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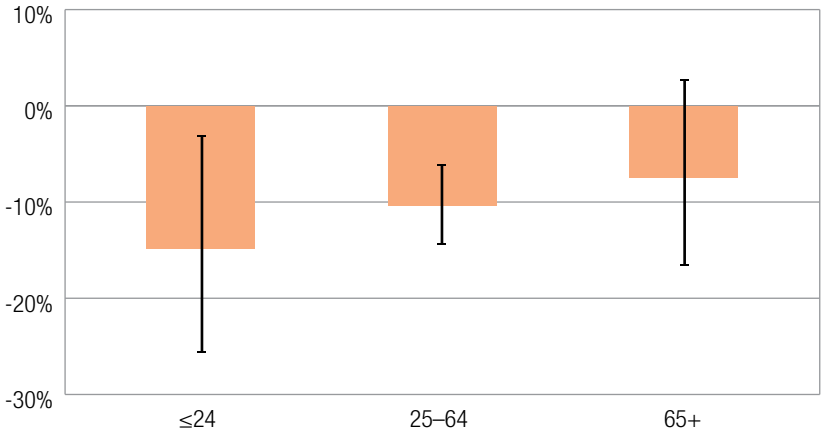
Impact of Honda Accord collision avoidance features on claim frequency by rated driver age

Summary

This is the first look at the effects of collision avoidance features on the Honda Accord by rated driver age. The Honda Accord is a popular passenger car and is one of the best-selling vehicles in America. Honda has equipped most of the Accords with a camera-based front crash prevention system, which is combined with a lane departure warning system, and LaneWatch, a passenger side blind spot detection system. Prior research by the Highway Loss Data Institute has shown the FCW/LDW feature to be beneficial while results for LaneWatch are mixed. Results of this analysis indicate that the combined camera-based forward collision warning system is beneficial for all rated driver ages, with the largest benefit for young drivers (24 years old and younger) under property damage liability and bodily injury liability, the two coverages affected by a system designed to prevent front-to-rear collisions. Results for LaneWatch, however, did not show consistent differences between ages, with results varying by coverage type. Also, LaneWatch results have not been stable when different comparison groups are used.

Change in property damage liability claim frequency by rated driver age for FCW and LDW



Introduction

This Highway Loss Data Institute (HLDI) bulletin provides the first look at the effects of available Honda Accord collision avoidance systems on insurance losses by rated driver age. Prior HLDI analysis of these systems indicate they are having some benefit. The features included in this analysis are as follows:

Forward Collision Warning (FCW) uses a camera system located behind the windshield to assess the risk of a collision with leading traffic. The warning system has three driver-selectable range settings. When a potential crash is detected, lights flash in the heads-up display, the FCW indicator blinks, and there is continuous beeping. The system is active only at speeds more than 10 mph and can be deactivated by the driver. At each ignition cycle, the system defaults to the previous on/off setting. Vehicles with FCW also have Lane Departure Warning.

Lane Departure Warning (LDW) utilizes the same camera as forward collision warning to also identify traffic lane markings. Audio and visual warnings will indicate if the vehicle path deviates from the intended lane. The system is functional at speeds between 40 and 90 mph but does not warn if the turn signal is on or the movement is determined to be sufficiently sudden as to be evasive. The system can be deactivated by the driver. At each ignition cycle, the system defaults to the previous on/off setting.

LaneWatch is Honda's term for a passenger-side-only blind spot monitor. A camera mounted behind the external passenger side rearview mirror monitors the passenger side of the vehicle and displays an 80-degree field of view on the console-mounted information screen when the turn signal indicator is activated. Reference lines are also provided to indicate proximity. Both the turn signal indicator and reference lines are driver-controllable settings and can be deactivated. An upcoming navigation system maneuver can also be given priority over the LaneWatch display. LaneWatch can be deactivated by the driver. At each ignition cycle, it will default to the previous on/off setting.

All of the vehicles in this study were equipped with rear cameras. As there are no vehicles without this feature, their effectiveness cannot be evaluated in this analysis. The vehicles in this analysis may also have been equipped with optional rear parking sensors. This feature was not controlled for in the analysis, as the availability of rear parking sensors on a vehicle was not discernible from the vehicle identification number (VIN).

Methods

Vehicles

Several trim levels are offered on the vehicles included in this study. Trim levels are bundles of vehicle options such as interior materials, engines, and comfort, convenience, and safety features. For example, the Honda Accord EX-L V6 is equipped with a 6-cylinder motor, leather seats, and several collision avoidance technologies. The less expensive LX is equipped with cloth seats, a 4-cylinder motor, and no collision avoidance technologies. For the Honda vehicles included in this study, the trim levels can be determined in the first 10 positions of the VIN. The collision avoidance features in this study are either standard or not available at the trim level. Consequently, by knowing the trim level, the presence of the collision avoidance features is known. LaneWatch and the combination of FCW and LDW is offered as standard equipment on several 2013–15 Honda Accord models (trims). The Touring trim level of the Accord four-door was excluded from the analysis because it is equipped with a different forward collision warning system that uses a radar system instead of a camera and includes adaptive cruise control functionality. Prior HLDI analysis indicates that it is also associated with reductions in losses. However, there is too little data by rated driver age to study in this report. Honda Accord vehicles without these features served as the control vehicles in the analysis. Table 1 lists the exposure (measured in insured vehicle years) for the age groups included in the analysis. Seventy-five percent of the exposure is in the 25–64 age group, followed by 19 percent for drivers 65 and older, and 6 percent for the youngest age group.

Table 1: 2013–15 Honda Accord collision exposure by rated driver age

Age	Exposure (insured vehicle years)
≤24	64,154
25–64	771,854
65+	197,308

Rated drivers

The rated driver is the driver who is considered to represent the greatest loss potential for the insured vehicle. In a multiple-vehicle/driver household, how a driver is assigned to a vehicle can vary by insurance company and state. Information on the actual driver at the time of a loss is not available in the HLDI database. In the present study, the rated driver age groups were 24 and younger, 25–64, and 65 and older.

Insurance data

Automobile insurance covers damages to vehicles and property as well as injuries to people involved in crashes. Different insurance coverages pay for vehicle damage versus injuries, and different coverages may apply depending on who is at fault. The current study is based on property damage liability, collision, bodily injury liability, personal injury protection, and medical payment coverages. Exposure is measured in insured vehicle years. An insured vehicle year is one vehicle insured for 1 year, two vehicles for 6 months, etc.

Because different crash avoidance features may affect different types of insurance coverage, it can be important to understand how coverages vary among the states and how this affects inclusion in the analyses. Collision coverage insures against vehicle damage to an at-fault driver's vehicle sustained in a crash with an object or other vehicle; this coverage is common to all 50 states. Property damage liability (PDL) coverage insures against vehicle damage that at-fault drivers cause to other people's vehicle and property in crashes; this coverage exists in all states except Michigan, where vehicle damage is covered on a no-fault basis (each insured vehicle pays for its own damage in a crash, regardless of who is at fault).

Coverage of injuries is more complex. Bodily injury (BI) liability coverage insures against medical, hospital, and other expenses for injuries that at-fault drivers inflict on occupants of other vehicles or others on the road; although motorists in most states may have BI coverage, this information is analyzed only in states where the at-fault driver has first obligation to pay for injuries (33 states with traditional tort insurance systems). Medical payment (MedPay) coverage, also sold in the 33 states with traditional tort insurance systems, covers injuries to insured drivers and the passengers in their vehicles, but not injuries to people in other vehicles involved in the crash. Seventeen other states employ no-fault injury systems (personal injury protection coverage, or PIP) that pay up to a specified amount for injuries to occupants of involved-insured vehicles, regardless of who is at fault in a collision. The District of Columbia has a hybrid insurance system for injuries and is excluded from the injury analysis.

Statistical methods

Regression analysis was used to quantify the effect of FCW/LDW by rated driver age while controlling for other covariates. The covariates included calendar year, model year, garaging state, vehicle density (number of registered vehicles per square mile), rated driver gender, rated driver marital status, deductible range (collision coverage only), and risk. For each safety feature studied, a variable was included. Claim frequency was modeled using a Poisson distribution using a logarithmic link function. A separate regression was performed for each age group for a total of three regressions per feature per coverage

Results

Results for Honda Accord's Forward Collision Warning System including Lane Departure Warning for rated drivers under 25 are summarized in **Table 2**. The lower and upper bounds represent the 95 percent confidence limits for the estimates. Results are not shown when data was too sparse to produce credible results. For vehicle damage losses, the PDL frequency and overall losses are down while severity and overall losses are down for collision. Only the PDL claim frequency reduction is significant (indicated in bold in the table).

For the injury-related coverage types, bodily injury liability and medical payment claim frequencies for paid and unpaid claims show reductions with the large bodily injury reduction being significant. Among paid claims, claim frequency shows a benefit.

Table 2: Change in insurance losses for Forward Collision Warning and Lane Departure Warning for rated drivers under 25

Vehicle damage coverage type	Lower bound	FREQUENCY	Upper bound	Lower bound	SEVERITY	Upper bound	Lower bound	OVERALL LOSSES	Upper bound
Collision	-8.7%	0.4%	10.4%	-$663	-$132	$459	-$97	-$13	$84
Property damage liability	-26.0%	**-14.9%**	-2.1%	-$314	$142	$663	-$54	-$23	$15

Injury coverage type	Lower bound	FREQUENCY	Upper bound	Lower bound	LOW SEVERITY FREQUENCY	Upper bound	Lower bound	HIGH SEVERITY FREQUENCY	Upper bound
Bodily injury liability	-60.9%	**-44.5%**	-21.1%	-73.5%	**-50.5%**	-7.7%	-56.5%	-17.3%	57.4%
Medical payment	-40.7%	-9.1%	39.4%				-58.9%	-22.3%	46.9%
Personal injury protection	-13.9%	21.5%	71.5%				-25.7%	16.6%	83.1%

Results for Honda Accord's Forward Collision Warning System including Lane Departure Warning for rated drivers 25-64 are summarized in **Table 3**. The lower and upper bounds represent the 95 percent confidence limits for the estimates. Reductions in claim frequency are estimated for both first and third-party vehicle damage coverages. Both collision and PDL claim frequency reductions are statistically significant. Claim severities and overall losses are also down but only the PDL overall loss is significant (indicated in bold in the table).

Under injury coverages, the frequency of claims is lower for all three coverages. The reductions under bodily injury liability and medical payment are statistically significant. Among paid claims, claim frequency shows a benefit.

Table 3: Change in insurance losses for Forward Collision Warning and Lane Departure Warning for rated drivers 25-64

Vehicle damage coverage type	Lower bound	FREQUENCY	Upper bound	Lower bound	SEVERITY	Upper bound	Lower bound	OVERALL LOSSES	Upper bound
Collision	-5.7%	**-2.9%**	-0.1%	-$175	-$29	$121	-$29	-$13	$3
Property damage liability	-14.7%	**-10.4%**	-5.8%	-$280	-$140	$6	-$20	**-$14**	-$8

Injury coverage type	Lower bound	FREQUENCY	Upper bound	Lower bound	LOW SEVERITY FREQUENCY	Upper bound	Lower bound	HIGH SEVERITY FREQUENCY	Upper bound
Bodily injury liability	-30.4%	**-19.7%**	-7.4%	-38.5%	-20.5%	2.8%	-49.4%	**-33.9%**	-13.6%
Medical payment	-31.7%	**-23.1%**	-13.4%	-51.2%	**-33.0%**	-8.2%	-35.4%	**-22.5%**	-7.2%
Personal injury protection	-17.0%	-8.5%	0.8%	-29.6%	-11.8%	10.5%	-18.7%	-7.3%	5.6%

Results for Honda Accord's Forward Collision Warning System including Lane Departure Warning for rated drivers 65 and older are summarized in **Table 4**. The lower and upper bounds represent the 95 percent confidence limits for the estimates. Results are not shown when data was too sparse to produce credible results. For property damage liability, claim frequency and overall losses are down. Under collision coverage, claim frequency showed little change while claim severity was reduced significantly.

Under injury coverages, the frequency of claims is lower for all three coverages. None of the reductions are statistically significant. Among paid claims, claim frequency shows a benefit with low severity benefits being significant.

Table 4: Change in insurance losses for Forward Collision Warning and Lane Departure Warning for rated drivers 65+

Vehicle damage coverage type	Lower bound	FREQUENCY	Upper bound	Lower bound	SEVERITY	Upper bound	Lower bound	OVERALL LOSSES	Upper bound
Collision	-4.7%	0.9%	6.8%	-$525	**-$303**	-$65	-$48	-$23	$4
Property damage liability	-15.6%	-7.4%	1.5%	-$231	$24	$304	-$17	-$6	$6

Injury coverage type	Lower bound	FREQUENCY	Upper bound	Lower bound	LOW SEVERITY FREQUENCY	Upper bound	Lower bound	HIGH SEVERITY FREQUENCY	Upper bound
Bodily injury liability	-44.3%	-25.2%	0.5%	-66.5%	**-45.6%**	-11.5%	-57.4%	-25.1%	31.6%
Medical payment	-38.4%	-18.4%	8.2%	-77.4%	**-53.6%**	-4.4%	-39.3%	-8.2%	38.8%
Personal injury protection	-29.7%	-11.5%	11.2%				-39.9%	-18.0%	11.8%

Figure 1 summarizes the changes in property damage liability claim frequency for Honda's forward collision warning system including lane departure warning by rated driver age. Reductions ranged from 7.4 percent for drivers 65 and older to 14.9 percent for the youngest drivers. Significant reductions were seen for drivers 24 and younger and 25–64.

Figure 1: Change in property damage liability claim frequency by rated driver age for FCW and LDW

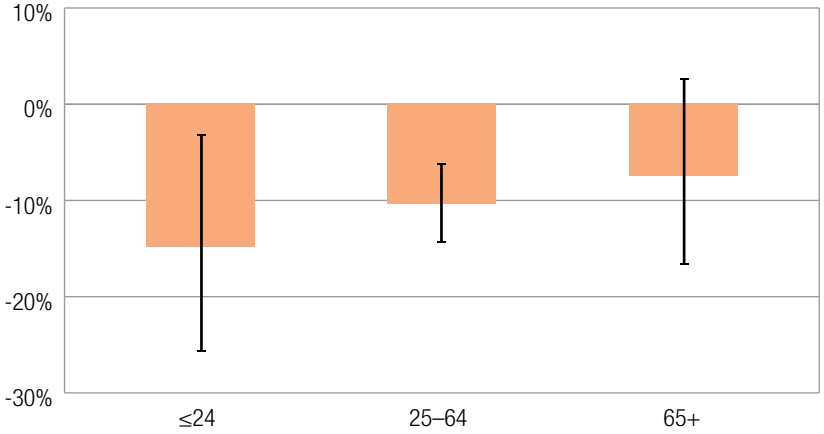
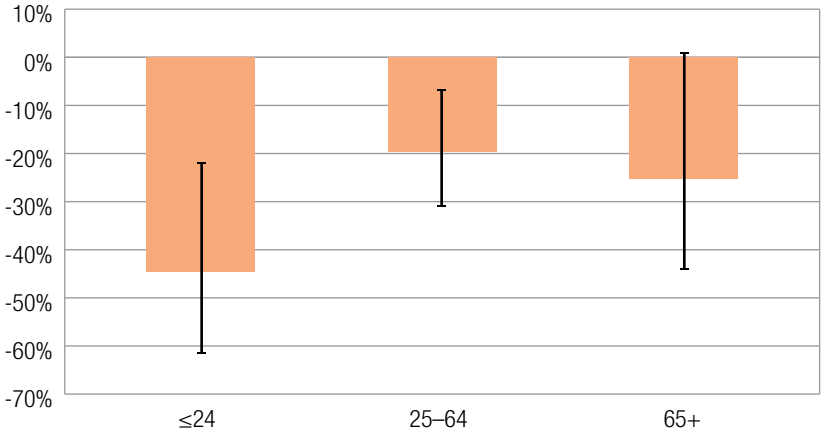


Figure 2 summarizes the changes in bodily injury liability claim frequency for Honda's FCW/LDW system by rated driver age. The largest effect was for the youngest drivers, with a significant 44.5 percent reduction in claim frequency. Reductions were also quite large for the other age groups, with the 19.7 percent reduction for 25–64 year-olds being significant.

Figure 2: Change in bodily injury liability claim frequency by rated driver age for FCW and LDW



Results for Honda Accord's LaneWatch system for rated drivers under 25 are summarized in Table 5. The lower and upper bounds represent the 95 percent confidence limits for the estimates. Results are not shown when data was too sparse to produce credible results. Reductions in all measures of loss are estimated for both first and third-party vehicle damage coverages. None of these reductions were statistically significantly.

Under injury coverages, the frequency of claims is lower for the two coverages shown. None of the reductions are statistically significant. Among paid claims, claim frequency shows a benefit with none being significant.

Table 5: Change in insurance losses for LaneWatch for rated drivers under 25

Vehicle damage coverage type	Lower bound	FREQUENCY	Upper bound	Lower bound	SEVERITY	Upper bound	Lower bound	OVERALL LOSSES	Upper bound
Collision	-15.6%	-7.8%	0.6%	-$647	-$155	$389	-$141	-$69	$14
Property damage liability	-18.2%	-7.1%	5.5%	-$641	-$265	$159	-$57	-$29	$5

Injury coverage type	Lower bound	FREQUENCY	Upper bound	Lower bound	LOW SEVERITY FREQUENCY	Upper bound	Lower bound	HIGH SEVERITY FREQUENCY	Upper bound
Bodily injury liability									
Medical payment	-43.7%	-16.5%	23.7%	-96.6%	-75.1%	83.8%	-54.5%	-18.9%	44.3%
Personal injury protection	-43.9%	-22.5%	7.1%	-67.4%	-24.0%	77.0%	-48.2%	-21.0%	20.6%

Results for Honda Accord's LaneWatch system for rated drivers 25-64 are summarized in Table 6. The lower and upper bounds represent the 95 percent confidence limits for the estimates. Reductions in claim frequency are estimated for both first and third-party vehicle damage coverages. Both collision and PDL claim frequency reductions are statistically significant. Overall losses are also down significantly.

Under injury coverages, the frequency of claims is lower for all there coverages. The reductions under bodiliy injury liability and personal injury protection are statistically significant. Among paid claims, claim frequency shows a benefit, especially among higher severity claims.

Table 6: Change in insurance losses for LaneWatch for rated drivers 25-64

Vehicle damage coverage type	Lower bound	FREQUENCY	Upper bound	Lower bound	SEVERITY	Upper bound	Lower bound	OVERALL LOSSES	Upper bound
Collision	-6.2%	**-3.5%**	-0.8%	-$288	**-$152**	-$11	-$40	**-$26**	-$10
Property damage liability	-13.5%	**-9.4%**	-5.1%	-$73	$69	$217	-$13	**-$7**	-$1

Injury coverage type	Lower bound	FREQUENCY	Upper bound	Lower bound	LOW SEVERITY FREQUENCY	Upper bound	Lower bound	HIGH SEVERITY FREQUENCY	Upper bound
Bodily injury liability	-28.7%	**-18.7%**	-7.2%	-33.8%	-16.0%	6.5%	-33.7%	-15.4%	8.0%
Medical payment	-13.3%	-3.1%	8.4%	1.2%	**36.6%**	84.6%	-29.2%	**-16.2%**	-0.7%
Personal injury protection	-19.0%	**-11.2%**	-2.7%	-15.0%	5.2%	30.3%	-23.5%	**-13.4%**	-2.0%

Results for Honda Accord's LaneWatch system for rated drivers 65 and older are summarized in Table 7. The lower and upper bounds represent the 95 percent confidence limits for the estimates. Results are not shown when data was too sparse to produce credible results. Reductions in claim frequency are estimated for both first and third-party vehicle damage coverages. The collision claim frequency reduction is statistically significant. Overall losses are also down under both coverages but not significantly.

Under injury coverages, the frequency of claims is lower for all there coverages yet none are significant. Among paid claims, claim frequency shows a nonsignificant benefit.

Table 7: Change in insurance losses for LaneWatch for rated drivers 65+

Vehicle damage coverage type	Lower bound	FREQUENCY	Upper bound	Lower bound	SEVERITY	Upper bound	Lower bound	OVERALL LOSSES	Upper bound
Collision	-12.6%	**-7.4%**	-2.0%	-$159	$91	$358	-$42	-$16	$12
Property damage liability	-16.0%	-7.9%	1.0%	-$340	-$94	$177	-$21	-$11	$2

Injury coverage type	Lower bound	FREQUENCY	Upper bound	Lower bound	LOW SEVERITY FREQUENCY	Upper bound	Lower bound	HIGH SEVERITY FREQUENCY	Upper bound
Bodily injury liability	-27.8%	-3.2%	29.8%				-45.6%	-4.8%	66.6%
Medical payment	-31.3%	-8.9%	20.9%				-45.1%	-16.8%	25.9%
Personal injury protection	-34.1%	-17.5%	3.2%	-61.5%	-32.2%	19.6%	-38.9%	-17.4%	11.8%

Discussion

Forward collision warning systems are designed to prevent or mitigate front-to-rear crashes, which typically result in PDL and BI claims if an injury in the struck vehicle occurs. In prior analysis of the Honda FCW/LDW system, large significant claim frequency benefits have been observed. This is the first study that examined these losses by rated driver age. In this analysis, large reductions under these two coverage types are seen across the age bands. The largest benefits, however, were seen for the youngest drivers, those 24 years old and younger, with significant 14.9 and 44.5 percent reductions under PDL and BI, respectively. Young drivers have the highest claim frequency of any age, and this research suggests that the youngest drivers may benefit the most from a FCW/LDW system.

LaneWatch, a passenger side blind spot detection system, is designed to prevent incursion into an occupied adjacent lane that would be expected to result in a two-vehicle crash leading to a property damage liability claim against the encroaching driver. Although not always significant, PDL reductions of 7.1 to 9.4 percent are seen for drivers, with the largest reductions for those ages 25–64. Unlike with FCW/LDW, the benefits for LaneWatch vary and do not appear to consistently benefit a certain age group. With the exception of those 24 and younger, the estimated reduction in property damage liability claims is larger than the reduction estimated for collision claims. This is consistent with the fact that the reductions in collision claims from such crashes would be diluted by the many single-vehicle crashes that result in collision claims and are unaffected by the LaneWatch system.

As previously mentioned, the collision avoidance systems are tied to the vehicle trim levels. In prior HLDI studies on the Honda systems, a supplemental analysis was performed in order to be confident that the measured differences were attributable to the collision avoidance features and not the trim levels. The supplemental analysis used loss data for model year 2012 Honda Accord vehicles. While the Honda Accord was redesigned in 2013, the trim levels in 2012–15 were comparable. The inclusion of loss data for the 2012 model year, in which no crash avoidance features were present, allowed the supplemental analysis to include the vehicle trim level in addition to the control variables used in the primary analysis. Thus, the supplemental analysis assumes that loss differences attributable to the different trim levels were the same in both model years. Results for the FCW/LDW system in both the primary and supplemental analysis were consistent. However, the supplemental estimates for the LaneWatch system are showing increased claim frequencies. This suggests that the positive results may not be due to LaneWatch but to other, uncontrolled factors (HLDI, 2015). Because the data for the youngest and oldest rated drivers in this report are somewhat limited, this supplemental analysis can not reliably be conducted. As the data matures, similar results would be expected.

References

Highway Loss Data Institute. 2015. 2013-15 Honda Accord collision avoidance features. *Loss Bulletin* Vol. 32, No. 33. Arlington, VA.

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