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DIRECT OBSERVATION OF SEAT BELT USE IN MICHIGAN: APRIL 1987

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16. Abstract

Results of a direct observation study of seat belt use in Michigan conducted in April 1987 were compared with results of previous surveys in December 1984, April 1985, July 1985, December 1985, April 1986, July 1986, and December 1986. In the current survey, 24,414 occupants in 16,225 cars and light trucks were observed between April 20 and May 15, 1987. The main finding was that use of seat belts changed little between December 1986 and April 1987. Front-seat restraint use among all motorists observed was 45.7% in April 1987, compared to 44.7% in December 1986. The increase is not statistically significant since the estimates have a margin of error of ± 2.6%. Use rates within all age groups exhibited only marginal increases or decreases from the previous survey wave and were as follows in April 1987 (all seat positions): 62.8% among occupants age 0-3; 32.0% among occupants age 4-15; 37.1% among occupants age 16-29; 46.9% among occupants age 30-59; and 55.9% among occupants age 60 and older. Females continued to exhibit higher restraint use than males, 48.7% versus 39.7% in the current survey. As in previous surveys, restraint use varied by region of the state. Seat belt use has remained relatively stable since December 1985 when use among front-seat occupants was 44.5%. Finally, front-seat belt use among those age 16 and over remains significantly higher than it was before Michigan's mandatory use law took effect (45.6% in April 1987, versus 18.3% in December 1984). An additional survey is scheduled for July 1987.

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1 INTRODUCTION

The Michigan mandatory seat belt law, implemented in July of 1985, is one of 27 similar laws in the United States intended to reduce motor vehicle crash-related deaths and injuries (Highway and Vehicle Safety Report, 1987).[1] The success of these laws in preventing injury and death, however, has not been uniform, perhaps due to varying levels of compliance attained in these states. For example, a recently completed multiple time-series evaluation of effects in the first eight states with seat belt laws in the U.S. identified significant fatality reductions of 7.1% to 24.5% (Wagenaar, 1987). Compliance with mandatory belt laws has also varied **within** states over time. Although the short-term trend following such legislation has generally been a sharp increase in belt use immediately following implementation of such laws followed by a partial decline over the subsequent six to twelve months, belt use in some states has exhibited a departure from this pattern. In Austin, Texas, for example, the sharp increase in belt use observed immediately after enforcement of the law began was still evident six months later (Bunch and others, 1986). These differing trends over time have implications for expected reductions in motor vehicle crash-related deaths and injuries. Consequently, evaluation of the success of mandatory seat belt laws should include an understanding of trends in belt use.

In order to measure compliance with Michigan's seat belt law, The University of Michigan Transportation Research Institute is conducting a series of direct observation surveys of seat belt use among motor vehicle occupants throughout the state. Two survey waves (December 1984 and April 1985) were conducted prior to implementation of the law and provide a base against which effects of the law are assessed. The third wave was conducted in July 1985 immediately following implementation of the law. The fourth, fifth, sixth, and seventh waves were conducted in December 1985 and April, July, and December 1986 respectively, five, nine, twelve, and seventeen months after the law took effect. The eighth survey wave reported here covered the period from April 20 to May 15, 1987, twenty-one months after the Michigan law was implemented. Each of the surveys examined restraint use by a number of variables including age, sex, seating position, time of day, day of week, type of roadway, weather conditions, vehicle type and size, and region of the state. Readers are referred to previous reports for complete results of the previous surveys (Wagenaar and Wiviott, 1985a; Wagenaar, Wiviott, and Compton, 1985; Wagenaar and Wiviott, 1985b;

1. Laws in two additional states, Nebraska and Massachsetts, were repealed by voter referendum in November 1986.

Wagenaar, Wiviott, and Businski, 1986; Wagenaar, Businski, and Molnar, 1986a; Wagenaar, Businski, and Molnar, 1986b; and Wagenaar, Molnar, and Businski, 1987). In the current report, restraint use in April 1987 is compared with the results of previous survey waves.[2] An additional survey wave is scheduled for July 1987.

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2. For the ease of the reader, the current survey wave is referred to as the April 1987 wave throughout this report even though data collection was not completed until mid-May.

2 METHODS

To ensure comparability across all survey waves in this series, the same methods were used in each wave. A few minor differences in the current wave are noted in this section. For a detailed discussion of the sample design, data collection procedures, and analytic procedures used throughout the series of survey waves, the reader is referred to the first report of this series (Wagenaar and Wiviott, 1985a).

As in previous survey waves, motor vehicle occupants at a carefully selected probability sample of 240 intersections throughout the State of Michigan were observed by trained field observers. Observers recorded restraint use, seat position, estimated age, and sex for occupants in **all** seating positions in each sampled vehicle. The size and type of vehicle was also recorded.

Detailed information on the seating positions of all occupants was recorded, including those in nonstandard seating positions. Specifically, observers noted whether passengers were sitting, standing, kneeling, or lying on the seat, floor, or cargo area of the vehicle. Passengers riding in the lap of another occupant were also recorded. The objective was to collect data on the full complement of restraint use and related information for all occupants of vehicles included in the sample.

Beginning in the July 1985 wave, observers were instructed to record incorrect use of seat belts. Examples of incorrect belt use included: positioning the shoulder harness under the outboard arm, behind the back, or over the inside shoulder; and restraining two occupants with one seat belt. The category of incorrect belt use did not include occupants (typically in the 4-15 age group) who were too short to wear a shoulder belt in the correct position across the chest. Often such occupants placed the belt behind the back. These occupants were coded as correctly belted. Occupants incorrectly using seat belts were coded as "belted" and, therefore, appear in the tables and figures below as restrained. However, incorrect use of belts was recorded to assess the extent of incorrect use and to permit further analyses of occupants who use seat belts incorrectly.

Observers limited the number of vehicles recorded during any given signal cycle to three. This procedure was adopted during the July 1985 wave. After the mandatory use law took effect, occupants in long traffic queues buckled up after noticing the observer examine

vehicles ahead of them in the queue. Recording data on only the first three vehicles prevented inclusion of these occupants in the survey.

The sample of 240 sites was identical to previous survey waves except that seven alternative sites were selected (from the pool of sites selected in the original sample design) to replace sites at which construction was occurring or at which an insufficient number of observations could be made due to the absence of traffic. Nine field staff conducted observations. Three had experience in previous survey waves; six were newly hired. A greater number of observers was used for the current survey wave than for previous waves because data were collected in conjuction with another UMTRI study, and observers also functioned as field personnel for that study.[3] All field personnel were spot checked in the field by a senior staff member. Field personnel attended an extensive training session in which data collection policies and procedures were reviewed (the training program was described in the first report of this series; Wagenaar and Wiviott, 1985a).

The first observer visited 35 sites, the second 24 sites, the third 27 sites, the fourth 36 sites, the fifth 14 sites, the sixth 28 sites, the seventh 25 sites, the eighth 24 sites, and the ninth 27 sites. Beginning in the April 1985 wave, two-person teams were used to observe certain central city sites due to safety considerations. At each of these sites two observers collected data at the same intersection but from different paths of traffic. Each observer recorded half of the required vehicles at each site. Using two observers for central city sites allowed for efficient and rapid collection of data while providing security for the observers. All other sites were observed by a single observer. Within each sampling area, the first site observed for each day and city was selected, using a random number table.

Descriptive statistics for the 240 observation sites are shown in Table 2.1. The distribution of site observations by day of week was similar to previous survey waves conducted in the month of April. The distribution of site observations by hour of the day differed from previous waves in that observations were extended to 9:00 in the evening in the current wave. The distribution of site observations by weather conditions differed only slightly from that of the April wave a year ago in that there were more observations made under sunny conditions (69.6% in the current wave versus 61.7% in the April 1986 wave). Conversely, there also was slight decrease in observations under cloudy and rainy conditions from a year ago.

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3. The added field support resulted in more total observations than in previous survey waves. Because the sample design called for 51 observed vehicles at each site, observed vehicles at sites where more than 51 vehicles were observed were weighted down to 51 during data processing. Similarly, in previously survey waves, observed vehicles at the few sites where fewer than 51 vehicles were observed were weighted up to 51.

TABLE 2.1
Descriptive Statistics for the 240 Observation Sites

Day of Week		Start Time		Site Choice		Weather		Observer	
Monday	14.2%	7-9 AM	8.7%	Primary	97.1%	Sunny	69.6%	(A)	14.6%
Tuesday	13.8%	9-11 AM	13.3%	Alternate	2.9%	Cloudy	27.5%	(B)	10.0%
Wednesday	14.6%	11-1 PM	18.4%			Rain	2.9%	(C)	11.3%
Thursday	15.8%	1-3 PM	17.1%					(D)	15.0%
Friday	15.8%	3-5 PM	17.5%					(E)	5.8%
Saturday	13.3%	5-7 PM	15.0%					(F)	11.7%
Sunday	12.5%	7-9 PM	10.0%					(G)	10.4%
								(H)	10.0%
								(I)	11.3%
TOTALS	100%		100%		100%		100%		100%

Actual numbers of cases observed across categories of the major variables are shown in Table 2.2. Restraint use estimates based on small numbers of cases, such as those for occupants in extra seats and cargo areas, need to be interpreted with care.

In addition to showing the actual number of cases by subcategory, Table 2.2 indicates the extent of missing data for each variable. The key restraint item was missing for only 0.2% of all occupants observed. These were cases in which the observer could not accurately identify whether the occupant was restrained. There were 13 cases of missing data on restraint use for the 16,225 drivers and 5,541 front-right occupants observed. Front-center and rear-seat occupants had low to moderate levels of missing data on restraint use (0.6% to 3.1%; see Table 2.2).

TABLE 2.2
Sample Distributions for Major Variables by Seat Position, Unweighted Ns and Percent Missing Data

	Seat Position									
	Driver	Front Center	Front Right	Rear Left	Rear Center	Rear Right	Extra Seats	Cargo Area	Held in Lap	All[1]
Restraint Use										
None	8,686	246	3,144	477	341	677	21	65	81	13,763
Belted	7,530	40	2,332	148	51	177	3	1	0	10,282
CRD Correct	—	15	39	60	61	58	0	0	0	233
CRD Wrong	—	13	22	20	16	21	0	0	0	92
Missing	9	10	4	12	3	6	0	0	0	44
% Missing	0.1	3.1	0.1	1.7	0.6	0.6	0.0	0.0	0.0	0.2
Sex										
Male	9,932	130	1,847	359	223	397	15	41	40	12,996
Female	6,283	186	3,684	347	243	540	9	21	33	11,359
Missing	10	8	10	11	6	2	0	4	8	59
% Missing	0.1	2.5	0.2	1.5	1.3	0.2	0.0	6.1	9.9	0.2
Age										
0–3	0	74	117	112	125	118	2	3	71	628
4–15	5	130	691	354	260	408	17	52	8	1,944
16–29	5,509	73	1,823	134	60	221	4	10	2	7,836
30–59	8,962	36	2,287	79	23	111	1	0	0	11,339
60+	1,741	7	767	33	3	79	0	0	0	2,630
Missing	8	4	16	5	1	2	0	1	0	37
% Missing	0.0	1.2	0.3	0.7	0.2	0.2	0.0	1.5	0.0	0.2
Vehicle Type										
Small Car	4,889	21	1,475	200	121	250	0	6	20	6,985
Midsize Car	4,553	67	1,600	219	138	307	2	3	21	6,920
Large Car	3,722	87	1,438	222	156	289	8	10	23	5,964
Pickup	1,730	131	538	5	2	5	0	25	10	2,446
Van	857	13	318	49	31	59	8	15	6	1,359
Other	458	5	164	20	20	25	6	7	1	706
Missing	16	0	8	2	4	4	0	0	0	34
% Missing	0.1	0.0	0.1	0.3	0.8	0.4	0.0	0.0	0.0	0.1
Site Type										
Intersection	12,852	269	4,491	579	375	733	16	48	62	19,445
Freeway Exit	3,373	55	1,050	138	97	206	8	18	19	4,969
Missing	0	0	0	0	0	0	0	0	0	0
Day of Week										
Monday	2,383	35	701	87	59	118	0	4	15	3,405
Tuesday	2,219	36	591	73	49	76	3	3	6	3,057
Wednesday	2,288	46	701	83	52	103	5	11	10	3,302
Thursday	2,545	36	766	89	65	136	4	3	17	3,667
Friday	2,774	45	798	108	66	131	6	4	12	3,948
Saturday	2,091	74	976	125	97	182	5	24	7	3,585
Sunday	1,925	52	1008	152	84	193	1	17	14	3,450
Missing	0	0	0	0	0	0	0	0	0	0

TABLE 2.2 Continued

	Seat Position									
	Driver	Front Center	Front Right	Rear Left	Rear Center	Rear Right	Extra Seats	Cargo Area	Held in Lap	All[1]
Time of Day										
7-8 AM	195	1	35	2	1	4	0	0	0	238
8-9 AM	744	8	117	18	11	15	2	0	1	916
9-10 AM	1,162	11	309	40	22	57	0	5	2	1,608
10-11 AM	914	12	275	32	31	47	2	3	6	1,325
11-12 AM	1,687	37	517	71	45	96	1	0	4	2,463
12-1 PM	1,104	9	352	43	31	49	0	4	1	1,594
1-2 PM	1,717	33	611	73	45	106	4	3	12	2,610
2-3 PM	1,368	26	492	68	42	80	3	10	7	2,096
3-4 PM	1,598	31	569	71	53	100	0	13	7	2,443
4-5 PM	1,283	33	425	80	37	80	3	5	8	1,955
5-6 PM	1,392	32	531	65	36	73	6	13	3	2,152
6-7 PM	1,219	29	486	60	42	82	0	3	12	1,935
7-8 PM	1,269	42	570	60	54	105	3	1	11	2,119
8-9 PM	573	20	252	34	22	45	0	6	7	960
Missing	0	0	0	0	0	0	0	0	0	0
Weather										
Sunny	11,525	228	3,929	506	332	683	14	54	61	17,349
Cloudy	4,302	82	1,473	203	133	236	10	10	19	6,476
Rain	398	14	139	8	7	20	0	2	1	589
Missing	0	0	0	0	0	0	0	0	0	0
MDOT Region										
Western U.P.	758	19	237	29	24	37	4	2	4	1,114
Eastern U.P.	495	17	203	26	27	34	0	5	5	812
Northwest	720	19	336	41	26	58	0	7	1	1,209
Northeast	526	18	228	32	26	36	1	1	0	869
West Central	1,826	37	634	69	53	105	0	6	8	2,744
East Central	1,879	59	731	90	71	134	7	11	20	3,007
Southwest	1,679	38	536	62	39	71	4	10	6	2,446
Southeast	1,631	23	447	59	42	85	1	1	6	2,297
Metro Detroit	6,711	94	2,189	309	164	379	7	23	31	9,916
Missing	0	0	0	0	0	0	0	0	0	0
TOTAL N	16,225	324	5,541	717	472	939	24	66	81	24,414

[1] Includes 25 occupants standing.

3 RESULTS

Seat belts or child restraint devices were used by 43.9% of all motor vehicle occupants observed during April 1987. This is essentially identical to the 43.6% use rate in December 1986 (Figure 3.1);[4] the difference is clearly not statistically significant (Z= 0.17).[5]

The latest survey supports earlier findings that restraint use has stabilized during the past sixteen months. In December 1985, five months after the mandatory seat belt law took effect, overall restraint use had declined to 43.0% from 58.4% in July 1985, immediately after the law took effect. Since that time, however, restraint use has changed little (43.7% in April 1986, 45.3% in July 1986, 43.6% in December 1986, and 43.9% in April 1987). While restraint use in April 1987 was lower than the 58.4% peak restraint use rate observed in July 1985, it is still higher than it was before the law took effect. The April 1987 use rate of 43.9% represents a 121.7% increase from the December 1984 rate of 19.8%.

Table 3.1 provides summary information on restraint use by seat location (front and rear) for each major variable of the study, including sex, age, type of vehicle, site type, day of week, time of day, weather, and region. As in previous surveys, restraint use was higher among front-seat occupants than rear-seat occupants (45.7% versus 29.2%).

Young children have particularly high rates of restraint use as a result of mandatory child restraint legislation implemented in 1982 (Wagenaar, 1984; Wagenaar and Webster, 1986) and therefore exert an upward influence on overall use rates. Consequently, effects of the adult mandatory seat belt law on restraint use can be seen most clearly by including only motor vehicle occupants 16 years and older in the analyses. In December 1984, restraint use for adults (16 and over) was 18.3% among front-seat occupants and 7.2% among rear-seat occupants. A noticeable increase in belt use was seen in April 1985, after the law was enacted but before implementation. In July 1985, immediately after implementation, restraint use among front-seat occupants more than doubled, increasing to 60.5%. In December 1985, after five months of compulsory belt use, restraint use was down to 44.0% among front-seat occupants and 6.9% among rear-seat occupants. Adult restraint use remained essentially at those levels through April 1986--44.4% among front-seat occupants

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4. These numbers include both correct and incorrect use of seat belts and child restraint devices.

5. Calculation of Z-statistics takes into account the design effect resulting from the multi-stage sampling procedure used. The design effect of the December 1986 wave was 16.7.

Figure 3.1: Overall Restraint Use

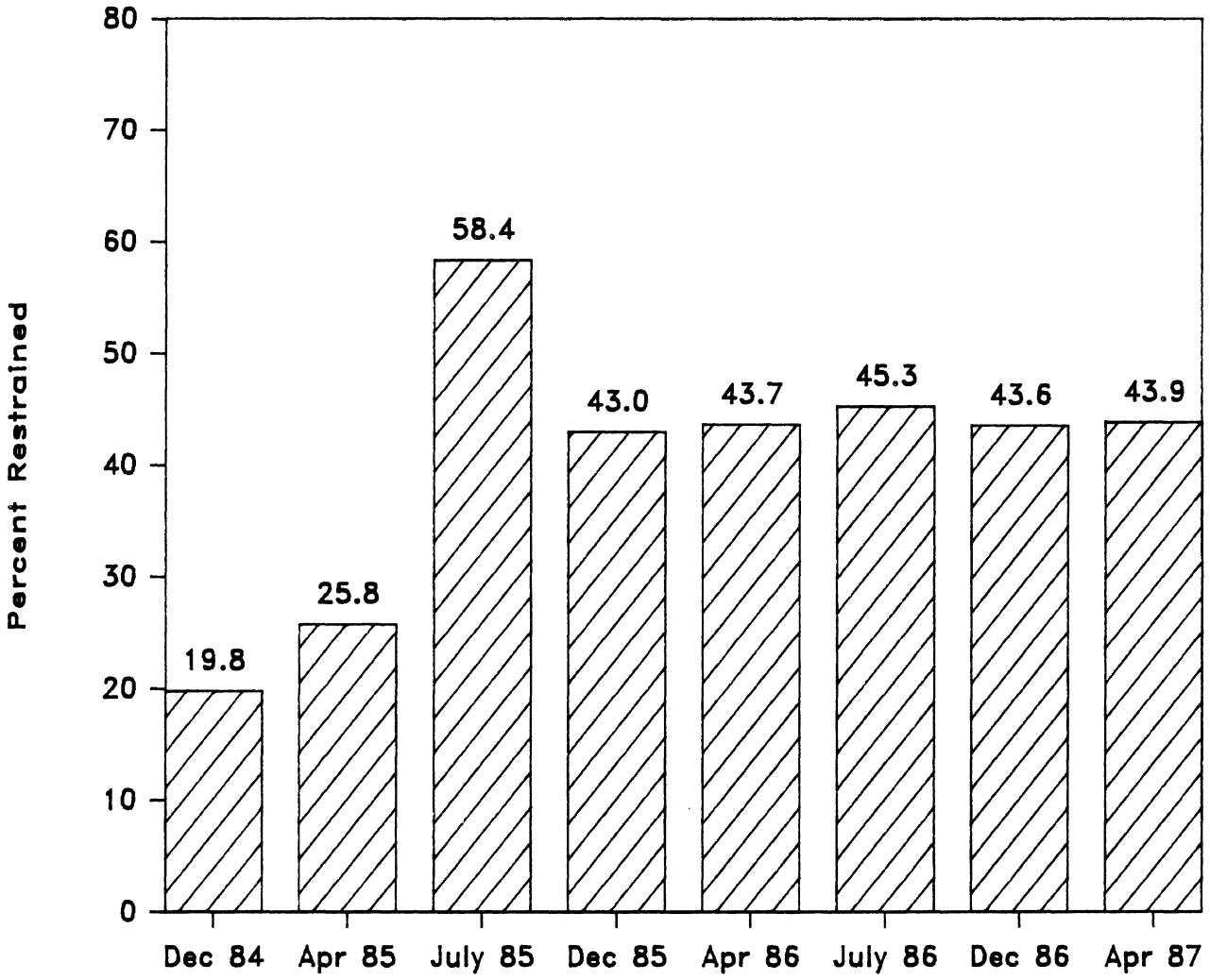

TABLE 3.1
Percent Restrained by Major Variables and Seat Location[1]

	Seat Location		
	Front Seat	Rear Seat	All[2]
Sex			
Male	40.8	31.4	39.7
Female	51.5	26.9	48.7
Age			
0-3	62.2	77.4	62.8
4-15	43.7	25.4	32.0
16-29	38.8	8.5	37.1
30-59	47.6	10.3	46.9
60+	57.5	22.0	55.9
Type of Vehicle			
Small Car	51.1	31.9	49.3
Mid-Sized Car	48.4	34.1	46.8
Large Car	42.6	20.2	39.8
Pickup Truck	32.4	0.0	31.8
Van	40.0	36.6	38.9
Other	48.5	29.5	46.1
Site Type			
Intersection	44.0	28.4	42.4
Freeway Exit	51.6	31.9	49.4
Day of Week			
Monday	42.8	31.0	41.6
Tuesday	47.1	33.1	46.0
Wednesday	47.7	33.4	46.3
Thursday	41.9	27.1	40.4
Friday	44.1	27.4	42.5
Saturday	50.1	28.5	47.3
Sunday	46.8	27.7	44.0

[1]All percents are based on analyses weighted according to the sample design to accurately represent the entire state. Restraint use includes correct and incorrect use of child restraint devices and seat belts.

[2]Includes occupants riding in third and fourth seats of station wagons and vans and in nonstandard seat positions (i.e., on laps, in cargo area, on floor).

TABLE 3.1 Continued

	Seat Location		
	Front Seat	Rear Seat	All[2]
Time of Day			
7-8 AM	56.1	47.7	55.8
8-9 AM	51.3	33.9	50.3
9-10 AM	49.2	36.8	48.2
10-11 AM	49.2	25.2	46.8
11-12 AM	42.5	26.8	41.0
12-1 PM	47.0	27.8	45.5
1-2 PM	47.2	39.0	46.1
2-3 PM	43.0	29.1	41.2
3-4 PM	44.2	20.5	41.7
4-5 PM	45.9	32.0	44.2
5-6 PM	46.5	25.2	44.3
6-7 PM	43.9	24.4	41.8
7-8 PM	44.6	33.4	43.1
8-9 PM	42.5	27.0	40.2
Weather			
Sunny	45.3	29.2	43.5
Cloudy	46.6	30.1	44.9
Rain	46.7	15.2	44.6
MDOT Region			
Western U.P.	45.2	28.2	43.6
Eastern U.P.	37.6	24.1	35.7
Northwest	46.8	34.7	45.3
Northeast	50.1	36.9	48.6
West Central	45.9	34.4	44.6
East Central	42.0	25.6	39.9
Southwest	47.3	26.2	45.5
Southeast	50.1	41.3	49.1
Metro Detroit	45.2	26.2	43.2
TOTAL	45.7	29.2	43.9

[1]All percents are based on analyses weighted according to the sample design to accurately represent the entire state. Restraint use includes correct and incorrect use of child restraint devices and seat belts.

[2]Includes occupants riding in third and fourth seats of station wagons and vans and in nonstandard seat positions (i.e., on laps, in cargo area, on floor).

and 6.6% among rear-seat occupants. In July 1986, estimated adult restraint use increased slightly to 47.0% among front-seat occupants and 7.3% among rear-seat occupants. In December 1986, restraint use among both front-seat and rear-seat adult occupants declined slightly (to 44.3% and 4.6%, respectively). In the current survey wave, restraint use for adults was 45.6% among front-seat occupants and 11.1% among rear-seat occupants (Figure 3.2). While the current use rate among rear-seat adults is higher than observed in the past four waves, and appears higher than the December 1986 rate, the increase is not statistically significant (Z=1.13).

An examination of restraint use by vehicle seating position indicates that in all age groups restraint use was higher among drivers than occupants of other seating positions (Table 3.2). Furthermore, as in previous post-law survey waves, only drivers and front-right passengers had use rates which were substantially higher than those observed in December 1984 prior to enactment of the seat belt law. Occupants in all other seating positions had use rates comparable to pre-law levels (Figure 3.3). This finding is consistent with expectations, given that the law applies only to front-seat occupants.

Restraint use remained highest among occupants age 0-3, who have been required to be restrained when traveling in motor vehicles in Michigan since 1982. A total of 62.8% of occupants 0-3 years were restrained, compared to 32.0% of occupants 4-15 years, 37.1% of occupants 16-29 years, 46.9% of occupants 30-59 years, and 55.9% of occupants 60 years and older (Table 3.2). All age groups exhibited only marginal increases or decreases in restraint use from December 1986 (Figure 3.4); none of these differences were statistically significant.[6]

Incorrect use of safety seats among children age 0-3 increased slightly from the previous wave and continues to be a problem. A total of 27.5% of child restraint devices were observed to be incorrectly used in the current wave, compared to 24.4% in December 1986, 28.1% in July 1986, 27.3% in April 1986, and approximately 20% in each prior wave. Because incorrect use was limited only to cases **obvious** to the observer (noting the data collection process used), data presented here should be considered a conservative estimate. A more detailed study of restraint use among Michigan children under the age of four found that 62.9% of child restraint devices were incorrectly used (Wagenaar, Molnar, Businski, and Margolis, 1986). Incorrect use of child restraint devices in that study was measured both by how the child restraint device was installed in the vehicle and how the child was positioned

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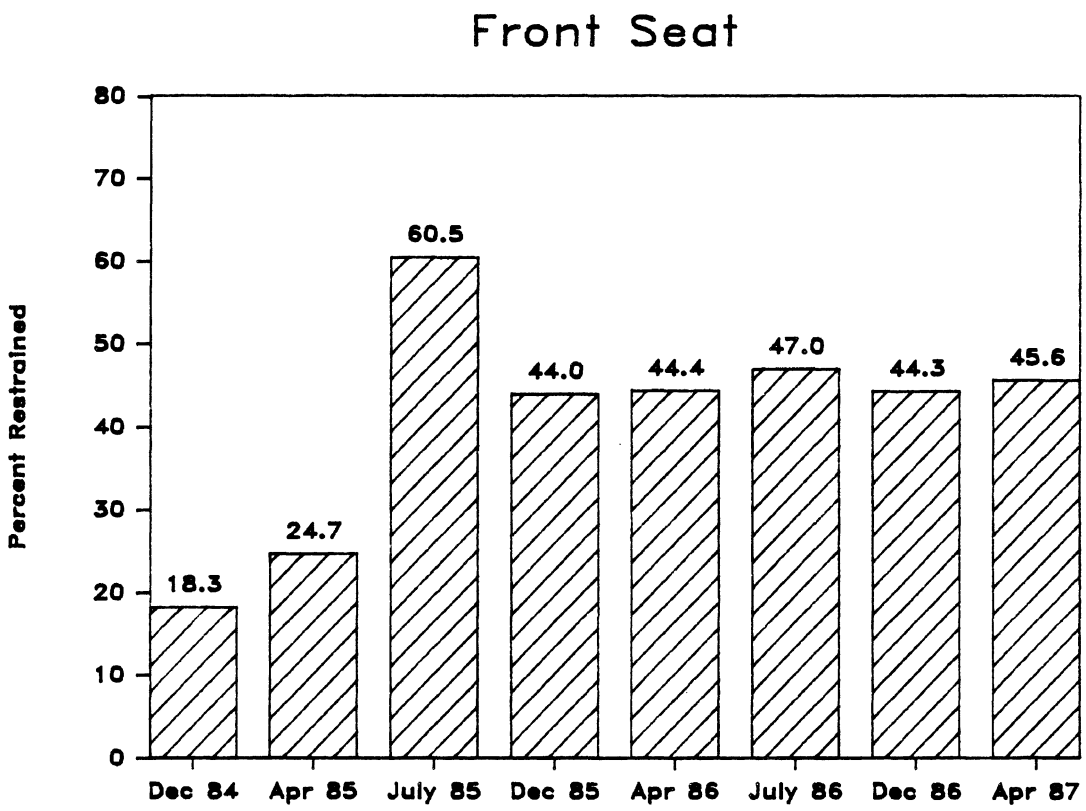
6. The Z-statistics are as follows: 0-3 years, 0.41; 4-15 years, 0.32; 16-29 years, 0.33; 30-59 years, 0.94; and 60 and over, 0.53.

Figure 3.2: Restraint Use by Seat Location

Occupants Age 16 and Over



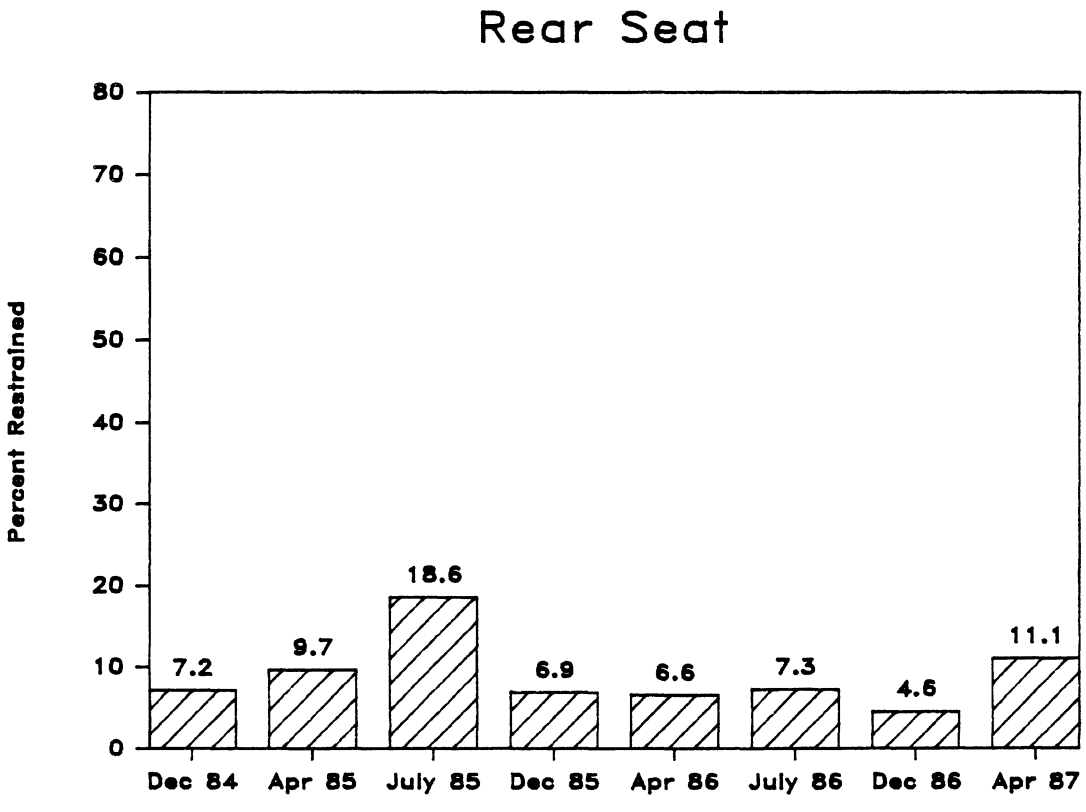


TABLE 3.2
Restraint Use by Age and Seat Position[1]

Age Group	Seat Position									
	Driver	Front Center	Front Right	Rear Left	Rear Center	Rear Right	Extra Seats	Cargo Area	Held in Lap	All[2]
Age 0-3										
% Belted	–	10.1	24.6	14.7	10.7	14.8	0.0	0.0	0.0	13.3
% Correct CRD	–	19.4	31.0	50.4	47.2	49.0	0.0	0.0	0.0	35.8
% Incorrect CRD	–	16.8	17.2	17.8	11.5	16.3	0.0	0.0	0.0	13.8
% Restrained[3]	–	46.3	72.9	82.9	69.4	80.1	0.0	0.0	0.0	62.8
Unweighted N	–	74	117	112	125	118	2	3	71	628
Age 4-15										
% Restrained	41.2	14.9	48.7	30.5	14.6	27.9	18.6	0.0	0.0	32.0
Unweighted N	5	130	691	354	260	408	17	52	8	1944
Age 16-29										
% Restrained	40.9	7.8	33.5	11.3	5.0	7.6	0.0	0.0	0.0	37.1
Unweighted N	5,509	73	1,823	134	60	221	4	10	2	7,836
Age 30-59										
% Restrained	48.4	16.7	44.5	10.3	0.0	12.4	0.0	–	–	46.9
Unweighted N	8,962	36	2,127	79	23	111	1	0	0	11,339
Age 60+										
% Restrained	57.7	22.4	57.3	21.4	0.0	23.1	–	–	–	55.9
Unweighted N	1,741	7	767	33	3	79	0	0	0	2,630
All Ages										
% Restrained	46.8	21.2	43.7	32.9	26.8	27.6	12.8	1.5	0.0	43.9
Unweighted N	16,225	324	5,541	717	472	939	24	66	81	24,414

[1]All percents are based on analyses weighted according to the sample design to accurately represent the entire state. Unweighted Ns indicate the actual number of occupants observed in a given group.
[2]Restraint use for all positions includes cargo areas, passengers held in laps, and passengers standing.
[3]Percent restrained includes correct and incorrect CRD use.

Figure 3.3: Restraint Use by Seat Position

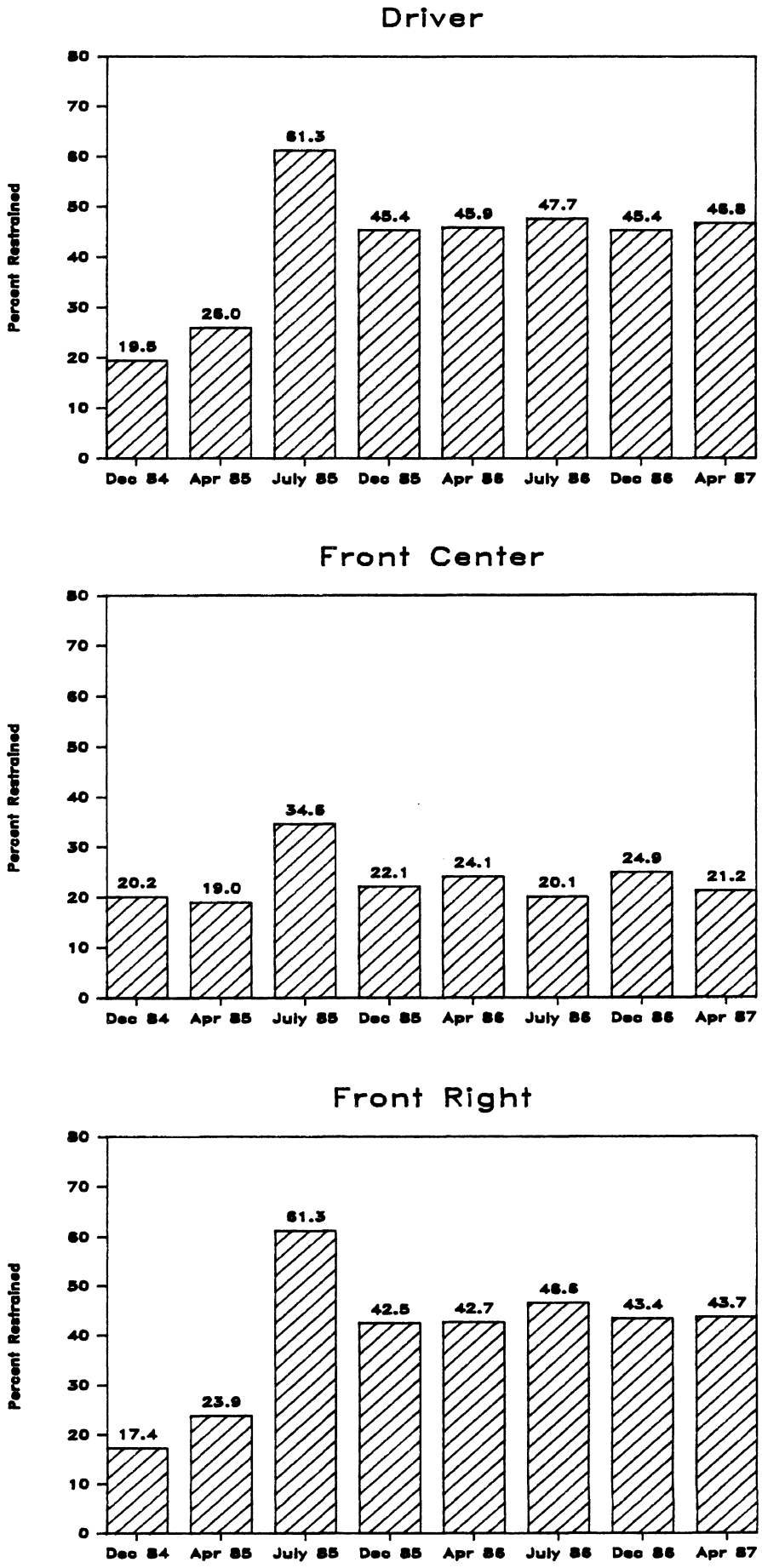


Figure 3.3 (Continued): Restraint Use by Seat Position

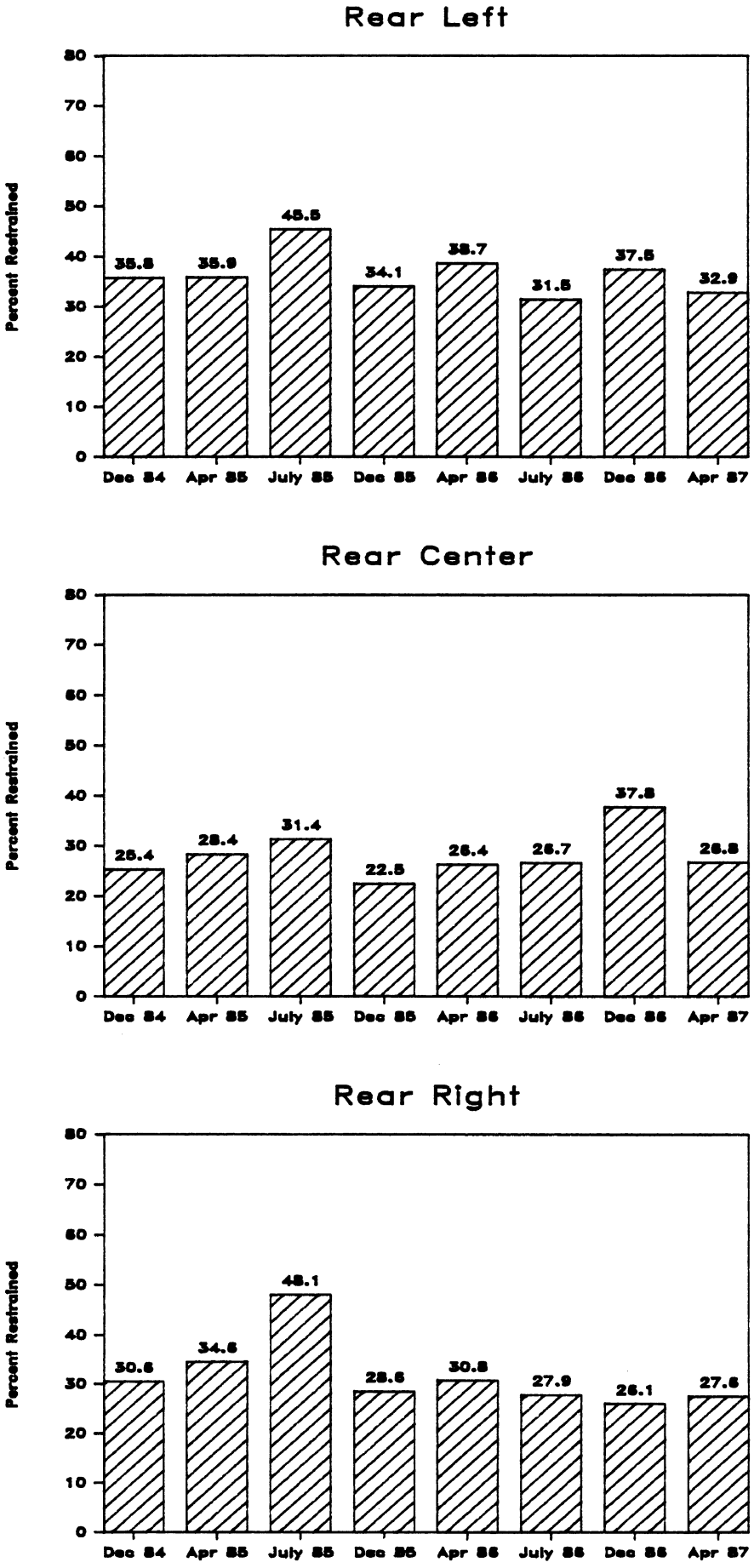


Figure 3.4: Restraint Use by Age

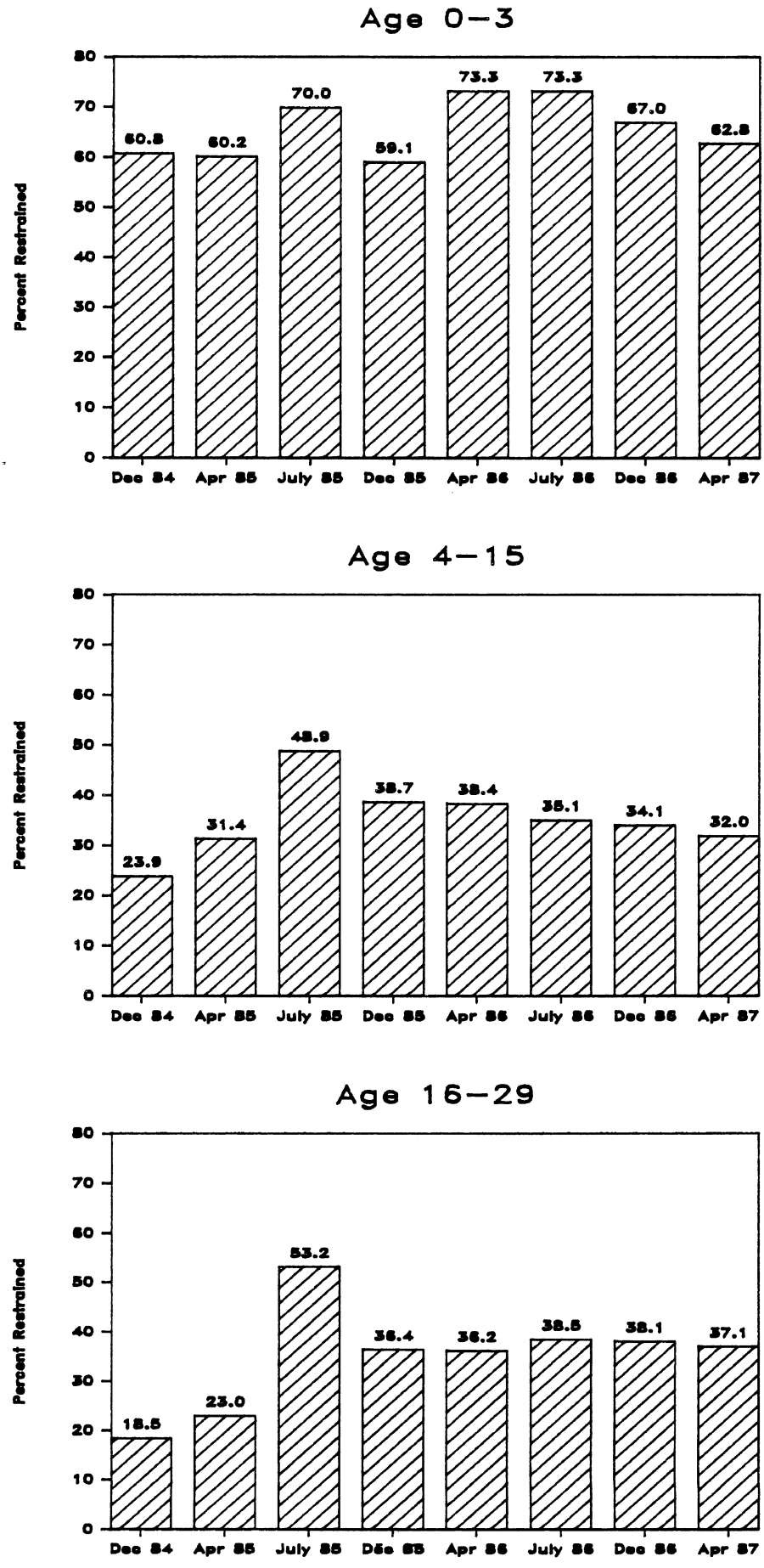
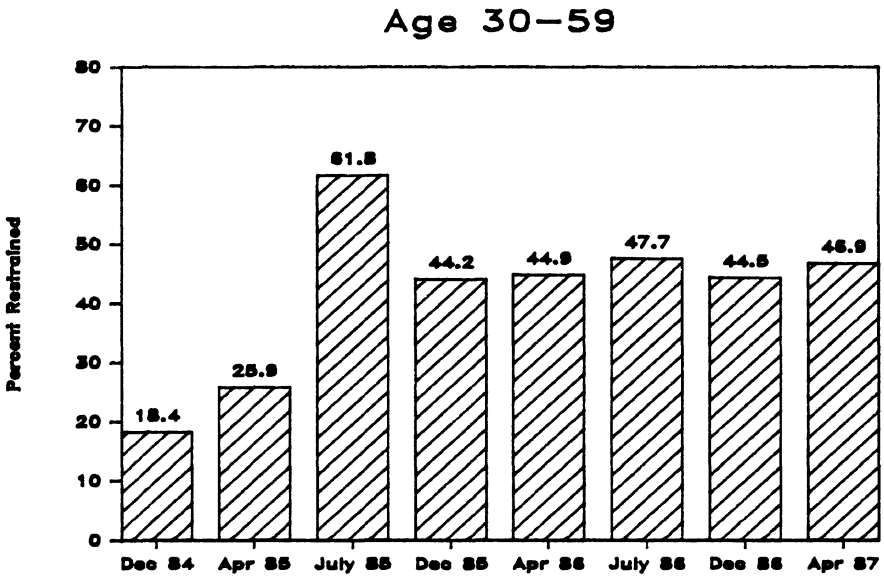
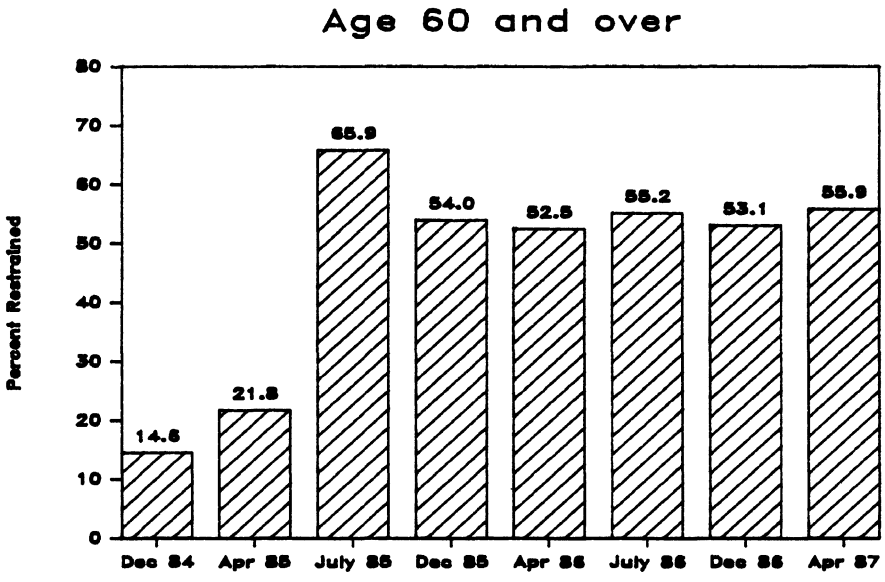


Figure 3.4 (Continued): Restraint Use by Age





in the restraint device. Specifically, data were collected on the type of seat used, whether the automobile belt was fastened, snug, and routed correctly, whether a locking clip was used, and whether a tether was required, used, anchored, and anchored properly. Data were also collected on whether a shield and/or harness were used, whether the harness was snug, whether a harness clip was used, and the harness position. Findings from that study confirm that the problem of incorrect use remains pervasive.

As in previous survey waves, occupants age 60 years and older had a restraint use rate higher than any other age group except occupants age 0-3. Prior to enactment of the mandatory seat belt law, the 60 and older age group had the lowest rate of use of all age groups. Since December 1984, however, the 282.9% increase in restraint use among those age 60 years and older has been greater than all other age groups (0-3 increased 3.3%; 4-15 increased 33.9%; 16-29 increased 101.1%; and 30-59 increased 154.9%). The pattern of driver restraint use by age was similar to that of total occupants by age (Figure 3.5).

Restraint use continued to vary by occupant sex, with a greater proportion of females than males using restraints (48.7% versus 39.7%; Table 3.3). The rate of increase in belt use among both females and males, however, has been similar since December 1984.

The pattern of restraint use by type of vehicle has been similar throughout the series of surveys (Figure 3.6). Occupants of small cars and mid-sized cars had the highest rates of restraint use in the current wave (49.3% and 46.8%, respectively; Table 3.3). Use rates for occupants of other types of vehicles were: large cars, 39.8%; vans, 38.9%; pickup trucks, 31.8%; and other vehicles, 46.1%.

Consistent with previous survey waves, occupants in vehicles observed at freeway exits had a higher rate of restraint use than those observed at local intersections (49.4% versus 42.4% in the current wave; Table 3.3). However, the rate of increase in restraint use at freeway exits since December 1984 has been less than that at local intersections (112.0% versus 125.5%).

In the current survey, restraint use was similar across all weather conditions (Table 3.3). Comparisons with previous waves continue to indicate no consistent pattern of restraint use by weather conditions.

Figure 3.5: Driver Restraint Use by Age

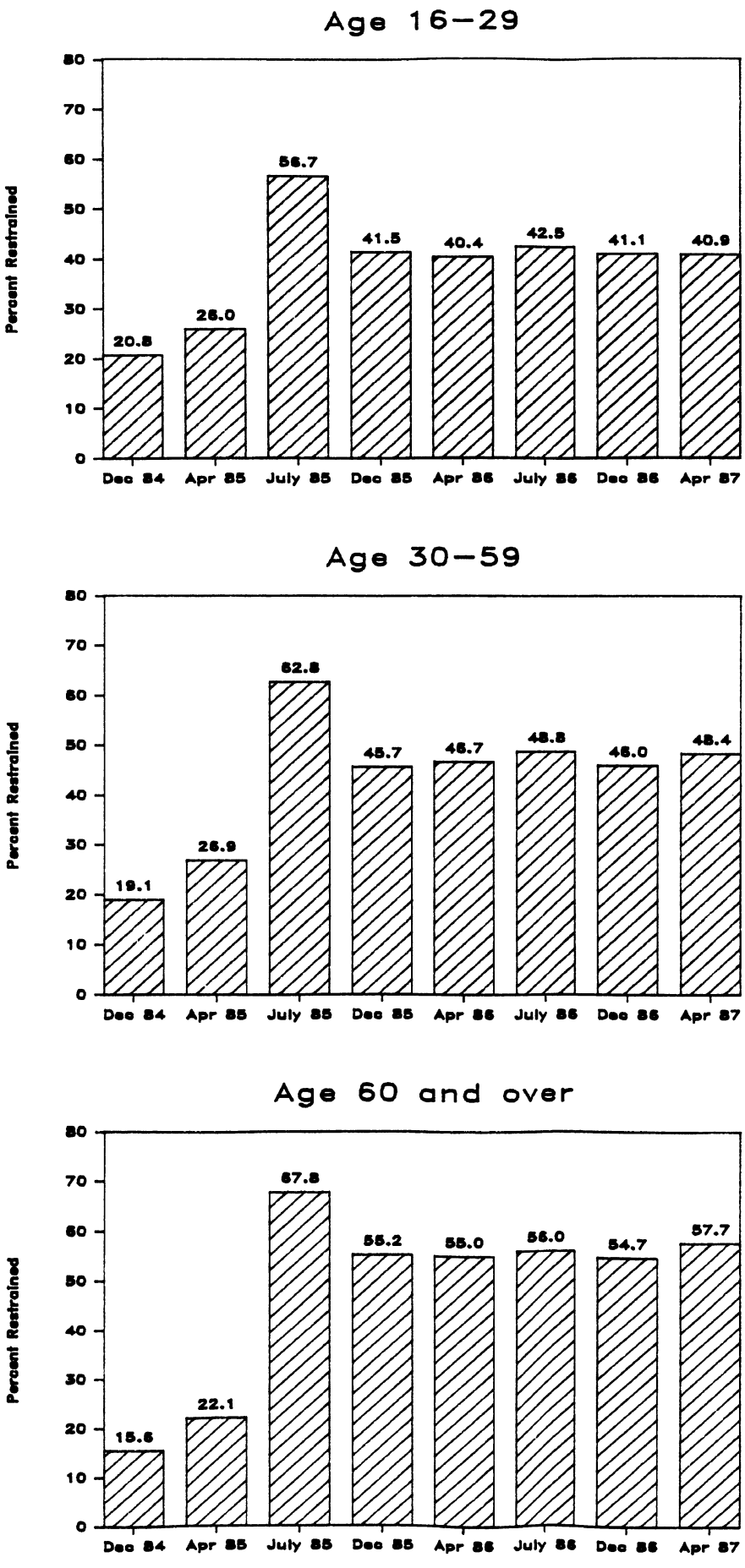


TABLE 3.3
Percent Restraint Use by Sex, Type of Vehicle, Observation Site, and Weather Conditions[1]

	Seat Position							
	Driver	Front Center	Front Right	Rear Left	Rear Center	Rear Right	Extra Seats[2]	All[3]
Sex								
Male	42.1	23.2	34.7	34.4	27.8	30.6	3.4	39.7
Female	54.3	19.3	48.3	30.4	25.4	25.3	25.7	48.7
Type of Vehicle								
Small Car	52.7	30.8	46.0	36.1	30.8	29.1	–	49.3
Mid-Sized Car	49.6	18.4	46.3	37.0	35.5	31.5	0.0	46.8
Large Car	43.1	26.1	42.1	24.4	15.2	19.9	0.0	39.8
Pickup Truck[4]	33.8	17.5	31.3	0.0	0.0	0.0	–	31.8
Van	39.4	13.5	42.5	40.8	29.7	37.0	17.7	38.9
Other	47.5	47.2	51.5	27.6	24.1	34.7	25.3	46.1
Observation Site								
Intersection	45.0	19.2	42.6	32.2	25.9	26.8	12.0	42.4
Freeway Exit	53.0	30.9	47.8	35.2	30.1	30.4	14.1	49.4
Weather Conditions								
Mostly Sunny	46.6	21.4	42.8	32.1	28.2	27.6	12.9	43.5
Mostly Cloudy	47.3	20.8	46.0	35.0	24.6	29.0	12.7	44.9
Raining	48.8	21.0	43.1	23.4	10.4	13.5	–	44.6
TOTAL	46.8	21.2	43.7	32.9	26.8	27.6	12.8	43.9

[1]All percents are based on analyses weighted according to the sample design to accurately represent the entire state. Restraint use includes correct and incorrect use of child restraint devices.
[2]Based on only 24 observed occupants.
[3]Restraint use for all positions includes cargo areas, passengers held in laps, and passengers standing.
[4]Data on rear seat passengers includes 12 occupants riding in crew cab.

Figure 3.6: Restraint Use by Vehicle Type

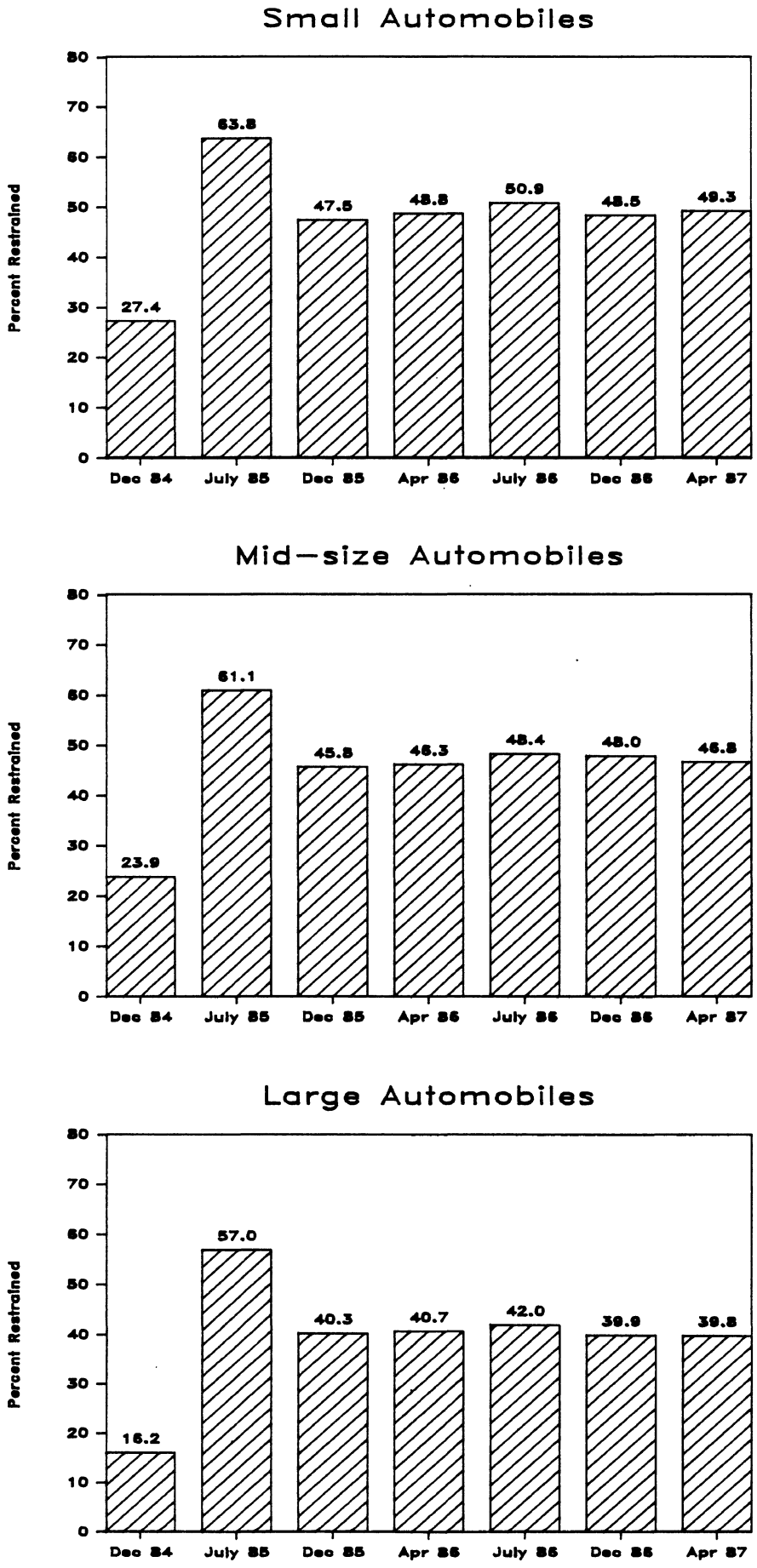
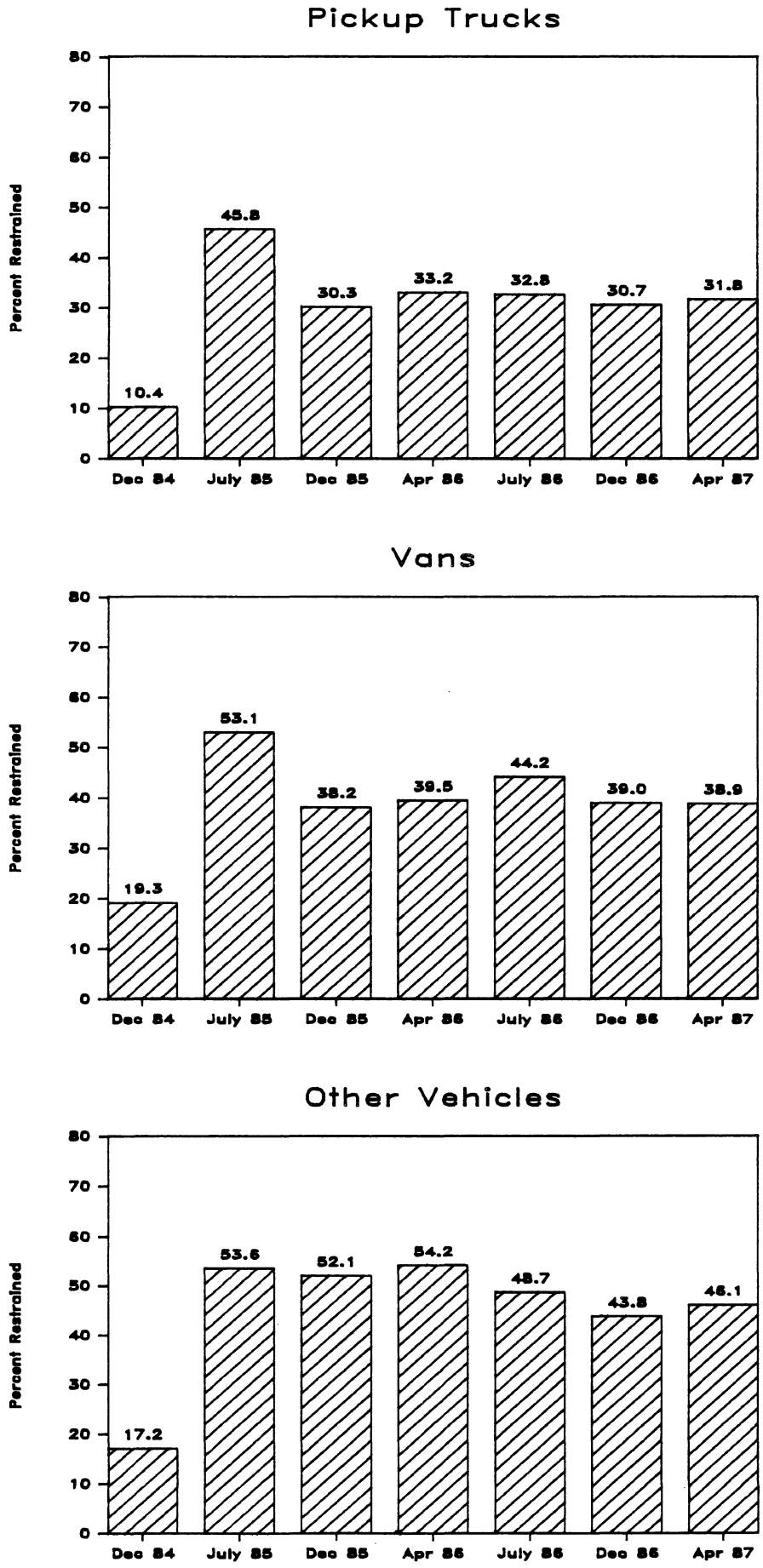


Figure 3.6 (Continued): Restraint Use by Vehicle Type



As in previous survey waves, there was no consistent pattern of restraint use across time of day and day of week although use rates were generally higher during morning hours in the current wave (Table 3.4).

Restraint use continued to vary by region of the state (Table 3.5 and Figure 3.7). Use rates were highest in the Southeast region (49.1%) and lowest in the Eastern upper peninsula (35.7%). The Southeast region has consistently had high rates of use throughout the series of surveys. The Eastern upper peninsula has had the lowest restraint use in every wave except April 1986. Six regions experienced decreases in restraint use between December 1986 and April 1987 and three regions experienced increases in restraint use.

There was also variability in restraint use by sampling area (Table 3.6). Low rates of restraint use were seen in Wayne County, City of Wyandotte (29.7%), Wayne County, City of Melvindale (31.1%), the City of Detroit (31.3%), Delta County (31.9%), and St. Clair County (32.7%). Sampling areas with high restraint use rates in the current survey included Washtenaw County, City of Ann Arbor (62.8%), Wayne County, City of Livonia (61.0%), Oakland County, City of Royal Oak (57.1%), remaining Oakland County (55.9%) and Ingham County (55.1%). The pattern of change in restraint use from previous survey waves was not consistent across sampling areas. Twenty-one sampling areas exhibited decreases in restraint use and twenty-three exhibited increases. Most of these changes are presumably due to sampling error and are not of interest.

Although restraint use in all sampling areas has increased since December 1984 (before enactment of mandatory seat belt legislation), the magnitude of the increases has varied. The largest percentage increases were experienced in Mecosta-Newago Counties (252.8%), Wayne County, City of Detroit (219.4%), and Wayne County, City of Melvindale (217.3%). One reason for these large percentage increases is the low prelegislation rates of belt use in these areas.

Occupants riding in nonstandard positions were tallied separately (Table 3.7). Nonstandard positions included: lying, standing, sitting, or kneeling on the floor, seat, or cargo area; sharing seat belts; or riding on the lap of another occupant. Occupants in nonstandard seating positions were typically under 16 years of age, as might be expected. A total of 20.1% of occupants 0-3 years and 9.6% of occupants 4-15 years were observed in nonstandard seating positions. Within the 0-3 age group, the most common nonstandard seating position was sitting on the lap of another occupant. Within the 4-15 age group, the most common positions were sitting on the edge of the rear seat or in the cargo area.

TABLE 3.4
Percent Restraint Use by Time of Day and Day of Week[1]

	Seat Position							
	Driver	Front Center	Front Right	Rear Left	Rear Center	Rear Right	Extra Seats[2]	All[3]
Time of Day								
7-8 AM	57.4	0.0[4]	48.9	66.1	0.0[4]	67.7	–	55.8
8-9 AM	52.3	21.1	46.6	46.6	32.3	19.9	0.0	50.3
9-10 AM	49.7	34.2	47.7	40.1	35.8	35.0	–	48.2
10-11 AM	50.2	30.6	46.9	24.8	25.1	25.6	0.0	46.8
11-12 AM	43.7	25.9	39.5	24.7	26.8	28.3	100.0[4]	41.0
12-1 PM	48.2	10.0	44.3	31.0	26.0	26.1	–	45.5
1-2 PM	47.5	26.8	47.2	47.6	35.1	34.8	25.2	46.1
2-3 PM	43.6	16.4	42.5	29.1	26.5	30.5	0.0	41.2
3-4 PM	44.9	29.4	43.1	26.7	19.2	16.7	–	41.7
4-5 PM	47.1	25.1	43.8	35.5	28.6	30.0	0.0	44.2
5-6 PM	48.1	18.0	43.5	31.4	21.8	21.3	0.0	44.3
6-7 PM	45.9	16.7	40.4	26.3	29.5	20.6	–	41.8
7-8 PM	45.4	14.9	45.1	39.2	27.9	32.8	40.4	43.1
8-9 PM	44.5	10.7	39.9	28.7	20.8	28.6	–	40.2
Day of Week								
Monday	44.4	21.2	38.3	38.1	21.5	30.2	–	41.6
Tuesday	47.9	10.0	46.1	39.2	24.9	32.7	0.0	46.0
Wednesday	49.6	21.4	43.2	42.1	28.0	28.7	54.7	46.3
Thursday	43.7	24.2	36.6	29.1	31.0	23.8	14.8	40.4
Friday	45.5	24.8	40.1	24.3	29.6	28.9	0.0	42.5
Saturday	50.6	23.0	51.0	33.6	27.7	25.6	0.0	47.3
Sunday	47.0	21.3	47.6	30.3	24.1	27.3	0.0	44.0
TOTAL	46.8	21.2	43.7	32.9	26.8	27.6	12.8	43.9

[1]All percents are based on analyses weighted according to the sample design to accurately represent the entire state. Restraint use includes correct and incorrect use of child restraint devices.
[2]Based on only 24 observed occupants.
[3]Restraint use for all positions includes cargo areas, passengers held in laps, and passengers standing.
[4]Based on only one occupant.

TABLE 3.5
Percent Restraint Use by Michigan Department of Transportation Regions[1]

MDOT Region	Seat Position							
	Driver	Front Center	Front Right	Rear Left	Rear Center	Rear Right	Extra Seats[2]	All[3]
1. Western U.P.	46.8	5.8	43.2	31.3	26.3	26.8	25.7	43.6
2. Eastern U.P.	37.3	36.6	38.3	25.1	30.4	18.2	–	35.7
3. Northwest	48.9	26.7	43.6	41.1	20.2	36.3	–	45.3
4. Northeast	49.3	33.0	53.5	33.7	50.4	29.9	0.0	48.6
5. West Central	46.3	25.7	45.7	40.8	34.9	30.1	–	44.6
6. East Central	44.4	15.3	38.1	32.7	24.8	21.5	18.8	39.9
7. Southwest	48.5	22.5	45.3	40.5	6.4	25.4	0.0	45.5
8. Southeast	51.0	31.2	47.6	44.7	37.9	40.5	0.0	49.1
Metro Detroit	46.1	17.9	43.4	26.8	25.8	26.0	15.5	43.2
TOTAL	46.8	21.2	43.7	32.9	26.8	27.6	12.8	43.9

[1]All percents are based on analyses weighted according to the sample design to accurately represent the entire state. Restraint use includes correct and incorrect use of child restraint devices.
[2]Based on only 24 observed occupants.
[3]Restraint use for all positions includes cargo areas, passengers held in laps and passengers standing.

Figure 3.7: Restraint Use by Region

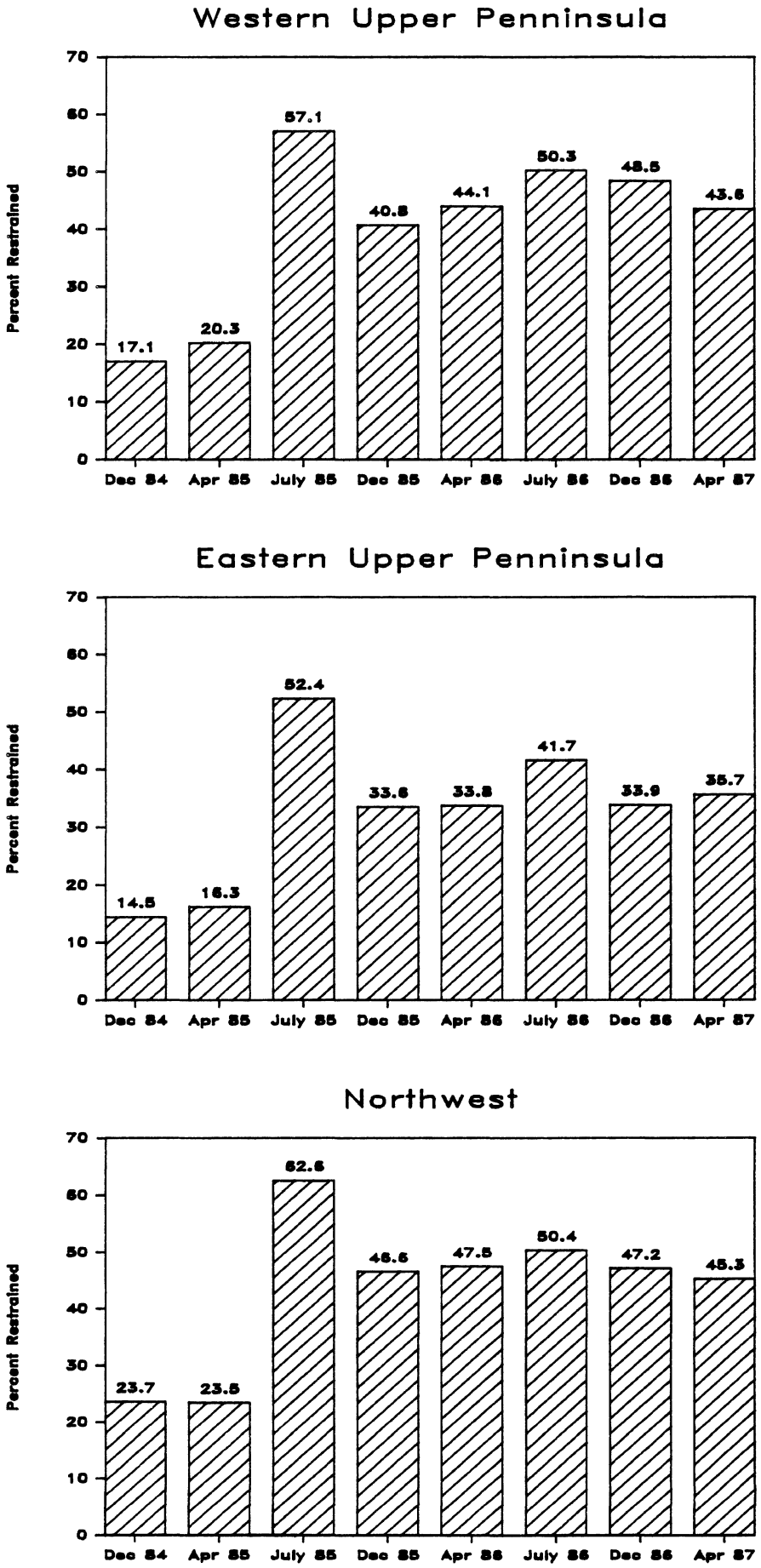


Figure 3.7 (Continued): Restraint Use by Region

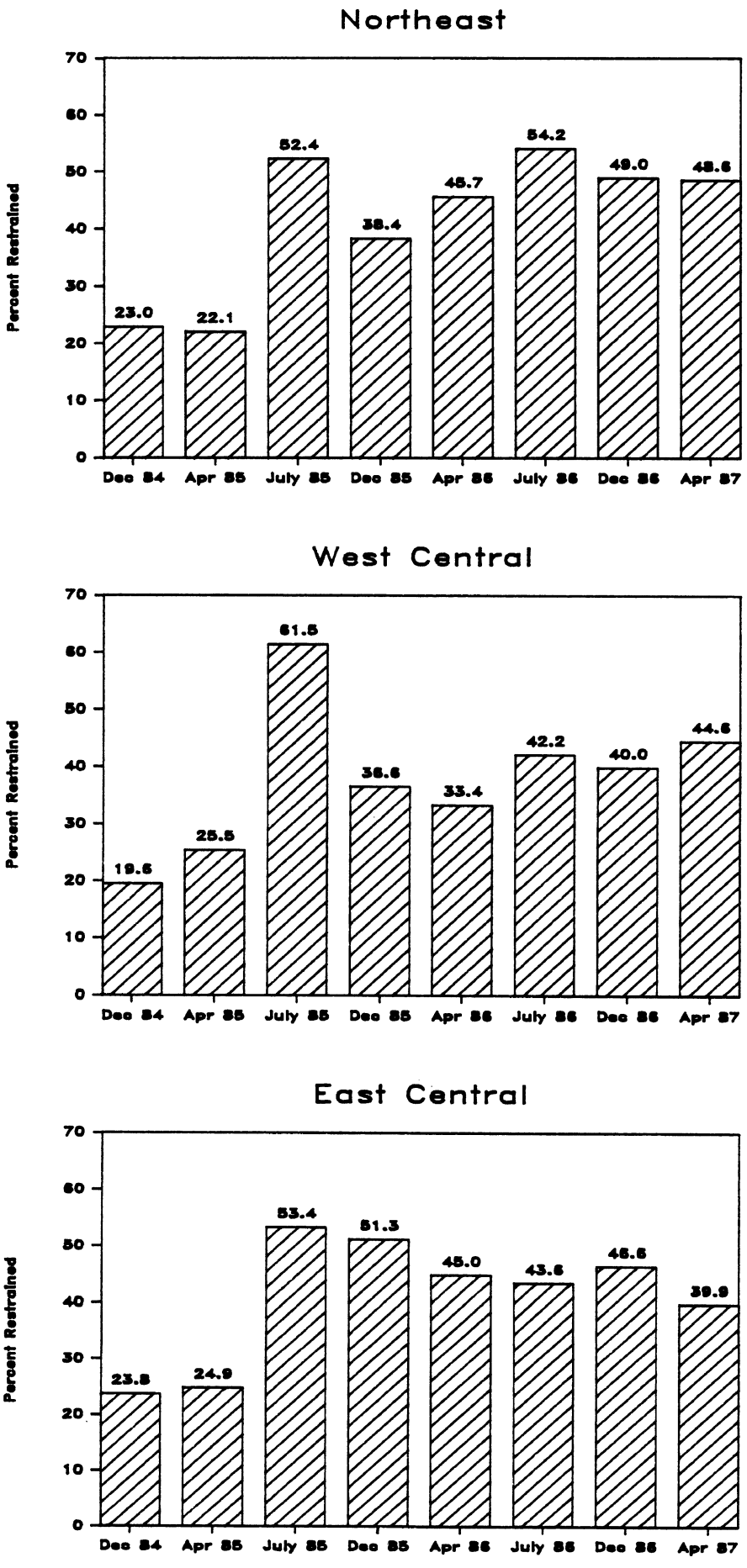


Figure 3.7 (Continued): Restraint Use by Region

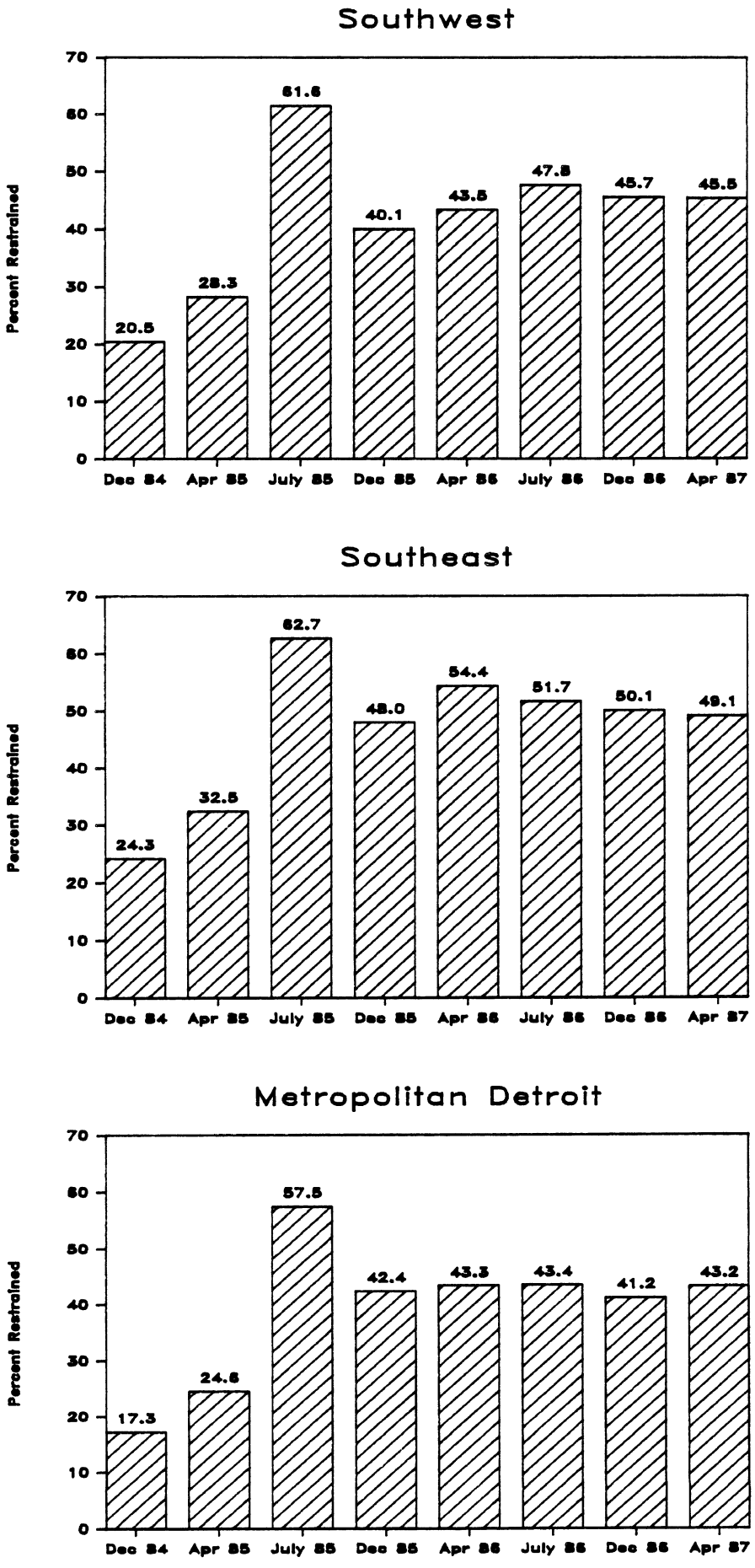


TABLE 3.6
Restraint Use, Number of Vehicles Observed, and Number of Occupants Observed for Each Sampling Area[1]

Sampling Area	Number of Vehicles Observed	Number of Occupants Observed	Percent Drivers Restrained	Percent Front Seat Passengers Restrained[2]	Percent All Occupants Restrained[2]
Barry[3]	281	477	46.1	47.0	44.1
Bay	310	416	53.9	54.4	52.6
Berrien County	221	311	45.6	35.7	40.4
Berrien, Niles	225	337	50.6	44.6	47.1
Charlevoix	266	493	38.2	40.6	35.2
Chippewa	245	443	40.8	43.8	38.8
Crawford-Roscommon	251	374	48.2	49.5	46.3
Delta	250	369	33.9	29.1	31.9
Dickinson	254	384	36.2	40.4	35.5
Eaton	233	299	51.4	51.5	50.5
Genesee	795	1,208	41.9	35.0	38.6
Grand Traverse	238	370	56.5	44.5	53.7
Ingham County	273	374	54.4	59.1	55.1
Ingham, East Lansing	268	403	51.9	43.3	48.0
Iosco-Alcona	275	495	50.3	53.8	50.5
Jackson	273	375	45.7	33.3	40.6
Kalamazoo County	274	361	50.8	46.8	49.6
Kalamazoo City	252	366	52.0	41.4	48.0
Kent County	273	378	49.8	38.7	47.6
Kent, Grand Rapids	271	384	45.2	43.1	45.1
Kent, Wyoming	265	383	46.3	47.4	45.9
Lapeer	262	498	42.7	34.4	35.5
Lenawee[3]	286	406	40.4	35.7	39.6
Macomb	908	1,259	48.4	45.1	46.7
Marquette	504	730	52.1	40.8	47.8
Mason	216	346	51.9	43.8	48.9
Mecosta-Newaygo	258	348	44.8	44.8	44.1
Monroe[3]	269	381	49.7	43.3	48.0
Montcalm[3]	286	433	48.4	37.4	44.1
Muskegon	226	401	44.4	46.9	41.8
Oakland County	1,298	1,808	58.4	56.6	55.9
Oakland, Royal Oak	264	401	57.1	58.8	57.1
Ottawa	247	417	45.0	50.5	44.1
Saginaw	512	885	44.8	34.5	39.3
St. Clair	272	516	36.2	31.9	32.7
VanBuren	193	295	43.2	40.8	39.8
Washtenaw, Ann Arbor	262	358	63.0	69.4	62.8
Wayne, Detroit	2,298	3,277	36.2	24.2	31.3
Wayne, Canton	288	510	56.0	57.1	51.6
Wayne, Garden City	294	429	49.8	53.4	50.1
Wayne, Livonia	278	459	62.2	60.6	61.0
Wayne, Melvindale etc.	252	452	32.5	36.4	31.1
Wayne, Trenton etc.	273	370	45.0	42.7	44.2
Wayne, Wyandotte	286	435	30.6	33.3	29.7
TOTAL	16,225	24,414	46.8	42.5	43.9

[1]All percentages are based on weighted analyses.
[2]Includes correct and incorrect use of child restraint devices.
[3]For these sampling areas no signalized freeway exits existed. Therefore, freeway exits required by the sample design were selected from an adjacent county.

TABLE 3.7
Number of Occupants in Nonstandard Seat Positions by Age[1]

	Age of Occupant		
Position	0–3	4–15	16+
Lying			
Front seat	1	2	0
Rear seat	3	10	2
Standing			
Front seat	4	5	0
Rear seat	10	11	0
On floor	6	19	0
Kneeling			
Front seat	3	5	0
Rear seat	5	11	0
Sitting			
On edge of front seat	1	2	0
On edge of rear seat	0	35	7
Between bucket seats	3	5	0
On lap	71	8	2
Cargo area	3	52	10
Shared seat belt	10	2	0
Total occupants in nonstandard positions	126	186	21
Total occupants in all positions	628	1,944	21,805

[1] Data are not weighted.

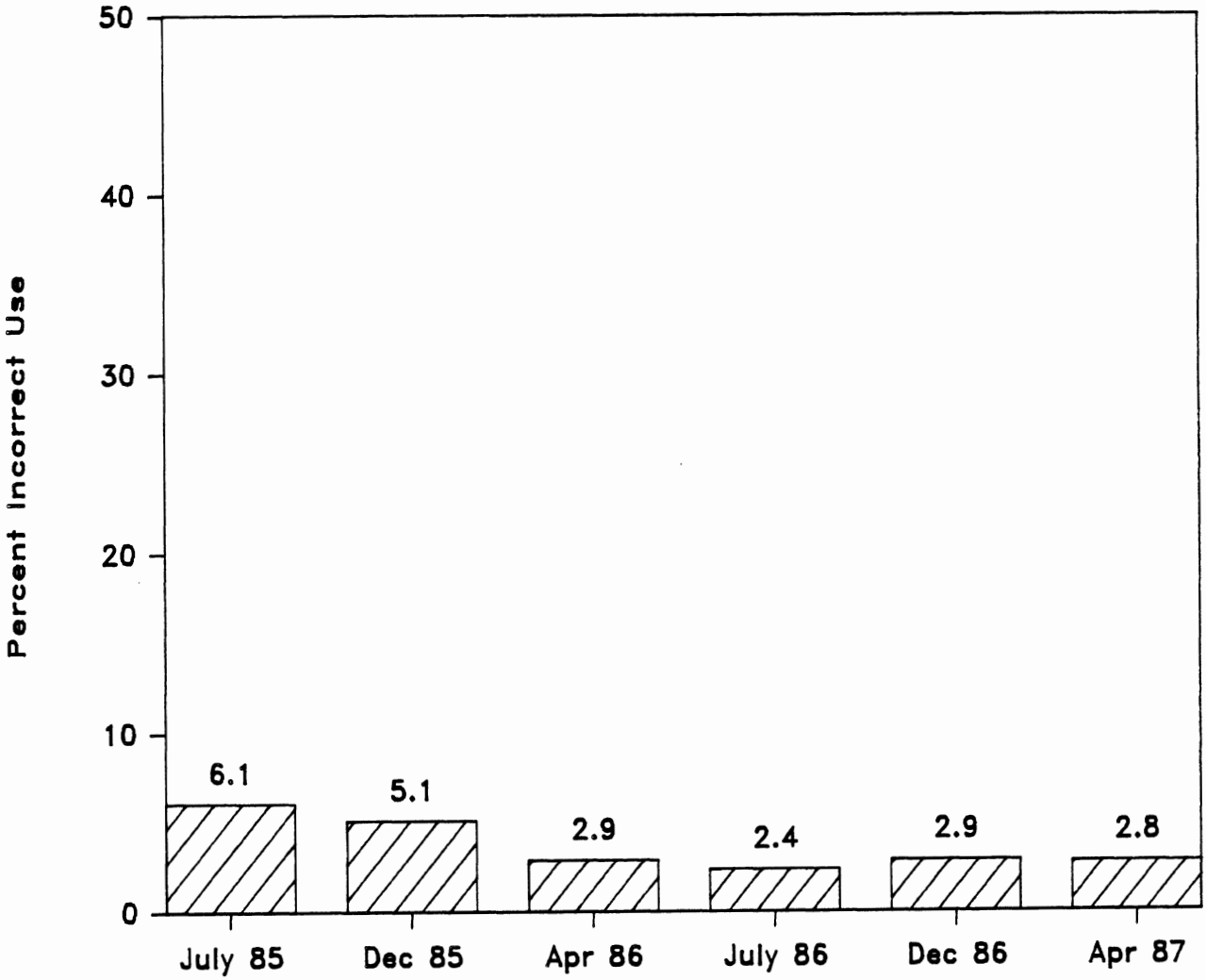
The proportion of belted occupants observed using their seat belts incorrectly has changed little during the last four survey waves (Figure 3.8; incorrect use of child restraint devices is **not** included here). The percentage of belted occupants with incorrect use was 2.8% in the current wave, 2.9% in December 1986, 2.4% in July 1986, and 2.9% in April 1986. By comparison, incorrect use of belts was 5.1% in December 1985 and 6.1% in July 1985. One possible explanation for the apparent decline in incorrect belt use since July 1985 is that occupants who used their belts incorrectly immediately after the law took effect are no longer using them at all.

In reporting findings from earlier survey waves, it was noted that a number of occupants observed during the July 1985 survey wave employed methods to **appear** restrained, when they were not. The relative absence of such attempts at deception since July 1985 may be due to a perception by the public that strict enforcement of the mandatory seat belt law is not occurring. Such a perception may also explain the decline in restraint use from the peak restraint use rate observed immediately following implementation of the law. Findings from other studies on the effects of mandatory seat belt legislation support the conclusion that public perception of enforcement of compulsory use laws and actual enforcement efforts affect restraint use. In Elmira, New York, for example, seat belt use increased substantially following a seat belt use law enforcement and publicity campaign conducted in late 1985; use declined in a comparison city during the same period (Williams and others, 1986). In Texas, strong enforcement efforts have been associated with high levels of seat belt use one year after implementation of seat belt legislation. Approximately 7,000 tickets per month are issued by state highway patrol officers to motorists in Texas who fail to obey the law (Insurance Institute for Highway Safety, 1986). In Michigan, a total of 32,711 tickets were issued by state police in 1986. However, the Texas law permits primary enforcement, in contrast to the Michigan law, which is limited to secondary enforcement.

Finally, restraint use in Illinois declined from 50% observed in August 1985, immediately after enforcement of the mandatory seat belt law began, to 30% one year later. Mortimer (1986) attributes the low use rates to lack of enforcement of the law and to the nature of the law, which permits only secondary enforcement.

Adherence to Michigan's seat belt law would be facilitated if it permitted primary enforcement. Even without such new legislation, however, stricter enforcement of the current law is needed, coupled with major publicity campaigns, in order to strengthen public perception about enforcement of the law and to ensure the law's continued success.

Figure 3.8: Percent of Belted Occupants with Incorrect Use



4 REFERENCES

Bunch, N.G., Hatfield, N.J., Hinshaw, W.M., and Womack, K.N. *Observed Front Seat Occupant Restraint Use in Fourteen Texas Cities Before and After Safety Belt Use Legislation.* Austin, TX: Texas A&M University System: Texas Transportation Institute. September 1986.

Highway and Vehicle Safety Report, 13(17):2, May 11, 1987.

Insurance Institute for Highway Safety. *Status Report*, V(14):1, December 13, 1986.

Mortimer, R.G. *Seat Belt Use by Front Seat Occupants in Illinois.* Champaign, IL: University of Illinois at Urbana-Champaign, Department of Health and Safety Studies. September 18, 1986.

Wagenaar, A.C. *Restraint Usage Among Crash-Involved Motor Vehicle Occupants.* Ann Arbor, MI: The University of Michigan Transportation Research Institute. 1984.

Wagenaar, A.C. and Webster, D.W. "Preventing Injuries to Children Through Compulsory Automobile Safety Seat Use." *Pediatrics*, 78(4):662-672, 1986.

Wagenaar, A.C. and Wiviott, M.B.T. *Direct Observation of Seat Belt Use in Michigan: December 1984.* Ann Arbor, MI: The University of Michigan Transportation Research Institute. February 1985a.

Wagenaar, A.C., Wiviott, M.B.T., and Compton, C. *Direct Observation of Seat Belt Use in Michigan: April 1985.* Ann Arbor, MI: The University of Michigan Transportation Research Institute. June 1985.

Wagenaar, A.C. and Wiviott, M.B.T. *Direct Observation of Seat Belt Use in Michigan: July 1985.* Ann Arbor, MI: The University of Michigan Transportation Research Institute. August 1985b.

Wagenaar, A.C., Wiviott, M.B.T., and Businski, K.L. *Direct Observation of Seat Belt Use in Michigan: December 1985.* Ann Arbor, MI: The University of Michigan Transportation Research Institute. February 1986.

Wagenaar, A.C., Businski, K.L., and Molnar, L.J. *Direct Observation of Seat Belt Use in Michigan: April 1986.* Ann Arbor, MI: The University of Michigan Transportation Research Institute. May 1986a.

Wagenaar, A.C., Businski, K.L., and Molnar, L.J. *Direct Observation of Seat Belt Use in Michigan: July 1986.* Ann Arbor, MI: The University of Michigan Transportation Research Institute. September 1986b.

Wagenaar, A.C., Molnar, L.J., Businski, K.L., Margolis, L.H. *Correlates of Child Restraint Use.* Ann Arbor, MI: The University of Michigan Transportation Research Institute. 1986.

Wagenaar, A.C., Molnar, L.J., and Businski, K.L. *Direct Observation of Seat Belt Use in Michigan: December 1986.* Ann Arbor, MI: The University of Michigan Transportation Research Institute. February 1987.

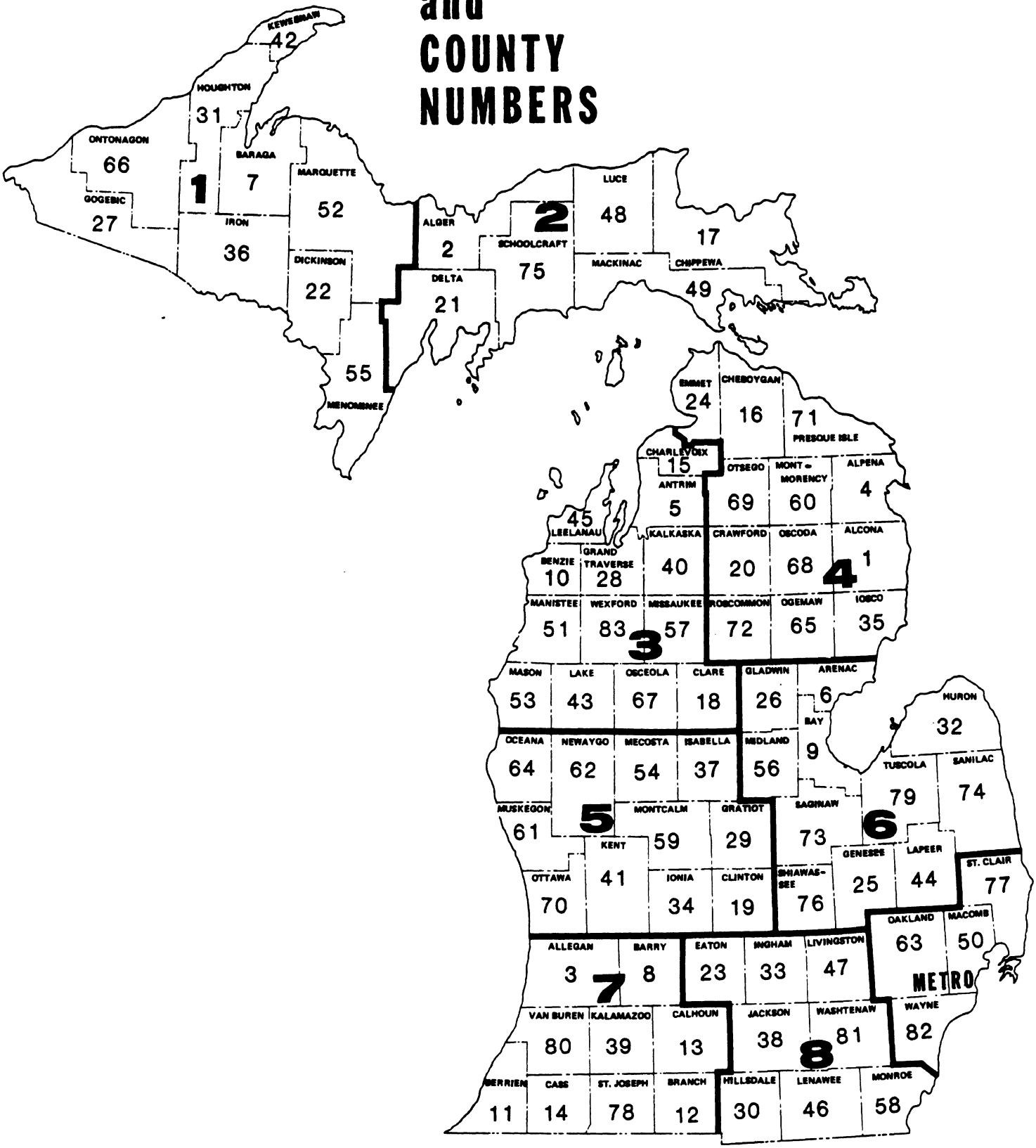
Wagenaar, A.C. Effects of Mandatory Seatbelt Laws on Traffic Fatalities in the United States. Presented at the *11th International Technical Conference on Experimental Safety Vehicles*, Arlington, Virginia, May 12-15, 1987.

Williams, A.F., Preusser, D.F., Blomberg, R.D., and Lund, A.K. *Results of a Seat Belt Use Law Enforcement and Publicity Campaign in Elmira, New York.* Washington, D.C.: Insurance Institute for Highway Safety. March 1986.

APPENDIX A

MICHIGAN DEPARTMENT OF TRANSPORTATION REGION MAP

DISTRICT and COUNTY NUMBERS



APPENDIX B

SEAT BELT SURVEY CODEBOOK

MICHIGAN SEAT BELT SURVEY
Wave 8, April 1987

Variable Number	Variable Name	Field Width	Character Type	Mult Resp	Page Number
1	SITE NUMBER	3	Numeric		48
2	SITE TYPE	1	Numeric		48
3	SITE CHOICE	1	Numeric		48
4	MONTH	2	Numeric		48
5	DAY OF MONTH	2	Numeric		48
6	START HOUR	2	Numeric		49
7	START MINUTE	2	Numeric		49
8	DAY OF WEEK	1	Numeric		49
9	WEATHER	1	Numeric		49
10	BREAK TIME (MINUTES)	2	Numeric		50
11	END HOUR	2	Numeric		50
12	END MINUTE	2	Numeric		50
13	SAMPLE REGION	1	Numeric		50
14	PSU ID	2	Numeric		51
15	MDOT REGION	1	Numeric		52
16	REGION WEIGHT	5	Numeric		52
17	ELAPSED TIME	2	Numeric		52
18	SITE OBSERVER	1	Numeric		52
19	SAMPLE ERROR COMP UNIT #	2	Numeric		52

MICHIGAN SEAT BELT SURVEY
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Variable Number	Variable Name	Field Width	Character Type	Mult Resp	Page Number
20	VEHICLE OBSERVER	1	Numeric		54
21	VEHICLE TYPE	1	Numeric		54
22	SEQUENCE NUMBER	2	Numeric		54
23	SITE # COUNT	2	Numeric		55
24	OBSERVER COUNT	2	Numeric		55
25	SITE/OBSERVER SEQ #	2	Numeric		55
26	HOUR OF OBSERVATION	2	Numeric		55
27	MINUTE OF OBSERVATION	2	Numeric		55
28	SITE WEIGHT	6	Numeric		56
29	TOTAL WEIGHT	6	Numeric		56
30	WAVE	2	Numeric		56
31	DRIVER BELTED (Y/N)	1	Numeric		56
32	DRIVER RESTRAINT USE	1	Numeric		56
33	DRIVER SEX	1	Numeric		56
34	DRIVER AGE	1	Numeric		57

MICHIGAN SEAT BELT SURVEY
Wave 8, April 1987

Variable Number	Variable Name	Field Width	Character Type	Mult Resp	Page Number
35	POSITION	2	Numeric		58
36	BELTED (Y/N)	1	Numeric		58
37	RESTRAINT USE	1	Numeric		58
38	SEX	1	Numeric		59
39	AGE	1	Numeric		59
40	SPECIAL TAG	2	Numeric		59

MICHIGAN SEAT BELT SURVEY
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Site Variables

Variables 1 through 19 describe site level information. The frequencies for the site variables contain one record for each of the 240 sites.

Variable 1 **SITE NUMBER** MD1: None MD2: None Field Width: 3 Type: Numeric

Variable 2 **SITE TYPE** MD1: None MD2: None Field Width: 1 Type: Numeric

FREQ	Prcnt	SITE TYPE
190	79.2	1. Intersection
50	20.8	2. Freeway Exit

Variable 3 **SITE CHOICE** MD1: None MD2: None Field Width: 1 Type: Numeric

FREQ	Prcnt	SITE CHOICE
233	97.1	1. Primary
7	2.9	2. Secondary

Variable 4 **MONTH** MD1: None MD2: None Field Width: 2 Type: Numeric

FREQ	Prcnt	MONTH
109	45.4	04. April
131	54.6	05. May

Variable 5 **DAY OF MONTH** MD1: None MD2: None Field Width: 2 Type: Numeric

MICHIGAN SEAT BELT SURVEY
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Variable 6 **START HOUR** MD1: None Field Width: 2
MD2: None Type: Numeric

FREQ	Prcnt	START HOUR
8	3.3	07.
13	5.4	08.
20	8.3	09.
12	5.0	10.
27	11.2	11.
17	7.1	12.
23	9.6	13.
18	7.5	14.
26	10.8	15.
16	6.7	16.
24	10.0	17.
12	5.0	18.
24	10.0	19.

Variable 7 **START MINUTE** MD1: None Field Width: 2
MD2: None Type: Numeric

Variable 8 **DAY OF WEEK** MD1: None Field Width: 1
MD2: None Type: Numeric

FREQ	Prcnt	DAY OF WEEK
34	14.2	1. Monday
33	13.7	2. Tuesday
35	14.6	3. Wednesday
38	15.8	4. Thursday
38	15.8	5. Friday
32	13.3	6. Saturday
30	12.5	7. Sunday

Variable 9 **WEATHER** MD1: None Field Width: 1
MD2: None Type: Numeric

FREQ	Prcnt	WEATHER
167	69.6	1. Mostly Sunny
66	27.5	2. Mostly Cloudy
7	2.9	3. Rain
0	0.0	4. Snow

MICHIGAN SEAT BELT SURVEY
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Variable 10 **BREAK TIME (MINUTES)** MD1: None Field Width: 2
MD2: None Type: Numeric

Variable 11 **END HOUR** MD1: None Field Width: 2
MD2: None Type: Numeric

FREQ	Prcnt	END HOUR
6	2.5	08.
11	4.6	09.
22	9.2	10.
9	3.7	11.
31	12.9	12.
13	5.4	13.
26	10.8	14.
18	7.5	15.
26	10.8	16.
16	6.7	17.
24	10.0	18.
14	5.8	19.
24	10.0	20.

Variable 12 **END MINUTE** MD1: None Field Width: 2
MD2: None Type: Numeric

Variable 13 **SAMPLE REGION** MD1: None Field Width: 1
MD2: None Type: Numeric

FREQ	Prcnt	SAMPLE REGION
20	8.3	1. Upper
20	8.3	2. Northern
20	8.3	3. Western
20	8.3	4. Central
20	8.3	5. South Central
20	8.3	6. Eastern
120	50.0	7. South Eastern

Variable 14 **PSU ID** MD1: None Field Width: 2
MD2: None Type: Numeric

FREQ	Prcnt	PSU ID
4	1.7	08. BARRY
4	1.7	09. BAY
4	1.7	11. BERRIEN COUNTY
4	1.7	12. BERRIEN, NILES
4	1.7	15. CHARLEVOIX
4	1.7	17. CHIPPEWA
4	1.7	20. CRAWFORD-ROSCOMMON
4	1.7	21. DELTA
4	1.7	22. DICKINSON
4	1.7	23. EATON
12	5.0	25. GENESEE
4	1.7	28. GRAND TRAVERSE
4	1.7	33. INGHAM COUNTY
4	1.7	34. INGHAM, EAST LANSING
4	1.7	35. IOSOC-ALCONA
4	1.7	38. JACKSON
4	1.7	39. KALAMAZOO COUNTY
4	1.7	40. KALAMAZOO, CITY OF
4	1.7	41. KENT COUNTY
4	1.7	42. KENT, GRAND RAPIDS
4	1.7	43. KENT, WYOMING
4	1.7	44. LAPEER
4	1.7	46. LENAWEE
12	5.0	50. MACOMB
8	3.3	52. MARQUETTE
4	1.7	53. MASON
4	1.7	54. MECSOTA-NEWAYGO
4	1.7	58. MONROE
4	1.7	59. MONTCALM
4	1.7	61. MUSKEGON
20	8.3	63. OAKLAND COUNTY
4	1.7	64. OAKLAND, ROYAL OAK
4	1.7	70. OTTAWA
8	3.3	73. SAGINAW
4	1.7	74. ST. CLAIR
4	1.7	80. VANBUREN
4	1.7	81. WASHTENAW, ANN ARBOR
28	11.7	82. WAYNE, DETROIT
4	1.7	83. WAYNE, CANTON
4	1.7	84. WAYNE, GARDEN CITY
4	1.7	85. WAYNE, LIVONIA
4	1.7	86. WAYNE, MELVINDALE ETC.
4	1.7	87. WAYNE, TRENTON ETC.
4	1.7	88. WAYNE, WYANDOTTE

MICHIGAN SEAT BELT SURVEY
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Variable 15 **MDOT REGION** MD1: None Field Width: 1
MD2: None Type: Numeric

FREQ	Prcnt	MDOT REGION
12	5.0	1. Western U.P.
8	3.3	2. Eastern U.P.
12	5.0	3. Northwest
8	3.3	4. Northeast
28	11.7	5. West Central
28	11.7	6. East Central
28	11.7	7. Southwest
24	10.0	8. Southeast
92	38.3	9. Metro Detroit

Variable 16 **REGION WEIGHT** MD1: None Field Width: 5
MD2: None Type: Numeric
Implied Dec Places: 4

Variable 17 **ELAPSED TIME** MD1: None Field Width: 2
MD2: None Type: Numeric

Variable 18 **SITE OBSERVER** MD1: None Field Width: 1
MD2: None Type: Numeric

FREQ	Prcnt	PRIMARY OBSERVER FOR THIS SITE
35	14.6	1. Observer #1
24	10.0	2. Observer #2
27	11.2	3. Observer #3
36	15.0	4. Observer #4
14	5.8	5. Observer #5
28	11.7	6. Observer #6
25	10.4	7. Observer #7
24	10.0	8. Observer #8
27	11.2	9. Observer #9

Variable 19 **SAMPLE ERROR COMP UNIT #** MD1: None Field Width: 2
MD2: None Type: Numeric

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Vehicle variables

Variables 20 through 34 describe the vehicle and driver. The frequencies for the vehicle variables reflect one record for each vehicle observed.

Variable 20 **VEHICLE OBSERVER** MD1: None Field Width: 1
MD2: None Type: Numeric

FREQ	Prcnt	ACTUAL OBSERVER FOR THIS VEHICLE
2374	14.6	1. Observer #1
1648	10.2	2. Observer #2
1692	10.4	3. Observer #3
2579	15.9	4. Observer #4
784	4.8	5. Observer #5
1808	11.1	6. Observer #6
1899	11.7	7. Observer #7
1642	10.1	8. Observer #8
1799	11.1	9. Observer #9

Variable 21 **VEHICLE TYPE** MD1: 8 Field Width: 1
MD2: None Type: Numeric

FREQ	Prcnt	VEHICLE TYPE
4889	30.1	1. Small Car
4553	28.1	2. Midsize Car
3722	22.9	3. Large Car
1730	10.7	4. Pickup
857	5.3	5. Van
458	2.8	6. Other
16	0.1	8. Missing Data

Variable 22 **SEQUENCE NUMBER** MD1: None Field Width: 2
MD2: None Type: Numeric

Variable 23 **SITE # COUNT** MD1: None Field Width: 2
MD2: None Type: Numeric

Variable 24 **OBSERVER COUNT** MD1: None Field Width: 2
MD2: None Type: Numeric

Variable 25 **SITE/OBSERVER SEQ #** MD1: None Field Width: 2
MD2: None Type: Numeric

Variable 26 **HOUR OF OBSERVATION** MD1: 88 Field Width: 2
MD2: None Type: Numeric

FREQ	Prcnt	HOUR OF THE DAY THIS VEHICLE WAS OBSERVED
195	1.2	07.
744	4.6	08.
1162	7.2	09.
914	5.6	10.
1687	10.4	11.
1104	6.8	12.
1717	10.6	13.
1368	8.4	14.
1598	9.8	15.
1283	7.9	16.
1392	8.6	17.
1219	7.5	18.
1269	7.8	19.
573	3.5	20.

Variable 27 **MINUTE OF OBSERVATION** MD1: 88 Field Width: 2
MD2: None Type: Numeric

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Variable 28 **SITE WEIGHT** MD1: None Field Width: 6
MD2: None Type: Numeric
Implied Dec Places: 4

Variable 29 **TOTAL WEIGHT** MD1: None Field Width: 6
MD2: None Type: Numeric
Implied Dec Places: 4

Variable 30 **WAVE** MD1: None Field Width: 2
MD2: None Type: Numeric

FREQ	Prcnt	WAVE
16225	100.0	08. Wave 8

Variable 31 **DRIVER BELTED (Y/N)** MD1: 8 Field Width: 1
MD2: None Type: Numeric

FREQ	Prcnt	DRIVER BELTED (Y/N)
8686	53.5	1. Not Belted
7530	46.4	2. Belted
9	0.1	8. Missing data

Variable 32 **DRIVER RESTRAINT USE** MD1: 8 Field Width: 1
MD2: None Type: Numeric

FREQ	Prcnt	DRIVER RESTRAINT USE
8686	53.5	1. Not Belted
7530	46.4	2. Belted
9	0.1	8. Missing Data

Variable 33 **DRIVER SEX** MD1: 8 Field Width: 1
MD2: None Type: Numeric

FREQ	Prcnt	DRIVER SEX
9932	61.2	1. Male
6283	38.7	2. Female
10	0.1	8. Missing Data

MICHIGAN SEAT BELT S'JRVEY
Wave 8, April 1987

Variable 34	DRIVER AGE	MD1: 8	Field Width: 1
		MD2: None	Type: Numeric

FREQ	Prcnt	DRIVER AGE
5	0.0	2. 4-15
5509	34.0	3. 16-29
8962	55.2	4. 30-59
1741	10.7	5. 60+
8	0.0	8. Missing Data

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Variables 35 through 37 describe the occupants. The frequencies for the occupant variables contain one record for each occupied occupant position.

Variable 35 **POSITION** MD1: 88 Field Width: 2
MD2: None Type: Numeric

FREQ	Prcnt	POSITION
16225	66.5	01. Front Left
324	1.3	02. Front Center
5541	22.7	03. Front Right
717	2.9	04. Rear Left
472	1.9	05. Rear Center
939	3.8	06. Rear Right
81	0.3	07. In Lap
66	0.3	08. Cargo Area
24	0.1	09. Extra Seat
25	0.1	10. Standing
0	0.0	88. Missing Data

Variable 36 **BELTED (Y/N)** MD1: 8 Field Width: 1
MD2: None Type: Numeric

FREQ	Prcnt	BELTED (Y/N)
13763	56.4	1. Not Belted
10607	43.4	2. Belted (any type)
44	0.2	8. Missing Data

Variable 37 **RESTRAINT USE** MD1: 8 Field Width: 1
MD2: None Type: Numeric

FREQ	Prcnt	RESTRAINT USE
13763	56.4	1. Not Belted
10282	42.1	2. Belted
233	1.0	3. CRD OK
92	0.4	4. CRD Wrong
44	0.2	8. Missing Data

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Variable 38 **SEX** MD1: 8 Field Width: 1
MD2: None Type: Numeric

FREQ	Prcnt	SEX
12996	53.2	1. Male
11359	46.5	2. Female
59	0.2	8. Missing Data

Variable 39 **AGE** MD1: 8 Field Width: 1
MD2: None Type: Numeric

FREQ	Prcnt	AGE
628	2.6	1. 0-3
1944	8.0	2. 4-15
7836	32.1	3. 16-29
11339	46.4	4. 30-59
2630	10.8	5. 60+
37	0.2	8. Missing Data

Variable 40 **SPECIAL TAG** MD1: None Field Width: 2
MD2: None Type: Numeric

FREQ	Prcnt	SPECIAL TAG
24125	98.8	00. None
281	1.2	01. Shoulder Belt Misused
8	0.0	02. Lap Belt Misused