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16. Abstract

Beginning with vehicle model year 2010, FMVSS 202a established new requirements for head restraints in passenger vehicles. This study evaluates the effectiveness of head restraints in reducing cervical spine injuries, including whiplash injuries, for passenger vehicle occupants using NHTSA's National Automotive Sampling System Crashworthiness Data System data from 2000 to 2015. The analysis found that female occupants were more likely to suffer cervical spine injuries in rear-end crashes than male occupants. Occupants in full rear-end crashes were more likely to report cervical spine injuries than occupants in partial or side rear-end crashes. The analysis found a statistically significant reduction of 11.1 percent in cervical spine injury protection for occupants in vehicles with head restraints compliant with FMVSS 202a, when compared to occupants in vehicles with a different head restraint or no head restraints. Furthermore, seating positions with FMVSS 202a-compliant head restraints were 10.9 percent more effective in preventing cervical spine injuries than seating positions with FMVSS 202-compliant head restraints.

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Acronyms

NASS-CDS or CDS	National Automotive Sampling System Crashworthiness Data System
CISS	Crash Investigation Sampling System
NASS	National Automotive Sampling System
FMVSS	Federal Motor Vehicle Safety Standard
MY	model year

Executive Summary

In 2015 there were more than 500,000 rear-end crashes in the United States, accounting for approximately 25 percent of the crashes in NHTSA's National Automotive Sampling System Crashworthiness Data System (CDS). The CDS target population is all police-reported motor vehicle crashes on public traffic ways, each involving at least one damaged passenger vehicle towed from the scene due to disabling damage. New head restraint improvements prevent and reduce the severity of passenger vehicle occupant whiplash injuries. In 2009 NHTSA implemented Federal Motor Vehicle Safety Standard 202a (upgraded head restraints) for vehicle model years 2010 and onward. This study evaluated head restraints and their relationship in reducing cervical spine injuries in passenger vehicle occupants during rear-end crashes. Toward this end, the analysis focused on CDS data from 2000 to 2015. The data showed that less than 2 percent of the seating positions considered in this analysis had head restraints compliant with FMVSS 202a, while the other seating positions in the data set were either equipped with FMVSS 202-compliant head restraints or no head restraints. Approximately 1 million neck injuries were classified as cervical spine injuries during those years, representing 12 percent of the occupants involved in rear-end crashes. FMVSS 202a marginal effectiveness in preventing cervical spine injury was 11 percent when compared to the former FMVSS 202 standard. This analysis found a statistically significant difference (at the alpha = 0.05 level) in whiplash injury reduction when comparing FMVSS 202a-compliant head restraints to the former FMVSS 202-compliant head restraints. Seating positions equipped with FMVSS 202a-compliant head restraints were 11.1 percent more effective in preventing whiplash injuries when compared with vehicles prior to its implementation.

Key findings:

- More than 1 million occupants suffered whiplash injuries from crashes from 2000 to 2015.
- FMVSS 202a-compliant head restraints reduced whiplash injuries by 11.1 percent when compared to seating positions without the upgraded safety standard guidelines.
- Female passenger car occupants had a 43 percent higher likelihood of suffering cervical spine injuries than male occupants when adjusting by other factors.
- Occupants involved in full-width, overlap, rear-end crashes (6 o'clock direction of force), had greater likelihood of whiplash injury than occupants in partial-width, overlap, rear-end crashes, after adjusting by sex, age, delta V, seating location, and head restraint type (5 or 7 o'clock direction of force).
- There was a statistically significant difference in this analysis between the marginal effectiveness of FMVSS 202-compliant head restraints and the FMVSS 202a-compliant head restraints in their protection against whiplash injuries in rear-end crashes.
- The majority of the vehicles in the study population were from MY 1998 to 2008, thus the FMVSS 202a compliant head restraints were not equally represented.

Introduction

Rear-End Crashes

In 2015 there were more than 500,000 rear-end crashes in the United States, accounting for approximately 25 percent of the crashes in the CDS annually. From 2000 to 2015 there were approximately 8 million rear-end crashes. Rear-end crashes are a leading cause of whiplash injuries in passenger vehicles (Mayo Clinic Staff, 2022).

Evaluation of Head Restraints

The purpose of vehicle head restraints is to prevent neck injuries in rear-end crashes caused by an excessive rearward displacement of an occupant's head relative to their upper torso, including whiplash injuries (Desapriya et al., 2011). Passenger vehicles manufactured after January 1, 1969, for sale in the United States must meet FMVSS 202, including head restraints for all front outboard seating positions. On September 1, 1991, this standard was extended to light truck vehicles (pickup trucks, vans, and SUVs weighing less than 10,000 pounds). The standard requires that front outboard seating positions for these vehicles must have at least 27.5 inches in the lowest setting position, measured from the H-point[1] to the top of the head restraint (FMVSS No. 202).

On December 7, 2004, NHTSA published new requirements for head restraints in passenger vehicles, known as FMVSS 202a. The FMVSS 202a requirement changes apply to vehicles produced and manufactured at the beginning of September 1, 2009. These vehicles were subject, with a few exceptions, to the following criteria:

- All front outboard designated seating positions: the top of an adjustable head restraint in all the seating positions must have a height not less than 800 mm in at least one position.
- All rear outboard designated seating positions: the top of an adjustable head restraint in all the seating positions must have a height not less than 750 mm in any position.
- For front outboard seating positions, the distance between the back of the head of an occupant[2] in a normal seated position and the head restraint, must be no farther than 50 mm in any adjustment.

It is important to note that in some cases auto manufacturers choose to implement FMVSS requirements early. In those cases, the relevant vehicles are identified in the analysis.

The Government Performance and Results Act of 1993 requires government agencies to evaluate existing programs and regulations and determine the actual benefits and costs of additional equipment required on vehicles. The purpose of this study is to assess the effect of these revised head restraint requirements on the frequency of cervical spine injuries in real-world crashes.

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[1] The H-point is defined by a test machine placed in the vehicle seat (Society of Automotive Engineers, 1995). From the side, the H-point represents the pivot point between the torso and upper leg portions of the test machine. It can be thought of, roughly, as the hip joint of a 50th percentile male occupant viewed laterally.

[2] Representing the position of a 50th percentile head.

Literature Review

NHTSA has performed several studies evaluating head restraint effectiveness in preventing neck injuries in rear-end crashes. Fixed head restraints had reduced the overall risk of injury to drivers by 17 percent but adjustable restraints reduced risk by only 10 percent (Chaudhary et al., 2015). It was noted that occupants in 75 percent of seating positions with adjustable head restraints were not using it properly for the occupant's height (Kahane, 1982). In April 2001 the evaluation division performed a head restraint effectiveness evaluation on light trucks (Walz, 2001), 10 years after the FMVSS 202 was extended to this type of vehicle. This evaluation was based on eight State files for the calendar years 1993–1998, and estimated that head restraints reduced overall neck injury risk in light truck vehicles by 6.08 percent (Walz, 2001).

Studies have shown that female occupants have a higher risk of whiplash injuries in rear-end crashes than male occupants (Walz, 2001). Some factors other than sex have been associated with neck injuries, such as the direction of force (full-overlap rear-end versus partial-overlap rear-end crashes), crash severity, and delta V (Gabauer & Gabler, 2006).

Current Evaluation

The main goal of this document is to compare the previous FMVSS 202 head restraints with the new and improved FMVSS 202a head restraints in reducing cervical spine injuries. We will calculate the effectiveness of the updated head restraint in preventing cervical spine injuries in rear-end crashes. A logistic regression analysis will also be conducted to explain the relationship between these variables, adjusting by sex, age, direction of force, delta V, and seating position.

Methods

Data Source

The data used for this evaluation was the CDS data for 2000 to 2015. Data show that the cervical spine injuries rate has decreased through the years, from 500,000 weighted cases in the CDS data in 2000, to near 160,000 cases in 2015. Other vehicle safety technologies (not examined in this analysis) that have played a major role in reducing rear-end crashes (and corresponding cervical spine injuries) such as forward collision warning systems and collision avoidance systems, have started development and rolled out in more recent years. The choice of data for this evaluation was complex. This analysis seeks to isolate the effect of FMVSS 202a by not adding more recent vehicle with other beneficial vehicle safety countermeasures, which is the focus of the NASS-CDS successor dataset, the CISS. The choice of datasets was made deliberately to focus exclusively on the difference in injury outcomes between vehicles with FMVSS 202a compliant head restraints and those vehicles without such head restraints. Using CISS for the evaluation would have made estimating and understanding the singular effect of FMVSS 202a much harder. Moreover, the target population for CISS is all police-reported motor vehicle crashes on trafficways involving passenger vehicles where at least one passenger vehicle was towed from the scene for any reason. The CISS and CDS target populations differ in that CDS focuses on cars towed from the scene due to damage.

This analysis will focus on neck injuries for occupants of passenger cars, light trucks, and vans in rear-end crashes. Head restraint type (FMVSS 202 or FMVSS 202a compliant) was assigned by information provided by manufacturers for vehicles' make, model, and model year. For those vehicles whose manufacturers did not have this information, a visual inspection of stock pictures of the vehicles from the Edmunds website was done and the head restraint types were manually assigned in an SAS code.

Exclusions

Since head restraints are primarily designed to reduce extension injuries in rear-end crashes, other types of crashes were excluded from this analysis (Curatolo et al., 2011), and only struck vehicles in rear-end crashes were included. The types of crashes excluded were crashes that were: non-rear-end crashes, rollovers, and crashes where the vehicles departed the roadway.

Analytical Variables

The interest variable in this analysis, cervical spine injury, was taken from the occupant injury file. Injuries reported as neck injuries for the *BODYREG* were classified as cervical spine injuries. Injuries other than whiplash can occur in the neck and back regions, with similar coding descriptions. However, we believe that limiting the analysis to rear-end crashes reduces the probability that neck injuries represent something other than whiplash (Gabauer & Gabler, 2006), and this is the main injury for which the head restraint was updated.

The main variable used to compare cervical spine injury in occupants was the head restraint type of the crash seating position. Three types of head restraint statuses were assigned to all the occupants in crashes from 2000 to 2015; seating positions without any head restraint, head restraint compliant with the FMVSS 202 regulations, and head restraints compliant with FMVSS 202a regulations. According to FMVSS 202, all front outboard sitting positions in passenger cars man-

ufactured after January 1, 1969, and light trucks manufactured after September 1, 1991, were required to have head restraints. This implies that head restraints in front outboard seating positions were mandatory on all model year 1970 or later passenger cars, and all model year 1991 and later light trucks. The information on head restraints for the other seating positions was sorted by make, model, and production year and specified in the dataset.

Various studies have shown that other variables might impact the incidence of whiplash injuries in crashes (Gabauer & Gabler, 2006). Female occupants have been associated with a higher whiplash likelihood when compared to men. This could be attributed to females having generally smaller neck bones and muscles than males, on average. Age has also been strongly associated with head restraints and neck injuries, where occupants younger than 64 years old had a greater neck injury likelihood reduction from head restraints (Trempel et al., 2016). Delta V has long been associated as a predictor of occupant injury severity in crashes (Curatolo et al., 2011). Another study showed that rear-end crashes where the direction of force occurred in full-width overlap (6 o'clock), rather than in partial-width overlap (5 or 7 o'clock), resulted in more neck injuries (Farmer et al., 1999; Walz, 2001), see Figure 1. These variables were also included in this analysis.

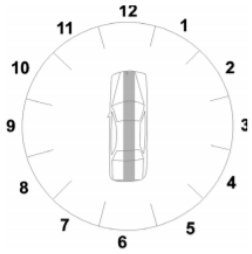

Figure 1. Vehicle Direction of Force

This analysis used logistic regression analysis to measure the association between these independent variables and the neck injury outcome (the analytical dependent variable). The logistic regression followed the form:

$$P = \frac{e^{\alpha+\beta_i X}}{1 + e^{\alpha+\beta_i X}}$$

Where α and β_i are the parameters of the model for the predictor variables for sex, age group (33 years and older versus younger; median of age in the study population), seating location (front vs rear), head restraint type (none, FMVSS 202-compliant, and FMVSS 202a-compliant), delta V (more than 32 mph versus less than 32 mph; delta V above or below median in the study population), and direction of force (full-width overlap versus partial-width overlap).

Results

The analytical data set derived from CDS shows that from 2000 to 2015 there were approximately 1 million cervical spine injuries in rear-end crashes. Table 1 shows the percentage of cervical spine injuries in occupants and the distribution of head restraint types, by vehicle model year. Figure 2 presents a visual representation of Table 1, where in red is the rate of cervical spine injuries per model year occupant. Vehicles produced after 2010 are required to have head restraints with the FMVSS 202a specifications in all outboard seating positions and middle rear seats. Most of the seating positions in vehicles in the study data (79 percent) had head restraints compliant with the FMVSS 202 specifications, while there were about 16 percent of occupants with an FMVSS 202a-compliant head restraint. Figure 2 shows cervical spine incident percentages fluctuate without a clear pattern for vehicles with model years 1998 to 2016. This pattern seems to stabilize in vehicles with model years 1998 through 2008. This could be attributed to the fact that these are the model years more prevalent in the analyzed data.

Table 1. Cervical Spine Injury Prevalence and Head Restraint Type Distribution by Vehicle Model Year

Vehicle Model Year	Cervical Spine Injury Rate*	Head Restraint Type Distribution†		
		No head restraint	FMVSS 202 Compliant	FMVSS 202a Compliant
1998	9.6	6.6	78.6	0.0
1999	13.0	8.6	84.1	0.1
2000	9.7	6.6	81.6	1.2
2001	11.3	3.1	90.3	4.4
2002	8.2	0.5	96.4	2.9
2003	8.9	6.2	86.7	6.4
2004	9.0	1.6	91.9	6.2
2005	15.5	0.8	53.7	45.4
2006	11.8	0.4	56.7	42.8
2007	10.8	0.8	51.0	48.2
2008	9.4	0.3	28.4	71.0
2009	9.0	0.8	7.2	92.0
2010	17.5	1.6	0.0	98.4
2011	9.9	0.9	0.4	98.6
2012	5.6	2.8	0.0	97.1
2013	11.9	0.8	0.0	99.2
2014	16.4	0.9	0.0	99.1
2015	10.9	0.0	0.0	100.0
2016††	0.0	0.0	0.0	100.0

* Rates are for every one hundred occupants in rear-end crashes $\hat{I} = (\sum_{h=1}^{H}\sum_{i=1}^{n_h}\sum_{j=1}^{m_{hi}} injuries_{year_{hij}} \times W_{hij}) / (\sum_{h=1}^{H}\sum_{i=1}^{n_h}\sum_{j=1}^{m_{hi}} occupants_{year_{hij}} \times W_{hij})$; where h is the PSU strata. i is the PSU, and j is the year.

† Unknown head restraint types are not presented in this table, therefore each row may not sum to 100.

†† There are vehicles 2016 model year vehicles in the 2015 CDS dataset.

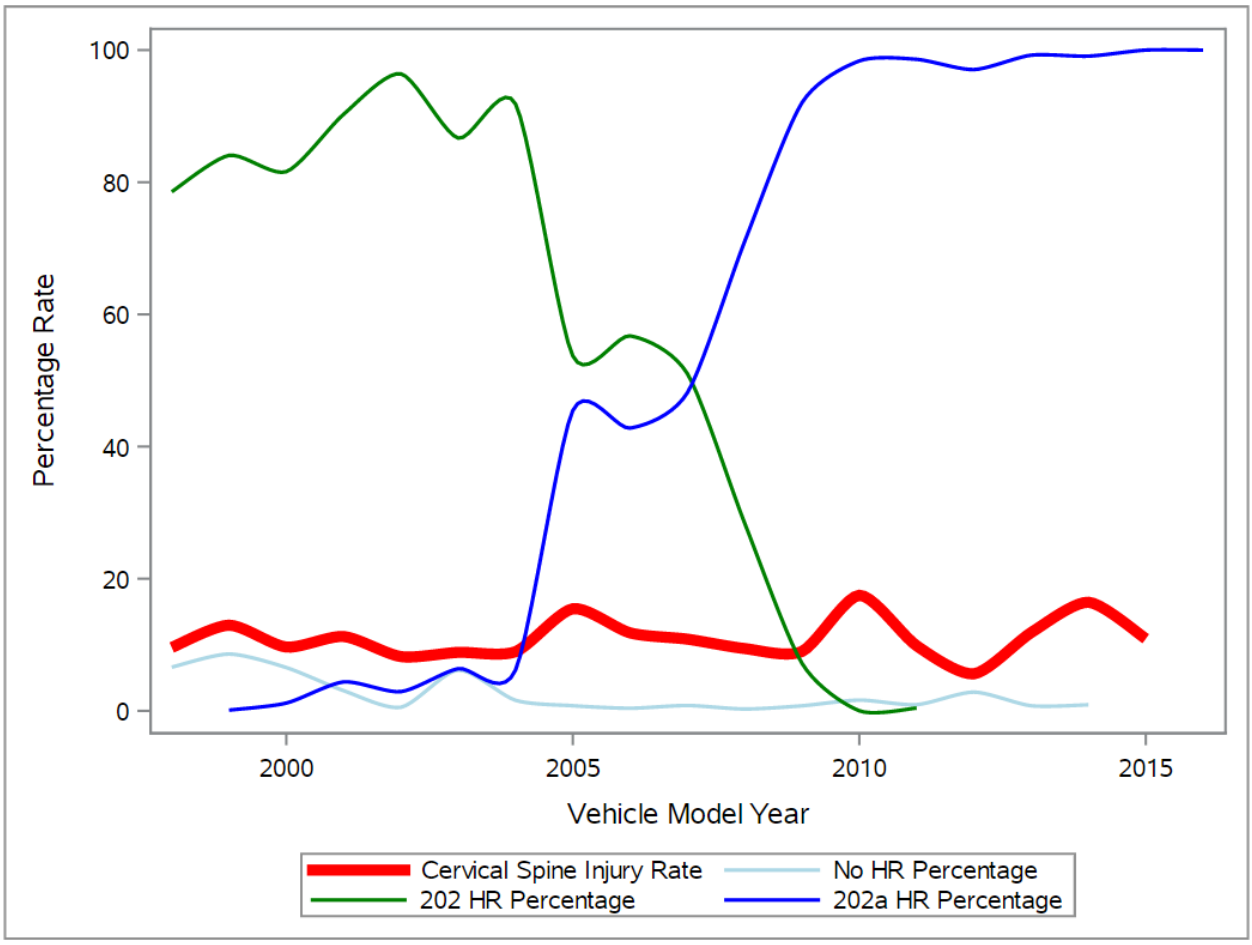

Figure 2. Percentage of Head Restraint Types and Cervical Spine Injury Incidence by Vehicle Model Year 1998–2016

Table 2 presents the weighted frequencies and percentage of occupants that sustain cervical spine injuries, as well as the odds ratios of the logistic regression including all these variables. Approximately 12 percent of the people involved in rear-end crashes where at least one vehicle was towed from the crash scene, suffered from neck injuries. Among the people who sustain cervical spine injuries, around 40 percent were males, and 60 percent were female. Females are at higher odds than males to experience cervical spine injuries in rear-end crashes. This difference was found to be statistically significant (at a level of 0.05). Drivers and front row passengers were more likely to suffer cervical spine injuries in rear-end crashes than occupants in rear outboard seats. Most occupants that suffer cervical spine injuries during a rear-end crash, were in a seat location that had a head restraint with specifications and requirements of the FMVSS 202, dating back to 1991. Delta V was not statistically significant at the alpha=0.05 level and there was not sufficient evidence to support the idea that low-speed crashes (prevalent in the analytical dataset) consistently minimized cervical spine injuries, holding other factors in the model constant. However, that does not mean that delta V could not be an important factor in crashes for which data were not available. Occupants in a full-width overlap direction of force (6 o'clock) had a significantly higher chance of having a cervical spine injury than those involved in a partial width impact (5 or 7 o'clock direction of force).

Table 2. Weighted Frequencies of Occupants with Cervical Spine Injuries

	Frequency	Weighted Frequency	Standard Error of Weighted Freq	Percent of Injured Occupants†	Odds Ratio	95% Confidence Interval	
						Lower	Upper
Sex							
Male	1,102	397,371	74,128	4.94	-	-	-
Female	1,538	610,494	135,131	7.59	**1.428**	**1.156**	**1.764**
Age Group							
Less than 33	1,294	455,276	87,382	5.84	-	-	-
33 and older	1,287	525,028	116,818	6.74	1.081	0.839	1.393
Seat location							
Rear rows	432	159,464	44,973	2.07	-	-	-
Front row	2,202	845,811	171,279	10.97	1.192	0.713	1.993
Head Restraint							
202	2,013	794,528	185,443	9.77	0.824	0.422	1.608
202a	486	148,714	24,081	1.83	0.681	0.191	2.428
None	148	65,734	21,018	0.80	-	-	-
delta V							
Less than 32 mph	1,343	611,321	127,530	11.36	-	-	-
32 mph or more	452	108,552	18,331	2.02	0.893	0.735	1.084
Rear Impact							
Partial Rear Impact	565	132,568	31,213	2.07	-	-	-
Full Rear Impact	2,082	876,408	183,245	10.35	**1.651**	**1.191**	**2.290**
Total	**2,660**	**1,010,270**	**206,367**	**12.42**	**-**	**-**	**-**

Bold indicates statistically significant difference with an alpha level of 0.05

†Percentage of injury occupants within categories. Adjusted neck-injury may not add to overall injury rate due to missing values in adjusted variables.

FMVSS 202a Improvement Over FMVSS 202

The objective of this analysis is to estimate the effectiveness of the upgraded head restraint standard. Although included as variables in the preceding logistic regression, passenger gender and rear impact type are not themselves safety features. Comparing only the reduction in cervical spine injures associated with the types of head restraints in the respective vehicles yields the following formula:

$$\text{Effectiveness (E)} = \frac{p_1 - p_2}{p_1} = 1 - \frac{p_2}{p_1} \quad (1)$$

where p_i = percentage of injured occupants as:

$i = 1$ for the group of head restraints prior to FMVSS 202a (FMVSS 202 and no head restraint), and

$i = 2$ for the group with updated head restraints

So, for the 2 groups:

$$p_1 = \frac{860{,}262}{6{,}521{,}067} = 0.131920$$

$$p_2 = \frac{148{,}714}{1{,}268{,}626} = 0.117224$$

We now add these values to equation (1) and calculate:

$$E = 1 - \frac{0.117224}{0.131920} = 1 - 0.8886 = 0.1114$$

Therefore, the introduction of the new FMVSS 202a standard presents an overall cervical spine injury reduction of 11.1 percent with respect to the grouping of head restraints designed according to FMVSS 202 and seating positions without head restraints. To estimate how much the new standard improved over the previous, we removed the no head restraint cases from the p1 group to estimate the effectiveness of the FMVSS 202a with regard to FMVSS 202. Following the previous methodology, we get:

$$p_1 = \frac{794{,}528}{6{,}038{,}374} = 0.131580$$

Therefore,

$$E = 1 - \frac{0.117224}{0.131580} = 1 - 0.8909 = 0.1091$$

Head restraints compliant with the FMVSS 202a provided an additional 10.9 percent protection from cervical spine injuries when compared to the FMVSS 202 compliant head restraints. The variance of the effectiveness would be the variance of p_2/p_1. The linear approximation of this variance is calculated as:

$$\sigma_E^2 = \frac{p_2^2 \times \sigma_{p_1}^2}{p_1^4} + \frac{\sigma_{p_2}^2}{p_1^2} \quad (2)$$

Where,

σ_E^2 = variance of effectiveness estimate

p_1 = cervical spine injury rate with head restraint 202

p_2 = cervical spine injury rate with head restraint 202a

$\sigma_{p_i}^2$ = variance of cervical spine injury rate within group

The variance for each injury group is first calculated with the following formula:

$$\sigma_{p_i}^2 = \frac{p_i \times (1 - p_i)}{n_i}$$

Where,

p_i = percent of occupant cervical spine injury

n_i = Number of occupants involved

i = 1 in 202 and no head restraint group; *i* = 2 in 202a group)

Therefore,

$$\sigma_{p_1}^2 = \frac{0.131580 \times (1 - 0.131580)}{18{,}930} = \frac{0.11427}{18{,}930} = 0.000006037$$

$$\sigma_{p_2}^2 = \frac{0.117224 \times (1 - \ 0.117224)}{4{,}547} = \frac{0.10348}{4{,}547} = \ 0.000022754$$

Using these numbers in equation (2), we get:

$$\sigma_E^2 = \frac{0.01374 \times 0.000006037}{0.00029993} + \frac{0.000022754}{0.01732} = 0.000276559 + 0.0013137 = 0.0015903$$

To determine the significance of this estimate, a z-score is calculated as:

$$z = \frac{E}{\sigma_E} = \frac{0.1091}{0.0398786} = 2.7358;$$

which is statistically significant with an α level of 0.05. Therefore, occupants with FMVSS 202a updated head restraints showed an estimated 11 percent reduction in cervical spine injuries in rear-end crashes when compared to vehicles equipped with FMVSS 202-compliant head restraint systems.

Conclusions

This analysis has demonstrated that the FMVSS 202a-compliant head restraint systems are statistically significant and more likely to reduce cervical spine injuries in rear-end crashes from 2000 to 2015. In both this analysis and previous studies (Chaudhary et al., 2015; Walz, 2001; Kahane, 1982), female occupants are 43 percent more likely to suffer cervical spine injuries than male occupants. Previous studies indicate that this disparity could be due to different levels of muscle density in the neck for male bodies versus female bodies (Stemper & Corner, 2016). Additionally, full rear impacts (at the 6 o'clock position) are 65 percent more likely to produce a cervical spine neck injury when compared to the partial width direction of force (5 and 7 o'clock). These differences are statistically significant when the rest of the variables are held constant. Although the initial logistic regression analysis did not show a statistically significant difference by head restraint type, the final estimate of the overall observed cervical spine injury reduction is statistically significant at an alpha level of 0.05. We found that the new standard reduced occupants with cervical spine injuries by 11.1 percent compared to the vehicle fleet before its implementation. Furthermore, the FMVSS 202a standard provided a significant marginal improvement to the previous FMVSS 202 standard in preventing cervical spine injuries by 10.9 percent in rear-end crashes.

Limitations

Although this evaluation was done following standard statistical methodology, the analysis has some limitations worth noting. The data included in this analysis comes exclusively from CDS data, a comprehensive sampled dataset of vehicles towed from the crash scene. Other studies (Kullgren et al., 2007) have shown that cervical spine-effect injuries mostly occur in low-speed crashes. This might suggest that the types of crashes resulting in cervical spine injuries, including whiplash-effect injuries, are largely underrepresented in our data(Freeman & Leith, 2020), since CDS collects data from vehicles that were towed away due to damage. Furthermore, the vehicles that were involved in rear-end crashes in the CDS data period from 2000 to 2015 were mostly those with model years from 1998 to 2008. This fact explains the lower annual fluctuation seen in Figure 2 between the vehicle model years for this period. Additionally, cervical spine injuries, including whiplash injuries, are not explicitly defined in the CDS data as there is not necessarily a medical record associated with each crash. It is, rather, more of an interpretation of multiple factors. Additionally, interior inspection data for vehicles with model years older than 10 years at the time of collection, are not available in CDS data for data years 2009 to 2015. Lastly, a portion of the classification of head restraint types (FMVSS 202, FMVSS 202a compliant, or non-head restraint) in this analysis was done by crash data collectors observing and recording the head restraint types in vehicles older than 2009 and analyzing the type of head restraint in every seating position. This was then coded into a SAS program for the final assignment. Although this was rigorously done, there could have been classification errors in the assignment of head restraint types.

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Appendix A: SAS Code

```
%MACRO A;
%DO Y=2000 %TO 2015;
/*%LET I=%SUBSTR(&Y,3,2);*/
%LET I=&Y;

LIBNAME NASS&I "\\NHTSA-NRDDATA\NASSDATA\NASSDB\Nass&I\";
LIBNAME FMT&I "\\NHTSA-
NRDDATA\npo100data\Eliseo\ORAE_ED\FMVSS_202\PROG_CODE\&I\";
OPTIONS FMTSEARCH=(FMT&I);

data NASS&I..gv;
      set NASS&I..gv;
      length mm 5;
      mm=put(make,z2.)||put(model,z3.);
      mm1 = put(mm, $makmod.);
      make1 = put(make, $make.);
run;
%END;
%MEND A;
%A;

*NASSCDS GV file;
data nasscds.gv;
length RATWGT 8 VIN $ 12;
set nass2000.gv(in=CY00) nass2001.gv(in=CY01) nass2002.gv(in=CY02)
nass2003.gv(in=CY03) nass2004.gv(in=CY04)
      nass2005.gv(in=CY05) nass2006.gv(in=CY06) nass2007.gv(in=CY07)
nass2008.gv(in=CY08) nass2009.gv(in=CY09)
      nass2010.gv(in=CY10) nass2011.gv(in=CY11) nass2012.gv(in=CY12)
nass2013.gv(in=CY13) nass2014.gv(in=CY14)
      nass2015.gv(in=CY15);
if CY00 then CY=2000;
      else if CY01 then CY=2001;
      else if CY02 then CY=2002;
      else if CY03 then CY=2003;
      else if CY04 then CY=2004;
      else if CY05 then CY=2005;
      else if CY06 then CY=2006;
      else if CY07 then CY=2007;
      else if CY08 then CY=2008;
      else if CY09 then CY=2009;
      else if CY10 then CY=2010;
      else if CY11 then CY=2011;
      else if CY12 then CY=2012;
      else if CY13 then CY=2013;
      else if CY14 then CY=2014;
      else if CY15 then CY=2015;
*towed vehicle group;
if towpar=1 then TOWED_VEH=1;
else towed_veh=0;
*light vehicle group;
if bodytype in (1:49) then LIGHT_VEH=1;
else light_veh=0;
```

```
run;

*NASSCDS OA file;
data nasscds.oa;
length RATWGT 8;
set nass2000.oa(in=CY00) nass2001.oa(in=CY01) nass2002.oa(in=CY02)
nass2003.oa(in=CY03) nass2004.oa(in=CY04)
      nass2005.oa(in=CY05) nass2006.oa(in=CY06) nass2007.oa(in=CY07)
nass2008.oa(in=CY08) nass2009.oa(in=CY09)
      nass2010.oa(in=CY10) nass2011.oa(in=CY11) nass2012.oa(in=CY12)
nass2013.oa(in=CY13) nass2014.oa(in=CY14)
      nass2015.oa(in=CY15);
if CY00 then CY=2000;
      else if CY01 then CY=2001;
      else if CY02 then CY=2002;
      else if CY03 then CY=2003;
      else if CY04 then CY=2004;
      else if CY05 then CY=2005;
      else if CY06 then CY=2006;
      else if CY07 then CY=2007;
      else if CY08 then CY=2008;
      else if CY09 then CY=2009;
      else if CY10 then CY=2010;
      else if CY11 then CY=2011;
      else if CY12 then CY=2012;
      else if CY13 then CY=2013;
      else if CY14 then CY=2014;
      else if CY15 then CY=2015;
run;

*merge GV & OA files;
proc sort data=nasscds.gv;
by psu caseno vehno cy;
run;
proc sort data=nasscds.oa;
by psu caseno vehno cy;
run;
data nasscds.gv_oa;
merge nasscds.gv(in=a) nasscds.oa(in=b);
by psu caseno vehno cy;
if a=1 and b=1;
run;

*NASSCDS VE file;
data nasscds.ve;
length RATWGT 8;
set nass2000.ve(in=CY00) nass2001.ve(in=CY01) nass2002.ve(in=CY02)
nass2003.ve(in=CY03) nass2004.ve(in=CY04)
      nass2005.ve(in=CY05) nass2006.ve(in=CY06) nass2007.ve(in=CY07)
nass2008.ve(in=CY08) nass2009.ve(in=CY09)
      nass2010.ve(in=CY10) nass2011.ve(in=CY11) nass2012.ve(in=CY12)
nass2013.ve(in=CY13) nass2014.ve(in=CY14)
      nass2015.ve(in=CY15);
if CY00 then CY=2000;
      else if CY01 then CY=2001;
      else if CY02 then CY=2002;
      else if CY03 then CY=2003;
```

```
      else if CY04 then CY=2004;
      else if CY05 then CY=2005;
      else if CY06 then CY=2006;
      else if CY07 then CY=2007;
      else if CY08 then CY=2008;
      else if CY09 then CY=2009;
      else if CY10 then CY=2010;
      else if CY11 then CY=2011;
      else if CY12 then CY=2012;
      else if CY13 then CY=2013;
      else if CY14 then CY=2014;
      else if CY15 then CY=2015;
run;
*merge GV & OA & VE files;
proc sort data=nasscds.gv_oa;
by psu caseno vehno cy;
run;
proc sort data=nasscds.ve;
by psu caseno vehno cy;
run;
data nasscds.gv_oa_ve;
merge nasscds.gv_oa(in=a) nasscds.ve(in=b);
by psu caseno vehno cy;
if a=1 and b=1;
run;

*NASSCDS ACCIDENT file;
data nasscds.accident;
length RATWGT 8;
set nass2000.accident(in=CY00) nass2001.accident(in=CY01) nass2002.acci-
dent(in=CY02) nass2003.accident(in=CY03)
      nass2004.accident(in=CY04) nass2005.accident(in=CY05) nass2006.acci-
dent(in=CY06) nass2007.accident(in=CY07)
      nass2008.accident(in=CY08) nass2009.accident(in=CY09) nass2010.acci-
dent(in=CY10) nass2011.accident(in=CY11)
      nass2012.accident(in=CY12) nass2013.accident(in=CY13) nass2014.acci-
dent(in=CY14) nass2015.accident(in=CY15);
if CY00 then CY=2000;
      else if CY01 then CY=2001;
      else if CY02 then CY=2002;
      else if CY03 then CY=2003;
      else if CY04 then CY=2004;
      else if CY05 then CY=2005;
      else if CY06 then CY=2006;
      else if CY07 then CY=2007;
      else if CY08 then CY=2008;
      else if CY09 then CY=2009;
      else if CY10 then CY=2010;
      else if CY11 then CY=2011;
      else if CY12 then CY=2012;
      else if CY13 then CY=2013;
      else if CY14 then CY=2014;
      else if CY15 then CY=2015;
run;
*merge GV & OA & VE & ACCIDENT files;
proc sort data=nasscds.gv_oa_ve;
by psu caseno cy;
```

```
run;
proc sort data=nasscds.accident;
by psu caseno cy;
run;

data nasscds.gv_oa_ve_accident;
merge nasscds.gv_oa_ve(in=a) nasscds.accident(in=b);
by psu caseno cy;
if a=1;
run;


data nasscds.impact_frontseat;
set nasscds.gv_oa_ve_accident;
*rear impacts: the direction of highest impact force;
if dof1 in (5,6,7,25,26,27,45,46,47,65,66,67,85,86,87) and rollover=0 then
REAR_IMPACT1=1;
else rear_impact1=0;
*rear impacts: the direction of 1st or 2nd highest impact force;
if (dof1 in (5,6,7,25,26,27,45,46,47,65,66,67,85,86,87) and rollover=0) or
      (dof2 in (5,6,7,25,26,27,45,46,47,65,66,67,85,86,87) and rollover=0)
then REAR_IMPACT2=1;
else rear_impact2=0;
*rear impact: full rear vs side rear impact of force;
if (dof1 in (6,26,46,66,86) and rollover=0) or
      (dof2 in (6,26,46,66,86) and rollover=0) then REAR_IMPACT3=1;
      else if (dof1 in (5,7,25,27,45,47,65,67,85,87) and rollover=0) or
            (dof2 in (5,7,25,27,45,47,65,67,85,87) and rollover=0) then
REAR_IMPACT3=2;
      else rear_impact3=0;
*occupant in front seat;
if seatpos in (11,12,13) then FRONT_SEAT="FRONT SEAT";
else if seatpos in (21:23,31:33,41:43) then front_seat="REAR SEAT";
run;

*injury type;
data nasscds.oi;
length RATWGT 8;
set nass2000.oi(in=CY00) nass2001.oi(in=CY01) nass2002.oi(in=CY02)
nass2003.oi(in=CY03) nass2004.oi(in=CY04)
      nass2005.oi(in=CY05) nass2006.oi(in=CY06) nass2007.oi(in=CY07)
nass2008.oi(in=CY08) nass2009.oi(in=CY09)
      nass2010.oi(in=CY10) nass2011.oi(in=CY11) nass2012.oi(in=CY12)
nass2013.oi(in=CY13) nass2014.oi(in=CY14)
      nass2015.oi(in=CY15);
      if CY00 then CY=2000;
      else if CY01 then CY=2001;
      else if CY02 then CY=2002;
      else if CY03 then CY=2003;
      else if CY04 then CY=2004;
      else if CY05 then CY=2005;
      else if CY06 then CY=2006;
      else if CY07 then CY=2007;
      else if CY08 then CY=2008;
      else if CY09 then CY=2009;
      else if CY10 then CY=2010;
      else if CY11 then CY=2011;
```

```
      else if CY12 then CY=2012;
      else if CY13 then CY=2013;
      else if CY14 then CY=2014;
      else if CY15 then CY=2015;
run;
*merge driver & passenger with OI;
proc sort data=nasscds.impact_frontseat;
by psu caseno vehno cy;
run;
proc sort data=nasscds.oi;
by psu caseno vehno cy;
run;
data nasscds.impact_frontseat_oi;
merge nasscds.impact_frontseat(in=a) nasscds.oi(in=b);
if a=1;
by psu caseno vehno cy;
run;

*occupants sit on front seats in rear impacts;
data nasscds.impact_frontseat_inj;
set nasscds.impact_frontseat_oi;
MY=MODELYR;
if my le 2006 then MY_GROUP=1;
else if my gt 2006 then my_group=2;
if my le 2009 then MY_GROUP2=1;
else if my gt 2009 then MY_GROUP2=2;
*whiplash injuries;
if bodyreg='N' then WHIPLASH=1;
else whiplash=0;
run;

/* Include program that assigns head restraint for the CDS dataset */
```

This part of the program will be omitted in this article. The resulting dataset from this part is called `hr`.

```
data hr2;
      set hr;

      if age ge 12;

      head_rest2 = "UNKNOWN";
      if head_rest = "202" then head_rest2 = "202";
      if head_rest = "202A" then head_rest2 = "202A";
      if head_rest = "202A_B" then head_rest2 = "202A";
      if head_rest = "NONE" then head_rest2 = "NONE";

      HEAD_REST3 = "UNKNOWN";
      IF head_rest2 = "202" then HEAD_REST3 = "BEFORE";
      IF head_rest2 = "NONE" THEN HEAD_REST3 = "BEFORE";
      IF HEAD_REST2 = "202A" THEN HEAD_REST3 = "AFTER";


      agegroup = "                          ";
      if age in (0:32) then agegroup = "Less than 33";
      else if age > 33 then agegroup = "33 and older";
```

```
      AGEGROUP2 = 1;
      IF AGE LE 25 THEN AGEGROUP2 = 1;
      IF AGE GE 26 AND AGE LE 55 THEN AGEGROUP2 = 2;
      IF AGE GE 56 THEN AGEGROUP2 = 3;

      deltav = "                                          ";
      if dvtotal in (0:31) then deltav = "Less than 32 MPH";
      else if dvtotal > 32 then deltav = "32 MPH of more";

      if sex in (2,3,4,5,6) then gender = "FEMALE";
      if sex = 1 then gender = "MALE";

      if seatpos = 11 then driver = 1;
      else if seatpos in (12,13,21:23,31:33,41:43) then driver = 0;
      else driver = .U;

      if my le 2005 then my2005 = "Yes";
      else if my ge 2006 then my2005 = "No";

RUN;
/* find median for age and Delta V */
proc means data=hr median mean;
      var age     /* Age median is 32 */
            dvtotal      /* delta-V median is 27 */;
run;


proc sort data=hr2;
by whiplash;
run;

/* TABLE 1 */
PROC SURVEYFREQ DATA=HR2;
      STRATA PSUSTRAT;
      CLUSTER PSU;
      WEIGHT RATWGT;
      TABLE WHIPLASH * (gender agegroup front_seat head_rest2 deltav rear_im-
pact3);
      WHERE WHIPLASH = 1 AND HEAD_REST2 ^= "UNKNOWN" AND REAR_IMPACT2 = 1;
RUN;

PROC SURVEYLOGISTIC DATA=HR2;
      STRATA PSUSTRAT;
      CLUSTER PSU;
      WEIGHT RATWGT;
      CLASS gender agegroup front_seat head_rest2 deltav rear_impact3;
      MODEL WHIPLASH(EVENT='1') = gender agegroup front_seat head_rest2 del-
tav rear_impact3;
      WHERE HEAD_REST2 ^= "UNKNOWN" AND REAR_IMPACT2 = 1; /* Include only
seating positions with known head restraint, and only rear end crashes */
RUN;
```

```
/* GRAPH 1 */
proc surveyfreq data=hr2;
      WEIGHT RATWGT;
      CLUSTER PSU;
      STRATA PSUSTRAT;
      TABLES HEAD_REST2 / ROW;
      BY MY;
      ODS OUTPUT OneWay = TESThr;
RUN;

DATA TESTHR2;
      SET TESThr;
      IF F_HEAD_REST2 EQ 202 THEN F_HEAD_REST2 = "PRE202A";
      IF F_HEAD_REST2 EQ "202A" THEN F_HEAD_REST2 = "POS202A";
RUN;

PROC SORT DATA=TESTHR2;
BY MY;RUN;

PROC TRANSPOSE DATA=TESTHR2 OUT=TRANSHR;
      ID F_HEAD_REST2;
      BY MY;
      VAR WGTFREQ;
RUN;


DATA TRANSHR2;
      SET TRANSHR;
      RATENONE = (NONE / Total) * 100;
      RATE202 = (pre202a / Total) * 100;
      RATE202A = (pos202a / Total) * 100;
RUN;

data HEAD_RESTSTAT;
merge trans2 transhr2;
by my;
run;

data rmhr;
set head_reststat (keep=MY rate ratenone rate202 rate202A);
run;

proc transpose data=rmhr out=rmhrtest;
by MY;
run;

proc sgplot data=head_reststat;
      series x = MY y = rate / smoothconnect legendlabel="Neck Inj Rate" lin-
eattrs=(color = red thickness=4) ;
      series x = MY y = ratenone / smoothconnect legendlabel="No HR Rate"
lineattrs=( thickness=2) ;
      series x = MY y = rate202 / smoothconnect legendlabel="202 HR Rate"
lineattrs=(color = green thickness=2) ;
      series x = MY y = rate202a / smoothconnect legendlabel="202A HR Rate"
lineattrs=(color = blue thickness=2) ;
      where MY ge 1985;
run;
```

Appendix B: Head Restraint Assignment Table

Make	Model	Year	Seat position	Head restraint
Acura	CL/TL	1996 – 2005	Front Outboard	202
		1996 – 2005	Rear Outboard	202
		2015	Front Outboard	202a
		2015	Rear Outboard	202a
		2002	Rear Center	None
	Integra	1987 – 2005	Front Outboard	202
		1987 – 1990	Rear Outboard	None
		1991 – 2005	Rear Outboard	202
		1991	Rear Center	None
	Legend	1991 - 1993	Front Outboard	202
		1991 - 1993	Rear Outboard	202
		1991	Rear Center	None
	Legend/RL	1988 - 2005	Front Outboard	202
		1991 - 1994	Rear Outboard	202
	MDX/RDX/TSX	2002 – 2005	Front Outboard	202
		2002 – 2008	Rear Outboard	202
		2006 – 2012	Front Outboard	202a
		2009 – 2012	Rear Outboard	202a
		2002 - 2007	Rear Center	None
	Vigor	1992	Front Outboard	202
Audi	100/A6	1992 – 2003	Front Outboard	202
	A4	1997 - 2008	Front Outboard	202
		2002	Rear Outboard	202
		2009-2010	Front Outboard	202a
	A5	2011	Front Outboard	202a
	Allroad	2004	Front Outboard	202
	Coupe Qattro	1997	Front Outboard	202
	Q5/Q7	2008	Front Outboard	202
		2011	Front Outboard	202a
	S4	2001	Front Outboard	202
BMW	1-Series	2013	Front Outboard	202a
	3-Series	1989 - 2008	Front Outboard	202
		1989 - 2003	Rear Outboard	None
		2003 - 2008	Rear Outboard	202
		2009 - 2014	Front Outboard	202a
		2009 - 2014	Rear Outboard	202a
	5-Series	1977 - 2008	Front Outboard	202
		1977 - 2003	Rear Outboard	None
		2003 - 2008	Rear Outboard	202
		2009 - 2014	Front Outboard	202a

Make	Model	Year	Seat position	Head restraint
		2009 - 2014	Rear Outboard	202a
	6-Series	1985 - 2004	Front Outboard	202
	7-Series	1991 - 2008	Front Outboard	202
		1991 - 2003	Rear Outboard	None
		2003 - 2008	Rear Outboard	202
		2009 - 2014	Front Outboard	202a
		2009 - 2014	Rear Outboard	202a
	Bavarian Sedan	1997	Front Outboard	202
	Coupe	2001 - 2004	Front Outboard	202
	X3	2007	Front Outboard	202
		2007	Rear Outboard	202
		2010 - 2015	Front Outboard	202a
		2010 - 2015	Rear Outboard	202a
	X5	2003 - 2006	Front Outboard	202
		2003 - 2006	Rear Outboard	202
		2009	Front Outboard	202a
		2009	Rear Outboard	202a
	Z3	2000	Front Outboard	202
Buick	Century	1978 - 2005	Front Outboard	202
		1990	Rear Outboard	None
		1999 - 2005	Rear Outboard	202
		1999	Rear Center	None
	Electra/Park Avenue	1976 - 2003	Front Outboard	202
	Enclave	2009 - 2014	Front Outboard	202a
		2009 - 2014	Rear Outboard	202a
	Encore	2014	Front Outboard	202a
		2014	Rear Outboard	202a
	Lacrosse	2005 - 2008	Front Outboard	202
		2007	Rear Outboard	202
		2010	Front Outboard	202a
	Lesabre/Wildcat/Centurion	1987 - 2005	Front Outboard	202
		1988 - 1995	Rear Outboard	None
		1988 - 1995	Rear Center	None
	Lucerne	2006 - 2007	Front Outboard	202
		2009	Front Outboard	202a
		2007	Rear Center	None
	Rainier	2004 - 2005	Front Outboard	202
		2004 - 2005	Rear Outboard	202
	Regal	1978 - 2004	Front Outboard	202
		1995 - 1999	Rear Outboard	202
		1995 - 1999	Rear Center	202
	Rendezvous	2002 - 2007	Front Outboard	202

Make	Model	Year	Seat position	Head restraint
		2002 - 2007	Rear Outboard	202
	Riviera	1987 - 1997	Front Outboard	202
		1987	Rear Outboard	None
	Roadmaster	1992 - 1994	Front Outboard	202
	Somerset/Skylark/Special	1982 - 1991	Front Outboard	202
	Terraza	2007	Front Outboard	202
	Verano	2012	Front Outboard	202a
Cadillac	Allante	1988	Front Outboard	202
	ATS	2013	Front Outboard	202
	Catera	2001	Front Outboard	202
	CTS	2003 - 2008	Front Outboard	202
		2008 - 2012	Front Outboard	202a
	Deville/Fleetwood	1985 - 2005	Front Outboard	202
		1985 - 1990	Rear Outboard	None
		1991 - 2005	Rear Outboard	202
		1989	Rear Center	None
		1991	Rear Center	202
	DTS	2006 - 2008	Front Outboard	202
	Eldorado	1989 - 1998	Front Outboard	202
	Escalade	1999 - 2007	Front Outboard	202
		1999	Rear Outboard	202
		1999	Rear Center	202
	Seville	1990 - 2003	Front Outboard	202
	SRX	2006	Front Outboard	202
		2006	Rear Outboard	202
		2010 - 2011	Front Outboard	202a
	STS	1993 - 2003	Front Outboard	202
		2011	Front Outboard	202a
Chevrolet	Astrovan	1992 - 2005	Front Outboard	202
		1992 - 2005	Rear Outboard	202
		1992	Rear Center	None
	Avalanche	2002 - 2003	Front Outboard	202
	Aveo	2004 - 2006	Front Outboard	202
		2004	Rear Outboard	202
		2007 - 2010	Front Outboard	202a
		2007 - 2010	Rear Outboard	202a
	Baretta/Corsica	1988 - 1996	Front Outboard	202
		1988 - 1989	Rear Outboard	None
		1991 - 1996	Rear Outboard	202
	C/K-Series Pickup	1970 - 1991	Front Outboard	None
		1992 - 2008	Front Outboard	202
		2009 - 2015	Front Outboard	202a

Make	Model	Year	Seat position	Head restraint
		1995 - 2003	Rear Outboard	202
		2001	Front Center	None
		1994 - 2003	Rear Center	None
	Camaro	1979 - 2002	Front Outboard	202
		2011 - 2012	Front Outboard	202a
		1987 - 1999	Rear Outboard	None
		1997	Rear Center	None
	Caprice/Impala	1965 - 2005	Front Outboard	202
		2006 - 2015	Front Outboard	202a
		1989 - 1996	Rear Outboard	None
		2001 - 2005	Rear Outboard	202
		2006 - 2015	Rear Outboard	202a
		1989	Rear Center	None
		2001 - 2005	Rear Center	202
		2010	Rear Center	202a
	Cavalier	1984 - 2005	Front Outboard	202
		1984 - 1997	Rear Outboard	None
		2000 - 2005	Rear Outboard	202
		1996 - 1997	Rear Center	None
	Celebrity	1985 - 1989	Front Outboard	202
	Chevette	1981 - 1986	Front Outboard	202
	Cobalt	2005 - 2010	Front Outboard	202a
		2005 - 2010	Rear Outboard	202a
	Colorado	2005 - 2008	Front Outboard	202
		2012	Front Outboard	202a
	Corvette	1986 - 2007	Front Outboard	202
	Cruze	2011 - 2014	Front Outboard	202a
		2011 - 2014	Rear Outboard	202a
	Equinox	2005 - 2008	Front Outboard	202
		2005 - 2008	Rear Outboard	202
		2010 - 2015	Front Outboard	202a
		2010 - 2015	Rear Outboard	202a
		2011	Rear Center	None
	Fullsize Blazer	1976 - 2007	Front Outboard	202
		2011	Front Outboard	202a
		1987	Rear Outboard	None
		2001 - 2007	Rear Outboard	202
		2011	Rear Outboard	202a
		2007	Rear Center	None
	Geo Metro	1989 - 2001	Front Outboard	202
		1996	Rear Outboard	None
	Geo Storm	1991	Front Outboard	202

Make	Model	Year	Seat position	Head restraint
	Geo Tracker	1993 - 2003	Front Outboard	202
		1994 - 1999	Rear Outboard	None
		1999	Rear Center	None
	G-Series Van	1983 - 2007	Front Outboard	202
		2009 - 2012	Front Outboard	202a
		1989 - 1993	Rear Outboard	None
		2001	Rear Outboard	202
		1989 - 2001	Rear Center	None
	HHR	2006 - 2011	Front Outboard	202a
		2006	Rear Outboard	202a
		2006	Rear Center	None
	Lumina	1990 - 2004	Front Outboard	202
		1994	Rear Outboard	None
		1998 - 2004	Rear Outboard	202
		1992 - 2004	Rear Center	None
	Malibu	1997 - 2004	Front Outboard	202
		2005 - 2013	Front Outboard	202a
		1998 - 2004	Rear Outboard	202
		2005 - 2013	Rear Outboard	202a
		1999 - 2003	Rear Center	None
	Monte Carlo	1984 - 2007	Front Outboard	202
		1984 -1985	Rear Outboard	None
		1985	rear	None
	Nova	1972 - 2002	Front Outboard	202
		1994 - 2002	Rear Outboard	202
	S-10	1982 - 1990	Front Outboard	None
		1991 - 2004	Front Outboard	202
		1993 - 2000	Rear Outboard	202
		1996	Front Center	None
		1995 - 1997	Rear Center	None
	Sonic	2012	Front Outboard	202a
	Spectrum	1985	Front Outboard	202
	Suburban	1985 - 2003	Front Outboard	202
		2007 - 2015	Front Outboard	202a
		1994 - 1999	Rear Outboard	202
		1994 - 2007	Rear Center	None
	Trail Blazer	2002 - 2005	Front Outboard	202
		2006 - 2008	Front Outboard	202a
		2002 - 2005	Rear Outboard	202
		2003	Rear Center	None
	Traverse	2011 - 2013	Front Outboard	202a
		2011	Front Center	None

Make	Model	Year	Seat position	Head restraint
	Uplander	2006	Front Outboard	202
		2008	Front Outboard	202a
		2008	Rear Outboard	202a
Chrysler	200	2011 - 2015	Front Outboard	202a
	300M	1999 - 2004	Front Outboard	202
		2005 - 2012	Front Outboard	202a
		2003	Rear Outboard	202
		2006 - 2012	Rear Outboard	202a
	Aspen	2008	Front Outboard	202
	Cirrus	1995 - 2000	Front Outboard	202
		1999	Rear Outboard	None
	Concorde	1994 - 2003	Front Outboard	202
		1995 - 2003	Rear Outboard	none
		2003	Rear Center	None
	Crossfire	2005	Front Outboard	202
	Lebaron	1991 - 1993	Front Outboard	202
	LHS	1995 - 2000	Front Outboard	202
		2000	Rear Outboard	None
	New Yorker/E-Class	1985 - 1992	Front Outboard	202
		1985	Rear Outboard	None
	Pacifica	2004 - 2006	Front Outboard	202
		2004	Front Center	None
	PT Cruiser	2001 - 2004	Front Outboard	202
		2005 - 2009	Front Outboard	202a
		2003 - 2004	Rear Outboard	202
		2005 - 2006	Rear Outboard	202a
		2003 - 2005	Rear Center	None
	Sebring	1995 - 2005	Front Outboard	202
		2007 - 2010	Front Outboard	202a
		2002 - 2004	Rear Outboard	None
		2010	Rear Outboard	202a
		2002 - 2010	Rear Center	None
	Town & Country	1996 - 2003	Front Outboard	202
		2004 - 2014	Front Outboard	202a
		1996 - 2005	Rear Outboard	202
		2008	Rear Outboard	202a
		2003	Rear Center	202a
	Voyager	2000 - 2001	Front Outboard	202
		2000	Rear Outboard	202
Daewoo	Lanos	2001	Front Outboard	202
	Leganza	2000	Front Outboard	202
		2000	Rear Outboard	202

Make	Model	Year	Seat position	Head restraint
		2000	Rear Center	None
	Nubira	2000	Front Outboard	202
Dodge	W-Series	1994 - 2007	Front Outboard	202
		2001	Rear Outboard	None
	600	1986	Front Outboard	202
	Aries	1989	Front Outboard	202
	Avanger	1995 - 1998	Front Outboard	202
		2008 - 2013	Front Outboard	202a
		1995	Rear Outboard	None
		2008 - 2013	Rear Outboard	202a
		2008 - 2013	Rear Center	None
	B-Series	1987 - 2001	Front Outboard	202
		1987	Rear Outboard	None
		1995 - 2001	Rear Outboard	202
	Caliber	2007 - 2008	Front Outboard	202
		2010 - 2011	Front Outboard	202a
	Caravan	1989 - 2004	Front Outboard	202
		2005 - 2010	Front Outboard	202a
		1992 - 2004	Rear Outboard	202
		2005 - 2010	Rear Outboard	202a
		1989 - 2006	Rear Center	None
	Charger	2006 - 2007	Front Outboard	202
		2009 - 2014	Front Outboard	202a
		2014	Rear Outboard	202a
	Colt	1993 - 1994	Front Outboard	202
	Dakota	1988 - 2007	Front Outboard	202
		1997	Rear Outboard	None
		2002	Rear Outboard	202
		2001	Front Center	None
	Dart	1965	Front Outboard	None
		2014	Front Outboard	202a
	Daytona	1993	Front Outboard	202
	Durango	1999 - 2008	Front Outboard	202
		2012	Front Outboard	202a
		1999 - 2002	Rear Outboard	202
		2012	Rear Outboard	202a
		1999 - 2012	Rear Center	None
	Dynasty	1991 - 1993	Front Outboard	202
	Intrepid	1993 - 2004	Front Outboard	202
		1995 - 1996	Rear Outboard	None
		1998 - 2002	Rear Outboard	202
		1996 - 1999	Rear Center	None

Make	Model	Year	Seat position	Head restraint
	Journey	2009 - 1012	Front Outboard	202a
	Lancer	1985	Front Outboard	202
		1985	Rear Outboard	202
	Magnum	2005 - 2007	Front Outboard	202
	Neon	1995 - 2005	Front Outboard	202
		1995 - 1998	Rear Outboard	None
		2000 - 2001	Rear Outboard	202
		1995 - 2002	Rear Center	None
	Nitro	2007 - 2008	Front Outboard	202
	Omni	1989	Front Outboard	202
	Ram 1500	1985	Front Outboard	None
		1991 - 2006	Front Outboard	202
		2007 - 2014	Front Outboard	202a
		1996 - 2003	Rear Outboard	None
		2004	Rear Outboard	202
		2010 - 2014	Rear Outboard	202a
		1996 - 2004	Front Center	None
		1996 - 2004	Rear Center	None
	Ramcharger	1984 - 1990	Front Outboard	202
		1990	Rear Center	None
	Shadow	1990 - 1993	Front Outboard	202
	Spirit	1993	Front Outboard	202
	Sprinter	2005 - 2007	Front Outboard	202
	Stratus	1997 - 2006	Front Outboard	202
		1998 - 2001	Rear Outboard	None
		2004 - 2006	Rear Outboard	202
	Van	1988	Front Outboard	202
		1988	Rear Outboard	None
	Viper	2003	Front Outboard	202
Eagle	Premier	1991	Front Outboard	202
	Talon	1991 - 1993	Front Outboard	202
	Vision	1996	Front Outboard	202
Fiat	500/500c	2012 - 2015	Front Outboard	202a
Ford	Aerostar	1986 - 1994	Front Outboard	202
		1993	Rear Outboard	None
	Aspire	1994 - 1997	Front Outboard	202
	Bronco II	1986 - 2006	Front Outboard	202
		2007 - 2014	Front Outboard	202a
		1988 -1996	Rear Outboard	None
		1997 - 2005	Rear Outboard	202
		2007 - 2014	Rear Outboard	202a
		1996 - 2003	Rear Center	None

Make	Model	Year	Seat position	Head restraint
	C-Max	2013	Front Outboard	202a
		2013	Rear Outboard	202a
	Contour	1995 - 2000	Front Outboard	202
	Crown Victoria	1987 - 2007	Front Outboard	202
		2008 - 2011	Front Outboard	202a
		1999 - 2008	Rear Outboard	None
		2000	Rear Center	None
	Edge	2007 - 2013	Front Outboard	202a
		2008 - 2013	Rear Outboard	202a
	Escape	2001 - 2004	Front Outboard	202
		2005 - 2011	Front Outboard	202a
		2002	Rear Outboard	202
		2007	Rear Outboard	202a
		2008	Rear Center	202
	Escort/EXP	1988-2002	Front Outboard	202
		1988 - 1996	Rear Outboard	None
		1998 - 1999	Rear Outboard	202
	E-Series	1982 - 2008	Front Outboard	202
		2009 - 2014	Front Outboard	202a
		1989 - 1999	Rear Outboard	None
		2011	Rear Outboard	202
	Excursion	2001 - 2005	Front Outboard	202
		2002	Rear Outboard	202
	Expedition	1997 - 2004	Front Outboard	202
		2005 - 2008	Front Outboard	202a
		1997 - 2004	Rear Outboard	202
		2006 - 2008	Rear Outboard	202a
		1999 - 2004	Rear Center	None
	Fairmont	1979 - 1982	Front Outboard	202
	Fiesta	2011 - 2013	Front Outboard	202a
	Five Hundred	2005 - 2007	Front Outboard	202a
		2006 - 2007	Rear Outboard	202
	FLEX	2009 - 2014	Front Outboard	202a
	Focus	2000 - 2014	Front Outboard	202a
		2000 - 2007	Rear Outboard	None
		2009	Rear Outboard	202
		2012 - 2014	Rear Outboard	202a
		2000 - 2006	Rear Center	None
	Freestar	2006 - 2007	Front Outboard	202a
		2006	Rear Outboard	202a
		2006	Rear Center	None
	Freestyle	2005 - 2007	Front Outboard	202a

Make	Model	Year	Seat position	Head restraint
		2005 - 2006	Rear Outboard	202a
	F-Series	1983 - 1987	Front Outboard	None
		1988 - 2003	Front Outboard	202
		2004 - 2015	Front Outboard	202a
		1997 - 2002	Rear Outboard	None
		2003 - 2008	Rear Outboard	202
		1993 - 1998	Front Center	None
	Fusion	2006 - 2007	Front Outboard	202
		2008 - 2016	Front Outboard	202a
		2008	Rear Outboard	202
		2014	Rear Outboard	202a
		2008	Rear Center	None
	Ltd/Galaxy/Custom	1986	Front Outboard	202
	Mustang	1967	Front Outboard	None
		1987 - 2002	Front Outboard	202
		2003 - 2016	Front Outboard	202a
		1993 - 2002	Rear Outboard	None
		2007 - 2016	Rear Outboard	202a
	Probe	1989 - 1996	Front Outboard	202
		1990 - 1994	Rear Outboard	202
	Ranger	1987 - 2007	Front Outboard	202
		2009 - 2010	Front Outboard	202a
		2003	Front Center	None
	Sport Trac	2002 - 2008	Front Outboard	202
	Taurus	1986 - 2003	Front Outboard	202
		2004 - 2015	Front Outboard	202a
		1986 - 1994	Rear Outboard	None
		1996 - 2004	Rear Outboard	202
		2008 - 2010	Rear Outboard	202a
		1996 - 2004	Front Center	None
		1994 - 2003	Rear Center	None
	Tempo	1985 - 1994	Front Outboard	202
		1990 - 1993	Rear Outboard	None
		1992	Rear Center	None
	Thunderbird	1987 - 1997	Front Outboard	202
		1989 - 1997	Rear Outboard	None
	Windstar	1996 - 2003	Front Outboard	202
		1996 - 2003	Rear Outboard	202
		1998 - 2003	Rear Center	None
GMC	Arcadia	2010	Front Outboard	202a
		2010	Rear Outboard	202a
	C,K,R,V-Series	1985 - 1991	Front Outboard	None

Make	Model	Year	Seat position	Head restraint
		1994 -2006	Front Outboard	202
		2007 - 2012	Front Outboard	202a
		2004	Rear Outboard	202
		2008	Rear Outboard	202a
		2000	Rear Center	None
	Canyon	2006	Front Outboard	202
		2011	Front Outboard	202a
	G-Series Van	1998 - 2006	Front Outboard	202
	Jimmy	1985 - 2007	Front Outboard	202
		1991	Rear Outboard	None
		1995 - 2004	Rear Outboard	202
		1998 - 1991	Rear Center	None
	S15/T15/Sonoma	1983 - 2004	Front Outboard	202
	Safari	1992 - 2004	Front Outboard	202
	Suburban	1995 - 1999	Front Outboard	202
		1999	Rear Center	None
	Terrain	2010 - 2013	Front Outboard	202a
		2010	Rear Outboard	202a
Grumman	LLV Postal	1987	Front Outboard	None
Honda	Accord	1984 - 2004	Front Outboard	202
		2005 - 2014	Front Outboard	202a
		1987 - 2007	Rear Outboard	202
		2011	Rear Outboard	202a
		1987 - 2006	Rear Center	None
	Civic/CRX	1983 - 2002	Front Outboard	202
		2003 - 2015	Front Outboard	202a
		1989 - 2006	Rear Outboard	202
		2011 - 2013	Rear Outboard	202a
		2003 - 2005	Rear Center	None
	C-VR	1997 - 2005	Front Outboard	202
		2006 - 2014	Front Outboard	202a
		1998 - 2004	Rear Outboard	202
		2006 - 2011	Rear Outboard	202a
		1998 - 2000	Rear Center	None
		2006	Rear Center	202a
	Element	2003 - 2004	Front Outboard	202
		2005 - 2008	Front Outboard	202a
		2005 - 2008	Rear Outboard	202a
	Fit	2007 - 2008	Front Outboard	202
		2010 - 2013	Front Outboard	202a
	Insight	2010	Front Outboard	202a
	Odyssey	1997 - 2004	Front Outboard	202

Make	Model	Year	Seat position	Head restraint
		2005 - 2011	Front Outboard	202a
		1999 - 2003	Rear Outboard	202
		2005 - 2009	Rear Outboard	202a
	Passport	1994	Front Outboard	202
	Pilot	2003 - 2004	Front Outboard	202
		2006 - 2012	Front Outboard	202a
		2006 - 2009	Rear Outboard	202
		2011	Rear Outboard	202a
		2009	Rear Center	202
		2011	Rear Center	202a
	Prelude	1986 - 2001	Front Outboard	202
		1997	Rear Outboard	None
		2001	Rear Outboard	202
	Ridgeline	2012	Front Outboard	202a
	S2000	2003	Front Outboard	202
Hyundai	Accent	1995 - 2008	Front Outboard	202
		2009 - 2012	Front Outboard	202a
		1995	Rear Outboard	202
	Elantra	1993 - 2007	Front Outboard	202
		2008 - 2013	Front Outboard	202a
		2000 - 2004	Rear Outboard	202
		2008 - 2010	Rear Outboard	202a
	Entourage	2007	Front Outboard	202
	Excel	1990 - 1993	Front Outboard	202
	Genesis	2010 - 2013	Front Outboard	202a
	Santa Fe	2001 - 2007	Front Outboard	202
		2002 - 2004	Rear Outboard	202
		2003	Rear Center	None
	Scoupe	1995	Front Outboard	202
	Sonata	1997 - 2006	Front Outboard	202
		2007 - 2015	Front Outboard	202a
		2003 - 2004	Rear Outboard	202
		2007 - 2015	Rear Outboard	202a
		2007	Rear Center	202a
	Tiburon	2000 - 2006	Front Outboard	202
		2006	Rear Outboard	202
	Tuscon	2005 - 2012	Front Outboard	202a
		2005 - 2011	Rear Outboard	202a
	Veloster	2014	Front Outboard	202a
	XG300/350	2001 - 2002	Front Outboard	202
Infinity	FX35/45	2003 - 2005	Front Outboard	202
		2010	Front Outboard	202a

Make	Model	Year	Seat position	Head restraint
	G20	1995 - 1999	Front Outboard	202
	G25/G35/G37	2003 - 2013	Front Outboard	202a
		2006 - 2013	Rear Outboard	202a
	I30	1996 - 2001	Front Outboard	202
		1999	Rear Outboard	202
	I35	2002 - 2004	Front Outboard	202
	J30	1994 - 1997	Front Outboard	202
		1994	Rear Outboard	202
	M30	2006	Front Outboard	202
	M35/M37/M45/M56	2003 - 2007	Front Outboard	202a
		2007	Rear Outboard	202a
	Q45	1990 - 1998	Front Outboard	202
	QX4	1999 - 2003	Front Outboard	202
Isuzu	Amigo	1994	Front Outboard	202
		1994	Rear Outboard	None
	Ascender	2006 - 2007	Front Outboard	202
	Oasis	1998	Front Outboard	202
	Pup Pickup	1989 - 1996	Front Outboard	202
	Rodeo	1993 - 2002	Front Outboard	202
		2002	Rear Outboard	202
	Trooper/Trooper II	1988 - 2001	Front Outboard	202
		2000	Rear Outboard	202
Jaguar	X100	2000 - 2005	Front Outboard	202
		2000	Rear Outboard	202
	XF/XF-R	2012	Front Outboard	202a
	XJ6/12 Sedan/Coupe	1988 - 1999	Front Outboard	202
	XJ-S Coupe	2000	Front Outboard	202
	X-Type	1999 - 2004	Front Outboard	202
		2004	Rear Outboard	202a
Jeep	Cherokee	1989 - 2005	Front Outboard	202
		1989 - 2001	Rear Outboard	None
		1990 - 2001	Rear Center	None
		2006	Rear Center	202a
	CJ-2-8	1984	Front Outboard	None
		1998- 1999	Front Outboard	202
	Comanche	1988	Front Outboard	202
	Commander	2007 - 2008	Front Outboard	202a
		2007	Rear Outboard	202a
		2007	Rear Center	None
	Compass	2007 - 2008	Front Outboard	202
		2009 - 2011	Front Outboard	202a
	Gr Wagoneer	1999	Front Outboard	202

Make	Model	Year	Seat position	Head restraint
	Liberty	2002 - 2007	Front Outboard	202
		2010 - 2012	Front Outboard	202a
		2003 - 2007	Rear Outboard	202
		2010	Rear Outboard	202a
		2003	Rear Center	None
	Patriot	2007	Front Outboard	202
		2009 - 2014	Front Outboard	202a
	YJ-Wrangler	1993 - 2008	Front Outboard	202
		2014	Front Outboard	202a
Kia	Amanti	2004	Front Outboard	202
		2004	Rear Outboard	202
	Forte	2010 - 2014	Front Outboard	202a
		2014	Rear Outboard	202a
	Optima	2001 - 2003	Front Outboard	202
		2004 - 2014	Front Outboard	202a
		2005 - 2011	Rear Outboard	202a
		2008	Rear Center	202a
	Rio	2001 - 2008	Front Outboard	202
		2012 - 2013	Front Outboard	202a
		2002	Rear Outboard	202
		2012	Rear Outboard	202a
	Rondo	2007	Front Outboard	202
	Sedona	2002 - 2008	Front Outboard	202
		2011	Front Outboard	202a
		2003	Rear Outboard	202
	Sephia	1996 - 2001	Front Outboard	202
		1996 - 2000	Rear Outboard	202
		1996 - 2000	Rear Center	None
	Sorrento	2003 - 2005	Front Outboard	202
	Soul	2011 - 2015	Front Outboard	202a
		2012	Rear Outboard	202a
	Spectra	2002 - 2006	Front Outboard	202
		2007 - 2009	Front Outboard	202a
		2007	Rear Outboard	202a
		2007	Rear Center	None
	Sportage	1997 - 2008	Front Outboard	202
		2011 - 2013	Front Outboard	202a
		1997 - 2001	Rear Outboard	202
		2013	Rear Outboard	202a
Land Rover	County LWB	1993 - 2008	Front Outboard	202
	Discovery	1997 - 2000	Front Outboard	202
Lexus	CT200h	2012	Front Outboard	202

Make	Model	Year	Seat position	Head restraint
	ES-250/300	1991 - 2007	Front Outboard	202
		2010 - 2011	Front Outboard	202a
		1991	Rear Outboard	None
		2003 - 2004	Rear Outboard	202
		1991 - 2003	Rear Center	None
	GS-300	1990 - 2006	Front Outboard	202
		2013	Front Outboard	202a
		2000	Rear Outboard	202
		2004	Rear Outboard	202a
		2000	Rear Center	202
	GX470	2003 - 2004	Front Outboard	202a
		2003	Rear Outboard	202a
	IS-300	2001 - 2008	Front Outboard	202
		2010	Front Outboard	202a
	IS-400	1991 - 2005	Front Outboard	202
		2009 - 2012	Front Outboard	202a
		2005	Rear Outboard	202
	LX 450/470	1997 - 2006	Front Outboard	202
	RX300	2000- 2006	Front Outboard	202
		2013	Front Outboard	202a
		2013	Rear Outboard	202a
	RX330/350/400h	2010 - 2011	Front Outboard	202a
	SC-300/400	1998	Front Outboard	202
	SC430	2005	Front Outboard	202
Lincoln	Aviator	2005	Front Outboard	202
		2005	Rear Outboard	202
	Continental	1985 1999	Front Outboard	202
		1985	Rear Outboard	None
	LS	2000 - 2006	Front Outboard	202a
		2000	Front Center	None
	Mark/Mark LT	1985 - 2007	Front Outboard	202
		1994 - 1995	Rear Outboard	None
	MKS	2009 - 2013	Front Outboard	202a
	Navigator	2000 - 2003	Front Outboard	202
		2004	Front Outboard	202a
		2000	Rear Outboard	202
		2004	Rear Outboard	202a
	Town Car/Continental	1977 - 2003	Front Outboard	202
		1986 - 1994	Rear Outboard	None
		1999 - 2001	Rear Outboard	202
		1986	Rear Center	None
	Zephyr	2006	Front Outboard	202

Make	Model	Year	Seat position	Head restraint
		2010	Front Outboard	202a
Mazda	626	1990 - 2002	Front Outboard	202
		1990 - 2001	Rear Outboard	202
		1990	Rear Center	None
	929	1988	Front Outboard	202
	CX-5	2014 - 2015	Front Outboard	202a
	CX-9	2011	Front Outboard	202a
	GLC/323/Protégé	1991 - 2004	Front Outboard	202
		2004	Rear Outboard	202
		2000	Rear Center	None
	Mazda 2	2012	Front Outboard	202a
	Mazda 3	2004 - 2007	Front Outboard	202
		2008 - 2011	Front Outboard	202a
	Mazda 5	2009	Front Outboard	202a
		2009	Rear Outboard	202a
	Mazda 6	2004 - 2007	Front Outboard	202
		2008 - 2012	Front Outboard	202a
		2010	Rear Outboard	202a
	Miata	1990 - 2004	Front Outboard	202
	Millenia	1995 - 2000	Front Outboard	202
	MPV	1991 - 2006	Front Outboard	202
		1996	Rear Outboard	202
		1996	Rear Center	202
	MX-3	1992 - 1997	Front Outboard	202
	Navajo	1992	Front Outboard	202
	Pickup	1984 - 2007	Front Outboard	202
	RX7	1986	Front Outboard	202
	RX-8	2004	Front Outboard	202
	Tribute	2001 - 2005	Front Outboard	202
		2001	Rear Outboard	202
Mercedes Benz	190	1992 - 1993	Front Outboard	202
	200-300 Sedan/Coupe	1982 - 2007	Front Outboard	202
		1993	Rear Outboard	None
	220/280 C	2002 - 2005	Front Outboard	202
		2009 - 2014	Front Outboard	202a
		2002	Rear Outboard	202
		2009	Rear Outboard	202a
	230/280 SL 2-pass	2006	Front Outboard	202
	280/300 SEL	1988	Front Outboard	202
		1988	Rear Outboard	None
	300	1980 - 1993	Front Outboard	202
		1989	Rear Outboard	None

Make	Model	Year	Seat position	Head restraint
	300-450	1983 - 1991	Front Outboard	202
		1984	Rear Outboard	None
	350-560 SLC	2006 - 2009	Front Outboard	202a
	400/500 E	2003	Front Outboard	202
	CLK	2004 - 2006	Front Outboard	202a
		2006	Rear Outboard	202a
	CLS Class	2006	Front Outboard	202
		2014	Front Outboard	202a
	E	1993 - 2001	Front Outboard	202
		2002 - 2014	Front Outboard	202a
		2002	Rear Outboard	202a
	G Class	2009 - 2011	Front Outboard	202a
	GL Class	2015	Front Outboard	202a
	M	1999 - 2001	Front Outboard	202
		2006 - 2013	Front Outboard	202a
		1999	Rear Outboard	202
	S Class	2000 - 2007	Front Outboard	202
	SL Class	2000	Front Outboard	202
	SLK	1998 - 2001	Front Outboard	202
	Sprinter	2011 - 2013	Front Outboard	202a
Mercury	Comet	1973	Front Outboard	202
	Cougar	1981 - 2002	Front Outboard	202
		1989	Rear Outboard	None
		1992 - 1995	Rear Outboard	202
		1992	Rear Center	None
	Cougar XR7	1993 - 2000	Front Outboard	202
	Marauder	2004	Front Outboard	202
	Mariner	2005 - 2008	Front Outboard	202
		2010	Front Outboard	202a
	Marquis/Monterey	1984 - 2006	Front Outboard	202
		2010	Front Outboard	202a
		1992	Rear Outboard	202
		1992	Front Center	None
		1992	Rear Center	None
	Milan	2006 - 2007	Front Outboard	202
	Monarch	1978	Front Outboard	202
	Montego	2006	Front Outboard	202a
		2006	Rear Outboard	202a
	Mountaineer	1999 - 2006	Front Outboard	202
		2002 - 2003	Rear Outboard	202
		1999	Rear Center	None
	Mystique	1996 - 2000	Front Outboard	202

Make	Model	Year	Seat position	Head restraint
		2000	Rear Outboard	None
	Sable	1988 - 2004	Front Outboard	202
		1990 - 2003	Rear Outboard	202
		1990 - 1994	Rear Center	None
	Topaz	1987 - 1994	Front Outboard	202
		1988	Rear Outboard	None
	Tracer	1989 - 1998	Front Outboard	202
		1989 - 1996	Rear Outboard	None
	Villager	1993 - 2000	Front Outboard	202
		1993	Rear Outboard	202
Mini	Cooper	2003 - 2006	Front Outboard	202
Mitsubishi	3000 GT	1993 - 1995	Front Outboard	202
		1993	Rear Outboard	None
	Diamante	1993 - 2003	Front Outboard	202
	Eclipse	1992 - 2008	Front Outboard	202
		1992 - 1995	Rear Outboard	None
	Endeavor	2005	Front Outboard	202
	Expo Wagon	1994	Front Outboard	202
	Galant	1994 - 2007	Front Outboard	202
		2009	Front Outboard	202a
		1995	Rear Outboard	None
		2001 - 2005	Rear Outboard	202
		2009	Rear Outboard	202a
		2003 - 2009	Rear Center	None
	Lancer	2002 - 2008	Front Outboard	202
		2009	Front Outboard	202a
		2004	Rear Outboard	202
		2009	Rear Outboard	202a
	Mirage	1992 - 2002	Front Outboard	202
		1992 - 2001	Rear Outboard	202
		2001	Rear Center	None
	Montero	1990 - 2003	Front Outboard	202
		2000 - 2001	Rear Outboard	202
	Outlander	2003	Front Outboard	202
		2009	Rear Outboard	202a
Nissan/Datsun	200SX/240SX	1981 - 1996	Front Outboard	202
	350Z	2004 - 2007	Front Outboard	202
	810/Maxima	1987 - 2006	Front Outboard	202
		2007 - 2014	Front Outboard	202a
		1987	Rear Outboard	None
		1994 - 2005	Rear Outboard	202
		2008	Rear Outboard	202a

Make	Model	Year	Seat position	Head restraint
		1994 - 2005	Rear Center	None
	Altima	1993 - 2007	Front Outboard	202
		2008 - 2014	Front Outboard	202a
		1995 - 2006	Rear Outboard	202
		2007 - 2014	Rear Outboard	202a
		2003	Rear Center	None
	B210/210/1200	1980	Front Outboard	202
	Cube	2009 - 2012	Front Outboard	202a
	GT-R	2009	Front Outboard	202a
	Murano	2003 - 2007	Front Outboard	202
		2009 - 2014	Front Outboard	202a
		2003	Rear Outboard	202
		2003	Rear Center	202
	Pathfinder	1988 - 2008	Front Outboard	202
		1999	Rear Outboard	202
		1994 - 2005	Rear Center	None
	Pathfinder Armada	2004 - 2006	Front Outboard	202
		2009	Front Outboard	202a
		2009	Rear Outboard	202a
	Pickup	1986 - 2000	Front Outboard	202
	Pickup/Frontier	1987 - 2008	Front Outboard	202
		2010 - 2013	Front Outboard	202a
		2008	Rear Outboard	202
	Quest	1993 - 2007	Front Outboard	202
		1993 - 2006	Rear Outboard	202
		1994	Rear Center	None
		2006	Rear Center	202
	Rogue	2008	Front Outboard	202
		2011 - 2015	Front Outboard	202a
		2008	Rear Outboard	202
		2011	Rear Outboard	202a
	Sentra	1985 - 2006	Front Outboard	202
		2007 - 2013	Front Outboard	202a
		1987 - 1993	Rear Outboard	None
		1994 - 2006	Rear Outboard	202
		2007 - 2013	Rear Outboard	202a
		1992 - 2006	Rear Center	None
	Stanza	1987 - 1992	Front Outboard	202
		1991	Rear Outboard	202
	Titan	2004 - 2005	Front Outboard	202
		2004	Rear Outboard	202
	Versa	2007 - 2014	Front Outboard	202a

Make	Model	Year	Seat position	Head restraint
		2007 - 2010	Rear Outboard	202a
	Xterra	2000 - 2004	Front Outboard	202
		2010 - 2012	Front Outboard	202a
	Z-Car/ZX	1990 - 2003	Front Outboard	202
Oldsmobile	Achieva	1995 - 1996	Front Outboard	202
	Alero	1999 - 2004	Front Outboard	202
		1999 - 2004	Rear Outboard	202
	Aurora	1996 - 2001	Front Outboard	202
		1996	Rear Outboard	202
	Bravada	1992 - 2003	Front Outboard	202
		1997 - 1998	Rear Outboard	202
	Ciera	1987 - 1995	Front Outboard	202
	Cutlass	1971 - 1998	Front Outboard	202
		1988 - 1995	Rear Outboard	None
		1988 - 1995	Rear Center	None
	Delta 88	1984 - 1999	Front Outboard	202
		1993	Rear Outboard	202
	Intrigue	1998 - 2002	Front Outboard	202
		2002	Rear Outboard	202
	Ninty - Eight	1988 - 1995	Front Outboard	202
		1988	Rear Outboard	None
	Silhouette	1993 - 2003	Front Outboard	202
		1995 - 2003	Rear Outboard	202
		1995	Rear Center	202a
	Toronado	1984 - 1985	Front Outboard	202
Plymouth	Acclaim	1989 - 1995	Front Outboard	202
		1993 - 1994	Rear Outboard	None
		1991 - 1993	Rear Center	None
	Breeze	1996 - 2000	Front Outboard	202
	Champ	1989	Front Outboard	202
	Horizon	1987 - 1989	Front Outboard	202
	Laser	1992 - 1993	Front Outboard	202
	Neon	1993 - 2000	Front Outboard	202
		1999 - 2000	Rear Outboard	202
	Reliant	1988 - 1989	Front Outboard	202
		1989	Rear Outboard	None
	Sundance	1988 - 1994	Front Outboard	202
	Vista 4x4	1987	Front Outboard	202
	Volare	1977	Front Outboard	202
	Voyager	1987 - 2000	Front Outboard	202
		1987- 1993	Rear Outboard	None
		1998	Rear Outboard	202

Make	Model	Year	Seat position	Head restraint
		1987 - 2000	Rear Center	None
Pontiac	6000	1982 - 1988	Front Outboard	202
		1988	Rear Outboard	None
	Aztek	2001 - 2005	Front Outboard	202
		2001	Rear Outboard	202
	Bonneville/Catalina	1985 - 2004	Front Outboard	202
		1989 - 2001	Rear Outboard	202
		1998	Rear Center	None
	Firebird/Trans AM	1990 - 2002	Front Outboard	202
		1996 - 2000	Rear Outboard	202
	G5	2007 - 2009	Front Outboard	202a
		2008	Rear Outboard	202a
	G6	2005 - 2009	Front Outboard	202a
		2005 - 2006	Rear Outboard	202a
		2007	Rear Center	None
	Grand AM	1988 - 2005	Front Outboard	202
		1996 - 2005	Rear Outboard	202
		1996 - 2003	Rear Center	None
	Grand Prix	1983 - 2007	Front Outboard	202
		1990 - 1992	Rear Outboard	None
		1994 - 2005	Rear Outboard	202
		1992 - 1999	Rear Center	None
	J-2000	1990 - 2005	Front Outboard	202
		1991	Rear Outboard	None
		1998 - 2004	Rear Outboard	202
		1991	Rear Center	None
	Soltice	2006	Front Outboard	202
	Sunbird	1994	Front Outboard	202
		1994	Rear Outboard	None
	Torrent	2007	Front Outboard	202
		2007	Rear Outboard	202
	Trans Sport	1992 - 2002	Front Outboard	202
		2002	Rear Outboard	202
	Ventura	2004	Front Outboard	202
	Vibe	2003 - 2007	Front Outboard	202
		2009 - 2010	Front Outboard	202a
		2003	Rear Outboard	202
		2009 - 2010	Rear Outboard	202a
		2010	Rear Center	202a
Porsche	911	1984 - 1998	Front Outboard	202
	Boxter	2000 - 2001	Front Outboard	202
	Cayenne	2004 - 2005	Front Outboard	202

Make	Model	Year	Seat position	Head restraint
Saab	9000	1991 - 1993	Front Outboard	202
		1993	Rear Outboard	202
	9-2X	2005	Front Outboard	202
		2005	Front Outboard	202
	9-3	1999 - 2006	Front Outboard	202a
		1999 - 2003	Rear Outboard	202a
	9-5	2000 - 2004	Front Outboard	202
	99/99E/900	1992 - 1995	Front Outboard	202
Saturn	Aura	2007 - 2008	Front Outboard	202
		2009	Front Outboard	202a
	Ion	2003 - 2007	Front Outboard	202
		2003 - 2004	Front Outboard	202
		2003	Rear Center	202
	LS	1998 - 2004	Front Outboard	202
		1988 - 2004	Rear Outboard	202
	LW	2000	Front Outboard	202
	SC	1993 - 2002	Front Outboard	202
		1994 - 2001	Rear Outboard	202
	SL	1991 - 2001	Front Outboard	202
		1993 - 2000	Rear Outboard	202
		1993 - 2000	Rear Center	None
	SW	1993 - 1998	Front Outboard	202
	Vue	2003 - 2008	Front Outboard	202
		2009	Front Outboard	202a
		2003 - 2007	Rear Outboard	202
Scion	xD	2012	Front Outboard	202a
Subaru	BRZ	2014	Front Outboard	202a
	DL/FE/G/GF/GL/GLF/STD/Loyale	1988 - 1989	Front Outboard	202
	Forester	1998 - 2005	Front Outboard	202
		2009 - 2015	Front Outboard	202a
		2001 - 2005	Rear Outboard	202
	Impreza	1993 - 2004	Front Outboard	202
		2005 - 2013	Front Outboard	202a
		1996 - 2004	Rear Outboard	202
		2007	Rear Center	202a
	Justy	1988	Front Outboard	202
	Legacy	1990 - 2008	Front Outboard	202
		2010 - 2014	Front Outboard	202a
		1992 - 1999	Rear Outboard	202
	Outback	2000 - 2007	Front Outboard	202
		2009 - 2014	Front Outboard	202a
		2003	Rear Outboard	202

Make	Model	Year	Seat position	Head restraint
	SVX	1992	Front Outboard	202
	XT/XT6	1989	Front Outboard	202
Suzuki	XL7	2006 - 2008	Front Outboard	202
		2006 - 2008	Rear Outboard	202
	Aerio	2003 - 2005	Front Outboard	202
		2005	Rear Outboard	202
	Esteem	1998 - 1999	Front Outboard	202
	Forenza	2004 - 2006	Front Outboard	202
		2006	Rear Outboard	202
	Grand Vitara	2001 - 2008	Front Outboard	202
	Samarai	1987	Front Outboard	202
		1987	Rear Outboard	202
	Sidekick	2001	Front Outboard	202
	Switf	1999	Front Outboard	202
	SX4	2007	Front Outboard	202
	X-90	2001 - 2002	Front Outboard	202
	XL7	2007 - 2008	Front Outboard	202
		2008	Rear Outboard	202
Toyota	4-Runner	1986 - 2007	Front Outboard	202
		2010 - 2013	Front Outboard	202a
		1994 - 2002	Rear Outboard	202
		1999	Rear Center	None
	Avalon	1995 - 2007	Front Outboard	202
		2013	Front Outboard	202a
		2000 - 2005	Rear Outboard	202
		2013	Rear Outboard	202a
	Camry	1986 - 2004	Front Outboard	202
		2005 - 2015	Front Outboard	202a
		1989 -2006	Rear Outboard	202
		2007 - 2013	Rear Outboard	202a
		1999 - 2004	Rear Center	None
		2005	Rear Center	202
		2007	Rear Center	202a
	Celica	1989 - 2004	Front Outboard	202
		2001	Rear Outboard	None
	Corolla	1981 - 2004	Front Outboard	202
		2005 - 2015	Front Outboard	202a
		1988 - 2006	Rear Outboard	202
		1985 - 2002	Rear Center	None
		2007	Rear Center	202a
		2007 - 2010	Rear Outboard	202a
	Cressida	1990	Front Outboard	202

Make	Model	Year	Seat position	Head restraint
		1990	Rear Outboard	None
	Echo	2000 - 2005	Front Outboard	202
	FJ Cruiser	2007 - 2008	Front Outboard	202
		2010	Front Outboard	202a
	Highlander	2001	Front Outboard	202
		2003 - 2012	Front Outboard	202a
		2003 - 2012	Rear Outboard	202a
	Landcruiser	1994	Front Outboard	202
	Matrix	2003 - 2008	Front Outboard	202
		2009	Front Outboard	202a
		2005	Rear Outboard	202
	Minivan/Previa	1986 - 1995	Front Outboard	202
	MR-2	2000 - 2003	Front Outboard	202
	Paseo	1992 - 1996	Front Outboard	202
		1992	Rear Outboard	None
	Pickup	1984 - 1996	Front Outboard	202
		1994	Rear Outboard	None
		1988	Front Center	None
	Prius	2002 - 2008	Front Outboard	202
		2009 - 2014	Front Outboard	202a
		2008 - 2013	Rear Outboard	202a
	RAV-4	1996 - 2005	Front Outboard	202
		2006 - 2015	Front Outboard	202a
		1998 - 2004	Rear Outboard	202
		2006 - 2011	Rear Outboard	202a
		1988	Rear Center	None
	Scion TC	2005 - 2010	Front Outboard	202a
		2006	Rear Outboard	202a
		2007	Rear Center	202a
	Scion XA	2004 - 2007	Front Outboard	202
	Scion XB	2004	Front Outboard	202
		2005 - 2008	Front Outboard	202a
		2006	Rear Outboard	202a
		2006	Rear Center	202a
	Scion XD	2008	Front Outboard	202
		2009	Front Outboard	202a
	Sequoia	2002 - 2005	Front Outboard	202
		2003	Rear Center	202
	Sienna	1998 - 2004	Front Outboard	202
		2005 - 2012	Front Outboard	202a
		1998 - 2001	Rear Outboard	202
		2005 - 2009	Rear Outboard	202a

Make	Model	Year	Seat position	Head restraint
		1999	Rear Center	None
		2001	Rear Center	202
		2005	Rear Center	202a
	Solara	2000 - 2008	Front Outboard	202
	Starlet	1983	Front Outboard	202
		1983	Rear Outboard	None
	Supra	1987 - 1990	Front Outboard	202
	T-100	1994	Front Outboard	202
	Tacoma	1995 - 2008	Front Outboard	202
		2009 - 2013	Front Outboard	202a
	Tercel	1984 - 1997	Front Outboard	202
		1990 - 1995	Rear Outboard	None
		1991 - 1995	Rear Center	None
	Tundra	2000 - 2006	Front Outboard	202
		2015	Front Outboard	202a
	Yaris	2007 - 2010	Front Outboard	202a
		2008 - 2010	Rear Center	202a
Volkswagen	Beetle	1972 - 2001	Front Outboard	202
		1972	Rear Outboard	202
	Eos	2008	Front Outboard	202
	Fox	1988	Front Outboard	202
	Golf	1987 - 2008	Front Outboard	202
	Golf III	1989 - 1995	Front Outboard	202
	Jetta	1987 - 2003	Front Outboard	202
		2004 - 2012	Front Outboard	202a
		1998 - 2007	Rear Outboard	202
		2002 - 2005	Rear Center	202
	Jetta III	1998 - 2002	Front Outboard	202
		2004 - 2013	Front Outboard	202a
		2012	Rear Center	202a
	New Beetle	1998 - 2008	Front Outboard	202
		2013	Front Outboard	202a
	Passat	1994 - 2006	Front Outboard	202
		2010 - 2008	Front Outboard	202a
		1999 - 2004	Rear Outboard	202
		2012	Rear Outboard	202a
	Rabbit	2008	Front Outboard	202a
		2008	Rear Outboard	202a
	Scirocco	1987	Front Outboard	202
	Tiguan	2009 - 2011	Front Outboard	202a
	Touareg	2004	Front Outboard	202
	Vanagon/Camper	1987	Front Outboard	202

Make	Model	Year	Seat position	Head restraint
		1987	Rear Outboard	None
Volvo	240/242/244/245	1984- 1992	Front Outboard	202
		2010	Front Outboard	202a
	40 Series	2001 - 2009	Front Outboard	202a
		2001	Rear Outboard	202a
	60 Series	2001 - 2009	Front Outboard	202a
		2003 - 2004	Rear Outboard	202a
		2001	Rear Center	202a
	70 Series	1998	Front Outboard	202
		2000 - 2008	Front Outboard	202a
		2001 - 2007	Rear Center	202a
	740	1987 - 1991	Front Outboard	202
	760/780	1987 - 1989	Front Outboard	202
		1989	Rear Outboard	202
	80 Series	2000 - 2005	Front Outboard	202
		2015	Front Outboard	202a
	850	1993 - 1995	Front Outboard	202
	940	1994 - 1997	Front Outboard	202
	XC90	2004 - 2008	Front Outboard	202

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