5% vs. 7.8%).

Among three age groups, observed usage is highest for drivers 50 years of age or over and lowest for drivers in the 24-years-or-under age group.

Table 3

NASS Areas

Usage by Sex and Age of Driver

1981-1982

	% Lap and Shoulder	% Lap Belt Only	% Total	N
Men	6.7	.8	7.5	13,176
Women	6.5	1.3	7.8	9,966
24 or under	5.6	.7	6.3	4,826
25 - 49	7.0	.9	7.9	13,022
50 or over	6.9	1.5	8.4	5,272

NASS Areas -- Accident Data Vs. Observation Data

NHTSA data on the use of safety belts by drivers involved in car accidents in each of the ten NASS areas are shown in the table below. Also shown, for comparison, are the safety belt usage rates for drivers in each area from the observation study for the period November 1980 through October 1982.

Table 4

NASS Sites - 1981-1982

ACCIDENT VS. OBSERVATIONS

	Accident Data			Observations		
	Both On	Lap Only	Total	Both On	Lap Only	Total
Skagit/San Juan, WA	20.7	10.9	31.6	10.1	1.8	11.9
Ulster Co., NY	14.4	5.3	19.7	7.2	.6	7.8
Chicago	10.4	5.8	16.2	6.5	.8	7.3
Delaware Co., PA	13.2	3.0	16.2	9.6	1.0	10.6
Muskegon, MI	8.5	5.0	13.5	6.6	1.4	8.0
Erie, PA	11.2	2.1	13.3	5.0	.8	5.8
Ft. Lauderdale/Hollywood, FL	8.1	1.9	10.0	8.4	1.0	9.4
Shelby/St. Clair, AL	8.2	1.2	9.4	6.5	.7	7.2
Dallas Co.	6.9	1.3	8.0	5.6	1.5	7.1
Arkansas	3.5	.6	4.1	1.6	.3	1.9
AREA AVERAGE	10.0	4.4	14.4	6.6	1.0	7.6

III

Use of Child Safety Seats, Passenger Safety Belts, and Position of Passengers in Cars 19 City Study

SUMMARY

Child Restraint and Seat Position Study

Among 54,539 cars observed in the Driver Study during November 1980 - October 1982, less than one percent had an infant passenger. The percentage of cars with passengers in four other age categories were: toddlers (3.2%); sub-teens (4.4%); teens (3.9%); and adults (26.1%).

The Passenger Study, based on 106,365 observations, shows that seat locations of passengers vary by age. Majorities of adults (83.6%), teens (60.2%), and infants (55.9%) were observed to be front seat occupants, while majorities of sub-teens (65.1%), and toddlers (59.8%) were observed to be rear seat occupants.

Use of approved child safety seats was observed for infants and toddlers. Safety belt usage was also measured for toddlers, and for sub-teen, teen, and adult passengers. The usage results:

	Restrained by:	
	Child Seat	Car Safety Belt
Infants	40.4%	--
Toddlers	19.4%	2.8%
Sub-Teens		4.7%
Teens		3.1%
Adults		7.4%

Seat position and posture were observed for passengers in each of the five age groups to determine, for those not restrained, the proportions who were seated and those who were not properly seated. The results:

		Not Restrained	
	N	Sitting on Seat 1/	Not Sitting on Seat 2/
Infants	232	3.8%	96.2% 3/
Toddlers	2,146	39.3%	60.7% 3/
Sub-Teens	4,250	80.8%	19.2%
Teens	4,833	99.2%	.8%
Adults	22,083	99.9%	.1%

1/ Passenger sitting on seat.

2/ Passenger who were either standing, kneeling, or lying on the seat or floor. Also included are those sitting on the floor of the car.

3/ Includes 87.1% of infants held on lap.
Includes 17.8% of toddlers held on lap.

Usage of child safety seats varies widely by city. Minneapolis-St. Paul and Atlanta scored above average in the percent of infants and toddlers restrained. Baltimore, Pittsburgh, New York and Chicago had above average scores for toddlers but not infants. Cities with usage scores below average for infants and toddlers were: Dallas, Miami, Phoenix, and Los Angeles.

Mandatory state laws requiring the use of restraint devices for small children are highly effective. In before and after observation studies conducted in four states which now have such a law, use of child safety seats increased by one-third.

INTRODUCTION AND METHODOLOGY

Introduction

The main objectives of this study were to assess the current use of approved child safety seats for infants (up to 1 year) and for toddlers (1 to 4 years) in private passenger cars. In addition, the study was designed to ascertain the use or non-use of safety belts by all passengers and to observe the seat positions and specific posture of all unrestrained passengers.

Methodology

The observation study of the use or nonuse of approved child safety seats for infants and toddlers and the use of safety belts by sub-teen and older passengers was conducted in the same 19 U.S. cities as the restraint usage study among drivers was conducted. In each city visited every other month, field personnel were required to observe over a period of five days a total of 15 hours on the passenger study and 10 hours on the driver study.

During the period November 1980, through January 1982, the observation of passengers was conducted at traffic intersections and utilized the same sampling plan as used for the driver study. (A description of the sample design is described on page v.) A different data collection procedure designed to increase the number of infants and small children was initiated in February 1982, and continued to be used thru October 1982. In the traffic population survey, passengers were being observed in cars at primary road sites but the frequency of small children in cars was very low when compared to older passengers. Since there is a great deal of interest in assessing use of child restraint devices by small children and infants, it was necessary to increase the sample size to provide more statistically reliable data.

Under the new sampling plan which was used from February 1982, through October 1982, observations of passengers were conducted at exits to major shopping centers in each of the 19 cities. Driver usage and child restraint usage rates observed at the shopping centers were compared to the usage rates obtained previously at primary road intersections to be sure that the data gathered by both methods are comparable. The average rate of usage for drivers was 11.8 percent in malls as compared to 11.7 percent observed at traffic sites. Also, as evident in the following table, the usage rates for each of the five age groups of passengers observed at mall exits are almost identical to the usage rates obtained at traffic sites. The data compare four months of observations at traffic sites compared to the next four months of observations at malls. The "ratio" column shows that for each infant observed at a traffic site, 2.8 were observed at a mall exit over the same length of time, etc.

Passenger Observations

MALLS VS. TRAFFIC SITES

2/82-10/82 VS. 11/80-1/82

Percent Restrained

	MALLS	TRAFFIC SITES	Ratio
Infants	37.8	36.2	2.8 - 1
Toddlers	18.6	19.0	2.6 - 1
Sub-Teens	5.1	4.0	1.6 - 1
Teens	3.5	2.7	1.4 - 1
Adults	7.0	6.0	1.5 - 1

Based on these findings, it was concluded that: (1) restraint usage observed at shopping centers is comparable to restraint usage observed at traffic intersections; and (2) obtaining data on child restraint usage is much more efficiently undertaken at shopping centers.

The shopping malls used for this study were selected accordingly:

1. ORC contacted their subcontractors in each of the 19 cities and requested the names and locations of the major shopping malls in that city area. For most cities, about 6-7 malls were identified.

2. Observers were then requested to review these identified malls and select three, if possible, where there was a sufficient traffic volume, a "good" vantage place to observe restraint usage, safety for the observer and no apparent problem with mall officials to collect data. In a few cities such as Fargo and Birmingham, there were not three large shopping malls, so in these cities only 1 or 2 malls were utilized.

Field personnel were provided with pictures of the various types of approved child safety seats currently on the market. In addition to studying what the various types of approved seats looked like, they also visited retail outlets and automobile dealers to physically inspect the seats.

Usage data for infants and toddlers are labeled as either "Appears Correct" or "Obviously Incorrect." The term "Appears Correct" is used since it was not always possible to determine if the seat was secured by a tether strap although the child and seat appeared to be properly secure. A detailed description of how usage data were classified will be found in the Appendix Section.

DETAILED FINDINGS

The primary body of data reported in this section is based on the following number of passenger observations:

Infants (Under 1 year)	2,405
Toddlers (1 to 4 years)	12,290
Sub-Teens (5 to 12 years)	12,035
Teens (13 to 19 years)	14,426
Adults (20 years and over)	65,209

The data that follows are analyzed separately for each of the above age groups.

Percentage of Cars with Passengers by Age Groups

Among 54,539 cars observed during November 1980 through October 1982, in 19 metropolitan areas, less than one percent had an infant passenger. The percentage of cars with passengers in four other age categories were: small children (3.2%); sub-teens (4.4%); teens (3.9%); and adults (26.1%).

Percent of Cars with Passengers in Five Age Groups

	Total
Total Cars	54,539
Infants (Under 1 year)	.4%
Toddlers (1-4)	3.2%
Sub-Teens (5-12)	4.4%
Teens (13-19)	3.9%
Adults (20 and over)	26.1%

Number of Passengers Per Car

The table below shows, for the 54,539 cars observed, what percent of the cars had 1 passenger, 2 passengers, etc.

	Total
Total Cars	54,539
Number of Passengers:	
One	25.2%
Two	5.6%
Three	2.2%
Four or more	.8%
No passengers	66.2%

Note: The data above comes from the Safety Belt Usage Study Among Drivers, during the period November 1980 through October 1982, and is based on the observation of every second car stopped for a traffic light. Thus, it is a representative sample of the incidence of passengers in cars by the five age categories. Base = 54,539 cars.

The findings that follow are derived from a purposive sample of passengers rather than a random sample, since field personnel were instructed to give priority to cars that included infants and toddlers. Base = 106,365 passengers.

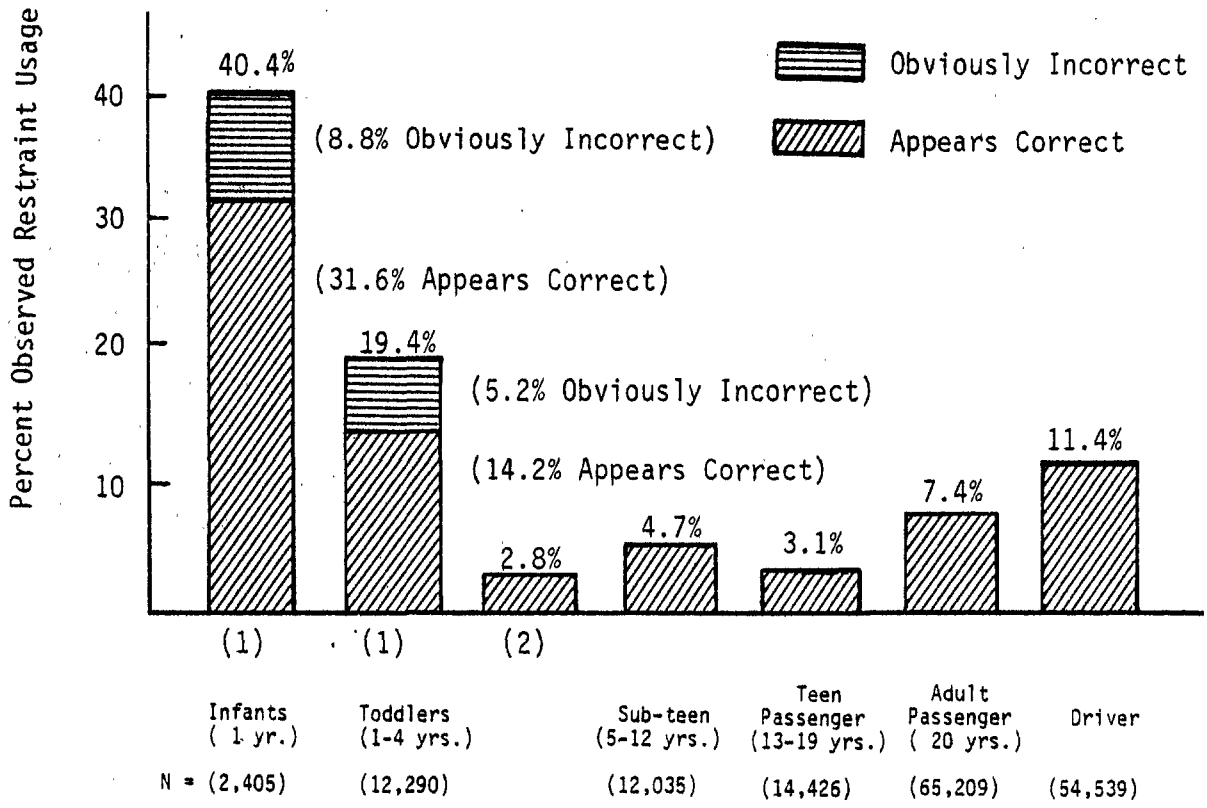
Observed Use of Restraint Systems for Five Age Groups

Use of restraint systems by passengers in five age groups is summarized in the table below. For infants and toddlers the proportions observed to be in an approved child seat are 40.4% and 19.4%, respectively. Also shown is the percent of each of these two age groups who were observed to be either correctly or incorrectly restrained. The percentages of other passengers using the car safety belt are as follows: toddlers (2.8%); sub-teens (4.7%); teens (3.1%); and adults (7.4%).

Table 1

OBSERVED USE OF RESTRAINT SYSTEM BY CAR OCCUPANT

(19 City, 1981-1982)



(1) Child Restraint Device
(2) Safety Belt

Seat Locations of Infants (Under 1 year)

In the study conducted during the period November, 1980 - October, 1982, a majority of infants (55.9%) were observed to be front seat occupants, with about four-fifths of the infants (45.4%) located on the front outboard seat. The proportions observed in other seat locations are also shown in the figure below. Among 2,405 infants observed, .9% or about 22 in number were observed to be sitting on the driver's lap.

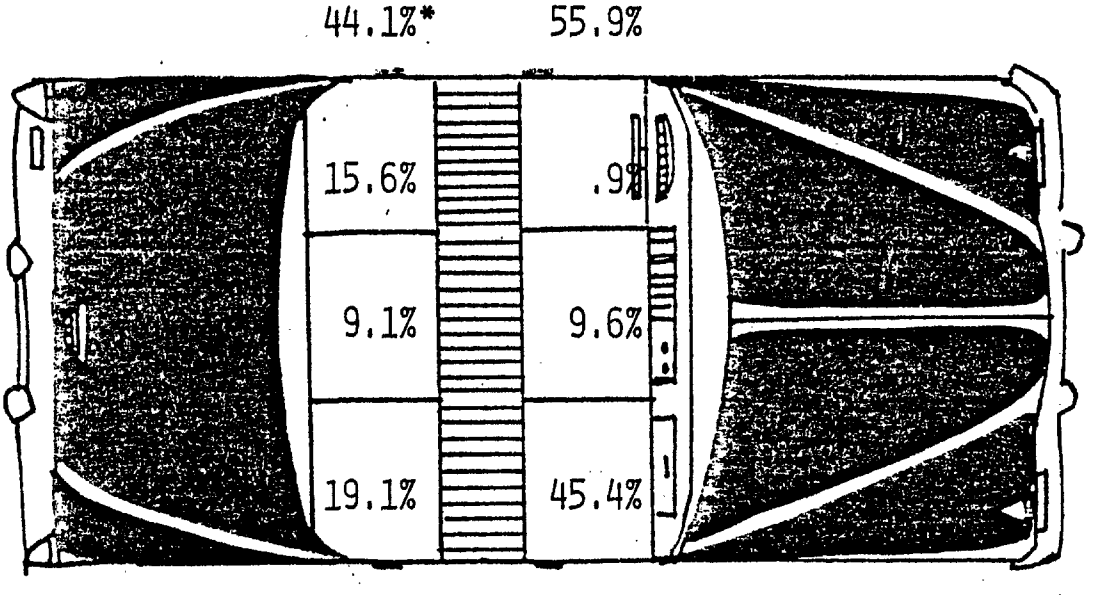
Table 2

Infant Passengers (Under 1 year)

Seat Locations of Infants in Cars

(19 City, 1981-1982)

	N
TOTAL INFANTS	(2,405)



*The percent of infants in the back of the car (44.1%) includes .3% or 7 in number who were observed to be riding behind the back seat of a station wagon or a hatchback.

Percentage of Infants Restrained by Seat Position

Two infants in five (40.4%) were observed to be in an approved child safety seat -- 31.6% were observed to be secured by the seat's harness or shield and with the seat secured by the car safety belt. Another 8.8% were in the safety seat, but the infant and/or the seat was not properly secured. Among all infants, 14.5% were in a child safety seat on the front seat of the car and 25.9% in a safety seat on the back seat. Since front seat passengers are more likely than those on the back seat to hold infants on their laps, there are more unrestrained infants in the front than in the back of the car.

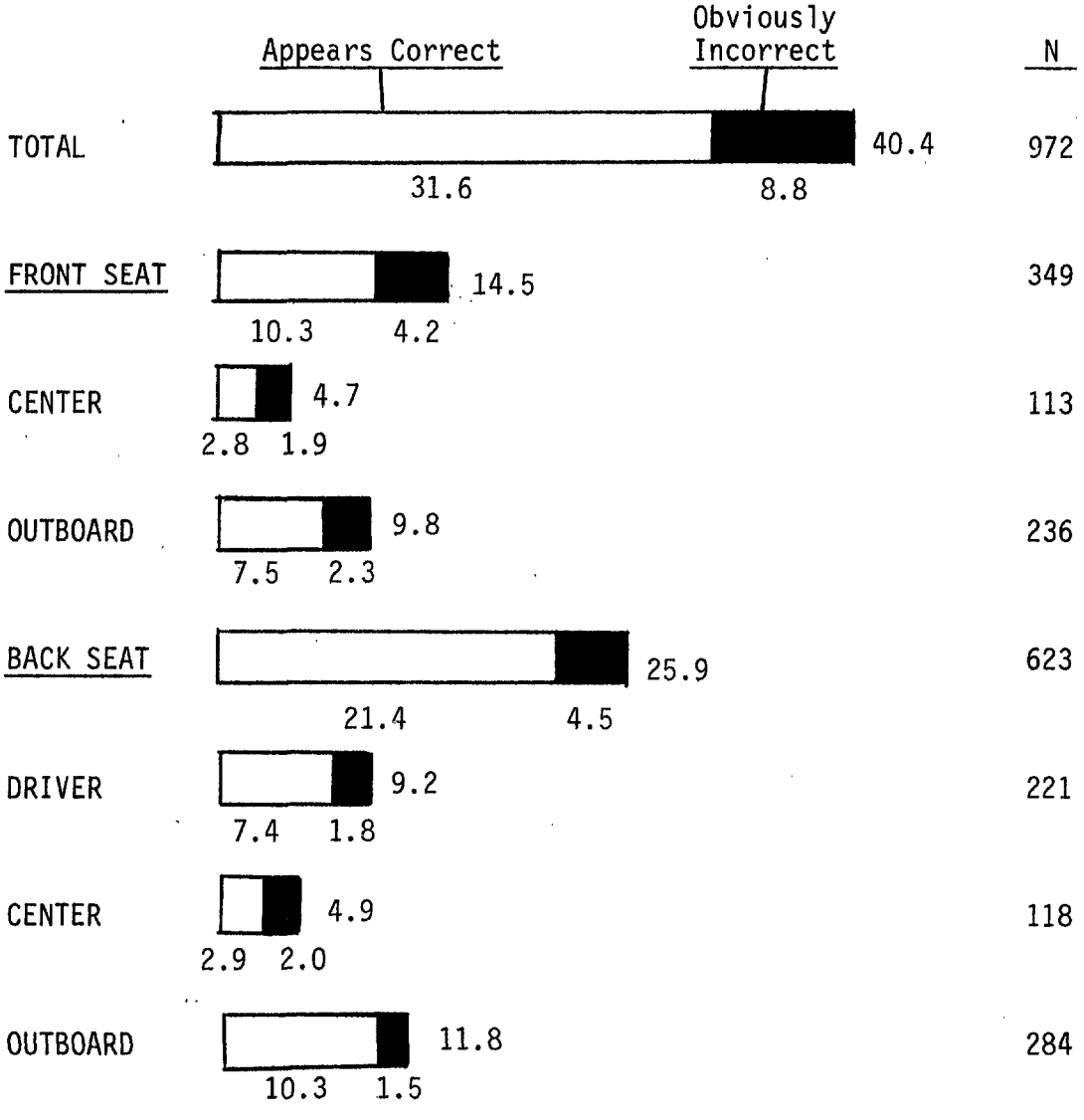
Table 3

Infants (Under 1 year)

Percent in Child Safety Seat

(19 City, 1981-1982)

Total Infants = 2,405



Percentage of Infants in Child Safety Seat by City

Table 4 shows, for each of the 19 cities surveyed, the percent of infants who were observed to be in an approved safety seat. Also shown is the percent identified as being properly restrained (Appears Correct column) and the percent identified as not properly restrained either because the infant was not harnessed properly or the seat was not secured by the car safety belt. Comparisons between cities are not appropriate because of the small number of infants observed in each city.

Table 4

Infants (Under 1 year)
Percent in Child Safety Seat
(19 City, 1981-1982)

	Child Safety Seat			
	Appears Correct	Obviously Incorrect	Total	N
Minneapolis/St. Paul	45.9	19.5	65.4	133
Atlanta	47.4	14.5	61.9	76
Providence	39.0	12.2	51.2	82
Chicago	38.9	11.5	50.4	113
Pittsburgh	41.3	8.0	49.3	75
New York	42.5	5.7	48.2	106
Fargo-Moorhead	21.8	25.0	46.8	124
Boston	41.0	4.8	45.8	83
Seattle	36.8	7.0	43.8	171
19 City Average	31.6	8.8	40.4	2,405
New Orleans	26.0	14.3	40.3	77
Baltimore	37.5	1.6	39.1	128
Birmingham	32.4	5.4	37.8	74
San Diego	33.2	4.5	37.7	220
San Francisco	30.3	6.3	36.6	208
Houston	19.9	13.3	33.2	166
Dallas	20.0	10.5	30.5	105
Miami	19.5	9.8	29.3	41
Phoenix	23.3	4.4	27.7	206
Los Angeles	22.6	2.8	25.4	217

Percent of Infants Unrestrained or Improperly Restrained

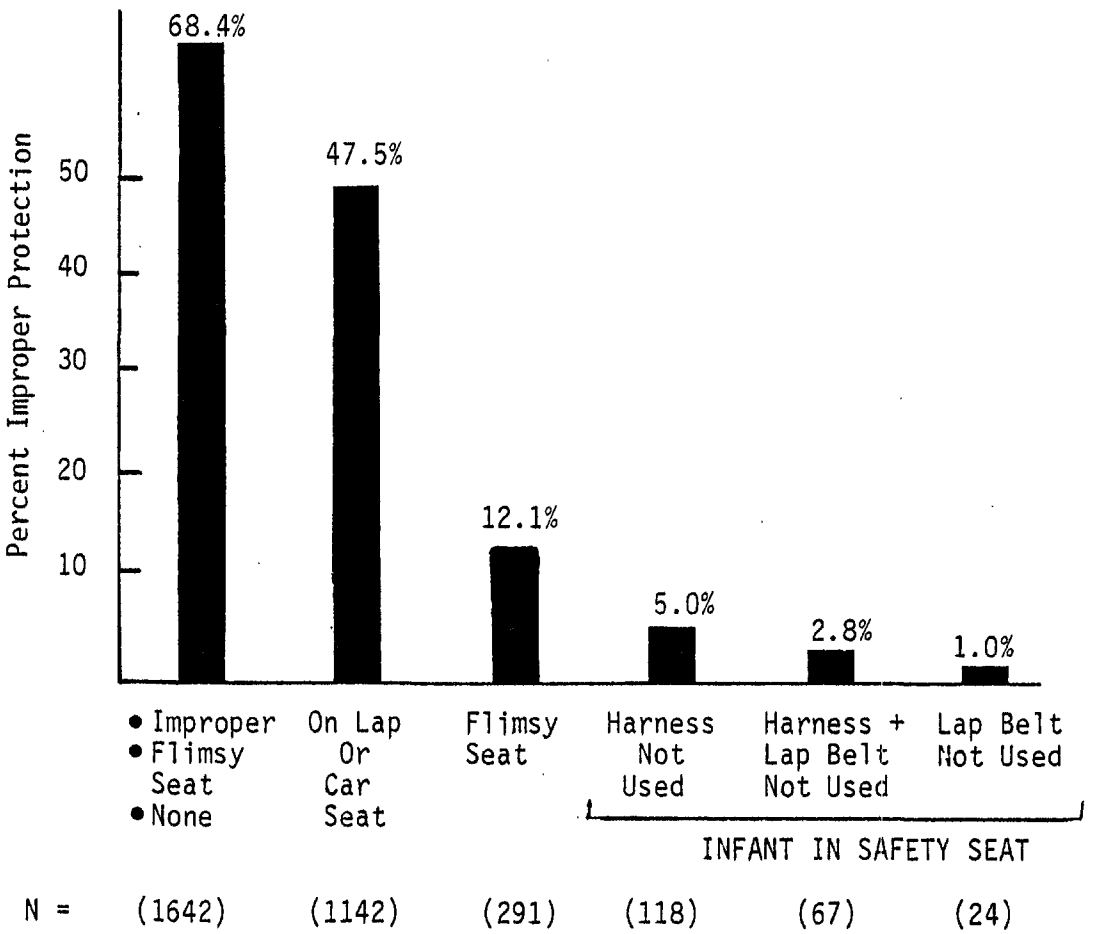
As shown in the table below, more than two-thirds (68.4%) of all infants observed in the 19 cities were classified as either unrestrained or improperly restrained. Among this group, 47.5% were on a passenger's lap or the car seat, 12.1% were in an unapproved or so-called "flimsy seat," and 8.8% were in an approved safety seat, but either the infant or the seat was not properly secured.

Table 5

Infants (Under 1 Year)

Frequency and Type of Improper or No Protection in Cars

(19 City, 1981-1982)



Unrestrained Infants, Posture by Seat Position in Cars

Among all unrestrained infants, 87.1% were held on a passenger's lap. Among the passengers holding infants (79%) were observed to be on the front seat of the car and 8.1% were on the back seat. Most infants, not on someone's lap, were observed to be either lying or sitting on the car seat.

Table 6

Unrestrained Infants (Under 1 year)

Posture by Seated Position

19 City Study

November 1980 - June 1981

	N	Total	N	Front	N	Back
Total Unrestrained	232	100.0%	208	89.7%	24	10.3%
On Lap	202	87.1	183	79.0	19	8.1
On Seat	26	11.2	23	9.9	3	1.3
Sitting, back supported	8	3.4	5	2.1	3	1.3
Sitting, not supported	1	.4	1	.4	0	0
Standing	2	.9	2	.9	0	0
Kneeling	0	0	0	0	0	0
Lying	15	6.5	15	6.5	0	0
On Floor	4	1.7	2	.8	2	.9
Standing	1	.4	0	0	1	.4
Sitting	1	.4	1	.4	0	0
Kneeling	1	.4	0	0	1	.4
Lying	1	.5	1	.4	0	0

Note: The data above are based on observations obtained during the period November, 1980 - June, 1981. Posture and seat position data were discontinued after June 1981.

Seat Locations of Toddlers (1-4 years)

Among children in this age group, 59.8% were observed to be back seat occupants and 40.2% to be front seat occupants. The seat locations for toddlers are fairly well dispersed.

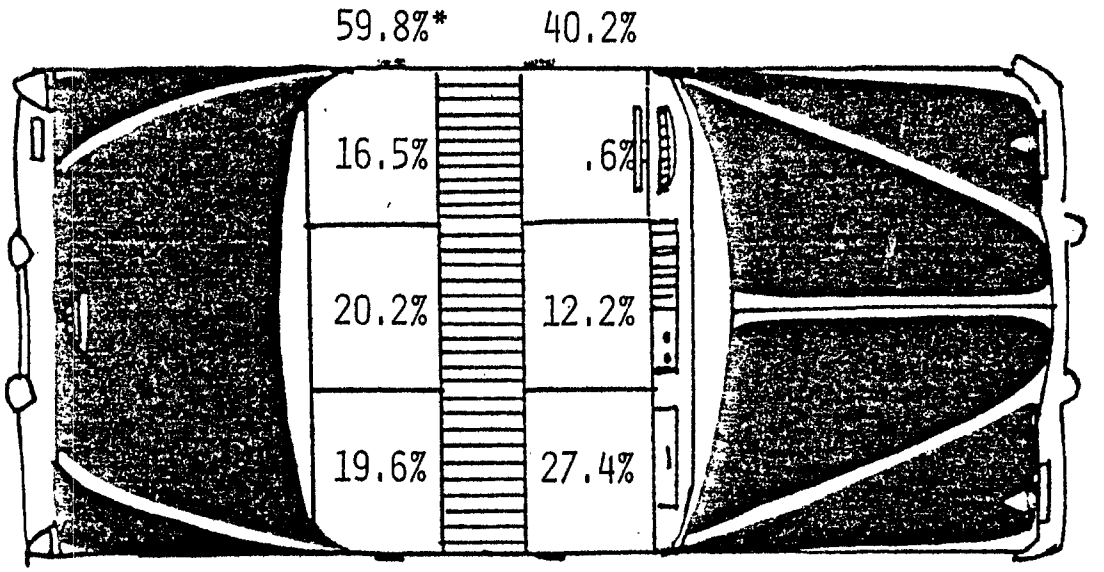
Table 7

Toddlers (1-4 years)

Seat Locations of Toddlers in Cars

(19 City, 1981-1982)

	N
TOTAL TODDLERS	(12,290)



*The percent of toddlers in the rear of the car (59.8%) includes 3.5% or 430 in number who were located behind the rear seat of a station wagon or a hatchback.

Percentage of Toddlers Restrained by Child Safety Seat or Car Safety Belt

Among toddlers one to four years of age, 19.4% were in an approved child safety seat (14.2% in a seat secured by the car safety belt and properly harnessed within the seat). Another 2.8% were restrained only by the car safety belt. About three times as many restrained toddlers were on the back seat as were observed to be on the front seat -- the most frequently used location being the rear outboard seat.

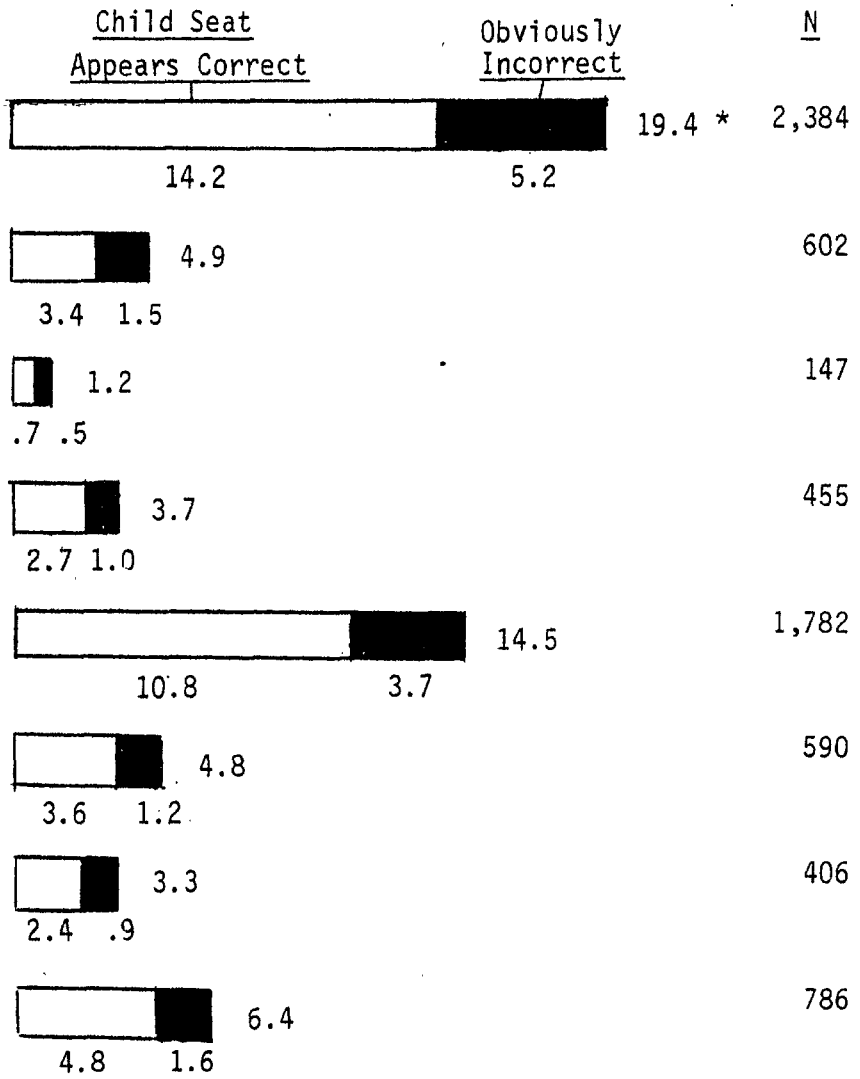
Table 8

Toddlers (1-4 years)

Percent Restrained by Child Safety Seat

(19 City, 1981-1982)

Total = 12,290



*In addition to the 19.4% observed to be in an approved child safety seat, 2.8% were not in a child seat, but were restrained by the car safety belt.

Percentage of Toddlers in Child Safety Seat or Restrained by Car Safety Belt

The percent of toddlers observed to be in a child safety seat or, if not in a safety seat, to be restrained by the car safety belt range from a high of 41.7% in Minneapolis/St. Paul to a low of 12.9% in Dallas. In terms of percent restrained, six cities are above the 19 city average and seven are below the average.

Table 9

Toddlers (1-4 years)

Percent in Child Safety Seat or Restrained by Car Safety Belt

(19 City, 1981-1982)

	Child Safety Seat			Adult Safety Belt Only	Total	N
	Appears Correct	Obviously Incorrect	Total			
Minneapolis/St. Paul	23.5	11.8	35.3	6.4	41.7	876*
Baltimore	33.5	2.3	35.8	.9	36.7	215*
Pittsburgh	22.2	5.7	27.9	3.7	31.6	616*
New York	29.0	1.4	30.4	.5	30.9	221*
Atlanta	23.2	4.2	27.4	3.1	30.5	667*
Providence	27.2	1.2	28.4	0	28.4	169
Chicago	14.9	6.9	21.8	4.0	25.8	778*
Boston	23.0	2.5	25.5	0	25.5	161
Birmingham	15.1	4.5	19.6	2.9	22.5	716
19 City Average	14.2	5.2	19.4	2.8	22.2	12,290
Seattle	13.0	5.0	18.0	4.1	22.1	585
Fargo-Moorhead	9.8	8.9	18.7	2.9	21.6	799
New Orleans	15.3	3.6	18.9	1.4	20.3	740
Houston	8.6	7.0	15.6	3.2	18.8	973**
Miami	13.2	2.8	16.0	1.3	17.3	687**
San Diego	10.8	4.1	14.9	2.4	17.3	781**
San Francisco	9.6	4.6	14.2	1.5	15.7	779**
Los Angeles	9.9	2.4	12.3	3.1	15.4	899**
Phoenix	7.8	3.0	10.8	2.9	13.7	730**
Dallas	6.6	5.0	11.6	1.3	12.9	898**

*Usage rate significantly above the 19 city average
**Usage rate significantly below the 19 city average

Percentage of Toddlers Unrestrained or Improperly Restrained

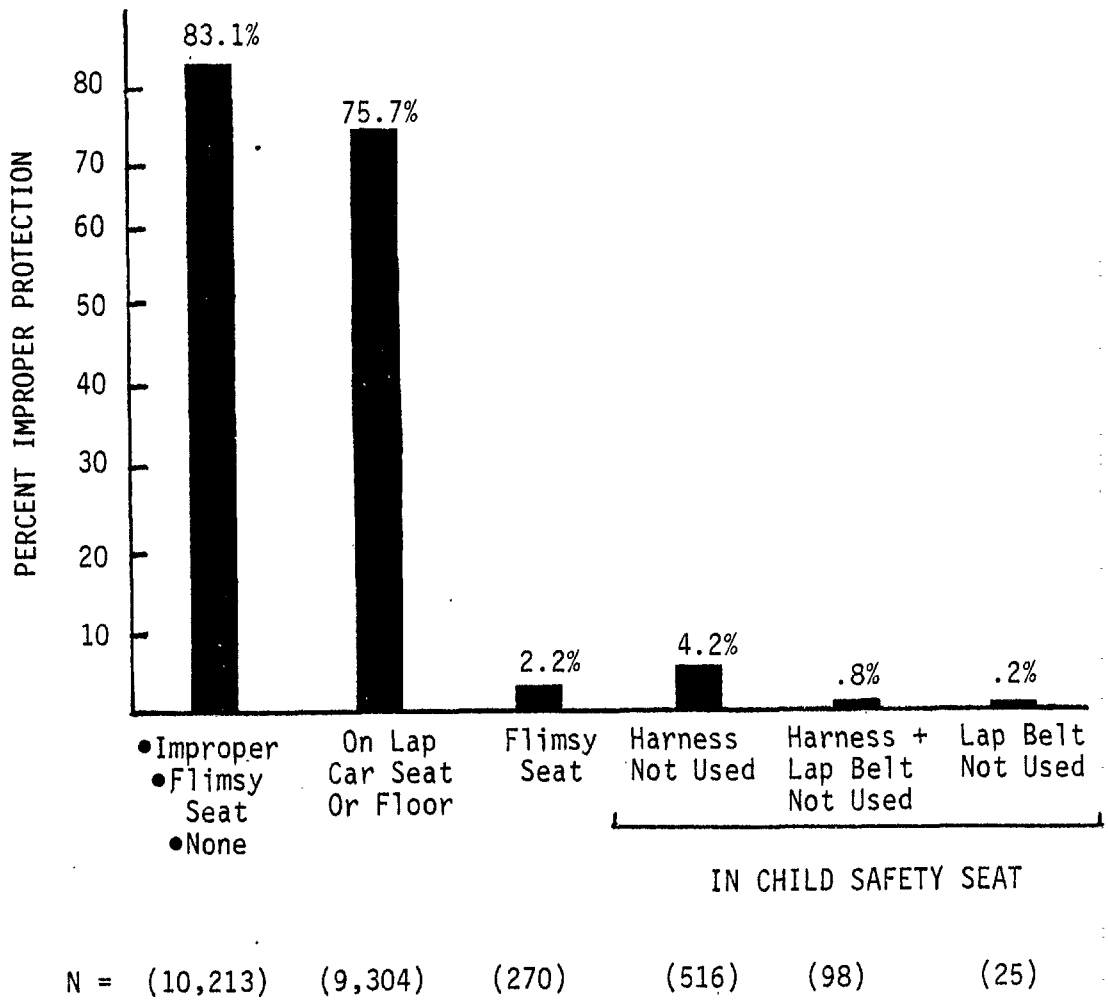
More than eight out of ten toddlers (83.1%) observed were classified as either unrestrained or improperly restrained. Among this group, (75.7%) were either on a passenger's lap, on the seat, or on the floor of the car, 2.2% were in an unapproved or flimsy child seat, and 5.2% were in an approved child seat, but either the toddler was not harnessed properly or the seat was not secured by the car safety belt.

Table 10

Toddlers (1-4 Years)

Frequency and Type of Improper or No Protection in Cars

(19 City, 1981-1982)



Unrestrained Toddlers, Posture by Seat Position in Cars

Among all passengers, the unrestrained toddler is probably the most vulnerable to injury while riding in a car. Among unrestrained children in this age group, only 21.2% were observed to be sitting properly on the car seat; i.e., sitting with back supported. Most of these children were either not seated properly, or standing, kneeling, lying on the seat or floor or sitting on someone's lap.

Table 11

Unrestrained Toddlers (1-4 years)

Posture by Seated Position in Car

19 City Study

November 1980 - June 1981

	N	Total	N	Front	N	Back
Total Unrestrained	2,146	100.0%	1,150	53.6%	996	46.4%
On Lap	381	17.8	334	15.6	47	2.2
On Seat	1,413	65.8	781	36.4	632	29.4
Sitting, back supported	456	21.2	231	10.8	225	10.4
Sitting, not supported	389	18.1	186	8.7	203	9.4
Standing	354	16.5	275	12.8	79	3.7
Kneeling	175	8.2	75	3.5	100	4.7
Lying	39	1.8	14	.6	25	1.2
On Floor	352	16.4	35	1.6	317	14.8
Standing	229	10.7	18	.8	211	9.9
Sitting	58	2.7	12	.6	46	2.1
Kneeling	55	2.6	4	.2	51	2.4
Lying	10	.4	1	*	9	.4

Note: The data above are based on observations obtained during the period November, 1980 - June, 1981. Posture and seat position data were discontinued after June 1981.

Seat Locations of Sub-Teens (5-12 years)

Among passengers in this age group, 65.1% were observed to be riding in the rear of the car and 34.9% in the front of the car. About three in ten (29.8%) were on the front outboard seat with most of the others in one of the three rear seat locations.

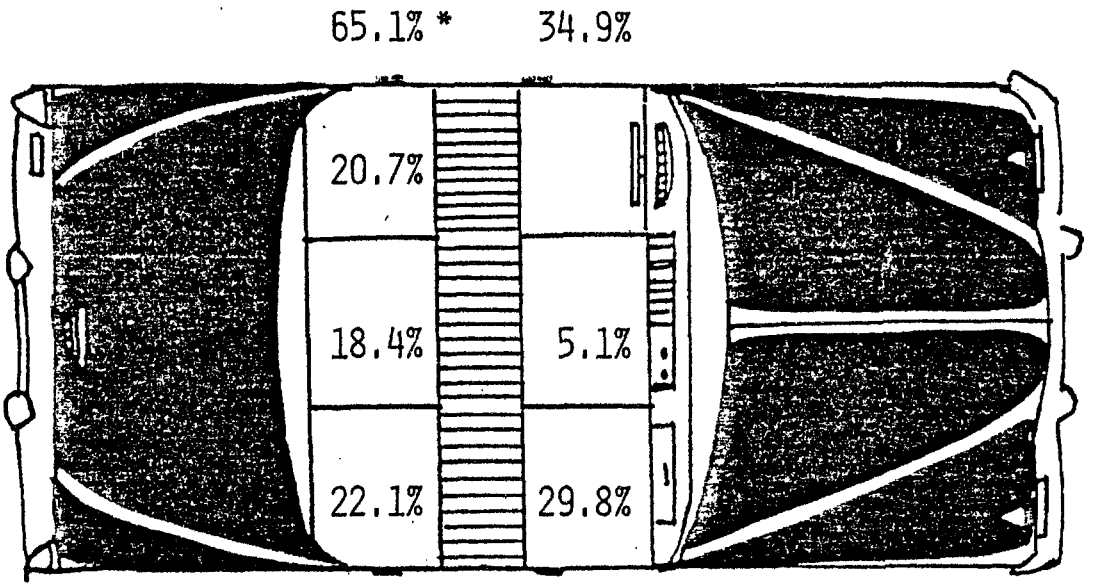
Table 12

Sub-Teen Passengers (5-12 years)

Seat Locations of Sub-Teens in Cars

(19 City, 1981-1982)

	N
TOTAL SUB-TEEN PASSENGERS	(12,035)



*The percent of sub-teens in the rear of the car (65.1%) includes 3.9% or 466 in number who were located behind the rear seat of a station wagon or a hatchback.

Percentage of Sub-Teens Restrained by Car Safety Belt by Seat Position

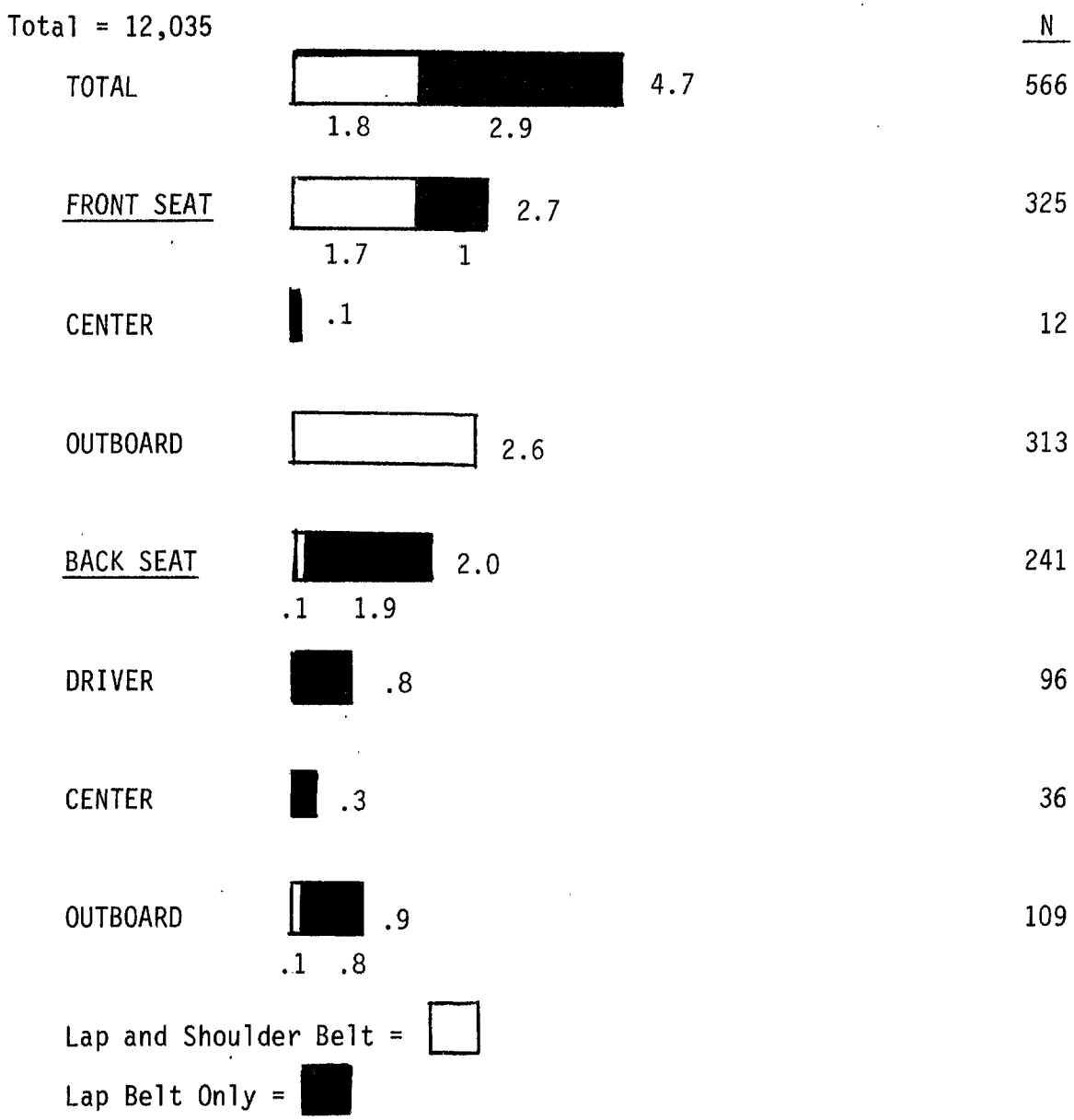
Among passengers in this age group, only 4.7% were restrained by the car safety belt. More than half of those restrained were observed to be riding on the front outboard seat. Most of those restrained tend to use the lap belt rather than the combination belt, since two-thirds of all sub-teens observed were in the back of the car.

Table 13

Sub-Teen Passengers (5-12 years)

Percent Restrained by Car Safety Belt

(19 City, 1981-1982)



Percentage of Sub-Teen Passengers Restrained by Car Safety Belt by City

In the 19 cities surveyed, safety belt usage among sub-teen passengers is highest in Minneapolis/St. Paul (14.8%) and lowest in Dallas (1.5%). Only one other city -- Chicago -- shows a usage rate for sub-teens significantly above the 19 city average.

Table 14

Sub-Teen Passengers (5-12 years)

Percent Restrained by Car Safety Belt

(19 City, 1981-1982)

	% Lap and Shoulder	% Lap Belt Only	% Total	N
Minneapolis/St. Paul	2.9	11.9	14.8	849*
Chicago	3.0	6.1	9.1	643*
Houston	1.4	4.2	5.6	785
Pittsburgh	1.6	3.7	5.3	617
Seattle	3.1	1.7	4.8	515
San Francisco	2.8	1.9	4.7	684
19 City Average	1.8	2.9	4.7	12,035
San Diego	2.3	2.3	4.6	743
Atlanta	1.7	2.2	3.9	828
Fargo-Moorhead	1.0	2.9	3.9	719
New York	3.8	0	3.8	424
Phoenix	1.8	1.8	3.6	559
Boston	3.2	0	3.2	370
Providence	2.5	.4	2.9	277
Los Angeles	1.3	1.6	2.9	619
Miami	.4	2.2	2.6	728**
New Orleans	.9	1.5	2.4	796**
Birmingham	1.1	1.2	2.3	733**
Baltimore	1.6	.5	2.1	364**
Dallas	.3	1.2	1.5	782**

*Usage rate significantly above that for 19 city average.
**Usage rate significantly below that for 19 city average.

Unrestrained Sub-Teen Passengers by Seat Position

Among unrestrained sub-teens, 54.6% were observed to be seated with their back supported; 45.4% were either not seated properly (back not supported) or were standing, kneeling, or lying on the seat or floor.

Table 15

Unrestrained Sub-Teen Passengers

Posture by Seated Position

19 City Study

November 1980 - June 1981

	N	Total	N	Front	N	Back
Total Unrestrained	4,250	100.0%	1,703	40.0%	2,547	60.0%
On Seat	3,800	89.4	1,675	39.4	2,125	50.0
Sitting, back supported	2,321	54.6	1,199	28.2	1,122	26.4
Sitting, not supported	1,115	26.2	322	7.6	793	18.6
Standing	71	1.7	51	1.2	20	.5
Kneeling	250	5.9	96	2.3	154	3.6
Lying	43	1.0	7	.1	36	.9
On Floor	431	10.1	14	.3	417	9.8
Standing	239	5.6	7	.1	232	5.5
Sitting	101	2.4	7	.1	94	2.3
Kneeling	65	1.5	0	0	65	1.5
Lying	26	.6	0	0	26	.6
On Lap	19	.5	14	.3	5	.2

Seat Locations of Teen Passengers (13-19 years)

Three-fifths (60.2%) of the passengers in this age group were observed to be riding in the front of the car and two-fifths (39.8%) in the rear of the car. More than half of the teenage passengers occupied the front outboard seat.

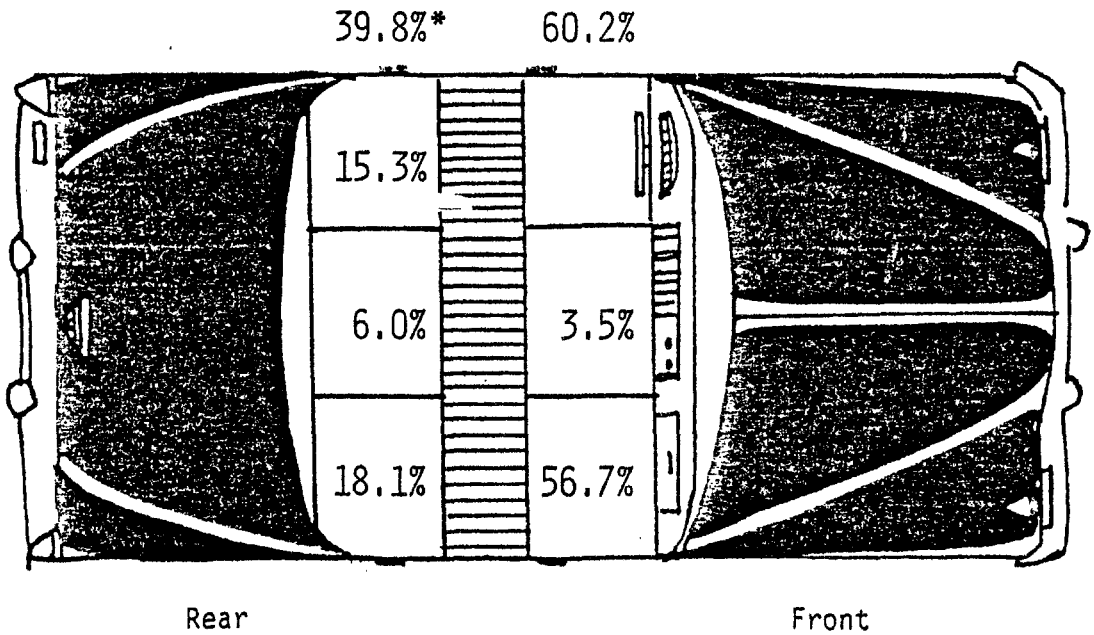
Table 16

Teen Passengers (13-19 years)

Seat Locations of Teens in Cars

(19 City, 1981-1982)

	N
TOTAL TEEN PASSENGERS	(14,426)



*The percent of teens in the rear of the car (39.8%) includes .4% or 58 in number who were located behind the back seat of a station wagon or a hatchback.

Percentage of Teen Passengers Restrained by Car Safety Belt by Seat Position

Among all teenage passengers observed, 3.1% were restrained by the car safety belt. Most of the restrained passengers occupied the front outboard seat.

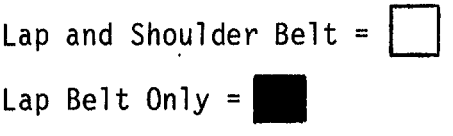
Table 17

Teen Passengers (13-19 years)

Percent Restrained by Car Safety Belt

(19 City, 1981-1982)

Total = 14,426		N
TOTAL	3.1 (2.5 / .6)	447
FRONT SEAT	2.9 (2.5 / .4)	418
CENTER	.1	14
OUTBOARD	2.8 (2.5 / .3)	404
BACK SEAT	.2	29
DRIVER	.1	14
CENTER	*	1
OUTBOARD	.1	14



Percentage of Teen Passengers Restrained by Car Safety Belt by City

In none of the 19 cities surveyed were more than 6.6% of the teen passengers restrained by the car safety belt. Cities showing significantly above average belt use for this age group are Seattle and Minneapolis/St. Paul. Use of the safety belt by teen passengers is significantly below average in Atlanta, New Orleans, Birmingham, Houston, Fargo-Moorhead and Dallas.

Table 18

Teen Passengers (13-19 years)

Percent Restrained by Car Safety Belt

(19 City, 1981-1982)

	% Lap and Shoulder	% Lap Belt Only	% Total	N
Seattle	4.7	1.9	6.6	1,020*
Minneapolis/St. Paul	3.3	1.9	5.2	486*
Baltimore	4.4	.3	4.7	633
Providence	3.9	.3	4.2	646
San Francisco	3.3	.9	4.2	980
San Diego	3.3	.8	4.1	1,061
Los Angeles	3.3	.4	3.7	1,001
New York	3.0	.2	3.2	665
Phoenix	2.6	.5	3.1	881
19 City Average	2.5	.6	3.1	14,426
Chicago	2.9	0	2.9	384
Pittsburgh	1.8	.9	2.7	787
Boston	2.2	.3	2.5	628
Miami	1.6	.6	2.2	972
Atlanta	1.5	.3	1.8	1,055**
Birmingham	1.2	.2	1.4	939**
Houston	1.0	.3	1.3	297**
New Orleans	1.3	.2	1.5	1,216**
Fargo-Moorhead	1.2	0	1.2	418**
Dallas	.3	0	.3	357**

*Usage rate significantly above the 19 city average
**Usage rate significantly below the 19 city average

Unrestrained Teen Passengers by Seat Position

Among unrestrained teen passengers, the large majority (93.2%) were observed to be seated properly with their back supported. This was evident for both those seated in the front and back seat of the car.

Table 19

Unrestrained Teen Passengers

Posture by Seated Position

19 City Study

November 1980 - June 1981

	N	Total	N	Front	N	Back
Total Unrestrained	4,833	100.0%	3,308	68.4%	1,525	31.6%
On Seat	4,811	99.5	3,305	68.3	1,506	31.2
Sitting, back supported	4,504	93.2	3,180	65.8	1,324	27.4
Sitting, not supported	290	6.0	121	2.5	169	3.5
Standing	1	*	1	*	0	0
Kneeling	5	.1	2	*	3	*
Lying	11	.2	1	*	10	.2
On Floor	20	.4	2	*	18	.4
Standing	2	*	1	*	1	*
Sitting	14	.3	1	*	13	.3
Kneeling	1	*	0	0	1	*
Lying	3	.1	0	0	3	.1
On Lap	2	*	1	*	1	*

Seat Locations of Adult Passengers (20 years or over)

The large majority of adult passengers were observed to be riding in the front of the car with more than four out of every five sitting on the front outboard seat.

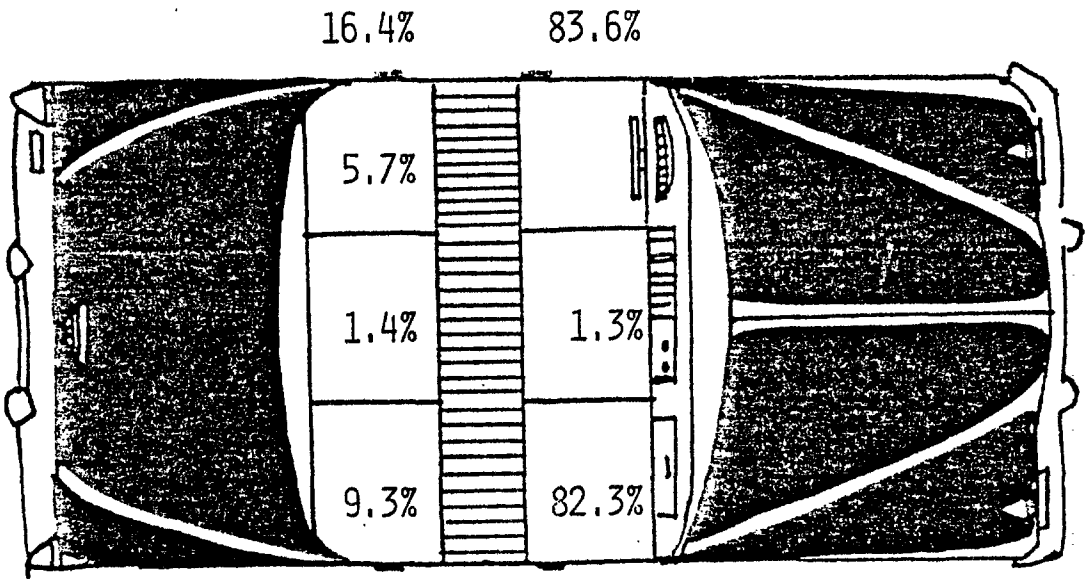
Table 20

Adult Passengers (20 years or over)

Seat Locations of Adults in Cars

(19 City, 1981-1982)

	N
TOTAL ADULT PASSENGERS	(65,209)



Percentage of Adult Passengers Restrained by Car Safety Belt by Seat Position

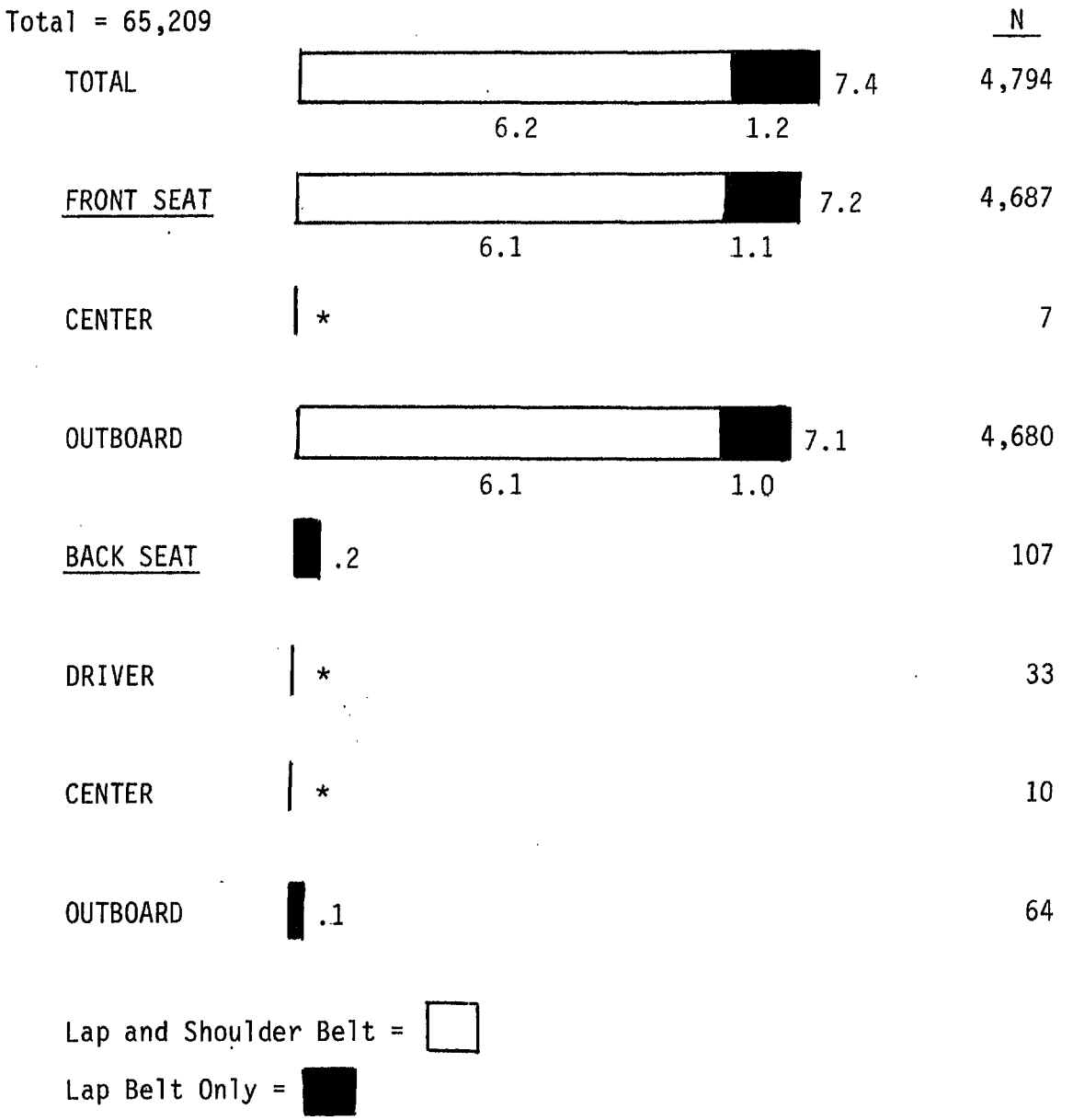
Among all adult passengers observed, 7.4% were restrained by the car safety belt. Virtually all of these passengers were seated on the front outboard seat.

Table 21

Adult Passengers (20 years or over)

Percent Restrained by Car Safety Belt

(19 City, 1981-1982)



Percentage of Adult Passengers Restrained by Car Safety Belt by City

As evident in the table below, safety belt use by adult passengers is significantly above the 19 city average in six cities and below average in eleven of the 19 cities.

Table 22

Adult Passengers (20 years or over)

Percent Restrained by Car Safety Belt

(19 City, 1981-1982)

	% Lap and Shoulder	% Lap Belt Only	% Total	N	
Seattle	13.5	2.5	16.0	3,854	
Minneapolis/St. Paul	10.1	2.5	12.6	2,984	
San Diego	9.4	2.1	11.5	3,971	*
San Francisco	8.4	1.9	10.3	4,064	
Phoenix	6.9	2.2	9.1	3,439	
Los Angeles	6.3	2.0	8.3	4,149	
19 City Average	6.1	1.2	7.3	65,209	
Houston	6.0	1.1	7.1	3,398	
Chicago	5.6	.9	6.5	3,619	**
Boston	5.7	.6	6.3	1,742	
Atlanta	5.2	.9	6.1	5,136	
Pittsburgh	5.0	.8	5.8	4,532	
Providence	4.5	1.1	5.6	1,663	
Baltimore	5.0	.3	5.3	1,779	
Miami	4.5	.7	5.2	4,792	**
New York	4.1	.7	4.8	2,014	
Dallas	3.8	.8	4.6	2,864	
Birmingham	3.5	.5	4.0	4,324	
Fargo-Moorhead	3.3	.7	4.0	2,575	
New Orleans	3.3	.5	3.8	4,310	

*Usage rate significantly above that for 19 city average
**Usage rate significantly below that for 19 city average

Unrestrained Adult Passengers by Posture and Seat Position

The large majority of unrestrained adult passengers were observed to be riding in the front of the car with more than four out of every five sitting properly (back supported). Among all unrestrained adults, only 2.6% were observed to be seated improperly (back not supported).

Table 23

Unrestrained Adult Passengers

Posture by Seated Position

19 City Study

November 1980 - June 1981

	N	Total	N	Front	N	Back
Total Unrestrained	22,083	100.0%	18,514	83.4%	3,668	16.6%
On Seat	22,074	99.9	18,409	83.4	3,665	16.5
Sitting, back supported	21,481	97.3	18,024	81.6	3,457	15.6
Sitting, not supported	566	2.6	369	1.7	197	.9
Standing	5	*	5	*	0	*
Kneeling	4	*	3	*	1	*
Lying	18	*	8	*	10	*
On Floor	6	*	3	*	3	*
Standing	1	*	0	0	0	0
Sitting	3	*	3	*	0	0
Kneeling	1	*	0	0	1	*
Lying	1	*	0	0	1	*
On Lap	3	*	3	*	0	0

Effect of Child Restraint Laws on Usage

States that have passed mandatory laws requiring child safety seats for infants and toddlers appear to be highly effective. In observation studies conducted in four states before the laws went into effect and in the same four states after the laws went into effect, overall use of child safety seats increased by one-third from 29% in the before study to 39% in the after study. The average length of time the laws were in effect for these studies was 9 months.

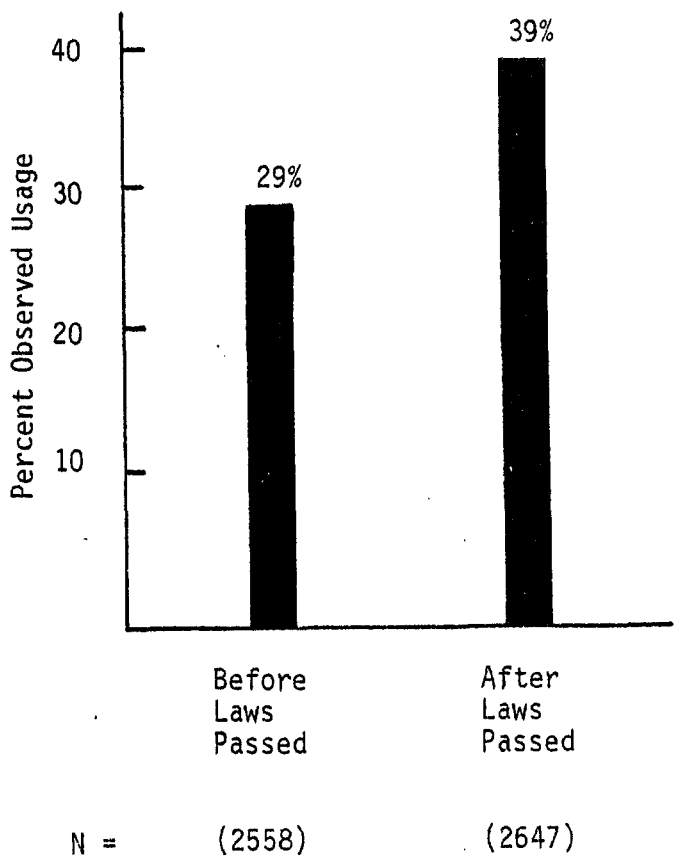
Data for the before and after observation studies were based on observations in one or more locations in the following states:

States	Site of Study
Massachusetts	Boston
Michigan	Muskegon, Portage, Midland
Minnesota	Minneapolis/St. Paul
New York	New York City, Ulster County

Table 24

Effect of Child Restraint Laws on Usage

Percent of Infants and Toddlers in Child Safety Seats



Effect of Child Restraint Laws on Usage

Use of child safety seats for children 4 year of age or under in Boston, New York and Minneapolis/St. Paul was found to be greater after mandatory child restraint laws were passed than before the laws went into effect. As shown in the table below, statistically significant increase in usage occurred in New York and Minneapolis/St. Paul. Usage in Boston also increased but the difference is not significant because of the small number of observations in the before and after studies.

Table 25

Percent of Infants and Toddlers Restrained by Child Safety Seat

	Before Law		After Law		
	N	%	N	%	Difference
Boston (City)					
Infants	41	53.7	42	45.8	- 7.9**
Toddlers	69	13.0	92	25.5	+12.5*
Total	110	28.2	134	35.8	+ 7.6**
New York (City & Ulster Co.)					
Infants	53	35.8	83	50.6	+14.8**
Toddlers	142	21.8	157	32.5	+10.7*
Total	195	25.6	240	38.8	+13.2*
Minneapolis/St. Paul (City)					
Infants	38	71.1	95	63.2	- 7.9**
Toddlers	366	31.3	510	39.8	+ 8.5*
Total	404	34.1	605	42.6	+ 8.5*

* Significant difference at 95% confidence level
** Not significant

Effect of Child Restraint Laws on Usage

The three Michigan cities -- Midland, Portage, and Muskegon -- all show greater use of child safety seats for children 4 years of age or under after the mandatory child restraint law was passed than before the law went into effect.

Table 26

Percent of Infants and Toddlers Restrained by Child Safety Seat

	Before Law		After Law		
	N	%	N	%	Difference
Midland					
Infants	260	60	163	53.4	- 6.6**
Toddlers	900	24.7	431	36.7	+12.0*
Total	1,160	32.6	594	41.2	+ 8.6*
Portage					
Infants	41	46.3	203	54.2	+ 7.9**
Toddlers	111	23.4	533	34.0	+10.6*
Total	152	29.6	736	39.5	+ 9.9*
Muskegon					
Infants	57	40.4	53	54.7	+14.3**
Toddlers	480	14.4	285	27.0	+12.6*
Total	537	17.1	338	31.3	+14.2*

* Significant difference at 95% confidence level
** Not significant

In the 19 city study, special tabulations were made to ascertain, first, how many of the cars observed had; (1) one or more infant passengers; (2) one or more toddlers and; (3) one or more infants and toddlers. Second, tabulations were made to determine for each of the three age groups, the average percent of children observed to be in an approved safety seat. The findings are summarized below. Note that use of a child safety seat drops sharply when there is more than 1 child in the car.

1) Number of cars with infants = 2,334

Percent with 1 infant = 97.6%	Average safety seat usage = 38.7%
Percent with 2 or more infants = 2.4%	Average safety seat usage = .9%

2) Number of cars with toddlers = 9,599

Percent with 1 toddler = 82.2%	Average safety seat usage = 17.8%
Percent with 2 toddlers = 15.8%	Average safety seat usage = 1.6%
Percent with 3 or more toddlers = 2.0%	Average safety seat usage = 0%

3) Number of cars with both infants and toddlers = 11,585

Percent with 1 child = 82.2%	Average safety seat usage = 20.8%
Percent with 2 children = 15.5%	Average safety seat usage = 2.0%
Percent with 3 or more children = 2.3%	Average safety seat usage = *

The source of the data above and tables for other special tabulations are presented in the Appendix Section, Pages A-15 thru A-21.

IV

Use of Child Safety Seats and Passenger Safety Belts in Ten National Accident Sampling System Areas

SUMMARY

Restraint System Usage, NASS Areas Vs. 19 Cities

Restraint system usage scores for five age groups of passengers in the 19 cities study and for those in ten NASS areas study are shown in the table below. With the exception of infants, the usage scores for the groupings of older passengers in the NASS study are below the scores obtained in the 19 city study. Also, among drivers the NASS usage rate of 7.6% is significantly below the usage rate obtained for drivers in the 19 city study.

Table 1

Observed Use of Restraint System

by Car Occupant

19 City Study Vs. NASS Area Study

	19 City		NASS	
	N	Percent	N	Percent
Infants	2,405	40.4	853	39.3
Toddlers	12,290	22.2	5,939	17.4
Sub-Teens	12,035	4.7	6,893	3.2
Teens	14,426	3.1	6,092	2.0
Adults	65,209	7.4	27,994	5.0
Drivers	54,539	11.4	23,142	7.6

Restraint usage by passengers in each of the ten NASS areas shows mixed results. Chicago, the Washington State counties of Skagit, San Juan and Island, Muskegon, Michigan and the Florida Counties, led other areas in the percent of toddlers restrained. Safety belt usage by sub-teens, teens, and adult passengers was at a relatively low level in all ten areas. Comparison of usage data for infant passengers by area is not feasible because of the limited number of observations.

Percentage of Infants in Child Safety Seat - NASS Areas

The percent of infants restrained in each of the ten NASS areas are shown below. Comparisons between one area and another are not appropriate because of the small number of observations in each area. In other tables that follow which show restraint usage for older passengers with a sufficient number of observations, a T-test has been applied to identify areas with usage rates significantly above or below the ten-area average at the 95% confidence level.

Table 2

Infants (Under 1 year)

Percent Restrained by Child Safety Seat

(NASS Areas, 1981-1982)

	N	Appears Correct	Obviously Incorrect	Total
Erie, Pa.	31	58.1	3.2	61.3
Chicago	113	38.9	11.5	50.4
Ft. Lauderdale/ Hollywood	35	40.0	8.6	48.6
Delaware Co., Pa.	71	46.5	1.4	47.9
Muskegon, Michigan	110	31.8	15.5	47.3
Skagit/San Juan, Wash.	93	39.8	6.5	46.3
10 Area Average	748	29.7	9.6	39.3
Shelby/St. Clair, Ala.	50	30.0	6.0	36.0
Ulster Co., New York	30	30.0	3.3	33.3
Dallas County	133	15.8	13.5	29.3
Arkansas[#]	82	7.3	9.8	17.1

[#]Drew, Lincoln, Desha, Chicot and Ashley Counties

Percentage of Toddlers in Child Safety Seat or Restrained by Car Safety Belt -- NASS Areas

The percent of toddlers observed to be in an approved child safety seat or restrained by the car safety belt ranges from a high of 27.1% in Muskegon to a low of 3.7% in the Arkansas counties. Other NASS areas that have usage rates either significantly above or below the 10 area average are identified in the table.

Table 3

Toddlers (1-4 years)

Percent Restrained by Child Safety Seat

(NASS Areas, 1981-1982)

		Child Safety Seat				
	N	Appears Correct	Obviously Incorrect	Total	Car Safety Belt Only	Total
Muskegon, MI	765	13.9	5.2	19.1	8.0	27.1*
Chicago	778	14.9	6.9	21.8	4.0	25.8*
Ft. Lauderdale/ Hollywood, FL	297	17.8	4.0	21.8	2.0	23.8*
Skagit/San Juan, WA	339	13.9	7.4	21.3	2.4	23.7*
Delaware Co., PA	182	18.1	1.1	19.2	0	19.2
Shelby/St. Clair, FL	464	14.7	3.0	17.7	1.5	19.2
Ulster, NY	78	19.2	0	19.2	0	19.2
10 Area Average	5,041	10.3	4.5	14.8	2.6	17.4
Erie, PA	419	10.3	5.0	15.3	1.2	16.5
Dallas County	1,030	5.5	4.5	10.0	1.8	11.8**
Arkansas#	689	1.9	1.5	3.4	.3	3.7**

#Drew, Lincoln, Desha, Chicot and Ashley Counties

*Usage rate significantly above average
**Usage rate significantly below average

Percentage of Sub-Teens Restrained by the Car Safety Belt -- NASS Areas

Use of the car safety belt by sub-teens reflects their seat location in cars. Children in this age group are more likely to be seated in the back of the car and thus, when restrained, are more likely to use the lap belt rather than the combination belt. In each of the ten areas only small minorities were observed to be restrained. Usage is highest in Chicago and lowest in the Arkansas counties.

Table 4

Sub-Teens (5-12 years)

Percent Restrained by Car Safety Belt

(NASS Areas, 1981-1982)

	N	Lap and Shoulder	Lap Belt Only	Total
Chicago	643	3.0	6.1	9.1*
Delaware Co., PA	364	3.8	1.1	4.9
Muskegon, MI	954	.5	3.9	4.4
Erie, PA	596	1.0	2.7	3.7
Skagit/San Juan, WA	402	2.0	1.2	3.2
10 Area Average	6,110	1.0	2.2	3.2
Dallas County	1,067	.3	2.0	2.3
Ulster, NY	279	1.8	.4	2.2
Ft. Lauderdale/ Hollywood, FL	450	.4	1.8	2.2
Shelby/St. Clair, AL	562	.7	1.3	2.0
Arkansas#	793	.1	.3	.4**

#Drew, Lincoln, Desha, Chicot and Ashley Counties

*Usage rate significantly above average
**Usage rate significantly below average

Percentage of Teen Passengers Restrained by Car Safety Belt -- NASS Areas

As evident in the 19 city study, relatively few teen passengers observed in the NASS study used the car safety belt. In none of the ten NASS areas surveyed was safety belt use by teens significantly above that for the ten area average. In Dallas County, safety belt use was signifcantly below the average for the ten areas.

Table 5

Teen Passengers (13-19 years)

Percent Restrained by Car Safety Belt

(NASS Areas, 1981-1982)

	N	Lap and Shoulder	Lap Belt Only	Total
Ulster, NY	474	2.7	.6	3.3
Skagit/San Juan, WA	423	2.8	.5	3.3
Chicago	384	2.9	0	2.9
Ft. Lauderdale/ Hollywood, FL	835	2.2	.6	2.8
Muskegon, MI	567	1.2	1.1	2.3
Delaware Co., PA	560	2.0	0	2.0
10 Area Average	5,735	1.6	.4	2.0
Arkansas[#]	394	1.0	.8	1.8
Shelby/St. Clair, AL	803	1.2	.4	1.6
Erie, PA	792	.8	.4	1.2
Dallas County	503	.4	.4	.8**

[#]Drew, Lincoln, Desha, Chicot and Ashley Counties

**Usage rate significantly below average

Percentage of Adult Passengers Restrained by Car Safety Belt -- NASS Areas

In the ten NASS areas surveyed, the average usage rate for adults was 5%. Only two areas -- Skagit/San Juan counties in Washington State and Chicago show significantly higher than average use of the safety belt. As noted in the table below, five of the NASS areas have usage rates significantly below average.

Table 6

Adult Passengers (20 and over)

Percent Restrained by Car Safety Belt

(NASS Areas, 1981-1982)

	N	Lap and Shoulder	Lap Belt Only	Total
Skagit/San Juan, WA	1,998	8.2	1.4	9.6*
Chicago	3,619	5.6	.9	6.5*
Delaware Co., PA	1,618	5.4	.5	5.9
Ft. Lauderdale/ Hollywood, FL	4,328	4.5	1.1	5.6
Muskegon, MI	2,792	4.4	1.2	5.6
10 Area Average	25,130	4.2	.8	5.0
Dallas County	2,055	3.4	.6	4.0**
Erie, PA	2,772	3.6	.4	4.0**
Ulster, NY	1,290	3.2	.4	3.6**
Shelby/St. Clair, AL	2,696	3.0	.4	3.4**
Arkansas[#]	1,962	1.0	.3	1.3**

[#]Drew, Lincoln, Desha, Chicot and Ashley Counties

*Usage rate significantly above average
**Usage rate significantly below average

V

Special Restraint System Usage Studies To Evaluate:

- The California AB 1198 Occupant Restraint Program
- The Michigan Occupant Restraint Program

INTRODUCTION

The National Highway Traffic Safety Administration is undertaking a nationwide educational program to enlist all potential networks to participate in a program to encourage the use of restraint systems. Working alone or in conjunction with ongoing state activities, mass media is being used, but a major thrust is being directed at employers, the medical profession, national clubs and associations, etc. The states of California and Michigan initiated their own programs to encourage the use of restraint systems by motorists and selected test cities to evaluate their programs. NHTSA provided support for the evaluation of these two state programs by conducting observation studies of restraint system usage in the cities selected for program testing and in the cities used for control purposes. The ORC sample design and traffic sites selected for the California and Michigan studies are presented in the Appendix.

California

In 1980 legislation was passed (AB 1198) in the State of California which required the California Office of Traffic Safety to conduct and evaluate a public information and education program to promote child passenger safety (ages 0-4 years). To help evaluate the program, NHTSA contracted with Opinion Research Corporation, Princeton, New Jersey to undertake special observation studies of restraint use among drivers and passengers in two California cities. The City of Fresno, including Clovis, was selected for the public information and education campaign and is identified as the intervention city. The City of Bakersfield was chosen for control purposes. Bakersfield was selected as the control city because it is comparable to Fresno in geographic and demographic characteristics and distant enough so as to not be influenced by any intervention initiated in Fresno.

Summary

The proposed educational program to be directed at the Fresno public was not initiated because of a variety of problems. The observation data collected by ORC, and presented in this section of the report, is being used for the new child restraint law in California and for other educational programs at the state level. The fact that no specific programs to motivate restraint usage in Fresno were initiated during the observation period is reflected in the data. As will be evident in the detailed findings presented in this chapter, there is no significant increase in the proportions of car passengers using child safety seats or car safety belts over the course of the observation study which was conducted during the period October 1981 through October 1982.

Michigan

The Michigan Office of Highway Safety Planning has instituted an occupant restraint campaign in Midland County. A major objective of the campaign is to ascertain the maximum restraint usage rates that can be expected

with a concentrated volunteer program. A number of organizations within the county such as area businesses, law enforcement agencies, scouting groups, the Midland County Safety Belt Committee, and other civic groups sponsored various programs designed to encourage local motorists to utilize child safety seats and safety belts.

Michigan's Child Restraint law went into effect on April 1, 1982. To measure any impact the law might have on restraint use in Midland and Portage, the observation data is presented for two periods in time. The first period includes observations during the period before April 1, 1982 and the second period includes observations after March 31, 1982.

Summary

Observation data collected for Midland City motorists prior to the effective date of the Child Restraint Law indicate that the volunteer program to encourage restraint system usage within the county has been very effective. When the data collected in Midland are compared with data collected in the control city of Portage, the restraint usage scores for Midland passengers are significantly above those for Portage passengers. This is evident for passengers in all five age groups studied -- infants, toddlers, sub-teens, teens, and adults.

Observations taken after the effective date of the Child Restraint Law show mixed results. Restraint usage scores for Midland infants and sub-teens did not change significantly during this period. The usage scores for toddlers, teens, and adult passengers, however, show significant increases from those obtained before the effective date of the law. In Portage, use of restraint systems shows an upward trend for all five age groups after the effective date of the law.

Fresno - Bakersfield Studies -- Infants (Under 1 Year)

Fresno

During the period October through December 1981, the use of an approved safety seat for Fresno infants averaged 50.5%. Among infants in an approved safety seat, 34.2% were observed to be restrained correctly (infant harnessed and seat secured by adult safety belt) and 16.3% were observed to be in an approved seat, but it was not being used properly. The percent of infants restrained did not change significantly between the first and fourth observation periods -- 50.5% vs. 46.2%.

Bakersfield

In the control City of Bakersfield, safety seat use among infants averaged 42.4% during the first period. As in Fresno, the usage rate in Bakersfield during the fourth period (July - October 1982) was not significantly different than the usage rate for the first period.

Table 1

Infants (Under 1 Year)
Percent in Child Safety Seat

FRESNO

	N	Child Safety Seat: Appears Correct %	Child Safety Seat: Obviously Incorrect %	Child Safety Seat: Total %
October - December 1981	190	34.2	16.3	50.5
January - March 1982	245	16.1	24.1	40.2
April - June 1982	270	26.0	17.0	43.0
July - October 1982	184	28.3	17.9	46.2

BAKERSFIELD

	N	Child Safety Seat: Appears Correct %	Child Safety Seat: Obviously Incorrect %	Child Safety Seat: Total %
October - December 1981	165	33.9	8.5	42.4
January - March 1982	264	20.4	20.1	40.5
April - June 1982	335	19.1	16.0	35.1
July - October 1982	251	20.7	16.3	37.0

Fresno - Bakersfield Studies -- Toddlers (1-4 Years)

Fresno

Among toddlers one to four years of age, 16.1% were observed to be in an approved safety seat (10.1% correctly restrained) during the first observation. Another 2.6% were restrained by the car safety belt. The usage rate of 17.4% during the fourth period is not significantly different from the usage rate of 16.1% during the first period.

Bakersfield

During the first period, the usage rate for toddlers in seats averaged 11.6% -- significantly below the Fresno rate of 16.1%. The fourth period usage rate of 13.6% is not significantly different from the first period rate of 11.6%.

Table 2

Toddlers (1-4 Years)
Percent in Child Safety Seat

FRESNO

	N	Child Safety Seat: Appears Correct %	Child Safety Seat: Obviously Incorrect %	Child Safety Seat: Total %	Belt %	Total %
October - December 1981	770	10.1	6.0	16.1	2.6	18.7
January - March 1982	738	8.4	8.5	16.9	3.8	20.7
April - June 1982	900	8.2	6.3	14.5	4.3	18.8
July - October 1982	1,064	9.2	8.2	17.4	4.5	21.9

BAKERSFIELD

	N	Child Safety Seat: Appears Correct %	Child Safety Seat: Obviously Incorrect %	Child Safety Seat: Total %	Belt %	Total %
October - December 1981	400	6.3	5.3	11.6	3.8	15.4
January - March 1982	485	2.7	8.2	10.9	5.4	16.3
April - June 1982	1,293	5.2	5.9	11.1	2.6	13.7
July - October 1982	1,161	7.3	6.3	13.6	5.2	18.8

Fresno - Bakersfield Studies -- Sub-Teen (5-14 Years)

Fresno

Among passengers in this age group, 5.0%, were observed to be restrained by the car safety belt during the first period. The percent of sub-teens restrained during the fourth period (July - October 1982) is not significantly different from the percent restrained during the first period.

Bakersfield

In Bakersfield, 3.6% of sub-teen passengers were observed to be restrained by the car safety belt during the first observation period. As in Fresno, the fourth period rate of 4.3% is not significantly different from the 3.6% rate for the first point in time.

Table 3

Sub-Teens (5-14 Years)

Percent Restrained by Adult Safety Belt

FRESNO

	N	%
October - December 1981	781	5.0
January - March 1982	806	5.8
April - June 1982	812	6.9
July - October 1982	1,399	5.6

BAKERSFIELD

	N	%
October - December 1981	578	3.6
January - March 1982	564	3.5
April - June 1982	1,504	3.5
July - October 1982	1,493	4.3

Fresno - Bakersfield Studies -- Teens (15-19 Years)

Fresno

Among all teenage passengers observed in Fresno, 2.7% were restrained by the car safety belt during the first period. Restraint usage during the fourth period (4.8%) is not significantly above the first period rate of (2.7%).

Bakersfield

In the control city, the percent of teen passengers restrained averaged 3.6% during the first period. No significant difference is evident between the fourth period rate of 1.6% and the first period rate of 3.6%.

Table 4

Teen Passengers (15-19 Years)

Percent Restrained by Adult Safety Belt

FRESNO

	N	%
October - December 1981	329	2.7
January - March 1982	244	2.0
April - June 1982	242	4.1
July - October 1982	354	4.8

BAKERSFIELD

	N	%
October - December 1981	194	3.6
January - March 1982	218	1.8
April - June 1982	453	2.9
July - October 1982	444	1.6

Fresno - Bakersfield Studies -- Adult Passengers (20 Years or Older)

Fresno

Among adult passengers observed in Fresno during the first period, 7.8% were restrained by the car safety belt. The usage rate for the fourth period of 5.4% is significantly below the first period rate of 7.8%. Belt usage among drivers also declined during the first and fourth periods.

Bakersfield

In Bakersfield, the average usage rate among adults was 6.4% during the first period. As in Fresno, the fourth period usage rate of 4.4% is significantly below the first period rate of 6.4%. Usage by drivers, however, did not change during these two points in time.

Table 5A

Adult Passengers (20 Years or Over)

Percent Restrained by Car Safety Belt

FRESNO

	N	%
October - December 1981	1,945	7.8
January - March 1982	2,456	5.6
April - June 1982	3,166	5.8
July - October 1982	4,221	5.4

BAKERSFIELD

	N	%
October - December 1981	1,101	6.4
January - March 1982	1,564	5.4
April - June 1982	4,293	4.0
July - October 1982	4,305	4.4

Fresno - Bakersfield Studies -- Drivers

Fresno

Over the four observation periods, the safety belt usage rates for Fresno drivers were higher than the belt usage rates for Bakersfield drivers. In Fresno, the percent of drivers restrained shows a small but significant decline between the first and fourth observation periods.

Bakersfield

In Bakersfield, the use of safety belts by drivers did not change significantly over the four observations periods.

Table 5B

Fresno Drivers

Percent Restrained by Safety Belt

	N	Both On	Lap Belt Only	Total
October - December 1981	2,078	11.0	3.3	14.3
January - March 1982	2,052	8.8	2.7	11.5
April - June 1982	2,132	7.9	1.9	9.8
July - October 1982	2,832	8.4	2.8	11.2

Bakersfield Drivers

	N	Both On	Lap Belt Only	Total
October - December 1981	1,527	6.1	2.0	8.1
January - March 1982	1,755	5.9	2.2	8.1
April - June 1982	2,496	6.1	1.8	7.9
July - October 1982	2,988	6.2	2.4	8.6

Midland - Portage Studies -- Infants (Under 1 Year)

Midland

Child restraint device usage among Midland infants averaged 60% during the period November 1981 through March 1982. Among 33 cities and counties where ORC conducted observation studies, Midland ranked third in number of infants restrained. However, the observed use of safety seats for infants did not change significantly after March 1982 when the Michigan law became effective.

Portage

In Portage, as in Midland, the use of safety seats by infants did not change significantly after the Michigan law became effective. The usage rate, however, is higher than before the law became effective.

Table 6

Infants (Under 1 Year)
Percent Restrained by Child Safety Seat

MIDLAND, MICHIGAN

	N	Child Safety Seat		
		Appears Correct %	Obviously Incorrect %	Total %
Before Law 1/	260	45.4	14.6	60.0
After Law 2/	163	44.8	8.6	53.4

PORTAGE, MICHIGAN

	N	Child Safety Seat		
		Appears Correct %	Obviously Incorrect %	Total %
Before Law 1/	41	36.6	9.8	46.4
After Law 2/	203	40.4	13.8	54.2

1/ Observations during the period November 1, 1981 through March 1982
2/ Observations during the period April 1, 1982 through October 1982

Midland - Portage Studies -- Toddlers (1-4 Years)

Midland

Among passengers one to four years of age, 24.6% were observed to be in an approved child restraint device during the period before Michigan's Child Restraint law became effective. After the law became effective, a significantly higher percent of toddlers (36.7%) were observed to be using the child safety seat.

Portage

In the control city of Portage, the usage rate for toddlers was quite similar to that observed in Midland prior to the child restraint law. A significant increase in usage is also evident in Portage after the law became effective 23.4% vs. 34%.

Table 7

Toddlers (1-4 years)
Percent Restrained by Child Safety Seat

MIDLAND, MICHIGAN

		Child Safety Seat				
	N	Appears Correct	Obviously Incorrect	Total	Car Safety Belt	Total
Before Law 1/	900	13.4	11.2	24.6	9.2	33.8
After Law 2/	431	20.2	16.5	36.7	5.3	42.0

PORTAGE, MICHIGAN

		Child Safety Seat				
	N	Appears Correct	Obviously Incorrect	Total	Car Safety Belt	Total
Before Law 1/	111	9.9	13.5	23.4	5.4	28.8
After Law 2/	533	15.8	18.2	34.0	5.1	39.1

1/ Observations during the period November 1, 1981 through March 1982
2/ Observations during the period April 1, 1982 through October 1982

Midland - Portage Studies -- Sub-Teens (5-12 Years)

Midland

Use of the car safety belt by Midland sub-teens was almost twice the rate of that observed for Portage sub-teens prior to the effective date of the Michigan Child Restraint law (22.4% vs. 12.1%). Use of the adult safety belt by Midland sub-teens, however, did not increase significantly during the seven months following the effective date of the law.

Portage

The before and after usage data for Portage sub-teens suggest that the Michigan law has had a positive effect on belt use. The 5.7% increase in the number of Portage sub-teens who were observed to be using the car safety belt after the effective date of the law, while not a statistically significant increase, is a favorable sign.

Table 8

Sub-Teens (5-12 Years)
Percent Restrained by Car Safety Seat

MIDLAND, MICHIGAN

	N	Percent Restrained
Before Law 1/	1,109	22.4
After Law 2/	537	23.6

PORTAGE, MICHIGAN

	N	Percent Restrained
Before Law 1/	99	12.1
After Law 2/	595	17.8

1/ Observations during the period November 1, 1981 through March 1982
2/ Observations during the period April 1, 1982 through October 1982

Midland - Portage Studies -- Teen Passengers (13-19 Years)

Midland

Prior to the Michigan child restraint law, about one teen passenger in ten was observed to be restrained by the car safety belt. In the seven-month period after the law became effective, the percent of teenage passengers restrained by the safety belt increased to 19.1%.

Portage

Use of the safety belt by teen passengers in Portage was virtually non-existent prior to the Michigan law. After the effective date of the law, 10.1% of teen passengers were observed to be using the safety belt.

Table 9

Teen Passengers (13-19 Years)

Percent Restrained by Car Safety Belt

MIDLAND, MICHIGAN

	N	Percent Restrained
Before Law 1/	1,506	10.8
After Law 2/	596	19.1

PORTAGE, MICHIGAN

	N	Percent Restrained
Before Law 1/	138	1.4
After Law 2/	769	10.1

1/ Observations during the period November 1, 1981 through March 1982
2/ Observations during the period April 1, 1982 through October 1982

Midland - Portage Studies -- Adult Passengers (20 Years or Older)

Midland

In Midland, safety belt use by adult passengers before the effective date of the Michigan law averaged 20.4%. During the seven-month period after the effective date of the law, belt use by adult passengers increased to an average of 28.2%.

Portage

Overall, use of safety belts by adult passengers in Portage is lower than for adult passengers in Midland. The percent of restrained adult passengers in Portage did not change significantly after the effective date of the Michigan child restraint law.

Table 10

Adult Passengers (20 Years or Older)

Percent Restrained by Car Safety Belt

MIDLAND, MICHIGAN

	N	Percent Restrained
Before Law 1/	4,830	20.4
After Law 2/	2,049	28.2

PORTAGE, MICHIGAN

	N	Percent Restrained
Before Law 1/	649	15.7
After Law 2/	2,641	16.8

1/ Observations during the period November 1, 1981 through March 1982
2/ Observations during the period April 1, 1982 through October 1982

Midland - Portage Studies -- Drivers

Midland

Safety belt use by Midland drivers averaged 21.5% during the period November 1981 through March 1982. This rate is almost twice the usage rate for Portage drivers during the same period. Belt usage by Midland drivers did not increase significantly during the period April 1982 through October 1982 when the Michigan Child Restraint Law was in effect.

Portage

In Portage, as in Midland, the use of safety belts by drivers did not change significantly after the Child Restraint Law became effective.

Table 11

Midland Drivers

Percent Restrained by Safety Belt

	N	Both On	Lap Belt Only	Total
Before Law 1/	9,506	19.9	1.6	21.5
After Law 2/	4,074	19.2	2.9	22.1

Portage Drivers

Percent Restrained by Safety Belt

	N	Both On	Lap Belt Only	Total
Before Law 1/	1,218	11.8	.4	12.2
After Law 2/	4,889	11.4	1.8	13.2

1/ Observations during the period November 1, 1981 through March 1982
2/ Observations during the period April 1, 1982 through October 1982

VI

Motorcycle Helmet Usage

INTRODUCTION AND METHODOLOGY

Objective

The main purpose of this observation study was to ascertain the use or non-use of helmets by drivers and passengers of motorcycles at the same locations where observations were conducted for restraint use by drivers and passengers of motor vehicles. A secondary purpose of the study was to determine the use or non-use of helmets by drivers and passengers of mopeds.

Methodology

In addition to observing restraint usage among drivers and passengers in motor vehicles at sampled traffic intersections and freeway exits, the ORC field personnel observed and recorded, on a special form, the use or non-use of helmets by drivers and passengers on motorcycles and mopeds as they approached intersections. These data were obtained while observers were waiting for the traffic light to turn red and could return to observing restraint usage in passenger cars. The study, which used the same sampling design as the one used for the main study, was conducted during the period November 1980 through October 1982.

SUMMARY

The findings from this observation study indicate that in states that have laws requiring drivers and passengers of motorcycles to wear helmets the laws are highly effective. In nine states with helmet laws, 92.9% of motorcycle drivers and 91.9% of their passengers were observed to be wearing helmets in the cities surveyed. By comparison, in seven states with none or only limited helmet laws, usage was only 49.2% for drivers and 30.3% for passengers.

Motorcycle Helmet Usage

States with mandatory laws that require drivers and passengers of motorcycles to wear protective helmets are highly effective. In nine states with mandatory helmet laws, 92.9% of drivers of motorcycles and 91.9% of their passengers were observed to be wearing helmets. By comparison, in seven states with no or only limited helmet laws usage declined to 49.2% for drivers and 30.3% for passengers.

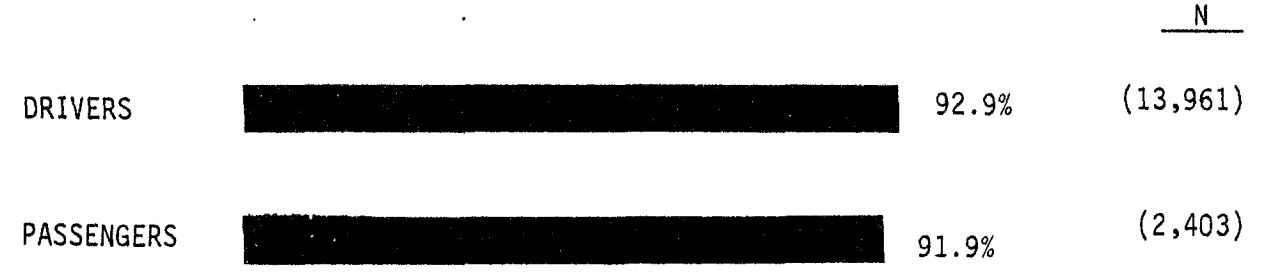
Table 1

Motorcycle Helmet Observation Study

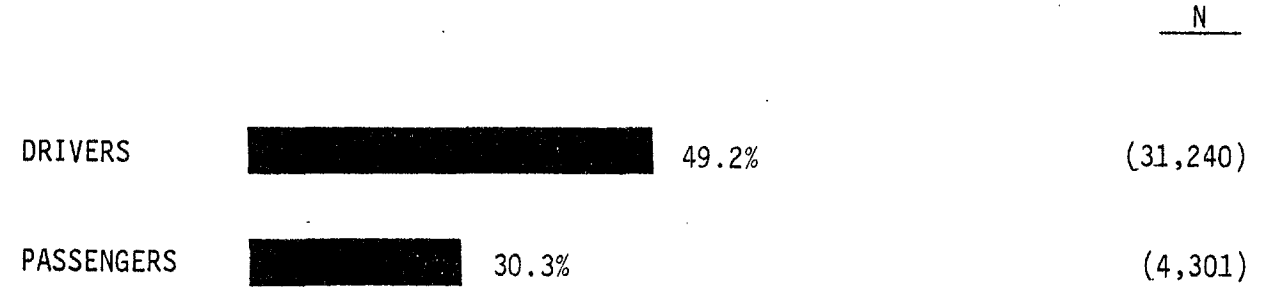
(1981-1982)

Percent of Drivers and Passengers Wearing Helmets

STATES WITH HELMET LAWS (9)



STATES WITH NO OR LIMITED HELMET LAWS (7) 1/



1/ Includes 3 states that require helmets for riders under 18 years of age and 1 state that requires helmets for all passengers.

Motorcycle Helmet Usage

Cities and Counties in States with Mandatory Helmet Laws for All Riders

Table 2 shows, for each city or county, the percent of drivers and passengers of motorcycles who were observed to be wearing protective helmets as they approached traffic intersections or were leaving freeway exits.

Table 2

	1981 - 1982	
	Drivers %	Passengers %
Atlanta	100.0	100.0
Birmingham	100.0	99.5
Muskegon, MI	99.5	98.8
Ft. Lauderdale/Hollywood, FL	99.8	99.6
Pittsburgh	99.7	100.0
Shelby/St. Clair, AL	99.7	100.0
New Orleans (After 12/31/81) 1/	99.4	96.9
Erie, PA	99.4	98.6
Portage, MI	99.3	100.0
Miami	99.1	99.1
Midland, MI	99.0	100.0
Arkansas counties 2/	96.3	88.1
Ulster County, NY	86.8	87.5
New York City	85.1	87.3
Boston	83.6	75.0
Delaware County, PA	83.6	76.5
	(13,961)	(2,403)

1/ Observations after mandatory law went into effect
2/ Drew, Lincoln, Desha, Chicot and Ashley Counties

Motorcycle Helmet Usage

Cities or Counties in States with No or Only Limited Helmet Laws

Table 3 shows, for each city, the percent of drivers and passengers of motorcycles who were observed to be wearing protective helmets as they approached traffic intersections or were leaving freeway exits.

Table 3

	1981 - 1982	
	Drivers %	Passengers %
Baltimore 2/	83.9	78.3
Providence 1/	79.8	70.8
Skagit/San Juan/Island Counties, Washington State	66.4	51.3
Seattle	64.8	35.0
San Francisco	60.1	35.6
San Diego	59.6	32.4
Minneapolis/St. Paul 2/	56.8	47.4
Dallas	56.0	37.5
Fargo/Moorhead 2/	54.0	41.3
Houston	51.9	23.5
Los Angeles	50.7	28.5
New Orleans (Before 1/1/82) 3/	49.3	52.6
Phoenix 2/	44.8	38.1
Bakersfield, California	41.2	22.6
Chicago	38.6	17.6
Fresno, California	36.1	18.5

1/ Requires all passengers to wear helmets
2/ Requires all under 18-21 years of age to wear helmets
3/ Observations before mandatory law went into effect

Mopeds

In addition to observing helmet usage by motorcyclists, data were also collected on helmet usage by moped drivers and passengers. The incidence of helmet usage among moped drivers and passengers is well below that for motorcyclists. In the 19 city study, 38.6% of moped drivers and 22.9% of passengers were observed to be wearing helmets over the twenty-four month period. The comparable usage rates among motorcylcists were 65.8% for drivers and 56.6% for passengers.

Mandatory helmets for motocyclists appear to have a positive impact on moped riders. Among moped riders, helmet usage in states that have helmet laws for motorcyclists is higher than in those states with no or only limited laws for motorcyclists.

Table 4

Percent of Moped Drivers and Passengers Wearing Helmets

	May - September 1979		N	
	Drivers	Passengers	Drivers	Passengers
	%	%		
Total 19 cities	38.6	22.9	1,939	170
NASS areas	41.3	32.3	578	65
States with helmet laws for motorcyclists	44.6	32.4	1,440	173
States with no or limited helmet laws for motorcyclists	24.0	5.7	1,843	106

*Helmet usage for each city not shown because of the limited number of cases.

APPENDIX SECTION

Table of Contents

Safety Belt Usage by Specific Car Series

Tables on page A-3 to A-9 show safety belt usage for 1976-1983 model years by car series for each manufacturer. Only those models that have 50 or more observations are presented.

USAGE BY CAR MAKE

	%	N
American Motors		
Concord	10.3	(165)
Gremlin	6.3	(63)
Hornet	4.2	(72)
Pacer	9.7	(124)
Spirit	9.6	(52)

(1976-1983 Model Years)

USAGE BY CAR MAKE

	%	N
Plymouth		
Fury	4.1	(74)
Horizon	14.9	(308)
Reliant	24.1	(141)
Volare	11.3	(542)
Spirit	9.6	(52)
Dodge		
Aries	20.7	(82)
Aspen	11.6	(439)
Diplomat	10.4	(125)
Omni	18.1	(259)
Chrysler		
Cordoba	3.0	(234)
Le Baron	8.0	(251)
Newport	2.8	(71)
New Yorker	7.0	(100)

(1976-1983 Model Years)

USAGE BY CAR MAKE

	%	N
Buick		
Century	12.4	(412)
Electra	8.1	(344)
Le Sabre	8.1	(395)
Regal	6.2	(938)
Riviera	8.7	(138)
Skylark	11.7	(515)
Chevrolet		
Camaro	6.5	(665)
Caprice	7.1	(847)
Cavalier	12.0	(50)
Chevelle	7.0	(301)
Chevette (Auto)*	--	--
Chevette (Regular)	14.9	(1134)
Citation	16.8	(668)
Corvette	4.1	(98)
Impala	8.3	(639)
Malibu	11.7	(911)
Monte Carlo	6.2	(1033)
Monza	8.6	(290)
Nova	9.0	(546)
Vega	10.1	(99)
Cadillac		
Seville	12.2	(304)

* 10 observations -- 60% usage

(1976-1983 Model Years)

USAGE BY CAR MAKE

	%	N
Oldsmobile		
Custom Cruiser	12.2	(90)
Cutlass	10.4	(2108)
Delta 88	8.2	(588)
Ninety-Eight	9.8	(328)
Omega	15.9	(253)
Toronado	7.3	(96)
Pontiac		
Bonneville	6.5	(341)
Catalina	7.8	(102)
Firebird	4.5	(352)
Grand-Prix	4.7	(557)
Le Mans	9.1	(154)
Phoenix	17.3	(191)
Sunbird	6.8	(237)

(1976-1983 Model Years)

USAGE BY CAR MAKE

	%	N
Ford		
Escort	19.1	(251)
Fairmont	11.1	(890)
Fiesta	13.1	(153)
Ford Wagon	8.9	(123)
Granada	8.1	(859)
LTD	7.0	(530)
Maverick	9.1	(88)
Mustang	8.6	(957)
Pinto	8.6	(491)
Thunderbird	2.8	(534)
Mercury		
Bobcat	4.0	(50)
Capri	10.9	(118)
Cougar	5.0	(397)
Lynx	19.0	(58)
Marquis	5.2	(232)
Monarch	5.7	(212)
Zephyr	11.8	(204)
Lincoln		
Continental	3.1	(161)
Mark Series	7.5	(106)

(1976-1983 Model Years)

USAGE BY CAR MAKE

(1976-1983 Model Years)

	%	N
Foreign Models		
Audi	20.2	(247)
Datsun	15.9	(1913)
Fiat	10.9	(230)
Honda	25.9	(1755)
Mazda	22.1	(498)
Porsche	25.0	(68)
Rabbit (Regular)	27.8	(687)
Rabbit (Automatic)	85.9	(304)
Subaru	17.3	(139)
Toyota (Regular)	17.2	(2977)
Toyota (Automatic)*		
Volvo	25.1	(462)
Other VWs	21.5	(331)

*Only 33 cars observed -- 93.9% usage

OPINION RESEARCH (Flow Chart #1)
Princeton, New Jersey

DRIVER STUDY

On Site:

1. Observer stands on curb with clipboard and observation form in hand
2. Traffic light turns red and a line of cars stop at intersection
3. Observer selects second car in line for data collection (First car if only one car stopped)

Observes and Records:

- 1 If driver is wearing both lap and shoulder belt
  2 If driver is wearing lap belt only
  3 If driver is not restrained
- 1 Male
  2 Female
- If car is Rabbit, Chevette, Toyota is the restraint system
  1 Automatic?
  2 Regular?
- Make of car
- Age of driver
  4 (15-19 yrs)
  5 (20-24 yrs)
  6 (25-49 yrs)
  7 (50 yrs or older)
- Seat location and age group of each passenger
  Front seat
    Center
    Outboard
  Back seat
    Driver
    Center
    Outboard
- If Station Wagon or Hatchback:
  Number of children in rear
- License number

Flow Chart #2

PASSENGER STUDY
(Infant and Small Child)

On Site:

1. Observer stands on curb with clipboard and observation form in hand
2. Traffic light turns red and a line of cars stop at intersection
3. Observer looks for car that has infant(s) and/or small child (children) for data collection
4. If no cars with infant or small child, collects data on car with teen or adult passenger (s)

Typical Case:

Observer spots car with passenger who he decides is in the 1 to 4 year old age group

Observes and Records:

- Is child in an acceptable child restraint device (CRD), a flimsy sear or not in a CRD?

  If in CRD is it:

  1 Restrained by auto safety belt and child harnessed in CRD?

  2 Not restrained by auto belt, but child is harnessed?

  3 Restrained by auto belt, but child is not harnessed?

  4 Not restrained by auto belt and child is not harnessed?

  If in Flimsy Seat is it:

  1 Hook over type?

  2 Feeder type?

  3 Car bed?

  If not in CRD or Flimsy Seat is child restrained by adult belt

  1 Both on?

  2 Lap only?

  3 None?

- Age group of child
- Sex of child
- Is child on:

  1 Front seat?

  2 Back seat?

  3 Rear of station wagon or hatchback?

- Is child positioned on:

  1 Driver's side?

  2 Center?

  3 Outboard?

- Total number of passengers
- License number of car

Flow Chart #3

PASSENGER STUDY

(Age 5 and over)

On Site:

1. Observer stands on curb with clipboard and observation form in hand
2. Traffic light turns red and a line of cars stop at intersection
3. Observer looks for car that has infant(s) and/or small child (children) for data collection
4. If no cars with infant or small child, collects data on car with teen or adult passenger(s)

Typical Case:

Observer spots car with passenger who he decides is in the 5 to 14 year old age group

Observes and Records:

- Is passenger restrained by adult belt
  - 1 Both on ?
  - 2 Lap only ?
  - 3 None ?
- Age group of passenger
- Sex of passenger
- Is passenger on:
  - 1 Front seat ?
  - 2 Back seat ?
  - 3 Rear of station wagon or hatchback ?
- Is passenger positioned on:
  - 1 Driver's side ?
  - 2 Center ?
  - 3 Outboard ?
- Total number of passengers
- License number of car

NOTE: The above sequence of events are observed for each passenger in the car in the following age groups: Sub-teen (5-14 yrs), Teen (15-19 yrs), and Adults (20 yrs and over).

Use of child safety seats by infants and toddlers is labeled as either "Appears Correct" or "Obviously Incorrect." When observing passenger cars in the traffic population or at exits to shopping malls, it was not always possible to determine if the safety seat was secured by a tether strap. Also, it was difficult at times to be certain that the safety seat was secured by the car safety belt although it appeared that it was secured. In such cases, field personnel were instructed to record the child as being properly restrained (i.e., code 1 in the table below). Codes 2, 3 and 4 in the table were used if the child was in an approved seat, but either the seat or the child was not properly secured. Code 5 identified a "Flimsy Seat" such as a plastic shell-type carrier, a hook-over type seat or a car bed.

CODES FOR RECORDING USE OF SAFETY SEATS

1. Straps & Belt -- Use if child is in a proper child restraint device and is restrained by straps or shield on device and the device is secured by the auto safety belt.

2. Straps Only -- Use if child is in a proper child restraint device (CRD) and is restrained by straps or shield on device, but device is <u>not</u> secured by the auto safety belt.

3. Belt Only -- Use if child is in a proper CRD that is secured by auto safety belt, but is <u>not</u> restrained by straps or shield on CRD.

4. No Straps/Belt -- Use if child is in a proper CRD, but CRD is <u>not</u> secured by auto safety belt and child is <u>not</u> restrained by straps or shield on CRD.

5. Flimsy Seat -- Use if just flimsy seat and is not proper CRD.

6. None -- Use if child is not in CRD or flimsy seat.

PERCENT AND NUMBER OF CARS OBSERVED WITH CHILDREN
BY THE NUMBER OF CHILDREN PASSENGERS BY AGE GROUPS

(19 CITY, 1981 - 1982 DATA)

	AGE GROUPS					
	3-12	1-12	0-4	UNDER 1	1-4	5-12
	% # VEHS.	% # VEHS.	% # VEHS.	% # VEHS.	% # VEHS.	% # VEHS.
TOTAL VEHICLES	18164	16295	11585	2334	9599	8678
1 CHILD	69.7	68.7	82.2	97.6	82.1	75.9
2 CHILDREN	23.8	24.6	15.5	2.4	15.8	20.9
3 CHILDREN	4.9	5.1	1.8	*	1.6	3.0
4 OR MORE CHILDREN	1.5	1.6	.4	*	.4	1.2

Safety Seat usage for 1-4 group
Auto Safety Belt for 5-12 group

AVERAGE CHILD SAFETY SEAT USAGE BY THE NUMBER OF CHILDREN IN THE CAR FOR DIFFERENT AGE GROUPS

(19 CITY, 1981 - 1982 DATA)

	AGE GROUPS					
	0 - 12	1 - 12	0 - 4	UNDER 1	1 - 4	5 - 12
AVERAGE PERCENT USAGE RATE FOR:						
TOTAL VEHICLES	18164	16295	11585	2334	9599	8678
1 CHILD IN CAR	13.4	10.9	20.8	38.7	17.8	4.3
2 CHILDREN IN CAR	1.6	1.4	2.0	.9	1.6	.6
3 CHILDREN IN CAR	*	*	*	0	0	*
4 OR MORE CHILDREN IN CAR	*	*	*	*	0	*

Child Safety Seat only for 1-4 group
Auto Safety Belt for 5-12 group

N's- Appendix

CHILD SAFETY SEAT USAGE BY THE FIRST, SECOND AND THIRD CHILD IN THE CAR FOR DIFFERENT AGE GROUPS

(19 CITY, 1981 - 1982 DATA)

	AGE GROUPS					
	0 - 12	1 - 12	0 - 4	UNDER 1	1 - 4	5 - 12
PERCENT USAGE RATE FOR:						
FIRST CHILD	18.7	15.5	25.6	40.3	21.7	5.6
SECOND CHILD	6.3	5.1	11.9	38.6	9.4	3.0
THIRD CHILD	1.1	1.0	.8	50.0	0	1.9

Table 7 w/5-12 retained

Usage Rate For:	0-12	1-12	0-4	Under 1	1-4	5-12
First Child	3400/8164 18.7	2524/16295 15.5	2961/11585 25.6	941/2334 40.3	2082/9599 21.7	485/8678 5.6
Second Child	348/5499 6.3	262/5096 5.1	245/2058 11.9	22/57 38.6	162/1717 9.4	62/2095 3.0
Third Child	13/1177 1.1	11/1083 1.0	2/258 0.8	1/2 50.0	0/196 0	7/359 1.9

Child Safety Seat only for 1-4 group
Seat Safety belt for 5-12 group

N's Appended

CHILD SAFETY SEAT USAGE FOR THE FIRST AND SECOND CHILD AS A FUNCTION OF ADDITIONAL CHILDREN BY AGE GROUPS

(19 CITY, 1981 - 1982 DATA)

	AGE GROUPS					
	0 - 12	1 - 12	0 - 4	UNDER 1	1 - 4	5 - 12
USAGE RATE OF:						
SINGLE CHILD PRESENT IN CAR	19.2	15.9	25.2	39.7	21.7	5.7
FIRST CHILD WHEN ONLY TWO ARE PRESENT	18.5	15.4	27.6	67.3	22.1	5.6
FIRST CHILD WHEN THREE OR MORE ARE PRESENT	13.9	11.6	22.9	50.0	17.3	4.2
SECOND CHILD WHEN ONLY TWO ARE PRESENT	6.8	5.5	12.6	38.2	10.0	3.2
SECOND CHILD WHEN THREE OR MORE ARE PRESENT	4.6	3.8	7.3	50.0	5.1	1.9

TABLE #3 – with 5-12 who are restrained

Usage Rate OF	0-12	1-12	0-4	Under 1	1-4	5-12
Single Child	2436/12665 19.2	1781/11199 15.9	2405/9527 25.2	903/2277 39.7	1711/7882 21.7	372/658 5.7
First When 2	800/4322 18.5	617/4013 15.4	497/1800 27.6	37/55 67.3	331/1521 22.1	98/173 5.6
First When 3	164/1177 13.9	126/1083 11.6	59/258 22.9	1/2 50.0	34/196 17.3	15/357 4.2
Second When 2	294/4322 6.8	221/4013 5.5	226/1800 12.6	21/55 38.2	152/1521 10.0	55/173 3.2
Second When 3	54/1177 4.6	41/1083 3.8	19/258 7.3	1/2 50.0	10/196 5.1	7/359 1.9

DRIVER STUDY
OBSERVATION FORM #1

S1646
111380

Observer _____ City _____

Intersection _____ 1 Primary Road 1 City
2 Freeway Exit 2 Suburb
3 Rural

Location No. _____

Day _____

Date _____

Month _____

Time Started _____ 1 AM 2 PM Time Ended _____ 1 AM 2 PM

Conditions 1 Daylight 2 Twilight 3 Night
1 Dry 2 Rain 3 Snow, Ice

#	License Number	Adult Self 1 Self 2 Use 3 None	Automatic System 1 Automatic 2 Possible 3 Missing	Sex of Driver 1 M 2 F	Make Model	Year	Driver and Passenger Position by Age Group: Front Seat: Driver	Front Seat: Center	Front Seat: Sub-Board	Rear Seat: Driver	Rear Seat: Center	Rear Seat: Sub-Board	Year of Sta. Wagon Hatchback Number of Children
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AGE GROUP: 1 Infant (Under 1 yr) 2 Small Child (1-4 yrs) 3 Sub-teen (5-12 yrs) 4 Teen (12-19 yrs) 5 Adult (20-24) 6 Adult (25-49)
7 Adult (30 yrs or over) 8 Child on Lap

#	LICENSE NUMBER	ADULT BELT USED 1 Belt 2 Lap 3 None	AUTOMATIC SYSTEM 1 Automatic 2 Possible 3 Missing	SEX OF DRIVER 1 M 2 F	MAKE (MODEL)	YEAR	DRIVER AND PASSENGER POSITION BY AGE GROUP FRONT SEAT Driver	FRONT SEAT Center	FRONT SEAT Right	REAR SEAT Driver	REAR SEAT Center	REAR SEAT Right	REAR OF STA. WAGON MATCHBACK NUMBER OF CHILDREN
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AGE GROUP: 1 Infant (Under 1 yr) 2 Small Child (1-4 yrs) 3 Sub-teen (5-12 yrs) 4 Teen (13-19 yrs) 5 Adult (20-24) 6 Adult (25-49)

7 Adult (50 yrs or over) 8 Child on Lap

CHILD RESTRAINT/OCCUPANT POSITION
PASSENGER OBSERVATION FORM #2

51646
111380

Observer _____ City _____

Intersection _____ 1 Primary Road 1 City
2 Freeway Exit 2 Suburb
3 Rural

Location No. _____

Day _____

Date _____

Month _____

Time Started _____ 1 AM 2 PM Time Ended _____ 1 AM 2 PM

Conditions 1 Daylight 2 Twilight 3 Night
1 Dry 2 Rain 3 Snow, Ice

#	LICENSE NUMBER	TOTAL PASSENGERS (Write in Number)	AGE GROUP (1 Infant, 2 Small Child, 3 Sub-Teen, 4 Teen, 5 Adult)	SEX (1 M, 2 F)	SEAT (1 Front, 2 Back, 3 Rear)	POSITION (1 Driver Side, 2 Center, 3 Outboard)	ADULT BELT (1 Both, 2 Lap, 3 None)	CHILD RES. DEVICE (1 Shldr & Belt, 2 Shldr Only, 3 Belt Only, 4 No Shldr/Blt, 5 Jimmy Seat, 6 No Seat)	NOT RESTRAINED: POSTURE (1 Sit, 2 Stand, 3 Kneel, 4 Lie)	NOT RESTRAINED: LOCATION (1 Seat, 2 Floor, 3 Lap)	NOT RESTRAINED: OCCUPANT'S FACE (1 Seat, 2 Door, 3 Person, 4 Non Sub.)	NOT RESTRAINED: OCCUPANT'S CHEST (1 Forward, 2 T.C., 3 L.C., 4 Rear)
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AGE GROUP: 1 Infant (Under 1 yr) 2 Small Child (1-4 yrs) 3 Sub-teen (5-12 yrs) 4 Teen (13-19 yrs) 5 Adult (20 yrs and over) 6 Child on Lap

#	LICENSE NUMBER	TOTAL PASSENGERS (write in Number)	AGE GROUP (1 Infant, 2 Small Child, 3 Sub-Teen, 4 Teen, 5 Adult)	SEX (1 M, 2 F)	SEAT (1 Front, 2 Back, 3 Rear)	POSITION (1 Driver Side, 2 Center, 3 Outboard)	ADULT BELT (1 Both, 2 Lap, 3 None)	CHILD RES. DEVICE (1 Straps & Belt, 2 Straps Only, 3 Belt Only, 4 No Straps/Belt, 5 Flimsy Seat, 6 No Seat)	NOT RESTRAINED: POSTURE (1 Sit, 2 Stand, 3 Kneel, 4 Lie)	NOT RESTRAINED: LOCATION (1 Seat, 2 Floor, 3 Lap)	NOT RESTRAINED: OCCUPANT'S BACK (1 Seat, 2 Door, 3 Person, 4 Non Sup.)	NOT RESTRAINED: OCCUPANT'S KNEES (1 Forward, 2 A.C., 3 L.C., 4 Rear)
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AGE GROUP: 1 Infant (Under 1 yr) 2 Small Child (1-4 yrs) 3 Sub-teen (5-12 yrs) 4 Teen (13-19 yrs) 5 Adult (20 yrs and over) 6 Child on Lap

MOTORCYCLE - MOPED
OBSERVATION FORM

Observer _____ City _____

Intersection _____ 1 Primary Road 1 City

Location No. _____ 2 Freeway Exit 2 Suburb

Day _____ 3 Turnpike (Night) 3 Rural

Date _____ 4 Turnpike (Day) 4 Rural

Month _____ 5 Turnpike

Time Started _____ 1 AM 2 PM Time Ended _____ 1 AM 2 PM

Conditions 1 Daylight 2 Twilight 3 Night

1 Dry 2 Rain 3 Snow, Ice

#	DRIVER 1 HELMET ON 2 HELMET OFF	PASSENGER* 1 HELMET ON 2 HELMET OFF (*IF NO PASSENGER, LEAVE SPACE BLANK)	• IF MOTORCYCLE, LEAVE SPACE BLANK • IF MOPED OR MOTOR-BIKE, RECORD "1"
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#	DRIVER 1 HELMET ON 2 HELMET OFF	PASSENGER* 1 HELMET ON 2 HELMET OFF (*IF NO PASSENGER, LEAVE SPACE BLANK)	• IF MOTORCYCLE, LEAVE SPACE BLANK • IF MOPED OR MOTORBIKE, RECORD "1"
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Sample Design for Fresno, California

The sample instructions for Fresno, California include:

1 These instructions
2 A map of Fresno
3 A list entitled "Location Assignments for Fresno, California"

Map of Fresno:

The map show 20 "Red Dots." Each "Dot" represents the intersection where observations are to be conducted. Each "Dot" is given a location number which ties in with the location number on the list entitled "Location Assignments for Fresno, California."

Location Assignments For Fresno, California

This form tells you on a given day what location number to go to and the time periods you must spend observing at the specified location number.

This is how it works:

On day 1, you go to West Herndon and North Van Hess (Loc. #1) and observe from 7 AM to 9:30 AM. In the afternoon, you go to West Shaw and Marks Ave. (Loc. #2) and observe from 1 PM to 3:30 PM. etc. for days 2 through 10.

At each location, observe 1/2 hour on the Driver study (White Form) and 2 hours on the Passenger Study (Pink Form). Thus, each month you will have observed 10 hours on the Driver Study and 40 hours on the Passenger Study for a total of 50 hours.

Minor adjustments may be made in the specified time periods because of weather conditions or the change from daylight to standard time since it is not practical to observe if you don't have good visibility. Also, if an assigned location does not have a traffic light, find the nearest location in that general area with a traffic light and observe there.

Driver Study

Observe every second car that stops for a red light. If time permits, go ahead and observe the third, fourth and fifth car. If only one car stopped at red light, you may observe that car.

Passenger Study

Observe only cars with passengers. Give preference to cars with infants and children under 15. No need to be concerned about the second car stopped for red light on this study.

Location Assignments For Fresno, California

Day	Loc. #	Intersection	Time Period
1	1	West Herndon and North Van Hess	AM 7:00-9:30
	2	West Shaw and Marks Ave.	PM 1:00-3:30
2	3	West Shields and West Ave.	AM 8:00-10:30
	4	West Shaw and Blackstone Ave.	PM 2:00-4:30
3	5	East Herndon and North First St.	AM 9:00-11:30
	6	North Cedar and Buelard Ave.	PM 3:00-5:30
4	7	East Shaw and North Clovis Ave.	AM 10:00-12:30
	8	East Olive and N. Chestnut Ave.	PM 4:00-6:30
5	9	East Belmont and Chestnut Ave.	AM 11:00-1:30
	10	Kings Canyon Rd. and Clovis Ave.	PM 2:30-5:00
6	11	East Belmont and Clovis	AM 7:00-9:30
	12	Ventura Ave. and South Cedar Ave.	PM 2:00-4:30
7	13	Ventura and "B" St.	AM 8:00-10:30
	14	Fresno Street and Divisadoro	PM 3:00-5:30
8	15	Belmont and Blackstone	AM 9:00-11:30
	16	W. McKinley and West Ave.	PM 4:00-6:30
9	17	E. Shields and Blackstone	AM 10:00-12:30
	18	E. McKinley and First St.	PM 2:00-4:30
10	19	Aslan Ave. and First Street	AM 11:00-1:30
	20	E. Shields and N. Chestnut	PM 2:30-5:00

Sample Design for Bakersfield, California

The sample instructions for Bakersfield, California include:

1 These instructions
2 A map
3 A list entitled "Location Assignments for Bakersfield, California"

Map

The map show 20 "Red Dots." Each "Dot" represents the intersection where observations are to be conducted. Each "Dot" is given a location number which ties in with the location number on the list entitled "Location Assignments for Bakersfield, California."

Location Assignments For Bakersfield, California

This form tells you on a given day what location number to go to and the time periods you must spend observing at the specified location number.

This is how it works:

On day 1, you go to "H" St. and 24th Street (Loc. #1) and observe from 7 AM to 9:30 AM. In the afternoon, you go to Union Ave. and Bernard Street (Loc. #2) and observe from 1 PM to 3:30 PM.

At each location, observe 1/2 hour on the Driver study (White Form) and 2 hours on the Passenger Study (Pink Form). Thus, each month you will have observed 10 hours on the Driver Study and 40 hours on the Passenger Study for a total of 50 hours.

Minor adjustments may be made in the specified time periods because of weather conditions or the change from daylight to standard time since it is not practical to observe if you don't have good visibility. Also, if an assigned location does not have a traffic light, find the nearest location in that general area with a traffic light and observe there.

Driver Study

Observe every second car that stops for a red light. If time permits, go ahead and observe the third, fourth and fifth car. If only one car stopped at red light, you may observe that car.

Passenger Study

Observe only cars with passengers. Give preference to cars with infants and children under 15. No need to be concerned about the second car stopped for red light on this study.

Location Assignments For Bakersfield, California

Day	Loc. #	Intersection	Time Period
1	1	"H" St. and 24th St.	AM 7:00-9:30
	2	Union Ave. and Bernard St.	PM 1:00-3:30
2	3	Verdon Ave. and Columbus St.	AM 8:00-10:30
	4	Bakers St. and Truxton St.	PM 2:00-4:30
3	5	California Ave. and Oak St.	AM 9:00-11:30
	6	Chester Ave. and Brundage Lane	PM 2:30-5:00
4	7	Stockdale Hwy and New Stine Rd.	AM 10:00-12:30
	8	Wible Rd. and Ming Ave.	PM 2:30-5:00
5	9	Ming Ave. and New Stine Rd.	AM 11:00-1:30
	10	Brundage and Wilke Rd.	PM 2:30-5:00
6	11	Chester Ave. and California Ave.	AM 7:00-9:30
	12	South Union and White Lane	PM 2:00-4:30
7	13	White Lane and "H" St.	AM 8:00-10:30
	14	Planz Rd. and Wible Rd.	PM 1:00-3:30
8	15	Beale Ave. and Lincoln St.	AM 9:00-11:30
	16	Auburn St. and Oswell St.	PM 2:00-4:30
9	17	Brundage and Cottonwood Rd.	AM 10:00-12:30
	18	"H" St. and Ming Ave.	PM 2:30-5:00
10	19	South Union Ave. and Ming Ave.	AM 11:00-1:30
	20	Washington St. and California Ave.	PM 3:00-5:30

Sample Design for Midland, Michigan

The sample instructions include:

1 These instructions
2 A map
3 A list entitled "Location Assignments"

Map

The map show 20 "Red Dots." Each "Dot" represents the intersection where observations are to be conducted. Each "Dot" is given a location number which ties in with the location number on the list entitled "Location Assignments."

Location Assignments

This form tells you on a given day what location number to go to and the time periods you must spend observing at the specified location number.

This is how it works:

On day 1, you go to Moorland and Perrine Rd. (Loc. #1) and observe from 7 AM to 9:30 AM. In the afternoon, you go back to Loc. #1 and observe from 1 PM to 3:30 PM.

At each location and time period, observe 1 hour on the Driver study (White Form) and 1 1/2 hours on the Passenger Study (Blue Form). Thus, each month you will have observed 40 hours on the Driver Study and 60 hours on the Passenger Study for a total of 100 hours.

Minor adjustments may be made in the specified time periods because of weather conditions or the change from daylight to standard time since it is not practical to observe if you don't have good visibility. Also, if an assigned location does not have a traffic light or stop sign, find the nearest location in that general area with a traffic light and observe there.

Driver Study

Observe every second car that stops for a red light. If time permits, go ahead and observe the third, fourth and fifth car. If only one car stopped at red light, you may observe that car.

Passenger Study

Observe only cars with passengers. Give preference to cars with infants and small children. No need to be concerned about the second car stopped for red light on this study.

12/01/81

Location Assignments (Midland)

Day	Loc. #	Intersection	Time Period
1	1	Moorland and Perrine	AM 7:00-9:30
	1	Moorland and Perrine	PM 1:00-3:30
2	2	N. Saginaw Rd. and Perrine	AM 8:00-10:30
	2	N. Saginaw Rd and Perrine	PM 2:00-4:30
3	3	Eastman and Saginaw	AM 9:00-11:30
	3	Eastman and Saginaw	PM 2:30-5:00
4	4	US #10 and Eastman	AM 10:00-12:30
	4	US #10 and Eastman	PM 2:30-5:00
5	5	Jefferson and Wheeler	AM 11:00-1:30
	5	Jefferson and Wheeler	PM 2:30-5:00
6	6	US #10 and Waldo	AM 7:00-9:30
	6	US #10 and Waldo	PM 2:00-4:30
7	7	Washington and St. Andrews	AM 8:00-10:30
	7	Washington and St. Andrews	PM 1:00-3:30
8	8	Ashman Circle and Saginaw	AM 9:00-11:30
	8	Ashman Circle and Saginaw	PM 2:00-4:30
9	9	Eastman and St. Andrews	AM 10:00-12:30
	9	Eastman and St. Andrews	PM 2:30-5:00
10	10	Carpenter and Ashman	AM 11:00-1:30
	10	Carpenter and Ashman	PM 2:30-5:00
11	11	Indian and Ashman	AM 7:00-9:30
	11	Indian and Ashman	PM 2:00-4:30
12	12	Saginaw and Bay City	AM 8:00-10:30
	12	Saginaw and Bay City	PM 1:00-3:30
13	13	Waldo and Bay City	AM 9:00-11:30
	13	Waldo and Bay City	PM 2:00-4:30
14	14	Swede Road and Ashman	AM 10:00-12:30
	14	Swede Road and Ashman	PM 2:30-5:00
15	15	E. Patrick and Abbott	AM 11:00-1:30
	15	E. Patrick and Abbott	PM 2:30-5:00
16	16	East Lawn and Washington St.	AM 7:00-9:30
	16	East Lawn and Washington St.	PM 2:00-4:30

17	17	Wheeler and Swede	AM 8:00-10:30
	17	Wheeler and Swede	PM 1:00-3:30
18	18	Sugnet and Jefferson	AM 9:00-11:30
	18	Sugnet and Jefferson	PM 2:00-4:30
19	19	Dilloway and Eastman	AM 10:00-12:30
	19	Dilloway and Eastman	PM 2:30-5:00
20	20	Orchard and Sugnet	AM 11:00-1:30
	20	Orchard and Sugnet	PM 2:30-5:00

Sample Design for Portage, Michigan

The sample instructions include:

1 These instructions
2 A map
3 A list entitled "Location Assignments"

Map

The map show 20 "Red Dots." Each "Dot" represents the intersection where observations are to be conducted. Each "Dot" is given a location number which ties in with the location number on the list entitled "Location Assignments."

Location Assignments

This form tells you on a given day what location number to go to and the time periods you must spend observing at the specified location number.

This is how it works:

On day 1, you go to West Milham and Angling Rd. (Loc. #1) and observe from 7 AM to 9:30 AM. In the afternoon, you go back to Loc. #1 and observe from 1 PM to 3:30 PM.

At each location and time period, observe 1 hour on the Driver study (White Form) and 1 1/2 hours on the Passenger Study (Blue Form). Thus, each month you will have observed 40 hours on the Driver Study and 60 hours on the Passenger Study for a total of 100 hours.

Minor adjustments may be made in the specified time periods because of weather conditions or the change from daylight to standard time since it is not practical to observe if you don't have good visibility. Also, if an assigned location does not have a traffic light or stop sign, find the nearest location in that general area with a traffic light and observe there.

Driver Study

Observe every second car that stops for a red light. If time permits, go ahead and observe the third, fourth and fifth car. If only one car stopped at red light, you may observe that car.

Passenger Study

Observe only cars with passengers. Give preference to cars with infants and small children. No need to be concerned about the second car stopped for red light on this study.

Location Assignments
(Portage)

Day	Loc #	Intersection	Time Period
1	1	West Milham and Angling	AM 7:00 - 9:30
	1	West Milham and Angling	PM 1:00 - 3:30
2	2	I-94 Exit and Oakland	AM 8:00 -10:30
	2	I-94 Exit and Oakland	PM 2:00 - 4:30
3	3	Milham and Westnedge	AM 9:00 -11:30
	3	Milham and Westnedge	PM 2:30 - 5:00
4	4	East Milham and Portage	AM 10:00 -12:30
	4	East Milham and Portage	PM 2:30 - 5:00
5	5	Angling Rd. and Romence	AM 11:00 - 1:30
	5	Angling Rd. and Romence	PM 2:30 - 5:00
6	6	Oakland and Romence	AM 7:00 - 9:30
	6	Oakland and Romence	PM 2:00 - 4:30
7	7	Romence and Westnedge	AM 8:00 -10:30
	7	Romence and Westnedge	PM 1:00 - 3:30
8	8	Centre and Oakland	AM 9:00 -11:30
	8	Centre and Oakland	PM 2:00 - 4:30
9	9	Lovers Lane and E. Centre	AM 10:00 -12:30
	9	Lovers Lane and E. Centre	PM 2:30 - 5:00
10	10	Portage and E. Centre	AM 11:00 - 1:30
	10	Portage and E. Centre	PM 2:30 - 5:00
11	11	I-131 and W. Centre	AM 7:00 - 9:30
	11	I-131 and W. Centre	PM 2:00 - 4:30
12	12	Melody and Westnedge	AM 8:00 -10:30
	12	Melody and Westnedge	PM 1:00 - 3:30
13	13	Zylman and Sprinkle Rd.	AM 9:00 -11:30
	13	Zylman and Sprinkle Rd.	PM 2:00 - 4:30
14	14	Vanderbilt and Oakland	AM 10:00 -12:30
	14	Vanderbilt and Oakland	PM 2:30 - 5:00
15	15	Ames and Portage	AM 11:00 - 1:30
	15	Ames and Portage	PM 2:30 - 5:00

Day	Loc #	Intersection	Time Period
16	16	Oakland and Shaver Rd.	AM 7:00 - 9:30
	16	Oakland and Shaver Rd.	PM 2:00 - 4:30
17	17	Bacon and Westnedge	AM 8:00 -10:30
	17	Bacon and Westnedge	PM 1:00 - 3:30
18	18	Osterhout and Westnedge	AM 9:00 -11:30
	18	Osterhout and Westnedge	PM 2:00 - 4:30
19	19	Osterhout and Portage	AM 10:00 -12:30
	19	Osterhout and Portage	PM 2:30 - 5:00
20	20	Woodhams and East Shore	AM 11:00 - 1:30
	20	Woodhams and East Shore	PM 2:30 - 5:00