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Historical Analysis of Costs and Benefits of FMVSS for Passenger Cars And LTVs on a Calendar- Year Basis

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Executive Summary

The National Highway Traffic Safety Administration issues Federal Motor Vehicle Safety Standards (FMVSS) for new motor vehicles and equipment to reduce the number of crashes and the risk of deaths and injuries. This report combines the results of three separate reports estimating the costs and weights added by the FMVSS, the benefits of the FMVSS in terms of crashes avoided, injuries reduced in severity, and fatalities reduced, and the societal cost impact from motor vehicle crashes and injuries to examine the cumulative impact on society of technologies required by the FMVSS for passenger cars and light trucks and vans (LTVs) from 1968 to 2019.

To explore the aggregate societal impact of motor vehicle safety technologies over time, estimates are made on a calendar-year (CY) basis, so all cost and benefit estimates are expressed on a CY basis. NHTSA’s FMVSS require improvements in motor vehicle safety technologies, but often these technologies were voluntarily installed on some portion of the vehicle fleet by industry. To reflect this, we break safety and cost impacts into those attributable to NHTSA safety standards and those voluntarily adopted by industry.

This data is combined to estimate the costs, benefits, and net benefits for each CY from 1968 to 2019. The estimate for each year is a “slice in time,” based on the cost and benefit accrued in that year (even though many of these benefits are accrued by vehicles that were sold in earlier years but were still on the road in that year). Total costs for the 52 years combined are over \$1 trillion. Benefits valued by comprehensive societal impacts, which include both economic impacts and lost quality of life, were \$17.3 trillion, and net benefits were \$16.3 trillion in 2019 dollars. Comprehensive values for safety benefits recognize that society values mitigation of lost quality of life and premature death as well as the more tangible direct impacts such as lost productivity or medical care costs.

Costs and benefits are analyzed for the FMVSS met voluntarily by vehicle manufacturers versus those attributable to the NHTSA requirements. The attributable standards have been particularly effective, accounting for 56 percent of total costs, but 63 percent of net benefits.

Table 1. Combined 52 years of data (1968-2019) total costs, comprehensive benefits, and net benefits – passenger cars and LTVs (billions of 2019\$)

| | Total Costs | | | Comprehensive Benefits | | | Net Benefits | | |
|-----------|-------------|---------|-------|------------------------|---------|--------|--------------|---------|--------|
| | Vol. | Attrib. | Total | Vol. | Attrib. | Total | Vol. | Attrib. | Total |
| Pass Cars | 233 | 324 | 558 | 4,293 | 6,686 | 10,979 | 4,060 | 6,361 | 10,421 |
| % | 41.9 | 58.1 | 100 | 39.1 | 60.9 | 100 | 39.0 | 61.0 | 100 |
| LTVs | 231 | 262 | 493 | 2,130 | 4,202 | 6,332 | 1,899 | 3,940 | 5,839 |
| % | 46.9 | 53.1 | 100 | 33.6 | 66.4 | 100 | 32.5 | 67.5 | 100 |
| Combined | 464 | 586 | 1,050 | 6,423 | 10,888 | 17,311 | 5,959 | 10,302 | 16,261 |
| % | 44.2 | 55.8 | 100 | 37.1 | 62.9 | 100 | 36.6 | 63.4 | 100 |

This report also examines impacts valuing safety benefits based solely on economic costs averted by injury and crash mitigation. Economic costs include medical care, lost productivity, property damage, legal costs, insurance administration costs, traffic congestion, emergency services, and workplace costs. These costs, which are also referred to as “human capital” costs, represent the productivity lost to society due to death and injury as well as the resources diverted to restore crash victims, as much as possible, to their pre-crash status, but they exclude the valuation society places on avoiding lost quality of life and premature death. Based solely on economic cost valuations for safety impacts, total benefits for the 52 years total \$3.7 trillion, and net benefits total \$2.7 trillion.

Table 2. Combined 52 years of data (1968-2019) total costs, economic benefits, and net benefits – passenger cars and LTVs (billions of 2019\$)

| | Total Costs | | | Economic Benefits | | | Net Benefits | | |
|-----------|-------------|---------|-------|-------------------|---------|-------|--------------|---------|-------|
| | Vol. | Attrib. | Total | Vol. | Attrib. | Total | Vol. | Attrib. | Total |
| Pass Cars | 233 | 324 | 558 | 929 | 1,389 | 2,319 | 696 | 1,065 | 1,761 |
| % | 41.9 | 58.1 | 100 | 40.1 | 59.9 | 100 | 39.5 | 60.5 | 100 |
| LTVs | 231 | 262 | 493 | 514 | 879 | 1,393 | 283 | 618 | 901 |
| % | 46.9 | 53.1 | 100 | 36.9 | 63.1 | 100 | 31.4 | 68.6 | 100 |
| Combined | 464 | 586 | 1,050 | 1,444 | 2,268 | 3,712 | 979 | 1,682 | 2,662 |
| % | 44.2 | 55.8 | 100 | 38.9 | 61.1 | 100 | 36.8 | 63.2 | 100 |

In CY 2019, the combined costs for added safety features associated with the FMVSS in passenger cars and LTVs totaled \$38 billion. This includes the added cost of FMVSS technologies in new vehicles purchased that year, plus the increased cost of fuel spent by vehicles of different ages (to carry the extra weight added by the FMVSS) in the on-road vehicle fleet. Comprehensive benefits of avoiding crashes, reducing injuries and fatalities are valued at \$882 billion, and net benefits in 2019 are estimated at \$844 billion. Economic benefits were valued at \$193 billion and net benefits based on economic impacts alone were \$154 billion.

This study examines the long-term cumulative impact of safety regulations on society on a year-by-year basis. Over time, in each CY society pays higher costs for new model year (MY) vehicles but receives safety benefits from an increasing portion of the entire on-road vehicle fleet. An impact on fuel economy from the added weight of safety technologies also occurs in the on-road fleet but is relatively minor. Increases in real wages, tied to many other cost factors also contribute to rising benefits, while decreasing real technology costs due to the manufacturing learning process works to temper the rise in annual new vehicle fleet costs. The net impact of safety improvements is thus a continuous increase in net benefits to society over time. Driver behavior also contributes to this trend. Seat belt use has climbed dramatically during this 52-year period, which essentially means more vehicle occupants are using, and thus receiving benefits from, technology that has been in place since the beginning of this timeframe. We have not attempted to estimate the cost of media campaigns and other efforts to increase seat belt use, with the exception of vehicle based electronic warning systems and labels. The net impact of these combined factors is shown in Figure 1 and Figure 2. Safety technology improvements have

been overwhelmingly beneficial to society, regardless of whether safety is valued using comprehensive values that recognize the value of lost quality of life, or whether it is limited to the purely economic impacts associated with the human capital approach.

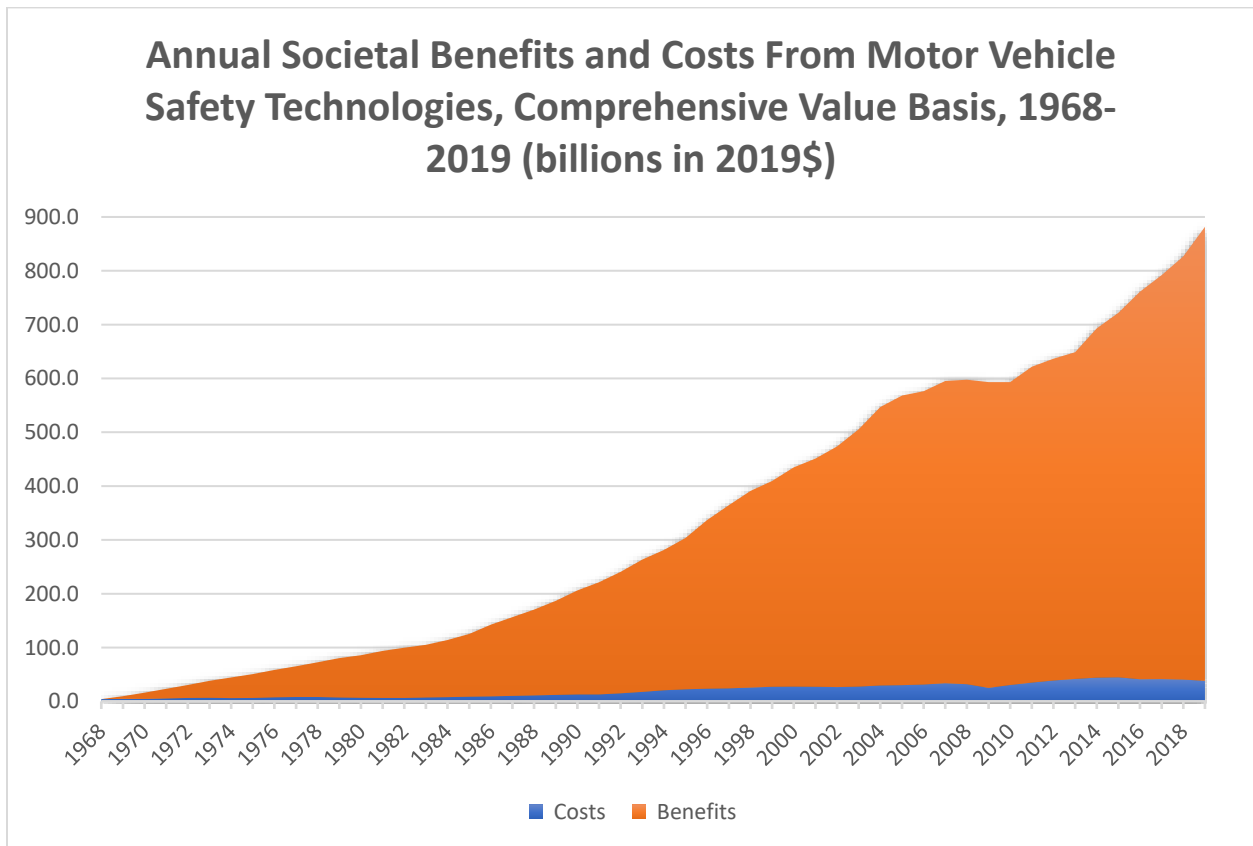


Figure 1. Annual societal benefits and costs from motor vehicle safety technologies, comprehensive value basis, 1968 to 2019 (billions in 2019\$)

Annual Societal Benefits and Costs From Motor Vehicle Safety, Technologies, Economic Costs Valuation Basis, 1968-2019 (billions in 2019\$)

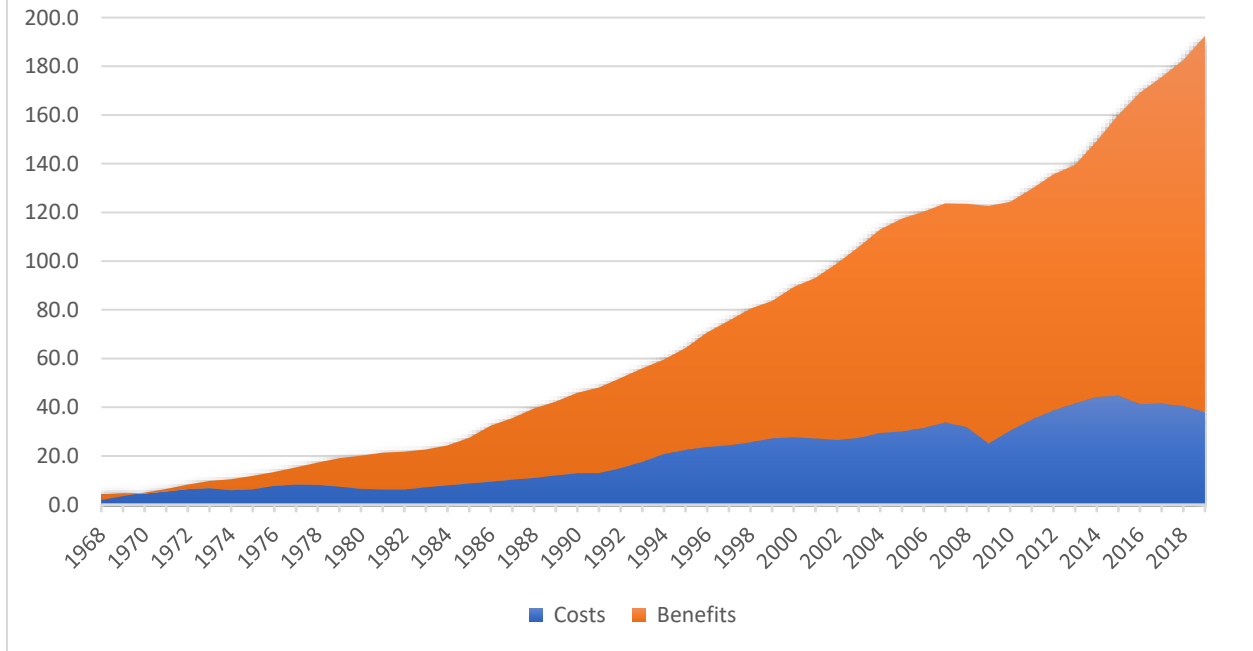


Figure 2. Annual societal benefits and costs from motor vehicle safety, technologies, economic costs valuation basis, 1968 to 2019 (billions in 2019\$)

Introduction

This report combines the results of three studies relating to the costs and benefits of the FMVSS to examine the cumulative net societal impact of motor vehicle safety standards over time. It estimates the incremental costs and benefits experienced in each CY from 1968 to 2019. Each year is treated as an individual “slice in time,” and the cumulative societal impact is the summation of all CYs’ impacts. All cost and benefit valuations are expressed in 2019 dollars.

When consumers purchase new vehicles, some portion of the vehicles’ price reflects safety features associated with the FMVSS. These technologies also add weight to the vehicle, which decreases fuel efficiency and increases the cost of operating the vehicle. These costs are experienced each year when new vehicles are purchased and when both new and older vehicles are driven. These impacts combined represent the societal cost of FMVSS technologies during a given CY. The corresponding safety benefits of FMVSS accrue each year as the on-road fleet is continually replaced by vehicles with more safety technologies. Some of these benefits derive from new vehicles sold in the current CY, but most of these benefits are derived from vehicles that were sold in earlier years that were still on the road in that CY. The largest portion of each CY’s benefits accrue from crashes avoided or mitigated in previous years that continue to impact society in the current CY.

Kahane and Simons (in press) calculated safety benefits for every CY from 1968 to 2019 based on ex-post effectiveness evaluations published by NHTSA. They examined impacts for both passenger cars and light trucks (LTVs)¹ separately as safety technologies were adopted for these two categories of vehicles at different paces. These benefits are estimated for lives saved, for injuries reduced by each severity level of the Maximum Abbreviated Injury Scale (MAIS),² and for vehicle involvements in crashes avoided. Benefits reflect what was reported in police crashes, but estimates for unreported injuries and property damage were added to these police reported crashes based on surveys of unreported crashes documented in Blincoe et al. (2023).

Simons (in press) estimated costs (retail price increases in constant 2019 dollars) for every MY from 1968 to 2019 based upon cost tear-down studies of safety countermeasures or NHTSA Final Regulatory Impact Analyses. In the cost-tear down studies, the weights of safety countermeasures were also collected, and in the Simons cost study the increased weights were estimated for every MY from 1968 to 2019. In this current study, the MY cost estimates were translated into CY data to make them comparable to the CY benefit estimates derived by Kahane and Simons (in press), and to give a temporal view of societal impacts from motor vehicle safety improvements. The impact of the increase in vehicle weight and the resulting decrease in mpg as a result of meeting the FMVSS were estimated on a yearly basis using weighted vehicle miles traveled schedules. This data was translated into CY data and combined with gasoline prices to determine the increased fuel costs for specific CYs.

¹ LTVs are light trucks and vans consisting of pickup trucks, vans, SUVs, and cross-over utility vehicles under 10,000 pounds gross vehicle weight rating (GVWR).

² M is for the Maximum injury for a person – many victims have several injuries of various AIS levels. AIS is for the abbreviated injury scale. AIS 5 is a critical injury (about 50% of AIS 5 injuries result in death), AIS 4 is for severe injuries, AIS 3 is for serious injuries, AIS 2 is for moderate injuries (usually broken bones), and AIS 1 is for minor injuries (bumps, bruises, most whiplash, and minor cuts). Injuries shown in this analysis are non-fatal injuries only.

Blincoe et al. (2023) estimated the societal cost impact of motor vehicle crashes in 2019. That study examined economic impacts, including medical care, lost productivity, property damage, traffic congestion, legal costs, insurance administrative costs, emergency services costs, and workplace costs, as well as comprehensive costs, which include both economic impacts and society's valuation for lost quality of life. That report gave these cost estimates on a per injured person basis for each MAIS level, as well as cost estimates per damaged vehicle for vehicles damaged in property damage only cases, all in constant 2019 dollars. The appropriate measure of societal welfare from safety countermeasures includes valuation of lost quality of life, which accounts for non-quantified injury impacts such as pain, suffering, and lost enjoyment of life associated with injury, disability, and lost years of life. This is required practice in preparing cost-benefit analysis accompanying regulatory actions as specified in Circular No. A-4 (Office of Management and Budget, 2023). This report adopts these comprehensive costs to assign a monetary value on health benefits and the benefits of avoiding crashes and vehicle damage. We multiply the number of lives saved, injuries reduced, and crashed vehicles avoided in both reported and unreported crashes due to safety technologies required by FMVSS by their comparable comprehensive value to society on per person or per vehicle basis to get a total societal value of benefits in each CY. All costs and benefits are expressed in 2019 dollars in this report.

While comprehensive costs capture the full societal impact of injury mitigation, it is also useful to examine the net societal impact based only on economic costs. Economic impacts are consistent with a "human capital" approach, which values death and injury in terms of its value to society at large, but does not reflect less tangible "pain and suffering" impacts on the individual. A "human capital" based analysis limits valuation of safety benefits to those directly measurable from production lost or goods and services required to repair injury and damage caused by crashes, but excludes valuation of lost quality of life, which is measured implicitly through willingness-to-pay studies of human behavior. In this report we also examine how benefits measured by these economic impacts alone relate to the cost society pays to enable improved motor vehicle safety. This report's narrative is primarily based on comprehensive valuations, but Appendix E provides the corresponding benefits tables based on economic costs of crashes to society, rather than comprehensive costs.

This historical analysis examines 52 CYs of data from 1968 to 2019. This time frame reflects the data examined in the three reports on which this study is based. When these studies were initiated, the latest data available was from 2019. It is also the last pre-COVID-19 year and thus thought to be more representative of likely post-COVID-19 circumstances.

This study examines the impacts experienced by society in each CY from the accumulated safety technologies that were employed to meet the safety standards set by NHTSA. In any CY, impacts to society include safety benefits and vehicle expenditures that result from changes initially made in that year and all previous years. As such, it is not a direct analysis of the cost-effectiveness of any individual standard. Such analyses are calculated from a point in time, either when the standard is effective or when the decision is made, which requires discounting of future benefit and cost impacts to reflect societal preferences for current outcomes. By contrast, this analysis estimates the impacts experienced by society in a given CY. In any specified year, a life saved is fully valued, regardless of whether the regulation that required the safety technology was promulgated many years in the past. Likewise, costs reflect all technologies present in the new vehicles purchased in that CY given, not just those standards that are new to that MY. The

valuation perspective is the specific CY in which costs are expended and safety benefits occur, not the year in which technologies were first required.

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Costs

Model Year Versus Calendar Year Data

Benefits derived by Kahane and Simons (in press) are estimated on a CY basis, reflecting crash data which is collected annually. By contrast, Simons (in press) estimated costs per vehicle on a MY basis. Manufacturers typically design and install new safety features by MY. Thus, retail price and fuel economy estimates have historically been reported on a MY basis. To be comparable with safety benefits, which are reported on a CY basis, we convert the MY cost data into CY data. Since the MY has historically started on September 1, one would expect that September 1 to December sales (4 months out of 12) would be about one third of the total and January- through-August sales would be about two-thirds of the total.³ Appendix A shows that on average 32.7 percent of MY sales occur in the previous CY and 67.3 percent occur in the same CY. While there is minor variation across years, there is no perceptible trend. We use these same ratios for all years. Thus, for example, for MY 2016 costs, we assume that 32.7 percent of the sales occur in CY 2015 and 67.3 percent of the sales occur in CY 2016. Thus, in a specific CY, roughly two-thirds of the added cost of safety features purchased by consumers of new passenger vehicles will be from vehicles of the same MY (e.g., MY 2016 vehicles purchased in CY 2016), and one-third will be from vehicles in the MY starting September 1 (MY 2017 vehicles purchased in CY 2016).

Fuel economy impacts are a function of vehicle miles traveled (VMT) rather than sales, and VMT will vary depending on when the vehicle is purchased. A vehicle purchased on September 1, 2016, will be driven more in 2016 than one purchased on December 1, 2016. Again, mileage can vary by months, but VMT data indicate that mileage driven in September through December averages about one-third of all mileage driven during a CY – roughly proportional to the number of months.⁴ We thus assume VMT for these 4 months is proportional to total VMT, and thus to fuel usage. We assume that sales during the September-to-December period are evenly spread out, and that the average MY 2017 car that is purchased in 2016 is bought on November 1, 2016 (the mid-point of the 4 months in 2016) with 2/12 or 1/6 (0.1667) of the first-year mileage occurring in 2016, and the remainder of the mileage 5/6 (0.8333) occurring in 2017.

Voluntary Versus Attributable Costs and Weights

Simons (in press) distributed both costs and weight impacts into those voluntarily adopted by manufacturers and those that were attributable to the FMVSS. The report determined how much of the incremental consumer cost of safety equipment was installed voluntarily by automobile manufacturers and what cost was attributable to the FMVSS requirements as set by NHTSA based on the timing of NHTSA's rulemaking efforts and research.

Several definitions are needed to determine what costs were included in the report and which ones were voluntary versus attributable.

³ When a brand-new vehicle is introduced, it will be released whenever it is ready, which could be anytime during the year. Some brand-new models have a very early release (e.g., the summer before the MY) and long production of the introductory MY. However, following the initial releases, all subsequent MYs are generally released around September 1 for most manufacturers or January 1 for some foreign manufacturers.

⁴ The U.S. monthly total vehicle miles traveled data was accessed from www.ycharts.com on December 21, 2023.

Baseline vehicle safety is defined as including all safety technologies that were standard equipment in MY 1965 vehicles. MY 1965 vehicle designs included technologies voluntarily adopted by manufacturers, often based on standards developed by the Society of Automotive Engineers (SAE), now SAE International. Only incremental costs are included over the safety equipment that was standard equipment on every MY 1965 passenger car and LTV, defined as Safety1965.⁵ When the safety equipment is not included in every 1965 passenger car and LTV, then it will be assigned as voluntary or attributable costs as discussed below. When the safety equipment is upgraded after MY 1965 the costs of newer safety equipment minus the cost of the Safety1965 equipment will be the incremental cost included in the analysis. The full cost of any linked safety equipment, not defined as having a Safety1965 equipment counterpart, is included in the analysis. There are two ways that a safety countermeasure could be linked to an FMVSS. First, NHTSA proposed it or proposed a performance standard in a Notice of Proposed Rulemaking (NPRM) that resulted in the safety countermeasure being used to meet a future standard. The proposal does not have to be a final rule at the time the countermeasure is installed. Second, even if it hasn't been proposed, NHTSA evaluated a safety countermeasure (e.g., pretensioners) and found it to be effective at reducing fatalities, injuries, or crashes.

After determining the cost and weight of safety technologies linked to the FMVSS, we divide them into those voluntarily supplied by the automobile manufacturers and those attributable to the FMVSS. The baseline MY for each FMVSS is determined individually and is defined as the last MY in production as of September 1 before an NPRM was published in the Federal Register. While a proposal is not binding, it is a strong signal of NHTSA's intention to regulate and manufacturers are responding to the strong likelihood of the rule being finalized. The installation rate of safety technologies, before or during the baseline year, are considered voluntary installations by the manufacturers. Voluntary compliance is assumed to carry over after the baseline year and it is assumed to be the same as the compliance percentage during the baseline year. The attributable cost of an FMVSS, in this report, includes the cost of all equipment or specific safety technologies added or modified primarily for the purpose of meeting (or even exceeding) the requirements of the standard, given these modifications took place after the baseline MY. Attributable costs will be determined based on the difference between the installation rates for MYs after the baseline year through MY 2019 minus the voluntary baseline level. Thus, technologies introduced into the fleet between the proposal and final rule would be considered attributable to the final rule. While an NPRM is not binding, it is a strong signal of the agency's intention to regulate. Starting compliance before the effective date of a final rule helps reduce design costs by spreading out costs over a longer time frame.

This works as follows: All MY vehicles meeting the final rule (or equipped with the technology that was used to meet the final rule, with uncertain compliance) on or before the first September 1 before an NPRM would be considered voluntary. For example, if an NPRM were published in the Federal Register in October 2000, the baseline date would be set at September 1, 2000 (MY 2001). Similarly, if an NPRM were published in the Federal Register in August 2001, the baseline date would be set at September 1, 2000 (MY 2001). All complying vehicles with the final rule (or in some cases parts of the final rule) in MY 2001 and earlier would be considered

⁵ The year 1965 was chosen for Safety1965 to have a clear baseline before NHTSA. Many safety innovations, like high-penetration-resistant windshields, were introduced in 1967. We wanted to include those in the analysis to be counted as voluntary safety added by the manufacturers.

voluntary costs. Voluntary compliance for MYs 2002 through 2019 is assumed to be at the same level as compliance in the baseline year of MY 2001. For all MY vehicles starting after the baseline year (MY 2002 in our example) the difference between complying vehicles in that MY and the voluntary assumption for the baseline year of MY 2001 would be considered attributable to the final rule. For example, if 30 percent of passenger cars met a standard in MY 2001 (the baseline year), 50 percent of passenger cars met the standard in MY 2002 and 100 percent of passenger cars met the standard in MY 2003, the assumptions would be as shown in Table 3.

Table 3. Example of voluntary/attributable assumptions

| | MY 2001 baseline | MY 2002 | MY 2003 and later |
|-------------------|-------------------------|----------------|--------------------------|
| Percent Complying | 30% | 50% | 100% |
| Voluntary | 30% | 30% | 30% |
| Attributable | | 20% | 70% |

A point of clarification is needed here. NHTSA does not always know whether a technology added voluntarily before a standard is required would actually meet the final standard. For example, an air bag added voluntarily could need some structural changes to comply with all of the injury criteria in the standard. The costs estimated are based on tear-down studies of the equipment, devices, and technology of systems that met the standard. If NHTSA tested a voluntarily added air bag system and it did not meet the final standard, that vehicle would not be included in the percentage of vehicles that voluntarily met the standard. Likewise, on the benefit side of the equation, if voluntarily added equipment did not meet the standard and NHTSA did not know about it, 100 percent of the benefits would not have been achieved. This analysis implicitly assumes that safety equipment we identified as voluntarily supplied complied with the FMVSS, costs the same as equipment meeting the standard, and achieves the same benefit as safety equipment that meets the standard. Note that the attributable estimates may be underestimates and the voluntary estimates may be overestimates for benefits if NHTSA did not know that the initial voluntary installation of technology did not meet the final standard. In this case the standard would require improvements in the technology, but may not be counted as attributable improvements.

Technology Costs – Retail Price Increase

Simons (in press) estimated the retail price increase due to safety technologies per vehicle by MY (see Table 4 and Table 5). To get total costs in Table 9, we multiply the price increase per vehicle times the sales by MY for passenger cars and LTVs (see Table 8). For example, the average passenger car in MY 2019 has \$2,428 of safety equipment in it that is linked to the FMVSS over and above the safety equipment that was standard on passenger cars in 1965. This safety equipment added 239 lb to the weight of an average passenger car.

We needed an estimate of the MY 2020 costs to get an estimate of the CY 2019 costs, since one-third of the CY 2019 costs come from MY 2020 vehicles. Generally, the cost estimates change very little from year to year. The MY 2020 changes that might affect the retail price increase of the FMVSS were not calculated in the Simons (in press) cost report but are believed to be a very small increase over the cost for MY 2019. No new FMVSS were introduced for MY 2020 and

100 percent of the fleet already met the standards for most of the FMVSS examined for MY 2019. For MY 2020, only 3 safety standards could have possibly increased their percentage in the fleet and could have added costs. These were rear seat pretensioners, torso side air bags, and minimum sound requirements for hybrid or electric vehicles. None of these percentages are believed to have increased by much in MY 2020 compared to MY 2019. Offsetting these potential cost increases would be small cost decreases from the learning curve. (In Table 4, the costs for a subsequent year are sometimes lower than the costs for a previous year because of the learning curve, which predicts that costs will slowly decrease over time for the same safety countermeasure as production volumes per year increase and as manufacturers find ways to produce items more efficiently over time.) In summary, we believe that the CY costs for 2019 will be very close to the MY costs for 2019 and assume they are the same for this analysis. For this analysis we also assume the same costs for both 2019 and 2020 CYs.

Table 4. Weight and cost per average vehicle of all safety technologies voluntarily supplied or attributable to the FMVSS by MY – passenger cars

| Model Year | Weight (lb) | | | Consumer Cost (2019\$) | | |
|-------------------|--------------------|--------------|--------------|-------------------------------|--------------|--------------|
| | Voluntary | Attr. | Total | Voluntary | Attr. | Total |
| 1968 | 25.0 | 8.7 | 33.6 | \$257.68 | \$93.96 | \$351.64 |
| 1969 | 32.1 | 15.7 | 47.7 | \$278.17 | \$137.10 | \$415.26 |
| 1970 | 32.4 | 23.1 | 55.5 | \$278.79 | \$170.46 | \$449.25 |
| 1971 | 32.9 | 25.8 | 58.7 | \$278.94 | \$176.87 | \$455.81 |
| 1972 | 34.9 | 32.3 | 67.2 | \$285.29 | \$219.50 | \$504.79 |
| 1973 | 35.0 | 45.8 | 80.8 | \$283.41 | \$257.22 | \$540.63 |
| 1974 | 34.8 | 52.3 | 87.1 | \$281.76 | \$277.77 | \$559.54 |
| 1975 | 34.6 | 52.1 | 86.7 | \$280.54 | \$277.93 | \$558.47 |
| 1976 | 34.4 | 53.0 | 87.3 | \$279.58 | \$326.98 | \$606.56 |
| 1977 | 32.0 | 50.9 | 82.9 | \$268.88 | \$320.16 | \$589.04 |
| 1978 | 31.5 | 49.8 | 81.3 | \$266.66 | \$319.38 | \$586.03 |
| 1979 | 30.9 | 48.1 | 78.9 | \$263.08 | \$308.62 | \$571.70 |
| 1980 | 31.0 | 48.3 | 79.3 | \$261.47 | \$308.15 | \$569.62 |
| 1981 | 30.8 | 47.8 | 78.6 | \$262.07 | \$307.15 | \$569.22 |
| 1982 | 30.2 | 47.3 | 77.5 | \$255.52 | \$305.14 | \$560.66 |
| 1983 | 30.1 | 46.9 | 77.1 | \$254.95 | \$304.05 | \$558.99 |
| 1984 | 30.1 | 46.9 | 77.0 | \$252.05 | \$302.85 | \$554.90 |
| 1985 | 30.0 | 46.5 | 76.5 | \$250.16 | \$301.48 | \$551.63 |
| 1986 | 32.0 | 47.2 | 79.2 | \$290.67 | \$314.74 | \$605.41 |

| Model Year | Weight (lb) | | | Consumer Cost (2019\$) | | |
|------------|-------------|-------|-------|------------------------|------------|------------|
| | Voluntary | Attr. | Total | Voluntary | Attr. | Total |
| 1987 | 34.4 | 48.3 | 82.7 | \$324.28 | \$336.33 | \$660.61 |
| 1988 | 35.6 | 50.0 | 85.6 | \$325.60 | \$352.27 | \$677.87 |
| 1989 | 35.3 | 53.1 | 88.4 | \$326.49 | \$381.44 | \$707.93 |
| 1990 | 36.0 | 64.9 | 101.0 | \$352.31 | \$559.29 | \$911.59 |
| 1991 | 37.1 | 66.2 | 103.3 | \$389.23 | \$581.69 | \$970.92 |
| 1992 | 40.3 | 67.3 | 107.5 | \$492.29 | \$619.89 | \$1,112.18 |
| 1993 | 42.9 | 71.8 | 114.7 | \$539.59 | \$685.45 | \$1,225.04 |
| 1994 | 46.8 | 83.8 | 130.5 | \$616.71 | \$837.94 | \$1,454.65 |
| 1995 | 46.7 | 93.0 | 139.7 | \$606.72 | \$941.22 | \$1,547.94 |
| 1996 | 52.6 | 98.1 | 150.7 | \$629.66 | \$961.10 | \$1,590.76 |
| 1997 | 52.5 | 106.5 | 159.0 | \$623.27 | \$984.94 | \$1,608.21 |
| 1998 | 53.9 | 105.8 | 159.7 | \$655.63 | \$965.66 | \$1,621.29 |
| 1999 | 55.4 | 104.6 | 160.0 | \$693.89 | \$944.54 | \$1,638.43 |
| 2000 | 56.1 | 103.9 | 160.0 | \$705.34 | \$926.61 | \$1,631.95 |
| 2001 | 57.4 | 102.9 | 160.3 | \$734.73 | \$906.16 | \$1,640.90 |
| 2002 | 57.9 | 101.7 | 159.7 | \$742.33 | \$886.62 | \$1,628.96 |
| 2003 | 58.0 | 101.3 | 159.3 | \$725.37 | \$870.69 | \$1,596.07 |
| 2004 | 65.8 | 102.1 | 167.9 | \$776.45 | \$928.04 | \$1,704.48 |
| 2005 | 66.7 | 102.1 | 168.9 | \$782.06 | \$916.55 | \$1,698.62 |
| 2006 | 67.8 | 103.4 | 171.2 | \$828.68 | \$962.56 | \$1,791.23 |
| 2007 | 65.4 | 109.6 | 175.0 | \$832.98 | \$1,056.64 | \$1,889.62 |
| 2008 | 65.9 | 117.1 | 183.0 | \$834.07 | \$1,241.90 | \$2,075.96 |
| 2009 | 66.1 | 124.8 | 191.0 | \$832.85 | \$1,324.84 | \$2,157.69 |
| 2010 | 70.7 | 128.9 | 199.6 | \$845.33 | \$1,424.48 | \$2,269.82 |
| 2011 | 71.8 | 129.6 | 201.4 | \$855.78 | \$1,434.81 | \$2,290.60 |
| 2012 | 73.3 | 133.0 | 206.3 | \$860.61 | \$1,457.98 | \$2,318.59 |
| 2013 | 73.6 | 150.3 | 223.9 | \$859.95 | \$1,502.49 | \$2,362.44 |
| 2014 | 73.7 | 157.6 | 231.3 | \$852.97 | \$1,536.61 | \$2,389.58 |
| 2015 | 73.6 | 161.4 | 235.0 | \$843.06 | \$1,566.84 | \$2,409.90 |

| Model Year | Weight (lb) | | | Consumer Cost (2019\$) | | |
|------------|-------------|-------|-------|------------------------|------------|------------|
| | Voluntary | Attr. | Total | Voluntary | Attr. | Total |
| 2016 | 73.6 | 164.1 | 237.7 | \$837.60 | \$1,594.14 | \$2,431.74 |
| 2017 | 73.6 | 164.4 | 238.1 | \$831.44 | \$1,581.04 | \$2,412.48 |
| 2018 | 73.8 | 165.2 | 239.0 | \$827.74 | \$1,597.80 | \$2,425.55 |
| 2019 | 73.6 | 165.2 | 238.9 | \$823.49 | \$1,604.48 | \$2,427.97 |

Source: Simons (in press)

Table 5. Weight and cost per average vehicle of all safety technologies voluntarily supplied or attributable to the FMVSS by MY – LTVs

| Model Year | Weight (lb) | | | Consumer Cost (2019\$) | | |
|------------|-------------|-------|-------|------------------------|----------|----------|
| | Voluntary | Attr. | Total | Voluntary | Attr. | Total |
| 1968 | 13.9 | 4.7 | 18.6 | \$139.43 | \$67.57 | \$207.00 |
| 1969 | 14.1 | 4.6 | 18.6 | \$140.04 | \$65.41 | \$205.45 |
| 1970 | 14.2 | 5.2 | 19.4 | \$142.06 | \$79.79 | \$221.85 |
| 1971 | 14.3 | 5.3 | 19.6 | \$142.05 | \$80.42 | \$222.47 |
| 1972 | 14.8 | 11.6 | 26.4 | \$143.41 | \$128.54 | \$271.94 |
| 1973 | 15.7 | 13.7 | 29.5 | \$157.05 | \$143.02 | \$300.07 |
| 1974 | 16.7 | 13.9 | 30.6 | \$161.45 | \$147.22 | \$308.67 |
| 1975 | 16.7 | 15.8 | 32.5 | \$161.23 | \$159.04 | \$320.27 |
| 1976 | 16.8 | 16.9 | 33.7 | \$161.73 | \$165.68 | \$327.42 |
| 1977 | 16.6 | 17.0 | 33.6 | \$165.09 | \$207.46 | \$372.55 |
| 1978 | 16.4 | 17.3 | 33.7 | \$163.17 | \$207.83 | \$371.00 |
| 1979 | 16.2 | 16.8 | 33.0 | \$164.21 | \$208.90 | \$373.10 |
| 1980 | 16.1 | 17.6 | 33.7 | \$162.94 | \$216.05 | \$378.99 |
| 1981 | 15.8 | 17.6 | 33.5 | \$161.96 | \$215.32 | \$377.28 |
| 1982 | 15.9 | 20.0 | 35.9 | \$158.16 | \$230.99 | \$389.15 |
| 1983 | 17.0 | 20.3 | 37.3 | \$164.21 | \$231.91 | \$396.11 |
| 1984 | 17.4 | 20.4 | 37.8 | \$166.02 | \$231.24 | \$397.25 |
| 1985 | 17.9 | 20.6 | 38.5 | \$167.92 | \$231.47 | \$399.39 |

| Model Year | Weight (lb) | | | Consumer Cost (2019\$) | | |
|------------|-------------|-------|-------|------------------------|------------|------------|
| | Voluntary | Attr. | Total | Voluntary | Attr. | Total |
| 1986 | 18.1 | 20.8 | 38.9 | \$167.89 | \$231.22 | \$399.11 |
| 1987 | 25.6 | 21.1 | 46.7 | \$362.07 | \$231.47 | \$593.54 |
| 1988 | 29.7 | 21.2 | 50.9 | \$453.19 | \$231.05 | \$684.25 |
| 1989 | 38.2 | 21.3 | 59.5 | \$629.23 | \$230.66 | \$859.89 |
| 1990 | 45.0 | 22.1 | 67.1 | \$734.21 | \$234.58 | \$968.80 |
| 1991 | 42.3 | 24.8 | 67.2 | \$738.13 | \$239.82 | \$977.95 |
| 1992 | 37.7 | 29.9 | 67.6 | \$717.40 | \$311.77 | \$1,029.17 |
| 1993 | 38.8 | 32.4 | 71.1 | \$712.28 | \$336.96 | \$1,049.24 |
| 1994 | 39.3 | 53.3 | 92.6 | \$691.38 | \$425.70 | \$1,117.08 |
| 1995 | 42.4 | 63.3 | 105.7 | \$730.62 | \$626.56 | \$1,357.18 |
| 1996 | 49.0 | 70.3 | 119.4 | \$744.43 | \$724.52 | \$1,468.95 |
| 1997 | 48.6 | 72.7 | 121.4 | \$743.63 | \$755.48 | \$1,499.10 |
| 1998 | 47.7 | 75.5 | 123.3 | \$740.70 | \$793.52 | \$1,534.22 |
| 1999 | 47.4 | 74.7 | 122.2 | \$735.53 | \$777.19 | \$1,512.72 |
| 2000 | 47.3 | 73.2 | 120.6 | \$735.19 | \$758.78 | \$1,493.97 |
| 2001 | 47.6 | 73.0 | 120.5 | \$750.56 | \$744.24 | \$1,494.80 |
| 2002 | 48.3 | 72.8 | 121.1 | \$767.46 | \$734.53 | \$1,501.99 |
| 2003 | 51.5 | 72.6 | 124.1 | \$805.40 | \$721.09 | \$1,526.49 |
| 2004 | 62.1 | 74.7 | 136.8 | \$849.11 | \$829.74 | \$1,678.85 |
| 2005 | 63.1 | 75.6 | 138.6 | \$862.90 | \$837.19 | \$1,700.09 |
| 2006 | 63.5 | 77.2 | 140.6 | \$884.91 | \$844.04 | \$1,728.96 |
| 2007 | 60.5 | 86.0 | 146.5 | \$907.97 | \$946.96 | \$1,854.93 |
| 2008 | 61.6 | 92.6 | 154.2 | \$940.83 | \$1,092.69 | \$2,033.52 |
| 2009 | 62.0 | 98.1 | 160.1 | \$942.03 | \$1,180.38 | \$2,122.41 |
| 2010 | 68.2 | 101.2 | 169.5 | \$965.83 | \$1,221.76 | \$2,187.59 |
| 2011 | 68.9 | 101.8 | 170.8 | \$955.60 | \$1,225.12 | \$2,180.72 |
| 2012 | 68.7 | 103.8 | 172.4 | \$943.30 | \$1,234.37 | \$2,177.67 |
| 2013 | 69.0 | 107.8 | 176.8 | \$932.58 | \$1,253.33 | \$2,185.92 |

| Model Year | Weight (lb) | | | Consumer Cost (2019\$) | | |
|------------|-------------|-------|-------|------------------------|------------|------------|
| | Voluntary | Attr. | Total | Voluntary | Attr. | Total |
| 2014 | 69.8 | 114.0 | 183.8 | \$929.10 | \$1,292.57 | \$2,221.67 |
| 2015 | 70.0 | 120.9 | 190.9 | \$917.69 | \$1,326.36 | \$2,244.05 |
| 2016 | 70.4 | 125.9 | 196.3 | \$913.23 | \$1,339.12 | \$2,252.35 |
| 2017 | 71.0 | 134.2 | 205.2 | \$908.48 | \$1,350.55 | \$2,259.03 |
| 2018 | 71.7 | 135.6 | 207.3 | \$906.84 | \$1,368.95 | \$2,275.79 |
| 2019 | 71.5 | 135.7 | 207.2 | \$901.31 | \$1,367.90 | \$2,269.21 |

Source: Simons (in press)

Table 6. CY consumer cost per vehicle (2019\$) – passenger cars

| Year | Voluntary | Attr. | Total |
|------|-----------|----------|----------|
| 1968 | \$264.38 | \$108.06 | \$372.44 |
| 1969 | \$278.37 | \$148.01 | \$426.38 |
| 1970 | \$278.84 | \$172.55 | \$451.40 |
| 1971 | \$281.02 | \$190.81 | \$471.83 |
| 1972 | \$284.67 | \$231.83 | \$516.51 |
| 1973 | \$282.87 | \$263.94 | \$546.81 |
| 1974 | \$281.37 | \$277.82 | \$559.19 |
| 1975 | \$280.23 | \$293.97 | \$574.20 |
| 1976 | \$276.08 | \$324.75 | \$600.83 |
| 1977 | \$268.16 | \$319.90 | \$588.06 |
| 1978 | \$265.49 | \$315.86 | \$581.35 |
| 1979 | \$262.55 | \$308.47 | \$571.02 |
| 1980 | \$261.67 | \$307.82 | \$569.49 |
| 1981 | \$259.93 | \$306.49 | \$566.42 |
| 1982 | \$255.33 | \$304.79 | \$560.12 |
| 1983 | \$254.00 | \$303.66 | \$557.65 |
| 1984 | \$251.43 | \$302.40 | \$553.83 |
| 1985 | \$263.40 | \$305.81 | \$569.22 |

| Year | Voluntary | Attr. | Total |
|-------------|------------------|--------------|--------------|
| 1986 | \$301.66 | \$321.80 | \$623.46 |
| 1987 | \$324.71 | \$341.54 | \$666.25 |
| 1988 | \$325.89 | \$361.81 | \$687.70 |
| 1989 | \$334.93 | \$439.60 | \$774.53 |
| 1990 | \$364.38 | \$566.61 | \$930.99 |
| 1991 | \$422.93 | \$594.18 | \$1,017.11 |
| 1992 | \$507.75 | \$641.33 | \$1,149.08 |
| 1993 | \$564.81 | \$735.32 | \$1,300.12 |
| 1994 | \$613.44 | \$871.71 | \$1,485.16 |
| 1995 | \$614.22 | \$947.72 | \$1,561.94 |
| 1996 | \$627.57 | \$968.90 | \$1,596.46 |
| 1997 | \$633.85 | \$978.64 | \$1,612.49 |
| 1998 | \$668.14 | \$958.76 | \$1,626.90 |
| 1999 | \$697.63 | \$938.68 | \$1,636.31 |
| 2000 | \$714.95 | \$919.93 | \$1,634.88 |
| 2001 | \$737.22 | \$899.78 | \$1,636.99 |
| 2002 | \$736.79 | \$881.41 | \$1,618.20 |
| 2003 | \$742.08 | \$889.44 | \$1,631.52 |
| 2004 | \$778.28 | \$924.28 | \$1,702.56 |
| 2005 | \$797.31 | \$931.60 | \$1,728.90 |
| 2006 | \$830.08 | \$993.32 | \$1,823.41 |
| 2007 | \$833.34 | \$1,117.22 | \$1,950.56 |
| 2008 | \$833.67 | \$1,269.02 | \$2,102.69 |
| 2009 | \$836.93 | \$1,357.42 | \$2,194.36 |
| 2010 | \$848.75 | \$1,427.86 | \$2,276.61 |
| 2011 | \$857.36 | \$1,442.39 | \$2,299.75 |
| 2012 | \$860.39 | \$1,472.54 | \$2,332.93 |
| 2013 | \$857.67 | \$1,513.64 | \$2,371.31 |
| 2014 | \$849.73 | \$1,546.49 | \$2,396.23 |

| Year | Voluntary | Attr. | Total |
|-------------|------------------|--------------|--------------|
| 2015 | \$841.28 | \$1,575.77 | \$2,417.05 |
| 2016 | \$835.59 | \$1,589.86 | \$2,425.44 |
| 2017 | \$830.23 | \$1,586.52 | \$2,416.76 |
| 2018 | \$826.35 | \$1,599.99 | \$2,426.34 |
| 2019 | \$824.56 | \$1,604.48 | \$2,429.03 |

Table 7. CY consumer cost per vehicle (2019\$) – LTVs

| Year | Voluntary | Attr. | Total |
|-------------|------------------|--------------|--------------|
| 1968 | \$139.63 | \$66.86 | \$206.49 |
| 1969 | \$140.70 | \$70.11 | \$210.81 |
| 1970 | \$142.06 | \$79.99 | \$222.05 |
| 1971 | \$142.49 | \$96.16 | \$238.65 |
| 1972 | \$147.87 | \$133.27 | \$281.14 |
| 1973 | \$158.49 | \$144.40 | \$302.88 |
| 1974 | \$161.38 | \$151.08 | \$312.46 |
| 1975 | \$161.39 | \$161.21 | \$322.61 |
| 1976 | \$162.83 | \$179.35 | \$342.18 |
| 1977 | \$164.46 | \$207.58 | \$372.04 |
| 1978 | \$163.51 | \$208.18 | \$371.69 |
| 1979 | \$163.79 | \$211.24 | \$375.03 |
| 1980 | \$162.62 | \$215.81 | \$378.43 |
| 1981 | \$160.72 | \$220.44 | \$381.16 |
| 1982 | \$160.13 | \$231.29 | \$391.42 |
| 1983 | \$164.80 | \$231.69 | \$396.48 |
| 1984 | \$166.64 | \$231.31 | \$397.95 |
| 1985 | \$167.91 | \$231.39 | \$399.29 |
| 1986 | \$231.39 | \$231.30 | \$462.69 |
| 1987 | \$391.87 | \$231.34 | \$623.20 |
| 1988 | \$510.76 | \$230.93 | \$741.68 |
| 1989 | \$663.56 | \$231.94 | \$895.50 |

| Year | Voluntary | Attr. | Total |
|-------------|------------------|--------------|--------------|
| 1990 | \$735.49 | \$236.30 | \$971.79 |
| 1991 | \$731.35 | \$263.35 | \$994.70 |
| 1992 | \$715.72 | \$320.00 | \$1,035.73 |
| 1993 | \$705.45 | \$365.98 | \$1,071.42 |
| 1994 | \$704.21 | \$491.38 | \$1,195.60 |
| 1995 | \$735.14 | \$658.60 | \$1,393.73 |
| 1996 | \$744.17 | \$734.64 | \$1,478.81 |
| 1997 | \$742.67 | \$767.92 | \$1,510.59 |
| 1998 | \$739.01 | \$788.18 | \$1,527.19 |
| 1999 | \$735.42 | \$771.17 | \$1,506.58 |
| 2000 | \$740.21 | \$754.02 | \$1,494.24 |
| 2001 | \$756.09 | \$741.07 | \$1,497.15 |
| 2002 | \$779.87 | \$730.14 | \$1,510.00 |
| 2003 | \$819.69 | \$756.62 | \$1,576.32 |
| 2004 | \$853.62 | \$832.18 | \$1,685.80 |
| 2005 | \$870.10 | \$839.43 | \$1,709.53 |
| 2006 | \$892.45 | \$877.70 | \$1,770.15 |
| 2007 | \$918.72 | \$994.61 | \$1,913.33 |
| 2008 | \$941.22 | \$1,121.37 | \$2,062.58 |
| 2009 | \$949.81 | \$1,193.91 | \$2,143.72 |
| 2010 | \$962.48 | \$1,222.86 | \$2,185.34 |
| 2011 | \$951.58 | \$1,228.15 | \$2,179.72 |
| 2012 | \$939.79 | \$1,240.57 | \$2,180.36 |
| 2013 | \$931.44 | \$1,266.16 | \$2,197.61 |
| 2014 | \$925.37 | \$1,303.62 | \$2,228.99 |
| 2015 | \$916.23 | \$1,330.53 | \$2,246.77 |
| 2016 | \$911.68 | \$1,342.86 | \$2,254.54 |
| 2017 | \$907.94 | \$1,356.57 | \$2,264.51 |
| 2018 | \$905.03 | \$1,368.61 | \$2,273.64 |
| 2019 | \$900.98 | \$1,367.90 | \$2,268.88 |

Table 8. Sales in millions of vehicles

| | Model Years | | Estimated Calendar Years | |
|------|-------------|------|--------------------------|------|
| | Pass. Cars | LTVs | Pass. Cars | LTVs |
| 1968 | 10.44 | 1.62 | 10.32 | 1.65 |
| 1969 | 10.07 | 1.70 | 9.57 | 1.63 |
| 1970 | 8.56 | 1.51 | 9.08 | 1.59 |
| 1971 | 10.12 | 1.77 | 10.22 | 1.89 |
| 1972 | 10.41 | 2.14 | 10.75 | 2.33 |
| 1973 | 11.42 | 2.72 | 10.57 | 2.63 |
| 1974 | 8.85 | 2.44 | 8.77 | 2.39 |
| 1975 | 8.61 | 2.28 | 9.11 | 2.51 |
| 1976 | 10.10 | 2.96 | 10.46 | 3.12 |
| 1977 | 11.17 | 3.43 | 11.21 | 3.56 |
| 1978 | 11.30 | 3.81 | 11.08 | 3.65 |
| 1979 | 10.65 | 3.32 | 10.09 | 3.03 |
| 1980 | 8.97 | 2.44 | 8.82 | 2.36 |
| 1981 | 8.53 | 2.19 | 8.35 | 2.27 |
| 1982 | 7.98 | 2.44 | 8.38 | 2.60 |
| 1983 | 9.18 | 2.92 | 9.58 | 3.27 |
| 1984 | 10.39 | 3.98 | 10.61 | 4.20 |
| 1985 | 11.04 | 4.64 | 11.18 | 4.73 |
| 1986 | 11.46 | 4.90 | 11.07 | 4.92 |
| 1987 | 10.28 | 4.95 | 10.37 | 4.94 |
| 1988 | 10.54 | 4.92 | 10.29 | 4.87 |
| 1989 | 9.78 | 4.76 | 9.62 | 4.70 |
| 1990 | 9.30 | 4.57 | 8.93 | 4.43 |
| 1991 | 8.18 | 4.14 | 8.19 | 4.31 |
| 1992 | 8.21 | 4.66 | 8.31 | 4.90 |
| 1993 | 8.52 | 5.38 | 8.68 | 5.61 |
| 1994 | 8.99 | 6.07 | 8.87 | 6.08 |
| 1995 | 8.62 | 6.11 | 8.57 | 6.28 |

| | Model Years | | Estimated Calendar Years | |
|------|-------------|-------|--------------------------|-------|
| | Pass. Cars | LTVs | Pass. Cars | LTVs |
| 1996 | 8.48 | 6.62 | 8.39 | 6.71 |
| 1997 | 8.22 | 6.90 | 8.17 | 7.09 |
| 1998 | 8.08 | 7.46 | 8.27 | 7.73 |
| 1999 | 8.64 | 8.26 | 8.69 | 8.36 |
| 2000 | 8.78 | 8.57 | 8.64 | 8.64 |
| 2001 | 8.35 | 8.77 | 8.25 | 8.77 |
| 2002 | 8.04 | 8.77 | 7.88 | 8.87 |
| 2003 | 7.56 | 9.08 | 7.53 | 9.18 |
| 2004 | 7.48 | 9.38 | 7.54 | 9.35 |
| 2005 | 7.66 | 9.29 | 7.75 | 9.14 |
| 2006 | 7.92 | 8.85 | 7.95 | 8.88 |
| 2007 | 7.99 | 8.93 | 8.13 | 8.65 |
| 2008 | 8.42 | 8.09 | 7.44 | 7.00 |
| 2009 | 5.48 | 4.83 | 5.75 | 5.25 |
| 2010 | 6.29 | 6.09 | 6.31 | 6.68 |
| 2011 | 6.36 | 7.86 | 6.71 | 8.02 |
| 2012 | 7.42 | 8.34 | 7.67 | 8.58 |
| 2013 | 8.16 | 9.05 | 8.08 | 9.30 |
| 2014 | 7.92 | 9.78 | 8.00 | 10.35 |
| 2015 | 8.15 | 11.50 | 7.64 | 11.08 |
| 2016 | 6.63 | 10.26 | 6.55 | 10.53 |
| 2017 | 6.38 | 11.08 | 6.00 | 11.31 |
| 2018 | 5.23 | 11.79 | 5.03 | 11.78 |
| 2019 | 4.62 | 11.76 | 4.35 | 11.52 |
| 2020 | 3.82 | 11.04 | | |

Table 9 shows the total retail price in millions of 2019 dollars. Table 9 is derived by taking the data in Table 4 and Table 5, changing those data from MY data to CY data, for example, by taking the passenger car data for MY 1968 costs * 0.673 + MY 1969 costs * 0.327 and assuming that is CY costs for 1968. Those CY costs are multiplied by Table 8 CY sales (\$257.68 * 0.673 + \$278.17 * 0.372 = \$264.38 * 10.32 million sales = \$2,728 million).

While the FMVSS costs on a per vehicle basis have generally increased over time, total consumer costs for passenger cars hit a high point in 2013 because of decreasing passenger car sales after 2013 (Table 8). On the other hand, both consumer cost per vehicle (Table 5) and sales (Table 8) for LTVs have been increasing and total consumer costs have increased. In 2019, U.S. consumers paid an incremental \$36.7 billion for the FMVSS safety equipment in passenger cars and LTVs compared to what was standard equipment in 1965.

Table 9. Total CY consumer costs for the FMVSS (millions in 2019\$)

| CY | Passenger Cars | | | LTVs | | | Passenger Cars + LTV |
|------|------------------------|---------|---------|------------------------|---------|---------|----------------------|
| | Consumer Cost (2019\$) | | | Consumer Cost (2019\$) | | | (2019\$) |
| | Voluntary | Attr. | Total | Voluntary | Attr. | Total | Total |
| 1968 | \$2,728 | \$1,115 | \$3,843 | \$230 | \$110 | \$340 | \$4,183 |
| 1969 | \$2,663 | \$1,416 | \$4,079 | \$230 | \$115 | \$344 | \$4,424 |
| 1970 | \$2,532 | \$1,567 | \$4,098 | \$226 | \$127 | \$354 | \$4,452 |
| 1971 | \$2,871 | \$1,949 | \$4,820 | \$270 | \$182 | \$452 | \$5,271 |
| 1972 | \$3,060 | \$2,492 | \$5,551 | \$345 | \$311 | \$656 | \$6,208 |
| 1973 | \$2,989 | \$2,789 | \$5,778 | \$416 | \$379 | \$796 | \$6,573 |
| 1974 | \$2,468 | \$2,436 | \$4,904 | \$385 | \$361 | \$746 | \$5,650 |
| 1975 | \$2,552 | \$2,677 | \$5,229 | \$405 | \$404 | \$809 | \$6,038 |
| 1976 | \$2,887 | \$3,396 | \$6,283 | \$507 | \$559 | \$1,066 | \$7,349 |
| 1977 | \$3,007 | \$3,587 | \$6,594 | \$585 | \$738 | \$1,323 | \$7,917 |
| 1978 | \$2,942 | \$3,501 | \$6,443 | \$596 | \$759 | \$1,355 | \$7,799 |
| 1979 | \$2,649 | \$3,112 | \$5,762 | \$496 | \$639 | \$1,135 | \$6,897 |
| 1980 | \$2,309 | \$2,716 | \$5,025 | \$383 | \$509 | \$892 | \$5,917 |
| 1981 | \$2,170 | \$2,558 | \$4,728 | \$365 | \$501 | \$867 | \$5,594 |
| 1982 | \$2,140 | \$2,554 | \$4,694 | \$416 | \$601 | \$1,018 | \$5,711 |
| 1983 | \$2,434 | \$2,910 | \$5,344 | \$539 | \$758 | \$1,298 | \$6,642 |
| 1984 | \$2,667 | \$3,207 | \$5,874 | \$700 | \$972 | \$1,671 | \$7,546 |
| 1985 | \$2,945 | \$3,419 | \$6,364 | \$794 | \$1,094 | \$1,887 | \$8,251 |
| 1986 | \$3,338 | \$3,561 | \$6,900 | \$1,138 | \$1,137 | \$2,275 | \$9,174 |
| 1987 | \$3,366 | \$3,541 | \$6,907 | \$1,936 | \$1,143 | \$3,079 | \$9,985 |
| 1988 | \$3,352 | \$3,722 | \$7,074 | \$2,486 | \$1,124 | \$3,610 | \$10,684 |

| CY | Passenger Cars | | | LTVs | | | Passenger Cars + LTV |
|------|------------------------|----------|----------|------------------------|----------|----------|----------------------|
| | Consumer Cost (2019\$) | | | Consumer Cost (2019\$) | | | (2019\$) |
| | Voluntary | Attr. | Total | Voluntary | Attr. | Total | Total |
| 1989 | \$3,222 | \$4,229 | \$7,451 | \$3,117 | \$1,089 | \$4,206 | \$11,657 |
| 1990 | \$3,253 | \$5,058 | \$8,311 | \$3,256 | \$1,046 | \$4,302 | \$12,613 |
| 1991 | \$3,464 | \$4,866 | \$8,330 | \$3,155 | \$1,136 | \$4,290 | \$12,621 |
| 1992 | \$4,221 | \$5,332 | \$9,553 | \$3,507 | \$1,568 | \$5,075 | \$14,628 |
| 1993 | \$4,901 | \$6,380 | \$11,281 | \$3,958 | \$2,053 | \$6,011 | \$17,291 |
| 1994 | \$5,439 | \$7,729 | \$13,168 | \$4,284 | \$2,989 | \$7,273 | \$20,442 |
| 1995 | \$5,266 | \$8,125 | \$13,391 | \$4,617 | \$4,136 | \$8,753 | \$22,144 |
| 1996 | \$5,267 | \$8,132 | \$13,400 | \$4,996 | \$4,932 | \$9,928 | \$23,327 |
| 1997 | \$5,181 | \$7,999 | \$13,179 | \$5,263 | \$5,442 | \$10,705 | \$23,884 |
| 1998 | \$5,523 | \$7,926 | \$13,449 | \$5,710 | \$6,090 | \$11,800 | \$25,249 |
| 1999 | \$6,060 | \$8,154 | \$14,214 | \$6,151 | \$6,450 | \$12,600 | \$26,814 |
| 2000 | \$6,175 | \$7,945 | \$14,120 | \$6,393 | \$6,512 | \$12,905 | \$27,025 |
| 2001 | \$6,080 | \$7,420 | \$13,500 | \$6,631 | \$6,499 | \$13,130 | \$26,630 |
| 2002 | \$5,806 | \$6,946 | \$12,751 | \$6,920 | \$6,479 | \$13,399 | \$26,150 |
| 2003 | \$5,590 | \$6,700 | \$12,291 | \$7,525 | \$6,946 | \$14,471 | \$26,761 |
| 2004 | \$5,868 | \$6,969 | \$12,837 | \$7,981 | \$7,781 | \$15,762 | \$28,600 |
| 2005 | \$6,177 | \$7,217 | \$13,394 | \$7,956 | \$7,676 | \$15,632 | \$29,026 |
| 2006 | \$6,595 | \$7,892 | \$14,488 | \$7,922 | \$7,791 | \$15,713 | \$30,201 |
| 2007 | \$6,779 | \$9,088 | \$15,866 | \$7,944 | \$8,601 | \$16,545 | \$32,411 |
| 2008 | \$6,201 | \$9,439 | \$15,639 | \$6,591 | \$7,852 | \$14,443 | \$30,082 |
| 2009 | \$4,814 | \$7,807 | \$12,621 | \$4,986 | \$6,268 | \$11,254 | \$23,875 |
| 2010 | \$5,357 | \$9,011 | \$14,368 | \$6,426 | \$8,165 | \$14,591 | \$28,959 |
| 2011 | \$5,754 | \$9,680 | \$15,434 | \$7,630 | \$9,848 | \$17,478 | \$32,912 |
| 2012 | \$6,599 | \$11,295 | \$17,894 | \$8,064 | \$10,644 | \$18,708 | \$36,602 |
| 2013 | \$6,934 | \$12,237 | \$19,171 | \$8,658 | \$11,769 | \$20,427 | \$39,598 |
| 2014 | \$6,797 | \$12,370 | \$19,166 | \$9,581 | \$13,497 | \$23,078 | \$42,244 |
| 2015 | \$6,429 | \$12,042 | \$18,471 | \$10,155 | \$14,747 | \$24,902 | \$43,373 |

| CY | Passenger Cars | | | LTVs | | | Passenger Cars + LTV |
|-----------|------------------------|----------|-----------|------------------------|----------|-----------|----------------------|
| | Consumer Cost (2019\$) | | | Consumer Cost (2019\$) | | | (2019\$) |
| | Voluntary | Attr. | Total | Voluntary | Attr. | Total | Total |
| 2016 | \$5,470 | \$10,407 | \$15,876 | \$9,599 | \$14,138 | \$23,737 | \$39,614 |
| 2017 | \$4,979 | \$9,515 | \$14,494 | \$10,271 | \$15,346 | \$25,616 | \$40,110 |
| 2018 | \$4,155 | \$8,045 | \$12,200 | \$10,659 | \$16,119 | \$26,779 | \$38,979 |
| 2019 | \$3,591 | \$6,987 | \$10,577 | \$10,381 | \$15,760 | \$26,141 | \$36,719 |
| 1968-2019 | | | \$537,179 | | | \$475,627 | \$1,012,806 |

Fuel Economy Costs

This section estimates the fuel economy impact of the weight of the safety standards over the lifetime of the vehicles in constant 2019 dollars and reports them on a CY basis. The basic methodology starts with the average weight (which includes the weight of the FMVSS) and average fuel economy in mpg of passenger cars and LTVs, which have been collected by the Environmental Protection Agency (EPA) since 1975 (U.S. Environmental Protection Agency, 2021). In addition, data for MYs 1968 to 1974 were taken from two sources. The first providing curb weight, which was adjusted to EPA test weight by adding 300 lb (Kahane, 1988). The second providing fuel economy data in mpg from the U.S. Energy Information Administration (2021).

We then estimate the impact on fuel costs over the lifetime of these vehicles of increasing the weight from their baseline (no FMVSS) weight and a calculated higher average fuel economy to their weight (which includes the FMVSS weight) and an EPA test result fuel economy. For example, the average MY 2019 passenger car has an estimated 239 lb of FMVSS equipment. With this FMVSS weight, EPA estimated the average MY 2019 passenger car weighed 3,565 lb and achieved 29.90 miles per gallon. Without this FMVSS weight we calculate that the average MY 2019 passenger car would have weighed 3,326 lb and achieved 31.61 mpg. Thus, the fuel economy impact is estimated based on a vehicle adding weight with the safety standards linked to the FMVSS, which decreases its fuel economy from 31.61 mpg to 29.90 mpg.

The formula to determine the impact of incremental weight on fuel economy in mpg is as follows:

Each year is calculated separately and then summed together:

$$\text{For year } 1 = [(V*S)/(w/w+i)^{0.8} * fe*0.80 - V*S/(fe*0.80)] * p*d$$

Where: V = Vehicle miles traveled, S = Survival probability, w = Baseline vehicle weight (in this case the No FMVSS weight), i = Incremental weight from safety standards, fe = Baseline fuel economy (in this case the No FMVSS mpg), 0.80 = Factor to derive on-road fuel economy from EPA test data on fuel economy, p = Fuel price, d = Mid-year discount factor (3% or 7%).

The EPA mpg data in Table 10 and Table 11 are EPA test data, which in the formula above are multiplied by 0.8 to make them closer to “on-road” data (closer to the mileage you could get on the road – driving up and down hills, etc., rather than in the test lab).

NHTSA has historically combined estimates, by multiplying them together, of the lifetime vehicle miles traveled (VMT) and vehicle survivability to determine a “weighted VMT” by the age of the vehicle. The VMT data are based on survey data and survivability data are based on the Polk NVPP registration files, which provide us with a distribution of vehicles by MY that are on-the-road for specific CYs. Weighted VMT has changed over time in NHTSA analyses as vehicles are lasting longer and being driven more miles. For example, a MY 1968 passenger car would be expected to last up to 20 years and be driven 106,953 miles, while a MY 2019 passenger car would be expected to last up to 30 years and be driven 179,398 miles. LTVs last longer and are driven further than passenger cars. A MY 1968 LTV would be expected to last up to 25 years and be driven 128,195 miles, while an average MY 2019 LTV would be expected to last up to 37 years and be driven 193,237 miles. Basically, in the last 50 years, vehicles are lasting 50 percent longer and being driven at least 50 percent further.

The safety countermeasures used to meet the FMVSS add weight to vehicles, and this weight has a negative impact on fuel economy. Simons (in press) estimated this added weight for every FMVSS applicable to passenger cars and LTVs. The percentage of the new vehicle fleet installed with the safety countermeasure was estimated for every MY and these increased average weight estimates are summed on a MY basis (see Table 4 and Table 5). The average FMVSS weight, average vehicle weight, and baseline mpg of that MY (see Table 10 and Table 11) are used in a formula to determine the decrease in mpg for that MY. As can be seen by comparing the last two columns of Table 10 and Table 11, the impact on average mpg of the weight of the FMVSS increases from 0.10 mpg in MY 1968 to 1.71 mpg in MY 2019 for passenger cars and from 0.04 mpg in MY 1968 to 0.82 mpg in 2019 for LTVs.⁶ The absolute difference in mpg with and without the safety standards is two times higher for passenger cars than LTVs for two reasons. First, the safety standards added more weight to passenger cars (239 lb) than to LTVs (207 lb). The main difference was that the sides of passenger cars needed much more structure than the sides of light trucks to meet the side impact standards. Second, the baseline weight for passenger cars (3,326 lb) is much lower than the baseline weight for LTVs (4,421 lb). Thus, the relative impact of increased weight for passenger cars ($239/3,326 = 0.072$) is much higher than for LTVs ($207/4,421 = 0.047$).

There are different schedules of weighted VMT for passenger cars and LTVs. We have taken specific weighted VMT schedules and assigned them to particular MY groups of vehicles to estimate the impact of costs by CY. Table 12 to Table 15 show the weighted VMT schedules for MY vehicles sold from 1968 to 1995, 1996 to 2005, 2006 to 2011, and 2012 to 2019. These annual mileages equal the proportion of the original fleet that is still on the road multiplied by the average mileage for those vehicles. For example, if 50 percent of the original vehicles are still on

⁶ Taking 2019 passenger cars as an example: The baseline weight is 3,565 lb and the baseline fuel economy is 29.90 mpg. If you take away the incremental weight from the FMVSS of 238.9 lb, you have a weight of 3,326.1 lb Using the formula $29.9 / (3,326.1 / 3,565)^{0.8} = 31.61$ mpg. So, with the FMVSS the average passenger car achieved 29.9 mpg and without the FMVSS added weight the average passenger car would have achieved 31.61 mpg.

the road 12 years later, and if these remaining vehicles averaged 6,000 miles during that year, the table would show 3,000 weighted VMT.

Note that this analysis excludes any costs or benefits attributable to improvements stemming from NHTSA’s Corporate Average Fuel Economy (CAFE) program, which sets fuel economy targets for passenger cars and light trucks.

Appendix B shows the various VMT schedules used in this analysis with miles traveled and scrappage rates. This is backup data to Table 12 to Table 15.

Table 10. Weight and average fuel economy data for passenger cars

| Model Year | Estimated No-FMVSS Baseline Weight (lb) | Added Weight Due to FMVSS (lb) | Total EPA Test Weight (lb) | Estimated No-FMVSS Baseline (mpg) | EPA mpg With FMVSS (mpg) |
|-------------------|--|---------------------------------------|-----------------------------------|--|---------------------------------|
| 1968 | 3,715 | 33.6 | 3,749 | 14.00 | 13.90 |
| 1969 | 3,781 | 47.7 | 3,829 | 13.74 | 13.60 |
| 1970 | 3,697 | 55.5 | 3,753 | 13.66 | 13.50 |
| 1971 | 3,593 | 58.7 | 3,652 | 13.78 | 13.60 |
| 1972 | 3,719 | 67.2 | 3,786 | 13.69 | 13.50 |
| 1973 | 3,820 | 80.8 | 3,901 | 13.63 | 13.40 |
| 1974 | 3,754 | 87.1 | 3,841 | 13.85 | 13.60 |
| 1975 | 3,971 | 86.7 | 4,057 | 13.74 | 13.50 |
| 1976 | 3,972 | 87.3 | 4,059 | 15.12 | 14.86 |
| 1977 | 3,861 | 82.9 | 3,944 | 15.85 | 15.59 |
| 1978 | 3,507 | 81.3 | 3,588 | 17.25 | 16.94 |
| 1979 | 3,406 | 78.9 | 3,485 | 17.56 | 17.24 |
| 1980 | 3,022 | 79.3 | 3,101 | 20.43 | 20.01 |
| 1981 | 2,997 | 78.6 | 3,076 | 21.86 | 21.42 |
| 1982 | 2,976 | 77.5 | 3,053 | 22.67 | 22.21 |
| 1983 | 3,035 | 77.1 | 3,112 | 22.53 | 22.08 |
| 1984 | 3,024 | 77.0 | 3,101 | 22.88 | 22.42 |
| 1985 | 3,019 | 76.5 | 3,096 | 23.45 | 22.99 |
| 1986 | 2,964 | 79.2 | 3,043 | 24.20 | 23.69 |
| 1987 | 2,952 | 82.7 | 3,035 | 24.29 | 23.76 |

| Model Year | Estimated No-FMVSS Baseline Weight (lb) | Added Weight Due to FMVSS (lb) | Total EPA Test Weight (lb) | Estimated No-FMVSS Baseline (mpg) | EPA mpg With FMVSS (mpg) |
|-------------------|--|---------------------------------------|-----------------------------------|--|---------------------------------|
| 1988 | 2,965 | 85.6 | 3,051 | 24.64 | 24.09 |
| 1989 | 3,015 | 88.4 | 3,104 | 24.20 | 23.65 |
| 1990 | 3,077 | 101.0 | 3,178 | 23.90 | 23.29 |
| 1991 | 3,065 | 103.3 | 3,168 | 23.88 | 23.26 |
| 1992 | 3,146 | 107.5 | 3,254 | 23.50 | 22.88 |
| 1993 | 3,126 | 114.7 | 3,241 | 23.67 | 23.00 |
| 1994 | 3,138 | 130.5 | 3,268 | 23.78 | 23.02 |
| 1995 | 3,134 | 139.7 | 3,274 | 24.10 | 23.27 |
| 1996 | 3,146 | 150.7 | 3,297 | 24.00 | 23.12 |
| 1997 | 3,126 | 159.0 | 3,285 | 24.10 | 23.17 |
| 1998 | 3,174 | 159.7 | 3,334 | 23.94 | 23.02 |
| 1999 | 3,230 | 160.0 | 3,390 | 23.60 | 22.70 |
| 2000 | 3,241 | 160.0 | 3,401 | 23.40 | 22.51 |
| 2001 | 3,251 | 160.3 | 3,411 | 23.52 | 22.63 |
| 2002 | 3,256 | 159.7 | 3,415 | 23.67 | 22.78 |
| 2003 | 3,278 | 159.3 | 3,437 | 23.90 | 23.01 |
| 2004 | 3,324 | 167.9 | 3,492 | 23.78 | 22.86 |
| 2005 | 3,329 | 168.9 | 3,498 | 24.08 | 23.15 |
| 2006 | 3,392 | 171.2 | 3,563 | 23.95 | 23.02 |
| 2007 | 3,376 | 175.0 | 3,551 | 24.68 | 23.70 |
| 2008 | 3,386 | 183.0 | 3,569 | 24.91 | 23.88 |
| 2009 | 3,311 | 191.0 | 3,502 | 26.12 | 24.97 |
| 2010 | 3,337 | 199.6 | 3,536 | 26.93 | 25.70 |
| 2011 | 3,415 | 201.4 | 3,617 | 26.58 | 25.39 |
| 2012 | 3,313 | 206.3 | 3,519 | 28.20 | 26.87 |
| 2013 | 3,319 | 223.9 | 3,543 | 29.13 | 27.65 |
| 2014 | 3,328 | 231.3 | 3,559 | 29.15 | 27.63 |
| 2015 | 3,321 | 234.9 | 3,556 | 29.83 | 28.24 |
| 2016 | 3,296 | 237.7 | 3,533 | 30.16 | 28.53 |

| Model Year | Estimated No-FMVSS Baseline Weight (lb) | Added Weight Due to FMVSS (lb) | Total EPA Test Weight (lb) | Estimated No-FMVSS Baseline (mpg) | EPA mpg With FMVSS (mpg) |
|-------------------|--|---------------------------------------|-----------------------------------|--|---------------------------------|
| 2017 | 3,318 | 238.0 | 3,556 | 30.85 | 29.19 |
| 2018 | 3,344 | 239.1 | 3,583 | 31.58 | 29.88 |
| 2019 | 3,326 | 238.9 | 3,565 | 31.61 | 29.90 |

Table 11. Weight and average fuel economy data for LTVs

| Model Year | Estimated No-FMVSS Baseline Weight (lb) | Added Weight Due to FMVSS (lb) | Total EPA Test Weight (lb) | Estimated No-FMVSS Baseline (mpg) | EPA mpg With FMVSS (mpg) |
|-------------------|--|---------------------------------------|-----------------------------------|--|---------------------------------|
| 1968 | 3,911 | 18.6 | 3,930 | 9.94 | 9.90 |
| 1969 | 3,946 | 18.6 | 3,965 | 9.84 | 9.80 |
| 1970 | 3,958 | 19.4 | 3,977 | 10.04 | 10.00 |
| 1971 | 3,963 | 19.6 | 3,983 | 10.24 | 10.20 |
| 1972 | 4,062 | 26.4 | 4,088 | 10.35 | 10.30 |
| 1973 | 4,097 | 29.5 | 4,126 | 10.56 | 10.50 |
| 1974 | 4,093 | 30.6 | 4,124 | 11.07 | 11.00 |
| 1975 | 4,040 | 32.5 | 4,073 | 11.71 | 11.63 |
| 1976 | 4,122 | 33.7 | 4,155 | 12.33 | 12.25 |
| 1977 | 4,102 | 33.6 | 4,136 | 13.37 | 13.28 |
| 1978 | 4,118 | 33.7 | 4,152 | 13.03 | 12.95 |
| 1979 | 4,224 | 33.0 | 4,257 | 12.60 | 12.52 |
| 1980 | 3,835 | 33.7 | 3,869 | 15.89 | 15.78 |
| 1981 | 3,772 | 33.5 | 3,806 | 17.21 | 17.09 |
| 1982 | 3,778 | 35.9 | 3,813 | 17.54 | 17.41 |
| 1983 | 3,735 | 37.3 | 3,773 | 17.87 | 17.73 |
| 1984 | 3,749 | 37.8 | 3,787 | 17.54 | 17.40 |
| 1985 | 3,765 | 38.5 | 3,803 | 17.61 | 17.47 |
| 1986 | 3,702 | 38.9 | 3,741 | 18.34 | 18.18 |
| 1987 | 3,671 | 46.7 | 3,718 | 18.47 | 18.28 |
| 1988 | 3,799 | 50.9 | 3,850 | 18.04 | 17.85 |
| 1989 | 3,872 | 59.5 | 3,932 | 17.77 | 17.55 |
| 1990 | 3,947 | 67.1 | 4,014 | 17.61 | 17.38 |
| 1991 | 3,894 | 67.2 | 3,961 | 18.01 | 17.76 |
| 1992 | 4,010 | 67.6 | 4,078 | 17.58 | 17.35 |
| 1993 | 4,027 | 71.1 | 4,098 | 17.76 | 17.51 |
| 1994 | 4,056 | 92.6 | 4,149 | 17.48 | 17.17 |

| Model Year | Estimated No-FMVSS Baseline Weight (lb) | Added Weight Due to FMVSS (lb) | Total EPA Test Weight (lb) | Estimated No-FMVSS Baseline (mpg) | EPA mpg With FMVSS (mpg) |
|-------------------|--|---------------------------------------|-----------------------------------|--|---------------------------------|
| 1995 | 4,095 | 105.7 | 4,201 | 17.30 | 16.95 |
| 1996 | 4,135 | 119.4 | 4,255 | 17.54 | 17.15 |
| 1997 | 4,273 | 121.4 | 4,394 | 17.22 | 16.84 |
| 1998 | 4,194 | 123.3 | 4,317 | 17.47 | 17.07 |
| 1999 | 4,335 | 122.2 | 4,457 | 17.00 | 16.62 |
| 2000 | 4,300 | 120.6 | 4,421 | 17.22 | 16.84 |
| 2001 | 4,422 | 120.5 | 4,543 | 16.87 | 16.51 |
| 2002 | 4,491 | 121.1 | 4,612 | 16.83 | 16.48 |
| 2003 | 4,530 | 124.1 | 4,655 | 17.05 | 16.68 |
| 2004 | 4,646 | 136.8 | 4,783 | 16.90 | 16.51 |
| 2005 | 4,624 | 138.6 | 4,763 | 17.30 | 16.90 |
| 2006 | 4,618 | 140.6 | 4,758 | 17.59 | 17.17 |
| 2007 | 4,725 | 146.5 | 4,871 | 17.78 | 17.35 |
| 2008 | 4,683 | 154.2 | 4,837 | 18.27 | 17.81 |
| 2009 | 4,593 | 160.1 | 4,753 | 19.04 | 18.53 |
| 2010 | 4,615 | 169.5 | 4,784 | 19.31 | 18.77 |
| 2011 | 4,654 | 170.7 | 4,824 | 19.65 | 19.09 |
| 2012 | 4,637 | 172.3 | 4,809 | 19.85 | 19.28 |
| 2013 | 4,647 | 176.8 | 4,824 | 20.35 | 19.75 |
| 2014 | 4,606 | 183.8 | 4,790 | 20.98 | 20.33 |
| 2015 | 4,490 | 190.9 | 4,680 | 21.76 | 21.05 |
| 2016 | 4,459 | 196.2 | 4,655 | 21.94 | 21.20 |
| 2017 | 4,484 | 205.2 | 4,689 | 22.13 | 21.35 |
| 2018 | 4,440 | 207.3 | 4,647 | 22.69 | 21.88 |
| 2019 | 4,421 | 207.2 | 4,628 | 22.79 | 21.97 |

Table 12. VMT schedules applied to MYs 1968 to 1995

| Age Years | Passenger Cars | | | LTVs | | |
|--------------|--------------------|--------------------------|---------------------|--------------------|--------------------------|---------------------|
| | Vehicle Mileage | Vehicle Survivability | Weighted Mileage | Vehicle Mileage | Vehicle Survivability | Weighted Mileage |
| 1 | 14,535 | 1.000 | 14,535 | 14,200 | 1.000 | 14,200 |
| 2 | 13,924 | 0.993 | 13,827 | 14,800 | 0.999 | 14,785 |
| 3 | 12,846 | 0.982 | 12,615 | 13,900 | 0.988 | 13,735 |
| 4 | 11,378 | 0.964 | 10,968 | 12,200 | 0.966 | 11,785 |
| 5 | 10,749 | 0.935 | 10,050 | 11,100 | 0.946 | 10,500 |
| 6 | 10,119 | 0.892 | 9,026 | 9,900 | 0.925 | 9,155 |
| 7 | 9,490 | 0.831 | 7,886 | 9,300 | 0.897 | 8,340 |
| 8 | 8,860 | 0.753 | 6,672 | 8,800 | 0.862 | 7,585 |
| 9 | 8,231 | 0.662 | 5,449 | 8,000 | 0.825 | 6,600 |
| 10 | 7,601 | 0.568 | 4,317 | 7,600 | 0.771 | 5,860 |
| 11 | 6,972 | 0.476 | 3,319 | 7,300 | 0.710 | 5,185 |
| 12 | 6,343 | 0.394 | 2,499 | 6,900 | 0.645 | 4,450 |
| 13 | 5,713 | 0.323 | 1,845 | 6,000 | 0.573 | 3,440 |
| 14 | 5,084 | 0.263 | 1,337 | 6,000 | 0.502 | 3,010 |
| 15 | 4,454 | 0.213 | 949 | 5,300 | 0.441 | 2,335 |
| 16 | 3,825 | 0.172 | 658 | 5,000 | 0.380 | 1,900 |
| 17 | 3,195 | 0.139 | 444 | 5,700 | 0.320 | 1,825 |
| 18 | 2,566 | 0.112 | 287 | 5,100 | 0.260 | 1,325 |
| 19 | 1,937 | 0.090 | 174 | 4,600 | 0.200 | 920 |
| 20 | 1,307 | 0.073 | 95 | 4,200 | 0.140 | 590 |
| 21 | | | | 4,000 | 0.080 | 320 |
| 22 | | | | 3,700 | 0.050 | 185 |
| 23 | | | | 3,200 | 0.030 | 95 |
| 24 | | | | 2,500 | 0.020 | 50 |
| 25 | | | | 2,000 | 0.010 | 20 |
| Total | | | 106,952 | | | 128,195 |

Table 13. VMT schedules applied to MYs 1996 to 2005

| Age Years | Passenger Cars | | | LTVs | | |
|--------------|--------------------|--------------------------|---------------------|--------------------|--------------------------|---------------------|
| | Vehicle Mileage | Vehicle Survivability | Weighted Mileage | Vehicle Mileage | Vehicle Survivability | Weighted Mileage |
| 1 | 13,533 | 0.995 | 13,459 | 12,885 | 0.998 | 12,853 |
| 2 | 12,989 | 0.988 | 12,839 | 12,469 | 0.995 | 12,401 |
| 3 | 12,466 | 0.978 | 12,191 | 12,067 | 0.989 | 11,937 |
| 4 | 11,964 | 0.962 | 11,505 | 11,678 | 0.980 | 11,450 |
| 5 | 11,482 | 0.938 | 10,776 | 11,302 | 0.967 | 10,932 |
| 6 | 11,020 | 0.908 | 10,005 | 10,938 | 0.949 | 10,376 |
| 7 | 10,577 | 0.870 | 9,200 | 10,585 | 0.924 | 9,782 |
| 8 | 10,151 | 0.825 | 8,376 | 10,244 | 0.894 | 9,154 |
| 9 | 9,742 | 0.775 | 7,549 | 9,914 | 0.857 | 8,498 |
| 10 | 9,350 | 0.721 | 6,737 | 9,594 | 0.816 | 7,825 |
| 11 | 8,974 | 0.644 | 5,779 | 9,285 | 0.795 | 7,378 |
| 12 | 8,613 | 0.541 | 4,662 | 8,985 | 0.734 | 6,593 |
| 13 | 8,266 | 0.445 | 3,675 | 8,696 | 0.669 | 5,820 |
| 14 | 7,933 | 0.358 | 2,843 | 8,415 | 0.604 | 5,079 |
| 15 | 7,614 | 0.285 | 2,167 | 8,144 | 0.539 | 4,387 |
| 16 | 7,308 | 0.223 | 1,632 | 7,882 | 0.476 | 3,755 |
| 17 | 7,014 | 0.174 | 1,218 | 7,628 | 0.418 | 3,187 |
| 18 | 6,731 | 0.134 | 902 | 7,382 | 0.364 | 2,686 |
| 19 | 6,460 | 0.103 | 665 | 7,144 | 0.315 | 2,250 |
| 20 | 6,200 | 0.079 | 488 | 6,913 | 0.271 | 1,875 |
| 21 | | | | 6,691 | 0.232 | 1,555 |
| 22 | | | | 6,475 | 0.198 | 1,285 |
| 23 | | | | 6,266 | 0.169 | 1,058 |
| 24 | | | | 6,064 | 0.143 | 869 |
| 25 | | | | 5,869 | 0.121 | 712 |
| Total | | | 126,668 | | | 153,697 |

Table 14. VMT schedules applied to MYs 2006 to 2011

| Age Years | Passenger Cars | | | LTVs | | |
|--------------|--------------------|--------------------------|---------------------|--------------------|--------------------------|---------------------|
| | Vehicle Mileage | Vehicle Survivability | Weighted Mileage | Vehicle Mileage | Vehicle Survivability | Weighted Mileage |
| 1 | 14,231 | 0.990 | 14,089 | 16,085 | 0.974 | 15,668 |
| 2 | 13,961 | 0.983 | 13,725 | 15,782 | 0.960 | 15,155 |
| 3 | 13,669 | 0.973 | 13,300 | 15,442 | 0.942 | 14,547 |
| 4 | 13,357 | 0.959 | 12,813 | 15,069 | 0.919 | 13,849 |
| 5 | 13,028 | 0.941 | 12,262 | 14,667 | 0.891 | 13,072 |
| 6 | 12,683 | 0.919 | 11,652 | 14,239 | 0.859 | 12,230 |
| 7 | 12,325 | 0.892 | 10,991 | 13,790 | 0.823 | 11,343 |
| 8 | 11,956 | 0.860 | 10,287 | 13,323 | 0.783 | 10,428 |
| 9 | 11,578 | 0.825 | 9,554 | 12,844 | 0.740 | 9,506 |
| 10 | 11,193 | 0.787 | 8,804 | 12,356 | 0.696 | 8,595 |
| 11 | 10,804 | 0.717 | 7,746 | 11,863 | 0.650 | 7,712 |
| 12 | 10,413 | 0.613 | 6,378 | 11,369 | 0.604 | 6,867 |
| 13 | 10,022 | 0.509 | 5,105 | 10,879 | 0.552 | 6,002 |
| 14 | 9,633 | 0.414 | 3,990 | 10,396 | 0.501 | 5,207 |
| 15 | 9,249 | 0.331 | 3,060 | 9,924 | 0.452 | 4,488 |
| 16 | 8,871 | 0.260 | 2,310 | 9,468 | 0.406 | 3,846 |
| 17 | 8,502 | 0.203 | 1,724 | 9,032 | 0.363 | 3,281 |
| 18 | 8,144 | 0.157 | 1,275 | 8,619 | 0.324 | 2,790 |
| 19 | 7,799 | 0.120 | 936 | 8,234 | 0.287 | 2,366 |
| 20 | 7,469 | 0.092 | 684 | 7,881 | 0.254 | 2,004 |
| 21 | 7,157 | 0.070 | 498 | 7,565 | 0.224 | 1,697 |
| 22 | 6,866 | 0.053 | 362 | 7,288 | 0.198 | 1,440 |
| 23 | 6,596 | 0.040 | 263 | 7,055 | 0.174 | 1,224 |
| 24 | 6,350 | 0.030 | 191 | 6,871 | 0.152 | 1,046 |
| 25 | 6,131 | 0.023 | 139 | 6,739 | 0.133 | 898 |
| 26 | | | | 6,663 | 0.117 | 776 |
| 27 | | | | 6,648 | 0.102 | 676 |
| 28 | | | | 6,648 | 0.089 | 590 |

| Age Years | Passenger Cars | | | LTVs | | |
|-----------|-----------------|-----------------------|------------------|-----------------|-----------------------|------------------|
| | Vehicle Mileage | Vehicle Survivability | Weighted Mileage | Vehicle Mileage | Vehicle Survivability | Weighted Mileage |
| 29 | | | | 6,648 | 0.077 | 514 |
| 30 | | | | 6,648 | 0.067 | 448 |
| 31 | | | | 6,648 | 0.059 | 389 |
| 32 | | | | 6,648 | 0.051 | 339 |
| 33 | | | | 6,648 | 0.044 | 295 |
| 34 | | | | 6,648 | 0.039 | 256 |
| 35 | | | | 6,648 | 0.034 | 222 |
| 36 | | | | 6,648 | 0.029 | 193 |
| Total | | | 152,138 | | | 179,959 |

Table 15. VMT schedules applied to MYs 2012 to 2019

| Age Years | Passenger Cars | | | LTVs | | |
|-----------|-----------------|-----------------------|------------------|-----------------|-----------------------|------------------|
| | Vehicle Mileage | Vehicle Survivability | Weighted Mileage | Vehicle Mileage | Vehicle Survivability | Weighted Mileage |
| 1 | 14,700 | 1.000 | 14,700 | 15,974 | 1.000 | 15,974 |
| 2 | 14,252 | 0.988 | 14,079 | 15,404 | 0.978 | 15,059 |
| 3 | 14,025 | 0.977 | 13,697 | 14,841 | 0.963 | 14,292 |
| 4 | 13,593 | 0.961 | 13,069 | 14,435 | 0.943 | 13,609 |
| 5 | 13,324 | 0.945 | 12,592 | 14,038 | 0.931 | 13,070 |
| 6 | 13,064 | 0.930 | 12,147 | 13,650 | 0.915 | 12,492 |
| 7 | 12,809 | 0.911 | 11,673 | 12,590 | 0.893 | 11,246 |
| 8 | 11,378 | 0.891 | 10,140 | 12,192 | 0.870 | 10,607 |
| 9 | 11,087 | 0.869 | 9,633 | 11,810 | 0.841 | 9,933 |
| 10 | 10,806 | 0.840 | 9,074 | 11,443 | 0.796 | 9,112 |
| 11 | 10,535 | 0.800 | 8,427 | 11,091 | 0.742 | 8,233 |
| 12 | 10,273 | 0.756 | 7,763 | 10,755 | 0.692 | 7,438 |
| 13 | 10,021 | 0.706 | 7,070 | 10,434 | 0.641 | 6,688 |
| 14 | 9,779 | 0.653 | 6,382 | 10,129 | 0.583 | 5,909 |
| 15 | 9,547 | 0.595 | 5,677 | 9,839 | 0.535 | 5,264 |

| Age Years | Passenger Cars | | | LTVs | | |
|-----------|-----------------|-----------------------|------------------|-----------------|-----------------------|------------------|
| | Vehicle Mileage | Vehicle Survivability | Weighted Mileage | Vehicle Mileage | Vehicle Survivability | Weighted Mileage |
| 16 | 9,324 | 0.531 | 4,952 | 9,564 | 0.486 | 4,649 |
| 17 | 9,111 | 0.458 | 4,177 | 9,350 | 0.442 | 4,135 |
| 18 | 8,908 | 0.383 | 3,413 | 9,061 | 0.398 | 3,603 |
| 19 | 8,714 | 0.308 | 2,681 | 8,833 | 0.352 | 3,109 |
| 20 | 8,530 | 0.241 | 2,059 | 8,620 | 0.309 | 2,665 |
| 21 | 8,356 | 0.183 | 1,532 | 8,423 | 0.267 | 2,246 |
| 22 | 8,192 | 0.139 | 1,137 | 8,241 | 0.228 | 1,877 |
| 23 | 8,037 | 0.107 | 856 | 8,075 | 0.202 | 1,630 |
| 24 | 7,892 | 0.082 | 647 | 7,923 | 0.175 | 1,387 |
| 25 | 7,757 | 0.063 | 488 | 7,788 | 0.158 | 1,234 |
| 26 | 7,632 | 0.051 | 392 | 7,668 | 0.145 | 1,113 |
| 27 | 7,516 | 0.042 | 315 | 7,563 | 0.139 | 1,052 |
| 28 | 7,410 | 0.034 | 250 | 7,473 | 0.125 | 934 |
| 29 | 7,314 | 0.028 | 206 | 7,399 | 0.111 | 822 |
| 30 | 7,227 | 0.024 | 170 | 7,341 | 0.103 | 754 |
| 31 | | | | 7,298 | 0.093 | 681 |
| 32 | | | | 7,270 | 0.083 | 607 |
| 33 | | | | 7,258 | 0.073 | 530 |
| 34 | | | | 7,246 | 0.062 | 449 |
| 35 | | | | 7,233 | 0.050 | 363 |
| 36 | | | | 7,221 | 0.038 | 277 |
| 37 | | | | 7,209 | 0.027 | 197 |
| Total | | | 179,398 | | | 193,237 |

Gasoline Costs

The data for the cost of gasoline is on a CY basis and is assumed to apply to the applicable MY's VMT. Thus, for example, the MY 2000 first year VMT is assumed to occur in CY 2000 and is divided by the fuel economy level and multiplied by the price of gas in 2000. The second year VMT is divided by the fuel economy level and multiplied by the price of gas in 2001. The gasoline price data used in this study do not include Federal or State fuel taxes, because fuel taxes are a transfer payment. Fuel taxes, like all taxes, are not a net cost to society, because they do not involve an exchange of goods or services. The price of gasoline was changed to 2019 dollars by using the implicit gross domestic product price deflator. Table 16 shows the resulting price of gasoline used in this report in 2019 dollars.

Based on the weighted VMT, the fuel economy impacts are distributed over the lifetime of the vehicle and applied to specific CYs. So, for example, CY 2019 fuel costs consist of added fuel costs for the entire on-road vehicle fleet, which would include vehicles from all previous MYs still being driven in 2019. Applying MY sales to the lifetime distribution and the price of gasoline to specific CYs results in millions of dollars of fuel economy impacts in specific CYs. Table 17 and Table 18 show the incremental value of gasoline consumed in those CYs as a result of the weight of passenger cars and LTVs increasing to meet the FMVSS. One might expect the total incremental costs (shown in column 4 of Table 17 and Table 18) to increase from year to year as more FMVSS and weight is added to vehicles. However, the price of gasoline has a significant impact on the results.

Table 16. Average price of gasoline without tax (2019\$)

| | | | |
|-------------|--------|-------------|--------|
| 1968 | \$1.34 | 1994 | \$1.28 |
| 1969 | \$1.32 | 1995 | \$1.31 |
| 1970 | \$1.29 | 1996 | \$1.41 |
| 1971 | \$1.23 | 1997 | \$1.38 |
| 1972 | \$1.17 | 1998 | \$1.10 |
| 1973 | \$1.23 | 1999 | \$1.25 |
| 1974 | \$1.70 | 2000 | \$1.58 |
| 1975 | \$1.71 | 2001 | \$1.46 |
| 1976 | \$1.69 | 2002 | \$1.27 |
| 1977 | \$1.69 | 2003 | \$1.63 |
| 1978 | \$1.67 | 2004 | \$1.96 |
| 1979 | \$2.21 | 2005 | \$2.42 |
| 1980 | \$2.92 | 2006 | \$2.72 |
| 1981 | \$2.97 | 2007 | \$2.91 |
| 1982 | \$2.63 | 2008 | \$3.39 |

| | | | |
|-------------|--------|-------------|--------|
| 1983 | \$2.28 | 2009 | \$2.31 |
| 1984 | \$2.13 | 2010 | \$2.77 |
| 1985 | \$2.05 | 2011 | \$3.67 |
| 1986 | \$1.46 | 2012 | \$3.61 |
| 1987 | \$1.46 | 2013 | \$3.43 |
| 1988 | \$1.41 | 2014 | \$3.22 |
| 1989 | \$1.52 | 2015 | \$2.24 |
| 1990 | \$1.63 | 2016 | \$2.60 |
| 1991 | \$1.50 | 2017 | \$2.04 |
| 1992 | \$1.45 | 2018 | \$2.28 |
| 1993 | \$1.31 | 2019 | \$2.14 |
| | | 2020 | \$1.66 |

Table 17. Increase in fuel economy costs based on FMVSS weight increases – passenger cars (millions in 2019\$)

| Calendar Year | Voluntary | Attr. | Total |
|----------------------|------------------|--------------|--------------|
| 1968 | \$28 | \$10 | \$38 |
| 1969 | \$35 | \$17 | \$52 |
| 1970 | \$40 | \$28 | \$68 |
| 1971 | \$45 | \$35 | \$80 |
| 1972 | \$47 | \$44 | \$91 |
| 1973 | \$50 | \$65 | \$115 |
| 1974 | \$74 | \$111 | \$185 |
| 1975 | \$82 | \$123 | \$205 |
| 1976 | \$85 | \$131 | \$216 |
| 1977 | \$87 | \$138 | \$225 |
| 1978 | \$89 | \$141 | \$231 |
| 1979 | \$121 | \$188 | \$310 |
| 1980 | \$161 | \$251 | \$413 |
| 1981 | \$163 | \$254 | \$417 |
| 1982 | \$142 | \$222 | \$364 |

| Calendar Year | Voluntary | Attr. | Total |
|----------------------|------------------|--------------|--------------|
| 1983 | \$121 | \$189 | \$311 |
| 1984 | \$111 | \$173 | \$284 |
| 1985 | \$105 | \$162 | \$267 |
| 1986 | \$76 | \$111 | \$187 |
| 1987 | \$77 | \$108 | \$185 |
| 1988 | \$74 | \$104 | \$177 |
| 1989 | \$76 | \$115 | \$191 |
| 1990 | \$75 | \$135 | \$209 |
| 1991 | \$71 | \$127 | \$198 |
| 1992 | \$74 | \$123 | \$196 |
| 1993 | \$69 | \$115 | \$184 |
| 1994 | \$68 | \$122 | \$190 |
| 1995 | \$68 | \$135 | \$203 |
| 1996 | \$80 | \$149 | \$230 |
| 1997 | \$78 | \$158 | \$237 |
| 1998 | \$67 | \$131 | \$198 |
| 1999 | \$81 | \$153 | \$234 |
| 2000 | \$109 | \$202 | \$311 |
| 2001 | \$107 | \$191 | \$298 |
| 2002 | \$97 | \$171 | \$269 |
| 2003 | \$129 | \$225 | \$354 |
| 2004 | \$173 | \$269 | \$442 |
| 2005 | \$224 | \$342 | \$566 |
| 2006 | \$260 | \$396 | \$656 |
| 2007 | \$271 | \$455 | \$726 |
| 2008 | \$315 | \$559 | \$874 |
| 2009 | \$213 | \$401 | \$614 |
| 2010 | \$268 | \$489 | \$757 |

| Calendar Year | Voluntary | Attr. | Total |
|----------------------|------------------|--------------|--------------|
| 2011 | \$368 | \$664 | \$1,032 |
| 2012 | \$371 | \$674 | \$1,046 |
| 2013 | \$337 | \$687 | \$1,024 |
| 2014 | \$316 | \$675 | \$991 |
| 2015 | \$223 | \$488 | \$711 |
| 2016 | \$262 | \$584 | \$846 |
| 2017 | \$209 | \$467 | \$676 |
| 2018 | \$238 | \$532 | \$769 |
| 2019 | \$221 | \$496 | \$717 |

Table 18. Increase in fuel economy costs based on FMVSS weight increases – LTVs (millions in 2019\$)

| Calendar Year | Voluntary | Attr. | Total |
|----------------------|------------------|--------------|--------------|
| 1968 | \$22 | \$7 | \$29 |
| 1969 | \$27 | \$9 | \$36 |
| 1970 | \$31 | \$11 | \$42 |
| 1971 | \$33 | \$12 | \$45 |
| 1972 | \$28 | \$22 | \$50 |
| 1973 | \$32 | \$28 | \$61 |
| 1974 | \$51 | \$43 | \$94 |
| 1975 | \$53 | \$50 | \$102 |
| 1976 | \$54 | \$54 | \$108 |
| 1977 | \$56 | \$57 | \$113 |
| 1978 | \$57 | \$60 | \$117 |
| 1979 | \$78 | \$80 | \$158 |
| 1980 | \$101 | \$110 | \$211 |
| 1981 | \$102 | \$113 | \$215 |
| 1982 | \$85 | \$106 | \$191 |

| Calendar Year | Voluntary | Attr. | Total |
|----------------------|------------------|--------------|--------------|
| 1983 | \$76 | \$91 | \$167 |
| 1984 | \$72 | \$84 | \$156 |
| 1985 | \$70 | \$81 | \$151 |
| 1986 | \$50 | \$58 | \$108 |
| 1987 | \$61 | \$50 | \$111 |
| 1988 | \$65 | \$46 | \$111 |
| 1989 | \$81 | \$45 | \$126 |
| 1990 | \$96 | \$47 | \$144 |
| 1991 | \$88 | \$52 | \$140 |
| 1992 | \$79 | \$62 | \$141 |
| 1993 | \$73 | \$61 | \$134 |
| 1994 | \$60 | \$82 | \$142 |
| 1995 | \$64 | \$95 | \$159 |
| 1996 | \$76 | \$109 | \$184 |
| 1997 | \$77 | \$115 | \$191 |
| 1998 | \$62 | \$99 | \$161 |
| 1999 | \$75 | \$117 | \$192 |
| 2000 | \$101 | \$156 | \$257 |
| 2001 | \$98 | \$151 | \$249 |
| 2002 | \$91 | \$137 | \$227 |
| 2003 | \$126 | \$177 | \$303 |
| 2004 | \$173 | \$209 | \$382 |
| 2005 | \$225 | \$269 | \$494 |
| 2006 | \$265 | \$323 | \$588 |
| 2007 | \$275 | \$391 | \$666 |
| 2008 | \$327 | \$491 | \$818 |
| 2009 | \$226 | \$358 | \$584 |
| 2010 | \$295 | \$437 | \$732 |
| 2011 | \$406 | \$601 | \$1,007 |

| Calendar Year | Voluntary | Attr. | Total |
|----------------------|------------------|--------------|--------------|
| 2012 | \$407 | \$615 | \$1,023 |
| 2013 | \$389 | \$607 | \$996 |
| 2014 | \$362 | \$592 | \$954 |
| 2015 | \$249 | \$431 | \$680 |
| 2016 | \$289 | \$517 | \$806 |
| 2017 | \$223 | \$422 | \$646 |
| 2018 | \$255 | \$482 | \$737 |
| 2019 | \$239 | \$453 | \$692 |

Given that the weight increases resulting from the FMVSS increase over time, and vehicle survivability and total VMT have increased over time, one would expect that the incremental fuel costs would also increase over time. In general, this is true, however there are noticeable peaks and valleys in the fuel costs over time and those peaks and valleys are consistent between passenger cars and LTVs. For example, in Table 17 for passenger cars, lifetime fuel costs rise to \$417 million in 1981, then decrease to \$177 million in 1988, rise again to \$1,046 million in 2012, and then fall to \$717 million in 2019. In Table 18 for LTVs, lifetime fuel costs rise to \$215 million in 1981, then decrease to \$111 million in 1988, rise again to \$1,023 million in 2012, and then fall to \$692 million in 2019. The reason for these consistent peaks and valleys is the changing price of gasoline (in 2019 dollars). As seen in Table 16, the price of gasoline (less taxes) in 2019 dollars increases to \$2.97 in CY 1981, lowers to \$1.41 in 1988, then increases to \$3.61 in 2012, before falling to \$2.14 in 2019. Remember that the fuel cost of weight increases is calculated year by year over the vehicle’s lifetime and multiplied by the price of gasoline during the CY that the increased fuel is consumed. So, it is not just the price of gasoline during the first year of the vehicle’s lifetime that is important, but the price of gasoline throughout about the first 10 years of the vehicle’s lifetime. The reason we say the first 10 years is that VMT weighted by survivability decreases with age and future savings are discounted at a higher rate over time. So, the bigger influences over the fuel economy costs happen in the first 10 years of the vehicle’s lifetime. For example, 64 percent of the total fuel economy impact for MY 2019 passenger cars and 61 percent of the total fuel economy impact for LTVs occur in the first 10 years of the vehicle’s lifetime.

For example, in CY 2019, the owner of a MY 2019 passenger car purchased on January 1, 2019, would have paid an additional \$76.18 in fuel to carry the weight of the FMVSS (239 lb) around for that year.

14,700 miles (Table 15) driven in the first year of its life in 2019.

31.61 mpg (Table 10) without the FMVSS would have used 465 gallons.

29.90 mpg (Table 10) with the FMVSS would have used 491.6 gallons.

The difference of 35.6 gallons x \$2.14 per gallon (less taxes) (Table 16) = \$76.18

Similar calculations for LTVs (207 lb increase in weight for the FMVSS) are:

15,974 miles (Table 15) driven in the first year of its life in 2019.

22.79 mpg (Table 11) without the FMVSS would have used 700.9 gallons.

21.97 mpg (Table 11) with the FMVSS would have used 727.1 gallons.

The difference of 26.2 gallons x \$2.14 per gallon (less taxes) (Table 16) = \$56.07

Total Consumer Costs

Table 19 shows total consumer costs for technology changes and added fuel consumption by CY and vehicle type. Technology costs clearly dominate consumer cost impacts throughout the 52-year time span. Changes in passenger cars are responsible for the largest societal cost impact until just after the turn of the century, when consumer preferences shifted to larger and more expensive SUVs and pickup trucks. By 2019, higher prices for and added fuel consumption by LTVs was responsible for 70 percent of societal costs for improved safety. This also reflects the different pace of safety technology adoption between passenger cars and LTVs. Safety standards were often applied to passenger cars earlier than to LTVs, but this gradually changed over time as consumers purchased more LTVs and as specific safety issues arose with them. For example, LTVs were prone to rollover crashes, and manufacturers began voluntarily installing electronic stability control (ESC) in LTVs very quickly to address this problem.

Table 19. Total CY consumer costs and fuel costs for the FMVSS (millions in 2019\$)

| CY | Passenger Cars | | | LTVs | | | Total | | |
|------|------------------------|-------|---------|------------------------|-------|---------|------------------------|-------|---------|
| | Consumer Cost (2019\$) | | | Consumer Cost (2019\$) | | | Consumer Cost (2019\$) | | |
| | Tech | Fuel | Total | Tech | Fuel | Total | Tech | Fuel | Total |
| 1968 | \$3,843 | \$38 | \$3,881 | \$340 | \$29 | \$369 | \$4,183 | \$67 | \$4,251 |
| 1969 | \$4,079 | \$52 | \$4,132 | \$344 | \$36 | \$380 | \$4,424 | \$88 | \$4,512 |
| 1970 | \$4,098 | \$68 | \$4,166 | \$354 | \$42 | \$395 | \$4,452 | \$109 | \$4,562 |
| 1971 | \$4,820 | \$80 | \$4,900 | \$452 | \$45 | \$497 | \$5,271 | \$125 | \$5,397 |
| 1972 | \$5,551 | \$91 | \$5,643 | \$656 | \$50 | \$707 | \$6,208 | \$142 | \$6,349 |
| 1973 | \$5,778 | \$115 | \$5,893 | \$796 | \$61 | \$856 | \$6,573 | \$176 | \$6,749 |
| 1974 | \$4,904 | \$185 | \$5,089 | \$746 | \$94 | \$839 | \$5,650 | \$278 | \$5,928 |
| 1975 | \$5,229 | \$205 | \$5,434 | \$809 | \$102 | \$911 | \$6,038 | \$307 | \$6,345 |
| 1976 | \$6,283 | \$216 | \$6,499 | \$1,066 | \$108 | \$1,175 | \$7,349 | \$324 | \$7,674 |
| 1977 | \$6,594 | \$225 | \$6,819 | \$1,323 | \$113 | \$1,436 | \$7,917 | \$338 | \$8,256 |
| 1978 | \$6,443 | \$231 | \$6,674 | \$1,355 | \$117 | \$1,472 | \$7,799 | \$347 | \$8,146 |
| 1979 | \$5,762 | \$310 | \$6,071 | \$1,135 | \$158 | \$1,293 | \$6,897 | \$468 | \$7,364 |
| 1980 | \$5,025 | \$413 | \$5,437 | \$892 | \$211 | \$1,103 | \$5,917 | \$624 | \$6,541 |

| CY | Passenger Cars | | | LTVs | | | Total | | |
|------|------------------------|-------|----------|------------------------|-------|----------|------------------------|---------|----------|
| | Consumer Cost (2019\$) | | | Consumer Cost (2019\$) | | | Consumer Cost (2019\$) | | |
| | Tech | Fuel | Total | Tech | Fuel | Total | Tech | Fuel | Total |
| 1981 | \$4,728 | \$417 | \$5,144 | \$867 | \$215 | \$1,081 | \$5,594 | \$631 | \$6,226 |
| 1982 | \$4,694 | \$364 | \$5,058 | \$1,018 | \$191 | \$1,209 | \$5,711 | \$555 | \$6,267 |
| 1983 | \$5,344 | \$311 | \$5,655 | \$1,298 | \$167 | \$1,464 | \$6,642 | \$477 | \$7,119 |
| 1984 | \$5,874 | \$284 | \$6,158 | \$1,671 | \$156 | \$1,828 | \$7,546 | \$440 | \$7,986 |
| 1985 | \$6,364 | \$267 | \$6,631 | \$1,887 | \$151 | \$2,039 | \$8,251 | \$419 | \$8,670 |
| 1986 | \$6,900 | \$187 | \$7,087 | \$2,275 | \$108 | \$2,383 | \$9,174 | \$296 | \$9,470 |
| 1987 | \$6,907 | \$185 | \$7,091 | \$3,079 | \$111 | \$3,189 | \$9,985 | \$295 | \$10,281 |
| 1988 | \$7,074 | \$177 | \$7,251 | \$3,610 | \$111 | \$3,720 | \$10,684 | \$288 | \$10,972 |
| 1989 | \$7,451 | \$191 | \$7,642 | \$4,206 | \$126 | \$4,332 | \$11,657 | \$317 | \$11,974 |
| 1990 | \$8,311 | \$209 | \$8,520 | \$4,302 | \$144 | \$4,445 | \$12,613 | \$353 | \$12,965 |
| 1991 | \$8,330 | \$198 | \$8,528 | \$4,290 | \$140 | \$4,430 | \$12,621 | \$338 | \$12,958 |
| 1992 | \$9,553 | \$196 | \$9,749 | \$5,075 | \$141 | \$5,216 | \$14,628 | \$338 | \$14,965 |
| 1993 | \$11,281 | \$184 | \$11,465 | \$6,011 | \$134 | \$6,145 | \$17,291 | \$318 | \$17,610 |
| 1994 | \$13,168 | \$190 | \$13,358 | \$7,273 | \$142 | \$7,415 | \$20,442 | \$332 | \$20,773 |
| 1995 | \$13,391 | \$203 | \$13,594 | \$8,753 | \$159 | \$8,911 | \$22,144 | \$362 | \$22,505 |
| 1996 | \$13,400 | \$230 | \$13,629 | \$9,928 | \$184 | \$10,112 | \$23,327 | \$414 | \$23,741 |
| 1997 | \$13,179 | \$237 | \$13,416 | \$10,705 | \$191 | \$10,896 | \$23,884 | \$428 | \$24,312 |
| 1998 | \$13,449 | \$198 | \$13,647 | \$11,800 | \$161 | \$11,961 | \$25,249 | \$359 | \$25,608 |
| 1999 | \$14,214 | \$234 | \$14,448 | \$12,600 | \$192 | \$12,792 | \$26,814 | \$426 | \$27,240 |
| 2000 | \$14,120 | \$311 | \$14,431 | \$12,905 | \$257 | \$13,162 | \$27,025 | \$568 | \$27,593 |
| 2001 | \$13,500 | \$298 | \$13,797 | \$13,130 | \$249 | \$13,379 | \$26,630 | \$547 | \$27,177 |
| 2002 | \$12,751 | \$269 | \$13,020 | \$13,399 | \$227 | \$13,626 | \$26,150 | \$496 | \$26,646 |
| 2003 | \$12,291 | \$354 | \$12,645 | \$14,471 | \$303 | \$14,773 | \$26,761 | \$657 | \$27,419 |
| 2004 | \$12,837 | \$442 | \$13,280 | \$15,762 | \$382 | \$16,144 | \$28,600 | \$824 | \$29,424 |
| 2005 | \$13,394 | \$566 | \$13,959 | \$15,632 | \$494 | \$16,126 | \$29,026 | \$1,060 | \$30,086 |
| 2006 | \$14,488 | \$656 | \$15,144 | \$15,713 | \$588 | \$16,301 | \$30,201 | \$1,244 | \$31,445 |
| 2007 | \$15,866 | \$726 | \$16,593 | \$16,545 | \$666 | \$17,211 | \$32,411 | \$1,392 | \$33,803 |
| 2008 | \$15,639 | \$874 | \$16,513 | \$14,443 | \$818 | \$15,262 | \$30,082 | \$1,693 | \$31,775 |

| CY | Passenger Cars | | | LTVs | | | Total | | |
|------|------------------------|---------|----------|------------------------|---------|----------|------------------------|---------|----------|
| | Consumer Cost (2019\$) | | | Consumer Cost (2019\$) | | | Consumer Cost (2019\$) | | |
| | Tech | Fuel | Total | Tech | Fuel | Total | Tech | Fuel | Total |
| 2009 | \$12,621 | \$614 | \$13,234 | \$11,254 | \$584 | \$11,838 | \$23,875 | \$1,198 | \$25,072 |
| 2010 | \$14,368 | \$757 | \$15,125 | \$14,591 | \$732 | \$15,324 | \$28,959 | \$1,489 | \$30,449 |
| 2011 | \$15,434 | \$1,032 | \$16,466 | \$17,478 | \$1,007 | \$18,485 | \$32,912 | \$2,039 | \$34,952 |
| 2012 | \$17,894 | \$1,046 | \$18,940 | \$18,708 | \$1,023 | \$19,731 | \$36,602 | \$2,068 | \$38,670 |
| 2013 | \$19,171 | \$1,024 | \$20,195 | \$20,427 | \$996 | \$21,423 | \$39,598 | \$2,020 | \$41,618 |
| 2014 | \$19,166 | \$991 | \$20,157 | \$23,078 | \$954 | \$24,033 | \$42,244 | \$1,946 | \$44,190 |
| 2015 | \$18,471 | \$711 | \$19,182 | \$24,902 | \$680 | \$25,582 | \$43,373 | \$1,391 | \$44,764 |
| 2016 | \$15,876 | \$846 | \$16,722 | \$23,737 | \$806 | \$24,544 | \$39,614 | \$1,652 | \$41,266 |
| 2017 | \$14,494 | \$676 | \$15,169 | \$25,616 | \$646 | \$26,262 | \$40,110 | \$1,322 | \$41,432 |
| 2018 | \$12,200 | \$769 | \$12,970 | \$26,779 | \$737 | \$27,516 | \$38,979 | \$1,507 | \$40,486 |
| 2019 | \$10,577 | \$717 | \$11,294 | \$26,141 | \$692 | \$26,833 | \$36,719 | \$1,408 | \$38,127 |

Table 20 shows total costs (technology costs and fuel costs) by vehicle type broken out by attribution. As Figure 3 shows, there was a notable change in attribution for LTVs around 1990. The most expensive FMVSS linked safety feature is antilock brake systems (ABS). Rear-wheel ABS was voluntarily added to some LTVs starting in the late 1980s and 70 percent of LTVs had rear-wheel ABS by 1990. ABS costs were significant enough to affect the change seen in Figure 3. Then manufacturers started to introduce 4-wheel ABS, but still voluntarily supplied a higher percentage of LTVs than passenger cars with 4-wheel ABS. FMVSS 126 resulted in all passenger cars and LTVs having ESC for MY 2012, with 4-wheel ABS as an integral part of the attributable ESC system.

Table 20. Total CY consumer costs and fuel costs for the FMVSS (millions in 2019\$)

| CY | Passenger Car Costs | | | LTVs Cost | | | Total Cost | | |
|------|---------------------|---------|---------|-----------|---------|---------|------------|---------|---------|
| | Voluntary | Attr. | Total | Voluntary | Attr. | Total | Voluntary | Attr. | Total |
| 1968 | \$2,756 | \$1,125 | \$3,881 | \$252 | \$118 | \$369 | \$3,008 | \$1,242 | \$4,251 |
| 1969 | \$2,698 | \$1,433 | \$4,132 | \$257 | \$123 | \$380 | \$2,955 | \$1,556 | \$4,512 |
| 1970 | \$2,571 | \$1,595 | \$4,166 | \$257 | \$139 | \$395 | \$2,828 | \$1,733 | \$4,562 |
| 1971 | \$2,915 | \$1,984 | \$4,900 | \$303 | \$194 | \$497 | \$3,218 | \$2,179 | \$5,397 |
| 1972 | \$3,107 | \$2,536 | \$5,643 | \$373 | \$333 | \$707 | \$3,481 | \$2,869 | \$6,349 |
| 1973 | \$3,039 | \$2,854 | \$5,893 | \$449 | \$408 | \$856 | \$3,487 | \$3,262 | \$6,749 |
| 1974 | \$2,541 | \$2,547 | \$5,089 | \$436 | \$403 | \$839 | \$2,977 | \$2,951 | \$5,928 |
| 1975 | \$2,634 | \$2,800 | \$5,434 | \$457 | \$454 | \$911 | \$3,091 | \$3,254 | \$6,345 |
| 1976 | \$2,972 | \$3,527 | \$6,499 | \$561 | \$613 | \$1,175 | \$3,533 | \$4,140 | \$7,674 |
| 1977 | \$3,094 | \$3,725 | \$6,819 | \$641 | \$796 | \$1,436 | \$3,735 | \$4,521 | \$8,256 |
| 1978 | \$3,032 | \$3,642 | \$6,674 | \$653 | \$819 | \$1,472 | \$3,685 | \$4,461 | \$8,146 |
| 1979 | \$2,770 | \$3,301 | \$6,071 | \$573 | \$720 | \$1,293 | \$3,344 | \$4,021 | \$7,364 |
| 1980 | \$2,470 | \$2,967 | \$5,437 | \$484 | \$619 | \$1,103 | \$2,954 | \$3,586 | \$6,541 |
| 1981 | \$2,333 | \$2,812 | \$5,144 | \$467 | \$614 | \$1,081 | \$2,800 | \$3,426 | \$6,226 |
| 1982 | \$2,282 | \$2,776 | \$5,058 | \$501 | \$708 | \$1,209 | \$2,783 | \$3,484 | \$6,267 |
| 1983 | \$2,556 | \$3,099 | \$5,655 | \$615 | \$849 | \$1,464 | \$3,171 | \$3,948 | \$7,119 |
| 1984 | \$2,778 | \$3,380 | \$6,158 | \$772 | \$1,056 | \$1,828 | \$3,550 | \$4,436 | \$7,986 |
| 1985 | \$3,050 | \$3,581 | \$6,631 | \$864 | \$1,175 | \$2,039 | \$3,914 | \$4,756 | \$8,670 |
| 1986 | \$3,414 | \$3,673 | \$7,087 | \$1,188 | \$1,195 | \$2,383 | \$4,602 | \$4,868 | \$9,470 |

| CY | Passenger Car Costs | | | LTVs Cost | | | Total Cost | | |
|------|---------------------|---------|----------|-----------|---------|----------|------------|----------|----------|
| | Voluntary | Attr. | Total | Voluntary | Attr. | Total | Voluntary | Attr. | Total |
| 1987 | \$3,443 | \$3,648 | \$7,091 | \$1,997 | \$1,193 | \$3,189 | \$5,440 | \$4,841 | \$10,281 |
| 1988 | \$3,426 | \$3,825 | \$7,251 | \$2,550 | \$1,170 | \$3,720 | \$5,976 | \$4,995 | \$10,972 |
| 1989 | \$3,298 | \$4,344 | \$7,642 | \$3,197 | \$1,135 | \$4,332 | \$6,496 | \$5,478 | \$11,974 |
| 1990 | \$3,327 | \$5,193 | \$8,520 | \$3,352 | \$1,093 | \$4,445 | \$6,679 | \$6,286 | \$12,965 |
| 1991 | \$3,535 | \$4,993 | \$8,528 | \$3,243 | \$1,188 | \$4,430 | \$6,778 | \$6,181 | \$12,958 |
| 1992 | \$4,295 | \$5,454 | \$9,749 | \$3,586 | \$1,630 | \$5,216 | \$7,880 | \$7,085 | \$14,965 |
| 1993 | \$4,970 | \$6,495 | \$11,465 | \$4,031 | \$2,114 | \$6,145 | \$9,000 | \$8,609 | \$17,610 |
| 1994 | \$5,507 | \$7,851 | \$13,358 | \$4,344 | \$3,071 | \$7,415 | \$9,852 | \$10,922 | \$20,773 |
| 1995 | \$5,334 | \$8,260 | \$13,594 | \$4,680 | \$4,231 | \$8,911 | \$10,014 | \$12,491 | \$22,505 |
| 1996 | \$5,347 | \$8,282 | \$13,629 | \$5,072 | \$5,040 | \$10,112 | \$10,419 | \$13,322 | \$23,741 |
| 1997 | \$5,259 | \$8,157 | \$13,416 | \$5,340 | \$5,557 | \$10,896 | \$10,598 | \$13,714 | \$24,312 |
| 1998 | \$5,590 | \$8,057 | \$13,647 | \$5,772 | \$6,189 | \$11,961 | \$11,363 | \$14,246 | \$25,608 |
| 1999 | \$6,141 | \$8,307 | \$14,448 | \$6,225 | \$6,567 | \$12,792 | \$12,366 | \$14,874 | \$27,240 |
| 2000 | \$6,284 | \$8,147 | \$14,431 | \$6,494 | \$6,668 | \$13,162 | \$12,778 | \$14,815 | \$27,593 |
| 2001 | \$6,186 | \$7,611 | \$13,797 | \$6,729 | \$6,650 | \$13,379 | \$12,915 | \$14,261 | \$27,177 |
| 2002 | \$5,903 | \$7,117 | \$13,020 | \$7,011 | \$6,615 | \$13,626 | \$12,914 | \$13,732 | \$26,646 |
| 2003 | \$5,719 | \$6,926 | \$12,645 | \$7,651 | \$7,123 | \$14,773 | \$13,370 | \$14,049 | \$27,419 |
| 2004 | \$6,042 | \$7,238 | \$13,280 | \$8,155 | \$7,989 | \$16,144 | \$14,196 | \$15,227 | \$29,424 |
| 2005 | \$6,400 | \$7,559 | \$13,959 | \$8,181 | \$7,945 | \$16,126 | \$14,581 | \$15,504 | \$30,086 |
| 2006 | \$6,855 | \$8,289 | \$15,144 | \$8,188 | \$8,114 | \$16,301 | \$15,043 | \$16,402 | \$31,445 |
| 2007 | \$7,050 | \$9,543 | \$16,593 | \$8,219 | \$8,992 | \$17,211 | \$15,269 | \$18,534 | \$33,803 |

| CY | Passenger Car Costs | | | LTVs Cost | | | Total Cost | | |
|------|---------------------|----------|----------|-----------|----------|----------|------------|----------|----------|
| | Voluntary | Attr. | Total | Voluntary | Attr. | Total | Voluntary | Attr. | Total |
| 2008 | \$6,515 | \$9,998 | \$16,513 | \$6,918 | \$8,344 | \$15,262 | \$13,433 | \$18,342 | \$31,775 |
| 2009 | \$5,026 | \$8,208 | \$13,234 | \$5,213 | \$6,626 | \$11,838 | \$10,239 | \$14,834 | \$25,072 |
| 2010 | \$5,625 | \$9,500 | \$15,125 | \$6,721 | \$8,602 | \$15,324 | \$12,346 | \$18,103 | \$30,449 |
| 2011 | \$6,122 | \$10,344 | \$16,466 | \$8,037 | \$10,449 | \$18,485 | \$14,159 | \$20,793 | \$34,952 |
| 2012 | \$6,971 | \$11,969 | \$18,940 | \$8,471 | \$11,260 | \$19,731 | \$15,442 | \$23,229 | \$38,670 |
| 2013 | \$7,271 | \$12,924 | \$20,195 | \$9,046 | \$12,376 | \$21,423 | \$16,317 | \$25,301 | \$41,618 |
| 2014 | \$7,112 | \$13,045 | \$20,157 | \$9,943 | \$14,089 | \$24,033 | \$17,056 | \$27,134 | \$44,190 |
| 2015 | \$6,652 | \$12,530 | \$19,182 | \$10,405 | \$15,178 | \$25,582 | \$17,056 | \$27,708 | \$44,764 |
| 2016 | \$5,731 | \$10,991 | \$16,722 | \$9,888 | \$14,656 | \$24,544 | \$15,619 | \$25,646 | \$41,266 |
| 2017 | \$5,188 | \$9,981 | \$15,169 | \$10,494 | \$15,768 | \$26,262 | \$15,682 | \$25,749 | \$41,432 |
| 2018 | \$4,393 | \$8,577 | \$12,970 | \$10,914 | \$16,601 | \$27,516 | \$15,307 | \$25,178 | \$40,486 |
| 2019 | \$3,811 | \$7,483 | \$11,294 | \$10,619 | \$16,213 | \$26,833 | \$14,431 | \$23,696 | \$38,127 |

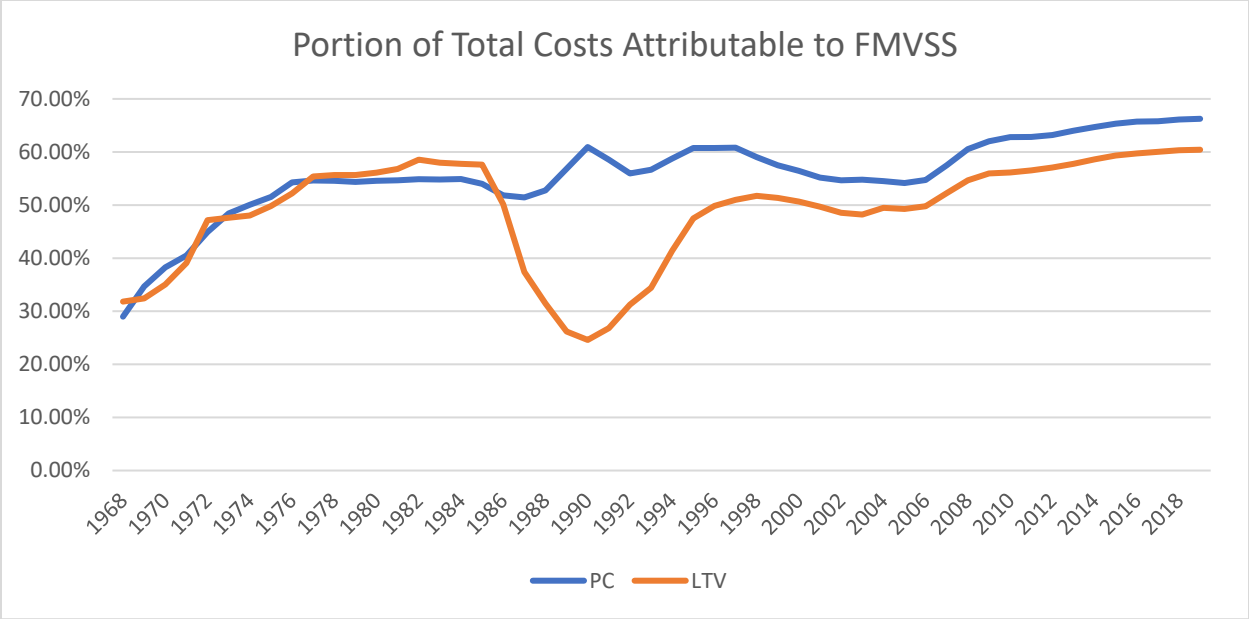


Figure 3. Portion of total costs attributable to FMVSS

Figure 4 shows the trend in total consumer costs over each CY. Total costs show trends similar to safety benefits with a notable break in the upward trend reflecting lower sales, which reduces technology purchase costs, and less driving, which reduces fuel penalties, due to the 2007 recession and its recovery.

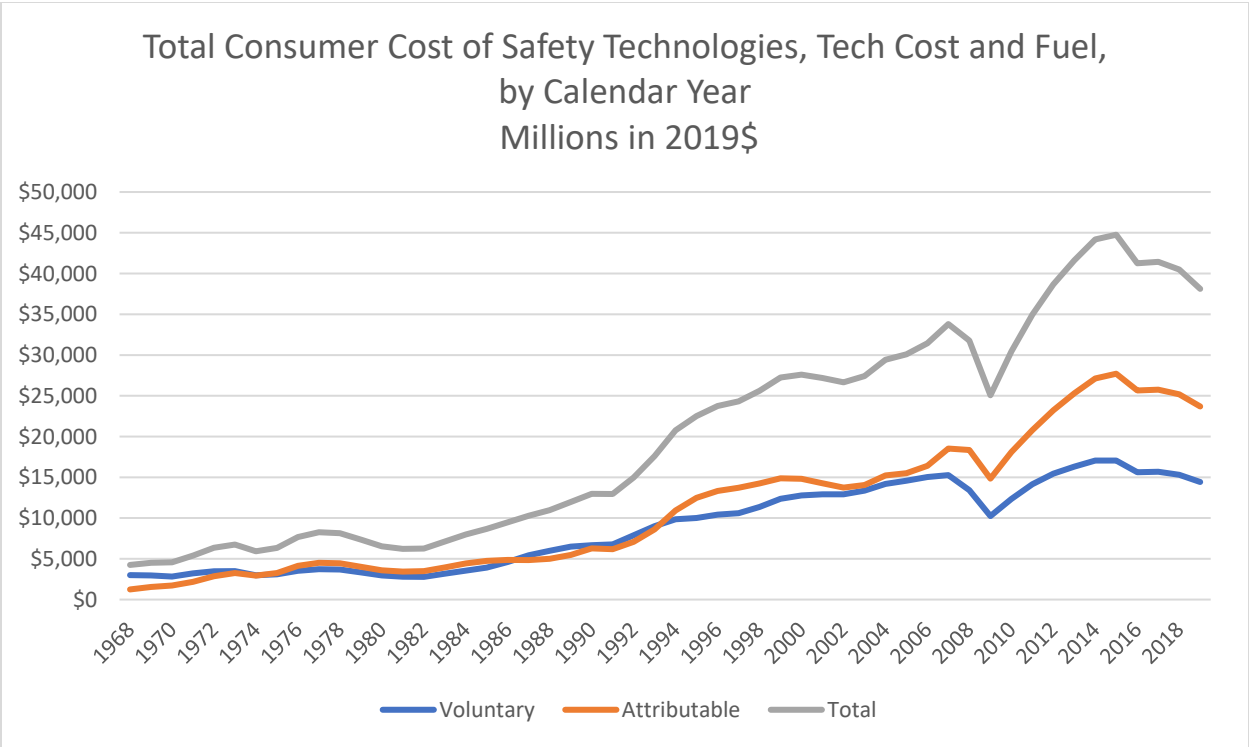


Figure 4. Total consumer cost of safety technologies, technology cost and fuel, by CY (millions in 2019\$)

Figure 5 shows the trend in consumer costs due to passenger cars compared to LTVs. Passenger cars dominated consumer cost impacts for decades until the early 2000s when consumers began to shift their sales preferences to light trucks. Light truck sales now dominate the U.S. light vehicle market and thus are responsible for the majority of costs associated with safety technologies.

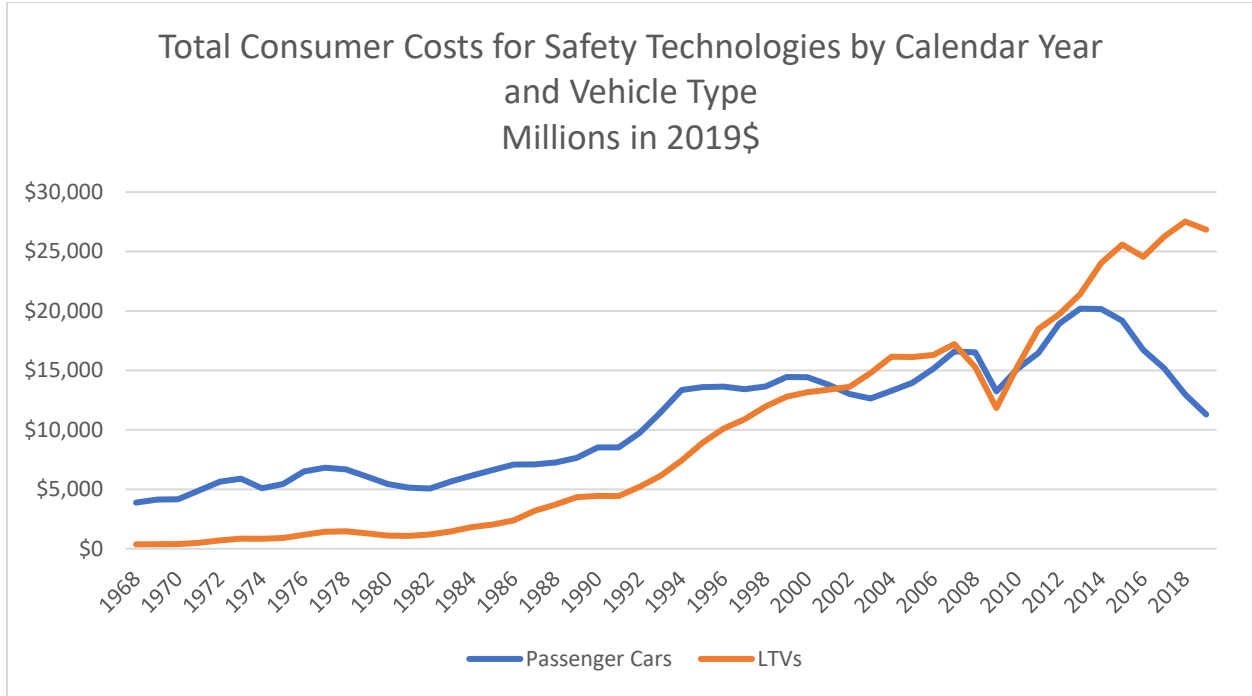


Figure 5. Total consumer costs for safety technologies by CY and vehicle type (millions in 2019\$)

Another breakout of costs and benefits we will examine in this analysis is between the crash avoidance (CA) standards (FMVSS 100 series) and the crashworthiness (CW) standards (FMVSS 200 and 300 series). Table 21 and Table 22 show the total consumer cost increases (including both retail price increases and fuel costs) on a CY basis for passenger cars and LTVs.

Table 21. Total CY costs (technology and fuel) for the FMVSS – passenger cars (millions in 2019\$)

| Calendar Year | Crash Avoidance | | | Crashworthiness | | |
|---------------|-----------------|-------|-------|-----------------|-------|-------|
| | Vol. | Attr. | Total | Vol. | Attr. | Total |
| 1968 | 911 | 10 | 916 | 1,856 | 1,144 | 2,966 |
| 1969 | 866 | 9 | 869 | 1,850 | 1,460 | 3,263 |
| 1970 | 847 | 9 | 846 | 1,753 | 1,625 | 3,320 |
| 1971 | 973 | 54 | 1,014 | 1,978 | 1,975 | 3,885 |
| 1972 | 1,027 | 154 | 1,164 | 2,124 | 2,429 | 4,479 |
| 1973 | 1,023 | 154 | 1,153 | 2,081 | 2,750 | 4,740 |

| Calendar Year | Crash Avoidance | | | Crashworthiness | | |
|---------------|-----------------|-------|-------|-----------------|-------|--------|
| | Vol. | Attr. | Total | Vol. | Attr. | Total |
| 1974 | 884 | 148 | 991 | 1,768 | 2,474 | 4,098 |
| 1975 | 929 | 207 | 1,089 | 1,828 | 2,675 | 4,345 |
| 1976 | 1,029 | 266 | 1,243 | 2,075 | 3,346 | 5,256 |
| 1977 | 1,008 | 257 | 1,216 | 2,224 | 3,556 | 5,603 |
| 1978 | 990 | 265 | 1,204 | 2,183 | 3,467 | 5,470 |
| 1979 | 926 | 247 | 1,105 | 2,033 | 3,175 | 4,966 |
| 1980 | 847 | 228 | 985 | 1,875 | 2,901 | 4,453 |
| 1981 | 803 | 218 | 931 | 1,783 | 2,757 | 4,214 |
| 1982 | 785 | 222 | 928 | 1,719 | 2,696 | 4,130 |
| 1983 | 861 | 263 | 1,055 | 1,884 | 2,958 | 4,600 |
| 1984 | 928 | 301 | 1,166 | 2,022 | 3,190 | 4,992 |
| 1985 | 1,078 | 372 | 1,390 | 2,134 | 3,314 | 5,241 |
| 1986 | 1,367 | 464 | 1,789 | 2,158 | 3,284 | 5,298 |
| 1987 | 1,452 | 428 | 1,837 | 2,099 | 3,298 | 5,255 |
| 1988 | 1,424 | 421 | 1,805 | 2,105 | 3,478 | 5,447 |
| 1989 | 1,474 | 391 | 1,820 | 1,939 | 4,029 | 5,823 |
| 1990 | 1,695 | 359 | 1,998 | 1,768 | 4,908 | 6,522 |
| 1991 | 2,042 | 328 | 2,315 | 1,619 | 4,737 | 6,213 |
| 1992 | 2,764 | 330 | 3,036 | 1,654 | 5,198 | 6,713 |
| 1993 | 3,364 | 340 | 3,648 | 1,720 | 6,225 | 7,817 |
| 1994 | 3,859 | 343 | 4,139 | 1,770 | 7,576 | 9,219 |
| 1995 | 3,668 | 329 | 3,930 | 1,801 | 7,999 | 9,664 |
| 1996 | 3,556 | 321 | 3,812 | 1,940 | 8,040 | 9,817 |
| 1997 | 3,422 | 311 | 3,667 | 1,995 | 7,924 | 9,749 |
| 1998 | 3,559 | 311 | 3,816 | 2,163 | 7,813 | 9,831 |
| 1999 | 3,824 | 326 | 4,089 | 2,470 | 8,062 | 10,359 |
| 2000 | 3,732 | 327 | 3,983 | 2,753 | 7,929 | 10,448 |
| 2001 | 3,534 | 311 | 3,778 | 2,844 | 7,406 | 10,020 |
| 2002 | 3,296 | 301 | 3,539 | 2,778 | 6,913 | 9,481 |

| Calendar Year | Crash Avoidance | | | Crashworthiness | | |
|---------------|-----------------|-------|-------|-----------------|-------|--------|
| | Vol. | Attr. | Total | Vol. | Attr. | Total |
| 2003 | 3,084 | 330 | 3,343 | 2,861 | 6,724 | 9,302 |
| 2004 | 3,164 | 400 | 3,488 | 3,147 | 7,011 | 9,791 |
| 2005 | 3,404 | 490 | 3,799 | 3,338 | 7,292 | 10,161 |
| 2006 | 3,810 | 794 | 4,488 | 3,442 | 7,754 | 10,656 |
| 2007 | 4,026 | 1,437 | 5,323 | 3,478 | 8,377 | 11,270 |
| 2008 | 3,716 | 2,069 | 5,611 | 3,358 | 8,244 | 10,902 |
| 2009 | 2,842 | 1,874 | 4,592 | 2,585 | 6,547 | 8,642 |
| 2010 | 3,142 | 2,487 | 5,482 | 2,972 | 7,281 | 9,643 |
| 2011 | 3,434 | 2,754 | 5,987 | 3,352 | 7,958 | 10,479 |
| 2012 | 3,865 | 3,221 | 6,884 | 3,780 | 9,119 | 12,056 |
| 2013 | 4,024 | 3,405 | 7,228 | 3,935 | 9,857 | 12,967 |
| 2014 | 3,932 | 3,471 | 7,207 | 3,856 | 9,890 | 12,950 |
| 2015 | 3,651 | 3,431 | 6,941 | 3,489 | 9,322 | 12,241 |
| 2016 | 3,158 | 3,015 | 6,003 | 3,158 | 8,238 | 10,720 |
| 2017 | 2,845 | 2,729 | 5,439 | 2,810 | 7,461 | 9,731 |
| 2018 | 2,421 | 2,384 | 4,651 | 2,503 | 6,431 | 8,319 |
| 2019 | 2,101 | 2,108 | 4,064 | 2,201 | 5,595 | 7,225 |

Table 22. Total CY costs (technology and fuel) for the FMVSS – LTVs (millions in 2019\$)

| Calendar Year | Crash Avoidance | | | Crashworthiness | | |
|---------------|-----------------|-------|-------|-----------------|-------|-------|
| | Vol. | Attr. | Total | Vol. | Attr. | Total |
| 1968 | 153 | 37 | 190 | 99 | 80 | 179 |
| 1969 | 156 | 44 | 200 | 101 | 79 | 180 |
| 1970 | 156 | 60 | 216 | 101 | 79 | 179 |
| 1971 | 184 | 78 | 262 | 119 | 116 | 236 |
| 1972 | 217 | 126 | 343 | 156 | 208 | 364 |
| 1973 | 244 | 168 | 412 | 204 | 239 | 444 |
| 1974 | 234 | 164 | 399 | 202 | 239 | 441 |
| 1975 | 246 | 201 | 447 | 211 | 253 | 464 |

| Calendar Year | Crash Avoidance | | | Crashworthiness | | |
|---------------|-----------------|-------|-------|-----------------|-------|--------|
| | Vol. | Attr. | Total | Vol. | Attr. | Total |
| 1976 | 293 | 253 | 545 | 269 | 361 | 629 |
| 1977 | 309 | 263 | 572 | 331 | 533 | 864 |
| 1978 | 314 | 274 | 588 | 338 | 545 | 884 |
| 1979 | 275 | 241 | 516 | 298 | 479 | 777 |
| 1980 | 234 | 201 | 434 | 251 | 418 | 669 |
| 1981 | 226 | 190 | 416 | 241 | 424 | 665 |
| 1982 | 241 | 212 | 453 | 260 | 496 | 756 |
| 1983 | 283 | 259 | 543 | 332 | 590 | 922 |
| 1984 | 349 | 325 | 674 | 423 | 731 | 1,154 |
| 1985 | 385 | 366 | 751 | 479 | 809 | 1,288 |
| 1986 | 676 | 374 | 1,050 | 512 | 821 | 1,333 |
| 1987 | 1,435 | 371 | 1,806 | 562 | 822 | 1,383 |
| 1988 | 2,007 | 365 | 2,372 | 543 | 805 | 1,348 |
| 1989 | 2,679 | 350 | 3,029 | 518 | 784 | 1,302 |
| 1990 | 2,866 | 332 | 3,199 | 486 | 761 | 1,247 |
| 1991 | 2,777 | 331 | 3,108 | 465 | 857 | 1,322 |
| 1992 | 3,061 | 381 | 3,441 | 525 | 1,250 | 1,775 |
| 1993 | 3,426 | 446 | 3,872 | 604 | 1,668 | 2,273 |
| 1994 | 3,643 | 504 | 4,147 | 701 | 2,567 | 3,268 |
| 1995 | 3,800 | 517 | 4,317 | 880 | 3,714 | 4,594 |
| 1996 | 3,976 | 549 | 4,525 | 1,096 | 4,491 | 5,587 |
| 1997 | 4,102 | 577 | 4,678 | 1,238 | 4,980 | 6,218 |
| 1998 | 4,341 | 623 | 4,963 | 1,432 | 5,566 | 6,998 |
| 1999 | 4,595 | 672 | 5,267 | 1,630 | 5,895 | 7,525 |
| 2000 | 4,661 | 699 | 5,356 | 1,833 | 5,969 | 7,806 |
| 2001 | 4,676 | 724 | 5,371 | 2,053 | 5,926 | 8,008 |
| 2002 | 4,747 | 743 | 5,430 | 2,264 | 5,872 | 8,196 |
| 2003 | 5,104 | 919 | 5,662 | 2,546 | 6,203 | 9,111 |
| 2004 | 5,526 | 1,324 | 5,704 | 2,629 | 6,665 | 10,440 |

| Calendar Year | Crash Avoidance | | | Crashworthiness | | |
|---------------|-----------------|-------|-------|-----------------|--------|--------|
| | Vol. | Attr. | Total | Vol. | Attr. | Total |
| 2005 | 5,650 | 1,400 | 5,726 | 2,531 | 6,545 | 10,400 |
| 2006 | 5,881 | 1,533 | 5,788 | 2,307 | 6,581 | 10,513 |
| 2007 | 6,534 | 2,125 | 5,941 | 1,686 | 6,867 | 11,269 |
| 2008 | 5,764 | 2,257 | 5,164 | 1,154 | 6,087 | 10,098 |
| 2009 | 4,282 | 1,818 | 4,012 | 931 | 4,808 | 7,826 |
| 2010 | 5,387 | 2,327 | 5,128 | 1,334 | 6,275 | 10,196 |
| 2011 | 6,365 | 2,806 | 6,153 | 1,672 | 7,642 | 12,332 |
| 2012 | 6,694 | 3,018 | 6,563 | 1,777 | 8,242 | 13,168 |
| 2013 | 7,114 | 3,384 | 7,188 | 1,933 | 8,992 | 14,234 |
| 2014 | 7,754 | 3,996 | 8,212 | 2,190 | 10,093 | 15,820 |
| 2015 | 8,145 | 4,350 | 8,797 | 2,260 | 10,828 | 16,785 |
| 2016 | 7,602 | 4,111 | 8,387 | 2,286 | 10,544 | 16,156 |
| 2017 | 8,014 | 4,383 | 8,954 | 2,480 | 11,385 | 17,308 |
| 2018 | 8,411 | 4,724 | 9,312 | 2,504 | 11,877 | 18,204 |
| 2019 | 8,220 | 4,644 | 9,062 | 2,403 | 11,570 | 17,775 |

Benefits

The FMVSS benefits are estimated by combining data from two studies (Kahane & Simons, in press; Blincoe et al., 2023). Kahane and Simons estimated the benefits for fatalities, injuries at various levels, crashes, and vehicles involved with the FMVSS for every year from CY 1968 to 2019. These estimates are given for passenger cars and LTVs for police reported and unreported crashes and are divided into voluntary countermeasures taken by the automobile manufacturers and countermeasures attributable to the standard.⁷

Blincoe et al. (2023) derived incidence estimates of unreported crash outcomes by severity level and ratios of total injuries to police reported injuries. The ratios shown in Table 23 were used to calculate total injuries from police reported injuries. All fatal and serious injuries are estimated to be captured in police reports, but as the severity of the crash declines, the proportion of injuries that go unreported increases. We note that applying these ratios implies an assumption that safety technologies are equally effective against both reported and unreported injuries. It's likely that this is true for most technologies, but possibly not all. It is also unclear whether, in cases where there is a difference, if effectiveness is biased upwards or downwards. Overall, we believe that this is a reasonable assumption since injury/crash severity is by definition the same for both reported and unreported crashes within each severity category.

Table 23. Multiplier from reported crash to reported and unreported crash

| | |
|--------------------------|--------|
| Fatality | 1 |
| MAIS5⁸ | 1 |
| MAIS4 | 1 |
| MAIS3 | 1.0677 |
| MAIS2 | 1.3740 |
| MAIS1 | 1.5126 |
| MAIS0 | 1.9266 |
| PDO vehicle | 2.4814 |

In Table 24 and throughout this analysis, the benefits are based on technologies that were employed to meet the safety standards set by NHTSA for passenger cars and LTVs. The 2019 estimated lives saved of 40,099 includes passenger car occupants, LTV occupants, pedestrians, bicyclists, and motorcyclists that were saved by technologies added to passenger cars and LTVs.

⁷ For CA, the Kahane (1988) report gives you the number of reported involvements avoided (unlike all the spreadsheets for injuries and fatalities, which did include unreported). The numbers from the Kahane (1988) spreadsheet requires two transformations: (1) a ratio of MAIS 0 people and of property damage only (PDO) vehicles to total involvements avoided; and (2) a multiplier from Table 23 for unreported crashes.

⁸ MAIS stands for maximum abbreviated injury scale and is based on the highest ranked injury for that person. MAIS5 is a “critical” injury; about 50% of MAIS5 injured people are fatally injured. MAIS4 is a “severe” injury. MAIS3 is a “serious” injury. MAIS2 is a “moderate” injury - most broken bones are MAIS2. MAIS1 is a “mild” injury of bruises, cuts, or whiplash. MAIS0 has no injury but was involved in the crash and may have societal cost due to lost work time, traffic delays, etc. The number of injuries used in this analysis are non-fatal injuries.

It does not include any heavy truck occupants saved by technologies added to passenger cars and LTVs. It excludes motorcyclists saved by motorcycles technologies. It also excludes heavy truck occupants, pedestrians, bicyclists, and motorcyclists saved by heavy truck standards.

These tables include police reported and unreported benefits. Many of the tables in this analysis provide benefits for PC or LTVs. These tables estimate the benefits for the passenger car technologies (not only for occupants of PCs), or for the LTVs technologies (not only for occupants of LTVs). In 2019 alone, the FMVSS for passenger cars and LTVs saved 40,099 fatalities, over 1.9 million MAIS1-5 injuries, and over 3.78 million PDO crashes.

Table 25 shows the benefits voluntarily provided by motor vehicle manufacturers. Table 26 shows the benefits attributable to the FMVSS. In 2019, 69 percent of the fatality benefits were attributable to the FMVSS and 31 percent were voluntarily provided by the motor vehicle manufacturers. The tables in Appendix C show the combined reported and unreported estimated benefits from the Kahane and Simons (in press) report for both passenger cars and LTVs.

The PDO benefits are based on the number of vehicles that avoid a crash. Of all the CA benefits from passenger car and LTV standards, 98.75 percent are to passenger cars or LTVs, based on crashes that involved at least one passenger car or LTV documented in the Kahane (1988) report. The rest are to heavy trucks or motorcycles. Table 24, Table 25, and Table 26 include the benefits for all vehicle types and the comprehensive and economic costs used later in this analysis are based on all vehicle types.

Blincoe et al. (2023) found that PDOs are 76.2 percent of all crashes. An examination of previous economic cost reports showed no trend in this ratio. We assumed the same ratio for all years. Thus, 76.2 percent of the vehicles that were not involved in a crash due to a passenger car or LTV standard are assumed to be in a PDO crash.

These benefits have been distributed between CA standards and CW standards and between voluntary and attributable and the combined totals. The data was supplemented in years prior to 1988, that is before this level of detail in crash data were collected by NHTSA, by using data from Accident Facts (National Safety Council. 2024). Appendix H shows the data from Accident Facts.

Figure 6 shows the trend in CY fatality benefits from safety technologies, with separate trends for voluntary, attributable, and total fatalities prevented by CY. All three groupings trend steadily upwards until the recession in 2007 caused a significant decrease in VMT and associated risk exposure, which lead to a decline in base fatality levels. Lives saved begin to increase again in concert with the increase in VMT that accompanied the economic recovery. As documented in Kahane and Simons (in press), seat belts and ESC were responsible for the largest safety gains. Much of the pre-recession increase was due to increases in seat belt usage in the mid-1980s through the early 2000s, which rose from less than 15 percent in 1983 to over 80 percent by 2007, but new safety technologies such as ESC also contributed to this increase. Some portion of the pre-recession benefit increase and a larger portion of the post-recession increase was driven by ESC, which had been voluntarily adopted in many vehicles during the pre-recession period. ESC was installed in 12.5 percent of passenger cars and 16.8 percent of LTVs in 2004, 20.2 percent of passenger cars and 49.4 percent of LTVs in 2007, and was required on all new passenger cars and LTVs for the 2012 MY. Side air bags for the torso were installed in 23 percent of passenger cars and 20 percent of LTVs in 2004, 57 percent of passenger cars and 32 percent of LTVs in 2007, and 100 percent of passenger cars and 91 percent of LTVs in 2012.

Window curtains (side air bags for the head) were installed in 19 percent of passenger cars and 13 percent of LTVs in 2004, 61 percent of passenger cars and 47 percent of LTVs in 2007, and 96 percent of both passenger cars and LTVs in 2012. By 2019, just before the COVID-19 pandemic, the impact of safety technologies began to stabilize as seat belt use levelled off at around 90 percent and most of the on-road vehicle fleet contained ESC. By 2019, over 40,000 lives were saved annually, with 69 percent of those (27,723) attributable to FMVSS and the rest due to voluntary adoption of safety technologies by manufacturers.

Figure 7 shows the pace of cumulative fatality benefits by CY. By 2019 over 860,000 lives had been saved by motor vehicle safety technologies, with 64 percent of those (552,174) attributable to FMVSS and the rest due to voluntary adoption of safety technologies by manufacturers. The difference in attributable portion between CY and cumulative impacts is due to shifts in this portion over time. In earlier CYs, impacts were primarily from existing safety technologies that were already on a significant portion of the vehicle fleet, whereas in later years, safety regulations became effective much earlier in the technology adoption cycle. On a CY basis, the attributable portion crossed over to 51 percent in CY 1986 and climbed to roughly 69 percent where it has stabilized over the past two decades.

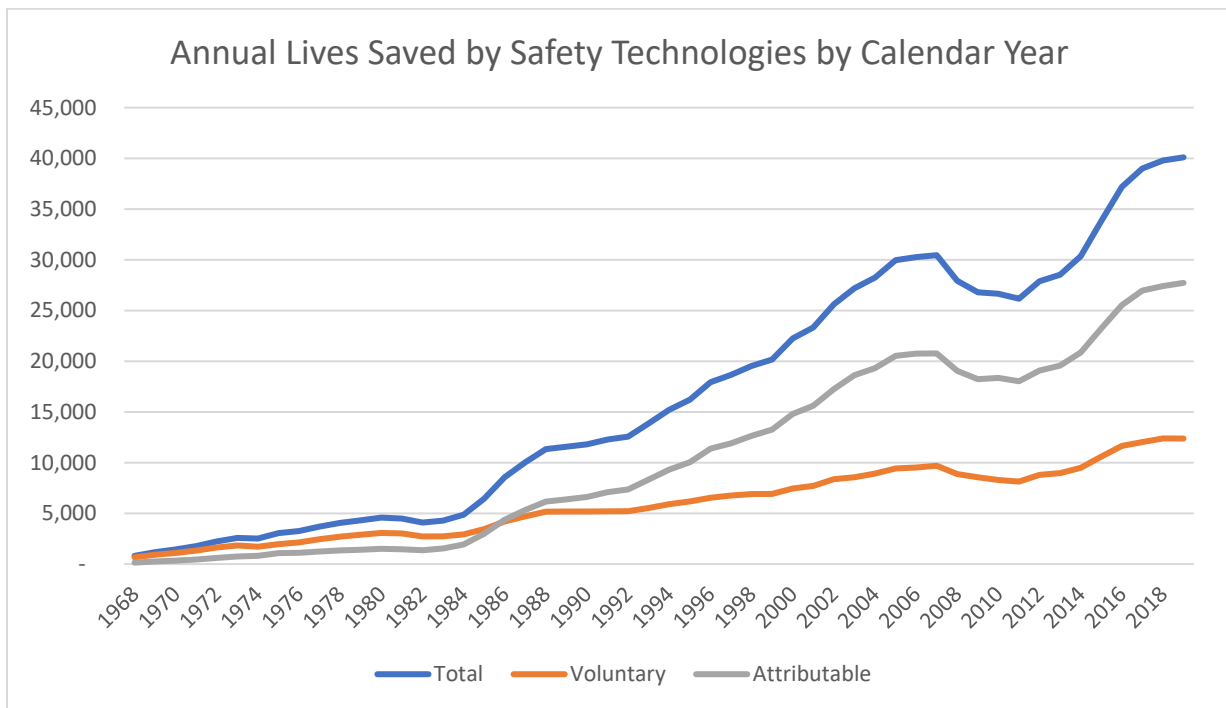


Figure 6. Annual lives saved by safety technologies by CY

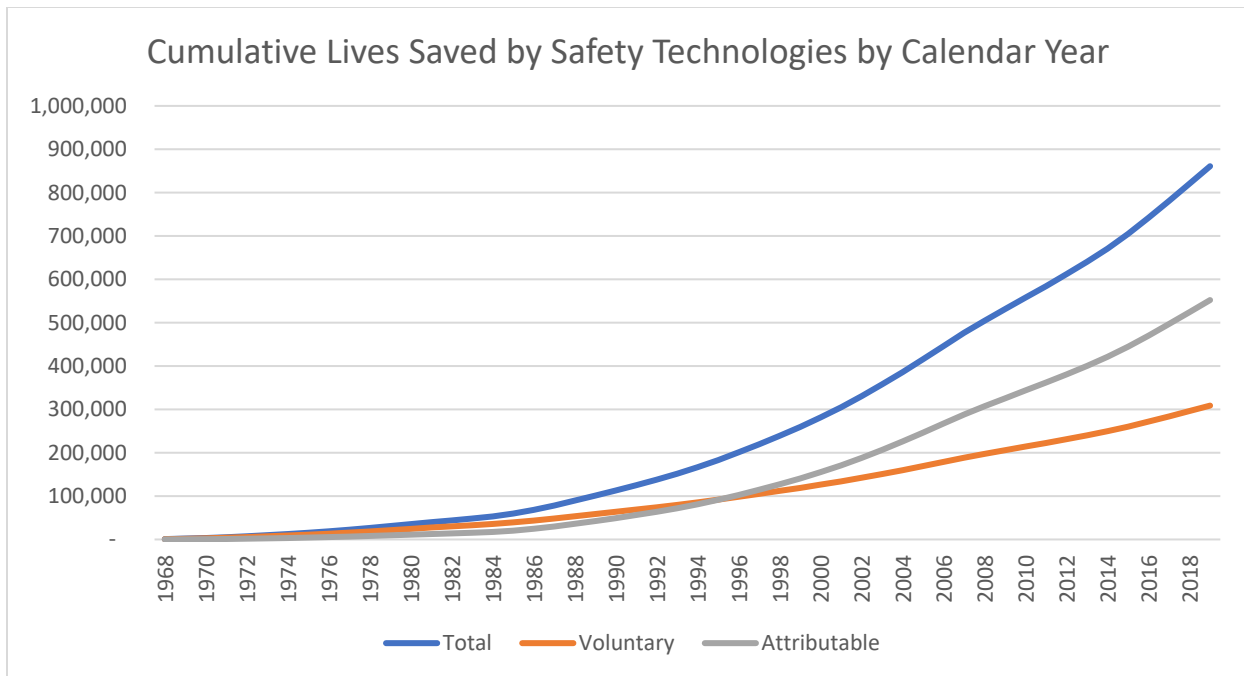


Figure 7. Cumulative lives saved by safety technologies by CY

Table 24. Total benefits for passenger cars and LTVs – reported and unreported

| Year | Fatal | MAIS5 | MAIS4 | MAIS3 | MAIS2 | MAIS1 | MAIS0 | PDO |
|------|-------|-------|-------|--------|---------|---------|---------|---------|
| 1968 | 812 | 327 | 561 | 7,159 | 22,677 | 50,784 | 18,322 | 74,674 |
| 1969 | 1,173 | 386 | 959 | 10,465 | 41,974 | 81,052 | 29,620 | 120,973 |
| 1970 | 1,444 | 443 | 1,194 | 11,958 | 55,204 | 112,371 | 41,877 | 171,316 |
| 1971 | 1,772 | 422 | 1,386 | 14,111 | 64,605 | 142,627 | 53,513 | 219,057 |
| 1972 | 2,225 | 496 | 1,698 | 16,237 | 77,743 | 183,211 | 66,088 | 270,669 |
| 1973 | 2,577 | 667 | 1,739 | 18,162 | 82,274 | 202,176 | 72,647 | 297,909 |
| 1974 | 2,520 | 899 | 1,843 | 16,037 | 71,945 | 212,867 | 75,503 | 309,987 |
| 1975 | 3,051 | 1,105 | 2,296 | 16,057 | 76,085 | 243,575 | 87,297 | 359,246 |
| 1976 | 3,250 | 1,320 | 2,764 | 18,665 | 82,427 | 259,048 | 96,296 | 396,779 |
| 1977 | 3,692 | 1,397 | 3,238 | 22,944 | 94,960 | 292,577 | 109,102 | 449,480 |
| 1978 | 4,055 | 1,399 | 3,302 | 26,639 | 106,879 | 336,099 | 120,870 | 497,711 |
| 1979 | 4,309 | 1,525 | 3,153 | 29,362 | 117,018 | 362,835 | 125,540 | 516,875 |
| 1980 | 4,576 | 1,537 | 3,055 | 30,701 | 121,116 | 362,000 | 129,724 | 534,685 |
| 1981 | 4,485 | 1,491 | 3,405 | 31,867 | 122,745 | 359,690 | 132,567 | 546,638 |
| 1982 | 4,086 | 1,162 | 3,379 | 30,495 | 111,269 | 332,030 | 136,343 | 561,680 |
| 1983 | 4,275 | 1,264 | 3,537 | 30,767 | 105,546 | 347,494 | 141,463 | 583,510 |

| Year | Fatal | MAIS5 | MAIS4 | MAIS3 | MAIS2 | MAIS1 | MAIS0 | PDO |
|-------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|------------|
| 1984 | 4,869 | 1,085 | 3,638 | 31,723 | 116,975 | 348,243 | 146,655 | 604,238 |
| 1985 | 6,439 | 1,529 | 4,344 | 39,734 | 149,503 | 382,104 | 151,132 | 624,912 |
| 1986 | 8,573 | 2,088 | 4,928 | 55,728 | 202,485 | 430,044 | 161,065 | 664,306 |
| 1987 | 10,042 | 2,113 | 5,100 | 59,016 | 217,829 | 440,036 | 172,270 | 710,607 |
| 1988 | 11,331 | 2,153 | 6,290 | 72,571 | 245,672 | 470,530 | 183,778 | 756,576 |
| 1989 | 11,573 | 2,607 | 6,718 | 76,250 | 261,356 | 469,709 | 187,844 | 747,543 |
| 1990 | 11,806 | 3,186 | 8,056 | 79,142 | 282,332 | 475,279 | 200,589 | 798,794 |
| 1991 | 12,287 | 3,292 | 8,766 | 77,202 | 273,267 | 468,892 | 201,164 | 787,216 |
| 1992 | 12,567 | 3,683 | 11,674 | 82,067 | 282,881 | 511,958 | 207,898 | 793,321 |
| 1993 | 13,870 | 4,224 | 11,872 | 85,571 | 270,426 | 555,347 | 223,677 | 845,295 |
| 1994 | 15,220 | 3,192 | 11,046 | 82,792 | 282,837 | 620,456 | 250,124 | 952,898 |
| 1995 | 16,208 | 2,991 | 9,045 | 81,019 | 301,546 | 715,863 | 289,541 | 1,107,486 |
| 1996 | 17,920 | 2,685 | 8,491 | 90,495 | 311,041 | 776,196 | 311,256 | 1,179,160 |
| 1997 | 18,661 | 3,157 | 7,980 | 98,116 | 328,786 | 778,340 | 316,266 | 1,247,237 |
| 1998 | 19,543 | 4,293 | 8,874 | 108,207 | 341,862 | 777,969 | 305,930 | 1,261,193 |
| 1999 | 20,168 | 5,048 | 9,737 | 100,677 | 365,368 | 779,058 | 307,911 | 1,269,216 |
| 2000 | 22,247 | 6,000 | 12,971 | 108,993 | 376,595 | 769,449 | 335,673 | 1,397,848 |
| 2001 | 23,315 | 5,263 | 13,868 | 119,714 | 379,468 | 719,392 | 342,659 | 1,460,446 |
| 2002 | 25,615 | 5,801 | 18,705 | 129,756 | 409,939 | 709,288 | 339,918 | 1,514,151 |
| 2003 | 27,187 | 8,050 | 22,205 | 130,044 | 409,441 | 735,519 | 374,252 | 1,600,603 |
| 2004 | 28,241 | 7,665 | 24,663 | 126,005 | 413,827 | 756,212 | 367,101 | 1,655,930 |
| 2005 | 29,966 | 7,366 | 25,182 | 128,990 | 404,619 | 740,179 | 357,771 | 1,706,728 |
| 2006 | 30,262 | 5,612 | 25,281 | 131,765 | 406,015 | 715,213 | 360,105 | 1,742,834 |
| 2007 | 30,457 | 6,187 | 24,352 | 130,272 | 387,685 | 689,946 | 361,877 | 1,831,537 |
| 2008 | 27,925 | 6,177 | 23,091 | 121,083 | 350,918 | 687,237 | 355,477 | 1,839,830 |
| 2009 | 26,791 | 6,452 | 21,230 | 113,045 | 345,249 | 698,900 | 354,000 | 1,823,790 |
| 2010 | 26,645 | 8,414 | 20,209 | 109,719 | 348,297 | 768,490 | 382,754 | 1,923,329 |
| 2011 | 26,156 | 9,790 | 19,844 | 106,608 | 340,327 | 824,576 | 391,531 | 1,990,408 |
| 2012 | 27,877 | 9,593 | 20,232 | 115,181 | 358,726 | 908,097 | 451,632 | 2,244,606 |
| 2013 | 28,535 | 8,267 | 21,007 | 122,475 | 370,581 | 916,242 | 477,152 | 2,424,156 |

| Year | Fatal | MAIS5 | MAIS4 | MAIS3 | MAIS2 | MAIS1 | MAIS0 | PDO |
|-------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|------------|
| 2014 | 30,358 | 6,158 | 24,014 | 122,119 | 382,717 | 959,445 | 529,684 | 2,811,430 |
| 2015 | 33,817 | 7,052 | 25,954 | 147,886 | 441,394 | 1,061,805 | 602,293 | 3,239,098 |
| 2016 | 37,183 | 8,479 | 27,915 | 157,961 | 463,648 | 1,131,871 | 676,755 | 3,218,393 |
| 2017 | 39,003 | 8,976 | 28,239 | 162,130 | 473,995 | 1,172,608 | 644,196 | 3,289,782 |
| 2018 | 39,797 | 9,673 | 28,733 | 163,419 | 470,726 | 1,192,860 | 651,045 | 3,541,019 |
| 2019 | 40,099 | 9,955 | 29,147 | 163,080 | 472,105 | 1,244,646 | 694,154 | 3,784,967 |

Table 25. Total voluntary benefits for passenger car and LTV standards – reported and unreported

| Year | Fatal | MAIS5 | MAIS4 | MAIS3 | MAIS2 | MAIS1 | MAIS0 | PDO |
|-------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|------------|
| 1968 | 669 | 225 | 335 | 4,807 | 19,274 | 36,338 | 13,325 | 54,306 |
| 1969 | 921 | 233 | 557 | 6,879 | 35,165 | 48,362 | 17,985 | 73,455 |
| 1970 | 1,102 | 296 | 793 | 7,339 | 46,576 | 60,297 | 22,638 | 92,640 |
| 1971 | 1,326 | 267 | 980 | 8,907 | 53,747 | 72,229 | 26,660 | 109,255 |
| 1972 | 1,624 | 316 | 1,187 | 9,991 | 64,299 | 86,793 | 31,126 | 127,736 |
| 1973 | 1,833 | 466 | 1,197 | 11,337 | 67,247 | 91,093 | 33,667 | 138,378 |
| 1974 | 1,715 | 666 | 1,322 | 9,830 | 57,047 | 90,588 | 34,625 | 142,522 |
| 1975 | 1,965 | 768 | 1,779 | 9,348 | 59,680 | 99,352 | 39,885 | 164,486 |
| 1976 | 2,134 | 994 | 2,087 | 10,718 | 62,876 | 107,486 | 43,874 | 181,195 |
| 1977 | 2,458 | 1,001 | 2,378 | 13,428 | 69,881 | 120,867 | 48,876 | 202,038 |
| 1978 | 2,708 | 966 | 2,362 | 15,190 | 77,223 | 135,354 | 53,265 | 220,321 |
| 1979 | 2,899 | 994 | 2,231 | 16,404 | 83,550 | 140,927 | 54,471 | 225,454 |
| 1980 | 3,075 | 977 | 2,154 | 16,944 | 85,817 | 140,537 | 55,783 | 231,112 |
| 1981 | 3,028 | 988 | 2,434 | 17,020 | 85,134 | 142,511 | 56,938 | 236,033 |
| 1982 | 2,722 | 774 | 2,486 | 16,377 | 70,973 | 130,450 | 58,400 | 242,101 |
| 1983 | 2,734 | 856 | 2,643 | 16,444 | 63,095 | 136,667 | 60,561 | 251,250 |
| 1984 | 2,933 | 651 | 2,583 | 15,171 | 66,716 | 133,951 | 62,637 | 259,798 |
| 1985 | 3,450 | 775 | 2,284 | 17,388 | 75,208 | 144,098 | 64,577 | 268,239 |
| 1986 | 4,203 | 1,125 | 2,514 | 22,297 | 93,687 | 156,483 | 66,723 | 277,225 |
| 1987 | 4,711 | 1,135 | 2,640 | 23,803 | 99,984 | 158,977 | 68,826 | 286,265 |
| 1988 | 5,172 | 1,077 | 3,163 | 29,176 | 110,821 | 167,145 | 71,017 | 295,548 |

| Year | Fatal | MAIS5 | MAIS4 | MAIS3 | MAIS2 | MAIS1 | MAIS0 | PDO |
|-------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|------------|
| 1989 | 5,185 | 1,227 | 3,457 | 31,014 | 119,287 | 168,241 | 70,235 | 284,012 |
| 1990 | 5,187 | 1,288 | 3,773 | 34,139 | 132,929 | 170,255 | 71,352 | 287,959 |
| 1991 | 5,203 | 1,343 | 4,004 | 33,318 | 124,613 | 166,233 | 70,902 | 282,461 |
| 1992 | 5,207 | 1,589 | 4,601 | 35,994 | 116,727 | 178,527 | 75,228 | 291,264 |
| 1993 | 5,534 | 1,636 | 5,532 | 32,310 | 95,247 | 188,658 | 83,751 | 323,607 |
| 1994 | 5,912 | 1,159 | 4,865 | 30,449 | 99,378 | 218,543 | 97,700 | 378,338 |
| 1995 | 6,171 | 1,039 | 4,152 | 28,922 | 107,571 | 272,897 | 116,716 | 452,508 |
| 1996 | 6,540 | 878 | 3,070 | 35,051 | 121,080 | 312,050 | 132,859 | 512,083 |
| 1997 | 6,765 | 1,129 | 2,871 | 38,581 | 122,830 | 316,337 | 138,176 | 553,051 |
| 1998 | 6,899 | 1,404 | 3,046 | 40,952 | 123,686 | 327,357 | 142,227 | 592,305 |
| 1999 | 6,917 | 1,667 | 3,229 | 35,794 | 122,832 | 309,147 | 159,322 | 661,677 |
| 2000 | 7,451 | 1,893 | 4,943 | 37,533 | 127,235 | 317,025 | 182,344 | 764,082 |
| 2001 | 7,710 | 1,603 | 5,207 | 41,549 | 134,190 | 307,176 | 190,174 | 814,702 |
| 2002 | 8,364 | 1,973 | 7,226 | 45,039 | 147,767 | 307,519 | 191,564 | 856,504 |
| 2003 | 8,558 | 2,242 | 7,878 | 46,128 | 145,522 | 315,770 | 221,108 | 947,063 |
| 2004 | 8,918 | 2,257 | 8,114 | 41,585 | 139,089 | 322,418 | 219,976 | 993,792 |
| 2005 | 9,431 | 1,791 | 8,512 | 40,657 | 137,160 | 320,934 | 223,522 | 1,065,763 |
| 2006 | 9,516 | 1,581 | 7,544 | 41,306 | 138,609 | 327,055 | 232,928 | 1,126,678 |
| 2007 | 9,686 | 1,819 | 7,398 | 40,664 | 137,549 | 316,205 | 240,445 | 1,218,509 |
| 2008 | 8,871 | 1,876 | 7,077 | 38,994 | 125,781 | 316,025 | 239,396 | 1,241,082 |
| 2009 | 8,561 | 2,039 | 6,862 | 36,614 | 124,907 | 324,081 | 236,918 | 1,221,790 |
| 2010 | 8,284 | 2,699 | 6,645 | 35,566 | 129,159 | 357,028 | 251,950 | 1,262,930 |
| 2011 | 8,133 | 3,088 | 6,227 | 34,662 | 126,959 | 382,412 | 255,826 | 1,292,412 |
| 2012 | 8,796 | 3,138 | 6,340 | 38,545 | 130,991 | 415,847 | 290,901 | 1,436,305 |
| 2013 | 8,970 | 2,642 | 6,336 | 41,457 | 137,254 | 415,373 | 302,971 | 1,528,510 |
| 2014 | 9,493 | 1,764 | 6,849 | 43,565 | 140,225 | 448,971 | 325,808 | 1,725,518 |
| 2015 | 10,596 | 1,893 | 7,482 | 52,669 | 161,881 | 491,186 | 361,590 | 1,943,204 |
| 2016 | 11,654 | 2,354 | 8,044 | 57,077 | 173,080 | 530,181 | 401,429 | 1,902,885 |
| 2017 | 12,029 | 2,505 | 8,126 | 58,116 | 177,783 | 546,023 | 374,674 | 1,910,719 |
| 2018 | 12,389 | 2,486 | 8,159 | 58,053 | 177,021 | 552,369 | 368,152 | 1,996,872 |
| 2019 | 12,376 | 2,504 | 8,080 | 57,773 | 176,130 | 577,033 | 391,985 | 2,126,107 |

Table 26. Total attributable benefits for passenger car and LTV standards – reported and unreported

| Year | Fatal | MAIS5 | MAIS4 | MAIS3 | MAIS2 | MAIS1 | MAIS0 | PDO |
|-------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|------------|
| 1968 | 143 | 102 | 227 | 2,352 | 3,403 | 14,446 | 4,997 | 20,368 |
| 1969 | 252 | 153 | 402 | 3,586 | 6,809 | 32,689 | 11,635 | 47,518 |
| 1970 | 342 | 148 | 401 | 4,619 | 8,628 | 52,074 | 19,239 | 78,676 |
| 1971 | 446 | 155 | 406 | 5,204 | 10,857 | 70,397 | 26,853 | 109,802 |
| 1972 | 601 | 180 | 511 | 6,246 | 13,444 | 96,418 | 34,962 | 142,933 |
| 1973 | 744 | 201 | 542 | 6,824 | 15,027 | 111,082 | 38,980 | 159,531 |
| 1974 | 805 | 233 | 521 | 6,207 | 14,898 | 122,279 | 40,879 | 167,464 |
| 1975 | 1,086 | 337 | 517 | 6,709 | 16,405 | 144,224 | 47,412 | 194,760 |
| 1976 | 1,116 | 326 | 677 | 7,948 | 19,551 | 151,562 | 52,422 | 215,584 |
| 1977 | 1,234 | 397 | 860 | 9,515 | 25,079 | 171,710 | 60,225 | 247,442 |
| 1978 | 1,346 | 433 | 940 | 11,449 | 29,656 | 200,744 | 67,605 | 277,391 |
| 1979 | 1,410 | 531 | 921 | 12,959 | 33,467 | 221,909 | 71,069 | 291,422 |
| 1980 | 1,502 | 560 | 901 | 13,757 | 35,299 | 221,463 | 73,941 | 303,574 |
| 1981 | 1,456 | 503 | 971 | 14,848 | 37,610 | 217,179 | 75,629 | 310,605 |
| 1982 | 1,364 | 388 | 892 | 14,118 | 40,296 | 201,580 | 77,943 | 319,579 |
| 1983 | 1,541 | 409 | 893 | 14,323 | 42,451 | 210,828 | 80,901 | 332,261 |
| 1984 | 1,936 | 435 | 1,055 | 16,552 | 50,259 | 214,292 | 84,019 | 344,440 |
| 1985 | 2,989 | 754 | 2,061 | 22,347 | 74,295 | 238,006 | 86,555 | 356,673 |
| 1986 | 4,370 | 963 | 2,415 | 33,431 | 108,798 | 273,561 | 94,342 | 387,081 |
| 1987 | 5,332 | 978 | 2,461 | 35,214 | 117,845 | 281,059 | 103,444 | 424,342 |
| 1988 | 6,159 | 1,075 | 3,127 | 43,395 | 134,851 | 303,385 | 112,761 | 461,028 |
| 1989 | 6,388 | 1,380 | 3,261 | 45,236 | 142,069 | 301,468 | 117,610 | 463,531 |
| 1990 | 6,619 | 1,898 | 4,283 | 45,002 | 149,403 | 305,024 | 129,237 | 510,835 |
| 1991 | 7,084 | 1,949 | 4,762 | 43,883 | 148,654 | 302,659 | 130,262 | 504,755 |
| 1992 | 7,360 | 2,094 | 7,073 | 46,072 | 166,154 | 333,432 | 132,671 | 502,057 |
| 1993 | 8,336 | 2,588 | 6,339 | 53,261 | 175,179 | 366,689 | 139,927 | 521,688 |
| 1994 | 9,308 | 2,032 | 6,180 | 52,343 | 183,459 | 401,913 | 152,425 | 574,560 |
| 1995 | 10,037 | 1,952 | 4,892 | 52,096 | 193,975 | 442,966 | 172,825 | 654,978 |
| 1996 | 11,381 | 1,807 | 5,421 | 55,444 | 189,962 | 464,146 | 178,397 | 667,078 |

| Year | Fatal | MAIS5 | MAIS4 | MAIS3 | MAIS2 | MAIS1 | MAIS0 | PDO |
|-------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|------------|
| 1997 | 11,896 | 2,027 | 5,110 | 59,536 | 205,957 | 462,003 | 178,090 | 694,186 |
| 1998 | 12,644 | 2,888 | 5,828 | 67,255 | 218,177 | 450,612 | 163,702 | 668,889 |
| 1999 | 13,251 | 3,380 | 6,508 | 64,883 | 242,536 | 469,911 | 148,589 | 607,539 |
| 2000 | 14,797 | 4,108 | 8,027 | 71,460 | 249,360 | 452,424 | 153,329 | 633,767 |
| 2001 | 15,606 | 3,660 | 8,661 | 78,165 | 245,278 | 412,216 | 152,485 | 645,745 |
| 2002 | 17,252 | 3,828 | 11,478 | 84,717 | 262,172 | 401,768 | 148,354 | 657,647 |
| 2003 | 18,629 | 5,808 | 14,328 | 83,915 | 263,919 | 419,749 | 153,145 | 653,541 |
| 2004 | 19,323 | 5,408 | 16,549 | 84,420 | 274,738 | 433,794 | 147,125 | 662,138 |
| 2005 | 20,536 | 5,575 | 16,669 | 88,333 | 267,459 | 419,245 | 134,249 | 640,966 |
| 2006 | 20,746 | 4,031 | 17,737 | 90,460 | 267,406 | 388,158 | 127,177 | 616,157 |
| 2007 | 20,771 | 4,368 | 16,954 | 89,609 | 250,136 | 373,741 | 121,432 | 613,029 |
| 2008 | 19,055 | 4,301 | 16,014 | 82,090 | 225,137 | 371,211 | 116,081 | 598,747 |
| 2009 | 18,230 | 4,413 | 14,367 | 76,431 | 220,342 | 374,818 | 117,082 | 602,000 |
| 2010 | 18,361 | 5,715 | 13,564 | 74,153 | 219,138 | 411,462 | 130,803 | 660,399 |
| 2011 | 18,024 | 6,702 | 13,617 | 71,946 | 213,368 | 442,164 | 135,704 | 697,995 |
| 2012 | 19,081 | 6,455 | 13,893 | 76,636 | 227,735 | 492,250 | 160,731 | 808,302 |
| 2013 | 19,565 | 5,625 | 14,671 | 81,018 | 233,327 | 500,869 | 174,181 | 895,647 |
| 2014 | 20,865 | 4,393 | 17,164 | 78,554 | 242,492 | 510,473 | 203,876 | 1,085,912 |
| 2015 | 23,222 | 5,159 | 18,472 | 95,216 | 279,513 | 570,618 | 240,704 | 1,295,894 |
| 2016 | 25,529 | 6,125 | 19,871 | 100,883 | 290,569 | 601,689 | 275,326 | 1,315,508 |
| 2017 | 26,974 | 6,471 | 20,113 | 104,014 | 296,212 | 626,585 | 269,522 | 1,379,062 |
| 2018 | 27,408 | 7,187 | 20,574 | 105,366 | 293,705 | 640,490 | 282,893 | 1,544,147 |
| 2019 | 27,723 | 7,451 | 21,067 | 105,308 | 295,975 | 667,613 | 302,170 | 1,658,860 |

Unit Valuation for Safety Benefits

Blincoe et al. (2023) estimated the societal cost impact of motor vehicle crashes in 2019. That study examined economic impacts, which includes medical care, lost productivity, property damage, traffic congestion, legal costs, insurance administrative costs, emergency services costs, and workplace costs, as well as comprehensive costs which include both economic impacts and society's valuation for lost quality of life. That report also gives cost estimates on a per person basis for injured people and per damaged vehicle basis for property damaged vehicles in constant 2019 dollars (Blincoe et al., 2023). Table 27 shows the unit costs for 2019 under both comprehensive and economic cost bases.

Table 28 shows the detailed component values for comprehensive costs derived by Blincoe et al (2023). The QALY designation in this table stands for quality adjusted life years and represents the value of lost quality of life.

Table 27. 2019 unit costs by injury severity (2019\$)

| Injury Severity | Comprehensive costs per person injured or vehicle damaged in 2019\$ | Economic costs per person injured or vehicle damaged in 2019\$ |
|------------------------|--|---|
| Fatality | \$11,258,495 | \$1,606,644 |
| MAIS5 | \$6,048,251 | \$979,328 |
| MAIS4 | \$3,613,735 | \$675,727 |
| MAIS3 | \$2,044,607 | \$280,726 |
| MAIS2 | \$473,760 | \$71,419 |
| MAIS1 | \$60,456 | \$19,344 |
| MAIS0 | \$3,252 | \$3,252 |
| PDO vehicle | \$5,251 | \$5,251 |

Table 28. Comprehensive unit costs by cost component and injury severity (2019\$)

| | PDO | MAIS0 | MAIS1 | MAIS2 | MAIS3 | MAIS4 | MAIS5 | Fatal |
|------------------------|------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| Medical | \$0 | \$0 | \$2,210 | \$13,269 | \$69,345 | \$188,626 | \$363,229 | \$17,289 |
| Emergency Services | \$31 | \$24 | \$106 | \$228 | \$486 | \$976 | \$999 | \$1,060 |
| Market Productivity | \$0 | \$0 | \$2,315 | \$23,096 | \$92,716 | \$229,903 | \$306,236 | \$1,010,970 |
| Household Productivity | \$71 | \$55 | \$848 | \$8,990 | \$39,001 | \$116,482 | \$127,886 | \$367,148 |
| Insurance Admin. | \$523 | \$225 | \$2,212 | \$8,220 | \$28,698 | \$36,485 | \$38,081 | \$36,245 |
| Workplace Costs | \$99 | \$76 | \$56 | \$418 | \$3,240 | \$7,077 | \$7,794 | \$13,589 |
| Legal Costs | \$0 | \$0 | \$740 | \$6,243 | \$27,714 | \$73,799 | \$110,012 | \$138,025 |
| Subtotal Injury | \$724 | \$380 | \$8,487 | \$60,464 | \$261,200 | \$653,348 | \$954,237 | \$1,584,326 |
| Travel Delay | \$1,327 | \$1,008 | \$1,207 | \$1,339 | \$1,691 | \$1,814 | \$1,857 | \$7,133 |
| Property Damage | \$3,200 | \$1,864 | \$9,650 | \$9,616 | \$17,835 | \$20,565 | \$23,234 | \$15,185 |
| Subtotal, Non-Injury | \$4,527 | \$2,872 | \$10,857 | \$10,955 | \$19,526 | \$22,379 | \$25,091 | \$22,318 |
| Total | \$5,251 | \$3,252 | \$19,344 | \$71,419 | \$280,726 | \$675,727 | \$979,328 | \$1,606,644 |
| QALYs | \$0 | \$0 | \$41,112 | \$402,341 | \$1,763,881 | \$2,938,008 | \$5,068,923 | \$9,651,851 |
| Comprehensive Total | \$5,251 | \$3,252 | \$60,456 | \$473,760 | \$2,044,607 | \$3,613,735 | \$6,048,251 | \$11,258,495 |

The appropriate measure of societal welfare from safety countermeasures is comprehensive costs, which differs from economic costs in that it includes valuation of lost quality of life, which accounts for intangible injury impacts such as pain, suffering, and lost enjoyment of life associated with injury, disability, and lost years of life. This is required practice in preparing cost-benefit analysis accompanying regulatory actions as specified in Circular No. A-4 (Office of Management and Budget, 2023). This report adopts these comprehensive costs to assign a monetary value on health benefits and the benefits of avoiding crashes and vehicle damage. We multiply the number of lives saved, injuries reduced, and crashed vehicles avoided by safety technologies in both reported and unreported crashes by their comparable comprehensive cost to society on per person injured or per vehicle damaged basis to get a total value of FMVSS benefits in a CY.

Some literature considers only the economic value of productivity lost or diverted to address public health concerns (Grosse & Krueger, 2011). Lost productivity and other economic impacts are often considered by policymakers and public interest groups when safety issues are being debated. These economic impacts are both more easily understood and more reliably measured than lost quality-of-life, which is subject to a wide range of estimates and uncertainty. This report gives estimates of impacts under both bases to facilitate either approach.

This report examines costs and benefits using 2019 dollars. Unit costs in 2019 represent the cost of productivity lost and services required to restore society to its pre-crash condition due to crashes that occurred in that year. There are cost components that are affected by crashes, these include medical care (including EMS), lost market and household productivity, emergency service costs (police and fire), legal costs, insurance administrative costs, property damage costs, workplace costs, and congestion costs, as well as the value of lost quality of life due to death or injury. For some of the cost components, the 2019\$ value is a reasonable proxy for real (2019\$) costs that were incurred in previous years because other than inflation, we do not expect or know of real shifts in the quality or quantity of the goods and services involved. However, for other categories, the 2019 unit cost represents a market basket of goods and services that has changed from previous years. For these components we made adjustments to reflect these changes and give estimates appropriate to the specific previous CY.

In addition, costs associated with an injury can occur over several years, while costs associated with a fatality will be spread over the remaining lifespan of victims of crashes. So, for example, many of the lifetime costs noted in Table 27 and Table 28 will be spread over subsequent years rather than incurred all in the first year. These distributions will be specific to the type of cost and the injury severity level.

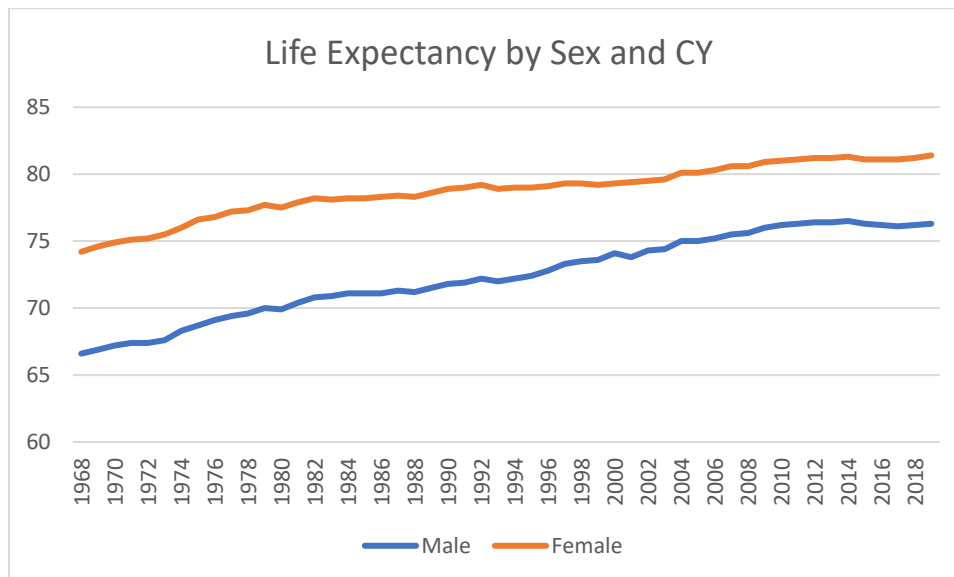
There are thus two adjustments made to each cost category; one to capture differences in the unit costs that reflect real changes in consumption over time, and another, where appropriate, to reflect the distribution of impacts over future years.

In the following sections, each cost component will be discussed to give a rationale for the approach taken for that cost component.

Lost Wages, Household Productivity, and Quality of Life

To express impacts in 2019 economic terms, this study applies the unit costs derived from the 2019 cost report to injuries experienced in previous years. Over time, changes in vehicle characteristics, safety technology, roadway design, and driver behavior can influence the injury profile that results from motor vehicle crashes. These changes are reflected in the incidence of different injury severities that are measured in NHTSA's Fatality Analysis Reporting System (FARS), Crash Investigation Sampling System, and Crash Report Sampling System databases over time, and are thus automatically accounted for in the Kahane (1988) safety analysis. However, changes also occur in inputs that affect the unit cost of lost workplace and household productivity, as well as lost quality of life. The 2019 cost of these factors are a direct function of life expectancy, shifts in the age of crash victims, the mix of crash victims by gender (because wages differ between genders), and real growth in wages. Expressing 2019 unit costs for these wage and lifespan influenced cost categories would thus attribute the 2019 life expectancy, crash age, crash gender profile, and real wages to previous years when these expected lifespans, demographic involvement, and real wages were different.

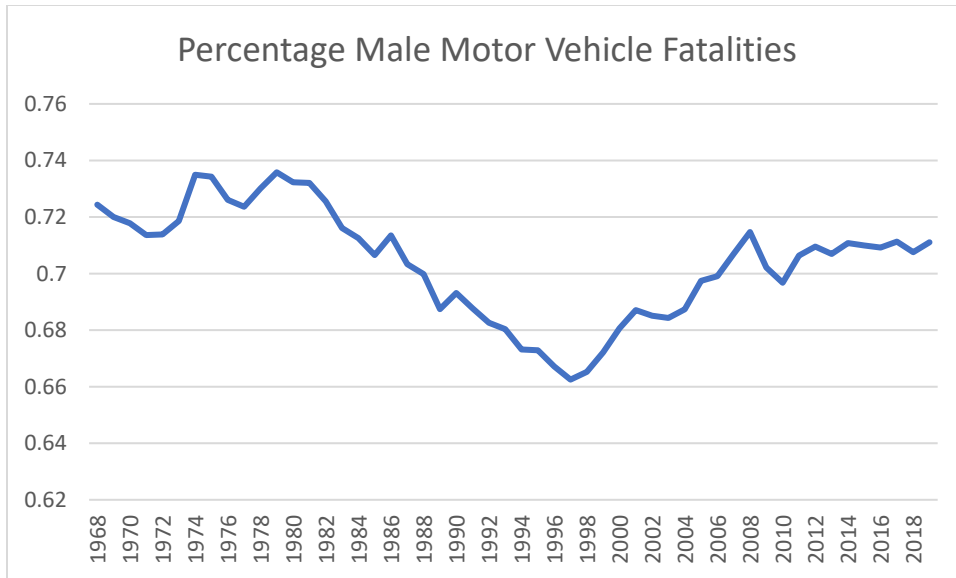
Figure 8 shows the shift in life expectancy over time starting from 1968 to 2019. The average expected lifespan increased by roughly 10 years for men and 7 years for women over this timeframe, implying that the expected lifespans over which crash victims would lose productivity and quality of life would be lower in previous years than in 2019.



Source: National Center for Health Statistics, National Vital Statistics System, Mortality

Figure 8. Life expectancy by sex and CY

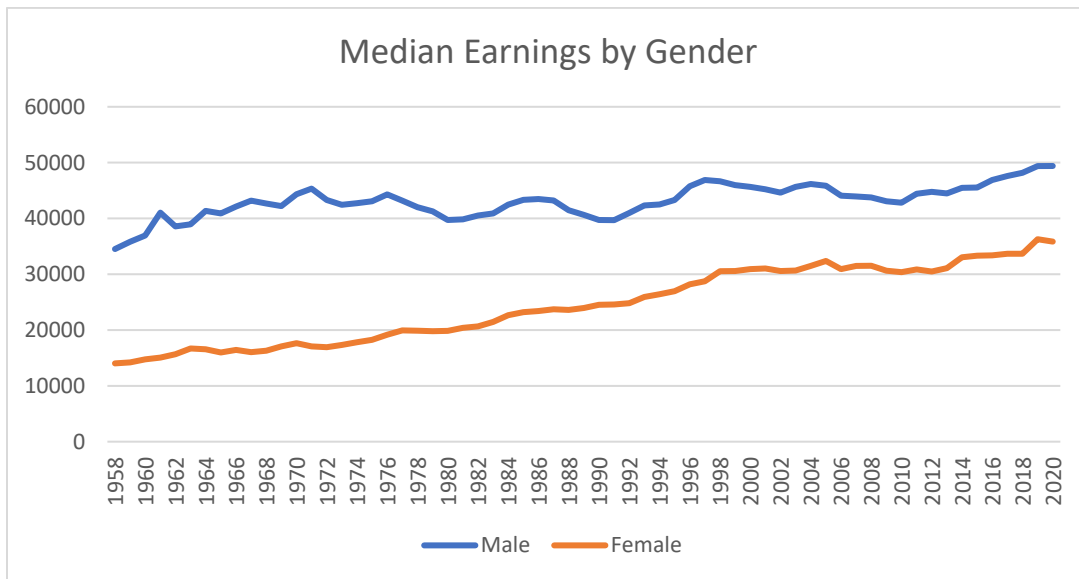
Likewise, the portion of motor vehicle crash victims that was male has changed over time. Figure 9 shows the portion of total fatalities that was male from 1968 to 2019. The portion has fluctuated over time, with a decline during the 1990s followed by gradual increases in the 2000s, but the variation has been within a relatively narrow range of 66 to 73 percent.



Source: FARS

Figure 9. Percentages of male motor vehicle fatalities

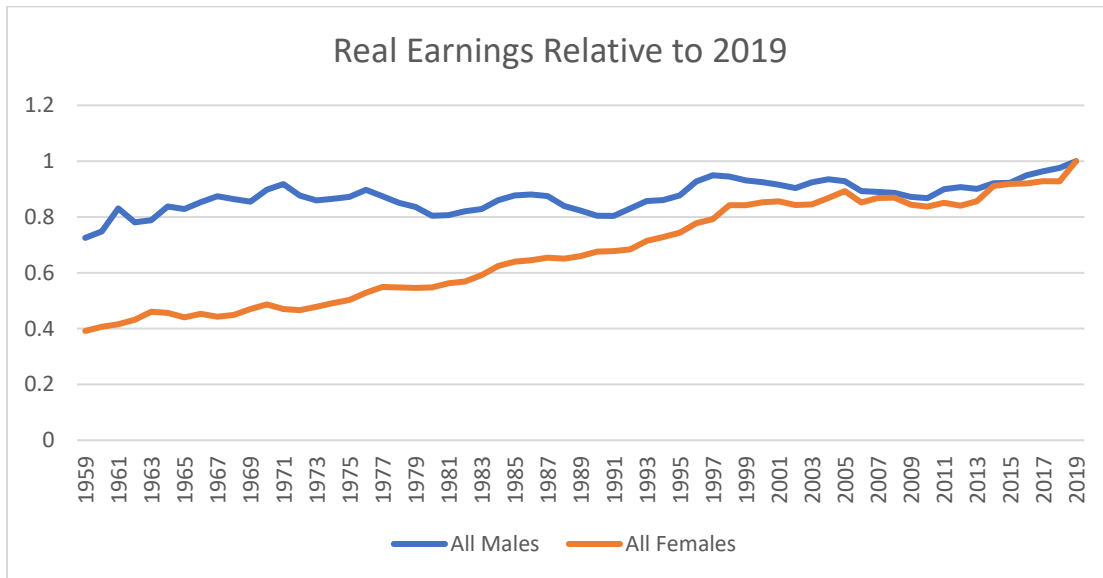
Figure 10 shows the change in real earnings for male and female employees. There is a significant gap in wages by gender in earlier years that narrowed considerably over time. The growth in real wages for women has thus outpaced that for men over time, but earnings have still not reached parity.



Source: U.S. Census Bureau, Current Population Survey, 1961 to 2021 Annual Social and Economic Supplements

Figure 10. Median earnings by gender

Figure 11 shows the change in real earnings relative to 2019 for male and female employees. Because the two data trends are normalized to current earning, the difference in trendlines is more apparent.



Source: U.S. Census Bureau, Current Population Survey, 1961 to 2021 Annual Social and Economic Supplements

Figure 11. Real earnings relative to 2019

To estimate the societal impacts of safety improvements on lifetime earnings, household productivity, and quality of life for each CY, we developed relative factors that express expected life years lost and real earnings as a function of 2019 values. We then calculated CY values for these categories in 2019\$ by applying these factors to the 2019 value.

This process is shown below for lost earnings from fatalities. Similar adjustments were made for other injury severity categories.

$$E_{(n)} = (W_m * (Y_{m(n)} * F_{m(n)} * P_{(n)}) + (W_f * (Y_{f(n)} * F_{f(n)} * (1 - P_{(n)})))$$

Where:

$E_{(n)}$ = average lifetime earnings lost due to fatality in CY n

W_m = 2019 male lifetime earnings lost (fatality)⁹

$Y_{m(n)}$ = factor relating expected male life years lost in CY n to 2019

$F_{m(n)}$ = factor relating male earnings in CY n to 2019¹⁰

⁹ The 2019 baseline values represent undiscounted unit costs from Blincoe et al., 2023, with the assumption of 1% productivity growth removed. Productivity growth in that reports' context represented future growth and is thus not relevant to this retrospective analysis. In this study, we are estimating previous years' wage loss directly from real earnings data.

¹⁰ Ibid.

$P_{(n)}$ = portion of fatalities in CY n that are male

W_f = 2019 female lifetime earnings lost (fatality)

$Y_{f(n)}$ = factor relating expected female life years lost in CY n to 2019

$F_{f(n)}$ = factor relating female earnings in CY n to 2019

$$Y_{m(n)} = (L_{m(n)} - A_{m(n)}) / (L_{m(2019)} - A_{m(2019)})$$

Where:

$L_{m(n)}$ = Expected lifespan of males in CY n

$A_{m(n)}$ = Average age of male victim at time of crash in CY n

$$Y_{f(n)} = (L_{f(n)} - A_{f(n)}) / (L_{f(2019)} - A_{f(2019)})$$

Where:

$L_{f(n)}$ = Expected lifespan of females in CY n

$A_{f(n)}$ = Average age of female victim at time of crash in CY n

Table 29, Table 30, and Table 31 show the resulting lifetime values for lost earnings, lost household productivity, and lost quality of life by CY and injury severity.

Table 29. Lost wages unit value of lifetime savings by CY (2019\$) – undiscounted

| CY | PDO | MAIS0 | MAIS1 | MAIS2 | MAIS3 | MAIS4 | MAIS5 | Fatal |
|-----------|------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| 1968 | NA | NA | \$2,419 | \$10,690 | \$64,298 | \$139,451 | \$309,210 | \$1,213,948 |
| 1969 | NA | NA | \$2,411 | \$10,658 | \$64,335 | \$139,532 | \$309,391 | \$1,214,659 |
| 1970 | NA | NA | \$2,523 | \$11,151 | \$67,919 | \$147,305 | \$326,625 | \$1,282,321 |
| 1971 | NA | NA | \$2,549 | \$11,265 | \$69,191 | \$150,064 | \$332,744 | \$1,306,342 |
| 1972 | NA | NA | \$2,450 | \$10,829 | \$66,363 | \$143,929 | \$319,139 | \$1,252,932 |
| 1973 | NA | NA | \$2,426 | \$10,725 | \$66,017 | \$143,180 | \$317,479 | \$1,246,415 |
| 1974 | NA | NA | \$2,472 | \$10,926 | \$68,879 | \$149,387 | \$331,241 | \$1,300,444 |
| 1975 | NA | NA | \$2,497 | \$11,037 | \$70,306 | \$152,482 | \$338,105 | \$1,327,390 |
| 1976 | NA | NA | \$2,569 | \$11,354 | \$72,808 | \$157,909 | \$350,137 | \$1,374,627 |
| 1977 | NA | NA | \$2,532 | \$11,191 | \$72,502 | \$157,245 | \$348,666 | \$1,368,855 |
| 1978 | NA | NA | \$2,481 | \$10,969 | \$71,936 | \$156,017 | \$345,942 | \$1,358,157 |
| 1979 | NA | NA | \$2,449 | \$10,827 | \$71,963 | \$156,077 | \$346,075 | \$1,358,679 |
| 1980 | NA | NA | \$2,374 | \$10,493 | \$68,941 | \$149,521 | \$331,539 | \$1,301,614 |
| 1981 | NA | NA | \$2,391 | \$10,571 | \$69,205 | \$150,093 | \$332,808 | \$1,306,594 |
| 1982 | NA | NA | \$2,424 | \$10,717 | \$70,454 | \$152,802 | \$338,814 | \$1,330,175 |
| 1983 | NA | NA | \$2,456 | \$10,854 | \$70,313 | \$152,497 | \$338,137 | \$1,327,517 |
| 1984 | NA | NA | \$2,556 | \$11,298 | \$72,795 | \$157,881 | \$350,076 | \$1,374,387 |
| 1985 | NA | NA | \$2,606 | \$11,517 | \$73,460 | \$159,323 | \$353,273 | \$1,386,938 |
| 1986 | NA | NA | \$2,624 | \$11,597 | \$74,816 | \$162,263 | \$359,791 | \$1,412,529 |
| 1987 | NA | NA | \$2,611 | \$11,543 | \$73,298 | \$158,972 | \$352,494 | \$1,383,883 |

| CY | PDO | MAIS0 | MAIS1 | MAIS2 | MAIS3 | MAIS4 | MAIS5 | Fatal |
|-----------|------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| 1988 | NA | NA | \$2,526 | \$11,163 | \$69,465 | \$150,657 | \$334,059 | \$1,311,505 |
| 1989 | NA | NA | \$2,490 | \$11,008 | \$67,185 | \$145,714 | \$323,097 | \$1,268,468 |
| 1990 | NA | NA | \$2,468 | \$10,911 | \$66,809 | \$144,898 | \$321,288 | \$1,261,368 |
| 1991 | NA | NA | \$2,467 | \$10,903 | \$65,925 | \$142,980 | \$317,035 | \$1,244,672 |
| 1992 | NA | NA | \$2,529 | \$11,177 | \$66,679 | \$144,616 | \$320,663 | \$1,258,914 |
| 1993 | NA | NA | \$2,619 | \$11,575 | \$67,933 | \$147,334 | \$326,690 | \$1,282,574 |
| 1994 | NA | NA | \$2,637 | \$11,656 | \$67,960 | \$147,393 | \$326,819 | \$1,283,084 |
| 1995 | NA | NA | \$2,688 | \$11,883 | \$69,219 | \$150,124 | \$332,875 | \$1,306,858 |
| 1996 | NA | NA | \$2,830 | \$12,508 | \$72,848 | \$157,995 | \$350,329 | \$1,375,382 |
| 1997 | NA | NA | \$2,892 | \$12,782 | \$73,667 | \$159,772 | \$354,269 | \$1,390,849 |
| 1998 | NA | NA | \$2,937 | \$12,984 | \$74,278 | \$161,097 | \$357,207 | \$1,402,386 |
| 1999 | NA | NA | \$2,910 | \$12,862 | \$73,904 | \$160,285 | \$355,407 | \$1,395,318 |
| 2000 | NA | NA | \$2,909 | \$12,858 | \$75,550 | \$163,855 | \$363,323 | \$1,426,396 |
| 2001 | NA | NA | \$2,894 | \$12,791 | \$74,535 | \$161,653 | \$358,439 | \$1,407,221 |
| 2002 | NA | NA | \$2,854 | \$12,614 | \$74,431 | \$161,429 | \$357,943 | \$1,405,273 |
| 2003 | NA | NA | \$2,901 | \$12,825 | \$75,192 | \$163,079 | \$361,602 | \$1,419,640 |
| 2004 | NA | NA | \$2,949 | \$13,037 | \$77,889 | \$168,927 | \$374,568 | \$1,470,545 |
| 2005 | NA | NA | \$2,961 | \$13,087 | \$77,458 | \$167,992 | \$372,496 | \$1,462,409 |
| 2006 | NA | NA | \$2,840 | \$12,555 | \$75,547 | \$163,848 | \$363,308 | \$1,426,335 |
| 2007 | NA | NA | \$2,850 | \$12,598 | \$75,769 | \$164,329 | \$364,374 | \$1,430,521 |
| 2008 | NA | NA | \$2,844 | \$12,570 | \$74,482 | \$161,538 | \$358,185 | \$1,406,223 |
| 2009 | NA | NA | \$2,787 | \$12,320 | \$72,002 | \$156,160 | \$346,261 | \$1,359,409 |

| CY | PDO | MAIS0 | MAIS1 | MAIS2 | MAIS3 | MAIS4 | MAIS5 | Fatal |
|-----------|------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| 2010 | NA | NA | \$2,769 | \$12,237 | \$70,109 | \$152,055 | \$337,156 | \$1,323,666 |
| 2011 | NA | NA | \$2,856 | \$12,624 | \$72,855 | \$158,011 | \$350,364 | \$1,375,518 |
| 2012 | NA | NA | \$2,863 | \$12,656 | \$73,214 | \$158,788 | \$352,087 | \$1,382,285 |
| 2013 | NA | NA | \$2,864 | \$12,661 | \$71,901 | \$155,941 | \$345,774 | \$1,357,499 |
| 2014 | NA | NA | \$2,962 | \$13,091 | \$74,274 | \$161,087 | \$357,186 | \$1,402,300 |
| 2015 | NA | NA | \$2,972 | \$13,136 | \$73,512 | \$159,435 | \$353,522 | \$1,387,919 |
| 2016 | NA | NA | \$3,036 | \$13,421 | \$74,566 | \$161,721 | \$358,590 | \$1,407,813 |
| 2017 | NA | NA | \$3,076 | \$13,598 | \$74,554 | \$161,696 | \$358,534 | \$1,407,594 |
| 2018 | NA | NA | \$3,103 | \$13,716 | \$74,396 | \$161,352 | \$357,773 | \$1,404,605 |
| 2019 | NA | NA | \$3,226 | \$14,261 | \$75,962 | \$164,749 | \$365,305 | \$1,434,177 |

Table 30. Lost household productivity unit value of lifetime savings by CY (2019\$) –undiscounted

| CY | PDO | MAIS0 | MAIS1 | MAIS2 | MAIS3 | MAIS4 | MAIS5 | Fatal |
|-----------|------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| 1968 | \$53 | \$41 | \$1,034 | \$4,296 | \$29,789 | \$70,035 | \$156,068 | \$511,146 |
| 1969 | \$53 | \$41 | \$1,031 | \$4,283 | \$30,139 | \$70,858 | \$157,901 | \$517,149 |
| 1970 | \$56 | \$43 | \$1,079 | \$4,481 | \$31,795 | \$74,751 | \$166,578 | \$545,568 |
| 1971 | \$56 | \$43 | \$1,090 | \$4,527 | \$32,226 | \$75,765 | \$168,836 | \$552,964 |
| 1972 | \$54 | \$42 | \$1,047 | \$4,352 | \$31,076 | \$73,060 | \$162,809 | \$533,224 |
| 1973 | \$53 | \$41 | \$1,037 | \$4,310 | \$31,018 | \$72,925 | \$162,508 | \$532,238 |
| 1974 | \$54 | \$42 | \$1,057 | \$4,391 | \$32,048 | \$75,346 | \$167,902 | \$549,904 |
| 1975 | \$55 | \$43 | \$1,068 | \$4,436 | \$32,814 | \$77,146 | \$171,915 | \$563,047 |
| 1976 | \$57 | \$44 | \$1,098 | \$4,563 | \$34,263 | \$80,553 | \$179,507 | \$587,911 |
| 1977 | \$56 | \$43 | \$1,082 | \$4,497 | \$34,555 | \$81,241 | \$181,039 | \$592,930 |
| 1978 | \$55 | \$42 | \$1,061 | \$4,408 | \$34,245 | \$80,512 | \$179,414 | \$587,608 |
| 1979 | \$54 | \$42 | \$1,047 | \$4,351 | \$34,123 | \$80,224 | \$178,773 | \$585,507 |
| 1980 | \$52 | \$40 | \$1,015 | \$4,217 | \$32,947 | \$77,459 | \$172,612 | \$565,329 |
| 1981 | \$53 | \$41 | \$1,022 | \$4,248 | \$33,185 | \$78,020 | \$173,862 | \$569,424 |
| 1982 | \$53 | \$41 | \$1,037 | \$4,307 | \$33,867 | \$79,623 | \$177,434 | \$581,122 |
| 1983 | \$54 | \$42 | \$1,050 | \$4,362 | \$34,151 | \$80,290 | \$178,920 | \$585,988 |
| 1984 | \$56 | \$44 | \$1,093 | \$4,541 | \$35,500 | \$83,462 | \$185,988 | \$609,140 |
| 1985 | \$57 | \$44 | \$1,114 | \$4,628 | \$36,016 | \$84,674 | \$188,691 | \$617,989 |
| 1986 | \$58 | \$45 | \$1,122 | \$4,661 | \$36,483 | \$85,772 | \$191,137 | \$626,002 |
| 1987 | \$57 | \$45 | \$1,116 | \$4,639 | \$36,196 | \$85,100 | \$189,639 | \$621,094 |

| CY | PDO | MAIS0 | MAIS1 | MAIS2 | MAIS3 | MAIS4 | MAIS5 | Fatal |
|-----------|------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| 1988 | \$56 | \$43 | \$1,080 | \$4,486 | \$34,640 | \$81,440 | \$181,484 | \$594,388 |
| 1989 | \$55 | \$42 | \$1,065 | \$4,424 | \$34,111 | \$80,196 | \$178,710 | \$585,303 |
| 1990 | \$54 | \$42 | \$1,055 | \$4,385 | \$33,932 | \$79,776 | \$177,774 | \$582,237 |
| 1991 | \$54 | \$42 | \$1,055 | \$4,382 | \$33,725 | \$79,288 | \$176,688 | \$578,680 |
| 1992 | \$56 | \$43 | \$1,081 | \$4,492 | \$34,103 | \$80,178 | \$178,671 | \$585,172 |
| 1993 | \$58 | \$45 | \$1,120 | \$4,652 | \$34,893 | \$82,035 | \$182,808 | \$598,724 |
| 1994 | \$58 | \$45 | \$1,127 | \$4,684 | \$35,239 | \$82,847 | \$184,620 | \$604,657 |
| 1995 | \$59 | \$46 | \$1,149 | \$4,776 | \$35,880 | \$84,356 | \$187,982 | \$615,669 |
| 1996 | \$62 | \$48 | \$1,210 | \$5,027 | \$37,894 | \$89,092 | \$198,535 | \$650,230 |
| 1997 | \$64 | \$49 | \$1,236 | \$5,137 | \$38,407 | \$90,297 | \$201,221 | \$659,029 |
| 1998 | \$65 | \$50 | \$1,256 | \$5,218 | \$39,023 | \$91,746 | \$204,449 | \$669,600 |
| 1999 | \$64 | \$50 | \$1,244 | \$5,169 | \$38,818 | \$91,263 | \$203,372 | \$666,074 |
| 2000 | \$64 | \$50 | \$1,244 | \$5,167 | \$39,373 | \$92,567 | \$206,280 | \$675,597 |
| 2001 | \$64 | \$49 | \$1,237 | \$5,140 | \$38,744 | \$91,089 | \$202,986 | \$664,809 |
| 2002 | \$63 | \$49 | \$1,220 | \$5,069 | \$38,700 | \$90,985 | \$202,754 | \$664,049 |
| 2003 | \$64 | \$49 | \$1,240 | \$5,154 | \$38,986 | \$91,658 | \$204,253 | \$668,957 |
| 2004 | \$65 | \$50 | \$1,261 | \$5,239 | \$40,486 | \$95,184 | \$212,111 | \$694,693 |
| 2005 | \$65 | \$50 | \$1,266 | \$5,260 | \$40,195 | \$94,500 | \$210,586 | \$689,701 |
| 2006 | \$63 | \$48 | \$1,214 | \$5,046 | \$39,050 | \$91,808 | \$204,587 | \$670,051 |
| 2007 | \$63 | \$49 | \$1,218 | \$5,063 | \$39,138 | \$92,015 | \$205,049 | \$671,566 |
| 2008 | \$63 | \$48 | \$1,216 | \$5,052 | \$38,146 | \$89,683 | \$199,852 | \$654,546 |
| 2009 | \$61 | \$48 | \$1,192 | \$4,951 | \$37,334 | \$87,775 | \$195,600 | \$640,620 |

| CY | PDO | MAIS0 | MAIS1 | MAIS2 | MAIS3 | MAIS4 | MAIS5 | Fatal |
|-----------|------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| 2010 | \$61 | \$47 | \$1,184 | \$4,918 | \$36,425 | \$85,637 | \$190,836 | \$625,015 |
| 2011 | \$63 | \$49 | \$1,221 | \$5,073 | \$37,448 | \$88,043 | \$196,197 | \$642,575 |
| 2012 | \$63 | \$49 | \$1,224 | \$5,086 | \$37,385 | \$87,894 | \$195,866 | \$641,491 |
| 2013 | \$63 | \$49 | \$1,225 | \$5,088 | \$37,040 | \$87,083 | \$194,059 | \$635,573 |
| 2014 | \$65 | \$50 | \$1,266 | \$5,261 | \$38,313 | \$90,076 | \$200,728 | \$657,414 |
| 2015 | \$65 | \$51 | \$1,271 | \$5,279 | \$38,151 | \$89,695 | \$199,880 | \$654,635 |
| 2016 | \$67 | \$52 | \$1,298 | \$5,394 | \$38,641 | \$90,848 | \$202,448 | \$663,048 |
| 2017 | \$68 | \$52 | \$1,315 | \$5,465 | \$38,487 | \$90,485 | \$201,640 | \$660,399 |
| 2018 | \$68 | \$53 | \$1,327 | \$5,512 | \$38,515 | \$90,552 | \$201,788 | \$660,884 |
| 2019 | \$71 | \$55 | \$1,379 | \$5,731 | \$39,644 | \$93,206 | \$207,703 | \$680,257 |

Table 31. Lost QALYs unit value of lifetime savings by CY (2019\$) – undiscounted

| CY | PDO | MAIS0 | MAIS1 | MAIS2 | MAIS3 | MAIS4 | MAIS5 | Fatal |
|-----------|------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| 1968 | NA | NA | \$22,965 | \$251,351 | \$1,147,338 | \$1,556,643 | \$3,757,935 | \$6,834,355 |
| 1969 | NA | NA | \$22,896 | \$250,599 | \$1,155,699 | \$1,567,987 | \$3,785,320 | \$6,884,159 |
| 1970 | NA | NA | \$23,953 | \$262,174 | \$1,219,552 | \$1,654,620 | \$3,994,463 | \$7,264,516 |
| 1971 | NA | NA | \$24,199 | \$264,865 | \$1,238,591 | \$1,680,451 | \$4,056,821 | \$7,377,924 |
| 1972 | NA | NA | \$23,263 | \$254,620 | \$1,191,818 | \$1,616,992 | \$3,903,623 | \$7,099,312 |
| 1973 | NA | NA | \$23,039 | \$252,168 | \$1,188,028 | \$1,611,850 | \$3,891,211 | \$7,076,737 |
| 1974 | NA | NA | \$23,471 | \$256,898 | \$1,232,240 | \$1,671,834 | \$4,036,018 | \$7,340,091 |
| 1975 | NA | NA | \$23,710 | \$259,511 | \$1,260,129 | \$1,709,673 | \$4,127,367 | \$7,506,222 |
| 1976 | NA | NA | \$24,390 | \$266,953 | \$1,311,480 | \$1,779,342 | \$4,295,558 | \$7,812,102 |
| 1977 | NA | NA | \$24,039 | \$263,115 | \$1,316,067 | \$1,785,566 | \$4,310,584 | \$7,839,428 |
| 1978 | NA | NA | \$23,562 | \$257,891 | \$1,304,854 | \$1,770,353 | \$4,273,856 | \$7,772,633 |
| 1979 | NA | NA | \$23,257 | \$254,555 | \$1,302,220 | \$1,766,778 | \$4,265,227 | \$7,756,941 |
| 1980 | NA | NA | \$22,541 | \$246,714 | \$1,253,475 | \$1,700,644 | \$4,105,570 | \$7,466,581 |
| 1981 | NA | NA | \$22,708 | \$248,537 | \$1,260,875 | \$1,710,685 | \$4,129,810 | \$7,510,666 |
| 1982 | NA | NA | \$23,021 | \$251,967 | \$1,285,547 | \$1,744,158 | \$4,210,619 | \$7,657,628 |
| 1983 | NA | NA | \$23,316 | \$255,198 | \$1,291,103 | \$1,751,696 | \$4,228,816 | \$7,690,721 |
| 1984 | NA | NA | \$24,270 | \$265,643 | \$1,340,007 | \$1,818,046 | \$4,388,993 | \$7,982,027 |
| 1985 | NA | NA | \$24,740 | \$270,786 | \$1,356,675 | \$1,840,660 | \$4,443,587 | \$8,081,314 |
| 1986 | NA | NA | \$24,912 | \$272,664 | \$1,377,138 | \$1,868,423 | \$4,510,610 | \$8,203,206 |
| 1987 | NA | NA | \$24,795 | \$271,390 | \$1,359,707 | \$1,844,774 | \$4,453,518 | \$8,099,375 |

| CY | PDO | MAIS0 | MAIS1 | MAIS2 | MAIS3 | MAIS4 | MAIS5 | Fatal |
|-----------|------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| 1988 | NA | NA | \$23,981 | \$262,471 | \$1,296,381 | \$1,758,857 | \$4,246,103 | \$7,722,161 |
| 1989 | NA | NA | \$23,647 | \$258,815 | \$1,267,887 | \$1,720,198 | \$4,152,776 | \$7,552,432 |
| 1990 | NA | NA | \$23,438 | \$256,535 | \$1,261,074 | \$1,710,954 | \$4,130,460 | \$7,511,847 |
| 1991 | NA | NA | \$23,421 | \$256,349 | \$1,249,975 | \$1,695,896 | \$4,094,108 | \$7,445,735 |
| 1992 | NA | NA | \$24,011 | \$262,802 | \$1,264,104 | \$1,715,066 | \$4,140,386 | \$7,529,899 |
| 1993 | NA | NA | \$24,865 | \$272,156 | \$1,291,305 | \$1,751,970 | \$4,229,478 | \$7,691,926 |
| 1994 | NA | NA | \$25,039 | \$274,054 | \$1,299,494 | \$1,763,081 | \$4,256,301 | \$7,740,707 |
| 1995 | NA | NA | \$25,527 | \$279,393 | \$1,323,314 | \$1,795,399 | \$4,334,320 | \$7,882,596 |
| 1996 | NA | NA | \$26,870 | \$294,095 | \$1,395,773 | \$1,893,707 | \$4,571,649 | \$8,314,214 |
| 1997 | NA | NA | \$27,458 | \$300,536 | \$1,413,474 | \$1,917,722 | \$4,629,624 | \$8,419,650 |
| 1998 | NA | NA | \$27,891 | \$305,273 | \$1,432,079 | \$1,942,965 | \$4,690,564 | \$8,530,478 |
| 1999 | NA | NA | \$27,629 | \$302,408 | \$1,424,659 | \$1,932,897 | \$4,666,258 | \$8,486,274 |
| 2000 | NA | NA | \$27,621 | \$302,314 | \$1,449,228 | \$1,966,231 | \$4,746,731 | \$8,632,625 |
| 2001 | NA | NA | \$27,477 | \$300,738 | \$1,427,447 | \$1,936,680 | \$4,675,390 | \$8,502,883 |
| 2002 | NA | NA | \$27,097 | \$296,577 | \$1,425,686 | \$1,934,291 | \$4,669,625 | \$8,492,397 |
| 2003 | NA | NA | \$27,550 | \$301,535 | \$1,437,727 | \$1,950,627 | \$4,709,060 | \$8,564,116 |
| 2004 | NA | NA | \$28,004 | \$306,513 | \$1,491,638 | \$2,023,770 | \$4,885,639 | \$8,885,250 |
| 2005 | NA | NA | \$28,113 | \$307,705 | \$1,481,837 | \$2,010,474 | \$4,853,538 | \$8,826,871 |
| 2006 | NA | NA | \$26,970 | \$295,192 | \$1,441,730 | \$1,956,058 | \$4,722,172 | \$8,587,961 |
| 2007 | NA | NA | \$27,062 | \$296,196 | \$1,445,352 | \$1,960,972 | \$4,734,035 | \$8,609,537 |
| 2008 | NA | NA | \$27,002 | \$295,546 | \$1,413,235 | \$1,917,397 | \$4,628,841 | \$8,418,225 |
| 2009 | NA | NA | \$26,464 | \$289,658 | \$1,376,788 | \$1,867,949 | \$4,509,466 | \$8,201,126 |

| CY | PDO | MAIS0 | MAIS1 | MAIS2 | MAIS3 | MAIS4 | MAIS5 | Fatal |
|-----------|------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| 2010 | NA | NA | \$26,288 | \$287,724 | \$1,342,259 | \$1,821,101 | \$4,396,370 | \$7,995,443 |
| 2011 | NA | NA | \$27,118 | \$296,810 | \$1,385,505 | \$1,879,776 | \$4,538,017 | \$8,253,049 |
| 2012 | NA | NA | \$27,188 | \$297,577 | \$1,386,600 | \$1,881,260 | \$4,541,601 | \$8,259,568 |
| 2013 | NA | NA | \$27,198 | \$297,689 | \$1,369,263 | \$1,857,740 | \$4,484,819 | \$8,156,301 |
| 2014 | NA | NA | \$28,122 | \$307,795 | \$1,415,621 | \$1,920,635 | \$4,636,656 | \$8,432,438 |
| 2015 | NA | NA | \$28,218 | \$308,855 | \$1,406,445 | \$1,908,185 | \$4,606,602 | \$8,377,780 |
| 2016 | NA | NA | \$28,830 | \$315,548 | \$1,425,296 | \$1,933,761 | \$4,668,345 | \$8,490,071 |
| 2017 | NA | NA | \$29,210 | \$319,709 | \$1,421,643 | \$1,928,806 | \$4,656,381 | \$8,468,312 |
| 2018 | NA | NA | \$29,464 | \$322,487 | \$1,442,435 | \$1,957,015 | \$4,724,481 | \$8,592,162 |
| 2019 | NA | NA | \$30,634 | \$335,294 | \$1,458,447 | \$1,978,739 | \$4,776,927 | \$8,687,542 |

These values represent the lifetime unit costs of each life saved or injury avoided during a specific CY. They will be spread over subsequent years of life lost, or, for nonfatal injuries, over some lesser number of years that are affected by the injury outcome. Generally, the years affected declines as injury severity declines. For example, the impact of lost quality of life from a fatality might be spread over 36 years that would have been the victim's remaining expected life span, but minor injuries costs might only affect 2 years.

Distribution Process

The results shown in Table 29, Table 30, and Table 31 for lost wages, household productivity, and QALYs represent undiscounted lifetime impacts from each injury avoided in a specific CY, expressed in 2019 dollars. Each of these impacts will be distributed over the CYs that they would impact, which includes the CY in which they occur plus some subset of future CYs, dependent on injury severity and the nature of each cost factor. For example, fatalities would affect all future CYs that the victim would have lived. Lifetime activities such as household production and lost quality of life would be distributed over the entire remaining lifespan of the victim. Lost wages are distributed through the victim's remaining lifespan, up to age 65, when people typically retire. Property damage or congestion would only affect first year costs and would not be distributed over future years. Medical care for nonfatal injuries would be spread across future years, but serious injuries would impact many more years than minor injuries.

To determine the distribution timeframe for each component, we broke out the first-year cost portion of lifetime costs from lost earnings, household productivity, and lost quality of life noted in Table 32. Based on this we estimated the number of years to distribute lifetime benefits as a function of $1/(\text{first year cost percentage})$.¹¹ This requires an assumption that remaining benefits will be evenly distributed over the time horizon that is affected by the injury. It is unlikely that benefits are actually distributed evenly over a crash victim's lifetime, but we are unable to identify the specific time stream of these impacts. Assuming an equal distribution will understate costs in some years while overstating it in others. Since each future CY's impacts are a sum of all previous years that impact it, hypothetically, these impacts will be somewhat offsetting.¹² As noted, we examined first year portion for the lifetime unit costs in Blincoe et al. (2023).

Table 32 shows the resulting estimates we used for distributions by MAIS for lost earnings, household productivity, and lost quality of life.

¹¹ May not match due to rounding to whole years.

¹² In fact, for all CYs that equal or exceed the timeframe over which the impacts are distributed, the offsets would be almost exact. Impacts from unequal distribution would primarily only affect the earliest CYs.

Table 32. Estimates for distributions by MAIS for lost earnings, household productivity, and lost quality of life

| MAIS | Average First Year Portion of Lifetime Cost Impacts | | |
|-------|---|-----------|------|
| | Wages | Household | QALY |
| 1 | 52% | 52% | 52% |
| 2 | 19% | 18% | 16% |
| 3 | 9% | 7% | 7% |
| 4 | 5% | 4% | 4% |
| 5 | 3% | 3% | 3% |
| Fatal | 3% | 3% | 3% |
| MAIS | Wages | Household | QALY |
| 1 | 2 | 2 | 2 |
| 2 | 5 | 6 | 6 |
| 3 | 11 | 14 | 14 |
| 4 | 20 | 25 | 25 |
| 5 | 20 | 36 | 36 |
| Fatal | 20 | 36 | 36 |

The timeframes differ by injury severity and cost category. To calculate the total impact of each CYs fatalities or injuries on subsequent CYs, we spread each CYs impacts across the average number of life years lost per fatality/injury in a motor vehicle crash and added each CYs specific years of impacts. Note that this assumes that the lives lost in previous years would have been valued at wage rates present during subsequent years when they would have been alive. That is, for example, a person killed in 1968 would have been making 1975 real wages in 1975 had they lived.

This process can be summarized as:

$$U_n = [E_n * F_n * S_n + \sum_{z=n-1}^{n-Y-1} E_n * (1-F)/(Y-1) * S_z] / S_n$$

Where:

U_n = unit cost savings per fatality/injury avoided for CY_n

E_n = lifetime cost savings for CY_n

F = First year portion of lifetime costs

S_n = Fatalities/injuries prevented in year n

Y = years distributed

This process is shown in Table 33 and Table 34 using wage loss for MAIS2 injuries as an example. In Table 33, an abbreviated version (showing impacts through 1975) of the initial distribution matrix is shown for MAIS2 injuries prevented. The first-year percentage and years distribution are taken from Table 32. The lifetime earnings loss values are from Table 29. The losses from CY 1968 are distributed horizontally across the 5-year period from CYs 1968 to 1972. The value assigned in each CY are based on the real (2019\$) wage rates prevalent in that year, defined by each CYs undiscounted lifetime earnings. The value for 1968 is 19 percent of \$10,690.¹³ The remaining value is distributed across 4 more years – a total of 5 years affected by MAIS2 injuries in 1968. By 1973, all of the impact from the 1968 MAIS2 injuries prevented has been exhausted. In CY 1973 society experiences lost earnings from injuries that occurred from 1969 to 1973.

Table 33. Abbreviated initial distribution matrix for MAIS2 injuries prevented

| Distribution Matrix Example, Value per MAIS2 Injury Prevented, Current CY Costs | | | | | | | | |
|--|----------|----------|----------|----------|----------|----------|----------|----------|
| First Year % = 19% | | | | | | | | |
| Years Distribution = 5 | | | | | | | | |
| Lifetime Earnings Loss (2019\$), MAIS2 Injuries, undiscounted | | | | | | | | |
| | \$10,690 | \$10,658 | \$11,151 | \$11,265 | \$10,829 | \$10,725 | \$10,926 | \$11,037 |
| CY | 1968 | 1969 | 1970 | 1971 | 1972 | 1973 | 1974 | 1975 |
| 1968 | \$2,031 | \$2,158 | \$2,258 | \$2,281 | \$2,193 | | | |
| 1969 | | \$2,025 | \$2,258 | \$2,281 | \$2,193 | \$2,172 | | |
| 1970 | | | \$2,119 | \$2,281 | \$2,193 | \$2,172 | \$2,213 | |
| 1971 | | | | \$2,140 | \$2,193 | \$2,172 | \$2,213 | \$2,235 |
| 1972 | | | | | \$2,058 | \$2,172 | \$2,213 | \$2,235 |
| 1973 | | | | | | \$2,038 | \$2,213 | \$2,235 |
| 1974 | | | | | | | \$2,076 | \$2,235 |
| 1975 | | | | | | | | \$2,097 |

¹³ Note that cost savings that accrue during the first year after a crash is averted could technically be spread throughout several CYs. In a given CY, first year cost savings might, on average, only accrue for half the specific CY. Each following CY might experience savings from crashes averted in that year and the previous year. We did not specifically adjust for this for several reasons. The first is that the shifts are minor and will largely be offset over the years affected. The second is that it is likely that cost savings are not evenly distributed throughout the first year after a crash is averted. For many cost categories they will likely be front loaded. Medical care, for example, would likely be concentrated in the days, weeks, or months immediately following the crash, which implies that a simple assumption that half of first year expenses occurred in the CY of the crash would understate that portion. We do not have data to precisely estimate within-year distributions, but overall, we believe the impact of this is minor.

Table 34 shows the total savings per MAIS2 injury prevented by CY from both the current and all previous CYs. Each cell value in Table 33 is multiplied by the total number of injuries prevented in the corresponding CY to produce the saving from those previous CY injuries prevented. The total savings for each CY are determined by adding the values in each column of Table 34. The total is then normalized to the injuries prevented in the current CY by dividing each CYs total savings by the total MAIS2 injuries prevented in that CY. This produces results shown in the bottom row of Table 34, which represent unit costs normalized to each year's savings. Note that these normalized unit benefits are not benefits that are due to injuries prevented that year. Rather, they are benefits that are experienced that year. In 1975, society experienced \$0.82 billion in additional earnings due to injuries prevented from 1971 to 1975. These earnings are the equivalent of \$10,809 for every MAIS2 prevented in 1975.

Table 34. Total savings by CY from previous CY distributions, and average unit cost per CY injury prevented – (billions in 2019\$)

| CY | MAIS2 Prevented | 1968 | 1969 | 1970 | 1971 | 1972 | 1973 | 1974 | 1975 |
|--|------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| 1968 | 22,677 | \$0.05 | \$0.05 | \$0.05 | \$0.05 | \$0.05 | \$0.00 | \$0.00 | \$0.00 |
| 1969 | 41,974 | \$0.00 | \$0.09 | \$0.09 | \$0.10 | \$0.09 | \$0.09 | \$0.00 | \$0.00 |
| 1970 | 55,204 | \$0.00 | \$0.00 | \$0.12 | \$0.13 | \$0.12 | \$0.12 | \$0.12 | \$0.00 |
| 1971 | 64,605 | \$0.00 | \$0.00 | \$0.00 | \$0.14 | \$0.14 | \$0.14 | \$0.14 | \$0.14 |
| 1972 | 77,743 | \$0.00 | \$0.00 | \$0.00 | \$0.00 | \$0.16 | \$0.17 | \$0.17 | \$0.17 |
| 1973 | 82,274 | \$0.00 | \$0.00 | \$0.00 | \$0.00 | \$0.00 | \$0.17 | \$0.18 | \$0.18 |
| 1974 | 71,945 | \$0.00 | \$0.00 | \$0.00 | \$0.00 | \$0.00 | \$0.00 | \$0.15 | \$0.16 |
| 1975 | 76,085 | \$0.00 | \$0.00 | \$0.00 | \$0.00 | \$0.00 | \$0.00 | \$0.00 | \$0.16 |
| 1976 | 82,427 | \$0.00 | \$0.00 | \$0.00 | \$0.00 | \$0.00 | \$0.00 | \$0.00 | \$0.00 |
| CY Total | | \$0.05 | \$0.13 | \$0.26 | \$0.41 | \$0.56 | \$0.69 | \$0.77 | \$0.82 |
| Normalize to Per CY Fatality (dollars) | | \$2,031 | \$3,191 | \$4,763 | \$6,372 | \$7,261 | \$8,361 | \$10,682 | \$10,809 |

We applied this same procedure to household productivity and lost quality of life. Both are dependent on changes in life years lost and real wages. The results are shown in Table 35 for fatalities. This same approach was applied for all nonfatal crash severity categories as well.

Table 35. Normalized unit value of fatality savings by CY (2019\$)

| CY | Lost Wages | Household Productivity | QALY |
|-----------|-------------------|-------------------------------|-------------|
| 1968 | \$60,697 | \$14,198 | \$189,843 |
| 1969 | \$102,775 | \$24,309 | \$323,602 |
| 1970 | \$152,253 | \$35,987 | \$479,186 |
| 1971 | \$191,712 | \$45,083 | \$601,527 |
| 1972 | \$209,085 | \$49,435 | \$658,171 |
| 1973 | \$241,907 | \$57,388 | \$763,038 |
| 1974 | \$323,124 | \$75,909 | \$1,013,227 |
| 1975 | \$338,787 | \$79,836 | \$1,064,331 |
| 1976 | \$398,092 | \$94,588 | \$1,256,880 |
| 1977 | \$417,404 | \$100,446 | \$1,328,041 |
| 1978 | \$444,976 | \$106,955 | \$1,414,760 |
| 1979 | \$486,842 | \$116,555 | \$1,544,147 |
| 1980 | \$504,261 | \$121,675 | \$1,607,026 |
| 1981 | \$581,791 | \$140,861 | \$1,857,943 |
| 1982 | \$716,638 | \$173,934 | \$2,291,989 |
| 1983 | \$749,962 | \$183,914 | \$2,413,757 |
| 1984 | \$750,437 | \$184,778 | \$2,421,284 |
| 1985 | \$641,989 | \$158,920 | \$2,078,166 |
| 1986 | \$561,708 | \$138,298 | \$1,812,276 |
| 1987 | \$539,007 | \$134,394 | \$1,752,566 |
| 1988 | \$513,583 | \$130,495 | \$1,695,363 |
| 1989 | \$543,338 | \$142,072 | \$1,833,218 |
| 1990 | \$584,988 | \$154,712 | \$1,996,044 |
| 1991 | \$607,906 | \$163,821 | \$2,107,851 |
| 1992 | \$652,963 | \$178,223 | \$2,293,346 |
| 1993 | \$654,954 | \$181,851 | \$2,336,277 |
| 1994 | \$650,630 | \$184,159 | \$2,357,573 |
| 1995 | \$675,332 | \$193,185 | \$2,473,403 |
| 1996 | \$699,138 | \$202,599 | \$2,590,549 |

| CY | Lost Wages | Household Productivity | QALY |
|-----------|-------------------|-------------------------------|-------------|
| 1997 | \$734,710 | \$215,493 | \$2,753,109 |
| 1998 | \$762,941 | \$227,668 | \$2,900,419 |
| 1999 | \$790,432 | \$237,954 | \$3,031,702 |
| 2000 | \$789,176 | \$237,567 | \$3,035,580 |
| 2001 | \$799,729 | \$241,532 | \$3,089,186 |
| 2002 | \$785,968 | \$238,039 | \$3,044,237 |
| 2003 | \$807,913 | \$244,515 | \$3,130,328 |
| 2004 | \$866,500 | \$263,187 | \$3,366,215 |
| 2005 | \$869,510 | \$264,663 | \$3,387,187 |
| 2006 | \$890,880 | \$272,332 | \$3,490,446 |
| 2007 | \$935,717 | \$288,770 | \$3,702,051 |
| 2008 | \$1,045,006 | \$323,704 | \$4,163,207 |
| 2009 | \$1,091,587 | \$346,310 | \$4,433,412 |
| 2010 | \$1,105,568 | \$355,445 | \$4,546,997 |
| 2011 | \$1,206,823 | \$388,030 | \$4,983,754 |
| 2012 | \$1,175,847 | \$379,203 | \$4,882,458 |
| 2013 | \$1,163,017 | \$382,411 | \$4,907,485 |
| 2014 | \$1,164,219 | \$387,623 | \$4,971,906 |
| 2015 | \$1,070,553 | \$362,370 | \$4,637,483 |
| 2016 | \$1,024,063 | \$349,953 | \$4,481,016 |
| 2017 | \$1,012,832 | \$348,526 | \$4,469,152 |
| 2018 | \$1,026,260 | \$358,296 | \$4,589,531 |
| 2019 | \$1,075,616 | \$382,903 | \$4,890,042 |

Estimated Property Damage Costs

To express impacts in current (2019) economic terms, this study applies the unit costs derived from the 2019 cost report to injuries experienced in previous years. Over time, changes in vehicle characteristics, safety technology, roadway design, and driver behavior can influence the injury profile that results from motor vehicle crashes. These changes are reflected in the incidence of different injury severities that are measured in NHTSA's FARS, Crash Investigation Sampling System, and Crash Report Sampling System databases over time, and are thus automatically accounted for in the Kahane (1988) safety analysis. Similarly, over time, the extent of property damage experienced in crashes can change due to the same factors mentioned above,

but also from changes in vehicle repair prices linked to vehicle content such as air bags or consumer preferences for larger, more expensive vehicles. The Corporate Average Fuel Economy standards, which resulted in the lightweighting of vehicles, advanced materials, and more expensive powertrains being used, also affected property damage costs. However, any such changes in the property damage profile are embedded in unit costs together with changes in the cost of repairing damaged vehicles that results from wage and material price changes. Expressing unit costs for property damage over time in constant 2019 dollars linked to the 2019 value would thus attribute the 2019 damage profile to previous years when this profile reflected damage to a different mix of vehicle types and technology content.

This shift in damage profiles is confirmed in changes in property damage costs measured in a series of cost reports over time. Examination of this data shows that the cost of property damage has exceeded inflation since the mid-1980s, likely reflecting the concepts discussed above. It is also illustrated in differences in the trend of indexes based on the Consumer Price Index (CPI). Figure 12 shows the trends in prices for the CPI All Items index (a measure of background inflation) and the CPI Auto Insurance index. There is a noticeable divergence in the two indexes starting in the mid-1980s. This shift reflects an acceleration in the cost of auto insurance premiums, which continues over time. This shift reflects any changes that would have caused higher premiums, including changes in the cost of repairing vehicles, as well as any changes that would have resulted from increases in bodily injury payments. It thus represents changes due to both property damage cost increases and medical payments for injury.

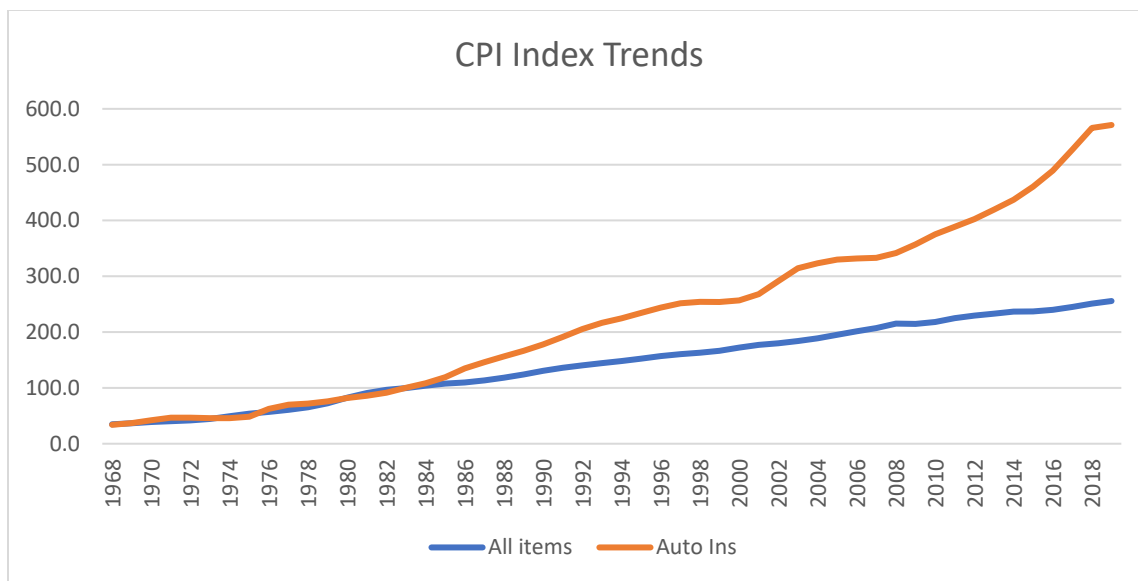


Figure 12. CPI index trends

Since the CPI for auto insurance is influenced by both background inflationary changes and external factors that influence both property damage and bodily injury premium costs, we derived a separate index that removes background inflation (as defined by CPI All Items) and isolates changes due to other factors that drive the cost of auto insurance. To estimate a trendline specific to these costs, we estimated previous years property damage costs as a function of the difference in multipliers between the CPI All Items and CPI Auto Insurance relative to 2019. This value was then indexed to 1983 to create a CPI equivalent index specific to auto insurance

cost changes beyond normal inflation. The CPI Medical Care index was adopted as a proxy for the trend in bodily injury losses.

To extract the trend for property damage only, we obtained insurance data from Blincoe et al. (2023), which shows that property damage makes up roughly 60 percent of both insurance premiums and incurred losses for auto insurance. Similar data from Blincoe et al. (2015) shows that this ratio stays relatively unchanged over the past decade. We used this 60/40 ratio to estimate the trend in property damage. Both medical care costs and property damage costs are specific to each category. The results are shown in Figure 13.

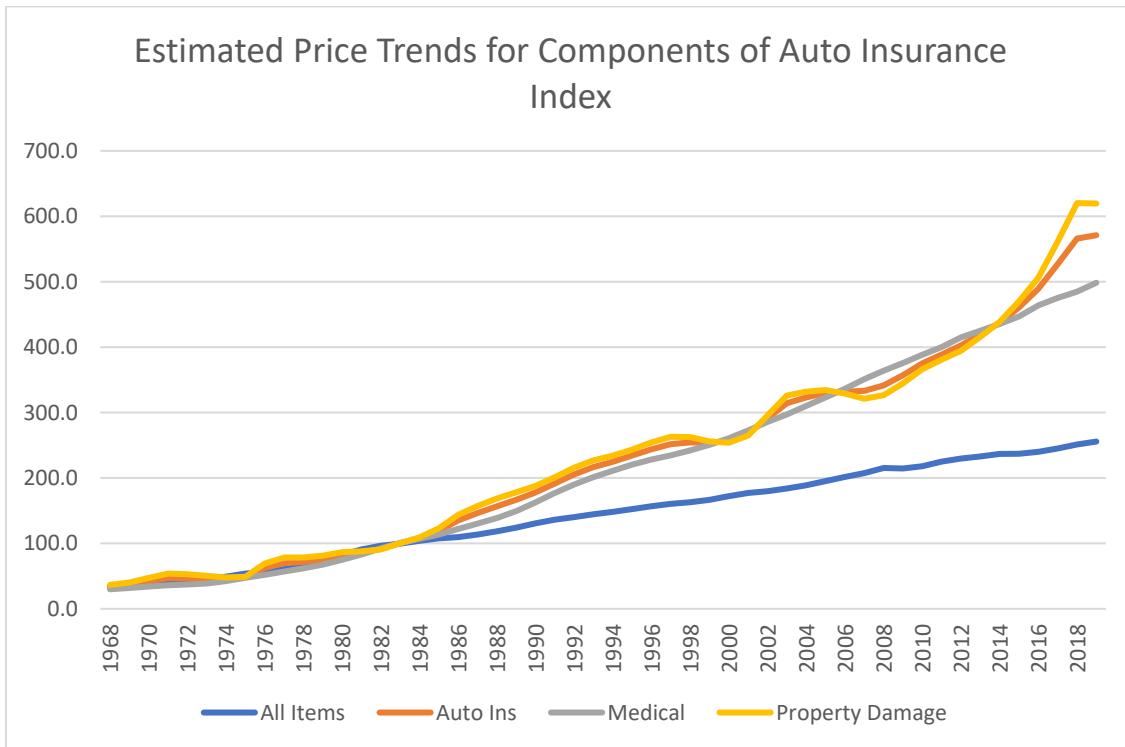


Figure 13. Estimated price trends for components of Auto Insurance index

The line titled Property Damage represents the removal of background inflation and the increase in bodily injury premiums from the Auto Insurance index. The trendline for this index closely parallels that for the Auto Insurance index as well as the Medical Care index. In various years either of the two component indexes may exceed the other, but, as would be expected, the Auto Insurance index always falls between the two component indexes.

The trends shown in Figure 13 represent current dollars for each component, but the goal of this process is to estimate the value of each year's property damage profile in 2019 economics. To accomplish this the current dollar values were adjusted to 2019\$ using the CPI All Items index. An example of the results for PDO vehicles is shown in Figure 14.

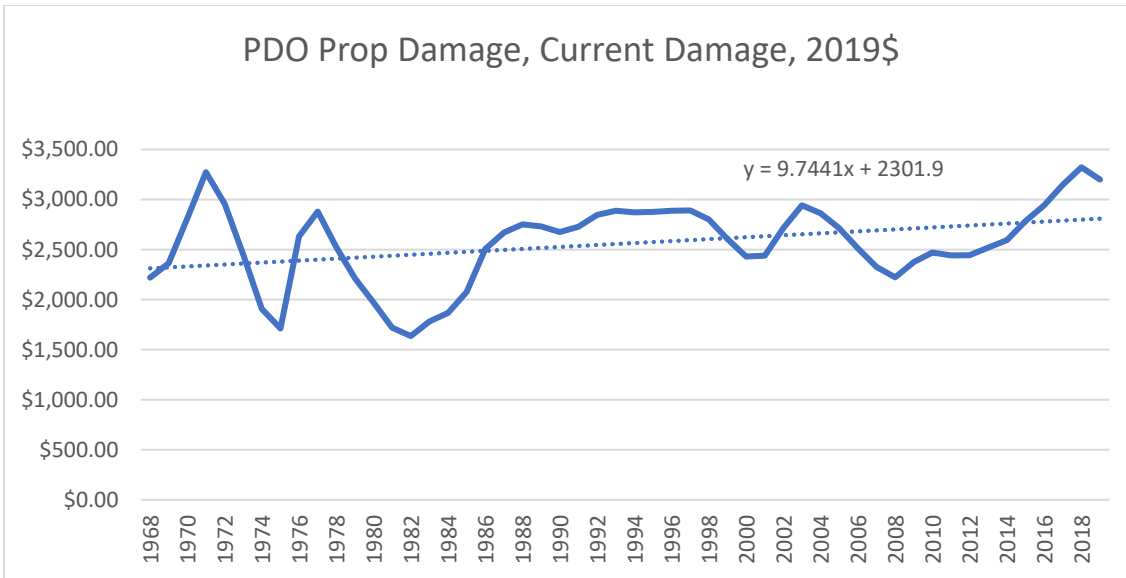


Figure 14. PDO property damage – current damage (2019\$)

Adjusting the current property damage profile for each year to 2019 economics reveals a trend with significant variation occurring over relatively short time frames. The \$3,200 value of per-vehicle property damage in a PDO crash in 2019\$ compares to a 1968 value of about \$2,200, roughly a \$1,000 cost increase in real terms over this 60-year period due to factors external to basic inflation. The year-to-year variation is a function at least partially of the relative pace of inflation measured by the All Items index compared to the pace of inflation in the Auto Insurance index. In the early years, it may also reflect real changes in the on-road vehicle fleet through consumer preferences for different sized vehicles that resulted from the Arab oil embargo in the 1970s, which made gasoline prices soar and temporarily increased the popularity of smaller and more fuel-efficient vehicles. Still, given that it takes over 30 years to turn over the on-road vehicle fleet, changes this radical seem unlikely. While the overall trend towards higher damage cost profiles for the average vehicle is clear, a more cautious approach would be to use the trendline of this model to predict the fleet’s damage profile over time. However, there is significant variation from the trendline in the baseline data.

Another source of information on property damage trends is NHTSA’s periodic examinations of the economic impact of motor vehicle crashes. In these studies the cost of property damage is derived from insurance data. The sources of this data are consistent over the past three studies dating back to 2000. Prior to that, similar data sources were examined using somewhat different methods. Results from these studies are available for 1980, 1994, 2000, 2010, and 2019. Figure 15 shows the resulting price trends derived from these periodic reports for PDO vehicles, with intervening years estimated based on a linear regression of the report data, along with the property damage index results derived above. Current dollar results published in each report were expressed in 2019\$ using the CPI All Items index.

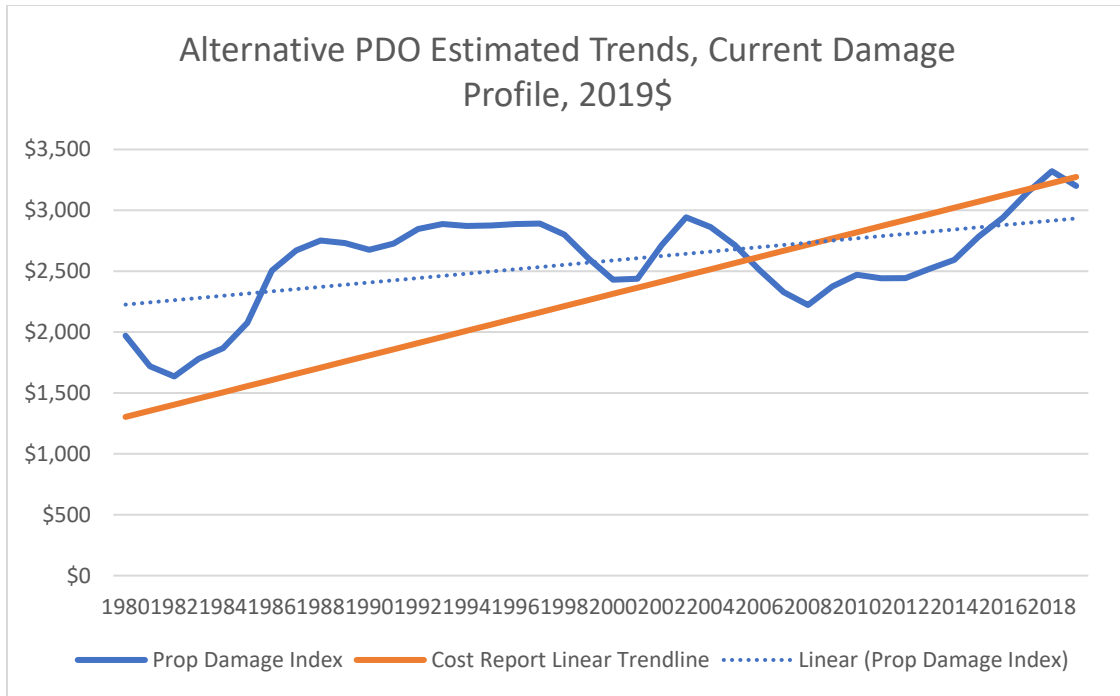


Figure 15. Alternative PDO estimated trends – current damage profile (2019\$)

The results for both methods show a similar upward trend, indicating that property damage insurance costs have increased over time due to insurance losses that exceed background inflation. However, the cost report’s trend has a steeper slope than that derived from CPI indexes, indicating an even larger shift in damage profiles over time. We will base our estimates on the cost report trendline for several reasons. The first is that the cost report results are derived directly from insurance data and reflect property damage cost changes due to changes in the real-world vehicle profile. A second reason is that they produce a more conservative estimate of property damage benefits, a preferable analytical approach when precision is illusive over long time spans.

Based on these same iterations of cost reports, we examined the trend in property damage costs across all injury categories. In Table 36 the results from each report are summarized in both current dollars as published in each report, and in 2019\$ derived using the CPI All Items index.

Table 36. Cost report for property damage history

| | Current \$ Property Damage | | | | | | |
|-------------|-----------------------------------|--------------|--------------|--------------|--------------|--------------|--------------|
| Year | PDO | MAIS1 | MAIS2 | MAIS3 | MAIS4 | MAIS5 | Fatal |
| 1980 | \$379 | \$811 | \$1,354 | \$2,120 | \$2,865 | \$2,845 | \$3,406 |
| 1994 | \$1,320 | \$3,263 | \$3,356 | \$5,771 | \$8,346 | \$8,018 | \$9,138 |
| 2000 | \$1,484 | \$3,844 | \$3,954 | \$6,799 | \$9,833 | \$9,446 | \$10,273 |
| 2010 | \$2,444 | \$5,404 | \$5,778 | \$10,882 | \$16,328 | \$15,092 | \$11,212 |
| 2019 | \$3,200 | \$9,650 | \$9,616 | \$17,835 | \$20,565 | \$23,234 | \$15,185 |
| | 2019\$ Property Damage | | | | | | |
| 1980 | \$1,176 | \$2,516 | \$4,201 | \$6,578 | \$8,889 | \$8,827 | \$10,568 |
| 1994 | \$2,277 | \$5,629 | \$5,789 | \$9,955 | \$14,398 | \$13,832 | \$15,764 |
| 2000 | \$2,203 | \$5,707 | \$5,870 | \$10,094 | \$14,599 | \$14,024 | \$15,252 |
| 2010 | \$2,865 | \$6,336 | \$6,774 | \$12,758 | \$19,144 | \$17,694 | \$13,145 |
| 2019 | \$3,200 | \$9,650 | \$9,616 | \$17,835 | \$20,565 | \$23,234 | \$15,185 |

To estimate property damage costs for each year, a best fit trendline was determined for each severity category based on the 2019\$ values in Table 36. The results are shown Figure 16. Note that the trendlines were applied only from 1984 forward. This reflects the divergence between the CPI All Items index and the Auto Insurance index shown in Figure 14. Moreover, the data used to construct these trendlines begins in 1980, and given the divergence noted in Table 36, it's unclear that extending these trendlines back before then would be appropriate. Property damage for years before 1984 are not directly estimated and are assumed to equal the 1984 value in 2019\$.

- With the exception of fatal crashes, the trendlines follow a generally predictable pattern of increased costs for more severe crashes. From Table 37, fatal crashes are much more likely to involve pedestrians or bicyclists, with almost 20 percent of fatal crashes involving these nonoccupants. Nonoccupant crashes would produce less property damage than multi-vehicle or vehicle to fixed object crashes.
- There is a general trend indicating bigger increases (a steeper slope) for property damage in more serious injuries/crashes. The slopes of MAIS3, 4, and 5 are much steeper than the slopes of MAIS1, 2, and PDO. The exception is fatal crashes, which, as explained above, involve disproportionate incidence of pedestrian crashes with minimal property damage. For PDOs, the slope is extremely shallow – showing only a minimal increase in property damage. There are logical reasons to expect this type of trend. Over time, vehicles have gotten bigger and contain more high-tech and expensive safety technologies (e.g., several

air bags). It is harder to seriously injure occupants in these larger and more crashworthy vehicles, so when injuries do happen, it means the crash was very severe (relative to the past). When it takes more crash force to seriously injure somebody, then it is likely the property damage will reflect this higher force in serious crashes, and that's what shows in the different slopes of serious crashes versus minor crashes.

Crashes involving a vehicle impacting a nonoccupant, while catastrophic to the nonoccupant, are likely to result in relatively little property damage to the vehicle. Note that MAIS0 costs were not separately estimated in the 1980 report. Therefore, we cannot develop a parallel statistical model for MAIS0. We believe that the trend in MAIS0 property damage costs should be similar to that of MAIS1 injuries. Both occur in injury crashes and MAIS1 injuries are by far the most common, as well as the most similar to MAIS0. The real change in MAIS0 costs is thus estimated to follow the same trend as MAIS1 injuries.

Table 38 lists the resulting 2019\$, current damage profile unit cost estimates for property damage by crash outcome severity and CY.

Property damage cost savings occur in the same year as the crash, so there is no need to distribute cost savings to future years.

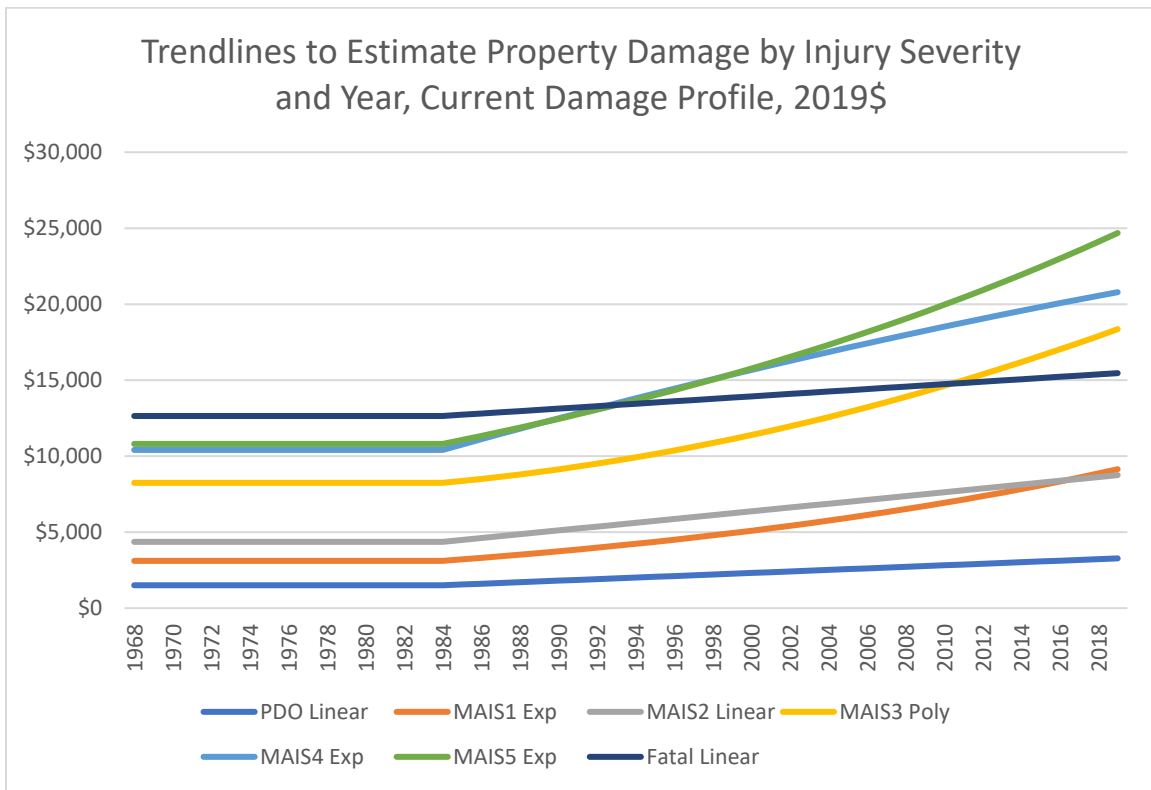


Figure 16. Trendlines to estimate property damage by injury severity and year, current damage profile (2019\$)

Table 37. Nonoccupant crash involvement by crash severity

| | % Ped or Bicyclist | Incidence | |
|---------------------|--------------------|------------|------------------|
| | | Total | Ped or Bicyclist |
| PDO Vehicles | 0.08% | 19,288,139 | 14,892 |
| MAIS0 | 4.54% | 4,525,901 | 205,508 |
| MAIS1 | 3.89% | 3,875,265 | 150,704 |
| MAIS2 | 7.96% | 427,119 | 33,997 |
| MAIS3 | 9.60% | 141,167 | 13,553 |
| MAIS4 | 6.81% | 19,285 | 1,313 |
| MAIS5 | 11.76% | 7,187 | 845 |
| Fatalities | 19.77% | 36,500 | 7,216 |
| Total | 1.51% | 28,320,563 | 428,028 |
| Percentage of Total | | 100.00% | 1.51% |

Source: Blincoe et al. (2023)

Table 38. Property damage unit costs by CY and crash outcome severity

| CY | PDO Linear | MAIS0* | MAIS1 Exp | MAIS2 Linear | MAIS3 Poly | MAIS4 Exp | MAIS5 Exp | Fatal Linear |
|------|------------|--------|-----------|--------------|------------|-----------|-----------|--------------|
| 1968 | \$1,505 | \$387 | \$3,110 | \$4,361 | \$8,244 | \$10,412 | \$10,806 | \$12,645 |
| 1969 | \$1,505 | \$400 | \$3,110 | \$4,361 | \$8,244 | \$10,412 | \$10,806 | \$12,645 |
| 1970 | \$1,505 | \$412 | \$3,110 | \$4,361 | \$8,244 | \$10,412 | \$10,806 | \$12,645 |
| 1971 | \$1,505 | \$425 | \$3,110 | \$4,361 | \$8,244 | \$10,412 | \$10,806 | \$12,645 |
| 1972 | \$1,505 | \$438 | \$3,110 | \$4,361 | \$8,244 | \$10,412 | \$10,806 | \$12,645 |
| 1973 | \$1,505 | \$452 | \$3,110 | \$4,361 | \$8,244 | \$10,412 | \$10,806 | \$12,645 |
| 1974 | \$1,505 | \$466 | \$3,110 | \$4,361 | \$8,244 | \$10,412 | \$10,806 | \$12,645 |
| 1975 | \$1,505 | \$481 | \$3,110 | \$4,361 | \$8,244 | \$10,412 | \$10,806 | \$12,645 |
| 1976 | \$1,505 | \$496 | \$3,110 | \$4,361 | \$8,244 | \$10,412 | \$10,806 | \$12,645 |
| 1977 | \$1,505 | \$511 | \$3,110 | \$4,361 | \$8,244 | \$10,412 | \$10,806 | \$12,645 |
| 1978 | \$1,505 | \$527 | \$3,110 | \$4,361 | \$8,244 | \$10,412 | \$10,806 | \$12,645 |
| 1979 | \$1,505 | \$544 | \$3,110 | \$4,361 | \$8,244 | \$10,412 | \$10,806 | \$12,645 |
| 1980 | \$1,505 | \$561 | \$3,110 | \$4,361 | \$8,244 | \$10,412 | \$10,806 | \$12,645 |

| CY | PDO Linear | MAIS0* | MAIS1 Exp | MAIS2 Linear | MAIS3 Poly | MAIS4 Exp | MAIS5 Exp | Fatal Linear |
|-----------|-----------------------|---------------|----------------------|-------------------------|-----------------------|----------------------|----------------------|-------------------------|
| 1981 | \$1,505 | \$578 | \$3,110 | \$4,361 | \$8,244 | \$10,412 | \$10,806 | \$12,645 |
| 1982 | \$1,505 | \$596 | \$3,110 | \$4,361 | \$8,244 | \$10,412 | \$10,806 | \$12,645 |
| 1983 | \$1,505 | \$615 | \$3,110 | \$4,361 | \$8,244 | \$10,412 | \$10,806 | \$12,645 |
| 1984 | \$1,505 | \$634 | \$3,110 | \$4,361 | \$8,244 | \$10,412 | \$10,806 | \$12,645 |
| 1985 | \$1,556 | \$654 | \$3,207 | \$4,487 | \$8,368 | \$10,766 | \$11,064 | \$12,725 |
| 1986 | \$1,606 | \$675 | \$3,308 | \$4,612 | \$8,502 | \$11,117 | \$11,329 | \$12,806 |
| 1987 | \$1,657 | \$696 | \$3,411 | \$4,738 | \$8,645 | \$11,464 | \$11,599 | \$12,886 |
| 1988 | \$1,708 | \$717 | \$3,518 | \$4,863 | \$8,798 | \$11,808 | \$11,876 | \$12,967 |
| 1989 | \$1,758 | \$740 | \$3,628 | \$4,989 | \$8,960 | \$12,149 | \$12,160 | \$13,047 |
| 1990 | \$1,809 | \$763 | \$3,741 | \$5,114 | \$9,133 | \$12,486 | \$12,450 | \$13,128 |
| 1991 | \$1,859 | \$787 | \$3,858 | \$5,240 | \$9,315 | \$12,820 | \$12,748 | \$13,208 |
| 1992 | \$1,910 | \$811 | \$3,979 | \$5,365 | \$9,507 | \$13,150 | \$13,052 | \$13,289 |
| 1993 | \$1,960 | \$837 | \$4,103 | \$5,491 | \$9,708 | \$13,477 | \$13,364 | \$13,369 |
| 1994 | \$2,011 | \$863 | \$4,232 | \$5,616 | \$9,919 | \$13,800 | \$13,683 | \$13,450 |
| 1995 | \$2,061 | \$890 | \$4,364 | \$5,742 | \$10,140 | \$14,121 | \$14,010 | \$13,530 |
| 1996 | \$2,112 | \$918 | \$4,501 | \$5,867 | \$10,371 | \$14,438 | \$14,344 | \$13,611 |
| 1997 | \$2,162 | \$947 | \$4,641 | \$5,993 | \$10,612 | \$14,751 | \$14,687 | \$13,691 |
| 1998 | \$2,213 | \$976 | \$4,787 | \$6,118 | \$10,862 | \$15,061 | \$15,037 | \$13,772 |
| 1999 | \$2,263 | \$1,007 | \$4,936 | \$6,244 | \$11,121 | \$15,368 | \$15,396 | \$13,852 |
| 2000 | \$2,314 | \$1,038 | \$5,091 | \$6,369 | \$11,391 | \$15,671 | \$15,764 | \$13,933 |
| 2001 | \$2,365 | \$1,071 | \$5,250 | \$6,494 | \$11,670 | \$15,971 | \$16,141 | \$14,014 |
| 2002 | \$2,415 | \$1,104 | \$5,414 | \$6,620 | \$11,959 | \$16,267 | \$16,526 | \$14,094 |
| 2003 | \$2,466 | \$1,139 | \$5,584 | \$6,745 | \$12,258 | \$16,561 | \$16,921 | \$14,175 |
| 2004 | \$2,516 | \$1,174 | \$5,758 | \$6,871 | \$12,566 | \$16,850 | \$17,325 | \$14,255 |
| 2005 | \$2,567 | \$1,211 | \$5,938 | \$6,996 | \$12,884 | \$17,137 | \$17,739 | \$14,336 |
| 2006 | \$2,617 | \$1,249 | \$6,124 | \$7,122 | \$13,212 | \$17,420 | \$18,162 | \$14,416 |
| 2007 | \$2,668 | \$1,288 | \$6,316 | \$7,247 | \$13,550 | \$17,699 | \$18,596 | \$14,497 |
| 2008 | \$2,718 | \$1,328 | \$6,513 | \$7,373 | \$13,897 | \$17,975 | \$19,040 | \$14,577 |
| 2009 | \$2,769 | \$1,370 | \$6,717 | \$7,498 | \$14,254 | \$18,248 | \$19,495 | \$14,658 |
| 2010 | \$2,819 | \$1,413 | \$6,927 | \$7,624 | \$14,621 | \$18,518 | \$19,960 | \$14,738 |

| CY | PDO Linear | MAIS0* | MAIS1 Exp | MAIS2 Linear | MAIS3 Poly | MAIS4 Exp | MAIS5 Exp | Fatal Linear |
|------|------------|---------|-----------|--------------|------------|-----------|-----------|--------------|
| 2011 | \$2,870 | \$1,457 | \$7,144 | \$7,749 | \$14,997 | \$18,784 | \$20,437 | \$14,819 |
| 2012 | \$2,920 | \$1,502 | \$7,367 | \$7,875 | \$15,383 | \$19,046 | \$20,925 | \$14,899 |
| 2013 | \$2,971 | \$1,549 | \$7,598 | \$8,000 | \$15,779 | \$19,306 | \$21,425 | \$14,980 |
| 2014 | \$3,022 | \$1,598 | \$7,835 | \$8,126 | \$16,185 | \$19,562 | \$21,936 | \$15,060 |
| 2015 | \$3,072 | \$1,648 | \$8,080 | \$8,251 | \$16,600 | \$19,814 | \$22,460 | \$15,141 |
| 2016 | \$3,123 | \$1,699 | \$8,333 | \$8,377 | \$17,025 | \$20,063 | \$22,996 | \$15,221 |
| 2017 | \$3,173 | \$1,753 | \$8,594 | \$8,502 | \$17,460 | \$20,309 | \$23,546 | \$15,302 |
| 2018 | \$3,224 | \$1,807 | \$8,863 | \$8,628 | \$17,904 | \$20,551 | \$24,108 | \$15,382 |
| 2019 | \$3,274 | \$1,864 | \$9,140 | \$8,753 | \$18,358 | \$20,790 | \$24,684 | \$15,463 |

*MAIS0 property damage trend is assumed to match MAIS1 property damage trend.

Insurance Administration

Some of the past NHTSA economic reports were based on a narrow definition of insurance administration while others included a broader definition. The difference had to do with where insurance company legal costs were parked – in insurance administration or in legal costs – and was tied to the data sources used. For consistency with the 2019 report we anchor each CY unit costs to the 2019 results. However, property damage costs have changed over time and part of the insurance administration costs are based on property damage. As a result we have adjusted the part of insurance administration that is linked to property damage. From Blincoe et al. (2023), insurance administration costs were 12.17 percent of the change in property damage. To adjust insurance administration costs to be consistent with changes in property damage costs, we calculated the change in each CY’s insurance administration costs as a function of the dollar change in property damage costs for that year and the 0.12174 insurance administration rate. So, the dollar change in insurance administration unit cost is equal to the dollar change in property damage unit cost x 0.1217.

$$A_{(n)} = A_{2019} - (P_{2019} - P_{(n)}) * 0.1217$$

Where:

$A_{(n)}$ = unit administrative costs for CY n

A_{2019} = unit administrative costs for CY 2019

P_{2019} = property damage unit costs for CY 2019

$P_{(n)}$ = property damage unit costs for CY n

Table 39 shows the resulting values used for insurance administration.

Table 39. Insurance administration unit costs by CY and crash outcome severity

| CY | PDO | MAIS0* | MAIS1 | MAIS2 | MAIS3 | MAIS4 | MAIS5 | Fatal |
|-----------|------------|---------------|--------------|--------------|--------------|--------------|--------------|--------------|
| 1968 | \$308 | \$150 | \$1,478 | \$7,685 | \$27,467 | \$35,222 | \$36,392 | \$35,902 |
| 1969 | \$308 | \$150 | \$1,478 | \$7,685 | \$27,467 | \$35,222 | \$36,392 | \$35,902 |
| 1970 | \$308 | \$150 | \$1,478 | \$7,685 | \$27,467 | \$35,222 | \$36,392 | \$35,902 |
| 1971 | \$308 | \$150 | \$1,478 | \$7,685 | \$27,467 | \$35,222 | \$36,392 | \$35,902 |
| 1972 | \$308 | \$150 | \$1,478 | \$7,685 | \$27,467 | \$35,222 | \$36,392 | \$35,902 |
| 1973 | \$308 | \$150 | \$1,478 | \$7,685 | \$27,467 | \$35,222 | \$36,392 | \$35,902 |
| 1974 | \$308 | \$150 | \$1,478 | \$7,685 | \$27,467 | \$35,222 | \$36,392 | \$35,902 |
| 1975 | \$308 | \$150 | \$1,478 | \$7,685 | \$27,467 | \$35,222 | \$36,392 | \$35,902 |
| 1976 | \$308 | \$150 | \$1,478 | \$7,685 | \$27,467 | \$35,222 | \$36,392 | \$35,902 |
| 1977 | \$308 | \$150 | \$1,478 | \$7,685 | \$27,467 | \$35,222 | \$36,392 | \$35,902 |
| 1978 | \$308 | \$150 | \$1,478 | \$7,685 | \$27,467 | \$35,222 | \$36,392 | \$35,902 |
| 1979 | \$308 | \$150 | \$1,478 | \$7,685 | \$27,467 | \$35,222 | \$36,392 | \$35,902 |
| 1980 | \$308 | \$150 | \$1,478 | \$7,685 | \$27,467 | \$35,222 | \$36,392 | \$35,902 |
| 1981 | \$308 | \$150 | \$1,478 | \$7,685 | \$27,467 | \$35,222 | \$36,392 | \$35,902 |
| 1982 | \$308 | \$150 | \$1,478 | \$7,685 | \$27,467 | \$35,222 | \$36,392 | \$35,902 |
| 1983 | \$308 | \$150 | \$1,478 | \$7,685 | \$27,467 | \$35,222 | \$36,392 | \$35,902 |
| 1984 | \$308 | \$150 | \$1,478 | \$7,685 | \$27,467 | \$35,222 | \$36,392 | \$35,902 |
| 1985 | \$314 | \$152 | \$1,490 | \$7,701 | \$27,482 | \$35,265 | \$36,424 | \$35,912 |
| 1986 | \$320 | \$153 | \$1,502 | \$7,716 | \$27,498 | \$35,308 | \$36,456 | \$35,922 |
| 1987 | \$326 | \$154 | \$1,515 | \$7,731 | \$27,516 | \$35,350 | \$36,489 | \$35,931 |

| CY | PDO | MAIS0* | MAIS1 | MAIS2 | MAIS3 | MAIS4 | MAIS5 | Fatal |
|-----------|------------|---------------|--------------|--------------|--------------|--------------|--------------|--------------|
| 1988 | \$332 | \$155 | \$1,528 | \$7,747 | \$27,534 | \$35,392 | \$36,522 | \$35,941 |
| 1989 | \$338 | \$157 | \$1,541 | \$7,762 | \$27,554 | \$35,433 | \$36,557 | \$35,951 |
| 1990 | \$345 | \$158 | \$1,555 | \$7,777 | \$27,575 | \$35,474 | \$36,592 | \$35,961 |
| 1991 | \$351 | \$160 | \$1,569 | \$7,792 | \$27,597 | \$35,515 | \$36,628 | \$35,971 |
| 1992 | \$357 | \$161 | \$1,584 | \$7,808 | \$27,621 | \$35,555 | \$36,665 | \$35,980 |
| 1993 | \$363 | \$163 | \$1,599 | \$7,823 | \$27,645 | \$35,595 | \$36,703 | \$35,990 |
| 1994 | \$369 | \$164 | \$1,615 | \$7,838 | \$27,671 | \$35,634 | \$36,742 | \$36,000 |
| 1995 | \$375 | \$166 | \$1,631 | \$7,853 | \$27,698 | \$35,673 | \$36,782 | \$36,010 |
| 1996 | \$382 | \$168 | \$1,647 | \$7,869 | \$27,726 | \$35,712 | \$36,823 | \$36,020 |
| 1997 | \$388 | \$169 | \$1,665 | \$7,884 | \$27,755 | \$35,750 | \$36,864 | \$36,029 |
| 1998 | \$394 | \$171 | \$1,682 | \$7,899 | \$27,786 | \$35,788 | \$36,907 | \$36,039 |
| 1999 | \$400 | \$173 | \$1,700 | \$7,915 | \$27,817 | \$35,825 | \$36,951 | \$36,049 |
| 2000 | \$406 | \$175 | \$1,719 | \$7,930 | \$27,850 | \$35,862 | \$36,996 | \$36,059 |
| 2001 | \$412 | \$177 | \$1,739 | \$7,945 | \$27,884 | \$35,898 | \$37,041 | \$36,069 |
| 2002 | \$418 | \$179 | \$1,759 | \$7,960 | \$27,919 | \$35,935 | \$37,088 | \$36,078 |
| 2003 | \$425 | \$181 | \$1,779 | \$7,976 | \$27,956 | \$35,970 | \$37,136 | \$36,088 |
| 2004 | \$431 | \$183 | \$1,800 | \$7,991 | \$27,993 | \$36,005 | \$37,185 | \$36,098 |
| 2005 | \$437 | \$185 | \$1,822 | \$8,006 | \$28,032 | \$36,040 | \$37,236 | \$36,108 |
| 2006 | \$443 | \$188 | \$1,845 | \$8,021 | \$28,072 | \$36,075 | \$37,287 | \$36,118 |
| 2007 | \$449 | \$190 | \$1,868 | \$8,037 | \$28,113 | \$36,109 | \$37,340 | \$36,127 |
| 2008 | \$455 | \$192 | \$1,892 | \$8,052 | \$28,155 | \$36,142 | \$37,394 | \$36,137 |
| 2009 | \$461 | \$195 | \$1,917 | \$8,067 | \$28,199 | \$36,176 | \$37,450 | \$36,147 |

| CY | PDO | MAIS0* | MAIS1 | MAIS2 | MAIS3 | MAIS4 | MAIS5 | Fatal |
|-----------|------------|---------------|--------------|--------------|--------------|--------------|--------------|--------------|
| 2010 | \$468 | \$198 | \$1,943 | \$8,083 | \$28,243 | \$36,208 | \$37,506 | \$36,157 |
| 2011 | \$474 | \$200 | \$1,969 | \$8,098 | \$28,289 | \$36,241 | \$37,564 | \$36,167 |
| 2012 | \$480 | \$203 | \$1,996 | \$8,113 | \$28,336 | \$36,273 | \$37,624 | \$36,176 |
| 2013 | \$486 | \$206 | \$2,024 | \$8,128 | \$28,384 | \$36,304 | \$37,684 | \$36,186 |
| 2014 | \$492 | \$209 | \$2,053 | \$8,144 | \$28,433 | \$36,335 | \$37,747 | \$36,196 |
| 2015 | \$498 | \$212 | \$2,083 | \$8,159 | \$28,484 | \$36,366 | \$37,810 | \$36,206 |
| 2016 | \$505 | \$215 | \$2,114 | \$8,174 | \$28,536 | \$36,397 | \$37,876 | \$36,216 |
| 2017 | \$511 | \$218 | \$2,146 | \$8,189 | \$28,589 | \$36,426 | \$37,943 | \$36,225 |
| 2018 | \$517 | \$222 | \$2,178 | \$8,205 | \$28,643 | \$36,456 | \$38,011 | \$36,235 |
| 2019 | \$523 | \$225 | \$2,212 | \$8,220 | \$28,698 | \$36,485 | \$38,081 | \$36,245 |

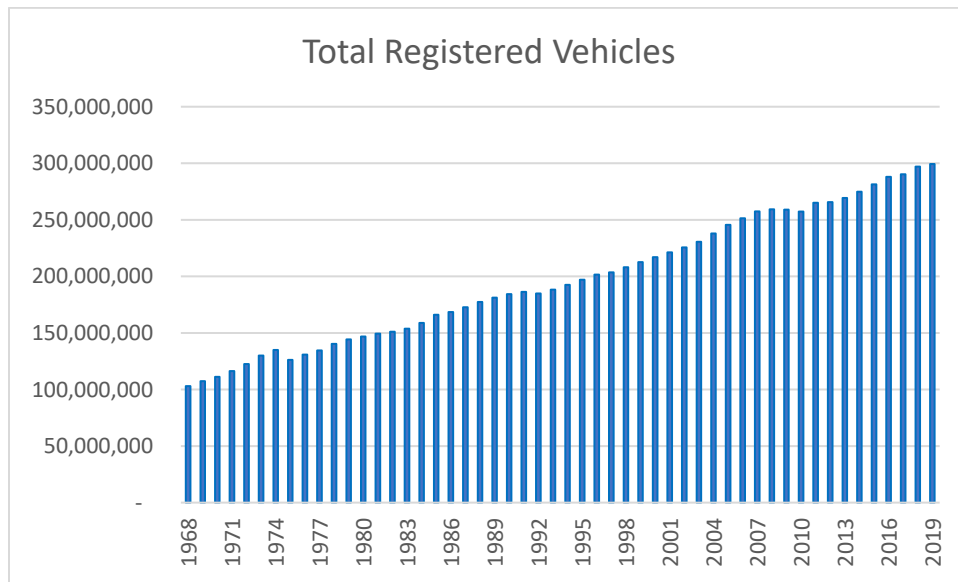
* MAIS0 insurance administration trend is assumed to match MAIS1 trend.

Most fatalities occur within 30 days of the crash. For fatalities, insurance administration cost savings are thus assumed to occur during the year the injury was prevented. For nonfatal injuries motor vehicle insurance settlements usually occur within the same year as the crash as well. The unit costs in Table 39 are thus applied fully to each CY.

Congestion

Congestion costs consist of the lost time, added fuel expenditure, and increased greenhouse gases and criteria pollutants that result from traffic congestion that results from motor vehicle crashes. These impacts are a direct function of the number of vehicles that are delayed in these crashes. The volume of traffic on U.S. roadways has steadily increased over time primarily due to population growth. Figure 17 shows the change in vehicle registrations from 1968 to 2019 (see Appendix F). In 2019 there were 299 million vehicles in the on-road fleet, a 191 percent increase over the 103 million vehicles in 1968. We estimate the impact of congestion in previous years as a direct function of traffic density as measured by vehicle registrations. Thus, the congestion impacts of a crash in 1968 are estimated to be 34 percent of those in 2019. Table 40 shows the resulting estimates by CY.

Congestion cost savings occur in the same year as the crash, so there is no need to distribute cost savings to future years.



Source: NCSA, 2022, p.20

Figure 17. Total registered vehicles

Table 40. Summary of congestion unit costs by CY and injury severity (2019\$)

| CY | Fatality | MAIS5 | MAIS4 | MAIS3 | MAIS2 | MAIS1 | MAIS0 | PDO |
|-----------|-----------------|--------------|--------------|--------------|--------------|--------------|--------------|------------|
| 1968 | \$2,455 | \$639 | \$624 | \$582 | \$461 | \$415 | \$347 | \$457 |
| 1969 | \$2,560 | \$667 | \$651 | \$607 | \$481 | \$433 | \$362 | \$476 |
| 1970 | \$2,651 | \$690 | \$674 | \$629 | \$498 | \$449 | \$375 | \$493 |
| 1971 | \$2,773 | \$722 | \$705 | \$657 | \$520 | \$469 | \$392 | \$516 |
| 1972 | \$2,921 | \$760 | \$743 | \$693 | \$548 | \$494 | \$413 | \$543 |
| 1973 | \$3,099 | \$807 | \$788 | \$735 | \$582 | \$524 | \$438 | \$577 |
| 1974 | \$3,215 | \$837 | \$818 | \$762 | \$604 | \$544 | \$454 | \$598 |
| 1975 | \$3,007 | \$783 | \$765 | \$713 | \$564 | \$509 | \$425 | \$559 |
| 1976 | \$3,117 | \$812 | \$793 | \$739 | \$585 | \$528 | \$441 | \$580 |
| 1977 | \$3,206 | \$835 | \$815 | \$760 | \$602 | \$543 | \$453 | \$596 |
| 1978 | \$3,346 | \$871 | \$851 | \$793 | \$628 | \$566 | \$473 | \$622 |
| 1979 | \$3,440 | \$896 | \$875 | \$815 | \$646 | \$582 | \$486 | \$640 |
| 1980 | \$3,500 | \$911 | \$890 | \$830 | \$657 | \$592 | \$495 | \$651 |
| 1981 | \$3,559 | \$927 | \$905 | \$844 | \$668 | \$602 | \$503 | \$662 |
| 1982 | \$3,603 | \$938 | \$916 | \$854 | \$676 | \$610 | \$509 | \$670 |
| 1983 | \$3,667 | \$955 | \$932 | \$869 | \$688 | \$620 | \$518 | \$682 |
| 1984 | \$3,787 | \$986 | \$963 | \$898 | \$711 | \$641 | \$535 | \$705 |
| 1985 | \$3,958 | \$1,030 | \$1,006 | \$938 | \$743 | \$670 | \$559 | \$736 |
| 1986 | \$4,017 | \$1,046 | \$1,022 | \$952 | \$754 | \$680 | \$568 | \$747 |
| 1987 | \$4,117 | \$1,072 | \$1,047 | \$976 | \$773 | \$697 | \$582 | \$766 |
| 1988 | \$4,230 | \$1,101 | \$1,076 | \$1,003 | \$794 | \$716 | \$598 | \$787 |
| 1989 | \$4,318 | \$1,124 | \$1,098 | \$1,024 | \$811 | \$731 | \$610 | \$803 |
| 1990 | \$4,392 | \$1,143 | \$1,117 | \$1,041 | \$824 | \$743 | \$621 | \$817 |
| 1991 | \$4,442 | \$1,156 | \$1,130 | \$1,053 | \$834 | \$752 | \$628 | \$826 |
| 1992 | \$4,408 | \$1,148 | \$1,121 | \$1,045 | \$827 | \$746 | \$623 | \$820 |
| 1993 | \$4,489 | \$1,169 | \$1,142 | \$1,064 | \$843 | \$760 | \$634 | \$835 |
| 1994 | \$4,588 | \$1,194 | \$1,167 | \$1,088 | \$861 | \$776 | \$648 | \$854 |
| 1995 | \$4,697 | \$1,223 | \$1,195 | \$1,114 | \$882 | \$795 | \$664 | \$874 |
| 1996 | \$4,806 | \$1,251 | \$1,222 | \$1,139 | \$902 | \$813 | \$679 | \$894 |

| CY | Fatality | MAIS5 | MAIS4 | MAIS3 | MAIS2 | MAIS1 | MAIS0 | PDO |
|-----------|-----------------|--------------|--------------|--------------|--------------|--------------|--------------|------------|
| 1997 | \$4,852 | \$1,263 | \$1,234 | \$1,150 | \$911 | \$821 | \$686 | \$903 |
| 1998 | \$4,959 | \$1,291 | \$1,261 | \$1,176 | \$931 | \$839 | \$701 | \$923 |
| 1999 | \$5,069 | \$1,320 | \$1,289 | \$1,202 | \$952 | \$858 | \$716 | \$943 |
| 2000 | \$5,173 | \$1,347 | \$1,316 | \$1,226 | \$971 | \$875 | \$731 | \$962 |
| 2001 | \$5,273 | \$1,373 | \$1,341 | \$1,250 | \$990 | \$892 | \$745 | \$981 |
| 2002 | \$5,379 | \$1,400 | \$1,368 | \$1,275 | \$1,010 | \$910 | \$760 | \$1,001 |
| 2003 | \$5,497 | \$1,431 | \$1,398 | \$1,303 | \$1,032 | \$930 | \$777 | \$1,023 |
| 2004 | \$5,671 | \$1,477 | \$1,442 | \$1,345 | \$1,065 | \$960 | \$801 | \$1,055 |
| 2005 | \$5,855 | \$1,524 | \$1,489 | \$1,388 | \$1,099 | \$991 | \$827 | \$1,089 |
| 2006 | \$5,992 | \$1,560 | \$1,524 | \$1,421 | \$1,125 | \$1,014 | \$847 | \$1,115 |
| 2007 | \$6,137 | \$1,598 | \$1,561 | \$1,455 | \$1,152 | \$1,038 | \$867 | \$1,142 |
| 2008 | \$6,182 | \$1,609 | \$1,572 | \$1,466 | \$1,160 | \$1,046 | \$874 | \$1,150 |
| 2009 | \$6,172 | \$1,607 | \$1,570 | \$1,463 | \$1,159 | \$1,044 | \$872 | \$1,148 |
| 2010 | \$6,133 | \$1,597 | \$1,560 | \$1,454 | \$1,151 | \$1,038 | \$867 | \$1,141 |
| 2011 | \$6,317 | \$1,645 | \$1,607 | \$1,498 | \$1,186 | \$1,069 | \$893 | \$1,175 |
| 2012 | \$6,332 | \$1,648 | \$1,610 | \$1,501 | \$1,189 | \$1,071 | \$895 | \$1,178 |
| 2013 | \$6,419 | \$1,671 | \$1,632 | \$1,522 | \$1,205 | \$1,086 | \$907 | \$1,194 |
| 2014 | \$6,550 | \$1,705 | \$1,666 | \$1,553 | \$1,230 | \$1,108 | \$926 | \$1,219 |
| 2015 | \$6,705 | \$1,746 | \$1,705 | \$1,590 | \$1,259 | \$1,135 | \$948 | \$1,247 |
| 2016 | \$6,865 | \$1,787 | \$1,746 | \$1,628 | \$1,289 | \$1,162 | \$970 | \$1,277 |
| 2017 | \$6,920 | \$1,802 | \$1,760 | \$1,641 | \$1,299 | \$1,171 | \$978 | \$1,287 |
| 2018 | \$7,080 | \$1,843 | \$1,800 | \$1,678 | \$1,329 | \$1,198 | \$1,000 | \$1,317 |
| 2019 | \$7,133 | \$1,857 | \$1,814 | \$1,691 | \$1,339 | \$1,207 | \$1,008 | \$1,327 |

Medical Care Costs

Medical care costs have generally increased at a faster rate than inflation due to a variety of factors. Some portion of this increase is due to normal inflationary pressures such as wages, which have risen in the health care sector as in the general economy. However, some portion of rising medical care costs also reflects more advanced treatment methods, new pharmaceuticals, and equipment costs, which were not available in previous decades, and which improve health outcomes in more recent years. These factors likely play a large role in overall health care costs, but they may be less of an issue for injury treatment. Because we do not know the relative contribution of these factors to current health care costs, and specifically to injury treatment costs, we will apply the 2019 costs as a measure of real costs in previous years, but we note that this may create an unknown bias in medical costs, which account for about 10 percent of economic costs and 2 percent of comprehensive costs (which include lost quality of life).

Most fatalities occur within 30 days of the crash. For fatalities, medical care cost savings are thus assumed to occur during the year the injury was prevented. For nonfatal injuries medical care costs can be recurring throughout the victim's lifetime, or some portion of that lifetime. For each injury severity category, we distribute medical care costs under the assumption that these costs will parallel lost quality of life. Therefore, we use the same distribution assumptions for medical care as for QALYs of the same injury severity. The results of this distribution process are in Appendix G for each nonfatal injury category.

Emergency Services Costs

Emergency services include police, fire, and ambulance transport costs. Aside from inflation, we are not aware of significant differences in these costs over the timeframe examined in this study. Therefore, we assume that the 2019 cost is an appropriate measure for the real cost of these services over previous CYs.

Emergency service cost savings occur in the same year as the crash, so there is no need to distribute cost savings to future years.

Legal Costs

Aside from inflation, we are not aware of any substantive changes in the quality or cost of legal services over time. We therefore assume the 2019 value of legal expenses is appropriate as a measure of real costs in 2019\$ over previous CYs.

Legal cost savings are assumed to occur in the same year as the crash, so there is no need to distribute cost savings to future years.

Workplace Costs

Death or injury in motor vehicle crashes results in workplace disruption due to the loss or absence of an employee. This can trigger costs to retrain new employees, overtime needed to accomplish the injured employee's work, and administrative costs for processing personal changes. We do not believe that there have been any substantial changes in the nature of these costs over time. We assume that the 2019 cost estimate is an appropriate measure of real 2019\$ workplace costs over previous CYs. Workplace cost savings occur in the same year as the crash, so there is no need to distribute cost savings to future years.

Total Unit Savings From Crash and Injury Mitigation

This study examines valuation of benefits from safety technologies at both a comprehensive level, which includes valuation for lost quality of life, and in terms of economic impacts alone. For benefit cost analysis valuing lost quality of life is standard practice and is required by Circular No. A-4 (Office of Management and Budget, 2023). It is inherent in societal valuations of statistical life based on willingness-to-pay and other techniques. We also examine economic cost-based estimates, which exclude valuation for lost quality of life to determine whether safety technologies might pay for themselves on a tangible cost basis alone, without regard for valuation of lost quality of life. Under each basis there are two different sets of values dependent on the safety countermeasure. Safety countermeasures that prevent crashes such as ESC will prevent costs associated with injuries, property damage, and traffic congestion, but countermeasures that only mitigate injury in the event of a crash (commonly referred to as CW technologies) such as seat belts or air bags will not impact property damage or congestion. Table 41 to Table 44 show the total unit value savings per CY safety benefit from crash and injury mitigation for comprehensive costs and economic costs. These unit costs are applied to safety impacts that result from accumulated CW and CA technologies that occur in each CY.

Occupants of PDO crashes (in the CW tables below) experience costs for emergency services (police/fire), lost household productivity, insurance administration, and workplace costs. Thus, if a CW standard changes a crash from an injury crash to a PDO, there are still costs associated with the crash. The unit costs for CA standards are higher for PDO crashes because they also avoid congestion and property damage.

Table 41. Comprehensive costs – CA – summary of unit cost values by CY (2019\$)

| Yr | Fatal | MAIS5 | MAIS4 | MAIS3 | MAIS2 | MAIS1 | MAIS0 | PDO |
|-----------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|------------|
| 1968 | 485,703 | 300,915 | 210,860 | 160,773 | 64,539 | 20,792 | 1,273 | 2,453 |
| 1969 | 671,756 | 575,208 | 258,105 | 226,843 | 89,926 | 29,355 | 1,288 | 2,472 |
| 1970 | 888,588 | 774,287 | 322,573 | 314,705 | 124,128 | 31,721 | 1,302 | 2,492 |
| 1971 | 1,059,605 | 1,050,551 | 384,209 | 382,040 | 159,209 | 32,947 | 1,320 | 2,515 |
| 1972 | 1,138,121 | 1,119,183 | 405,653 | 429,281 | 178,868 | 31,875 | 1,339 | 2,540 |
| 1973 | 1,283,942 | 1,099,875 | 480,425 | 487,979 | 215,494 | 33,434 | 1,364 | 2,573 |
| 1974 | 1,633,985 | 1,119,182 | 558,539 | 662,566 | 280,473 | 34,541 | 1,381 | 2,596 |
| 1975 | 1,704,471 | 1,198,561 | 564,091 | 778,350 | 289,992 | 33,699 | 1,352 | 2,557 |
| 1976 | 1,971,188 | 1,313,586 | 596,585 | 810,227 | 292,147 | 35,417 | 1,369 | 2,580 |
| 1977 | 2,067,606 | 1,503,875 | 618,567 | 781,374 | 268,119 | 34,253 | 1,381 | 2,595 |
| 1978 | 2,188,547 | 1,739,414 | 696,218 | 784,464 | 249,117 | 33,549 | 1,400 | 2,620 |
| 1979 | 2,369,493 | 1,854,743 | 799,166 | 822,145 | 240,881 | 34,012 | 1,412 | 2,637 |
| 1980 | 2,454,973 | 2,019,879 | 868,121 | 864,404 | 245,859 | 34,254 | 1,420 | 2,647 |
| 1981 | 2,802,664 | 2,327,827 | 895,836 | 940,913 | 262,096 | 34,512 | 1,428 | 2,658 |
| 1982 | 3,404,673 | 3,236,067 | 999,278 | 1,076,705 | 302,906 | 35,938 | 1,435 | 2,667 |
| 1983 | 3,569,809 | 3,244,701 | 1,102,438 | 1,140,522 | 326,615 | 34,522 | 1,445 | 2,679 |
| 1984 | 3,578,795 | 4,136,687 | 1,197,694 | 1,212,828 | 311,334 | 36,229 | 1,463 | 2,704 |
| 1985 | 3,101,633 | 3,274,881 | 1,155,716 | 1,063,902 | 262,730 | 35,635 | 1,509 | 2,793 |
| 1986 | 2,734,990 | 2,737,898 | 1,115,247 | 867,975 | 220,429 | 35,607 | 1,540 | 2,862 |
| 1987 | 2,648,865 | 2,933,791 | 1,155,833 | 891,254 | 227,822 | 36,923 | 1,576 | 2,937 |

| Yr | Fatal | MAIS5 | MAIS4 | MAIS3 | MAIS2 | MAIS1 | MAIS0 | PDO |
|-----------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|------------|
| 1988 | 2,562,542 | 3,004,209 | 1,031,935 | 789,831 | 225,439 | 35,532 | 1,614 | 3,012 |
| 1989 | 2,741,907 | 2,698,548 | 1,033,989 | 821,897 | 239,500 | 36,237 | 1,649 | 3,085 |
| 1990 | 2,959,187 | 2,465,966 | 1,003,864 | 869,210 | 249,517 | 35,950 | 1,684 | 3,155 |
| 1991 | 3,103,162 | 2,608,741 | 1,020,181 | 954,219 | 277,784 | 36,424 | 1,716 | 3,221 |
| 1992 | 3,348,173 | 2,611,802 | 872,641 | 980,588 | 287,787 | 35,837 | 1,739 | 3,272 |
| 1993 | 3,396,894 | 2,585,571 | 958,849 | 1,030,800 | 319,965 | 37,023 | 1,779 | 3,346 |
| 1994 | 3,416,363 | 3,627,374 | 1,138,997 | 1,136,257 | 315,574 | 36,977 | 1,821 | 3,422 |
| 1995 | 3,566,120 | 4,169,728 | 1,574,730 | 1,244,789 | 306,930 | 37,247 | 1,866 | 3,500 |
| 1996 | 3,716,686 | 5,114,884 | 1,833,491 | 1,251,680 | 315,041 | 39,747 | 1,913 | 3,580 |
| 1997 | 3,927,849 | 4,686,578 | 2,118,926 | 1,250,786 | 320,426 | 41,781 | 1,951 | 3,646 |
| 1998 | 4,115,763 | 3,798,342 | 2,056,782 | 1,235,090 | 323,337 | 42,513 | 1,998 | 3,724 |
| 1999 | 4,285,021 | 3,504,919 | 1,932,240 | 1,384,693 | 315,980 | 42,368 | 2,046 | 3,801 |
| 2000 | 4,287,450 | 3,292,868 | 1,418,762 | 1,361,396 | 321,143 | 42,773 | 2,094 | 3,876 |
| 2001 | 4,355,765 | 3,943,760 | 1,390,926 | 1,287,205 | 329,007 | 43,730 | 2,142 | 3,951 |
| 2002 | 4,293,759 | 3,856,395 | 1,144,980 | 1,243,109 | 315,674 | 42,593 | 2,192 | 4,027 |
| 2003 | 4,408,480 | 3,118,694 | 1,149,220 | 1,298,660 | 331,919 | 42,516 | 2,246 | 4,107 |
| 2004 | 4,721,889 | 3,646,125 | 1,279,784 | 1,428,637 | 343,439 | 43,394 | 2,309 | 4,197 |
| 2005 | 4,747,621 | 4,027,038 | 1,339,385 | 1,437,555 | 357,694 | 44,563 | 2,374 | 4,288 |
| 2006 | 4,880,147 | 5,345,728 | 1,557,453 | 1,419,126 | 347,648 | 43,677 | 2,432 | 4,368 |
| 2007 | 5,153,261 | 5,126,749 | 1,702,424 | 1,478,519 | 365,361 | 44,051 | 2,494 | 4,451 |
| 2008 | 5,758,776 | 5,271,427 | 1,881,216 | 1,589,475 | 391,527 | 43,689 | 2,543 | 4,516 |
| 2009 | 6,098,249 | 5,160,762 | 2,035,029 | 1,687,629 | 380,491 | 42,972 | 2,585 | 4,570 |

| Yr | Fatal | MAIS5 | MAIS4 | MAIS3 | MAIS2 | MAIS1 | MAIS0 | PDO |
|-----------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|------------|
| 2010 | 6,235,001 | 4,129,544 | 2,145,403 | 1,715,782 | 365,150 | 41,849 | 2,624 | 4,619 |
| 2011 | 6,805,873 | 3,909,493 | 2,330,669 | 1,824,820 | 373,462 | 43,399 | 2,699 | 4,712 |
| 2012 | 6,664,878 | 4,212,302 | 2,335,510 | 1,702,591 | 349,168 | 43,344 | 2,749 | 4,771 |
| 2013 | 6,680,461 | 5,012,136 | 2,423,814 | 1,605,935 | 336,642 | 44,964 | 2,811 | 4,844 |
| 2014 | 6,751,517 | 7,080,278 | 2,526,459 | 1,671,692 | 341,486 | 45,712 | 2,883 | 4,927 |
| 2015 | 6,298,421 | 6,372,527 | 2,446,698 | 1,407,339 | 312,595 | 45,267 | 2,958 | 5,013 |
| 2016 | 6,083,298 | 5,615,873 | 2,343,431 | 1,359,735 | 319,209 | 46,833 | 3,036 | 5,101 |
| 2017 | 6,058,920 | 5,524,301 | 2,384,380 | 1,347,188 | 333,222 | 48,027 | 3,101 | 5,169 |
| 2018 | 6,202,747 | 5,368,747 | 2,464,642 | 1,380,674 | 352,377 | 48,951 | 3,182 | 5,256 |
| 2019 | 6,577,365 | 5,582,142 | 2,602,616 | 1,454,692 | 377,381 | 50,163 | 3,252 | 5,325 |

Table 42. Comprehensive costs – CW – summary of unit cost values by CY (2019\$)

| Yr | Fatal | MAIS5 | MAIS4 | MAIS3 | MAIS2 | MAIS1 | MAIS0 | PDO |
|-----------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|------------|
| 1968 | 470,604 | 289,469 | 199,824 | 151,947 | 59,717 | 17,267 | 292 | 491 |
| 1969 | 656,551 | 563,735 | 247,042 | 217,992 | 85,084 | 25,811 | 291 | 491 |
| 1970 | 873,292 | 762,790 | 311,487 | 305,832 | 119,269 | 28,162 | 293 | 493 |
| 1971 | 1,044,187 | 1,039,023 | 373,092 | 373,138 | 154,327 | 29,368 | 294 | 494 |
| 1972 | 1,122,555 | 1,107,616 | 394,498 | 420,344 | 173,958 | 28,270 | 292 | 492 |
| 1973 | 1,268,198 | 1,088,262 | 469,225 | 479,000 | 210,551 | 29,800 | 292 | 491 |
| 1974 | 1,618,125 | 1,107,538 | 547,309 | 653,559 | 275,508 | 30,887 | 292 | 492 |
| 1975 | 1,688,819 | 1,186,972 | 552,914 | 769,393 | 285,066 | 30,080 | 293 | 493 |

| Yr | Fatal | MAIS5 | MAIS4 | MAIS3 | MAIS2 | MAIS1 | MAIS0 | PDO |
|-----------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|------------|
| 1976 | 1,955,426 | 1,301,968 | 585,380 | 801,244 | 287,200 | 31,780 | 294 | 494 |
| 1977 | 2,051,756 | 1,492,234 | 607,340 | 772,370 | 263,156 | 30,600 | 294 | 493 |
| 1978 | 2,172,556 | 1,727,736 | 684,955 | 775,426 | 244,127 | 29,873 | 293 | 492 |
| 1979 | 2,353,409 | 1,843,041 | 787,879 | 813,085 | 235,874 | 30,320 | 292 | 492 |
| 1980 | 2,438,828 | 2,008,161 | 856,819 | 855,330 | 240,840 | 30,551 | 291 | 490 |
| 1981 | 2,786,460 | 2,316,094 | 884,519 | 931,825 | 257,066 | 30,800 | 291 | 490 |
| 1982 | 3,388,426 | 3,224,323 | 987,950 | 1,067,607 | 297,868 | 32,218 | 292 | 491 |
| 1983 | 3,553,498 | 3,232,940 | 1,091,093 | 1,131,408 | 321,565 | 30,792 | 292 | 492 |
| 1984 | 3,562,363 | 4,124,894 | 1,186,319 | 1,203,686 | 306,261 | 32,478 | 294 | 494 |
| 1985 | 3,084,950 | 3,262,787 | 1,143,943 | 1,054,596 | 257,501 | 31,758 | 296 | 501 |
| 1986 | 2,718,167 | 2,725,524 | 1,103,109 | 858,521 | 215,063 | 31,620 | 298 | 508 |
| 1987 | 2,631,862 | 2,921,120 | 1,143,322 | 881,633 | 222,311 | 32,815 | 299 | 514 |
| 1988 | 2,545,346 | 2,991,231 | 1,019,051 | 780,030 | 219,782 | 31,299 | 298 | 518 |
| 1989 | 2,724,542 | 2,685,264 | 1,020,742 | 811,913 | 233,701 | 31,879 | 299 | 523 |
| 1990 | 2,941,667 | 2,452,372 | 990,261 | 859,036 | 243,578 | 31,465 | 300 | 529 |
| 1991 | 3,085,511 | 2,594,837 | 1,006,232 | 943,851 | 271,710 | 31,814 | 302 | 535 |
| 1992 | 3,330,476 | 2,597,602 | 858,370 | 970,037 | 281,595 | 31,112 | 304 | 543 |
| 1993 | 3,379,036 | 2,571,038 | 944,231 | 1,020,027 | 313,632 | 32,160 | 307 | 551 |
| 1994 | 3,398,325 | 3,612,497 | 1,124,029 | 1,125,250 | 309,096 | 31,968 | 309 | 557 |
| 1995 | 3,547,893 | 4,154,496 | 1,559,415 | 1,233,535 | 300,306 | 32,088 | 312 | 565 |
| 1996 | 3,698,269 | 5,099,289 | 1,817,831 | 1,240,170 | 308,272 | 34,433 | 316 | 574 |
| 1997 | 3,909,305 | 4,670,628 | 2,102,941 | 1,239,024 | 313,523 | 36,318 | 319 | 581 |

| Yr | Fatal | MAIS5 | MAIS4 | MAIS3 | MAIS2 | MAIS1 | MAIS0 | PDO |
|-----------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|------------|
| 1998 | 4,097,031 | 3,782,013 | 2,040,460 | 1,223,053 | 316,288 | 36,887 | 321 | 588 |
| 1999 | 4,266,100 | 3,488,203 | 1,915,583 | 1,372,370 | 308,785 | 36,574 | 323 | 594 |
| 2000 | 4,268,345 | 3,275,758 | 1,401,776 | 1,348,779 | 313,803 | 36,807 | 324 | 600 |
| 2001 | 4,336,479 | 3,926,246 | 1,373,614 | 1,274,285 | 321,523 | 37,588 | 326 | 606 |
| 2002 | 4,274,285 | 3,838,468 | 1,127,345 | 1,229,874 | 308,044 | 36,269 | 328 | 611 |
| 2003 | 4,388,808 | 3,100,342 | 1,131,261 | 1,285,099 | 324,142 | 36,002 | 330 | 618 |
| 2004 | 4,701,963 | 3,627,323 | 1,261,491 | 1,414,726 | 335,503 | 36,676 | 333 | 626 |
| 2005 | 4,727,431 | 4,007,776 | 1,320,759 | 1,423,283 | 349,598 | 37,634 | 336 | 632 |
| 2006 | 4,859,738 | 5,326,005 | 1,538,510 | 1,404,493 | 339,401 | 36,539 | 336 | 636 |
| 2007 | 5,132,628 | 5,106,555 | 1,683,164 | 1,463,515 | 356,962 | 36,697 | 339 | 642 |
| 2008 | 5,738,017 | 5,250,778 | 1,861,668 | 1,574,112 | 382,994 | 36,129 | 341 | 648 |
| 2009 | 6,077,419 | 5,139,661 | 2,015,211 | 1,671,912 | 371,834 | 35,210 | 343 | 653 |
| 2010 | 6,214,130 | 4,107,987 | 2,125,325 | 1,699,707 | 356,375 | 33,884 | 345 | 659 |
| 2011 | 6,784,737 | 3,887,411 | 2,310,279 | 1,808,325 | 364,527 | 35,186 | 349 | 667 |
| 2012 | 6,643,647 | 4,189,729 | 2,314,854 | 1,685,707 | 340,104 | 34,905 | 352 | 673 |
| 2013 | 6,659,063 | 4,989,040 | 2,402,876 | 1,588,634 | 327,436 | 36,281 | 355 | 679 |
| 2014 | 6,729,907 | 7,056,637 | 2,505,231 | 1,653,954 | 332,131 | 36,768 | 359 | 687 |
| 2015 | 6,276,575 | 6,348,321 | 2,425,178 | 1,389,149 | 303,085 | 36,052 | 363 | 694 |
| 2016 | 6,061,212 | 5,591,090 | 2,321,622 | 1,341,083 | 309,543 | 37,338 | 367 | 701 |
| 2017 | 6,036,698 | 5,498,954 | 2,362,311 | 1,328,088 | 323,420 | 38,262 | 371 | 708 |
| 2018 | 6,180,284 | 5,342,796 | 2,442,290 | 1,361,092 | 342,420 | 38,890 | 374 | 715 |
| 2019 | 6,554,769 | 5,555,601 | 2,580,012 | 1,434,643 | 367,289 | 39,816 | 380 | 724 |

Table 43. Economic costs – CA – summary of unit cost values by CY (2019\$)

| Yr | Fatal | MAIS5 | MAIS4 | MAIS3 | MAIS2 | MAIS1 | MAIS0 | PDO |
|-----------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|------------|
| 1968 | 295,860 | 196,528 | 146,118 | 80,459 | 24,323 | 8,850 | 1,273 | 2,453 |
| 1969 | 348,154 | 221,984 | 156,307 | 89,386 | 27,085 | 10,563 | 1,288 | 2,472 |
| 1970 | 409,402 | 247,714 | 169,547 | 100,746 | 30,597 | 10,972 | 1,302 | 2,492 |
| 1971 | 458,078 | 284,203 | 182,454 | 109,579 | 34,279 | 11,212 | 1,320 | 2,515 |
| 1972 | 479,950 | 294,588 | 187,741 | 116,427 | 36,634 | 11,085 | 1,339 | 2,540 |
| 1973 | 520,904 | 292,057 | 203,861 | 124,368 | 40,134 | 11,432 | 1,364 | 2,573 |
| 1974 | 620,758 | 293,637 | 219,661 | 147,053 | 46,326 | 11,635 | 1,381 | 2,596 |
| 1975 | 640,140 | 303,211 | 220,080 | 161,689 | 46,900 | 11,424 | 1,352 | 2,557 |
| 1976 | 714,307 | 316,524 | 225,565 | 164,564 | 46,677 | 11,726 | 1,369 | 2,580 |
| 1977 | 739,566 | 340,712 | 229,843 | 160,505 | 44,257 | 11,536 | 1,381 | 2,595 |
| 1978 | 773,787 | 371,903 | 246,299 | 161,201 | 42,588 | 11,451 | 1,400 | 2,620 |
| 1979 | 825,346 | 387,282 | 267,875 | 164,867 | 42,166 | 11,577 | 1,412 | 2,637 |
| 1980 | 847,946 | 410,972 | 283,971 | 169,736 | 43,021 | 11,688 | 1,420 | 2,647 |
| 1981 | 944,721 | 450,860 | 289,421 | 177,580 | 44,625 | 11,734 | 1,428 | 2,658 |
| 1982 | 1,112,684 | 567,832 | 309,917 | 192,954 | 48,515 | 11,997 | 1,435 | 2,667 |
| 1983 | 1,156,052 | 567,551 | 330,839 | 199,859 | 50,580 | 11,704 | 1,445 | 2,679 |
| 1984 | 1,157,511 | 678,013 | 347,880 | 206,297 | 48,431 | 11,984 | 1,463 | 2,704 |
| 1985 | 1,023,467 | 565,547 | 338,619 | 188,145 | 43,631 | 11,947 | 1,509 | 2,793 |
| 1986 | 922,714 | 496,116 | 329,891 | 164,934 | 39,701 | 12,028 | 1,540 | 2,862 |
| 1987 | 896,300 | 521,590 | 338,921 | 168,563 | 40,860 | 12,398 | 1,576 | 2,937 |

| Yr | Fatal | MAIS5 | MAIS4 | MAIS3 | MAIS2 | MAIS1 | MAIS0 | PDO |
|-----------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|------------|
| 1988 | 867,179 | 532,575 | 316,013 | 157,621 | 41,228 | 12,297 | 1,614 | 3,012 |
| 1989 | 908,689 | 492,416 | 316,851 | 161,910 | 42,958 | 12,571 | 1,649 | 3,085 |
| 1990 | 963,144 | 461,798 | 310,498 | 167,887 | 44,092 | 12,644 | 1,684 | 3,155 |
| 1991 | 995,311 | 479,351 | 313,780 | 178,706 | 46,925 | 12,850 | 1,716 | 3,221 |
| 1992 | 1,054,827 | 477,797 | 282,624 | 181,839 | 47,871 | 12,796 | 1,739 | 3,272 |
| 1993 | 1,060,617 | 471,182 | 298,922 | 187,680 | 50,624 | 13,090 | 1,779 | 3,346 |
| 1994 | 1,058,790 | 596,621 | 334,754 | 200,750 | 50,162 | 13,199 | 1,821 | 3,422 |
| 1995 | 1,092,717 | 657,055 | 420,431 | 213,807 | 49,363 | 13,353 | 1,866 | 3,500 |
| 1996 | 1,126,137 | 756,674 | 465,461 | 212,142 | 50,048 | 13,880 | 1,913 | 3,580 |
| 1997 | 1,174,740 | 699,075 | 518,787 | 210,594 | 49,866 | 14,359 | 1,951 | 3,646 |
| 1998 | 1,215,344 | 590,443 | 504,182 | 207,274 | 50,269 | 14,615 | 1,998 | 3,724 |
| 1999 | 1,253,319 | 555,214 | 480,646 | 223,869 | 49,832 | 14,757 | 2,046 | 3,801 |
| 2000 | 1,251,871 | 528,589 | 381,060 | 220,161 | 50,437 | 14,987 | 2,094 | 3,876 |
| 2001 | 1,266,579 | 603,560 | 377,492 | 212,202 | 51,394 | 15,335 | 2,142 | 3,951 |
| 2002 | 1,249,522 | 593,811 | 330,833 | 207,747 | 50,408 | 15,311 | 2,192 | 4,027 |
| 2003 | 1,278,151 | 509,860 | 331,931 | 214,325 | 51,909 | 15,438 | 2,246 | 4,107 |
| 2004 | 1,355,675 | 567,232 | 355,215 | 227,824 | 52,894 | 15,757 | 2,309 | 4,197 |
| 2005 | 1,360,434 | 611,875 | 367,577 | 229,728 | 54,310 | 16,157 | 2,374 | 4,288 |
| 2006 | 1,389,701 | 764,776 | 412,339 | 229,887 | 54,017 | 16,255 | 2,432 | 4,368 |
| 2007 | 1,451,210 | 738,255 | 440,439 | 237,125 | 55,634 | 16,513 | 2,494 | 4,451 |
| 2008 | 1,595,569 | 758,440 | 478,687 | 251,414 | 58,203 | 16,635 | 2,543 | 4,516 |
| 2009 | 1,664,837 | 747,297 | 511,765 | 263,332 | 57,454 | 16,720 | 2,585 | 4,570 |

| Yr | Fatal | MAIS5 | MAIS4 | MAIS3 | MAIS2 | MAIS1 | MAIS0 | PDO |
|-----------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|------------|
| 2010 | 1,688,004 | 631,736 | 536,857 | 268,220 | 56,192 | 16,704 | 2,624 | 4,619 |
| 2011 | 1,822,119 | 603,075 | 569,751 | 279,065 | 56,648 | 17,166 | 2,699 | 4,712 |
| 2012 | 1,782,420 | 637,456 | 569,926 | 264,903 | 54,539 | 17,356 | 2,749 | 4,771 |
| 2013 | 1,772,976 | 727,483 | 588,047 | 253,464 | 53,716 | 17,882 | 2,811 | 4,844 |
| 2014 | 1,779,611 | 952,451 | 603,182 | 258,472 | 54,012 | 18,198 | 2,883 | 4,927 |
| 2015 | 1,660,938 | 873,833 | 589,802 | 229,121 | 51,505 | 18,354 | 2,958 | 5,013 |
| 2016 | 1,602,282 | 788,217 | 569,742 | 223,815 | 52,196 | 18,860 | 3,036 | 5,101 |
| 2017 | 1,589,768 | 779,482 | 581,129 | 223,245 | 53,503 | 19,304 | 3,101 | 5,169 |
| 2018 | 1,613,216 | 760,391 | 593,868 | 225,680 | 55,360 | 19,727 | 3,182 | 5,256 |
| 2019 | 1,687,323 | 776,189 | 624,009 | 233,467 | 57,365 | 20,141 | 3,252 | 5,325 |

Table 44. Economic costs – CW – summary of unit cost values by CY (2019\$)

| Yr | Yr | Fatal | MAIS5 | MAIS4 | MAIS3 | MAIS2 | MAIS1 | MAIS0 | PDO |
|-----------|-----------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|------------|
| 1968 | 68 | 280,761 | 185,082 | 135,082 | 71,633 | 19,501 | 5,325 | 292 | 491 |
| 1969 | 69 | 332,949 | 210,511 | 145,244 | 80,535 | 22,243 | 7,019 | 291 | 491 |
| 1970 | 70 | 394,106 | 236,217 | 158,461 | 91,873 | 25,738 | 7,413 | 293 | 493 |
| 1971 | 71 | 442,661 | 272,675 | 171,337 | 100,677 | 29,397 | 7,633 | 294 | 494 |
| 1972 | 72 | 464,385 | 283,021 | 176,586 | 107,490 | 31,724 | 7,480 | 292 | 492 |
| 1973 | 73 | 505,160 | 280,444 | 192,661 | 115,389 | 35,191 | 7,798 | 292 | 491 |
| 1974 | 74 | 604,898 | 281,993 | 208,431 | 138,046 | 41,361 | 7,981 | 292 | 492 |
| 1975 | 75 | 624,488 | 291,622 | 208,903 | 152,732 | 41,974 | 7,805 | 293 | 493 |

| Yr | Yr | Fatal | MAIS5 | MAIS4 | MAIS3 | MAIS2 | MAIS1 | MAIS0 | PDO |
|-----------|-----------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|------------|
| 1976 | 76 | 698,545 | 304,906 | 214,360 | 155,581 | 41,730 | 8,089 | 294 | 494 |
| 1977 | 77 | 723,715 | 329,071 | 218,616 | 151,501 | 39,294 | 7,883 | 294 | 493 |
| 1978 | 78 | 757,797 | 360,225 | 235,036 | 152,163 | 37,598 | 7,775 | 293 | 492 |
| 1979 | 79 | 809,262 | 375,580 | 256,588 | 155,807 | 37,159 | 7,885 | 292 | 492 |
| 1980 | 80 | 831,802 | 399,254 | 272,669 | 160,662 | 38,002 | 7,985 | 291 | 490 |
| 1981 | 81 | 928,517 | 439,127 | 278,104 | 168,492 | 39,595 | 8,022 | 291 | 490 |
| 1982 | 82 | 1,096,437 | 556,088 | 298,589 | 183,856 | 43,477 | 8,277 | 292 | 491 |
| 1983 | 83 | 1,139,741 | 555,790 | 319,494 | 190,745 | 45,530 | 7,974 | 292 | 492 |
| 1984 | 84 | 1,141,079 | 666,220 | 336,505 | 197,155 | 43,358 | 8,233 | 294 | 494 |
| 1985 | 85 | 1,006,784 | 553,453 | 326,846 | 178,839 | 38,402 | 8,070 | 296 | 501 |
| 1986 | 86 | 905,891 | 483,742 | 317,753 | 155,480 | 34,335 | 8,041 | 298 | 508 |
| 1987 | 87 | 879,296 | 508,919 | 326,410 | 158,942 | 35,349 | 8,290 | 299 | 514 |
| 1988 | 88 | 849,982 | 519,597 | 303,129 | 147,820 | 35,571 | 8,064 | 298 | 518 |
| 1989 | 89 | 891,324 | 479,132 | 303,604 | 151,926 | 37,159 | 8,213 | 299 | 523 |
| 1990 | 90 | 945,624 | 448,204 | 296,895 | 157,713 | 38,153 | 8,159 | 300 | 529 |
| 1991 | 91 | 977,661 | 465,447 | 299,831 | 168,338 | 40,851 | 8,240 | 302 | 535 |
| 1992 | 92 | 1,037,130 | 463,597 | 268,353 | 171,288 | 41,679 | 8,071 | 304 | 543 |
| 1993 | 93 | 1,042,759 | 456,649 | 284,304 | 176,907 | 44,291 | 8,227 | 307 | 551 |
| 1994 | 94 | 1,040,752 | 581,744 | 319,786 | 189,743 | 43,684 | 8,190 | 309 | 557 |
| 1995 | 95 | 1,074,490 | 641,823 | 405,116 | 202,553 | 42,739 | 8,194 | 312 | 565 |
| 1996 | 96 | 1,107,720 | 741,079 | 449,801 | 200,632 | 43,279 | 8,566 | 316 | 574 |
| 1997 | 97 | 1,156,196 | 683,125 | 502,802 | 198,832 | 42,963 | 8,896 | 319 | 581 |

| Yr | Yr | Fatal | MAIS5 | MAIS4 | MAIS3 | MAIS2 | MAIS1 | MAIS0 | PDO |
|-----------|-----------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|------------|
| 1998 | 98 | 1,196,612 | 574,114 | 487,860 | 195,237 | 43,220 | 8,989 | 321 | 588 |
| 1999 | 99 | 1,234,398 | 538,498 | 463,989 | 211,546 | 42,637 | 8,963 | 323 | 594 |
| 2000 | 0 | 1,232,765 | 511,479 | 364,074 | 207,544 | 43,097 | 9,021 | 324 | 600 |
| 2001 | 1 | 1,247,293 | 586,046 | 360,180 | 199,282 | 43,910 | 9,193 | 326 | 606 |
| 2002 | 2 | 1,230,048 | 575,884 | 313,198 | 194,512 | 42,778 | 8,987 | 328 | 611 |
| 2003 | 3 | 1,258,480 | 491,508 | 313,972 | 200,764 | 44,132 | 8,924 | 330 | 618 |
| 2004 | 4 | 1,335,748 | 548,430 | 336,922 | 213,913 | 44,958 | 9,039 | 333 | 626 |
| 2005 | 5 | 1,340,244 | 592,613 | 348,951 | 215,456 | 46,214 | 9,228 | 336 | 632 |
| 2006 | 6 | 1,369,292 | 745,053 | 393,396 | 215,254 | 45,770 | 9,117 | 336 | 636 |
| 2007 | 7 | 1,430,577 | 718,061 | 421,179 | 222,121 | 47,235 | 9,159 | 339 | 642 |
| 2008 | 8 | 1,574,810 | 737,791 | 459,139 | 236,051 | 49,670 | 9,075 | 341 | 648 |
| 2009 | 9 | 1,644,007 | 726,196 | 491,947 | 247,615 | 48,797 | 8,958 | 343 | 653 |
| 2010 | 10 | 1,667,133 | 610,179 | 516,779 | 252,145 | 47,417 | 8,739 | 345 | 659 |
| 2011 | 11 | 1,800,983 | 580,993 | 549,361 | 262,570 | 47,713 | 8,953 | 349 | 667 |
| 2012 | 12 | 1,761,189 | 614,883 | 549,270 | 248,019 | 45,475 | 8,917 | 352 | 673 |
| 2013 | 13 | 1,751,578 | 704,387 | 567,109 | 236,163 | 44,510 | 9,199 | 355 | 679 |
| 2014 | 14 | 1,758,001 | 928,810 | 581,954 | 240,734 | 44,657 | 9,254 | 359 | 687 |
| 2015 | 15 | 1,639,092 | 849,627 | 568,282 | 210,931 | 41,995 | 9,139 | 363 | 694 |
| 2016 | 16 | 1,580,195 | 763,434 | 547,933 | 205,163 | 42,530 | 9,365 | 367 | 701 |
| 2017 | 17 | 1,567,546 | 754,135 | 559,060 | 204,145 | 43,701 | 9,539 | 371 | 708 |
| 2018 | 18 | 1,590,754 | 734,440 | 571,516 | 206,098 | 45,403 | 9,666 | 374 | 715 |
| 2019 | 19 | 1,664,727 | 749,648 | 601,405 | 213,418 | 47,273 | 9,794 | 380 | 724 |

Total Societal Value of Safety Benefits

Table 45 shows the comprehensive value of societal benefits from FMVSS safety technologies for all light vehicles (passenger cars and LTVs) and both technology types (CA and CW) by CY and injury severity level. Table 46 shows this same information with benefits valued using economic costs alone. For comprehensive costs, fatalities contribute significantly due to the high value society places on preventing fatalities and the relative rarity of the most serious nonfatal injuries (MAIS4 and MAIS5), which also have significant QALY values. MAIS2 and MAIS3 injuries also contribute significantly to total benefits due to their relatively high incidence. Similar results are found for economic costs reflecting lost lifetime productivity for fatalities prevented and high incidence of MAIS2 and MAIS3 injuries, but additionally, PDOs make up a significant portion of costs due to their incidence.

Table 45. Total benefits, comprehensive cost valuation – passenger cars and LTVs by CY (millions in 2019\$)

| Year | Fatal | MAIS5 | MAIS4 | MAIS3 | MAIS2 | MAIS1 | MAIS0 | PDO | Total |
|-------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|------------|--------------|
| 1968 | 384 | 95 | 113 | 1,095 | 1,367 | 956 | 23 | 183 | 4,216 |
| 1969 | 772 | 218 | 238 | 2,292 | 3,593 | 2,228 | 38 | 299 | 9,678 |
| 1970 | 1,264 | 339 | 372 | 3,671 | 6,613 | 3,350 | 55 | 427 | 16,090 |
| 1971 | 1,854 | 438 | 518 | 5,282 | 10,006 | 4,439 | 71 | 551 | 23,158 |
| 1972 | 2,501 | 550 | 671 | 6,845 | 13,569 | 5,504 | 89 | 688 | 30,417 |
| 1973 | 3,272 | 726 | 817 | 8,721 | 17,373 | 6,396 | 99 | 767 | 38,171 |
| 1974 | 4,082 | 996 | 1,010 | 10,500 | 19,869 | 6,965 | 104 | 805 | 44,330 |
| 1975 | 5,157 | 1,312 | 1,270 | 12,374 | 21,743 | 7,792 | 118 | 919 | 50,685 |
| 1976 | 6,360 | 1,719 | 1,619 | 14,977 | 23,735 | 8,725 | 132 | 1,024 | 58,291 |
| 1977 | 7,580 | 2,086 | 1,968 | 17,747 | 25,064 | 9,517 | 151 | 1,167 | 65,279 |
| 1978 | 8,815 | 2,417 | 2,263 | 20,686 | 26,176 | 10,695 | 169 | 1,304 | 72,526 |
| 1979 | 10,147 | 2,812 | 2,486 | 23,905 | 27,692 | 11,726 | 177 | 1,363 | 80,307 |
| 1980 | 11,168 | 3,087 | 2,619 | 26,292 | 29,264 | 11,780 | 184 | 1,415 | 85,809 |
| 1981 | 12,502 | 3,454 | 3,014 | 29,726 | 31,646 | 11,786 | 189 | 1,453 | 93,769 |
| 1982 | 13,850 | 3,747 | 3,339 | 32,587 | 33,226 | 11,338 | 196 | 1,498 | 99,781 |
| 1983 | 15,195 | 4,088 | 3,860 | 34,835 | 34,025 | 11,362 | 204 | 1,563 | 105,134 |
| 1984 | 17,352 | 4,477 | 4,318 | 38,212 | 35,919 | 11,953 | 215 | 1,634 | 114,079 |
| 1985 | 19,870 | 4,990 | 4,972 | 41,935 | 38,597 | 12,808 | 228 | 1,746 | 125,145 |
| 1986 | 23,310 | 5,692 | 5,439 | 47,880 | 43,671 | 14,299 | 248 | 1,901 | 142,440 |
| 1987 | 26,438 | 6,174 | 5,834 | 52,069 | 48,557 | 15,169 | 272 | 2,087 | 156,599 |
| 1988 | 28,849 | 6,440 | 6,412 | 56,649 | 54,134 | 15,505 | 297 | 2,279 | 170,563 |

| Year | Fatal | MAIS5 | MAIS4 | MAIS3 | MAIS2 | MAIS1 | MAIS0 | PDO | Total |
|-------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|------------|--------------|
| 1989 | 31,538 | 7,000 | 6,860 | 61,948 | 61,215 | 15,739 | 310 | 2,306 | 186,915 |
| 1990 | 34,737 | 7,813 | 7,980 | 68,025 | 68,917 | 15,714 | 338 | 2,520 | 206,044 |
| 1991 | 37,920 | 8,544 | 8,823 | 72,909 | 74,407 | 15,695 | 345 | 2,535 | 221,179 |
| 1992 | 41,861 | 9,568 | 10,024 | 79,650 | 79,843 | 16,824 | 361 | 2,596 | 240,727 |
| 1993 | 46,875 | 10,863 | 11,213 | 87,339 | 85,041 | 18,877 | 398 | 2,828 | 263,433 |
| 1994 | 51,730 | 11,531 | 12,419 | 93,213 | 87,673 | 21,010 | 455 | 3,260 | 281,292 |
| 1995 | 57,514 | 12,426 | 14,108 | 99,996 | 90,840 | 24,374 | 540 | 3,876 | 303,673 |
| 1996 | 66,283 | 13,691 | 15,438 | 112,290 | 96,121 | 28,377 | 595 | 4,221 | 337,017 |
| 1997 | 72,959 | 14,746 | 16,786 | 121,637 | 103,335 | 30,025 | 617 | 4,548 | 364,653 |
| 1998 | 80,079 | 16,236 | 18,111 | 132,423 | 108,369 | 30,441 | 611 | 4,697 | 390,967 |
| 1999 | 86,049 | 17,609 | 18,656 | 138,239 | 113,105 | 30,317 | 630 | 4,824 | 409,428 |
| 2000 | 94,970 | 19,658 | 18,187 | 147,086 | 118,486 | 30,161 | 703 | 5,419 | 434,669 |
| 2001 | 101,118 | 20,665 | 19,054 | 152,630 | 122,341 | 28,888 | 734 | 5,771 | 451,201 |
| 2002 | 109,500 | 22,271 | 21,093 | 159,681 | 126,638 | 27,600 | 745 | 6,098 | 473,625 |
| 2003 | 119,335 | 24,962 | 25,134 | 167,221 | 133,045 | 28,480 | 841 | 6,573 | 505,591 |
| 2004 | 132,807 | 27,808 | 31,128 | 178,374 | 139,157 | 29,849 | 848 | 6,950 | 546,920 |
| 2005 | 141,683 | 29,528 | 33,276 | 183,702 | 141,763 | 30,042 | 849 | 7,318 | 568,162 |
| 2006 | 147,088 | 29,892 | 38,906 | 185,189 | 138,157 | 28,375 | 876 | 7,612 | 576,095 |
| 2007 | 156,351 | 31,600 | 41,000 | 190,781 | 138,781 | 27,612 | 902 | 8,153 | 595,181 |
| 2008 | 160,263 | 32,440 | 43,002 | 190,728 | 134,787 | 27,216 | 904 | 8,309 | 597,650 |
| 2009 | 162,845 | 33,164 | 42,797 | 189,134 | 128,777 | 27,153 | 915 | 8,335 | 593,119 |
| 2010 | 165,608 | 34,574 | 42,967 | 186,633 | 124,579 | 28,940 | 1,004 | 8,884 | 593,189 |

| Year | Fatal | MAIS5 | MAIS4 | MAIS3 | MAIS2 | MAIS1 | MAIS0 | PDO | Total |
|-------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|------------|--------------|
| 2011 | 177,495 | 38,070 | 45,863 | 192,949 | 124,528 | 32,262 | 1,057 | 9,378 | 621,602 |
| 2012 | 185,246 | 40,207 | 46,861 | 194,365 | 122,546 | 35,442 | 1,242 | 10,710 | 636,618 |
| 2013 | 190,064 | 41,257 | 50,505 | 194,856 | 121,957 | 37,149 | 1,341 | 11,743 | 648,872 |
| 2014 | 204,366 | 43,462 | 60,199 | 202,273 | 127,711 | 39,705 | 1,527 | 13,853 | 693,096 |
| 2015 | 212,328 | 44,779 | 62,990 | 205,837 | 134,527 | 43,452 | 1,782 | 16,238 | 721,932 |
| 2016 | 225,460 | 47,423 | 64,860 | 212,303 | 144,354 | 48,164 | 2,055 | 16,418 | 761,036 |
| 2017 | 235,546 | 49,374 | 66,764 | 215,834 | 154,186 | 51,220 | 1,998 | 17,005 | 791,927 |
| 2018 | 246,066 | 51,704 | 70,237 | 222,998 | 162,110 | 53,085 | 2,072 | 18,611 | 826,884 |
| 2019 | 262,963 | 55,334 | 75,263 | 234,566 | 174,363 | 56,803 | 2,257 | 20,156 | 881,706 |

Table 46. Total benefits, economic cost valuation – passenger cars and LTVs by CY (millions in 2019\$)

| Year | Fatal | MAIS5 | MAIS4 | MAIS3 | MAIS2 | MAIS1 | MAIS0 | PDO | Total |
|-------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|------------|--------------|
| 1968 | 229 | 61 | 76 | 520 | 455 | 350 | 23 | 183 | 1,898 |
| 1969 | 393 | 81 | 140 | 854 | 955 | 705 | 38 | 299 | 3,465 |
| 1970 | 572 | 105 | 190 | 1,112 | 1,450 | 1,018 | 55 | 427 | 4,928 |
| 1971 | 788 | 115 | 238 | 1,437 | 1,935 | 1,339 | 71 | 551 | 6,473 |
| 1972 | 1,037 | 141 | 301 | 1,765 | 2,511 | 1,695 | 89 | 688 | 8,227 |
| 1973 | 1,306 | 187 | 336 | 2,117 | 2,945 | 1,948 | 99 | 767 | 9,705 |
| 1974 | 1,528 | 254 | 385 | 2,233 | 3,023 | 2,089 | 104 | 805 | 10,421 |
| 1975 | 1,910 | 323 | 481 | 2,472 | 3,247 | 2,366 | 118 | 919 | 11,835 |
| 1976 | 2,275 | 403 | 594 | 2,926 | 3,501 | 2,588 | 132 | 1,024 | 13,442 |
| 1977 | 2,677 | 460 | 709 | 3,502 | 3,806 | 2,870 | 151 | 1,167 | 15,342 |

| Year | Fatal | MAIS5 | MAIS4 | MAIS3 | MAIS2 | MAIS1 | MAIS0 | PDO | Total |
|-------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|------------|--------------|
| 1978 | 3,078 | 505 | 778 | 4,084 | 4,102 | 3,268 | 169 | 1,304 | 17,287 |
| 1979 | 3,493 | 574 | 811 | 4,605 | 4,439 | 3,586 | 177 | 1,363 | 19,048 |
| 1980 | 3,813 | 614 | 835 | 4,965 | 4,697 | 3,611 | 184 | 1,415 | 20,135 |
| 1981 | 4,170 | 656 | 949 | 5,400 | 4,952 | 3,593 | 189 | 1,453 | 21,362 |
| 1982 | 4,485 | 647 | 1,010 | 5,636 | 4,920 | 3,389 | 196 | 1,498 | 21,782 |
| 1983 | 4,877 | 703 | 1,131 | 5,894 | 4,891 | 3,433 | 204 | 1,563 | 22,698 |
| 1984 | 5,562 | 724 | 1,226 | 6,281 | 5,166 | 3,510 | 215 | 1,634 | 24,317 |
| 1985 | 6,489 | 847 | 1,422 | 7,137 | 5,841 | 3,757 | 228 | 1,746 | 27,467 |
| 1986 | 7,773 | 1,011 | 1,568 | 8,701 | 7,076 | 4,159 | 248 | 1,901 | 32,438 |
| 1987 | 8,838 | 1,076 | 1,667 | 9,419 | 7,831 | 4,377 | 272 | 2,087 | 35,566 |
| 1988 | 9,639 | 1,120 | 1,909 | 10,769 | 8,878 | 4,572 | 297 | 2,279 | 39,462 |
| 1989 | 10,323 | 1,250 | 2,042 | 11,623 | 9,847 | 4,623 | 310 | 2,306 | 42,324 |
| 1990 | 11,172 | 1,429 | 2,394 | 12,521 | 10,918 | 4,637 | 338 | 2,520 | 45,929 |
| 1991 | 12,020 | 1,534 | 2,631 | 13,038 | 11,321 | 4,641 | 345 | 2,535 | 48,066 |
| 1992 | 13,041 | 1,709 | 3,136 | 14,099 | 11,975 | 5,028 | 361 | 2,596 | 51,945 |
| 1993 | 14,471 | 1,930 | 3,378 | 15,192 | 12,204 | 5,586 | 398 | 2,828 | 55,987 |
| 1994 | 15,848 | 1,858 | 3,535 | 15,760 | 12,605 | 6,257 | 455 | 3,260 | 59,580 |
| 1995 | 17,424 | 1,921 | 3,667 | 16,467 | 13,171 | 7,269 | 540 | 3,876 | 64,336 |
| 1996 | 19,860 | 1,991 | 3,823 | 18,217 | 13,697 | 8,299 | 595 | 4,221 | 70,703 |
| 1997 | 21,584 | 2,158 | 4,016 | 19,577 | 14,379 | 8,681 | 617 | 4,548 | 75,561 |
| 1998 | 23,395 | 2,466 | 4,333 | 21,206 | 15,018 | 8,737 | 611 | 4,697 | 80,463 |
| 1999 | 24,905 | 2,720 | 4,522 | 21,371 | 15,863 | 8,807 | 630 | 4,824 | 83,641 |

| Year | Fatal | MAIS5 | MAIS4 | MAIS3 | MAIS2 | MAIS1 | MAIS0 | PDO | Total |
|-------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|------------|--------------|
| 2000 | 27,437 | 3,071 | 4,727 | 22,698 | 16,539 | 8,781 | 703 | 5,419 | 89,375 |
| 2001 | 29,093 | 3,086 | 5,000 | 23,938 | 16,995 | 8,461 | 734 | 5,771 | 93,078 |
| 2002 | 31,521 | 3,343 | 5,865 | 25,337 | 17,895 | 8,250 | 745 | 6,098 | 99,053 |
| 2003 | 34,229 | 3,961 | 6,986 | 26,211 | 18,398 | 8,564 | 841 | 6,573 | 105,762 |
| 2004 | 37,740 | 4,208 | 8,325 | 27,065 | 18,921 | 8,950 | 848 | 6,950 | 113,007 |
| 2005 | 40,181 | 4,370 | 8,804 | 27,905 | 19,008 | 9,016 | 849 | 7,318 | 117,453 |
| 2006 | 41,459 | 4,184 | 9,957 | 28,488 | 18,939 | 8,763 | 876 | 7,612 | 120,278 |
| 2007 | 43,596 | 4,446 | 10,269 | 29,062 | 18,705 | 8,613 | 902 | 8,153 | 123,746 |
| 2008 | 44,004 | 4,561 | 10,616 | 28,711 | 17,818 | 8,624 | 904 | 8,309 | 123,546 |
| 2009 | 44,071 | 4,689 | 10,458 | 28,124 | 17,249 | 8,806 | 915 | 8,335 | 122,646 |
| 2010 | 44,451 | 5,143 | 10,459 | 27,809 | 16,970 | 9,617 | 1,004 | 8,884 | 124,336 |
| 2011 | 47,139 | 5,701 | 10,920 | 28,158 | 16,707 | 10,631 | 1,057 | 9,378 | 129,692 |
| 2012 | 49,139 | 5,914 | 11,139 | 28,771 | 16,855 | 11,843 | 1,242 | 10,710 | 135,611 |
| 2013 | 50,030 | 5,836 | 11,941 | 29,212 | 17,110 | 12,336 | 1,341 | 11,743 | 139,549 |
| 2014 | 53,428 | 5,730 | 14,014 | 29,692 | 17,690 | 13,307 | 1,527 | 13,853 | 149,241 |
| 2015 | 55,501 | 6,001 | 14,796 | 31,595 | 19,284 | 14,876 | 1,782 | 16,238 | 160,074 |
| 2016 | 58,843 | 6,487 | 15,348 | 32,872 | 20,554 | 16,502 | 2,055 | 16,418 | 169,079 |
| 2017 | 61,236 | 6,787 | 15,843 | 33,609 | 21,600 | 17,539 | 1,998 | 17,005 | 175,616 |
| 2018 | 63,417 | 7,129 | 16,484 | 34,250 | 22,296 | 18,225 | 2,072 | 18,611 | 182,483 |
| 2019 | 66,876 | 7,491 | 17,593 | 35,408 | 23,282 | 19,437 | 2,257 | 20,156 | 192,500 |

Table 47 shows a breakout of total comprehensive benefits by vehicle type and attribution status, and Table 48 shows the same for economic benefits. Passenger car safety benefits dominate the earlier years of this analysis but the shift in consumer preference to trucks and SUVs becomes gradually apparent over time.

Table 47. Comprehensive benefits by vehicle type and attribution status (billions in 2019\$)

| Calendar Year | Passenger Cars | | | LTVs | | | Passenger Cars + LTVs Total | | |
|---------------|----------------|-------|-------|------|-------|-------|-----------------------------|-------|-------|
| | Vol. | Attr. | Total | Vol. | Attr. | Total | Vol. | Attr. | Total |
| 1968 | 2.8 | 0.9 | 3.7 | 0.3 | 0.2 | 0.5 | 3.2 | 1.0 | 4.2 |
| 1969 | 6.1 | 2.4 | 8.4 | 0.9 | 0.4 | 1.2 | 6.9 | 2.8 | 9.7 |
| 1970 | 10.1 | 4.2 | 14.3 | 1.2 | 0.6 | 1.8 | 11.3 | 4.8 | 16.1 |
| 1971 | 14.6 | 6.1 | 20.7 | 1.6 | 0.8 | 2.4 | 16.2 | 6.9 | 23.2 |
| 1972 | 19.0 | 8.4 | 27.4 | 2.0 | 1.0 | 3.0 | 21.0 | 9.4 | 30.4 |
| 1973 | 23.4 | 10.6 | 33.9 | 2.9 | 1.3 | 4.2 | 26.3 | 11.9 | 38.2 |
| 1974 | 26.2 | 12.8 | 39.0 | 3.5 | 1.7 | 5.3 | 29.8 | 14.5 | 44.3 |
| 1975 | 29.5 | 16.0 | 45.5 | 3.6 | 1.6 | 5.2 | 33.1 | 17.6 | 50.7 |
| 1976 | 32.9 | 18.5 | 51.5 | 4.6 | 2.2 | 6.8 | 37.5 | 20.8 | 58.3 |
| 1977 | 35.8 | 21.1 | 56.9 | 5.4 | 2.9 | 8.4 | 41.3 | 24.0 | 65.3 |
| 1978 | 38.2 | 24.0 | 62.2 | 6.6 | 3.7 | 10.4 | 44.8 | 27.7 | 72.5 |
| 1979 | 40.8 | 27.2 | 68.0 | 7.9 | 4.4 | 12.3 | 48.7 | 31.6 | 80.3 |
| 1980 | 43.2 | 29.5 | 72.7 | 8.6 | 4.5 | 13.1 | 51.8 | 34.1 | 85.8 |
| 1981 | 46.2 | 32.9 | 79.2 | 9.8 | 4.8 | 14.6 | 56.0 | 37.7 | 93.8 |
| 1982 | 48.6 | 36.1 | 84.8 | 9.4 | 5.6 | 15.0 | 58.0 | 41.8 | 99.8 |
| 1983 | 50.0 | 39.6 | 89.5 | 9.5 | 6.1 | 15.6 | 59.5 | 45.6 | 105.1 |
| 1984 | 51.0 | 46.3 | 97.3 | 9.3 | 7.4 | 16.8 | 60.3 | 53.8 | 114.1 |
| 1985 | 50.1 | 56.6 | 106.7 | 9.1 | 9.3 | 18.5 | 59.2 | 65.9 | 125.1 |
| 1986 | 52.6 | 67.8 | 120.4 | 10.1 | 11.9 | 22.0 | 62.7 | 79.7 | 142.4 |
| 1987 | 56.5 | 73.8 | 130.3 | 11.9 | 14.4 | 26.3 | 68.4 | 88.2 | 156.6 |
| 1988 | 60.1 | 80.7 | 140.9 | 13.2 | 16.5 | 29.7 | 73.3 | 97.3 | 170.6 |
| 1989 | 65.9 | 86.3 | 152.1 | 14.9 | 19.9 | 34.8 | 80.7 | 106.2 | 186.9 |
| 1990 | 74.7 | 91.4 | 166.1 | 15.9 | 24.0 | 39.9 | 90.6 | 115.4 | 206.0 |

| Calendar Year | Passenger Cars | | | LTVs | | | Passenger Cars + LTVs Total | | |
|---------------|----------------|-------|-------|-------|-------|-------|-----------------------------|-------|-------|
| | Vol. | Attr. | Total | Vol. | Attr. | Total | Vol. | Attr. | Total |
| 1991 | 78.4 | 97.7 | 176.1 | 17.2 | 27.9 | 45.1 | 95.6 | 125.6 | 221.2 |
| 1992 | 83.0 | 108.2 | 191.2 | 17.2 | 32.3 | 49.5 | 100.2 | 140.5 | 240.7 |
| 1993 | 79.7 | 127.7 | 207.4 | 19.0 | 37.0 | 56.1 | 98.7 | 164.7 | 263.4 |
| 1994 | 81.7 | 136.2 | 217.8 | 22.1 | 41.4 | 63.5 | 103.7 | 177.6 | 281.3 |
| 1995 | 85.4 | 142.5 | 227.9 | 26.6 | 49.2 | 75.8 | 111.9 | 191.8 | 303.7 |
| 1996 | 99.2 | 154.2 | 253.4 | 29.5 | 54.2 | 83.7 | 128.7 | 208.3 | 337.0 |
| 1997 | 104.0 | 162.2 | 266.2 | 34.8 | 63.7 | 98.4 | 138.8 | 225.9 | 364.7 |
| 1998 | 104.7 | 171.5 | 276.1 | 39.9 | 75.0 | 114.8 | 144.5 | 246.4 | 391.0 |
| 1999 | 98.9 | 180.7 | 279.6 | 44.9 | 84.9 | 129.8 | 143.8 | 265.6 | 409.4 |
| 2000 | 105.1 | 191.0 | 296.1 | 46.6 | 91.9 | 138.6 | 151.7 | 283.0 | 434.7 |
| 2001 | 109.8 | 199.2 | 308.9 | 49.6 | 92.6 | 142.3 | 159.4 | 291.8 | 451.2 |
| 2002 | 118.4 | 205.2 | 323.5 | 50.4 | 99.7 | 150.1 | 168.8 | 304.9 | 473.6 |
| 2003 | 120.8 | 210.3 | 331.0 | 56.3 | 118.3 | 174.5 | 177.0 | 328.6 | 505.6 |
| 2004 | 122.3 | 221.4 | 343.7 | 61.5 | 141.7 | 203.2 | 183.9 | 363.1 | 546.9 |
| 2005 | 120.9 | 222.0 | 342.9 | 66.7 | 158.6 | 225.3 | 187.6 | 380.6 | 568.2 |
| 2006 | 121.5 | 222.3 | 343.8 | 69.0 | 163.3 | 232.3 | 190.5 | 385.6 | 576.1 |
| 2007 | 126.4 | 223.1 | 349.5 | 73.1 | 172.6 | 245.7 | 199.5 | 395.7 | 595.2 |
| 2008 | 127.7 | 224.3 | 352.0 | 75.3 | 170.3 | 245.6 | 203.0 | 394.7 | 597.6 |
| 2009 | 121.8 | 214.1 | 335.9 | 81.8 | 175.4 | 257.2 | 203.6 | 389.5 | 593.1 |
| 2010 | 121.4 | 212.5 | 333.9 | 82.6 | 176.7 | 259.3 | 204.0 | 389.2 | 593.2 |
| 2011 | 127.1 | 222.4 | 349.5 | 86.2 | 186.0 | 272.1 | 213.3 | 408.3 | 621.6 |
| 2012 | 130.3 | 229.0 | 359.3 | 90.5 | 186.8 | 277.3 | 220.8 | 415.8 | 636.6 |
| 2013 | 130.2 | 227.9 | 358.0 | 95.1 | 195.8 | 290.9 | 225.2 | 423.7 | 648.9 |
| 2014 | 141.1 | 242.2 | 383.3 | 100.3 | 209.5 | 309.8 | 241.4 | 451.7 | 693.1 |
| 2015 | 139.8 | 247.1 | 386.9 | 111.4 | 223.7 | 335.0 | 251.2 | 470.7 | 721.9 |
| 2016 | 148.0 | 261.8 | 409.7 | 119.6 | 231.7 | 351.3 | 267.6 | 493.4 | 761.0 |
| 2017 | 152.5 | 271.5 | 424.0 | 124.2 | 243.7 | 368.0 | 276.7 | 515.2 | 791.9 |
| 2018 | 155.8 | 278.0 | 433.8 | 131.5 | 261.5 | 393.0 | 287.3 | 539.6 | 826.9 |
| 2019 | 159.3 | 286.6 | 445.9 | 144.8 | 291.0 | 435.8 | 304.1 | 577.6 | 881.7 |

Table 48. Economic benefits by vehicle type and attribution status (billions in 2019\$)

| Calendar Year | Passenger Cars | | | LTVs | | | Passenger Cars + LTVs Total | | |
|---------------|----------------|-------|-------|------|-------|-------|-----------------------------|-------|-------|
| | Vol. | Attr. | Total | Vol. | Attr. | Total | Vol. | Attr. | Total |
| 1968 | 1.3 | 0.4 | 1.7 | 0.1 | 0.1 | 0.2 | 1.4 | 0.5 | 1.9 |
| 1969 | 2.1 | 0.9 | 3.0 | 0.3 | 0.1 | 0.4 | 2.4 | 1.1 | 3.5 |
| 1970 | 3.0 | 1.4 | 4.4 | 0.4 | 0.2 | 0.6 | 3.3 | 1.6 | 4.9 |
| 1971 | 3.9 | 1.9 | 5.8 | 0.4 | 0.3 | 0.7 | 4.3 | 2.2 | 6.5 |
| 1972 | 4.8 | 2.5 | 7.4 | 0.5 | 0.3 | 0.8 | 5.4 | 2.9 | 8.2 |
| 1973 | 5.6 | 3.0 | 8.6 | 0.7 | 0.4 | 1.1 | 6.3 | 3.4 | 9.7 |
| 1974 | 5.8 | 3.4 | 9.2 | 0.8 | 0.5 | 1.2 | 6.5 | 3.9 | 10.4 |
| 1975 | 6.4 | 4.2 | 10.6 | 0.8 | 0.5 | 1.2 | 7.2 | 4.6 | 11.8 |
| 1976 | 7.2 | 4.7 | 11.9 | 1.0 | 0.6 | 1.6 | 8.2 | 5.3 | 13.4 |
| 1977 | 8.0 | 5.4 | 13.4 | 1.2 | 0.7 | 2.0 | 9.2 | 6.1 | 15.3 |
| 1978 | 8.7 | 6.2 | 14.9 | 1.5 | 0.9 | 2.4 | 10.2 | 7.1 | 17.3 |
| 1979 | 9.3 | 6.9 | 16.2 | 1.8 | 1.1 | 2.9 | 11.0 | 8.0 | 19.0 |
| 1980 | 9.7 | 7.4 | 17.1 | 1.9 | 1.1 | 3.0 | 11.6 | 8.5 | 20.1 |
| 1981 | 10.2 | 7.9 | 18.1 | 2.1 | 1.2 | 3.3 | 12.3 | 9.0 | 21.4 |
| 1982 | 10.3 | 8.2 | 18.5 | 2.0 | 1.3 | 3.3 | 12.3 | 9.4 | 21.8 |
| 1983 | 10.5 | 8.8 | 19.3 | 2.1 | 1.4 | 3.4 | 12.6 | 10.1 | 22.7 |
| 1984 | 10.7 | 9.9 | 20.6 | 2.1 | 1.7 | 3.7 | 12.7 | 11.6 | 24.3 |
| 1985 | 10.8 | 12.4 | 23.2 | 2.1 | 2.2 | 4.3 | 13.0 | 14.5 | 27.5 |
| 1986 | 11.9 | 15.3 | 27.3 | 2.4 | 2.8 | 5.2 | 14.3 | 18.1 | 32.4 |
| 1987 | 12.7 | 16.7 | 29.4 | 2.8 | 3.4 | 6.2 | 15.5 | 20.1 | 35.6 |
| 1988 | 13.7 | 18.6 | 32.4 | 3.1 | 4.0 | 7.1 | 16.9 | 22.6 | 39.5 |
| 1989 | 14.6 | 19.6 | 34.2 | 3.5 | 4.6 | 8.1 | 18.1 | 24.2 | 42.3 |
| 1990 | 16.1 | 20.5 | 36.6 | 3.8 | 5.6 | 9.3 | 19.8 | 26.1 | 45.9 |
| 1991 | 16.4 | 21.5 | 37.8 | 4.0 | 6.2 | 10.2 | 20.4 | 27.7 | 48.1 |
| 1992 | 17.3 | 23.6 | 41.0 | 4.0 | 7.0 | 11.0 | 21.3 | 30.6 | 51.9 |
| 1993 | 17.0 | 27.0 | 43.9 | 4.3 | 7.7 | 12.1 | 21.3 | 34.7 | 56.0 |
| 1994 | 17.4 | 28.5 | 45.9 | 4.9 | 8.7 | 13.7 | 22.3 | 37.3 | 59.6 |
| 1995 | 18.3 | 29.7 | 48.0 | 5.9 | 10.4 | 16.3 | 24.2 | 40.2 | 64.3 |

| Calendar Year | Passenger Cars | | | LTVs | | | Passenger Cars + LTVs Total | | |
|---------------|----------------|-------|-------|------|-------|-------|-----------------------------|-------|-------|
| | Vol. | Attr. | Total | Vol. | Attr. | Total | Vol. | Attr. | Total |
| 1996 | 20.5 | 32.0 | 52.5 | 6.6 | 11.6 | 18.2 | 27.1 | 43.6 | 70.7 |
| 1997 | 21.3 | 33.2 | 54.5 | 7.7 | 13.4 | 21.1 | 29.0 | 46.6 | 75.6 |
| 1998 | 21.5 | 34.5 | 56.1 | 8.8 | 15.6 | 24.4 | 30.3 | 50.2 | 80.5 |
| 1999 | 20.6 | 35.9 | 56.4 | 9.9 | 17.3 | 27.2 | 30.5 | 53.2 | 83.6 |
| 2000 | 21.9 | 37.7 | 59.6 | 10.8 | 19.0 | 29.8 | 32.6 | 56.7 | 89.4 |
| 2001 | 22.9 | 39.3 | 62.1 | 11.5 | 19.5 | 30.9 | 34.3 | 58.7 | 93.1 |
| 2002 | 24.7 | 41.0 | 65.7 | 12.0 | 21.3 | 33.4 | 36.7 | 62.3 | 99.1 |
| 2003 | 25.3 | 42.1 | 67.4 | 13.3 | 25.0 | 38.3 | 38.6 | 67.1 | 105.8 |
| 2004 | 25.5 | 43.6 | 69.0 | 14.6 | 29.3 | 44.0 | 40.1 | 72.9 | 113.0 |
| 2005 | 25.5 | 43.8 | 69.3 | 15.9 | 32.3 | 48.1 | 41.4 | 76.0 | 117.5 |
| 2006 | 25.8 | 44.0 | 69.9 | 16.8 | 33.6 | 50.4 | 42.6 | 77.7 | 120.3 |
| 2007 | 26.8 | 44.1 | 70.9 | 17.7 | 35.1 | 52.8 | 44.5 | 79.2 | 123.7 |
| 2008 | 26.8 | 43.9 | 70.7 | 18.2 | 34.7 | 52.8 | 45.0 | 78.5 | 123.5 |
| 2009 | 25.7 | 42.1 | 67.8 | 19.4 | 35.4 | 54.9 | 45.2 | 77.5 | 122.6 |
| 2010 | 26.0 | 42.3 | 68.3 | 19.9 | 36.2 | 56.0 | 45.8 | 78.5 | 124.3 |
| 2011 | 26.9 | 44.1 | 71.1 | 20.8 | 37.8 | 58.6 | 47.7 | 82.0 | 129.7 |
| 2012 | 28.2 | 46.4 | 74.5 | 22.4 | 38.6 | 61.1 | 50.6 | 85.0 | 135.6 |
| 2013 | 28.5 | 46.9 | 75.4 | 23.6 | 40.6 | 64.1 | 52.1 | 87.5 | 139.5 |
| 2014 | 30.8 | 49.7 | 80.5 | 25.1 | 43.6 | 68.7 | 56.0 | 93.3 | 149.2 |
| 2015 | 32.0 | 52.6 | 84.6 | 28.3 | 47.2 | 75.5 | 60.2 | 99.8 | 160.1 |
| 2016 | 33.6 | 55.8 | 89.4 | 30.2 | 49.4 | 79.6 | 63.9 | 105.2 | 169.1 |
| 2017 | 34.5 | 58.0 | 92.6 | 31.2 | 51.9 | 83.1 | 65.7 | 109.9 | 175.6 |
| 2018 | 35.0 | 59.2 | 94.2 | 33.0 | 55.3 | 88.3 | 68.0 | 114.5 | 182.5 |
| 2019 | 35.4 | 60.5 | 95.9 | 35.9 | 60.7 | 96.6 | 71.3 | 121.2 | 192.5 |

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Net Benefits

Table 49 shows total costs, comprehensive benefits, and net benefits of all FMVSS safety technologies by CY and attribution status. Table 50 shows total costs, economic benefits, and net benefits of all FMVSS safety technologies by CY and attribution status. In both scenarios, benefits quickly exceed costs showing positive net benefits in 1969 for comprehensive costs and in 1970 for economic costs. Throughout the 5 decades examined, annual CY benefits outpace annual costs because, while both represent cumulative impacts of adding safety technologies, vehicle technology costs apply to the new vehicle fleet, but safety improvements are experienced by a growing portion of the entire on-road fleet. Fuel economy impacts also affect the on-road fleet but represent a relatively small portion of overall costs. Unit valuations also contribute to this trend since many factors such as productivity gains and valuation of lost quality of life increase over time in real terms to reflect real increases in wages and their effects on consumption (e.g., through purchase of more expensive vehicles and their corresponding increases in repair costs). By contrast, although costs increase as more technology is added, the impact of learning on unit costs, which is reflected in the costs measured by Simons (in press), will offset some portion of this reflecting lower real prices for specific technologies over time.

Table 49. Total costs, comprehensive benefits, and net benefits – passenger cars + LTVs (billions in 2019\$)

| Calendar Year | Total Costs | | | Comprehensive Benefits | | | Net Benefits | | |
|---------------|-------------|-------|-------|------------------------|-------|-------|--------------|-------|-------|
| | Vol. | Attr. | Total | Vol. | Attr. | Total | Vol. | Attr. | Total |
| 1968 | 3.0 | 1.2 | 4.3 | 3.2 | 1.0 | 4.2 | 0.2 | -0.2 | 0.0 |
| 1969 | 3.0 | 1.6 | 4.5 | 6.9 | 2.8 | 9.7 | 4.0 | 1.2 | 5.2 |
| 1970 | 2.8 | 1.7 | 4.6 | 11.3 | 4.8 | 16.1 | 8.5 | 3.0 | 11.5 |
| 1971 | 3.2 | 2.2 | 5.4 | 16.2 | 6.9 | 23.2 | 13.0 | 4.8 | 17.8 |
| 1972 | 3.5 | 2.9 | 6.3 | 21.0 | 9.4 | 30.4 | 17.5 | 6.5 | 24.1 |
| 1973 | 3.5 | 3.3 | 6.7 | 26.3 | 11.9 | 38.2 | 22.8 | 8.6 | 31.4 |
| 1974 | 3.0 | 3.0 | 5.9 | 29.8 | 14.5 | 44.3 | 26.8 | 11.6 | 38.4 |
| 1975 | 3.1 | 3.3 | 6.3 | 33.1 | 17.6 | 50.7 | 30.0 | 14.3 | 44.3 |
| 1976 | 3.5 | 4.1 | 7.7 | 37.5 | 20.8 | 58.3 | 34.0 | 16.6 | 50.6 |
| 1977 | 3.7 | 4.5 | 8.3 | 41.3 | 24.0 | 65.3 | 37.6 | 19.5 | 57.0 |
| 1978 | 3.7 | 4.5 | 8.1 | 44.8 | 27.7 | 72.5 | 41.1 | 23.3 | 64.4 |
| 1979 | 3.3 | 4.0 | 7.4 | 48.7 | 31.6 | 80.3 | 45.4 | 27.6 | 72.9 |
| 1980 | 3.0 | 3.6 | 6.5 | 51.8 | 34.1 | 85.8 | 48.8 | 30.5 | 79.3 |
| 1981 | 2.8 | 3.4 | 6.2 | 56.0 | 37.7 | 93.8 | 53.2 | 34.3 | 87.5 |

| Calendar Year | Total Costs | | | Comprehensive Benefits | | | Net Benefits | | |
|---------------|-------------|-------|-------|------------------------|-------|-------|--------------|-------|-------|
| | Vol. | Attr. | Total | Vol. | Attr. | Total | Vol. | Attr. | Total |
| 1982 | 2.8 | 3.5 | 6.3 | 58.0 | 41.8 | 99.8 | 55.2 | 38.3 | 93.5 |
| 1983 | 3.2 | 3.9 | 7.1 | 59.5 | 45.6 | 105.1 | 56.3 | 41.7 | 98.0 |
| 1984 | 3.5 | 4.4 | 8.0 | 60.3 | 53.8 | 114.1 | 56.8 | 49.3 | 106.1 |
| 1985 | 3.9 | 4.8 | 8.7 | 59.2 | 65.9 | 125.1 | 55.3 | 61.2 | 116.5 |
| 1986 | 4.6 | 4.9 | 9.5 | 62.7 | 79.7 | 142.4 | 58.1 | 74.8 | 133.0 |
| 1987 | 5.4 | 4.8 | 10.3 | 68.4 | 88.2 | 156.6 | 63.0 | 83.3 | 146.3 |
| 1988 | 6.0 | 5.0 | 11.0 | 73.3 | 97.3 | 170.6 | 67.3 | 92.3 | 159.6 |
| 1989 | 6.5 | 5.5 | 12.0 | 80.7 | 106.2 | 186.9 | 74.2 | 100.7 | 174.9 |
| 1990 | 6.7 | 6.3 | 13.0 | 90.6 | 115.4 | 206.0 | 83.9 | 109.2 | 193.1 |
| 1991 | 6.8 | 6.2 | 13.0 | 95.6 | 125.6 | 221.2 | 88.8 | 119.4 | 208.2 |
| 1992 | 7.9 | 7.1 | 15.0 | 100.2 | 140.5 | 240.7 | 92.4 | 133.4 | 225.8 |
| 1993 | 9.0 | 8.6 | 17.6 | 98.7 | 164.7 | 263.4 | 89.7 | 156.1 | 245.8 |
| 1994 | 9.9 | 10.9 | 20.8 | 103.7 | 177.6 | 281.3 | 93.9 | 166.6 | 260.5 |
| 1995 | 10.0 | 12.5 | 22.5 | 111.9 | 191.8 | 303.7 | 101.9 | 179.3 | 281.2 |
| 1996 | 10.4 | 13.3 | 23.7 | 128.7 | 208.3 | 337.0 | 118.3 | 195.0 | 313.3 |
| 1997 | 10.6 | 13.7 | 24.3 | 138.8 | 225.9 | 364.7 | 128.2 | 212.2 | 340.3 |
| 1998 | 11.4 | 14.2 | 25.6 | 144.5 | 246.4 | 391.0 | 133.2 | 232.2 | 365.4 |
| 1999 | 12.4 | 14.9 | 27.2 | 143.8 | 265.6 | 409.4 | 131.4 | 250.7 | 382.2 |
| 2000 | 12.8 | 14.8 | 27.6 | 151.7 | 283.0 | 434.7 | 138.9 | 268.1 | 407.1 |
| 2001 | 12.9 | 14.3 | 27.2 | 159.4 | 291.8 | 451.2 | 146.5 | 277.5 | 424.0 |
| 2002 | 12.9 | 13.7 | 26.6 | 168.8 | 304.9 | 473.6 | 155.8 | 291.1 | 447.0 |
| 2003 | 13.4 | 14.0 | 27.4 | 177.0 | 328.6 | 505.6 | 163.7 | 314.5 | 478.2 |
| 2004 | 14.2 | 15.2 | 29.4 | 183.9 | 363.1 | 546.9 | 169.7 | 347.8 | 517.5 |
| 2005 | 14.6 | 15.5 | 30.1 | 187.6 | 380.6 | 568.2 | 173.0 | 365.1 | 538.1 |
| 2006 | 15.0 | 16.4 | 31.4 | 190.5 | 385.6 | 576.1 | 175.5 | 369.2 | 544.7 |
| 2007 | 15.3 | 18.5 | 33.8 | 199.5 | 395.7 | 595.2 | 184.2 | 377.2 | 561.4 |
| 2008 | 13.4 | 18.3 | 31.8 | 203.0 | 394.7 | 597.6 | 189.6 | 376.3 | 565.9 |
| 2009 | 10.2 | 14.8 | 25.1 | 203.6 | 389.5 | 593.1 | 193.3 | 374.7 | 568.0 |
| 2010 | 12.3 | 18.1 | 30.4 | 204.0 | 389.2 | 593.2 | 191.7 | 371.1 | 562.7 |

| Calendar Year | Total Costs | | | Comprehensive Benefits | | | Net Benefits | | |
|---------------|-------------|-------|-------|------------------------|-------|-------|--------------|-------|-------|
| | Vol. | Attr. | Total | Vol. | Attr. | Total | Vol. | Attr. | Total |
| 2011 | 14.2 | 20.8 | 35.0 | 213.3 | 408.3 | 621.6 | 199.1 | 387.5 | 586.7 |
| 2012 | 15.4 | 23.2 | 38.7 | 220.8 | 415.8 | 636.6 | 205.3 | 392.6 | 597.9 |
| 2013 | 16.3 | 25.3 | 41.6 | 225.2 | 423.7 | 648.9 | 208.9 | 398.4 | 607.3 |
| 2014 | 17.1 | 27.1 | 44.2 | 241.4 | 451.7 | 693.1 | 224.3 | 424.6 | 648.9 |
| 2015 | 17.1 | 27.7 | 44.8 | 251.2 | 470.7 | 721.9 | 234.2 | 443.0 | 677.2 |
| 2016 | 15.6 | 25.6 | 41.3 | 267.6 | 493.4 | 761.0 | 252.0 | 467.8 | 719.8 |
| 2017 | 15.7 | 25.7 | 41.4 | 276.7 | 515.2 | 791.9 | 261.1 | 489.4 | 750.5 |
| 2018 | 15.3 | 25.2 | 40.5 | 287.3 | 539.6 | 826.9 | 272.0 | 514.4 | 786.4 |
| 2019 | 14.4 | 23.7 | 38.1 | 304.1 | 577.6 | 881.7 | 289.7 | 553.9 | 843.6 |

Table 50. Total costs, economic benefits, and net benefits – passenger cars + LTVs (billions in 2019\$)

| Calendar Year | Total Costs | | | Economic Benefits | | | Net Benefits | | |
|---------------|-------------|-------|-------|-------------------|-------|-------|--------------|-------|-------|
| | Vol. | Attr. | Total | Vol. | Attr. | Total | Vol. | Attr. | Total |
| 1968 | 3.0 | 1.2 | 4.3 | 1.4 | 0.5 | 1.9 | -1.6 | -0.8 | -2.4 |
| 1969 | 3.0 | 1.6 | 4.5 | 2.4 | 1.1 | 3.5 | -0.5 | -0.5 | -1.0 |
| 1970 | 2.8 | 1.7 | 4.6 | 3.3 | 1.6 | 4.9 | 0.5 | -0.1 | 0.4 |
| 1971 | 3.2 | 2.2 | 5.4 | 4.3 | 2.2 | 6.5 | 1.1 | 0.0 | 1.1 |
| 1972 | 3.5 | 2.9 | 6.3 | 5.4 | 2.9 | 8.2 | 1.9 | 0.0 | 1.9 |
| 1973 | 3.5 | 3.3 | 6.7 | 6.3 | 3.4 | 9.7 | 2.8 | 0.2 | 3.0 |
| 1974 | 3.0 | 3.0 | 5.9 | 6.5 | 3.9 | 10.4 | 3.6 | 0.9 | 4.5 |
| 1975 | 3.1 | 3.3 | 6.3 | 7.2 | 4.6 | 11.8 | 4.1 | 1.4 | 5.5 |
| 1976 | 3.5 | 4.1 | 7.7 | 8.2 | 5.3 | 13.4 | 4.6 | 1.1 | 5.8 |
| 1977 | 3.7 | 4.5 | 8.3 | 9.2 | 6.1 | 15.3 | 5.5 | 1.6 | 7.1 |
| 1978 | 3.7 | 4.5 | 8.1 | 10.2 | 7.1 | 17.3 | 6.5 | 2.7 | 9.1 |
| 1979 | 3.3 | 4.0 | 7.4 | 11.0 | 8.0 | 19.0 | 7.7 | 4.0 | 11.7 |
| 1980 | 3.0 | 3.6 | 6.5 | 11.6 | 8.5 | 20.1 | 8.7 | 4.9 | 13.6 |
| 1981 | 2.8 | 3.4 | 6.2 | 12.3 | 9.0 | 21.4 | 9.5 | 5.6 | 15.1 |
| 1982 | 2.8 | 3.5 | 6.3 | 12.3 | 9.4 | 21.8 | 9.6 | 6.0 | 15.5 |

| Calendar Year | Total Costs | | | Economic Benefits | | | Net Benefits | | |
|---------------|-------------|-------|-------|-------------------|-------|-------|--------------|-------|-------|
| | Vol. | Attr. | Total | Vol. | Attr. | Total | Vol. | Attr. | Total |
| 1983 | 3.2 | 3.9 | 7.1 | 12.6 | 10.1 | 22.7 | 9.4 | 6.2 | 15.6 |
| 1984 | 3.5 | 4.4 | 8.0 | 12.7 | 11.6 | 24.3 | 9.2 | 7.2 | 16.3 |
| 1985 | 3.9 | 4.8 | 8.7 | 13.0 | 14.5 | 27.5 | 9.0 | 9.8 | 18.8 |
| 1986 | 4.6 | 4.9 | 9.5 | 14.3 | 18.1 | 32.4 | 9.7 | 13.3 | 23.0 |
| 1987 | 5.4 | 4.8 | 10.3 | 15.5 | 20.1 | 35.6 | 10.1 | 15.2 | 25.3 |
| 1988 | 6.0 | 5.0 | 11.0 | 16.9 | 22.6 | 39.5 | 10.9 | 17.6 | 28.5 |
| 1989 | 6.5 | 5.5 | 12.0 | 18.1 | 24.2 | 42.3 | 11.6 | 18.7 | 30.4 |
| 1990 | 6.7 | 6.3 | 13.0 | 19.8 | 26.1 | 45.9 | 13.1 | 19.8 | 33.0 |
| 1991 | 6.8 | 6.2 | 13.0 | 20.4 | 27.7 | 48.1 | 13.6 | 21.5 | 35.1 |
| 1992 | 7.9 | 7.1 | 15.0 | 21.3 | 30.6 | 51.9 | 13.4 | 23.5 | 37.0 |
| 1993 | 9.0 | 8.6 | 17.6 | 21.3 | 34.7 | 56.0 | 12.3 | 26.1 | 38.4 |
| 1994 | 9.9 | 10.9 | 20.8 | 22.3 | 37.3 | 59.6 | 12.5 | 26.3 | 38.8 |
| 1995 | 10.0 | 12.5 | 22.5 | 24.2 | 40.2 | 64.3 | 14.1 | 27.7 | 41.8 |
| 1996 | 10.4 | 13.3 | 23.7 | 27.1 | 43.6 | 70.7 | 16.7 | 30.3 | 47.0 |
| 1997 | 10.6 | 13.7 | 24.3 | 29.0 | 46.6 | 75.6 | 18.4 | 32.8 | 51.2 |
| 1998 | 11.4 | 14.2 | 25.6 | 30.3 | 50.2 | 80.5 | 18.9 | 35.9 | 54.9 |
| 1999 | 12.4 | 14.9 | 27.2 | 30.5 | 53.2 | 83.6 | 18.1 | 38.3 | 56.4 |
| 2000 | 12.8 | 14.8 | 27.6 | 32.6 | 56.7 | 89.4 | 19.9 | 41.9 | 61.8 |
| 2001 | 12.9 | 14.3 | 27.2 | 34.3 | 58.7 | 93.1 | 21.4 | 44.5 | 65.9 |
| 2002 | 12.9 | 13.7 | 26.6 | 36.7 | 62.3 | 99.1 | 23.8 | 48.6 | 72.4 |
| 2003 | 13.4 | 14.0 | 27.4 | 38.6 | 67.1 | 105.8 | 25.3 | 53.1 | 78.3 |
| 2004 | 14.2 | 15.2 | 29.4 | 40.1 | 72.9 | 113.0 | 25.9 | 57.7 | 83.6 |
| 2005 | 14.6 | 15.5 | 30.1 | 41.4 | 76.0 | 117.5 | 26.8 | 60.5 | 87.4 |
| 2006 | 15.0 | 16.4 | 31.4 | 42.6 | 77.7 | 120.3 | 27.6 | 61.3 | 88.8 |
| 2007 | 15.3 | 18.5 | 33.8 | 44.5 | 79.2 | 123.7 | 29.3 | 60.7 | 89.9 |
| 2008 | 13.4 | 18.3 | 31.8 | 45.0 | 78.5 | 123.5 | 31.6 | 60.2 | 91.8 |
| 2009 | 10.2 | 14.8 | 25.1 | 45.2 | 77.5 | 122.6 | 34.9 | 62.6 | 97.6 |
| 2010 | 12.3 | 18.1 | 30.4 | 45.8 | 78.5 | 124.3 | 33.5 | 60.4 | 93.9 |
| 2011 | 14.2 | 20.8 | 35.0 | 47.7 | 82.0 | 129.7 | 33.6 | 61.2 | 94.7 |

| Calendar Year | Total Costs | | | Economic Benefits | | | Net Benefits | | |
|---------------|-------------|-------|-------|-------------------|-------|-------|--------------|-------|-------|
| | Vol. | Attr. | Total | Vol. | Attr. | Total | Vol. | Attr. | Total |
| 2012 | 15.4 | 23.2 | 38.7 | 50.6 | 85.0 | 135.6 | 35.2 | 61.8 | 96.9 |
| 2013 | 16.3 | 25.3 | 41.6 | 52.1 | 87.5 | 139.5 | 35.8 | 62.2 | 97.9 |
| 2014 | 17.1 | 27.1 | 44.2 | 56.0 | 93.3 | 149.2 | 38.9 | 66.1 | 105.1 |
| 2015 | 17.1 | 27.7 | 44.8 | 60.2 | 99.8 | 160.1 | 43.2 | 72.1 | 115.3 |
| 2016 | 15.6 | 25.6 | 41.3 | 63.9 | 105.2 | 169.1 | 48.3 | 79.6 | 127.8 |
| 2017 | 15.7 | 25.7 | 41.4 | 65.7 | 109.9 | 175.6 | 50.0 | 84.1 | 134.2 |
| 2018 | 15.3 | 25.2 | 40.5 | 68.0 | 114.5 | 182.5 | 52.7 | 89.3 | 142.0 |
| 2019 | 14.4 | 23.7 | 38.1 | 71.3 | 121.2 | 192.5 | 56.9 | 97.5 | 154.4 |

Figure 18 shows the trend in total net benefits by CY from Table 49. In 1968 net benefits were negative (i.e., society experienced a net cost from safety improvements). This is an expected result because consumers expend most of their lifetime costs (all technology costs plus one year of fuel costs) during the first CY, but they experience only one year of safety benefits during the first year, which represents roughly 10 percent of their expected lifetime safety benefits. Over time, during each CY society experiences more years' worth of safety benefits from previous MYs but continues to expend just one year of technology costs. Under a comprehensive safety valuation, net benefits occur after 2 years, and after roughly 35 years, society receives the equivalent of a full vehicle's lifetime's safety savings, experiencing very high net benefits that continue to rise as more safety technology is adopted in vehicles over time. The same technological, behavioral, and economic factors that drive the trend in safety benefits will automatically influence corresponding net benefits. Figure 19 shows the same net benefit trends using economic costs for safety valuation. The trendlines are similar but produce lower net benefits, and because of the lower valuation, net benefits start in 1970 rather than 1969.

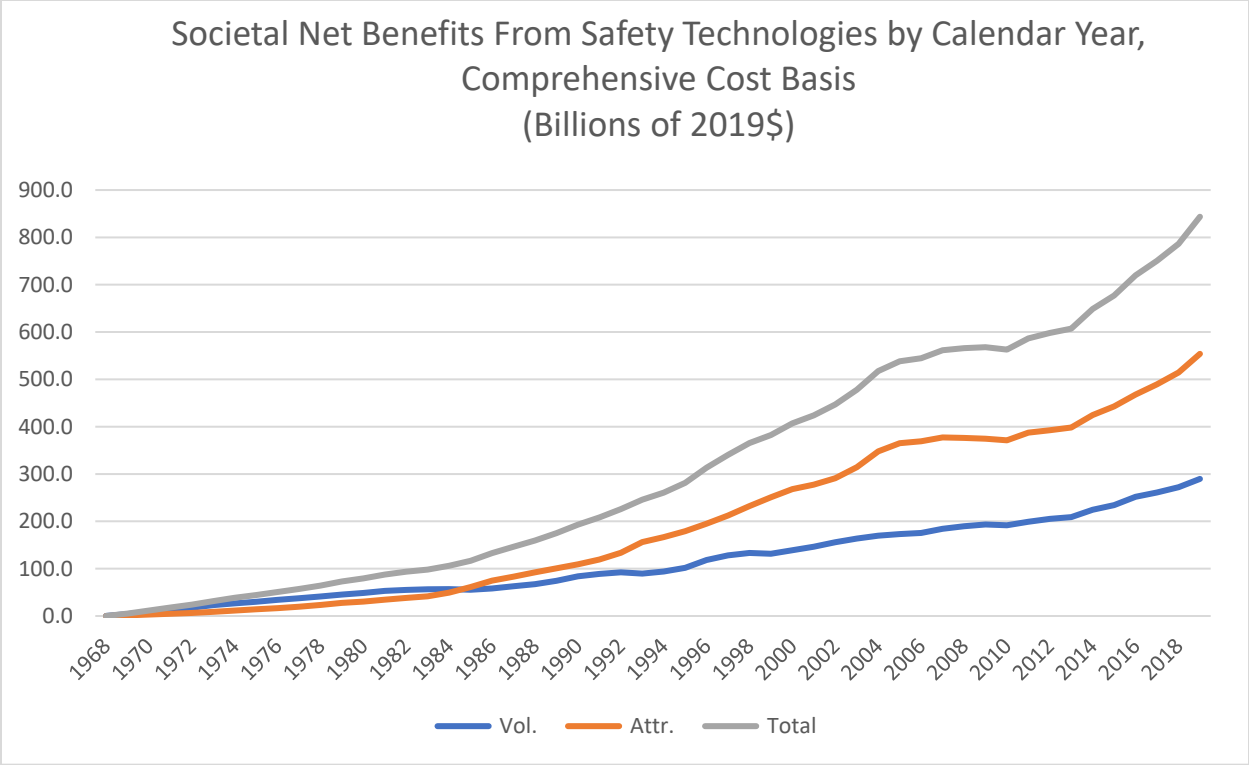


Figure 18. Societal net benefits from safety technologies by CY – comprehensive cost basis (billions in 2019\$)

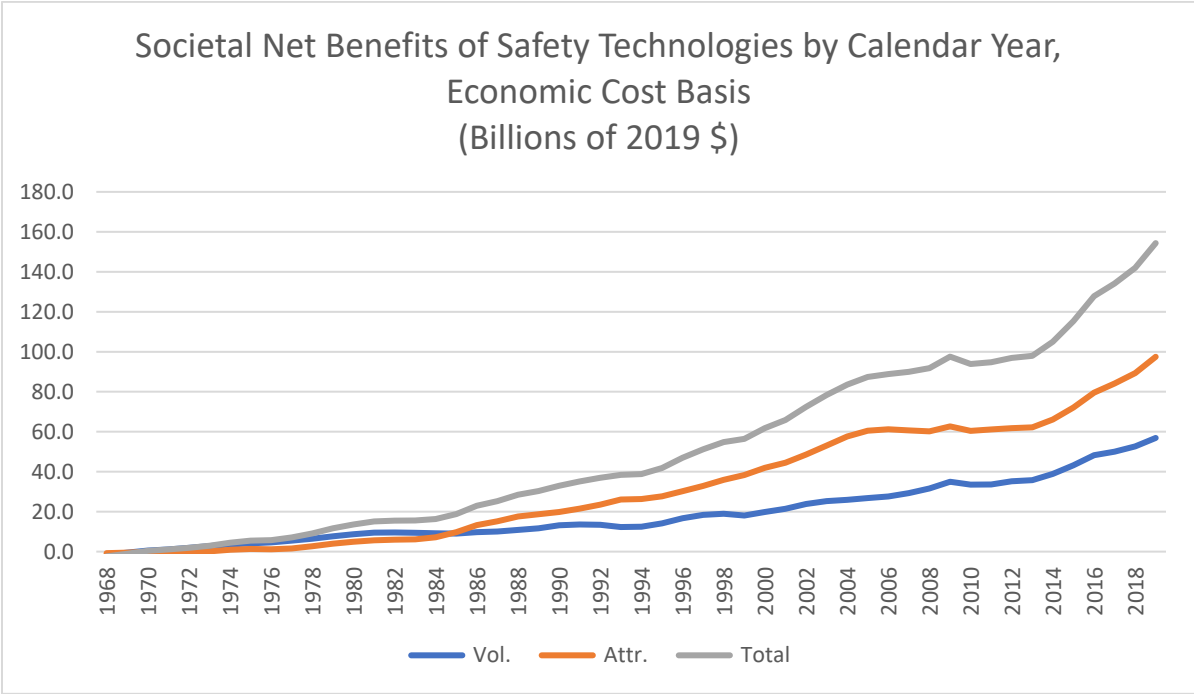


Figure 19. Societal net benefits of safety technologies by CY – economic cost basis (billions in 2019\$)

Benefit/Cost Ratios

Table 51 lists benefit/cost ratios based on comprehensive benefit valuations by CY attribution status, and vehicle type. Table 52 lists these same benefit/cost ratios based on economic cost benefit valuations. Benefit/cost ratios exhibit the same rising pattern as net benefits, with comprehensive valued benefit/cost ratios rising from .99 to 23.1 over the 52-year period, while economic cost valued ratios rise from 0.45 to 5.1 during this same period.

Table 51. Benefit/cost ratios based on comprehensive benefits – passenger cars + LTVs

| Calendar Year | Passenger Cars | | | LTVs | | | Passenger Cars + LTVs | | |
|---------------|----------------|-------|-------|-------|-------|-------|-----------------------|-------|-------|
| | Vol. | Attr. | Total | Vol. | Attr. | Total | Vol. | Attr. | Total |
| 1968 | 1.03 | 0.76 | 0.95 | 1.32 | 1.55 | 1.40 | 1.06 | 0.83 | 0.99 |
| 1969 | 2.24 | 1.66 | 2.04 | 3.35 | 3.10 | 3.27 | 2.34 | 1.77 | 2.15 |
| 1970 | 3.93 | 2.62 | 3.42 | 4.76 | 4.33 | 4.61 | 4.00 | 2.75 | 3.53 |
| 1971 | 5.01 | 3.09 | 4.23 | 5.35 | 4.16 | 4.89 | 5.04 | 3.18 | 4.29 |
| 1972 | 6.13 | 3.30 | 4.86 | 5.32 | 3.06 | 4.26 | 6.04 | 3.27 | 4.79 |
| 1973 | 7.69 | 3.70 | 5.76 | 6.52 | 3.24 | 4.96 | 7.54 | 3.64 | 5.66 |
| 1974 | 10.32 | 5.02 | 7.67 | 8.14 | 4.34 | 6.31 | 10.00 | 4.93 | 7.48 |
| 1975 | 11.21 | 5.71 | 8.38 | 7.78 | 3.52 | 5.66 | 10.71 | 5.41 | 7.99 |
| 1976 | 11.08 | 5.26 | 7.92 | 8.15 | 3.65 | 5.80 | 10.62 | 5.02 | 7.60 |
| 1977 | 11.59 | 5.66 | 8.35 | 8.49 | 3.66 | 5.82 | 11.06 | 5.31 | 7.91 |
| 1978 | 12.59 | 6.59 | 9.31 | 10.15 | 4.57 | 7.04 | 12.15 | 6.22 | 8.90 |
| 1979 | 14.73 | 8.24 | 11.20 | 13.80 | 6.12 | 9.53 | 14.57 | 7.86 | 10.90 |
| 1980 | 17.49 | 9.95 | 13.38 | 17.67 | 7.30 | 11.85 | 17.52 | 9.50 | 13.12 |
| 1981 | 19.82 | 11.71 | 15.39 | 20.95 | 7.84 | 13.50 | 20.01 | 11.02 | 15.06 |
| 1982 | 21.31 | 13.01 | 16.76 | 18.72 | 7.98 | 12.43 | 20.84 | 11.99 | 15.92 |
| 1983 | 19.56 | 12.77 | 15.84 | 15.48 | 7.14 | 10.65 | 18.77 | 11.56 | 14.77 |
| 1984 | 18.36 | 13.71 | 15.80 | 12.08 | 7.03 | 9.16 | 16.99 | 12.12 | 14.28 |
| 1985 | 16.42 | 15.80 | 16.09 | 10.56 | 7.95 | 9.05 | 15.13 | 13.86 | 14.43 |
| 1986 | 15.41 | 18.46 | 16.99 | 8.51 | 9.97 | 9.25 | 13.63 | 16.38 | 15.04 |
| 1987 | 16.42 | 20.22 | 18.38 | 5.96 | 12.05 | 8.24 | 12.58 | 18.21 | 15.23 |
| 1988 | 17.55 | 21.10 | 19.42 | 5.16 | 14.13 | 7.98 | 12.27 | 19.47 | 15.55 |
| 1989 | 19.96 | 19.86 | 19.91 | 4.65 | 17.57 | 8.03 | 12.43 | 19.39 | 15.61 |
| 1990 | 22.45 | 17.60 | 19.50 | 4.74 | 21.99 | 8.99 | 13.56 | 18.37 | 15.89 |

| Calendar Year | Passenger Cars | | | LTVs | | | Passenger Cars + LTVs | | |
|---------------|----------------|-------|-------|-------|-------|-------|-----------------------|-------|-------|
| | Vol. | Attr. | Total | Vol. | Attr. | Total | Vol. | Attr. | Total |
| 1991 | 22.17 | 19.57 | 20.65 | 5.30 | 23.49 | 10.18 | 14.10 | 20.33 | 17.07 |
| 1992 | 19.33 | 19.83 | 19.61 | 4.80 | 19.83 | 9.50 | 12.72 | 19.83 | 16.09 |
| 1993 | 16.04 | 19.65 | 18.09 | 4.72 | 17.52 | 9.12 | 10.97 | 19.13 | 14.96 |
| 1994 | 14.83 | 17.34 | 16.31 | 5.08 | 13.48 | 8.56 | 10.53 | 16.26 | 13.54 |
| 1995 | 16.00 | 17.25 | 16.76 | 5.67 | 11.64 | 8.51 | 11.18 | 15.35 | 13.49 |
| 1996 | 18.55 | 18.62 | 18.59 | 5.82 | 10.74 | 8.27 | 12.35 | 15.64 | 14.20 |
| 1997 | 19.77 | 19.89 | 19.84 | 6.51 | 11.46 | 9.03 | 13.09 | 16.47 | 15.00 |
| 1998 | 18.72 | 21.28 | 20.23 | 6.91 | 12.11 | 9.60 | 12.72 | 17.30 | 15.27 |
| 1999 | 16.10 | 21.75 | 19.35 | 7.22 | 12.93 | 10.15 | 11.63 | 17.86 | 15.03 |
| 2000 | 16.72 | 23.45 | 20.52 | 7.18 | 13.79 | 10.53 | 11.87 | 19.10 | 15.75 |
| 2001 | 17.75 | 26.17 | 22.39 | 7.38 | 13.93 | 10.63 | 12.34 | 20.46 | 16.60 |
| 2002 | 20.05 | 28.83 | 24.85 | 7.19 | 15.07 | 11.01 | 13.07 | 22.20 | 17.77 |
| 2003 | 21.12 | 30.36 | 26.18 | 7.36 | 16.60 | 11.81 | 13.24 | 23.39 | 18.44 |
| 2004 | 20.25 | 30.59 | 25.88 | 7.54 | 17.73 | 12.59 | 12.95 | 23.84 | 18.59 |
| 2005 | 18.89 | 29.37 | 24.56 | 8.15 | 19.96 | 13.97 | 12.86 | 24.55 | 18.88 |
| 2006 | 17.73 | 26.82 | 22.70 | 8.43 | 20.12 | 14.25 | 12.66 | 23.51 | 18.32 |
| 2007 | 17.93 | 23.38 | 21.06 | 8.89 | 19.20 | 14.28 | 13.06 | 21.35 | 17.61 |
| 2008 | 19.60 | 22.44 | 21.32 | 10.89 | 20.41 | 16.09 | 15.11 | 21.52 | 18.81 |
| 2009 | 24.23 | 26.09 | 25.38 | 15.69 | 26.48 | 21.73 | 19.88 | 26.26 | 23.66 |
| 2010 | 21.58 | 22.36 | 22.07 | 12.29 | 20.54 | 16.92 | 16.52 | 21.50 | 19.48 |
| 2011 | 20.76 | 21.50 | 21.22 | 10.72 | 17.80 | 14.72 | 15.06 | 19.64 | 17.78 |
| 2012 | 18.69 | 19.14 | 18.97 | 10.68 | 16.59 | 14.05 | 14.30 | 17.90 | 16.46 |
| 2013 | 17.90 | 17.63 | 17.73 | 10.51 | 15.82 | 13.58 | 13.80 | 16.74 | 15.59 |
| 2014 | 19.84 | 18.57 | 19.02 | 10.08 | 14.87 | 12.89 | 14.15 | 16.65 | 15.68 |
| 2015 | 21.02 | 19.72 | 20.17 | 10.70 | 14.74 | 13.10 | 14.73 | 16.99 | 16.13 |
| 2016 | 25.82 | 23.82 | 24.50 | 12.10 | 15.81 | 14.31 | 17.13 | 19.24 | 18.44 |
| 2017 | 29.40 | 27.20 | 27.95 | 11.84 | 15.46 | 14.01 | 17.65 | 20.01 | 19.11 |
| 2018 | 35.47 | 32.42 | 33.45 | 12.05 | 15.75 | 14.28 | 18.77 | 21.43 | 20.42 |
| 2019 | 41.79 | 38.31 | 39.48 | 13.64 | 17.95 | 16.24 | 21.07 | 24.38 | 23.13 |

Table 52. Benefit/cost ratios based on economic benefits – passenger cars + LTVs

| Calendar Year | Passenger Cars | | | LTVs | | | Passenger Cars + LTVs | | |
|---------------|----------------|-------|-------|------|-------|-------|-----------------------|-------|-------|
| | Vol. | Attr. | Total | Vol. | Attr. | Total | Vol. | Attr. | Total |
| 1968 | 0.46 | 0.36 | 0.43 | 0.59 | 0.70 | 0.63 | 0.47 | 0.39 | 0.45 |
| 1969 | 0.79 | 0.63 | 0.73 | 1.12 | 1.17 | 1.13 | 0.82 | 0.68 | 0.77 |
| 1970 | 1.16 | 0.87 | 1.05 | 1.38 | 1.46 | 1.41 | 1.18 | 0.92 | 1.08 |
| 1971 | 1.33 | 0.96 | 1.18 | 1.42 | 1.33 | 1.39 | 1.34 | 0.99 | 1.20 |
| 1972 | 1.56 | 1.00 | 1.31 | 1.39 | 0.97 | 1.19 | 1.54 | 1.00 | 1.30 |
| 1973 | 1.84 | 1.07 | 1.46 | 1.53 | 0.97 | 1.26 | 1.80 | 1.05 | 1.44 |
| 1974 | 2.28 | 1.34 | 1.81 | 1.76 | 1.15 | 1.46 | 2.20 | 1.31 | 1.76 |
| 1975 | 2.45 | 1.48 | 1.95 | 1.69 | 1.02 | 1.36 | 2.33 | 1.42 | 1.87 |
| 1976 | 2.42 | 1.33 | 1.83 | 1.75 | 0.97 | 1.34 | 2.31 | 1.28 | 1.75 |
| 1977 | 2.59 | 1.45 | 1.96 | 1.88 | 0.94 | 1.36 | 2.47 | 1.36 | 1.86 |
| 1978 | 2.86 | 1.70 | 2.23 | 2.28 | 1.15 | 1.65 | 2.76 | 1.60 | 2.12 |
| 1979 | 3.34 | 2.09 | 2.66 | 3.10 | 1.53 | 2.23 | 3.30 | 1.99 | 2.59 |
| 1980 | 3.93 | 2.49 | 3.14 | 3.97 | 1.81 | 2.76 | 3.94 | 2.37 | 3.08 |
| 1981 | 4.37 | 2.80 | 3.51 | 4.56 | 1.92 | 3.06 | 4.40 | 2.64 | 3.43 |
| 1982 | 4.52 | 2.95 | 3.65 | 4.06 | 1.79 | 2.73 | 4.43 | 2.71 | 3.48 |
| 1983 | 4.11 | 2.83 | 3.41 | 3.35 | 1.61 | 2.34 | 3.97 | 2.56 | 3.19 |
| 1984 | 3.84 | 2.94 | 3.35 | 2.66 | 1.57 | 2.03 | 3.58 | 2.62 | 3.04 |
| 1985 | 3.56 | 3.45 | 3.50 | 2.44 | 1.84 | 2.09 | 3.31 | 3.05 | 3.17 |
| 1986 | 3.50 | 4.17 | 3.85 | 2.00 | 2.35 | 2.17 | 3.11 | 3.72 | 3.43 |
| 1987 | 3.69 | 4.57 | 4.15 | 1.39 | 2.84 | 1.93 | 2.85 | 4.14 | 3.46 |
| 1988 | 4.01 | 4.87 | 4.47 | 1.23 | 3.38 | 1.90 | 2.82 | 4.52 | 3.60 |
| 1989 | 4.44 | 4.50 | 4.47 | 1.09 | 4.10 | 1.88 | 2.79 | 4.42 | 3.53 |
| 1990 | 4.83 | 3.96 | 4.30 | 1.12 | 5.08 | 2.10 | 2.97 | 4.15 | 3.54 |
| 1991 | 4.63 | 4.30 | 4.44 | 1.23 | 5.25 | 2.31 | 3.01 | 4.48 | 3.71 |
| 1992 | 4.04 | 4.34 | 4.20 | 1.11 | 4.28 | 2.10 | 2.71 | 4.32 | 3.47 |
| 1993 | 3.41 | 4.15 | 3.83 | 1.07 | 3.66 | 1.96 | 2.36 | 4.03 | 3.18 |
| 1994 | 3.15 | 3.64 | 3.44 | 1.14 | 2.84 | 1.84 | 2.26 | 3.41 | 2.87 |
| 1995 | 3.43 | 3.60 | 3.53 | 1.26 | 2.47 | 1.83 | 2.41 | 3.22 | 2.86 |

| Calendar Year | Passenger Cars | | | LTVs | | | Passenger Cars + LTVs | | |
|---------------|----------------|-------|-------|------|-------|-------|-----------------------|-------|-------|
| | Vol. | Attr. | Total | Vol. | Attr. | Total | Vol. | Attr. | Total |
| 1996 | 3.84 | 3.87 | 3.86 | 1.30 | 2.29 | 1.80 | 2.60 | 3.27 | 2.98 |
| 1997 | 4.05 | 4.07 | 4.06 | 1.44 | 2.41 | 1.93 | 2.74 | 3.40 | 3.11 |
| 1998 | 3.85 | 4.29 | 4.11 | 1.52 | 2.52 | 2.04 | 2.67 | 3.52 | 3.14 |
| 1999 | 3.35 | 4.32 | 3.90 | 1.59 | 2.64 | 2.13 | 2.46 | 3.58 | 3.07 |
| 2000 | 3.48 | 4.63 | 4.13 | 1.66 | 2.85 | 2.26 | 2.55 | 3.83 | 3.24 |
| 2001 | 3.70 | 5.16 | 4.50 | 1.70 | 2.93 | 2.31 | 2.66 | 4.12 | 3.42 |
| 2002 | 4.19 | 5.76 | 5.05 | 1.72 | 3.22 | 2.45 | 2.85 | 4.54 | 3.72 |
| 2003 | 4.43 | 6.08 | 5.33 | 1.74 | 3.51 | 2.60 | 2.89 | 4.78 | 3.86 |
| 2004 | 4.22 | 6.02 | 5.20 | 1.79 | 3.67 | 2.72 | 2.83 | 4.79 | 3.84 |
| 2005 | 3.99 | 5.79 | 4.97 | 1.94 | 4.06 | 2.99 | 2.84 | 4.90 | 3.90 |
| 2006 | 3.77 | 5.31 | 4.61 | 2.05 | 4.15 | 3.09 | 2.83 | 4.73 | 3.82 |
| 2007 | 3.80 | 4.62 | 4.27 | 2.16 | 3.90 | 3.07 | 2.92 | 4.27 | 3.66 |
| 2008 | 4.12 | 4.39 | 4.28 | 2.63 | 4.15 | 3.46 | 3.35 | 4.28 | 3.89 |
| 2009 | 5.12 | 5.12 | 5.12 | 3.73 | 5.35 | 4.63 | 4.41 | 5.22 | 4.89 |
| 2010 | 4.62 | 4.46 | 4.52 | 2.96 | 4.20 | 3.66 | 3.71 | 4.34 | 4.08 |
| 2011 | 4.40 | 4.27 | 4.32 | 2.59 | 3.62 | 3.17 | 3.37 | 3.94 | 3.71 |
| 2012 | 4.04 | 3.87 | 3.94 | 2.65 | 3.43 | 3.10 | 3.28 | 3.66 | 3.51 |
| 2013 | 3.92 | 3.63 | 3.73 | 2.61 | 3.28 | 2.99 | 3.19 | 3.46 | 3.35 |
| 2014 | 4.34 | 3.81 | 3.99 | 2.53 | 3.09 | 2.86 | 3.28 | 3.44 | 3.38 |
| 2015 | 4.80 | 4.20 | 4.41 | 2.72 | 3.11 | 2.95 | 3.53 | 3.60 | 3.58 |
| 2016 | 5.87 | 5.08 | 5.35 | 3.06 | 3.37 | 3.24 | 4.09 | 4.10 | 4.10 |
| 2017 | 6.66 | 5.81 | 6.10 | 2.97 | 3.29 | 3.16 | 4.19 | 4.27 | 4.24 |
| 2018 | 7.96 | 6.91 | 7.26 | 3.02 | 3.33 | 3.21 | 4.44 | 4.55 | 4.51 |
| 2019 | 9.28 | 8.09 | 8.49 | 3.38 | 3.74 | 3.60 | 4.94 | 5.11 | 5.05 |

Comprehensive safety benefit valuations show positive cost benefit ratios starting in 1969, when benefits from both 1968 and 1969 model vehicles were experienced. These ratios grow dramatically over time as each CY experiences safety benefits from an on-road fleet increasingly dominated by vehicles containing more advanced and sophisticated safety features, and as seat belt use climbs from about 11 percent for drivers in 1979-to-1982 to 90.7 percent for adult front seat passengers in 2019 (Figure 21) (NCSA, 2019). Costs increase each CY due to the

cumulative price impacts from periodic safety improvements on the new vehicle fleet, but benefits increase disproportionately as the entire on-road fleet is replaced with safer vehicles and more vehicle occupants wear seat belts.

Another factor affecting this trend is cost learning. Prices for products fall over time as manufacturing efficiencies and economies of scale enable producers to reduce production costs. This process is typically measured in a learning curve that describes reductions in costs as a function of successive doubling of cumulative production volumes over time. Eventually price trends become asymptotic as new efficiencies are exhausted. Figure 22 shows this process. The costs derived in Simons (in press) and used in this study were derived by applying this process to initial technology costs.

From Figure 20, voluntary safety technologies initially produce higher benefit/cost ratios but in later years safety changes attributable to FMVSS are more cost beneficial. This reflects the voluntary adoption of ABS primarily on light trucks in the mid-1980s. This technology was costly but had only minimal safety benefits until ESC was added in the early 2000s. The same pattern would occur for economic cost valuations for safety benefits, except that the absolute values of the benefit/cost ratios would be much lower and would not turn positive until 1970. This is a function of the lower valuation placed on safety inherent in using a human capital basis for valuation rather than a broader societal valuation that includes lost quality of life. Table 52 shows benefit/cost ratios based on economic cost valuation for safety benefits.

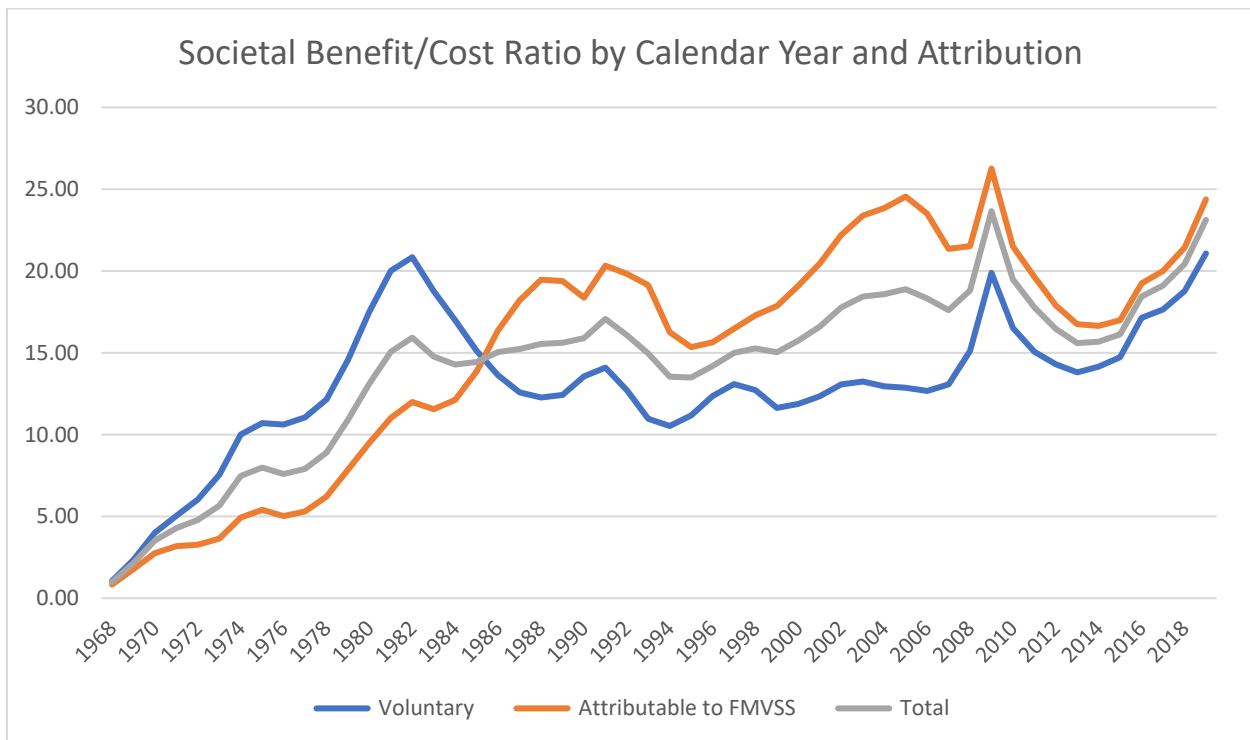


Figure 20. Societal benefit/cost ratio by CY and attribution

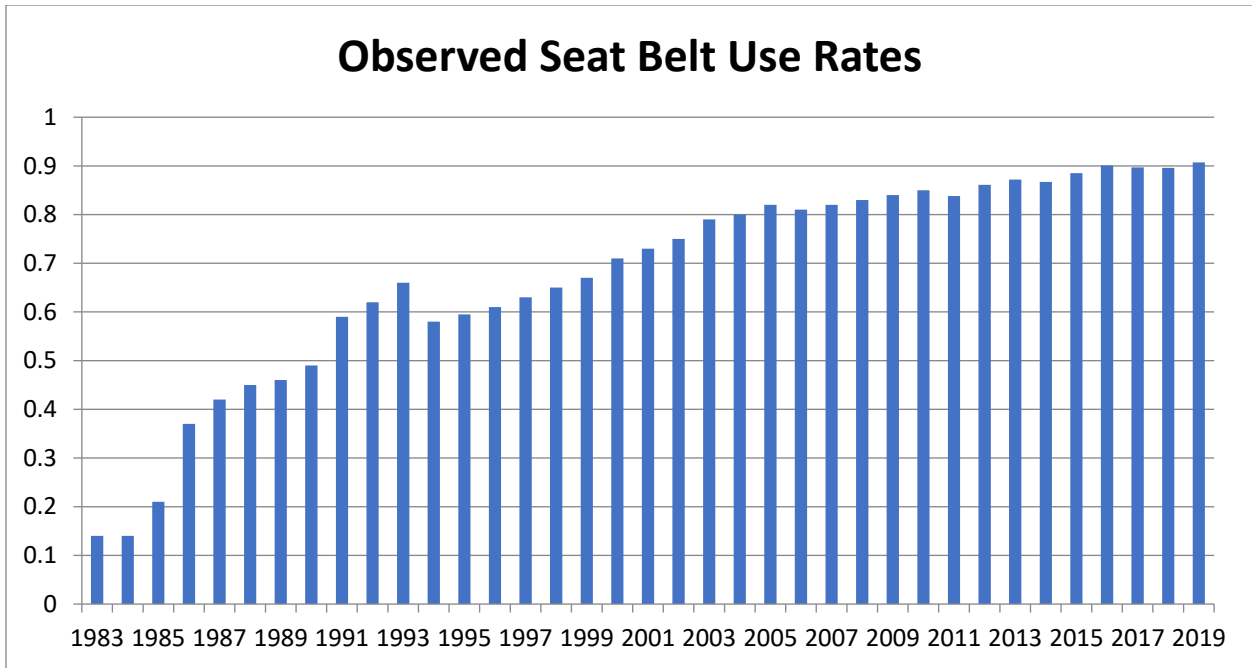


Figure 21. Observed seat belt use rates

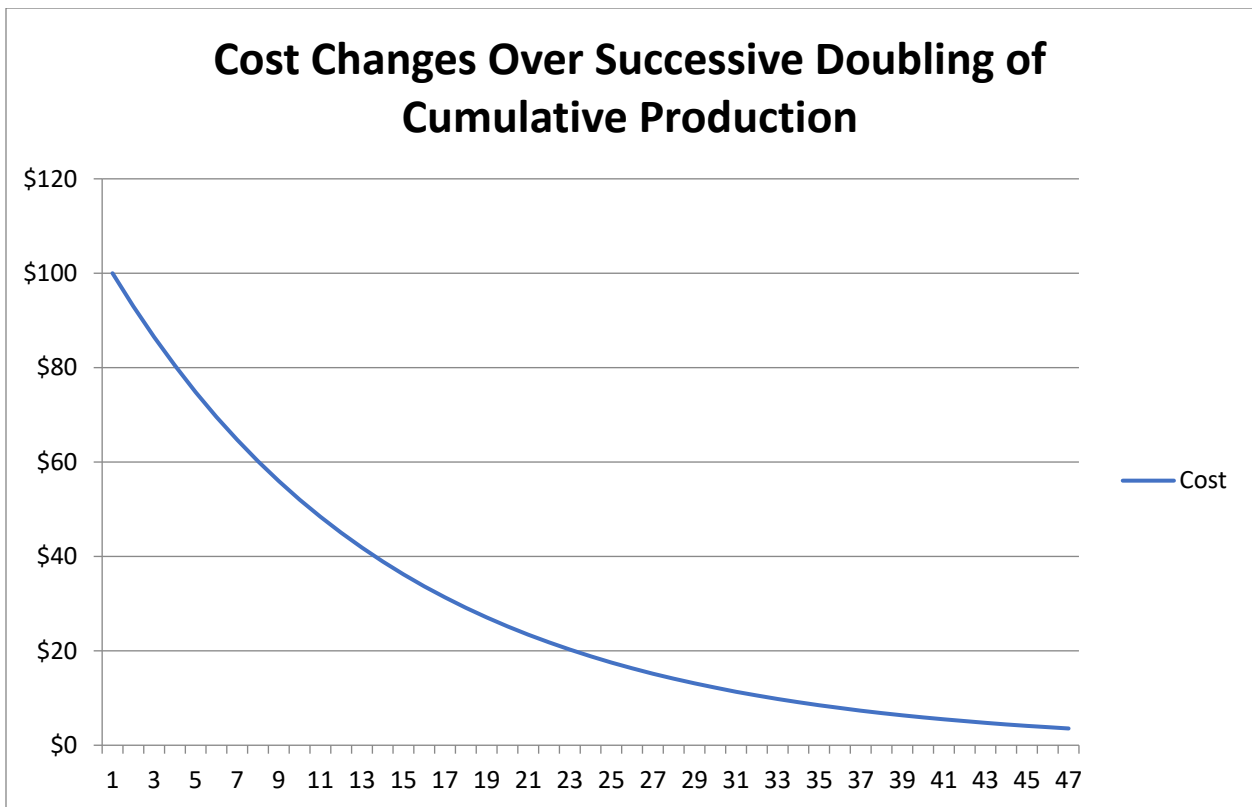


Figure 22. Cost changes over successive doubling of cumulative production

Table 53 shows the combined impact of FMVSS technologies on costs, comprehensive valued safety benefits, and net benefits over the 52-year period from 1968 to 2019. Table 54 shows this same information when safety benefits are valued based only on economic costs.

Total costs for the 52 years combined are over \$1 trillion. Benefits valued by comprehensive societal impacts, which include both economic impacts and lost quality of life, were \$17.3 trillion, and net benefits were \$16.3 trillion in 2019 dollars. Comprehensive values for safety benefits recognize that society values mitigation of lost quality of life and premature death as well as the more tangible direct impacts such as lost productivity or medical care costs.

Industry and government share both responsibility and credit for improved vehicle safety. Costs and benefits are analyzed for the FMVSS met voluntarily by vehicle manufacturers versus those attributable to the NHTSA requirements. Over the 52-year span, 44 percent of the total costs were incurred from technologies voluntarily adopted in some portion of the vehicle fleet by manufacturers. FMVSS required by Federal regulation were responsible for 56 percent of these costs.

Thirty-seven percent of the comprehensive benefits and net benefits were provided voluntarily by manufacturers while 63 percent of the comprehensive benefits and net benefits were attributable to FMVSS.

Combined, these data show that the FMVSS required by NHTSA and attributed to the standards were particularly effective in providing net benefits to the American public. The attributable standards accounted for 56 percent of total costs but provided 63 percent of both benefits and net benefits.

Table 53. Combined 52 years of data (1968 to 2019) total costs, comprehensive benefits, and net benefits – passenger cars and LTVs (billions in 2019\$)

| | Total Costs | | | Comprehensive Benefits | | | Net Benefits | | |
|----------------|-------------|---------|-------|------------------------|---------|--------|--------------|---------|--------|
| | Vol. | Attrib. | Total | Vol. | Attrib. | Total | Vol. | Attrib. | Total |
| Passenger Cars | 233 | 324 | 558 | 4,293 | 6,686 | 10,979 | 4,060 | 6,361 | 10,421 |
| % | 41.9 | 58.1 | 100 | 39.1 | 60.9 | 100 | 39.0 | 61.0 | 100 |
| LTVs | 231 | 262 | 493 | 2,130 | 4,202 | 6,332 | 1,899 | 3940 | 5,839 |
| % | 46.9 | 53.1 | 100 | 33.6 | 66.4 | 100 | 32.5 | 67.5 | 100 |
| Combined | 464 | 586 | 1,050 | 6,423 | 10,888 | 17,311 | 5,959 | 10,302 | 16,261 |
| % | 44.2 | 55.8 | 100 | 37.1 | 62.9 | 100 | 36.6 | 63.4 | 100 |

This report also examines impacts valuing safety benefits based solely on economic costs averted by injury and crash mitigation. These more tangible impacts include medical care, lost productivity, property damage, legal costs, insurance administration costs, traffic congestion, emergency services, and workplace costs. These “human capital” costs, represent the productivity lost to society due to death and injury as well as the resources diverted to restore crash victims, as much as possible, to their pre-crash status, but they exclude the valuation society places on avoiding lost quality of life and premature death. Based solely on economic

cost valuations for safety impacts, total benefits for the 52 years total \$3.7 trillion, and net benefits total \$2.7 trillion.

Table 54. Combined 52 years of data (1968 to 2019) total costs, economic benefits, and net benefits – passenger cars and LTVs (billions in 2019\$)

| | Total Costs | | | Economic Benefits | | | Net Benefits | | |
|----------------|-------------|---------|-------|-------------------|---------|-------|--------------|---------|-------|
| | Vol. | Attrib. | Total | Vol. | Attrib. | Total | Vol. | Attrib. | Total |
| Passenger Cars | 233 | 324 | 558 | 929 | 1,389 | 2,319 | 696 | 1,065 | 1,761 |
| % | 41.9 | 58.1 | 100 | 40.1 | 59.9 | 100 | 39.5 | 60.5 | 100 |
| LTVs | 231 | 262 | 493 | 514 | 879 | 1,393 | 283 | 618 | 901 |
| % | 46.9 | 53.1 | 100 | 36.9 | 63.1 | 100 | 31.4 | 68.6 | 100 |
| Combined | 464 | 586 | 1,050 | 1,444 | 2,268 | 3,712 | 979 | 1,682 | 2,662 |
| % | 44.2 | 55.8 | 100 | 38.9 | 61.1 | 100 | 36.8 | 63.2 | 100 |

Table 55 using comprehensive benefits and Table 56 using economic benefits compare the costs and benefits of CA standards (FMVSS 100 series) to CW standards (FMVSS 200 and 300 series) for passenger cars and LTVs combined. As a group the CW standards have cost more than the CA standards but have achieved greater benefits and overall have been more cost effective. For example, for the 2019 CY, 66 percent of the costs and 79 percent of the comprehensive benefits came from CW standards. The differences were even larger in earlier years. In the 1990 CY, 60 percent of the costs and 90 percent of the benefits came from CW standards and in the 2000 CY, 66 percent of the costs and 90 percent of the benefits came from the CW standards. The increase in CA benefits portion in later years reflects the impact of ESC, a highly effective CA countermeasure that was required on all new light passenger vehicles by MY 2012.

Table 55. Total costs, comprehensive benefits, and net benefits – passenger cars and LTVs
(billions in 2019\$)

| Calendar Year | Total Costs | | | Comprehensive Benefits | | | Net Benefits | | |
|---------------|-------------|-------|-------|------------------------|--------|--------|--------------|--------|--------|
| | CA | CW | Total | CA | CW | Total | CA | CW | Total |
| 1968 | 1.11 | 3.14 | 4.25 | 1.03 | 3.18 | 4.22 | (0.07) | 0.04 | (0.03) |
| 1969 | 1.07 | 3.44 | 4.51 | 2.26 | 7.41 | 9.68 | 1.19 | 3.97 | 5.17 |
| 1970 | 1.06 | 3.50 | 4.56 | 3.54 | 12.55 | 16.09 | 2.47 | 9.06 | 11.53 |
| 1971 | 1.28 | 4.12 | 5.40 | 5.05 | 18.11 | 23.16 | 3.77 | 13.99 | 17.76 |
| 1972 | 1.51 | 4.84 | 6.35 | 6.58 | 23.84 | 30.42 | 5.07 | 18.99 | 24.07 |
| 1973 | 1.57 | 5.18 | 6.75 | 8.05 | 30.12 | 38.17 | 6.48 | 24.94 | 31.42 |
| 1974 | 1.39 | 4.54 | 5.93 | 9.16 | 35.17 | 44.33 | 7.77 | 30.63 | 38.40 |
| 1975 | 1.54 | 4.81 | 6.35 | 10.80 | 39.89 | 50.68 | 9.26 | 35.08 | 44.34 |
| 1976 | 1.79 | 5.89 | 7.67 | 12.27 | 46.02 | 58.29 | 10.48 | 40.14 | 50.62 |
| 1977 | 1.79 | 6.47 | 8.26 | 13.71 | 51.57 | 65.28 | 11.92 | 45.10 | 57.02 |
| 1978 | 1.79 | 6.35 | 8.15 | 15.26 | 57.27 | 72.53 | 13.46 | 50.92 | 64.38 |
| 1979 | 1.62 | 5.74 | 7.36 | 16.48 | 63.83 | 80.31 | 14.86 | 58.09 | 72.94 |
| 1980 | 1.42 | 5.12 | 6.54 | 17.19 | 68.62 | 85.81 | 15.77 | 63.49 | 79.27 |
| 1981 | 1.35 | 4.88 | 6.23 | 17.58 | 76.19 | 93.77 | 16.23 | 71.31 | 87.54 |
| 1982 | 1.38 | 4.89 | 6.27 | 17.86 | 81.92 | 99.78 | 16.48 | 77.03 | 93.51 |
| 1983 | 1.60 | 5.52 | 7.12 | 18.14 | 87.00 | 105.13 | 16.54 | 81.48 | 98.01 |
| 1984 | 1.84 | 6.15 | 7.99 | 19.12 | 94.96 | 114.08 | 17.28 | 88.82 | 106.09 |
| 1985 | 2.14 | 6.53 | 8.67 | 18.25 | 106.89 | 125.15 | 16.11 | 100.36 | 116.48 |
| 1986 | 2.84 | 6.63 | 9.47 | 18.35 | 124.09 | 142.44 | 15.51 | 117.46 | 132.97 |
| 1987 | 3.64 | 6.64 | 10.28 | 19.45 | 137.15 | 156.60 | 15.80 | 130.51 | 146.32 |
| 1988 | 4.18 | 6.79 | 10.97 | 19.55 | 151.02 | 170.56 | 15.37 | 144.22 | 159.59 |
| 1989 | 4.85 | 7.12 | 11.97 | 19.42 | 167.49 | 186.92 | 14.58 | 160.37 | 174.94 |
| 1990 | 5.20 | 7.77 | 12.97 | 20.18 | 185.86 | 206.04 | 14.99 | 178.09 | 193.08 |
| 1991 | 5.42 | 7.54 | 12.96 | 21.80 | 199.37 | 221.18 | 16.38 | 191.84 | 208.22 |
| 1992 | 6.48 | 8.49 | 14.97 | 24.01 | 216.72 | 240.73 | 17.53 | 208.23 | 225.76 |
| 1993 | 7.52 | 10.09 | 17.61 | 29.42 | 234.01 | 263.43 | 21.90 | 223.92 | 245.82 |
| 1994 | 8.29 | 12.49 | 20.77 | 31.90 | 249.39 | 281.29 | 23.61 | 236.91 | 260.52 |
| 1995 | 8.25 | 14.26 | 22.51 | 36.31 | 267.36 | 303.67 | 28.06 | 253.11 | 281.17 |

| Calendar Year | Total Costs | | | Comprehensive Benefits | | | Net Benefits | | |
|---------------|-------------|-------|-------|------------------------|--------|--------|--------------|--------|--------|
| | CA | CW | Total | CA | CW | Total | CA | CW | Total |
| 1996 | 8.34 | 15.40 | 23.74 | 37.40 | 299.62 | 337.02 | 29.06 | 284.22 | 313.28 |
| 1997 | 8.34 | 15.97 | 24.31 | 40.47 | 324.18 | 364.65 | 32.12 | 308.22 | 340.34 |
| 1998 | 8.78 | 16.83 | 25.61 | 40.74 | 350.23 | 390.97 | 31.96 | 333.40 | 365.36 |
| 1999 | 9.36 | 17.88 | 27.24 | 42.62 | 366.81 | 409.43 | 33.26 | 348.93 | 382.19 |
| 2000 | 9.34 | 18.25 | 27.59 | 44.45 | 390.22 | 434.67 | 35.12 | 371.96 | 407.08 |
| 2001 | 9.15 | 18.03 | 27.18 | 45.93 | 405.28 | 451.20 | 36.78 | 387.25 | 424.02 |
| 2002 | 8.97 | 17.68 | 26.65 | 47.17 | 426.45 | 473.63 | 38.20 | 408.78 | 446.98 |
| 2003 | 9.01 | 18.41 | 27.42 | 49.24 | 456.35 | 505.59 | 40.24 | 437.94 | 478.17 |
| 2004 | 9.19 | 20.23 | 29.42 | 52.41 | 494.51 | 546.92 | 43.22 | 474.27 | 517.50 |
| 2005 | 9.52 | 20.56 | 30.09 | 53.97 | 514.19 | 568.16 | 44.45 | 493.63 | 538.08 |
| 2006 | 10.28 | 21.17 | 31.45 | 56.30 | 519.80 | 576.10 | 46.02 | 498.63 | 544.65 |
| 2007 | 11.26 | 22.54 | 33.80 | 60.36 | 534.82 | 595.18 | 49.09 | 512.29 | 561.38 |
| 2008 | 10.78 | 21.00 | 31.77 | 63.69 | 533.96 | 597.65 | 52.92 | 512.96 | 565.87 |
| 2009 | 8.60 | 16.47 | 25.07 | 65.47 | 527.65 | 593.12 | 56.87 | 511.18 | 568.05 |
| 2010 | 10.61 | 19.84 | 30.45 | 71.55 | 521.64 | 593.19 | 60.94 | 501.80 | 562.74 |
| 2011 | 12.14 | 22.81 | 34.95 | 80.65 | 540.95 | 621.60 | 68.51 | 518.14 | 586.65 |
| 2012 | 13.45 | 25.22 | 38.67 | 91.82 | 544.80 | 636.62 | 78.37 | 519.58 | 597.95 |
| 2013 | 14.42 | 27.20 | 41.62 | 103.77 | 545.10 | 648.87 | 89.36 | 517.90 | 607.25 |
| 2014 | 15.42 | 28.77 | 44.19 | 113.76 | 579.34 | 693.10 | 98.34 | 550.57 | 648.91 |
| 2015 | 15.74 | 29.03 | 44.76 | 127.71 | 594.22 | 721.93 | 111.98 | 565.19 | 677.17 |
| 2016 | 14.39 | 26.88 | 41.27 | 141.86 | 619.18 | 761.04 | 127.47 | 592.30 | 719.77 |
| 2017 | 14.39 | 27.04 | 41.43 | 152.76 | 639.16 | 791.93 | 138.37 | 612.13 | 750.50 |
| 2018 | 13.96 | 26.52 | 40.49 | 168.33 | 658.55 | 826.88 | 154.37 | 632.03 | 786.40 |
| 2019 | 13.13 | 25.00 | 38.13 | 186.09 | 695.62 | 881.71 | 172.96 | 670.62 | 843.58 |

Table 56. Total costs, economic benefits, and net benefits – passenger cars and LTVs (billions in 2019\$)

| Calendar Year | Total Costs | | | Economic Benefits | | | Net Benefits | | |
|---------------|-------------|-------|-------|-------------------|-------|-------|--------------|--------|--------|
| | CA | CW | Total | CA | CW | Total | CA | CW | Total |
| 1968 | 1.11 | 3.14 | 4.25 | 0.57 | 1.33 | 1.90 | (0.53) | (1.82) | (2.35) |
| 1969 | 1.07 | 3.44 | 4.51 | 1.03 | 2.43 | 3.47 | (0.03) | (1.01) | (1.05) |
| 1970 | 1.06 | 3.50 | 4.56 | 1.47 | 3.46 | 4.93 | 0.41 | (0.04) | 0.37 |
| 1971 | 1.28 | 4.12 | 5.40 | 1.96 | 4.51 | 6.47 | 0.69 | 0.39 | 1.08 |
| 1972 | 1.51 | 4.84 | 6.35 | 2.51 | 5.72 | 8.23 | 1.00 | 0.88 | 1.88 |
| 1973 | 1.57 | 5.18 | 6.75 | 2.90 | 6.80 | 9.71 | 1.34 | 1.62 | 2.96 |
| 1974 | 1.39 | 4.54 | 5.93 | 3.09 | 7.34 | 10.42 | 1.70 | 2.80 | 4.49 |
| 1975 | 1.54 | 4.81 | 6.35 | 3.58 | 8.25 | 11.84 | 2.04 | 3.45 | 5.49 |
| 1976 | 1.79 | 5.89 | 7.67 | 3.98 | 9.46 | 13.44 | 2.19 | 3.58 | 5.77 |
| 1977 | 1.79 | 6.47 | 8.26 | 4.52 | 10.83 | 15.34 | 2.73 | 4.36 | 7.09 |
| 1978 | 1.79 | 6.35 | 8.15 | 5.11 | 12.18 | 17.29 | 3.31 | 5.83 | 9.14 |
| 1979 | 1.62 | 5.74 | 7.36 | 5.51 | 13.54 | 19.05 | 3.89 | 7.80 | 11.68 |
| 1980 | 1.42 | 5.12 | 6.54 | 5.69 | 14.44 | 20.13 | 4.27 | 9.32 | 13.59 |
| 1981 | 1.35 | 4.88 | 6.23 | 5.73 | 15.63 | 21.36 | 4.39 | 10.75 | 15.14 |
| 1982 | 1.38 | 4.89 | 6.27 | 5.64 | 16.14 | 21.78 | 4.26 | 11.25 | 15.51 |
| 1983 | 1.60 | 5.52 | 7.12 | 5.73 | 16.97 | 22.70 | 4.13 | 11.45 | 15.58 |
| 1984 | 1.84 | 6.15 | 7.99 | 5.92 | 18.40 | 24.32 | 4.08 | 12.26 | 16.33 |
| 1985 | 2.14 | 6.53 | 8.67 | 5.98 | 21.49 | 27.47 | 3.83 | 14.96 | 18.80 |
| 1986 | 2.84 | 6.63 | 9.47 | 6.28 | 26.15 | 32.44 | 3.45 | 19.52 | 22.97 |
| 1987 | 3.64 | 6.64 | 10.28 | 6.69 | 28.88 | 35.57 | 3.04 | 22.24 | 25.29 |
| 1988 | 4.18 | 6.79 | 10.97 | 7.00 | 32.46 | 39.46 | 2.82 | 25.67 | 28.49 |
| 1989 | 4.85 | 7.12 | 11.97 | 6.96 | 35.36 | 42.32 | 2.11 | 28.24 | 30.35 |
| 1990 | 5.20 | 7.77 | 12.97 | 7.26 | 38.67 | 45.93 | 2.06 | 30.90 | 32.96 |
| 1991 | 5.42 | 7.54 | 12.96 | 7.51 | 40.56 | 48.07 | 2.08 | 33.02 | 35.11 |
| 1992 | 6.48 | 8.49 | 14.97 | 8.07 | 43.88 | 51.94 | 1.59 | 35.39 | 36.98 |
| 1993 | 7.52 | 10.09 | 17.61 | 9.27 | 46.72 | 55.99 | 1.75 | 36.63 | 38.38 |
| 1994 | 8.29 | 12.49 | 20.77 | 10.27 | 49.31 | 59.58 | 1.98 | 36.82 | 38.81 |
| 1995 | 8.25 | 14.26 | 22.51 | 11.89 | 52.44 | 64.34 | 3.65 | 38.18 | 41.83 |

| Calendar Year | Total Costs | | | Economic Benefits | | | Net Benefits | | |
|------------------|-------------|-------|-------|-------------------|--------|--------|--------------|--------|--------|
| | CA | CW | Total | CA | CW | Total | CA | CW | Total |
| 1996 | 8.34 | 15.40 | 23.74 | 12.71 | 58.00 | 70.70 | 4.37 | 42.59 | 46.96 |
| 1997 | 8.34 | 15.97 | 24.31 | 13.60 | 61.96 | 75.56 | 5.25 | 46.00 | 51.25 |
| 1998 | 8.78 | 16.83 | 25.61 | 13.73 | 66.73 | 80.46 | 4.95 | 49.90 | 54.86 |
| 1999 | 9.36 | 17.88 | 27.24 | 14.24 | 69.41 | 83.64 | 4.88 | 51.52 | 56.40 |
| 2000 | 9.34 | 18.25 | 27.59 | 15.11 | 74.26 | 89.38 | 5.77 | 56.01 | 61.78 |
| 2001 | 9.15 | 18.03 | 27.18 | 15.70 | 77.38 | 93.08 | 6.55 | 59.35 | 65.90 |
| 2002 | 8.97 | 17.68 | 26.65 | 16.29 | 82.76 | 99.05 | 7.32 | 65.08 | 72.41 |
| 2003 | 9.01 | 18.41 | 27.42 | 17.30 | 88.46 | 105.76 | 8.30 | 70.05 | 78.34 |
| 2004 | 9.19 | 20.23 | 29.42 | 18.25 | 94.76 | 113.01 | 9.06 | 74.53 | 83.58 |
| 2005 | 9.52 | 20.56 | 30.09 | 18.92 | 98.53 | 117.45 | 9.40 | 77.97 | 87.37 |
| 2006 | 10.28 | 21.17 | 31.45 | 19.72 | 100.55 | 120.28 | 9.45 | 79.39 | 88.83 |
| 2007 | 11.26 | 22.54 | 33.80 | 20.93 | 102.82 | 123.75 | 9.67 | 80.28 | 89.94 |
| 2008 | 10.78 | 21.00 | 31.77 | 21.72 | 101.83 | 123.55 | 10.94 | 80.83 | 91.77 |
| 2009 | 8.60 | 16.47 | 25.07 | 22.26 | 100.38 | 122.65 | 13.66 | 83.92 | 97.57 |
| 2010 | 10.61 | 19.84 | 30.45 | 24.34 | 100.00 | 124.34 | 13.73 | 80.16 | 93.89 |
| 2011 | 12.14 | 22.81 | 34.95 | 26.72 | 102.97 | 129.69 | 14.58 | 80.16 | 94.74 |
| 2012 | 13.45 | 25.22 | 38.67 | 30.85 | 104.76 | 135.61 | 17.40 | 79.54 | 96.94 |
| 2013 | 14.42 | 27.20 | 41.62 | 34.17 | 105.38 | 139.55 | 19.75 | 78.18 | 97.93 |
| 2014 | 15.42 | 28.77 | 44.19 | 38.52 | 110.72 | 149.24 | 23.10 | 81.95 | 105.05 |
| 2015 | 15.74 | 29.03 | 44.76 | 44.54 | 115.53 | 160.07 | 28.81 | 86.50 | 115.31 |
| 2016 | 14.39 | 26.88 | 41.27 | 48.43 | 120.65 | 169.08 | 34.04 | 93.77 | 127.81 |
| 2017 | 14.39 | 27.04 | 41.43 | 51.33 | 124.29 | 175.62 | 36.93 | 97.25 | 134.18 |
| 2018 | 13.96 | 26.52 | 40.49 | 55.75 | 126.73 | 182.48 | 41.79 | 100.21 | 142.00 |
| 2019 | 13.13 | 25.00 | 38.13 | 60.69 | 131.81 | 192.50 | 47.57 | 106.81 | 154.37 |

Conclusion

Our transportation system is heavily dependent on individually controlled motor vehicles traveling on roadways designed for maximum efficiency. In 2019, over 276 million registered vehicles traveled 3.2 trillion miles on our nation's roadways, many of those miles on fast moving interstates or rural roadways. Driving is inherently risky and from 1968 to 2019 over 1.6 million fatalities occurred in motor vehicle crashes to occupants of passenger cars and LTVs.

However, during this same timeframe, 861,578 fatalities were prevented by new and improved safety technologies installed on passenger cars and LTVs.

When safety regulations are established, they are subject to rigorous benefit/cost analysis that estimate the benefit and cost impacts on a MY basis. Once enacted, those impacts continue to affect all future MYs as well. This study examines the long-term cumulative impact of safety regulations on society on a year-by-year basis. Over time, in each CY society pays higher costs for new MY vehicles but receives safety benefits from an increasing portion of the entire on-road vehicle fleet.

Fuel economy penalties from the added weight of safety technologies also occur in the on-road fleet but are relatively minor. Increases in real wages, tied to many other cost factors also contribute to rising benefits, while decreasing real technology costs due to the learning process works to temper the rise in annual new vehicle fleet costs.

The net impact of safety improvements is thus a continuous increase in net benefits to society over time. Driver behavior also contributes to this trend. Seat belt use has climbed dramatically during this 52-year period (see Figure 21), which essentially means more vehicle occupants are using, and thus receiving benefits from, technology that has been in place since the beginning of this timeframe.

As illustrated in Figure 23, safety technology improvements have been overwhelmingly beneficial to society, regardless of whether safety is valued using comprehensive values that recognize the value of lost quality of life, or whether it is limited to the purely economic impacts associated with the human capital approach.

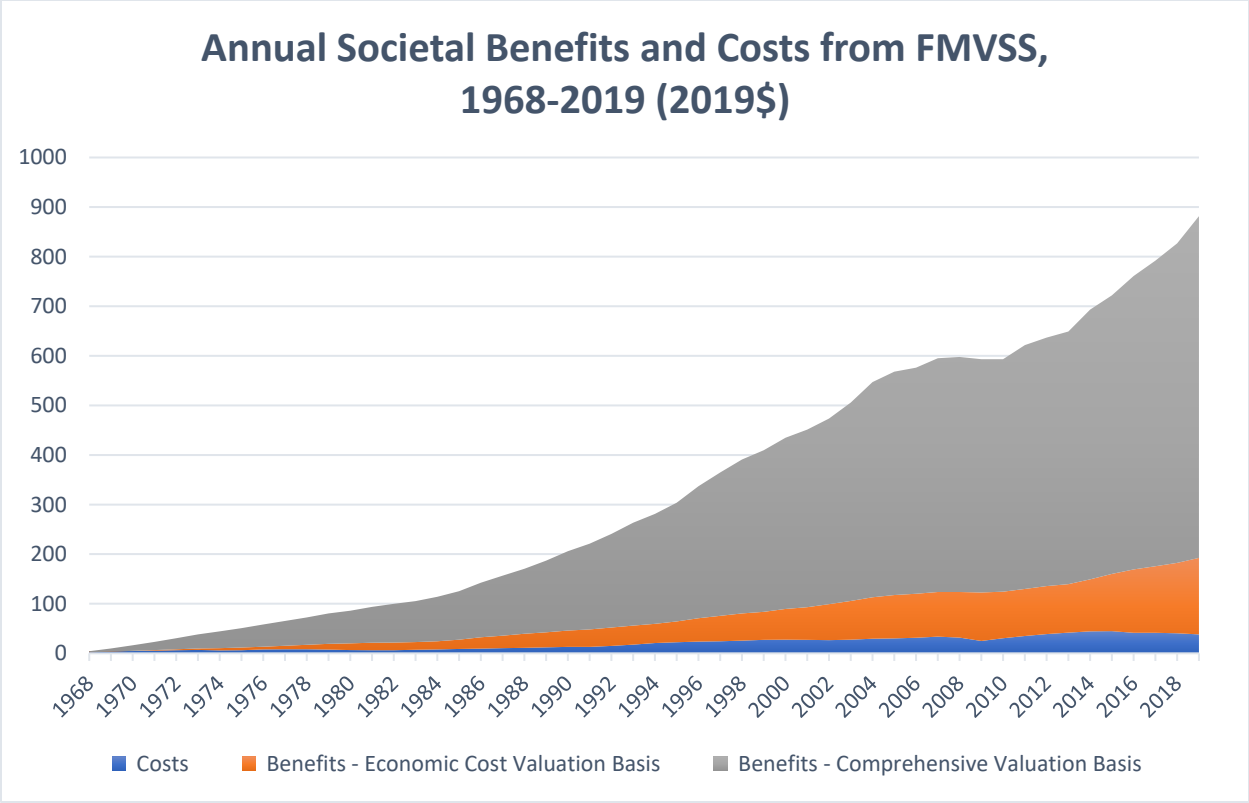


Figure 23. Annual Societal Benefits and Costs from FMVSS, 1968-2019 (2019\$)

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Appendix A: Percentages of Model Year Sales by Month Grouping

| Model Year | September to December | January to August |
|-------------------|------------------------------|--------------------------|
| 2006 | 31 | 69 |
| 2007 | 32 | 68 |
| 2008 | 34 | 66 |
| 2009 | 33 | 67 |
| 2010 | 30 | 70 |
| 2011 | 32 | 68 |
| 2012 | 31 | 69 |
| 2013 | 31 | 69 |
| 2014 | 31 | 69 |
| 2015 | 31 | 69 |
| 2016 | 33 | 67 |
| 2017 | 34 | 66 |
| 2018 | 34 | 66 |
| 2019 | 34 | 66 |
| 2020 | 38 | 62 |
| 2021 | 34 | 66 |
| | | |
| | | |
| Average | 32.7 | 67.3 |

Based on Ward's Automotive Annual Report Yearbooks.

Appendix B: Lifetime Vehicle Mileage and Survivability Schedules

A note about sources

This report uses four main databases and data collections as sources for much of the research and tables in this appendix, as follows.

The National Vehicle Population Profile (NVPP) is a set of annual censuses of registered passenger cars and light-duty trucks in the United States, Canada and Puerto Rico, conducted by R. L. Polk & Company. Polk's New Registration Data reports provide detailed indicators for new vehicle registrations. This is cited as "Survivability from Polk NVPP" and the years of any given table or body of data.

The vehicle miles traveled (VMT) schedule used for passenger cars is derived from the Residential Transportation Energy Consumption Survey (RTECS), designed by the Energy Information Administration of the Department of Energy to collect information on the use of energy in residential vehicles in the United States. This is cited as RTECS.

The Nationwide Personal Transportation Survey (NPTS) is a series produced by the Federal Highway Administration's Office of Highway Policy Information. This survey has been conducted periodically since 1969 and is the source of data on the amount and nature of personal travel by all modes of transport, and the relationship between demographic change and travel. It lets analysts view travel from the perspective of the person and the household unit. The NPTS is sponsored by the FHWA, the Bureau of Transportation Statistics (BTS), the National Highway Traffic Safety Administration, and the Federal Transit Administration. This is cited as NPTS.

Table B-1. 1968 to 1995 data – passenger cars

| Vehicle Age Years | Vehicle Mileage | Vehicle Survivability | Weighted Mileage |
|------------------------------|----------------------------|----------------------------------|-----------------------------|
| 1 | 14,535 | 1.000 | 14,535 |
| 2 | 13,924 | 0.993 | 13,827 |
| 3 | 12,846 | 0.982 | 12,615 |
| 4 | 11,378 | 0.964 | 10,968 |
| 5 | 10,749 | 0.935 | 10,050 |
| 6 | 10,119 | 0.892 | 9,026 |
| 7 | 9,490 | 0.831 | 7,886 |
| 8 | 8,860 | 0.753 | 6,672 |
| 9 | 8,231 | 0.662 | 5,449 |
| 10 | 7,601 | 0.568 | 4,317 |
| 11 | 6,972 | 0.476 | 3,319 |
| 12 | 6,343 | 0.394 | 2,499 |
| 13 | 5,713 | 0.323 | 1,845 |
| 14 | 5,084 | 0.263 | 1,337 |
| 15 | 4,454 | 0.213 | 949 |
| 16 | 3,825 | 0.172 | 658 |
| 17 | 3,195 | 0.139 | 444 |
| 18 | 2,566 | 0.112 | 287 |
| 19 | 1,937 | 0.090 | 174 |
| 20 | 1,307 | 0.073 | 95 |
| Total | | | 106,952 |

Sources: Survivability from Polk NVPP, vehicles in use. VMT from NPTS

Table B-2. VMT 1968 to 1995 data – LTVs

| Vehicle Age Years | Vehicle Mileage | Vehicle Survivability | Weighted Mileage |
|------------------------------|----------------------------|----------------------------------|-----------------------------|
| 1 | 14,200 | 1.000 | 14,200 |
| 2 | 14,800 | 0.999 | 14,785 |
| 3 | 13,900 | 0.988 | 13,735 |
| 4 | 12,200 | 0.966 | 11,785 |
| 5 | 11,100 | 0.946 | 10,500 |
| 6 | 9,900 | 0.925 | 9,155 |
| 7 | 9,300 | 0.897 | 8,340 |
| 8 | 8,800 | 0.862 | 7,585 |
| 9 | 8,000 | 0.825 | 6,600 |
| 10 | 7,600 | 0.771 | 5,860 |
| 11 | 7,300 | 0.710 | 5,185 |
| 12 | 6,900 | 0.645 | 4,450 |
| 13 | 6,000 | 0.573 | 3,440 |
| 14 | 6,000 | 0.502 | 3,010 |
| 15 | 5,300 | 0.441 | 2,335 |
| 16 | 5,000 | 0.380 | 1,900 |
| 17 | 5,700 | 0.320 | 1,825 |
| 18 | 5,100 | 0.260 | 1,325 |
| 19 | 4,600 | 0.200 | 920 |
| 20 | 4,200 | 0.140 | 590 |
| 21 | 4,000 | 0.080 | 320 |
| 22 | 3,700 | 0.050 | 185 |
| 23 | 3,200 | 0.030 | 95 |
| 24 | 2,500 | 0.020 | 50 |
| 25 | 2,000 | 0.010 | 20 |
| Total | | | 128,195 |

Sources: Survivability from Polk NVPP, vehicles in use and Truck Inventory Use Survey. VMT from NPTS.

Table B-3. VMT 1996 to 2005 – passenger cars

| Vehicle Age Years | Vehicle Mileage | Vehicle Survivability | Weighted Mileage |
|------------------------------|----------------------------|----------------------------------|-----------------------------|
| 1 | 13,533 | 0.995 | 13,459 |
| 2 | 12,989 | 0.988 | 12,839 |
| 3 | 12,466 | 0.978 | 12,191 |
| 4 | 11,964 | 0.962 | 11,505 |
| 5 | 11,482 | 0.938 | 10,776 |
| 6 | 11,020 | 0.908 | 10,005 |
| 7 | 10,577 | 0.870 | 9,200 |
| 8 | 10,151 | 0.825 | 8,376 |
| 9 | 9,742 | 0.775 | 7,549 |
| 10 | 9,350 | 0.721 | 6,737 |
| 11 | 8,974 | 0.644 | 5,779 |
| 12 | 8,613 | 0.541 | 4,662 |
| 13 | 8,266 | 0.445 | 3,675 |
| 14 | 7,933 | 0.358 | 2,843 |
| 15 | 7,614 | 0.285 | 2,167 |
| 16 | 7,308 | 0.223 | 1,632 |
| 17 | 7,014 | 0.174 | 1,218 |
| 18 | 6,731 | 0.134 | 902 |
| 19 | 6,460 | 0.103 | 665 |
| 20 | 6,200 | 0.079 | 488 |
| Total | | | 126,668 |

Sources: Berkowitz (1995). Survivability from Polk NVPP, 1977 to 1993. VMT from RTECS.

Table B-4. VMT 1996 to 2005 – LTVs

| Vehicle Age Years | Vehicle Mileage | Vehicle Survivability | Weighted Mileage |
|------------------------------|----------------------------|----------------------------------|-----------------------------|
| 1 | 12,885 | 0.998 | 12,853 |
| 2 | 12,469 | 0.995 | 12,401 |
| 3 | 12,067 | 0.989 | 11,937 |
| 4 | 11,678 | 0.980 | 11,450 |
| 5 | 11,302 | 0.967 | 10,932 |
| 6 | 10,938 | 0.949 | 10,376 |
| 7 | 10,585 | 0.924 | 9,782 |
| 8 | 10,244 | 0.894 | 9,154 |
| 9 | 9,914 | 0.857 | 8,498 |
| 10 | 9,594 | 0.816 | 7,825 |
| 11 | 9,285 | 0.795 | 7,378 |
| 12 | 8,985 | 0.734 | 6,593 |
| 13 | 8,696 | 0.669 | 5,820 |
| 14 | 8,415 | 0.604 | 5,079 |
| 15 | 8,144 | 0.539 | 4,387 |
| 16 | 7,882 | 0.476 | 3,755 |
| 17 | 7,628 | 0.418 | 3,187 |
| 18 | 7,382 | 0.364 | 2,686 |
| 19 | 7,144 | 0.315 | 2,250 |
| 20 | 6,913 | 0.271 | 1,875 |
| 21 | 6,691 | 0.232 | 1,555 |
| 22 | 6,475 | 0.198 | 1,285 |
| 23 | 6,266 | 0.169 | 1,058 |
| 24 | 6,064 | 0.143 | 869 |
| 25 | 5,869 | 0.121 | 712 |
| Total | | | 153,697 |

Sources: Berkowitz, (1995). Survivability from Polk NVPP, 1977 to 1993. VMT from RTECS.

Table B-5. VMT 2006 to 2011 – passenger cars

| Vehicle Age Years | Vehicle Mileage | Vehicle Survivability | Weighted Mileage |
|-------------------|-----------------|-----------------------|------------------|
| 1 | 14,231 | 0.9900 | 14,089 |
| 2 | 13,961 | 0.9831 | 13,725 |
| 3 | 13,669 | 0.9731 | 13,300 |
| 4 | 13,357 | 0.9593 | 12,813 |
| 5 | 13,028 | 0.9413 | 12,262 |
| 6 | 12,683 | 0.9188 | 11,652 |
| 7 | 12,325 | 0.8918 | 10,991 |
| 8 | 11,956 | 0.8604 | 10,287 |
| 9 | 11,578 | 0.8252 | 9,554 |
| 10 | 11,193 | 0.7866 | 8,804 |
| 11 | 10,804 | 0.7170 | 7,746 |
| 12 | 10,413 | 0.6125 | 6,378 |
| 13 | 10,022 | 0.5094 | 5,105 |
| 14 | 9,633 | 0.4142 | 3,990 |
| 15 | 9,249 | 0.3308 | 3,060 |
| 16 | 8,871 | 0.2604 | 2,310 |
| 17 | 8,502 | 0.2028 | 1,724 |
| 18 | 8,144 | 0.1565 | 1,275 |
| 19 | 7,799 | 0.1200 | 936 |
| 20 | 7,469 | 0.0916 | 684 |
| 21 | 7,157 | 0.0696 | 498 |
| 22 | 6,866 | 0.0527 | 362 |
| 23 | 6,596 | 0.0399 | 263 |
| 24 | 6,350 | 0.0301 | 191 |
| 25 | 6,131 | 0.0227 | 139 |
| Total | | | 152,138 |

Sources: *Vehicle Survivability and Travel Mileage Schedules* (Lu, 2006). Survivability from Polk NVPP, 1977 to 2003. VMT from 2001 National Household Travel Survey.

Table B-6. VMT 2006 to 2011 – LTVs

| Vehicle Age Years | Vehicle Mileage | Vehicle Survivability | Weighted Mileage |
|------------------------------|----------------------------|----------------------------------|-----------------------------|
| 1 | 16,085 | 0.9741 | 15,668 |
| 2 | 15,782 | 0.9603 | 15,155 |
| 3 | 15,442 | 0.9420 | 14,547 |
| 4 | 15,069 | 0.9190 | 13,849 |
| 5 | 14,667 | 0.8913 | 13,072 |
| 6 | 14,239 | 0.8590 | 12,230 |
| 7 | 13,790 | 0.8226 | 11,343 |
| 8 | 13,323 | 0.7827 | 10,428 |
| 9 | 12,844 | 0.7401 | 9,506 |
| 10 | 12,356 | 0.6956 | 8,595 |
| 11 | 11,863 | 0.6501 | 7,712 |
| 12 | 11,369 | 0.6040 | 6,867 |
| 13 | 10,879 | 0.5517 | 6,002 |
| 14 | 10,396 | 0.5009 | 5,207 |
| 15 | 9,924 | 0.4522 | 4,488 |
| 16 | 9,468 | 0.4062 | 3,846 |
| 17 | 9,032 | 0.3633 | 3,281 |
| 18 | 8,619 | 0.3236 | 2,790 |
| 19 | 8,234 | 0.2873 | 2,366 |
| 20 | 7,881 | 0.2542 | 2,004 |
| 21 | 7,565 | 0.2244 | 1,697 |
| 22 | 7,288 | 0.1975 | 1,440 |
| 23 | 7,055 | 0.1735 | 1,224 |
| 24 | 6,871 | 0.1522 | 1,046 |
| 25 | 6,739 | 0.1332 | 898 |
| 26 | 6,663 | 0.1165 | 776 |
| 27 | 6,648 | 0.1017 | 676 |

| Vehicle Age Years | Vehicle Mileage | Vehicle Survivability | Weighted Mileage |
|--------------------------|------------------------|------------------------------|-------------------------|
| 28 | 6,648 | 0.0887 | 590 |
| 29 | 6,648 | 0.0773 | 514 |
| 30 | 6,648 | 0.0673 | 448 |
| 31 | 6,648 | 0.0586 | 389 |
| 32 | 6,648 | 0.0509 | 339 |
| 33 | 6,648 | 0.0443 | 295 |
| 34 | 6,648 | 0.0385 | 256 |
| 35 | 6,648 | 0.0344 | 222 |
| 36 | 6,648 | 0.0290 | 193 |
| Total | | | 179,959 |

Sources: *Vehicle Survivability and Travel Mileage Schedules* (Lu, 2006). Survivability from Polk NVPP, 1977 to 2003. VMT from 2001 National Household Travel Survey.

Table B-7. VMT 2012 to 2019 – passenger cars

| Vehicle Age Years | Vehicle Mileage | Vehicle Survivability | Weighted Mileage |
|------------------------------|----------------------------|----------------------------------|-----------------------------|
| 1 | 14,700 | 1.00000 | 14,700 |
| 2 | 14,252 | 0.98784 | 14,079 |
| 3 | 14,025 | 0.97659 | 13,697 |
| 4 | 13,593 | 0.96144 | 13,069 |
| 5 | 13,324 | 0.94505 | 12,592 |
| 6 | 13,064 | 0.92983 | 12,147 |
| 7 | 12,809 | 0.91130 | 11,673 |
| 8 | 11,378 | 0.89119 | 10,140 |
| 9 | 11,087 | 0.86888 | 9,633 |
| 10 | 10,806 | 0.83971 | 9,074 |
| 11 | 10,535 | 0.79989 | 8,427 |
| 12 | 10,273 | 0.75563 | 7,763 |
| 13 | 10,021 | 0.70551 | 7,070 |
| 14 | 9,779 | 0.65266 | 6,382 |
| 15 | 9,547 | 0.59458 | 5,677 |
| 16 | 9,324 | 0.53107 | 4,952 |
| 17 | 9,111 | 0.45848 | 4,177 |
| 18 | 8,908 | 0.38319 | 3,413 |
| 19 | 8,714 | 0.30772 | 2,681 |
| 20 | 8,530 | 0.24140 | 2,059 |
| 21 | 8,356 | 0.18328 | 1,532 |
| 22 | 8,192 | 0.13878 | 1,137 |
| 23 | 8,037 | 0.10657 | 856 |
| 24 | 7,892 | 0.08203 | 647 |
| 25 | 7,757 | 0.06294 | 488 |
| 26 | 7,632 | 0.05142 | 392 |
| 27 | 7,516 | 0.04195 | 315 |
| 28 | 7,410 | 0.03369 | 250 |

| Vehicle Age Years | Vehicle Mileage | Vehicle Survivability | Weighted Mileage |
|------------------------------|----------------------------|----------------------------------|-----------------------------|
| 29 | 7,314 | 0.02815 | 206 |
| 30 | 7,227 | 0.02352 | 170 |
| Total | | | 179,398 |

Sources: Survivability from Polk NVPP, 1977 to 2005. VMT from 2009 National Household Travel Survey.

Table B-8. VMT 2012 to 2019 – LTVs

| Vehicle Age Years | Vehicle Mileage | Vehicle Survivability | Weighted Mileage |
|------------------------------|----------------------------|----------------------------------|-----------------------------|
| 1 | 15,974 | 1.0000 | 15,974 |
| 2 | 15,404 | 0.9776 | 15,059 |
| 3 | 14,841 | 0.9630 | 14,292 |
| 4 | 14,435 | 0.9428 | 13,609 |
| 5 | 14,038 | 0.9311 | 13,070 |
| 6 | 13,650 | 0.9152 | 12,492 |
| 7 | 12,590 | 0.8933 | 11,246 |
| 8 | 12,192 | 0.8700 | 10,607 |
| 9 | 11,810 | 0.8411 | 9,933 |
| 10 | 11,443 | 0.7963 | 9,112 |
| 11 | 11,091 | 0.7423 | 8,233 |
| 12 | 10,755 | 0.6916 | 7,438 |
| 13 | 10,434 | 0.6410 | 6,688 |
| 14 | 10,129 | 0.5833 | 5,909 |
| 15 | 9,839 | 0.5350 | 5,264 |
| 16 | 9,564 | 0.4861 | 4,649 |
| 17 | 9,350 | 0.4422 | 4,135 |
| 18 | 9,061 | 0.3976 | 3,603 |
| 19 | 8,833 | 0.3520 | 3,109 |
| 20 | 8,620 | 0.3092 | 2,665 |
| 21 | 8,423 | 0.2666 | 2,246 |
| 22 | 8,241 | 0.2278 | 1,877 |
| 23 | 8,075 | 0.2019 | 1,630 |
| 24 | 7,923 | 0.1750 | 1,387 |
| 25 | 7,788 | 0.1584 | 1,234 |
| 26 | 7,668 | 0.1452 | 1,113 |
| 27 | 7,563 | 0.1390 | 1,052 |
| 28 | 7,473 | 0.1250 | 934 |

| Vehicle Age Years | Vehicle Mileage | Vehicle Survivability | Weighted Mileage |
|------------------------------|----------------------------|----------------------------------|-----------------------------|
| 29 | 7,399 | 0.1112 | 822 |
| 30 | 7,341 | 0.1028 | 754 |
| 31 | 7,298 | 0.0933 | 681 |
| 32 | 7,270 | 0.0835 | 607 |
| 33 | 7,258 | 0.0731 | 530 |
| 34 | 7,246 | 0.0619 | 449 |
| 35 | 7,233 | 0.0502 | 363 |
| 36 | 7,221 | 0.0384 | 277 |
| 37 | 7,209 | 0.0273 | 197 |
| Total | | | 193,240 |

Sources: Survivability from Polk NVPP, 1977 to 2005. VMT from 2009 National Household Travel Survey.

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Appendix C: Detailed Safety Benefits by Injury Level by Year

Appendix C tables show safety benefits by injury level broken out by vehicle type (passenger cars versus LTVs), technology category (CA versus CW), and attribution status (attributable to FMVSS versus voluntary).

Table C-1. Total benefits for passenger car standards – CA – reported and unreported

| Year | Fatal | MAIS5 | MAIS4 | MAIS3 | MAIS2 | MAIS1 | MAIS0 | PDO |
|-------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|------------|
| 1968 | 74 | 14 | 30 | 732 | 2,187 | 18,980 | 16,362 | 66,733 |
| 1969 | 104 | 19 | 46 | 1,077 | 3,879 | 31,831 | 26,473 | 108,071 |
| 1970 | 127 | 22 | 54 | 1,319 | 5,190 | 42,569 | 37,505 | 152,787 |
| 1971 | 154 | 24 | 64 | 1,582 | 6,334 | 58,106 | 48,270 | 195,102 |
| 1972 | 188 | 30 | 75 | 1,894 | 8,050 | 75,616 | 59,948 | 240,494 |
| 1973 | 211 | 36 | 82 | 2,019 | 8,843 | 85,809 | 65,755 | 263,541 |
| 1974 | 194 | 34 | 75 | 1,797 | 8,153 | 89,338 | 68,240 | 273,232 |
| 1975 | 227 | 40 | 84 | 1,884 | 9,306 | 105,694 | 78,278 | 315,548 |
| 1976 | 242 | 46 | 98 | 2,042 | 10,590 | 110,557 | 85,806 | 345,846 |
| 1977 | 262 | 49 | 109 | 2,311 | 12,791 | 127,723 | 97,528 | 389,311 |
| 1978 | 279 | 52 | 116 | 2,582 | 14,163 | 146,632 | 107,976 | 426,327 |
| 1979 | 287 | 55 | 115 | 2,584 | 15,016 | 163,003 | 112,236 | 440,120 |
| 1980 | 293 | 56 | 118 | 2,780 | 15,279 | 160,954 | 115,376 | 453,524 |
| 1981 | 288 | 54 | 111 | 2,818 | 14,777 | 157,850 | 117,566 | 461,736 |
| 1982 | 259 | 44 | 102 | 2,657 | 13,507 | 144,648 | 121,473 | 472,572 |
| 1983 | 254 | 43 | 103 | 2,243 | 13,970 | 149,945 | 125,361 | 490,663 |
| 1984 | 267 | 45 | 105 | 2,329 | 15,374 | 144,150 | 130,327 | 505,192 |
| 1985 | 272 | 46 | 117 | 2,665 | 15,763 | 139,819 | 131,194 | 520,273 |
| 1986 | 300 | 52 | 127 | 3,097 | 19,332 | 143,014 | 141,047 | 552,262 |
| 1987 | 308 | 53 | 126 | 3,166 | 19,854 | 143,813 | 150,423 | 592,937 |
| 1988 | 319 | 55 | 130 | 3,269 | 19,991 | 147,535 | 160,884 | 630,413 |
| 1989 | 308 | 56 | 125 | 2,857 | 17,946 | 141,050 | 164,819 | 616,069 |
| 1990 | 301 | 59 | 127 | 2,891 | 17,136 | 131,051 | 174,815 | 660,526 |
| 1991 | 286 | 55 | 129 | 3,001 | 18,092 | 129,572 | 175,862 | 652,725 |
| 1992 | 274 | 53 | 156 | 2,981 | 22,135 | 143,887 | 179,284 | 649,692 |
| 1993 | 284 | 56 | 160 | 4,033 | 26,981 | 159,765 | 194,241 | 685,114 |
| 1994 | 289 | 56 | 156 | 3,713 | 28,575 | 180,449 | 210,246 | 751,847 |

| Year | Fatal | MAIS5 | MAIS4 | MAIS3 | MAIS2 | MAIS1 | MAIS0 | PDO |
|-------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|------------|
| 1995 | 296 | 56 | 137 | 3,923 | 28,713 | 212,949 | 239,016 | 850,946 |
| 1996 | 304 | 53 | 137 | 3,839 | 24,278 | 241,325 | 251,048 | 870,054 |
| 1997 | 302 | 54 | 137 | 4,003 | 23,471 | 241,731 | 247,988 | 899,832 |
| 1998 | 299 | 63 | 145 | 4,490 | 21,005 | 222,306 | 226,997 | 871,406 |
| 1999 | 302 | 64 | 157 | 3,635 | 25,539 | 208,545 | 217,031 | 841,689 |
| 2000 | 325 | 69 | 173 | 3,864 | 27,936 | 196,614 | 229,701 | 902,616 |
| 2001 | 352 | 63 | 198 | 3,701 | 31,044 | 190,098 | 225,210 | 911,030 |
| 2002 | 370 | 75 | 233 | 4,107 | 32,072 | 184,407 | 216,961 | 924,274 |
| 2003 | 395 | 174 | 634 | 4,206 | 26,665 | 181,764 | 225,947 | 947,694 |
| 2004 | 423 | 156 | 640 | 4,256 | 23,853 | 176,958 | 212,917 | 939,845 |
| 2005 | 477 | 193 | 607 | 3,939 | 21,839 | 165,573 | 196,924 | 946,437 |
| 2006 | 509 | 100 | 318 | 4,312 | 22,757 | 161,006 | 189,873 | 927,003 |
| 2007 | 580 | 96 | 333 | 4,169 | 25,329 | 165,593 | 189,167 | 938,659 |
| 2008 | 578 | 98 | 311 | 4,055 | 23,949 | 168,659 | 186,701 | 944,143 |
| 2009 | 568 | 110 | 354 | 4,049 | 21,798 | 169,821 | 176,569 | 895,437 |
| 2010 | 647 | 319 | 355 | 3,980 | 21,596 | 181,326 | 186,375 | 971,481 |
| 2011 | 731 | 467 | 510 | 4,508 | 21,765 | 186,252 | 180,748 | 1,000,241 |
| 2012 | 915 | 431 | 761 | 4,856 | 23,631 | 211,829 | 207,985 | 1,117,266 |
| 2013 | 1,068 | 287 | 653 | 5,381 | 25,639 | 219,208 | 221,587 | 1,209,023 |
| 2014 | 1,304 | 325 | 802 | 5,658 | 28,286 | 247,538 | 257,193 | 1,393,946 |
| 2015 | 1,643 | 262 | 865 | 6,800 | 36,624 | 281,924 | 293,224 | 1,586,696 |
| 2016 | 1,839 | 370 | 1,122 | 9,004 | 41,388 | 310,158 | 327,308 | 1,598,838 |
| 2017 | 2,113 | 391 | 1,200 | 9,926 | 43,498 | 322,373 | 315,768 | 1,630,685 |
| 2018 | 2,216 | 421 | 1,384 | 11,421 | 44,782 | 329,884 | 314,964 | 1,749,173 |
| 2019 | 2,296 | 423 | 1,436 | 11,611 | 44,696 | 335,137 | 323,414 | 1,837,968 |

Table C-2. Voluntary benefits for passenger car standards – CA – reported and unreported

| Year | Fatal | MAIS5 | MAIS4 | MAIS3 | MAIS2 | MAIS1 | MAIS0 | PDO |
|-------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|------------|
| 1968 | 74 | 14 | 30 | 476 | 1,598 | 13,315 | 11,842 | 48,297 |
| 1969 | 104 | 19 | 46 | 631 | 2,181 | 17,653 | 15,953 | 65,124 |
| 1970 | 127 | 22 | 54 | 727 | 2,608 | 22,403 | 20,089 | 81,840 |
| 1971 | 154 | 24 | 64 | 879 | 3,128 | 27,489 | 23,815 | 96,257 |
| 1972 | 188 | 30 | 75 | 1,065 | 3,766 | 33,554 | 27,951 | 112,132 |
| 1973 | 211 | 36 | 82 | 1,118 | 4,103 | 35,386 | 30,149 | 120,833 |
| 1974 | 194 | 34 | 75 | 963 | 3,590 | 35,039 | 30,946 | 123,908 |
| 1975 | 227 | 40 | 84 | 1,056 | 4,114 | 39,091 | 35,331 | 142,423 |
| 1976 | 242 | 46 | 98 | 1,176 | 4,514 | 41,712 | 38,590 | 155,538 |
| 1977 | 262 | 49 | 109 | 1,308 | 5,040 | 46,395 | 43,131 | 172,170 |
| 1978 | 279 | 52 | 116 | 1,418 | 5,483 | 50,856 | 46,960 | 185,415 |
| 1979 | 287 | 55 | 115 | 1,439 | 5,626 | 53,535 | 48,057 | 188,449 |
| 1980 | 293 | 56 | 118 | 1,490 | 5,704 | 52,856 | 48,924 | 192,313 |
| 1981 | 288 | 54 | 111 | 1,517 | 5,640 | 52,387 | 49,773 | 195,479 |
| 1982 | 259 | 44 | 102 | 1,370 | 5,136 | 47,771 | 51,309 | 199,608 |
| 1983 | 254 | 43 | 103 | 1,299 | 5,159 | 48,925 | 52,889 | 207,006 |
| 1984 | 267 | 45 | 105 | 1,360 | 5,463 | 47,924 | 54,874 | 212,709 |
| 1985 | 272 | 46 | 117 | 1,460 | 5,700 | 47,660 | 55,104 | 218,524 |
| 1986 | 300 | 52 | 127 | 1,677 | 6,686 | 49,594 | 57,224 | 224,058 |
| 1987 | 308 | 53 | 126 | 1,710 | 6,879 | 48,807 | 58,464 | 230,453 |
| 1988 | 319 | 55 | 130 | 1,801 | 7,084 | 48,848 | 60,169 | 235,767 |
| 1989 | 308 | 56 | 125 | 1,732 | 6,694 | 46,263 | 59,340 | 221,805 |
| 1990 | 301 | 59 | 127 | 1,685 | 6,525 | 43,879 | 59,777 | 225,863 |
| 1991 | 286 | 55 | 129 | 1,634 | 6,538 | 43,730 | 58,867 | 218,488 |
| 1992 | 274 | 53 | 156 | 1,635 | 7,193 | 47,768 | 61,863 | 224,180 |
| 1993 | 284 | 56 | 160 | 1,911 | 8,989 | 54,185 | 69,017 | 243,433 |
| 1994 | 289 | 56 | 156 | 1,905 | 9,924 | 63,084 | 77,939 | 278,712 |
| 1995 | 296 | 56 | 137 | 1,985 | 10,470 | 81,571 | 92,347 | 328,774 |
| 1996 | 304 | 53 | 137 | 2,045 | 10,238 | 94,201 | 101,909 | 353,185 |

| Year | Fatal | MAIS5 | MAIS4 | MAIS3 | MAIS2 | MAIS1 | MAIS0 | PDO |
|-------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|------------|
| 1997 | 302 | 54 | 137 | 2,093 | 10,806 | 101,268 | 102,772 | 372,912 |
| 1998 | 299 | 63 | 145 | 2,471 | 10,219 | 96,507 | 100,097 | 384,258 |
| 1999 | 302 | 64 | 157 | 2,359 | 12,099 | 93,500 | 106,310 | 412,292 |
| 2000 | 325 | 69 | 173 | 2,544 | 13,603 | 95,553 | 118,397 | 465,244 |
| 2001 | 352 | 63 | 198 | 2,501 | 14,042 | 101,881 | 118,412 | 479,008 |
| 2002 | 370 | 75 | 233 | 2,666 | 15,600 | 103,349 | 116,338 | 495,609 |
| 2003 | 395 | 174 | 634 | 2,991 | 13,623 | 100,650 | 126,622 | 531,093 |
| 2004 | 423 | 156 | 640 | 2,937 | 12,796 | 98,420 | 120,991 | 534,070 |
| 2005 | 477 | 193 | 607 | 2,736 | 12,513 | 93,493 | 116,243 | 558,676 |
| 2006 | 508 | 100 | 318 | 3,012 | 12,872 | 93,848 | 115,608 | 564,421 |
| 2007 | 576 | 94 | 327 | 3,009 | 14,453 | 97,528 | 118,158 | 586,309 |
| 2008 | 560 | 92 | 274 | 2,958 | 13,910 | 99,351 | 117,532 | 594,357 |
| 2009 | 530 | 94 | 285 | 2,889 | 12,892 | 99,184 | 110,693 | 561,360 |
| 2010 | 548 | 266 | 293 | 2,762 | 12,280 | 103,430 | 114,159 | 595,057 |
| 2011 | 566 | 376 | 348 | 3,185 | 12,487 | 102,508 | 108,389 | 599,814 |
| 2012 | 636 | 363 | 409 | 3,542 | 13,000 | 112,311 | 121,249 | 651,334 |
| 2013 | 663 | 144 | 332 | 3,434 | 13,287 | 113,972 | 125,407 | 684,244 |
| 2014 | 748 | 145 | 364 | 3,412 | 15,286 | 130,032 | 140,817 | 763,204 |
| 2015 | 848 | 126 | 407 | 3,491 | 18,774 | 146,167 | 154,394 | 835,456 |
| 2016 | 951 | 163 | 462 | 4,259 | 19,804 | 157,988 | 169,520 | 828,074 |
| 2017 | 1,002 | 167 | 475 | 4,416 | 20,508 | 160,465 | 159,954 | 826,034 |
| 2018 | 993 | 164 | 496 | 4,635 | 20,874 | 161,660 | 153,334 | 851,550 |
| 2019 | 984 | 161 | 496 | 4,542 | 20,391 | 161,069 | 156,574 | 889,812 |

Table C-3. Attributable benefits for passenger car standards – CA – reported and unreported

| Year | Fatal | MAIS5 | MAIS4 | MAIS3 | MAIS2 | MAIS1 | MAIS0 | PDO |
|-------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|------------|
| 1968 | - | - | - | 257 | 589 | 5,665 | 4,520 | 18,436 |
| 1969 | - | - | - | 447 | 1,697 | 14,178 | 10,520 | 42,947 |
| 1970 | - | - | - | 592 | 2,582 | 20,165 | 17,415 | 70,947 |
| 1971 | - | - | - | 703 | 3,207 | 30,617 | 24,455 | 98,845 |
| 1972 | - | - | - | 830 | 4,285 | 42,062 | 31,997 | 128,362 |
| 1973 | - | - | - | 901 | 4,741 | 50,423 | 35,607 | 142,709 |
| 1974 | - | - | - | 834 | 4,562 | 54,299 | 37,293 | 149,323 |
| 1975 | - | - | - | 829 | 5,192 | 66,603 | 42,947 | 173,126 |
| 1976 | - | - | - | 866 | 6,077 | 68,846 | 47,216 | 190,308 |
| 1977 | - | - | - | 1,004 | 7,751 | 81,328 | 54,397 | 217,141 |
| 1978 | - | - | - | 1,164 | 8,680 | 95,776 | 61,016 | 240,912 |
| 1979 | - | - | - | 1,145 | 9,390 | 109,468 | 64,179 | 251,672 |
| 1980 | - | - | - | 1,290 | 9,575 | 108,098 | 66,452 | 261,211 |
| 1981 | - | - | - | 1,302 | 9,137 | 105,463 | 67,794 | 266,256 |
| 1982 | - | - | - | 1,286 | 8,371 | 96,876 | 70,165 | 272,964 |
| 1983 | - | - | - | 944 | 8,810 | 101,020 | 72,472 | 283,657 |
| 1984 | - | - | - | 969 | 9,911 | 96,226 | 75,454 | 292,483 |
| 1985 | - | - | - | 1,206 | 10,063 | 92,159 | 76,090 | 301,749 |
| 1986 | - | - | - | 1,420 | 12,646 | 93,420 | 83,823 | 328,204 |
| 1987 | - | - | - | 1,456 | 12,975 | 95,006 | 91,959 | 362,484 |
| 1988 | - | - | - | 1,467 | 12,907 | 98,687 | 100,715 | 394,645 |
| 1989 | - | - | - | 1,125 | 11,251 | 94,787 | 105,479 | 394,264 |
| 1990 | - | - | - | 1,206 | 10,610 | 87,171 | 115,038 | 434,663 |
| 1991 | - | - | - | 1,366 | 11,555 | 85,842 | 116,995 | 434,237 |
| 1992 | - | - | - | 1,346 | 14,941 | 96,119 | 117,421 | 425,512 |
| 1993 | - | - | - | 2,121 | 17,992 | 105,580 | 125,224 | 441,682 |
| 1994 | - | - | - | 1,807 | 18,651 | 117,365 | 132,308 | 473,135 |
| 1995 | - | - | - | 1,939 | 18,243 | 131,377 | 146,669 | 522,172 |
| 1996 | - | - | - | 1,795 | 14,040 | 147,124 | 149,139 | 516,869 |

| Year | Fatal | MAIS5 | MAIS4 | MAIS3 | MAIS2 | MAIS1 | MAIS0 | PDO |
|-------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|------------|
| 1997 | - | - | - | 1,910 | 12,665 | 140,463 | 145,216 | 526,920 |
| 1998 | - | - | - | 2,018 | 10,786 | 125,799 | 126,900 | 487,148 |
| 1999 | - | - | - | 1,276 | 13,439 | 115,045 | 110,721 | 429,397 |
| 2000 | - | - | - | 1,320 | 14,333 | 101,061 | 111,304 | 437,373 |
| 2001 | - | - | - | 1,200 | 17,002 | 88,217 | 106,797 | 432,022 |
| 2002 | 0 | - | - | 1,440 | 16,472 | 81,058 | 100,623 | 428,665 |
| 2003 | - | - | - | 1,215 | 13,042 | 81,114 | 99,325 | 416,601 |
| 2004 | 0 | - | 0 | 1,319 | 11,058 | 78,537 | 91,926 | 405,775 |
| 2005 | 0 | - | 0 | 1,203 | 9,325 | 72,080 | 80,681 | 387,761 |
| 2006 | 0 | - | 0 | 1,300 | 9,885 | 67,158 | 74,266 | 362,582 |
| 2007 | 4 | 2 | 6 | 1,160 | 10,876 | 68,065 | 71,009 | 352,351 |
| 2008 | 18 | 6 | 37 | 1,097 | 10,039 | 69,308 | 69,169 | 349,786 |
| 2009 | 38 | 15 | 69 | 1,160 | 8,907 | 70,637 | 65,876 | 334,077 |
| 2010 | 99 | 53 | 62 | 1,218 | 9,317 | 77,896 | 72,215 | 376,424 |
| 2011 | 165 | 91 | 161 | 1,323 | 9,279 | 83,744 | 72,359 | 400,427 |
| 2012 | 279 | 68 | 351 | 1,314 | 10,631 | 99,517 | 86,736 | 465,932 |
| 2013 | 405 | 143 | 320 | 1,947 | 12,352 | 105,236 | 96,180 | 524,779 |
| 2014 | 556 | 180 | 439 | 2,246 | 13,000 | 117,506 | 116,376 | 630,741 |
| 2015 | 795 | 136 | 457 | 3,309 | 17,851 | 135,757 | 138,830 | 751,239 |
| 2016 | 888 | 207 | 661 | 4,744 | 21,584 | 152,170 | 157,788 | 770,764 |
| 2017 | 1,110 | 224 | 725 | 5,510 | 22,990 | 161,909 | 155,814 | 804,651 |
| 2018 | 1,223 | 256 | 888 | 6,786 | 23,908 | 168,224 | 161,630 | 897,622 |
| 2019 | 1,312 | 262 | 940 | 7,069 | 24,305 | 174,068 | 166,840 | 948,155 |

Table C-4. Total benefits for passenger car standards – CW – reported and unreported

| Year | Fatal | MAIS5 | MAIS4 | MAIS3 | MAIS2 | MAIS1 | MAIS0 | PDO |
|-------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|------------|
| 1968 | 646 | 299 | 467 | 5,403 | 17,919 | 25,537 | 0 | 0 |
| 1969 | 942 | 349 | 838 | 8,177 | 31,712 | 39,179 | 0 | 0 |
| 1970 | 1,160 | 402 | 1,059 | 9,329 | 43,603 | 56,032 | 0 | 0 |
| 1971 | 1,430 | 374 | 1,237 | 11,109 | 51,500 | 68,034 | 0 | 0 |
| 1972 | 1,807 | 435 | 1,478 | 12,734 | 62,408 | 87,459 | 0 | 0 |
| 1973 | 2,085 | 594 | 1,496 | 14,316 | 63,672 | 93,710 | 0 | 0 |
| 1974 | 2,040 | 802 | 1,626 | 12,485 | 54,301 | 99,370 | 0 | 0 |
| 1975 | 2,508 | 943 | 2,070 | 13,177 | 57,923 | 108,263 | 0 | 0 |
| 1976 | 2,635 | 1,136 | 2,512 | 14,866 | 61,045 | 115,338 | 0 | 0 |
| 1977 | 2,943 | 1,221 | 2,951 | 17,928 | 68,628 | 128,341 | 0 | 0 |
| 1978 | 3,200 | 1,224 | 2,951 | 20,227 | 75,633 | 147,248 | 0 | 0 |
| 1979 | 3,356 | 1,297 | 2,674 | 22,024 | 82,766 | 154,499 | 0 | 0 |
| 1980 | 3,584 | 1,306 | 2,547 | 23,123 | 86,121 | 153,863 | 0 | 0 |
| 1981 | 3,487 | 1,219 | 2,639 | 25,029 | 84,918 | 153,923 | 0 | 0 |
| 1982 | 3,178 | 885 | 2,653 | 23,546 | 80,574 | 144,727 | 0 | 0 |
| 1983 | 3,319 | 947 | 2,947 | 23,416 | 78,923 | 151,014 | 0 | 0 |
| 1984 | 3,723 | 780 | 2,888 | 24,687 | 87,835 | 158,427 | 0 | 0 |
| 1985 | 4,976 | 1,072 | 3,388 | 32,376 | 113,662 | 182,961 | 0 | 0 |
| 1986 | 6,578 | 1,628 | 4,193 | 45,623 | 150,324 | 222,013 | 0 | 0 |
| 1987 | 7,549 | 1,644 | 4,078 | 47,581 | 161,427 | 225,633 | 0 | 0 |
| 1988 | 8,497 | 1,795 | 4,670 | 59,334 | 179,781 | 245,983 | 0 | 0 |
| 1989 | 8,484 | 2,017 | 4,734 | 62,254 | 193,407 | 249,788 | 0 | 0 |
| 1990 | 8,520 | 2,124 | 5,091 | 64,331 | 214,683 | 260,320 | 0 | 0 |
| 1991 | 8,799 | 2,197 | 5,787 | 59,853 | 209,045 | 249,868 | 0 | 0 |
| 1992 | 8,873 | 2,800 | 9,813 | 63,648 | 205,500 | 265,033 | 0 | 0 |
| 1993 | 9,788 | 3,366 | 10,190 | 66,202 | 181,026 | 283,622 | 0 | 0 |
| 1994 | 10,494 | 2,817 | 9,290 | 63,486 | 181,538 | 304,954 | 0 | 0 |
| 1995 | 11,021 | 2,112 | 6,473 | 59,613 | 195,762 | 343,402 | 0 | 0 |
| 1996 | 11,991 | 1,696 | 6,075 | 66,882 | 216,558 | 357,698 | 0 | 0 |

| Year | Fatal | MAIS5 | MAIS4 | MAIS3 | MAIS2 | MAIS1 | MAIS0 | PDO |
|-------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|------------|
| 1997 | 12,104 | 2,087 | 5,470 | 69,332 | 226,720 | 345,075 | 0 | 0 |
| 1998 | 12,316 | 3,188 | 5,630 | 74,162 | 226,081 | 342,871 | 0 | 0 |
| 1999 | 12,491 | 3,340 | 6,340 | 66,830 | 230,612 | 333,225 | 0 | 0 |
| 2000 | 13,280 | 3,826 | 7,722 | 75,589 | 234,325 | 327,569 | 0 | 0 |
| 2001 | 13,910 | 2,906 | 8,553 | 84,215 | 242,273 | 287,993 | 0 | 0 |
| 2002 | 14,845 | 3,331 | 12,244 | 91,512 | 264,438 | 277,591 | 0 | 0 |
| 2003 | 15,284 | 3,523 | 14,436 | 88,627 | 257,033 | 279,094 | 0 | 0 |
| 2004 | 15,430 | 3,422 | 14,082 | 81,721 | 253,923 | 284,411 | 0 | 0 |
| 2005 | 16,142 | 3,016 | 14,424 | 79,459 | 237,385 | 269,447 | 0 | 0 |
| 2006 | 16,180 | 2,882 | 12,879 | 80,654 | 231,303 | 250,648 | 0 | 0 |
| 2007 | 16,120 | 3,217 | 12,755 | 77,414 | 211,668 | 233,476 | 0 | 0 |
| 2008 | 14,524 | 3,423 | 11,755 | 72,630 | 192,572 | 231,705 | 0 | 0 |
| 2009 | 13,760 | 3,076 | 10,360 | 64,675 | 182,728 | 221,018 | 0 | 0 |
| 2010 | 13,520 | 4,601 | 9,914 | 60,695 | 182,853 | 240,819 | 0 | 0 |
| 2011 | 13,043 | 5,597 | 10,469 | 57,166 | 179,180 | 247,259 | 0 | 0 |
| 2012 | 13,814 | 5,586 | 10,926 | 62,403 | 185,613 | 264,780 | 0 | 0 |
| 2013 | 14,250 | 4,531 | 10,346 | 63,396 | 188,441 | 261,460 | 0 | 0 |
| 2014 | 14,851 | 3,501 | 11,061 | 64,160 | 192,001 | 268,989 | 0 | 0 |
| 2015 | 16,546 | 3,375 | 11,590 | 74,563 | 206,737 | 292,508 | 0 | 0 |
| 2016 | 17,736 | 4,271 | 12,792 | 77,509 | 221,871 | 294,986 | 0 | 0 |
| 2017 | 18,462 | 4,381 | 12,914 | 77,899 | 223,812 | 300,904 | 0 | 0 |
| 2018 | 17,877 | 4,320 | 13,018 | 76,395 | 220,469 | 300,722 | 0 | 0 |
| 2019 | 17,181 | 4,133 | 12,804 | 73,312 | 211,736 | 294,461 | 0 | 0 |

Table C-5. Voluntary benefits for passenger car standards – CW – reported and unreported

| Year | Fatal | MAIS5 | MAIS4 | MAIS3 | MAIS2 | MAIS1 | MAIS0 | PDO |
|-------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|------------|
| 1968 | 523 | 198 | 281 | 3,866 | 15,676 | 18,834 | 0 | 0 |
| 1969 | 723 | 199 | 481 | 5,696 | 27,374 | 25,046 | 0 | 0 |
| 1970 | 865 | 259 | 703 | 5,999 | 38,403 | 30,698 | 0 | 0 |
| 1971 | 1,044 | 227 | 877 | 7,336 | 44,851 | 36,340 | 0 | 0 |
| 1972 | 1,283 | 268 | 1,021 | 8,115 | 54,422 | 43,195 | 0 | 0 |
| 1973 | 1,436 | 411 | 1,018 | 9,315 | 54,730 | 44,451 | 0 | 0 |
| 1974 | 1,332 | 585 | 1,165 | 7,954 | 45,848 | 43,669 | 0 | 0 |
| 1975 | 1,538 | 652 | 1,605 | 7,683 | 48,140 | 47,077 | 0 | 0 |
| 1976 | 1,642 | 830 | 1,900 | 8,561 | 49,671 | 50,497 | 0 | 0 |
| 1977 | 1,862 | 843 | 2,164 | 10,547 | 54,782 | 56,992 | 0 | 0 |
| 1978 | 2,023 | 810 | 2,115 | 11,592 | 59,364 | 64,154 | 0 | 0 |
| 1979 | 2,142 | 803 | 1,890 | 12,257 | 63,784 | 65,262 | 0 | 0 |
| 1980 | 2,271 | 782 | 1,770 | 12,452 | 66,118 | 64,969 | 0 | 0 |
| 1981 | 2,222 | 748 | 1,954 | 12,857 | 63,165 | 65,898 | 0 | 0 |
| 1982 | 1,989 | 536 | 2,028 | 12,219 | 56,023 | 60,288 | 0 | 0 |
| 1983 | 2,001 | 590 | 2,347 | 11,813 | 51,250 | 61,981 | 0 | 0 |
| 1984 | 2,123 | 406 | 2,198 | 11,058 | 54,820 | 62,595 | 0 | 0 |
| 1985 | 2,528 | 475 | 1,853 | 13,361 | 61,116 | 69,850 | 0 | 0 |
| 1986 | 3,127 | 816 | 2,130 | 17,377 | 72,543 | 78,662 | 0 | 0 |
| 1987 | 3,461 | 825 | 2,087 | 18,194 | 77,566 | 78,571 | 0 | 0 |
| 1988 | 3,804 | 854 | 2,371 | 22,590 | 84,408 | 84,229 | 0 | 0 |
| 1989 | 3,764 | 953 | 2,443 | 24,033 | 92,800 | 85,741 | 0 | 0 |
| 1990 | 3,717 | 756 | 2,441 | 27,417 | 109,141 | 86,133 | 0 | 0 |
| 1991 | 3,697 | 745 | 2,703 | 26,127 | 103,637 | 79,863 | 0 | 0 |
| 1992 | 3,659 | 1,066 | 3,763 | 28,910 | 95,326 | 81,295 | 0 | 0 |
| 1993 | 3,874 | 1,172 | 4,769 | 24,634 | 70,915 | 83,449 | 0 | 0 |
| 1994 | 4,083 | 984 | 4,211 | 22,391 | 68,969 | 90,315 | 0 | 0 |
| 1995 | 4,231 | 672 | 3,354 | 20,300 | 73,992 | 109,227 | 0 | 0 |
| 1996 | 4,457 | 538 | 2,305 | 25,640 | 87,757 | 123,862 | 0 | 0 |

| Year | Fatal | MAIS5 | MAIS4 | MAIS3 | MAIS2 | MAIS1 | MAIS0 | PDO |
|-------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|------------|
| 1997 | 4,433 | 658 | 2,147 | 26,401 | 90,981 | 116,579 | 0 | 0 |
| 1998 | 4,451 | 948 | 2,070 | 26,970 | 86,290 | 121,238 | 0 | 0 |
| 1999 | 4,353 | 1,054 | 2,153 | 21,880 | 79,373 | 91,006 | 0 | 0 |
| 2000 | 4,586 | 1,267 | 2,394 | 25,193 | 79,125 | 90,438 | 0 | 0 |
| 2001 | 4,748 | 939 | 2,577 | 27,221 | 86,283 | 80,828 | 0 | 0 |
| 2002 | 5,004 | 1,235 | 4,043 | 30,121 | 100,057 | 76,651 | 0 | 0 |
| 2003 | 5,014 | 1,181 | 4,627 | 28,865 | 98,328 | 75,894 | 0 | 0 |
| 2004 | 5,027 | 1,230 | 4,558 | 25,786 | 91,291 | 70,995 | 0 | 0 |
| 2005 | 5,275 | 920 | 4,739 | 24,341 | 85,052 | 67,261 | 0 | 0 |
| 2006 | 5,245 | 869 | 4,239 | 25,012 | 83,616 | 62,186 | 0 | 0 |
| 2007 | 5,235 | 1,025 | 4,219 | 24,125 | 80,675 | 58,630 | 0 | 0 |
| 2008 | 4,685 | 1,079 | 4,004 | 22,569 | 73,911 | 59,072 | 0 | 0 |
| 2009 | 4,422 | 997 | 3,571 | 19,964 | 70,064 | 55,673 | 0 | 0 |
| 2010 | 4,315 | 1,525 | 3,379 | 19,029 | 70,296 | 58,942 | 0 | 0 |
| 2011 | 4,167 | 1,913 | 3,430 | 17,851 | 68,262 | 60,057 | 0 | 0 |
| 2012 | 4,408 | 1,837 | 3,524 | 20,538 | 66,597 | 65,425 | 0 | 0 |
| 2013 | 4,539 | 1,575 | 3,386 | 21,700 | 68,249 | 65,968 | 0 | 0 |
| 2014 | 4,726 | 1,053 | 3,944 | 22,947 | 70,658 | 69,721 | 0 | 0 |
| 2015 | 5,259 | 970 | 4,183 | 25,162 | 78,139 | 75,309 | 0 | 0 |
| 2016 | 5,587 | 1,286 | 4,477 | 26,223 | 85,296 | 78,673 | 0 | 0 |
| 2017 | 5,839 | 1,317 | 4,493 | 26,379 | 86,308 | 80,344 | 0 | 0 |
| 2018 | 5,672 | 1,299 | 4,502 | 26,097 | 85,633 | 78,988 | 0 | 0 |
| 2019 | 5,379 | 1,235 | 4,425 | 25,209 | 82,056 | 78,705 | 0 | 0 |

Table C-6. Attributable benefits for passenger car standards – CW – reported and unreported

| Year | Fatal | MAIS5 | MAIS4 | MAIS3 | MAIS2 | MAIS1 | MAIS0 | PDO |
|-------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|------------|
| 1968 | 123 | 101 | 186 | 1,537 | 2,243 | 6,703 | 0 | 0 |
| 1969 | 218 | 150 | 357 | 2,481 | 4,338 | 14,133 | 0 | 0 |
| 1970 | 296 | 143 | 356 | 3,329 | 5,200 | 25,334 | 0 | 0 |
| 1971 | 387 | 147 | 360 | 3,773 | 6,649 | 31,693 | 0 | 0 |
| 1972 | 524 | 167 | 457 | 4,619 | 7,986 | 44,263 | 0 | 0 |
| 1973 | 648 | 183 | 478 | 5,001 | 8,941 | 49,259 | 0 | 0 |
| 1974 | 709 | 217 | 460 | 4,531 | 8,453 | 55,701 | 0 | 0 |
| 1975 | 970 | 292 | 465 | 5,494 | 9,783 | 61,187 | 0 | 0 |
| 1976 | 992 | 306 | 611 | 6,306 | 11,374 | 64,841 | 0 | 0 |
| 1977 | 1,081 | 378 | 787 | 7,381 | 13,846 | 71,350 | 0 | 0 |
| 1978 | 1,177 | 413 | 837 | 8,635 | 16,268 | 83,094 | 0 | 0 |
| 1979 | 1,214 | 494 | 784 | 9,767 | 18,983 | 89,237 | 0 | 0 |
| 1980 | 1,313 | 523 | 777 | 10,671 | 20,003 | 88,894 | 0 | 0 |
| 1981 | 1,264 | 471 | 685 | 12,172 | 21,753 | 88,025 | 0 | 0 |
| 1982 | 1,189 | 349 | 625 | 11,327 | 24,550 | 84,439 | 0 | 0 |
| 1983 | 1,318 | 357 | 599 | 11,603 | 27,672 | 89,034 | 0 | 0 |
| 1984 | 1,600 | 374 | 691 | 13,629 | 33,014 | 95,832 | 0 | 0 |
| 1985 | 2,448 | 598 | 1,535 | 19,014 | 52,547 | 113,111 | 0 | 0 |
| 1986 | 3,451 | 813 | 2,063 | 28,245 | 77,781 | 143,351 | 0 | 0 |
| 1987 | 4,087 | 818 | 1,991 | 29,386 | 83,861 | 147,062 | 0 | 0 |
| 1988 | 4,693 | 941 | 2,299 | 36,745 | 95,373 | 161,754 | 0 | 0 |
| 1989 | 4,720 | 1,064 | 2,291 | 38,221 | 100,607 | 164,046 | 0 | 0 |
| 1990 | 4,803 | 1,368 | 2,649 | 36,914 | 105,543 | 174,188 | 0 | 0 |
| 1991 | 5,102 | 1,451 | 3,083 | 33,726 | 105,409 | 170,005 | 0 | 0 |
| 1992 | 5,214 | 1,734 | 6,051 | 34,738 | 110,174 | 183,738 | 0 | 0 |
| 1993 | 5,914 | 2,193 | 5,422 | 41,568 | 110,112 | 200,173 | 0 | 0 |
| 1994 | 6,411 | 1,833 | 5,080 | 41,095 | 112,569 | 214,639 | 0 | 0 |
| 1995 | 6,790 | 1,440 | 3,118 | 39,313 | 121,770 | 234,175 | 0 | 0 |
| 1996 | 7,534 | 1,158 | 3,770 | 41,242 | 128,800 | 233,836 | 0 | 0 |

| Year | Fatal | MAIS5 | MAIS4 | MAIS3 | MAIS2 | MAIS1 | MAIS0 | PDO |
|-------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|------------|
| 1997 | 7,671 | 1,430 | 3,323 | 42,931 | 135,740 | 228,497 | 0 | 0 |
| 1998 | 7,865 | 2,240 | 3,560 | 47,192 | 139,791 | 221,633 | 0 | 0 |
| 1999 | 8,138 | 2,286 | 4,187 | 44,951 | 151,239 | 242,219 | 0 | 0 |
| 2000 | 8,694 | 2,559 | 5,329 | 50,396 | 155,200 | 237,131 | 0 | 0 |
| 2001 | 9,162 | 1,968 | 5,976 | 56,994 | 155,990 | 207,164 | 0 | 0 |
| 2002 | 9,841 | 2,097 | 8,200 | 61,391 | 164,381 | 200,940 | 0 | 0 |
| 2003 | 10,270 | 2,342 | 9,809 | 59,763 | 158,705 | 203,201 | 0 | 0 |
| 2004 | 10,403 | 2,192 | 9,524 | 55,935 | 162,632 | 213,416 | 0 | 0 |
| 2005 | 10,867 | 2,096 | 9,685 | 55,119 | 152,333 | 202,185 | 0 | 0 |
| 2006 | 10,935 | 2,013 | 8,640 | 55,643 | 147,687 | 188,463 | 0 | 0 |
| 2007 | 10,885 | 2,192 | 8,535 | 53,290 | 130,993 | 174,846 | 0 | 0 |
| 2008 | 9,839 | 2,345 | 7,751 | 50,061 | 118,661 | 172,634 | 0 | 0 |
| 2009 | 9,339 | 2,079 | 6,790 | 44,711 | 112,664 | 165,345 | 0 | 0 |
| 2010 | 9,205 | 3,076 | 6,536 | 41,666 | 112,557 | 181,877 | 0 | 0 |
| 2011 | 8,876 | 3,684 | 7,039 | 39,315 | 110,918 | 187,202 | 0 | 0 |
| 2012 | 9,407 | 3,749 | 7,401 | 41,864 | 119,016 | 199,355 | 0 | 0 |
| 2013 | 9,711 | 2,956 | 6,959 | 41,696 | 120,192 | 195,492 | 0 | 0 |
| 2014 | 10,125 | 2,448 | 7,118 | 41,213 | 121,343 | 199,268 | 0 | 0 |
| 2015 | 11,287 | 2,406 | 7,406 | 49,401 | 128,599 | 217,198 | 0 | 0 |
| 2016 | 12,149 | 2,985 | 8,315 | 51,286 | 136,576 | 216,313 | 0 | 0 |
| 2017 | 12,623 | 3,063 | 8,420 | 51,520 | 137,504 | 220,560 | 0 | 0 |
| 2018 | 12,205 | 3,021 | 8,516 | 50,298 | 134,835 | 221,734 | 0 | 0 |
| 2019 | 11,802 | 2,898 | 8,379 | 48,103 | 129,680 | 215,756 | 0 | 0 |

Table C-7. Total benefits for passenger car standards – reported and unreported

| Year | Fatal | MAIS5 | MAIS4 | MAIS3 | MAIS2 | MAIS1 | MAIS0 | PDO |
|-------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|------------|
| 1968 | 720 | 313 | 497 | 6,135 | 20,106 | 44,517 | 16,362 | 66,733 |
| 1969 | 1,046 | 369 | 883 | 9,254 | 35,591 | 71,010 | 26,473 | 108,071 |
| 1970 | 1,288 | 424 | 1,114 | 10,648 | 48,792 | 98,601 | 37,505 | 152,787 |
| 1971 | 1,584 | 398 | 1,301 | 12,690 | 57,834 | 126,140 | 48,270 | 195,102 |
| 1972 | 1,996 | 466 | 1,553 | 14,628 | 70,459 | 163,075 | 59,948 | 240,494 |
| 1973 | 2,296 | 630 | 1,578 | 16,335 | 72,515 | 179,519 | 65,755 | 263,541 |
| 1974 | 2,234 | 836 | 1,701 | 14,282 | 62,454 | 188,707 | 68,240 | 273,232 |
| 1975 | 2,735 | 983 | 2,154 | 15,061 | 67,229 | 213,957 | 78,278 | 315,548 |
| 1976 | 2,876 | 1,182 | 2,610 | 16,908 | 71,635 | 225,896 | 85,806 | 345,846 |
| 1977 | 3,204 | 1,270 | 3,060 | 20,239 | 81,419 | 256,065 | 97,528 | 389,311 |
| 1978 | 3,479 | 1,275 | 3,067 | 22,809 | 89,796 | 293,880 | 107,976 | 426,327 |
| 1979 | 3,643 | 1,352 | 2,789 | 24,608 | 97,782 | 317,502 | 112,236 | 440,120 |
| 1980 | 3,877 | 1,361 | 2,665 | 25,903 | 101,400 | 314,818 | 115,376 | 453,524 |
| 1981 | 3,775 | 1,273 | 2,750 | 27,847 | 99,696 | 311,773 | 117,566 | 461,736 |
| 1982 | 3,436 | 930 | 2,755 | 26,202 | 94,080 | 289,374 | 121,473 | 472,572 |
| 1983 | 3,572 | 991 | 3,049 | 25,659 | 92,892 | 300,959 | 125,361 | 490,663 |
| 1984 | 3,990 | 825 | 2,994 | 27,016 | 103,208 | 302,577 | 130,327 | 505,192 |
| 1985 | 5,247 | 1,119 | 3,505 | 35,041 | 129,426 | 322,781 | 131,194 | 520,273 |
| 1986 | 6,878 | 1,681 | 4,319 | 48,720 | 169,656 | 365,026 | 141,047 | 552,262 |
| 1987 | 7,856 | 1,696 | 4,205 | 50,747 | 181,281 | 369,446 | 150,423 | 592,937 |
| 1988 | 8,816 | 1,851 | 4,800 | 62,603 | 199,773 | 393,518 | 160,884 | 630,413 |
| 1989 | 8,792 | 2,073 | 4,860 | 65,111 | 211,353 | 390,838 | 164,819 | 616,069 |
| 1990 | 8,822 | 2,183 | 5,218 | 67,222 | 231,819 | 391,371 | 174,815 | 660,526 |
| 1991 | 9,084 | 2,252 | 5,915 | 62,853 | 227,138 | 379,440 | 175,862 | 652,725 |
| 1992 | 9,147 | 2,852 | 9,970 | 66,629 | 227,634 | 408,919 | 179,284 | 649,692 |
| 1993 | 10,072 | 3,422 | 10,350 | 70,234 | 208,007 | 443,386 | 194,241 | 685,114 |
| 1994 | 10,783 | 2,873 | 9,446 | 67,198 | 210,113 | 485,403 | 210,246 | 751,847 |
| 1995 | 11,317 | 2,168 | 6,609 | 63,536 | 224,475 | 556,351 | 239,016 | 850,946 |
| 1996 | 12,295 | 1,749 | 6,212 | 70,721 | 240,836 | 599,023 | 251,048 | 870,054 |

| Year | Fatal | MAIS5 | MAIS4 | MAIS3 | MAIS2 | MAIS1 | MAIS0 | PDO |
|-------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|------------|
| 1997 | 12,407 | 2,141 | 5,607 | 73,335 | 250,191 | 586,806 | 247,988 | 899,832 |
| 1998 | 12,615 | 3,251 | 5,775 | 78,652 | 247,086 | 565,176 | 226,997 | 871,406 |
| 1999 | 12,792 | 3,404 | 6,497 | 70,465 | 256,151 | 541,770 | 217,031 | 841,689 |
| 2000 | 13,606 | 3,895 | 7,895 | 79,453 | 262,261 | 524,183 | 229,701 | 902,616 |
| 2001 | 14,262 | 2,969 | 8,751 | 87,916 | 273,317 | 478,091 | 225,210 | 911,030 |
| 2002 | 15,214 | 3,406 | 12,477 | 95,618 | 296,510 | 461,998 | 216,961 | 924,274 |
| 2003 | 15,679 | 3,698 | 15,070 | 92,834 | 283,699 | 460,858 | 225,947 | 947,694 |
| 2004 | 15,853 | 3,578 | 14,722 | 85,977 | 277,777 | 461,369 | 212,917 | 939,845 |
| 2005 | 16,619 | 3,209 | 15,031 | 83,399 | 259,224 | 435,020 | 196,924 | 946,437 |
| 2006 | 16,689 | 2,982 | 13,197 | 84,966 | 254,060 | 411,654 | 189,873 | 927,003 |
| 2007 | 16,700 | 3,313 | 13,088 | 81,583 | 236,998 | 399,069 | 189,167 | 938,659 |
| 2008 | 15,103 | 3,521 | 12,067 | 76,686 | 216,521 | 400,365 | 186,701 | 944,143 |
| 2009 | 14,329 | 3,185 | 10,715 | 68,724 | 204,526 | 390,839 | 176,569 | 895,437 |
| 2010 | 14,167 | 4,920 | 10,269 | 64,675 | 204,449 | 422,145 | 186,375 | 971,481 |
| 2011 | 13,774 | 6,064 | 10,979 | 61,674 | 200,945 | 433,511 | 180,748 | 1,000,241 |
| 2012 | 14,729 | 6,017 | 11,686 | 67,259 | 209,245 | 476,609 | 207,985 | 1,117,266 |
| 2013 | 15,318 | 4,818 | 10,998 | 68,778 | 214,079 | 480,668 | 221,587 | 1,209,023 |
| 2014 | 16,155 | 3,826 | 11,863 | 69,818 | 220,287 | 516,527 | 257,193 | 1,393,946 |
| 2015 | 18,189 | 3,637 | 12,454 | 81,363 | 243,362 | 574,431 | 293,224 | 1,586,696 |
| 2016 | 19,575 | 4,642 | 13,914 | 86,512 | 263,259 | 605,144 | 327,308 | 1,598,838 |
| 2017 | 20,575 | 4,771 | 14,114 | 87,825 | 267,310 | 623,277 | 315,768 | 1,630,685 |
| 2018 | 20,093 | 4,740 | 14,402 | 87,816 | 265,250 | 630,606 | 314,964 | 1,749,173 |
| 2019 | 19,477 | 4,556 | 14,239 | 84,924 | 256,433 | 629,598 | 323,414 | 1,837,968 |

Table C-8. Total voluntary benefits for passenger car standards – reported and unreported

| Year | Fatal | MAIS5 | MAIS4 | MAIS3 | MAIS2 | MAIS1 | MAIS0 | PDO |
|-------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|------------|
| 1968 | 598 | 212 | 311 | 4,342 | 17,274 | 32,149 | 11,842 | 48,297 |
| 1969 | 828 | 218 | 526 | 6,327 | 29,555 | 42,699 | 15,953 | 65,124 |
| 1970 | 992 | 281 | 757 | 6,727 | 41,011 | 53,101 | 20,089 | 81,840 |
| 1971 | 1,198 | 251 | 941 | 8,215 | 47,979 | 63,830 | 23,815 | 96,257 |
| 1972 | 1,472 | 299 | 1,096 | 9,179 | 58,188 | 76,750 | 27,951 | 112,132 |
| 1973 | 1,647 | 447 | 1,100 | 10,433 | 58,833 | 79,836 | 30,149 | 120,833 |
| 1974 | 1,526 | 619 | 1,240 | 8,917 | 49,439 | 78,708 | 30,946 | 123,908 |
| 1975 | 1,765 | 692 | 1,689 | 8,739 | 52,254 | 86,167 | 35,331 | 142,423 |
| 1976 | 1,884 | 876 | 1,998 | 9,737 | 54,185 | 92,208 | 38,590 | 155,538 |
| 1977 | 2,123 | 892 | 2,273 | 11,854 | 59,822 | 103,387 | 43,131 | 172,170 |
| 1978 | 2,302 | 862 | 2,230 | 13,010 | 64,848 | 115,009 | 46,960 | 185,415 |
| 1979 | 2,428 | 858 | 2,005 | 13,695 | 69,409 | 118,797 | 48,057 | 188,449 |
| 1980 | 2,564 | 838 | 1,888 | 13,942 | 71,822 | 117,825 | 48,924 | 192,313 |
| 1981 | 2,511 | 802 | 2,065 | 14,373 | 68,805 | 118,285 | 49,773 | 195,479 |
| 1982 | 2,248 | 580 | 2,129 | 13,590 | 61,159 | 108,060 | 51,309 | 199,608 |
| 1983 | 2,255 | 633 | 2,450 | 13,112 | 56,410 | 110,906 | 52,889 | 207,006 |
| 1984 | 2,391 | 451 | 2,303 | 12,418 | 60,283 | 110,519 | 54,874 | 212,709 |
| 1985 | 2,799 | 521 | 1,969 | 14,821 | 66,815 | 117,510 | 55,104 | 218,524 |
| 1986 | 3,427 | 868 | 2,256 | 19,054 | 79,229 | 128,256 | 57,224 | 224,058 |
| 1987 | 3,769 | 878 | 2,214 | 19,905 | 84,446 | 127,377 | 58,464 | 230,453 |
| 1988 | 4,123 | 910 | 2,501 | 24,391 | 91,492 | 133,077 | 60,169 | 235,767 |
| 1989 | 4,072 | 1,009 | 2,569 | 25,765 | 99,495 | 132,004 | 59,340 | 221,805 |
| 1990 | 4,018 | 815 | 2,568 | 29,102 | 115,666 | 130,012 | 59,777 | 225,863 |
| 1991 | 3,983 | 800 | 2,832 | 27,761 | 110,175 | 123,593 | 58,867 | 218,488 |
| 1992 | 3,934 | 1,118 | 3,919 | 30,545 | 102,519 | 129,062 | 61,863 | 224,180 |
| 1993 | 4,158 | 1,229 | 4,929 | 26,546 | 79,904 | 137,633 | 69,017 | 243,433 |
| 1994 | 4,372 | 1,040 | 4,367 | 24,296 | 78,893 | 153,399 | 77,939 | 278,712 |
| 1995 | 4,527 | 728 | 3,491 | 22,285 | 84,462 | 190,799 | 92,347 | 328,774 |
| 1996 | 4,761 | 591 | 2,442 | 27,685 | 97,995 | 218,063 | 101,909 | 353,185 |

| Year | Fatal | MAIS5 | MAIS4 | MAIS3 | MAIS2 | MAIS1 | MAIS0 | PDO |
|-------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|------------|
| 1997 | 4,735 | 712 | 2,284 | 28,494 | 101,787 | 217,846 | 102,772 | 372,912 |
| 1998 | 4,750 | 1,011 | 2,215 | 29,441 | 96,509 | 217,744 | 100,097 | 384,258 |
| 1999 | 4,655 | 1,118 | 2,310 | 24,238 | 91,473 | 184,507 | 106,310 | 412,292 |
| 2000 | 4,912 | 1,336 | 2,567 | 27,737 | 92,728 | 185,991 | 118,397 | 465,244 |
| 2001 | 5,100 | 1,002 | 2,775 | 29,722 | 100,326 | 182,710 | 118,412 | 479,008 |
| 2002 | 5,373 | 1,310 | 4,276 | 32,787 | 115,657 | 180,000 | 116,338 | 495,609 |
| 2003 | 5,409 | 1,355 | 5,261 | 31,856 | 111,951 | 176,544 | 126,622 | 531,093 |
| 2004 | 5,450 | 1,386 | 5,198 | 28,723 | 104,086 | 169,416 | 120,991 | 534,070 |
| 2005 | 5,752 | 1,113 | 5,346 | 27,077 | 97,566 | 160,755 | 116,243 | 558,676 |
| 2006 | 5,753 | 969 | 4,557 | 28,024 | 96,488 | 156,033 | 115,608 | 564,421 |
| 2007 | 5,811 | 1,119 | 4,546 | 27,134 | 95,128 | 156,157 | 118,158 | 586,309 |
| 2008 | 5,246 | 1,171 | 4,278 | 25,528 | 87,821 | 158,423 | 117,532 | 594,357 |
| 2009 | 4,952 | 1,091 | 3,856 | 22,853 | 82,955 | 154,858 | 110,693 | 561,360 |
| 2010 | 4,863 | 1,791 | 3,672 | 21,791 | 82,575 | 162,372 | 114,159 | 595,057 |
| 2011 | 4,733 | 2,289 | 3,778 | 21,036 | 80,749 | 162,565 | 108,389 | 599,814 |
| 2012 | 5,044 | 2,199 | 3,934 | 24,080 | 79,598 | 177,737 | 121,249 | 651,334 |
| 2013 | 5,201 | 1,718 | 3,719 | 25,134 | 81,536 | 179,940 | 125,407 | 684,244 |
| 2014 | 5,475 | 1,198 | 4,307 | 26,359 | 85,944 | 199,753 | 140,817 | 763,204 |
| 2015 | 6,107 | 1,096 | 4,591 | 28,653 | 96,912 | 221,477 | 154,394 | 835,456 |
| 2016 | 6,539 | 1,449 | 4,939 | 30,482 | 105,099 | 236,661 | 169,520 | 828,074 |
| 2017 | 6,842 | 1,484 | 4,968 | 30,795 | 106,816 | 240,809 | 159,954 | 826,034 |
| 2018 | 6,665 | 1,463 | 4,998 | 30,732 | 106,508 | 240,647 | 153,334 | 851,550 |
| 2019 | 6,363 | 1,396 | 4,921 | 29,751 | 102,448 | 239,773 | 156,574 | 889,812 |

Table C-9. Total attributable benefits for passenger car standards – reported and unreported

| Year | Fatal | MAIS5 | MAIS4 | MAIS3 | MAIS2 | MAIS1 | MAIS0 | PDO |
|-------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|------------|
| 1968 | 123 | 101 | 186 | 1,794 | 2,832 | 12,367 | 4,520 | 18,436 |
| 1969 | 218 | 150 | 357 | 2,928 | 6,035 | 28,311 | 10,520 | 42,947 |
| 1970 | 296 | 143 | 356 | 3,921 | 7,781 | 45,500 | 17,415 | 70,947 |
| 1971 | 387 | 147 | 360 | 4,475 | 9,855 | 62,310 | 24,455 | 98,845 |
| 1972 | 524 | 167 | 457 | 5,449 | 12,271 | 86,326 | 31,997 | 128,362 |
| 1973 | 648 | 183 | 478 | 5,902 | 13,682 | 99,683 | 35,607 | 142,709 |
| 1974 | 709 | 217 | 460 | 5,365 | 13,015 | 110,000 | 37,293 | 149,323 |
| 1975 | 970 | 292 | 465 | 6,322 | 14,975 | 127,790 | 42,947 | 173,126 |
| 1976 | 992 | 306 | 611 | 7,172 | 17,450 | 133,687 | 47,216 | 190,308 |
| 1977 | 1,081 | 378 | 787 | 8,385 | 21,597 | 152,678 | 54,397 | 217,141 |
| 1978 | 1,177 | 413 | 837 | 9,799 | 24,948 | 178,870 | 61,016 | 240,912 |
| 1979 | 1,214 | 494 | 784 | 10,913 | 28,372 | 198,705 | 64,179 | 251,672 |
| 1980 | 1,313 | 523 | 777 | 11,961 | 29,578 | 196,993 | 66,452 | 261,211 |
| 1981 | 1,264 | 471 | 685 | 13,474 | 30,891 | 193,488 | 67,794 | 266,256 |
| 1982 | 1,189 | 349 | 625 | 12,613 | 32,922 | 181,315 | 70,165 | 272,964 |
| 1983 | 1,318 | 357 | 599 | 12,547 | 36,483 | 190,053 | 72,472 | 283,657 |
| 1984 | 1,600 | 374 | 691 | 14,598 | 42,925 | 192,059 | 75,454 | 292,483 |
| 1985 | 2,448 | 598 | 1,535 | 20,220 | 62,610 | 205,270 | 76,090 | 301,749 |
| 1986 | 3,451 | 813 | 2,063 | 29,665 | 90,427 | 236,771 | 83,823 | 328,204 |
| 1987 | 4,087 | 818 | 1,991 | 30,842 | 96,835 | 242,068 | 91,959 | 362,484 |
| 1988 | 4,693 | 941 | 2,299 | 38,212 | 108,281 | 260,441 | 100,715 | 394,645 |
| 1989 | 4,720 | 1,064 | 2,291 | 39,346 | 111,858 | 258,834 | 105,479 | 394,264 |
| 1990 | 4,803 | 1,368 | 2,649 | 38,120 | 116,153 | 261,359 | 115,038 | 434,663 |
| 1991 | 5,102 | 1,451 | 3,083 | 35,092 | 116,963 | 255,847 | 116,995 | 434,237 |
| 1992 | 5,214 | 1,734 | 6,051 | 36,084 | 125,115 | 279,857 | 117,421 | 425,512 |
| 1993 | 5,914 | 2,193 | 5,422 | 43,689 | 128,103 | 305,753 | 125,224 | 441,682 |
| 1994 | 6,411 | 1,833 | 5,080 | 42,902 | 131,220 | 332,004 | 132,308 | 473,135 |
| 1995 | 6,790 | 1,440 | 3,118 | 41,252 | 140,013 | 365,552 | 146,669 | 522,172 |
| 1996 | 7,534 | 1,158 | 3,770 | 43,036 | 142,840 | 380,960 | 149,139 | 516,869 |

| Year | Fatal | MAIS5 | MAIS4 | MAIS3 | MAIS2 | MAIS1 | MAIS0 | PDO |
|-------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|------------|
| 1997 | 7,671 | 1,430 | 3,323 | 44,841 | 148,404 | 368,960 | 145,216 | 526,920 |
| 1998 | 7,865 | 2,240 | 3,560 | 49,211 | 150,577 | 347,432 | 126,900 | 487,148 |
| 1999 | 8,138 | 2,286 | 4,187 | 46,227 | 164,678 | 357,264 | 110,721 | 429,397 |
| 2000 | 8,694 | 2,559 | 5,329 | 51,716 | 169,533 | 338,192 | 111,304 | 437,373 |
| 2001 | 9,162 | 1,968 | 5,976 | 58,194 | 172,991 | 295,381 | 106,797 | 432,022 |
| 2002 | 9,841 | 2,097 | 8,200 | 62,831 | 180,853 | 281,998 | 100,623 | 428,665 |
| 2003 | 10,270 | 2,342 | 9,809 | 60,978 | 171,748 | 284,314 | 99,325 | 416,601 |
| 2004 | 10,403 | 2,192 | 9,524 | 57,255 | 173,690 | 291,953 | 91,926 | 405,775 |
| 2005 | 10,867 | 2,096 | 9,685 | 56,322 | 161,658 | 274,265 | 80,681 | 387,761 |
| 2006 | 10,936 | 2,013 | 8,640 | 56,942 | 157,572 | 255,621 | 74,266 | 362,582 |
| 2007 | 10,889 | 2,194 | 8,541 | 54,449 | 141,870 | 242,912 | 71,009 | 352,351 |
| 2008 | 9,857 | 2,350 | 7,788 | 51,158 | 128,700 | 241,942 | 69,169 | 349,786 |
| 2009 | 9,377 | 2,094 | 6,859 | 45,871 | 121,571 | 235,981 | 65,876 | 334,077 |
| 2010 | 9,304 | 3,130 | 6,597 | 42,883 | 121,874 | 259,773 | 72,215 | 376,424 |
| 2011 | 9,041 | 3,775 | 7,200 | 40,638 | 120,197 | 270,946 | 72,359 | 400,427 |
| 2012 | 9,685 | 3,818 | 7,753 | 43,179 | 129,647 | 298,872 | 86,736 | 465,932 |
| 2013 | 10,116 | 3,100 | 7,280 | 43,644 | 132,544 | 300,727 | 96,180 | 524,779 |
| 2014 | 10,681 | 2,628 | 7,556 | 43,458 | 134,343 | 316,774 | 116,376 | 630,741 |
| 2015 | 12,082 | 2,541 | 7,863 | 52,710 | 146,449 | 352,955 | 138,830 | 751,239 |
| 2016 | 13,036 | 3,193 | 8,975 | 56,030 | 158,160 | 368,483 | 157,788 | 770,764 |
| 2017 | 13,733 | 3,287 | 9,146 | 57,030 | 160,494 | 382,469 | 155,814 | 804,651 |
| 2018 | 13,428 | 3,277 | 9,404 | 57,084 | 158,743 | 389,958 | 161,630 | 897,622 |
| 2019 | 13,114 | 3,160 | 9,318 | 55,172 | 153,985 | 389,825 | 166,840 | 948,155 |

Table C-10. Total benefits for LTV standards – CA – reported and unreported

| Year | Fatal | MAIS5 | MAIS4 | MAIS3 | MAIS2 | MAIS1 | MAIS0 | PDO |
|-------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|------------|
| 1968 | 18 | 4 | 5 | 115 | 386 | 3,546 | 1,960 | 7,941 |
| 1969 | 26 | 4 | 8 | 166 | 616 | 6,507 | 3,148 | 12,902 |
| 1970 | 31 | 5 | 10 | 209 | 762 | 9,525 | 4,373 | 18,529 |
| 1971 | 37 | 5 | 12 | 253 | 957 | 11,707 | 5,243 | 23,955 |
| 1972 | 45 | 6 | 14 | 300 | 1,143 | 14,558 | 6,140 | 30,175 |
| 1973 | 53 | 6 | 15 | 336 | 1,298 | 16,379 | 6,892 | 34,368 |
| 1974 | 51 | 6 | 14 | 310 | 1,402 | 17,381 | 7,264 | 36,755 |
| 1975 | 52 | 5 | 13 | 296 | 1,539 | 22,896 | 9,019 | 43,697 |
| 1976 | 60 | 6 | 17 | 387 | 1,805 | 24,764 | 10,490 | 50,933 |
| 1977 | 72 | 8 | 21 | 535 | 2,215 | 26,705 | 11,574 | 60,170 |
| 1978 | 86 | 9 | 27 | 759 | 2,648 | 31,351 | 12,893 | 71,385 |
| 1979 | 96 | 10 | 32 | 766 | 3,110 | 33,238 | 13,303 | 76,755 |
| 1980 | 99 | 11 | 32 | 780 | 3,511 | 33,737 | 14,348 | 81,161 |
| 1981 | 96 | 13 | 36 | 575 | 3,542 | 32,689 | 15,001 | 84,902 |
| 1982 | 88 | 13 | 31 | 596 | 2,922 | 27,623 | 14,870 | 89,107 |
| 1983 | 87 | 13 | 30 | 538 | 2,937 | 27,616 | 16,101 | 92,847 |
| 1984 | 93 | 13 | 34 | 625 | 3,210 | 27,144 | 16,328 | 99,046 |
| 1985 | 101 | 13 | 34 | 661 | 3,379 | 33,916 | 19,938 | 104,640 |
| 1986 | 111 | 17 | 37 | 772 | 3,721 | 32,893 | 20,017 | 112,044 |
| 1987 | 123 | 18 | 42 | 855 | 3,878 | 33,712 | 21,847 | 117,670 |
| 1988 | 131 | 19 | 50 | 928 | 4,684 | 36,190 | 22,894 | 126,164 |
| 1989 | 136 | 22 | 61 | 1,056 | 5,469 | 34,539 | 23,025 | 131,474 |
| 1990 | 139 | 24 | 68 | 997 | 7,556 | 38,134 | 25,774 | 138,268 |
| 1991 | 136 | 26 | 64 | 1,031 | 7,874 | 39,170 | 25,302 | 134,491 |
| 1992 | 135 | 29 | 52 | 998 | 7,712 | 45,781 | 28,614 | 143,628 |
| 1993 | 144 | 30 | 54 | 948 | 8,748 | 49,440 | 29,436 | 160,181 |
| 1994 | 155 | 24 | 60 | 946 | 9,946 | 54,206 | 39,878 | 201,051 |
| 1995 | 170 | 26 | 76 | 1,134 | 14,045 | 59,164 | 50,526 | 256,540 |
| 1996 | 181 | 29 | 82 | 1,461 | 10,555 | 69,203 | 60,208 | 309,106 |

| Year | Fatal | MAIS5 | MAIS4 | MAIS3 | MAIS2 | MAIS1 | MAIS0 | PDO |
|-------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|------------|
| 1997 | 192 | 34 | 85 | 1,832 | 13,179 | 79,937 | 68,279 | 347,405 |
| 1998 | 206 | 32 | 89 | 2,161 | 13,387 | 87,596 | 78,933 | 389,787 |
| 1999 | 220 | 40 | 96 | 2,303 | 14,069 | 106,273 | 90,880 | 427,527 |
| 2000 | 250 | 44 | 116 | 2,281 | 14,189 | 111,720 | 105,972 | 495,232 |
| 2001 | 266 | 46 | 125 | 2,566 | 13,424 | 110,661 | 117,449 | 549,417 |
| 2002 | 282 | 45 | 136 | 3,284 | 14,891 | 112,100 | 122,957 | 589,877 |
| 2003 | 341 | 64 | 175 | 3,367 | 15,580 | 125,191 | 148,305 | 652,910 |
| 2004 | 411 | 68 | 211 | 3,729 | 16,046 | 137,788 | 154,184 | 716,085 |
| 2005 | 458 | 65 | 307 | 3,980 | 16,338 | 149,886 | 160,847 | 760,292 |
| 2006 | 538 | 69 | 290 | 4,253 | 20,338 | 153,138 | 170,231 | 815,831 |
| 2007 | 613 | 76 | 311 | 4,191 | 21,415 | 146,241 | 172,710 | 892,878 |
| 2008 | 697 | 76 | 377 | 4,334 | 21,496 | 147,109 | 168,776 | 895,687 |
| 2009 | 720 | 81 | 353 | 4,371 | 24,565 | 158,091 | 177,432 | 928,353 |
| 2010 | 771 | 93 | 409 | 4,944 | 30,244 | 182,898 | 196,379 | 951,849 |
| 2011 | 818 | 153 | 393 | 5,557 | 30,763 | 209,325 | 210,782 | 990,167 |
| 2012 | 1,101 | 242 | 483 | 7,232 | 36,151 | 231,935 | 243,647 | 1,127,340 |
| 2013 | 1,219 | 256 | 671 | 11,278 | 41,186 | 230,771 | 255,565 | 1,215,134 |
| 2014 | 1,427 | 120 | 1,037 | 10,872 | 35,788 | 247,576 | 272,491 | 1,417,484 |
| 2015 | 1,657 | 132 | 1,329 | 15,266 | 41,970 | 279,362 | 309,070 | 1,652,402 |
| 2016 | 2,121 | 179 | 1,290 | 15,910 | 44,992 | 311,388 | 349,448 | 1,619,554 |
| 2017 | 2,257 | 311 | 1,314 | 16,824 | 46,916 | 328,274 | 328,428 | 1,659,096 |
| 2018 | 2,657 | 535 | 1,396 | 17,682 | 47,980 | 335,532 | 336,081 | 1,791,846 |
| 2019 | 3,073 | 648 | 1,396 | 18,521 | 50,822 | 365,269 | 370,741 | 1,946,999 |

Table C-11. Voluntary benefits for LTV standards – CA – reported and unreported

| Year | Fatal | MAIS5 | MAIS4 | MAIS3 | MAIS2 | MAIS1 | MAIS0 | PDO |
|-------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|------------|
| 1968 | 18 | 4 | 5 | 95 | 294 | 2,636 | 1,483 | 6,009 |
| 1969 | 26 | 4 | 8 | 126 | 402 | 3,515 | 2,033 | 8,331 |
| 1970 | 31 | 5 | 10 | 150 | 489 | 4,448 | 2,549 | 10,800 |
| 1971 | 37 | 5 | 12 | 174 | 555 | 5,182 | 2,845 | 12,998 |
| 1972 | 45 | 6 | 14 | 199 | 654 | 6,183 | 3,175 | 15,604 |
| 1973 | 53 | 6 | 15 | 220 | 732 | 6,848 | 3,518 | 17,545 |
| 1974 | 51 | 6 | 14 | 204 | 687 | 7,055 | 3,678 | 18,614 |
| 1975 | 52 | 5 | 13 | 193 | 712 | 7,965 | 4,554 | 22,063 |
| 1976 | 60 | 6 | 17 | 242 | 834 | 8,987 | 5,284 | 25,657 |
| 1977 | 72 | 8 | 21 | 305 | 982 | 10,133 | 5,745 | 29,869 |
| 1978 | 86 | 9 | 27 | 384 | 1,210 | 11,872 | 6,305 | 34,906 |
| 1979 | 96 | 10 | 32 | 419 | 1,342 | 12,577 | 6,414 | 37,005 |
| 1980 | 99 | 11 | 32 | 439 | 1,456 | 12,587 | 6,859 | 38,798 |
| 1981 | 96 | 13 | 36 | 397 | 1,457 | 12,321 | 7,165 | 40,553 |
| 1982 | 88 | 13 | 31 | 375 | 1,292 | 11,035 | 7,091 | 42,493 |
| 1983 | 87 | 13 | 30 | 366 | 1,314 | 10,932 | 7,673 | 44,243 |
| 1984 | 93 | 13 | 34 | 388 | 1,392 | 11,155 | 7,763 | 47,089 |
| 1985 | 101 | 13 | 34 | 406 | 1,478 | 12,508 | 9,473 | 49,715 |
| 1986 | 111 | 17 | 37 | 481 | 1,630 | 13,049 | 9,499 | 53,167 |
| 1987 | 123 | 18 | 42 | 529 | 1,760 | 13,566 | 10,362 | 55,812 |
| 1988 | 131 | 19 | 50 | 582 | 1,979 | 14,085 | 10,848 | 59,781 |
| 1989 | 136 | 22 | 61 | 619 | 2,203 | 13,886 | 10,894 | 62,207 |
| 1990 | 139 | 24 | 68 | 632 | 2,547 | 14,522 | 11,575 | 62,096 |
| 1991 | 136 | 26 | 64 | 624 | 2,582 | 14,982 | 12,035 | 63,973 |
| 1992 | 135 | 29 | 52 | 643 | 2,590 | 16,391 | 13,365 | 67,083 |
| 1993 | 144 | 30 | 54 | 648 | 2,812 | 17,835 | 14,734 | 80,175 |
| 1994 | 155 | 24 | 60 | 703 | 3,212 | 20,515 | 19,761 | 99,627 |
| 1995 | 170 | 26 | 76 | 788 | 4,237 | 23,920 | 24,369 | 123,734 |
| 1996 | 181 | 29 | 82 | 929 | 4,335 | 31,629 | 30,950 | 158,898 |

| Year | Fatal | MAIS5 | MAIS4 | MAIS3 | MAIS2 | MAIS1 | MAIS0 | PDO |
|-------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|------------|
| 1997 | 192 | 34 | 85 | 1,029 | 4,916 | 36,926 | 35,404 | 180,139 |
| 1998 | 206 | 32 | 89 | 1,243 | 6,864 | 45,941 | 42,130 | 208,047 |
| 1999 | 220 | 40 | 96 | 1,424 | 7,900 | 61,176 | 53,012 | 249,385 |
| 2000 | 250 | 44 | 116 | 1,517 | 9,137 | 67,846 | 63,947 | 298,838 |
| 2001 | 266 | 46 | 125 | 1,814 | 8,340 | 66,926 | 71,762 | 335,693 |
| 2002 | 282 | 45 | 136 | 2,285 | 8,542 | 66,734 | 75,227 | 360,894 |
| 2003 | 341 | 64 | 175 | 2,437 | 9,386 | 71,597 | 94,486 | 415,970 |
| 2004 | 411 | 68 | 211 | 2,610 | 10,577 | 80,118 | 98,985 | 459,722 |
| 2005 | 458 | 65 | 307 | 2,873 | 10,467 | 90,218 | 107,279 | 507,087 |
| 2006 | 537 | 69 | 289 | 3,154 | 12,989 | 102,690 | 117,320 | 562,257 |
| 2007 | 609 | 76 | 311 | 3,398 | 13,171 | 96,654 | 122,287 | 632,200 |
| 2008 | 678 | 72 | 356 | 3,509 | 13,698 | 98,295 | 121,864 | 646,725 |
| 2009 | 682 | 79 | 337 | 3,368 | 15,467 | 105,473 | 126,225 | 660,430 |
| 2010 | 694 | 89 | 380 | 3,805 | 20,199 | 122,928 | 137,791 | 667,873 |
| 2011 | 711 | 147 | 336 | 4,255 | 21,375 | 143,441 | 147,437 | 692,599 |
| 2012 | 905 | 210 | 385 | 5,607 | 25,946 | 154,914 | 169,652 | 784,971 |
| 2013 | 962 | 213 | 455 | 7,628 | 29,275 | 152,137 | 177,565 | 844,266 |
| 2014 | 1,105 | 83 | 756 | 8,007 | 24,741 | 168,521 | 184,991 | 962,314 |
| 2015 | 1,232 | 97 | 939 | 10,565 | 25,711 | 184,356 | 207,196 | 1,107,748 |
| 2016 | 1,527 | 122 | 907 | 11,356 | 28,507 | 204,137 | 231,909 | 1,074,811 |
| 2017 | 1,583 | 188 | 902 | 11,666 | 29,674 | 213,867 | 214,720 | 1,084,686 |
| 2018 | 1,838 | 301 | 958 | 11,735 | 30,134 | 218,686 | 214,818 | 1,145,322 |
| 2019 | 2,051 | 361 | 956 | 12,034 | 31,678 | 234,946 | 235,411 | 1,236,294 |

Table C-12. Attributable benefits for LTV standards – CA – reported and unreported

| Year | Fatal | MAIS5 | MAIS4 | MAIS3 | MAIS2 | MAIS1 | MAIS0 | PDO |
|-------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|------------|
| 1968 | - | - | - | 20 | 92 | 910 | 477 | 1,932 |
| 1969 | - | - | - | 40 | 215 | 2,991 | 1,115 | 4,571 |
| 1970 | - | - | - | 59 | 273 | 5,078 | 1,824 | 7,729 |
| 1971 | - | - | - | 79 | 402 | 6,525 | 2,398 | 10,957 |
| 1972 | - | - | - | 102 | 489 | 8,375 | 2,965 | 14,572 |
| 1973 | - | - | - | 116 | 566 | 9,531 | 3,373 | 16,822 |
| 1974 | - | - | - | 107 | 714 | 10,326 | 3,585 | 18,141 |
| 1975 | - | - | - | 102 | 827 | 14,931 | 4,465 | 21,634 |
| 1976 | - | - | - | 145 | 971 | 15,777 | 5,206 | 25,276 |
| 1977 | - | - | - | 231 | 1,233 | 16,572 | 5,829 | 30,301 |
| 1978 | - | - | - | 375 | 1,437 | 19,479 | 6,589 | 36,479 |
| 1979 | - | - | - | 347 | 1,768 | 20,662 | 6,890 | 39,750 |
| 1980 | - | - | - | 341 | 2,055 | 21,150 | 7,489 | 42,363 |
| 1981 | - | - | - | 178 | 2,086 | 20,367 | 7,836 | 44,348 |
| 1982 | - | - | - | 221 | 1,631 | 16,588 | 7,779 | 46,615 |
| 1983 | - | - | - | 172 | 1,623 | 16,684 | 8,429 | 48,604 |
| 1984 | - | - | - | 237 | 1,817 | 15,989 | 8,565 | 51,957 |
| 1985 | - | - | - | 255 | 1,901 | 21,408 | 10,465 | 54,924 |
| 1986 | - | - | - | 291 | 2,091 | 19,844 | 10,519 | 58,877 |
| 1987 | - | - | - | 326 | 2,119 | 20,146 | 11,485 | 61,858 |
| 1988 | - | - | - | 346 | 2,705 | 22,105 | 12,046 | 66,382 |
| 1989 | - | - | - | 436 | 3,266 | 20,653 | 12,131 | 69,267 |
| 1990 | - | - | - | 365 | 5,009 | 23,612 | 14,199 | 76,173 |
| 1991 | - | - | - | 408 | 5,292 | 24,188 | 13,266 | 70,518 |
| 1992 | - | - | - | 355 | 5,123 | 29,390 | 15,250 | 76,545 |
| 1993 | - | - | - | 300 | 5,936 | 31,605 | 14,703 | 80,006 |
| 1994 | - | - | - | 243 | 6,735 | 33,691 | 20,117 | 101,424 |
| 1995 | - | - | - | 346 | 9,807 | 35,244 | 26,156 | 132,806 |
| 1996 | - | - | - | 532 | 6,220 | 37,573 | 29,258 | 150,209 |

| Year | Fatal | MAIS5 | MAIS4 | MAIS3 | MAIS2 | MAIS1 | MAIS0 | PDO |
|-------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|------------|
| 1997 | - | - | - | 803 | 8,264 | 43,012 | 32,874 | 167,266 |
| 1998 | - | - | - | 918 | 6,523 | 41,655 | 36,803 | 181,740 |
| 1999 | - | - | - | 879 | 6,169 | 45,097 | 37,868 | 178,142 |
| 2000 | - | - | - | 765 | 5,052 | 43,874 | 42,025 | 196,394 |
| 2001 | - | - | - | 752 | 5,084 | 43,735 | 45,688 | 213,723 |
| 2002 | - | - | - | 999 | 6,349 | 45,366 | 47,730 | 228,983 |
| 2003 | - | - | - | 931 | 6,194 | 53,594 | 53,820 | 236,940 |
| 2004 | 0 | - | 0 | 1,119 | 5,469 | 57,669 | 55,199 | 256,363 |
| 2005 | 0 | - | 0 | 1,107 | 5,871 | 59,668 | 53,568 | 253,205 |
| 2006 | 1 | - | 0 | 1,099 | 7,349 | 50,447 | 52,911 | 253,574 |
| 2007 | 3 | 0 | 1 | 793 | 8,244 | 49,587 | 50,423 | 260,678 |
| 2008 | 19 | 4 | 20 | 826 | 7,798 | 48,814 | 46,912 | 248,962 |
| 2009 | 38 | 3 | 15 | 1,003 | 9,098 | 52,618 | 51,207 | 267,923 |
| 2010 | 76 | 4 | 29 | 1,139 | 10,045 | 59,970 | 58,588 | 283,975 |
| 2011 | 107 | 6 | 57 | 1,302 | 9,388 | 65,883 | 63,345 | 297,568 |
| 2012 | 196 | 32 | 98 | 1,625 | 10,205 | 77,021 | 73,995 | 342,370 |
| 2013 | 256 | 43 | 216 | 3,650 | 11,911 | 78,634 | 78,000 | 370,868 |
| 2014 | 322 | 37 | 281 | 2,865 | 11,047 | 79,055 | 87,500 | 455,170 |
| 2015 | 424 | 36 | 390 | 4,701 | 16,259 | 95,006 | 101,874 | 544,654 |
| 2016 | 594 | 57 | 383 | 4,554 | 16,485 | 107,252 | 117,538 | 544,744 |
| 2017 | 674 | 124 | 411 | 5,158 | 17,241 | 114,406 | 113,708 | 574,411 |
| 2018 | 819 | 233 | 438 | 5,947 | 17,846 | 116,846 | 121,263 | 646,525 |
| 2019 | 1,022 | 287 | 439 | 6,487 | 19,144 | 130,323 | 135,330 | 710,705 |

Table C-13. Total benefits for LTV standards – CW – reported and unreported

| Year | Fatal | MAIS5 | MAIS4 | MAIS3 | MAIS2 | MAIS1 | MAIS0 | PDO |
|-------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|------------|
| 1968 | 74 | 10 | 60 | 909 | 2,185 | 2,721 | - | - |
| 1969 | 102 | 13 | 68 | 1,046 | 5,767 | 3,536 | - | - |
| 1970 | 125 | 15 | 70 | 1,101 | 5,649 | 4,244 | - | - |
| 1971 | 151 | 18 | 73 | 1,167 | 5,814 | 4,780 | - | - |
| 1972 | 184 | 24 | 132 | 1,309 | 6,141 | 5,578 | - | - |
| 1973 | 228 | 31 | 146 | 1,491 | 8,461 | 6,278 | - | - |
| 1974 | 235 | 57 | 128 | 1,445 | 8,090 | 6,778 | - | - |
| 1975 | 264 | 117 | 129 | 701 | 7,317 | 6,722 | - | - |
| 1976 | 314 | 131 | 138 | 1,370 | 8,987 | 8,388 | - | - |
| 1977 | 415 | 120 | 156 | 2,169 | 11,326 | 9,807 | - | - |
| 1978 | 490 | 114 | 208 | 3,071 | 14,436 | 10,868 | - | - |
| 1979 | 571 | 164 | 332 | 3,988 | 16,126 | 12,096 | - | - |
| 1980 | 601 | 164 | 358 | 4,018 | 16,206 | 13,446 | - | - |
| 1981 | 614 | 205 | 619 | 3,445 | 19,506 | 15,229 | - | - |
| 1982 | 561 | 219 | 593 | 3,697 | 14,266 | 15,032 | - | - |
| 1983 | 615 | 261 | 458 | 4,570 | 9,717 | 18,920 | - | - |
| 1984 | 786 | 247 | 611 | 4,082 | 10,557 | 18,522 | - | - |
| 1985 | 1,091 | 398 | 806 | 4,033 | 16,699 | 25,408 | - | - |
| 1986 | 1,585 | 391 | 573 | 6,237 | 29,108 | 32,125 | - | - |
| 1987 | 2,063 | 398 | 854 | 7,414 | 32,669 | 36,878 | - | - |
| 1988 | 2,383 | 283 | 1,440 | 9,040 | 41,215 | 40,822 | - | - |
| 1989 | 2,644 | 511 | 1,797 | 10,084 | 44,534 | 44,331 | - | - |
| 1990 | 2,846 | 979 | 2,770 | 10,923 | 42,957 | 45,774 | - | - |
| 1991 | 3,067 | 1,014 | 2,787 | 13,317 | 38,255 | 50,282 | - | - |
| 1992 | 3,285 | 802 | 1,652 | 14,440 | 47,534 | 57,258 | - | - |
| 1993 | 3,654 | 772 | 1,468 | 14,389 | 53,671 | 62,520 | - | - |
| 1994 | 4,282 | 294 | 1,539 | 14,648 | 62,777 | 80,846 | - | - |
| 1995 | 4,722 | 796 | 2,359 | 16,349 | 63,027 | 100,347 | - | - |
| 1996 | 5,444 | 906 | 2,197 | 18,313 | 59,650 | 107,970 | - | - |

| Year | Fatal | MAIS5 | MAIS4 | MAIS3 | MAIS2 | MAIS1 | MAIS0 | PDO |
|-------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|------------|
| 1997 | 6,062 | 982 | 2,288 | 22,949 | 65,416 | 111,597 | - | - |
| 1998 | 6,723 | 1,009 | 3,010 | 27,394 | 81,389 | 125,196 | - | - |
| 1999 | 7,155 | 1,604 | 3,144 | 27,909 | 95,148 | 131,015 | - | - |
| 2000 | 8,391 | 2,061 | 4,960 | 27,259 | 100,144 | 133,546 | - | - |
| 2001 | 8,787 | 2,248 | 4,991 | 29,232 | 92,727 | 130,640 | - | - |
| 2002 | 10,119 | 2,350 | 6,092 | 30,854 | 98,538 | 135,189 | - | - |
| 2003 | 11,167 | 4,288 | 6,960 | 33,843 | 110,162 | 149,469 | - | - |
| 2004 | 11,977 | 4,019 | 9,730 | 36,298 | 120,004 | 157,055 | - | - |
| 2005 | 12,889 | 4,092 | 9,844 | 41,611 | 129,057 | 155,273 | - | - |
| 2006 | 13,036 | 2,561 | 11,794 | 42,546 | 131,617 | 150,421 | - | - |
| 2007 | 13,144 | 2,799 | 10,953 | 44,498 | 129,273 | 144,636 | - | - |
| 2008 | 12,126 | 2,580 | 10,648 | 40,063 | 112,902 | 139,762 | - | - |
| 2009 | 11,742 | 3,185 | 10,162 | 39,950 | 116,157 | 149,970 | - | - |
| 2010 | 11,708 | 3,401 | 9,532 | 40,101 | 113,603 | 163,447 | - | - |
| 2011 | 11,564 | 3,573 | 8,472 | 39,377 | 108,619 | 181,740 | - | - |
| 2012 | 12,046 | 3,334 | 8,063 | 40,690 | 113,330 | 199,553 | - | - |
| 2013 | 11,998 | 3,193 | 9,338 | 42,418 | 115,316 | 204,803 | - | - |
| 2014 | 12,776 | 2,211 | 11,113 | 41,430 | 126,642 | 195,341 | - | - |
| 2015 | 13,972 | 3,282 | 12,171 | 51,256 | 156,062 | 208,011 | - | - |
| 2016 | 15,487 | 3,659 | 12,710 | 55,538 | 155,398 | 215,338 | - | - |
| 2017 | 16,172 | 3,893 | 12,811 | 57,481 | 159,769 | 221,057 | - | - |
| 2018 | 17,047 | 4,397 | 12,935 | 57,921 | 157,496 | 226,722 | - | - |
| 2019 | 17,550 | 4,751 | 13,512 | 59,636 | 164,850 | 249,779 | - | - |

Table C-14. Voluntary benefits for LTV standards – CW – reported and unreported

| Year | Fatal | MAIS5 | MAIS4 | MAIS3 | MAIS2 | MAIS1 | MAIS0 | PDO |
|------|-------|-------|-------|-------|--------|--------|-------|-----|
| 1968 | 54 | 9 | 19 | 370 | 1,706 | 1,553 | - | - |
| 1969 | 68 | 10 | 23 | 427 | 5,208 | 2,148 | - | - |
| 1970 | 78 | 10 | 25 | 463 | 5,075 | 2,748 | - | - |
| 1971 | 91 | 10 | 27 | 518 | 5,213 | 3,218 | - | - |
| 1972 | 107 | 12 | 77 | 613 | 5,457 | 3,860 | - | - |
| 1973 | 133 | 13 | 82 | 685 | 7,682 | 4,409 | - | - |
| 1974 | 139 | 41 | 68 | 710 | 6,921 | 4,824 | - | - |
| 1975 | 148 | 71 | 77 | 416 | 6,714 | 5,219 | - | - |
| 1976 | 190 | 112 | 72 | 739 | 7,857 | 6,290 | - | - |
| 1977 | 262 | 101 | 83 | 1,270 | 9,077 | 7,347 | - | - |
| 1978 | 321 | 94 | 104 | 1,796 | 11,165 | 8,473 | - | - |
| 1979 | 375 | 127 | 194 | 2,290 | 12,799 | 9,554 | - | - |
| 1980 | 411 | 128 | 234 | 2,564 | 12,539 | 10,125 | - | - |
| 1981 | 421 | 173 | 333 | 2,249 | 14,872 | 11,905 | - | - |
| 1982 | 386 | 180 | 326 | 2,413 | 8,522 | 11,355 | - | - |
| 1983 | 392 | 209 | 164 | 2,966 | 5,371 | 14,829 | - | - |
| 1984 | 449 | 187 | 247 | 2,365 | 5,041 | 12,278 | - | - |
| 1985 | 550 | 241 | 280 | 2,161 | 6,915 | 14,080 | - | - |
| 1986 | 665 | 240 | 221 | 2,762 | 12,828 | 15,178 | - | - |
| 1987 | 819 | 239 | 384 | 3,369 | 13,778 | 18,034 | - | - |
| 1988 | 917 | 148 | 612 | 4,203 | 17,350 | 19,983 | - | - |
| 1989 | 977 | 195 | 827 | 4,630 | 17,589 | 22,350 | - | - |
| 1990 | 1,030 | 449 | 1,137 | 4,406 | 14,716 | 25,721 | - | - |
| 1991 | 1,084 | 517 | 1,109 | 4,934 | 11,857 | 27,658 | - | - |
| 1992 | 1,139 | 442 | 630 | 4,806 | 11,618 | 33,074 | - | - |
| 1993 | 1,231 | 378 | 550 | 5,116 | 12,531 | 33,190 | - | - |
| 1994 | 1,385 | 95 | 439 | 5,450 | 17,273 | 44,628 | - | - |
| 1995 | 1,474 | 284 | 585 | 5,850 | 18,871 | 58,178 | - | - |
| 1996 | 1,597 | 257 | 546 | 6,437 | 18,749 | 62,358 | - | - |

| Year | Fatal | MAIS5 | MAIS4 | MAIS3 | MAIS2 | MAIS1 | MAIS0 | PDO |
|-------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|------------|
| 1997 | 1,837 | 384 | 502 | 9,057 | 16,127 | 61,565 | - | - |
| 1998 | 1,943 | 361 | 742 | 10,267 | 20,313 | 63,671 | - | - |
| 1999 | 2,042 | 509 | 823 | 10,131 | 23,459 | 63,465 | - | - |
| 2000 | 2,289 | 513 | 2,261 | 8,279 | 25,369 | 63,188 | - | - |
| 2001 | 2,344 | 555 | 2,306 | 10,012 | 25,524 | 57,540 | - | - |
| 2002 | 2,709 | 618 | 2,814 | 9,967 | 23,568 | 60,785 | - | - |
| 2003 | 2,808 | 823 | 2,441 | 11,836 | 24,185 | 67,629 | - | - |
| 2004 | 3,057 | 802 | 2,705 | 10,252 | 24,426 | 72,884 | - | - |
| 2005 | 3,221 | 613 | 2,860 | 10,707 | 29,127 | 69,961 | - | - |
| 2006 | 3,225 | 543 | 2,698 | 10,128 | 29,132 | 68,331 | - | - |
| 2007 | 3,265 | 625 | 2,541 | 10,132 | 29,251 | 63,394 | - | - |
| 2008 | 2,947 | 633 | 2,442 | 9,957 | 24,263 | 59,307 | - | - |
| 2009 | 2,927 | 869 | 2,669 | 10,393 | 26,484 | 63,751 | - | - |
| 2010 | 2,727 | 820 | 2,593 | 9,970 | 26,385 | 71,727 | - | - |
| 2011 | 2,689 | 652 | 2,112 | 9,371 | 24,836 | 76,406 | - | - |
| 2012 | 2,847 | 729 | 2,022 | 8,858 | 25,447 | 83,197 | - | - |
| 2013 | 2,806 | 711 | 2,162 | 8,694 | 26,443 | 83,295 | - | - |
| 2014 | 2,913 | 483 | 1,786 | 9,198 | 29,540 | 80,697 | - | - |
| 2015 | 3,256 | 701 | 1,952 | 13,451 | 39,258 | 85,354 | - | - |
| 2016 | 3,589 | 784 | 2,198 | 15,239 | 39,474 | 89,383 | - | - |
| 2017 | 3,604 | 833 | 2,255 | 15,655 | 41,293 | 91,347 | - | - |
| 2018 | 3,886 | 721 | 2,204 | 15,586 | 40,379 | 93,036 | - | - |
| 2019 | 3,962 | 747 | 2,203 | 15,988 | 42,004 | 102,313 | - | - |

Table C-15. Attributable benefits for LTV standards – CW – reported and unreported

| Year | Fatal | MAIS5 | MAIS4 | MAIS3 | MAIS2 | MAIS1 | MAIS0 | PDO |
|-------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|------------|
| 1968 | 21 | 1 | 40 | 539 | 479 | 1,169 | - | - |
| 1969 | 34 | 2 | 45 | 619 | 559 | 1,388 | - | - |
| 1970 | 47 | 5 | 45 | 638 | 574 | 1,497 | - | - |
| 1971 | 60 | 8 | 46 | 649 | 600 | 1,563 | - | - |
| 1972 | 77 | 13 | 55 | 696 | 684 | 1,718 | - | - |
| 1973 | 95 | 18 | 64 | 807 | 779 | 1,869 | - | - |
| 1974 | 97 | 16 | 60 | 735 | 1,169 | 1,954 | - | - |
| 1975 | 116 | 45 | 52 | 285 | 603 | 1,503 | - | - |
| 1976 | 124 | 20 | 66 | 631 | 1,130 | 2,098 | - | - |
| 1977 | 153 | 19 | 73 | 900 | 2,249 | 2,460 | - | - |
| 1978 | 169 | 20 | 104 | 1,275 | 3,271 | 2,395 | - | - |
| 1979 | 195 | 37 | 137 | 1,698 | 3,327 | 2,542 | - | - |
| 1980 | 189 | 37 | 124 | 1,455 | 3,666 | 3,321 | - | - |
| 1981 | 192 | 32 | 286 | 1,196 | 4,634 | 3,323 | - | - |
| 1982 | 175 | 39 | 267 | 1,284 | 5,744 | 3,677 | - | - |
| 1983 | 223 | 51 | 294 | 1,604 | 4,346 | 4,090 | - | - |
| 1984 | 337 | 60 | 364 | 1,718 | 5,517 | 6,244 | - | - |
| 1985 | 541 | 157 | 525 | 1,871 | 9,784 | 11,328 | - | - |
| 1986 | 919 | 150 | 352 | 3,475 | 16,280 | 16,947 | - | - |
| 1987 | 1,245 | 160 | 470 | 4,045 | 18,891 | 18,845 | - | - |
| 1988 | 1,466 | 134 | 828 | 4,837 | 23,865 | 20,839 | - | - |
| 1989 | 1,668 | 316 | 970 | 5,454 | 26,945 | 21,981 | - | - |
| 1990 | 1,816 | 530 | 1,633 | 6,517 | 28,241 | 20,053 | - | - |
| 1991 | 1,982 | 497 | 1,678 | 8,384 | 26,398 | 22,624 | - | - |
| 1992 | 2,146 | 361 | 1,022 | 9,634 | 35,916 | 24,184 | - | - |
| 1993 | 2,422 | 395 | 918 | 9,272 | 41,140 | 29,331 | - | - |
| 1994 | 2,897 | 199 | 1,101 | 9,198 | 45,504 | 36,218 | - | - |
| 1995 | 3,248 | 512 | 1,774 | 10,498 | 44,156 | 42,169 | - | - |
| 1996 | 3,846 | 650 | 1,651 | 11,876 | 40,902 | 45,612 | - | - |

| Year | Fatal | MAIS5 | MAIS4 | MAIS3 | MAIS2 | MAIS1 | MAIS0 | PDO |
|-------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|------------|
| 1997 | 4,225 | 598 | 1,787 | 13,892 | 49,289 | 50,032 | - | - |
| 1998 | 4,779 | 648 | 2,268 | 17,126 | 61,076 | 61,525 | - | - |
| 1999 | 5,114 | 1,094 | 2,321 | 17,778 | 71,689 | 67,550 | - | - |
| 2000 | 6,103 | 1,549 | 2,699 | 18,980 | 74,775 | 70,358 | - | - |
| 2001 | 6,443 | 1,692 | 2,685 | 19,219 | 67,202 | 73,099 | - | - |
| 2002 | 7,410 | 1,732 | 3,278 | 20,887 | 74,970 | 74,404 | - | - |
| 2003 | 8,359 | 3,465 | 4,519 | 22,007 | 85,977 | 81,841 | - | - |
| 2004 | 8,920 | 3,216 | 7,025 | 26,047 | 95,578 | 84,172 | - | - |
| 2005 | 9,668 | 3,479 | 6,984 | 30,904 | 99,930 | 85,312 | - | - |
| 2006 | 9,810 | 2,018 | 9,097 | 32,418 | 102,485 | 82,090 | - | - |
| 2007 | 9,879 | 2,174 | 8,412 | 34,366 | 100,022 | 81,242 | - | - |
| 2008 | 9,178 | 1,947 | 8,206 | 30,106 | 88,640 | 80,455 | - | - |
| 2009 | 8,815 | 2,316 | 7,493 | 29,557 | 89,673 | 86,219 | - | - |
| 2010 | 8,981 | 2,581 | 6,938 | 30,130 | 87,218 | 91,720 | - | - |
| 2011 | 8,875 | 2,921 | 6,359 | 30,006 | 83,783 | 105,334 | - | - |
| 2012 | 9,199 | 2,605 | 6,042 | 31,832 | 87,883 | 116,357 | - | - |
| 2013 | 9,192 | 2,482 | 7,176 | 33,724 | 88,873 | 121,508 | - | - |
| 2014 | 9,863 | 1,728 | 9,327 | 32,231 | 97,102 | 114,644 | - | - |
| 2015 | 10,715 | 2,582 | 10,219 | 37,806 | 116,805 | 122,657 | - | - |
| 2016 | 11,898 | 2,875 | 10,512 | 40,299 | 115,924 | 125,955 | - | - |
| 2017 | 12,568 | 3,060 | 10,556 | 41,826 | 118,476 | 129,710 | - | - |
| 2018 | 13,161 | 3,676 | 10,732 | 42,335 | 117,117 | 133,686 | - | - |
| 2019 | 13,587 | 4,004 | 11,309 | 43,648 | 122,846 | 147,465 | - | - |

Table C-16. Total benefits for LTVs – reported and unreported

| Year | Fatal | MAIS5 | MAIS4 | MAIS3 | MAIS2 | MAIS1 | MAIS0 | PDO |
|-------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|------------|
| 1968 | 92 | 14 | 65 | 1,024 | 2,571 | 6,267 | 1,960 | 7,941 |
| 1969 | 127 | 17 | 76 | 1,211 | 6,384 | 10,042 | 3,148 | 12,902 |
| 1970 | 157 | 20 | 80 | 1,310 | 6,412 | 13,770 | 4,373 | 18,529 |
| 1971 | 188 | 23 | 85 | 1,420 | 6,770 | 16,487 | 5,243 | 23,955 |
| 1972 | 230 | 30 | 145 | 1,609 | 7,284 | 20,136 | 6,140 | 30,175 |
| 1973 | 281 | 37 | 161 | 1,827 | 9,759 | 22,657 | 6,892 | 34,368 |
| 1974 | 286 | 63 | 142 | 1,755 | 9,492 | 24,160 | 7,264 | 36,755 |
| 1975 | 316 | 122 | 142 | 996 | 8,856 | 29,618 | 9,019 | 43,697 |
| 1976 | 374 | 138 | 155 | 1,757 | 10,792 | 33,152 | 10,490 | 50,933 |
| 1977 | 488 | 128 | 177 | 2,705 | 13,541 | 36,512 | 11,574 | 60,170 |
| 1978 | 576 | 123 | 235 | 3,830 | 17,084 | 42,219 | 12,893 | 71,385 |
| 1979 | 666 | 174 | 364 | 4,754 | 19,236 | 45,334 | 13,303 | 76,755 |
| 1980 | 700 | 175 | 390 | 4,799 | 19,717 | 47,182 | 14,348 | 81,161 |
| 1981 | 710 | 218 | 655 | 4,020 | 23,049 | 47,917 | 15,001 | 84,902 |
| 1982 | 649 | 232 | 624 | 4,293 | 17,189 | 42,655 | 14,870 | 89,107 |
| 1983 | 702 | 274 | 488 | 5,108 | 12,654 | 46,536 | 16,101 | 92,847 |
| 1984 | 879 | 260 | 645 | 4,707 | 13,767 | 45,665 | 16,328 | 99,046 |
| 1985 | 1,191 | 411 | 840 | 4,694 | 20,077 | 59,323 | 19,938 | 104,640 |
| 1986 | 1,695 | 407 | 609 | 7,009 | 32,829 | 65,018 | 20,017 | 112,044 |
| 1987 | 2,186 | 417 | 896 | 8,269 | 36,548 | 70,590 | 21,847 | 117,670 |
| 1988 | 2,515 | 302 | 1,490 | 9,968 | 45,900 | 77,012 | 22,894 | 126,164 |
| 1989 | 2,780 | 533 | 1,858 | 11,139 | 50,003 | 78,870 | 23,025 | 131,474 |
| 1990 | 2,985 | 1,003 | 2,838 | 11,920 | 50,513 | 83,908 | 25,774 | 138,268 |
| 1991 | 3,203 | 1,040 | 2,850 | 14,348 | 46,129 | 89,452 | 25,302 | 134,491 |
| 1992 | 3,420 | 831 | 1,704 | 15,438 | 55,247 | 103,039 | 28,614 | 143,628 |
| 1993 | 3,798 | 802 | 1,521 | 15,337 | 62,419 | 111,961 | 29,436 | 160,181 |
| 1994 | 4,437 | 319 | 1,599 | 15,593 | 72,724 | 135,052 | 39,878 | 201,051 |
| 1995 | 4,891 | 823 | 2,435 | 17,482 | 77,071 | 159,512 | 50,526 | 256,540 |
| 1996 | 5,625 | 936 | 2,279 | 19,774 | 70,205 | 177,173 | 60,208 | 309,106 |

| Year | Fatal | MAIS5 | MAIS4 | MAIS3 | MAIS2 | MAIS1 | MAIS0 | PDO |
|-------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|------------|
| 1997 | 6,254 | 1,016 | 2,373 | 24,781 | 78,595 | 191,534 | 68,279 | 347,405 |
| 1998 | 6,928 | 1,041 | 3,099 | 29,555 | 94,776 | 212,792 | 78,933 | 389,787 |
| 1999 | 7,376 | 1,644 | 3,240 | 30,212 | 109,217 | 237,288 | 90,880 | 427,527 |
| 2000 | 8,642 | 2,105 | 5,075 | 29,540 | 114,334 | 245,266 | 105,972 | 495,232 |
| 2001 | 9,053 | 2,293 | 5,116 | 31,798 | 106,151 | 241,301 | 117,449 | 549,417 |
| 2002 | 10,401 | 2,395 | 6,228 | 34,137 | 113,429 | 247,289 | 122,957 | 589,877 |
| 2003 | 11,508 | 4,352 | 7,135 | 37,210 | 125,742 | 274,660 | 148,305 | 652,910 |
| 2004 | 12,389 | 4,087 | 9,941 | 40,027 | 136,050 | 294,843 | 154,184 | 716,085 |
| 2005 | 13,347 | 4,157 | 10,150 | 45,591 | 145,395 | 305,159 | 160,847 | 760,292 |
| 2006 | 13,573 | 2,630 | 12,084 | 46,799 | 151,955 | 303,559 | 170,231 | 815,831 |
| 2007 | 13,757 | 2,875 | 11,264 | 48,689 | 150,687 | 290,877 | 172,710 | 892,878 |
| 2008 | 12,823 | 2,656 | 11,025 | 44,398 | 134,398 | 286,872 | 168,776 | 895,687 |
| 2009 | 12,462 | 3,266 | 10,515 | 44,321 | 140,723 | 308,061 | 177,432 | 928,353 |
| 2010 | 12,478 | 3,494 | 9,940 | 45,044 | 143,847 | 346,345 | 196,379 | 951,849 |
| 2011 | 12,383 | 3,726 | 8,865 | 44,934 | 139,381 | 391,065 | 210,782 | 990,167 |
| 2012 | 13,148 | 3,576 | 8,546 | 47,922 | 149,481 | 431,488 | 243,647 | 1,127,340 |
| 2013 | 13,217 | 3,449 | 10,009 | 53,697 | 156,502 | 435,574 | 255,565 | 1,215,134 |
| 2014 | 14,203 | 2,331 | 12,150 | 52,301 | 162,430 | 442,917 | 272,491 | 1,417,484 |
| 2015 | 15,628 | 3,415 | 13,500 | 66,522 | 198,033 | 487,373 | 309,070 | 1,652,402 |
| 2016 | 17,608 | 3,838 | 14,000 | 71,448 | 200,390 | 526,726 | 349,448 | 1,619,554 |
| 2017 | 18,429 | 4,205 | 14,125 | 74,305 | 206,685 | 549,330 | 328,428 | 1,659,096 |
| 2018 | 19,704 | 4,932 | 14,331 | 75,603 | 205,476 | 562,254 | 336,081 | 1,791,846 |
| 2019 | 20,623 | 5,399 | 14,907 | 78,157 | 215,672 | 615,047 | 370,741 | 1,946,999 |

Table C-17. Total voluntary benefits for LTV standards – reported and unreported

| Year | Fatal | MAIS5 | MAIS4 | MAIS3 | MAIS2 | MAIS1 | MAIS0 | PDO |
|-------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|------------|
| 1968 | 71 | 13 | 24 | 465 | 2,000 | 4,189 | 1,483 | 6,009 |
| 1969 | 94 | 15 | 31 | 553 | 5,610 | 5,663 | 2,033 | 8,331 |
| 1970 | 110 | 15 | 35 | 612 | 5,564 | 7,196 | 2,549 | 10,800 |
| 1971 | 129 | 15 | 39 | 692 | 5,768 | 8,400 | 2,845 | 12,998 |
| 1972 | 153 | 18 | 91 | 812 | 6,111 | 10,043 | 3,175 | 15,604 |
| 1973 | 186 | 19 | 97 | 905 | 8,414 | 11,257 | 3,518 | 17,545 |
| 1974 | 189 | 47 | 82 | 913 | 7,609 | 11,880 | 3,678 | 18,614 |
| 1975 | 200 | 76 | 90 | 609 | 7,426 | 13,184 | 4,554 | 22,063 |
| 1976 | 250 | 118 | 89 | 981 | 8,691 | 15,277 | 5,284 | 25,657 |
| 1977 | 335 | 109 | 104 | 1,574 | 10,059 | 17,480 | 5,745 | 29,869 |
| 1978 | 407 | 103 | 131 | 2,180 | 12,375 | 20,345 | 6,305 | 34,906 |
| 1979 | 471 | 136 | 226 | 2,709 | 14,141 | 22,130 | 6,414 | 37,005 |
| 1980 | 510 | 139 | 266 | 3,003 | 13,995 | 22,712 | 6,859 | 38,798 |
| 1981 | 517 | 186 | 369 | 2,646 | 16,329 | 24,227 | 7,165 | 40,553 |
| 1982 | 474 | 193 | 357 | 2,788 | 9,814 | 22,390 | 7,091 | 42,493 |
| 1983 | 479 | 222 | 193 | 3,332 | 6,685 | 25,761 | 7,673 | 44,243 |
| 1984 | 542 | 200 | 281 | 2,753 | 6,433 | 23,432 | 7,763 | 47,089 |
| 1985 | 651 | 254 | 314 | 2,567 | 8,392 | 26,588 | 9,473 | 49,715 |
| 1986 | 776 | 257 | 258 | 3,243 | 14,458 | 28,227 | 9,499 | 53,167 |
| 1987 | 941 | 257 | 426 | 3,898 | 15,538 | 31,599 | 10,362 | 55,812 |
| 1988 | 1,048 | 168 | 662 | 4,785 | 19,329 | 34,068 | 10,848 | 59,781 |
| 1989 | 1,112 | 218 | 888 | 5,249 | 19,792 | 36,236 | 10,894 | 62,207 |
| 1990 | 1,169 | 473 | 1,205 | 5,037 | 17,263 | 40,243 | 11,575 | 62,096 |
| 1991 | 1,220 | 543 | 1,172 | 5,557 | 14,439 | 42,640 | 12,035 | 63,973 |
| 1992 | 1,274 | 470 | 682 | 5,450 | 14,208 | 49,464 | 13,365 | 67,083 |
| 1993 | 1,376 | 408 | 604 | 5,765 | 15,343 | 51,025 | 14,734 | 80,175 |
| 1994 | 1,540 | 119 | 499 | 6,153 | 20,484 | 65,143 | 19,761 | 99,627 |
| 1995 | 1,644 | 311 | 661 | 6,638 | 23,109 | 82,098 | 24,369 | 123,734 |
| 1996 | 1,779 | 286 | 628 | 7,366 | 23,084 | 93,987 | 30,950 | 158,898 |

| Year | Fatal | MAIS5 | MAIS4 | MAIS3 | MAIS2 | MAIS1 | MAIS0 | PDO |
|-------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|------------|
| 1997 | 2,029 | 418 | 587 | 10,086 | 21,043 | 98,491 | 35,404 | 180,139 |
| 1998 | 2,149 | 393 | 831 | 11,511 | 27,177 | 109,613 | 42,130 | 208,047 |
| 1999 | 2,262 | 550 | 919 | 11,555 | 31,359 | 124,641 | 53,012 | 249,385 |
| 2000 | 2,539 | 557 | 2,377 | 9,796 | 34,506 | 131,034 | 63,947 | 298,838 |
| 2001 | 2,610 | 601 | 2,432 | 11,827 | 33,865 | 124,467 | 71,762 | 335,693 |
| 2002 | 2,991 | 663 | 2,950 | 12,252 | 32,110 | 127,519 | 75,227 | 360,894 |
| 2003 | 3,149 | 887 | 2,617 | 14,272 | 33,571 | 139,226 | 94,486 | 415,970 |
| 2004 | 3,468 | 871 | 2,916 | 12,862 | 35,003 | 153,002 | 98,985 | 459,722 |
| 2005 | 3,679 | 678 | 3,167 | 13,581 | 39,594 | 160,180 | 107,279 | 507,087 |
| 2006 | 3,763 | 612 | 2,987 | 13,282 | 42,121 | 171,021 | 117,320 | 562,257 |
| 2007 | 3,875 | 701 | 2,851 | 13,530 | 42,421 | 160,048 | 122,287 | 632,200 |
| 2008 | 3,625 | 705 | 2,799 | 13,466 | 37,960 | 157,602 | 121,864 | 646,725 |
| 2009 | 3,609 | 947 | 3,007 | 13,761 | 41,952 | 169,224 | 126,225 | 660,430 |
| 2010 | 3,421 | 909 | 2,973 | 13,775 | 46,584 | 194,656 | 137,791 | 667,873 |
| 2011 | 3,400 | 799 | 2,448 | 13,626 | 46,210 | 219,847 | 147,437 | 692,599 |
| 2012 | 3,753 | 939 | 2,406 | 14,465 | 51,394 | 238,110 | 169,652 | 784,971 |
| 2013 | 3,768 | 924 | 2,617 | 16,322 | 55,718 | 235,432 | 177,565 | 844,266 |
| 2014 | 4,018 | 566 | 2,542 | 17,206 | 54,281 | 249,218 | 184,991 | 962,314 |
| 2015 | 4,489 | 797 | 2,891 | 24,016 | 64,969 | 269,710 | 207,196 | 1,107,748 |
| 2016 | 5,115 | 905 | 3,105 | 26,595 | 67,980 | 293,520 | 231,909 | 1,074,811 |
| 2017 | 5,187 | 1,021 | 3,158 | 27,321 | 70,967 | 305,214 | 214,720 | 1,084,686 |
| 2018 | 5,724 | 1,023 | 3,161 | 27,321 | 70,514 | 311,722 | 214,818 | 1,145,322 |
| 2019 | 6,013 | 1,108 | 3,159 | 28,022 | 73,682 | 337,259 | 235,411 | 1,236,294 |

Table C-18. Total attributable benefits for LTV standards – reported and unreported

| Year | Fatal | MAIS5 | MAIS4 | MAIS3 | MAIS2 | MAIS1 | MAIS0 | PDO |
|-------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|------------|
| 1968 | 21 | 1 | 40 | 558 | 571 | 2,079 | 477 | 1,932 |
| 1969 | 34 | 2 | 45 | 658 | 774 | 4,379 | 1,115 | 4,571 |
| 1970 | 47 | 5 | 45 | 698 | 847 | 6,574 | 1,824 | 7,729 |
| 1971 | 60 | 8 | 46 | 728 | 1,002 | 8,087 | 2,398 | 10,957 |
| 1972 | 77 | 13 | 55 | 798 | 1,173 | 10,093 | 2,965 | 14,572 |
| 1973 | 95 | 18 | 64 | 923 | 1,345 | 11,400 | 3,373 | 16,822 |
| 1974 | 97 | 16 | 60 | 842 | 1,883 | 12,280 | 3,585 | 18,141 |
| 1975 | 116 | 45 | 52 | 387 | 1,430 | 16,434 | 4,465 | 21,634 |
| 1976 | 124 | 20 | 66 | 776 | 2,101 | 17,875 | 5,206 | 25,276 |
| 1977 | 153 | 19 | 73 | 1,131 | 3,482 | 19,032 | 5,829 | 30,301 |
| 1978 | 169 | 20 | 104 | 1,650 | 4,708 | 21,874 | 6,589 | 36,479 |
| 1979 | 195 | 37 | 137 | 2,046 | 5,095 | 23,204 | 6,890 | 39,750 |
| 1980 | 189 | 37 | 124 | 1,796 | 5,721 | 24,471 | 7,489 | 42,363 |
| 1981 | 192 | 32 | 286 | 1,374 | 6,720 | 23,690 | 7,836 | 44,348 |
| 1982 | 175 | 39 | 267 | 1,505 | 7,375 | 20,265 | 7,779 | 46,615 |
| 1983 | 223 | 51 | 294 | 1,776 | 5,968 | 20,774 | 8,429 | 48,604 |
| 1984 | 337 | 60 | 364 | 1,955 | 7,334 | 22,233 | 8,565 | 51,957 |
| 1985 | 541 | 157 | 525 | 2,127 | 11,685 | 32,735 | 10,465 | 54,924 |
| 1986 | 919 | 150 | 352 | 3,766 | 18,371 | 36,791 | 10,519 | 58,877 |
| 1987 | 1,245 | 160 | 470 | 4,371 | 21,010 | 38,991 | 11,485 | 61,858 |
| 1988 | 1,466 | 134 | 828 | 5,183 | 26,571 | 42,944 | 12,046 | 66,382 |
| 1989 | 1,668 | 316 | 970 | 5,890 | 30,211 | 42,634 | 12,131 | 69,267 |
| 1990 | 1,816 | 530 | 1,633 | 6,882 | 33,250 | 43,665 | 14,199 | 76,173 |
| 1991 | 1,982 | 497 | 1,678 | 8,791 | 31,691 | 46,812 | 13,266 | 70,518 |
| 1992 | 2,146 | 361 | 1,022 | 9,988 | 41,039 | 53,575 | 15,250 | 76,545 |
| 1993 | 2,422 | 395 | 918 | 9,572 | 47,075 | 60,936 | 14,703 | 80,006 |
| 1994 | 2,897 | 199 | 1,101 | 9,440 | 52,239 | 69,909 | 20,117 | 101,424 |
| 1995 | 3,248 | 512 | 1,774 | 10,845 | 53,963 | 77,413 | 26,156 | 132,806 |
| 1996 | 3,846 | 650 | 1,651 | 12,408 | 47,121 | 83,185 | 29,258 | 150,209 |

| Year | Fatal | MAIS5 | MAIS4 | MAIS3 | MAIS2 | MAIS1 | MAIS0 | PDO |
|-------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|------------|
| 1997 | 4,225 | 598 | 1,787 | 14,695 | 57,553 | 93,043 | 32,874 | 167,266 |
| 1998 | 4,779 | 648 | 2,268 | 18,044 | 67,599 | 103,180 | 36,803 | 181,740 |
| 1999 | 5,114 | 1,094 | 2,321 | 18,657 | 77,858 | 112,647 | 37,868 | 178,142 |
| 2000 | 6,103 | 1,549 | 2,699 | 19,744 | 79,827 | 114,232 | 42,025 | 196,394 |
| 2001 | 6,443 | 1,692 | 2,685 | 19,971 | 72,286 | 116,834 | 45,688 | 213,723 |
| 2002 | 7,410 | 1,732 | 3,278 | 21,886 | 81,318 | 119,770 | 47,730 | 228,983 |
| 2003 | 8,359 | 3,465 | 4,519 | 22,938 | 92,171 | 135,435 | 53,820 | 236,940 |
| 2004 | 8,920 | 3,216 | 7,025 | 27,166 | 101,048 | 141,841 | 55,199 | 256,363 |
| 2005 | 9,668 | 3,479 | 6,984 | 32,011 | 105,801 | 144,979 | 53,568 | 253,205 |
| 2006 | 9,811 | 2,018 | 9,097 | 33,517 | 109,834 | 132,537 | 52,911 | 253,574 |
| 2007 | 9,883 | 2,174 | 8,413 | 35,159 | 108,266 | 130,829 | 50,423 | 260,678 |
| 2008 | 9,198 | 1,951 | 8,226 | 30,932 | 96,437 | 129,270 | 46,912 | 248,962 |
| 2009 | 8,853 | 2,319 | 7,508 | 30,560 | 98,771 | 138,837 | 51,207 | 267,923 |
| 2010 | 9,057 | 2,585 | 6,967 | 31,269 | 97,264 | 151,690 | 58,588 | 283,975 |
| 2011 | 8,983 | 2,927 | 6,416 | 31,308 | 93,171 | 171,218 | 63,345 | 297,568 |
| 2012 | 9,395 | 2,637 | 6,140 | 33,457 | 98,088 | 193,378 | 73,995 | 342,370 |
| 2013 | 9,449 | 2,525 | 7,392 | 37,374 | 100,784 | 200,142 | 78,000 | 370,868 |
| 2014 | 10,185 | 1,765 | 9,608 | 35,096 | 108,149 | 193,699 | 87,500 | 455,170 |
| 2015 | 11,139 | 2,617 | 10,608 | 42,507 | 133,064 | 217,663 | 101,874 | 544,654 |
| 2016 | 12,493 | 2,933 | 10,895 | 44,853 | 132,409 | 233,207 | 117,538 | 544,744 |
| 2017 | 13,241 | 3,184 | 10,967 | 46,984 | 135,718 | 244,116 | 113,708 | 574,411 |
| 2018 | 13,980 | 3,910 | 11,170 | 48,282 | 134,962 | 250,532 | 121,263 | 646,525 |
| 2019 | 14,609 | 4,290 | 11,748 | 50,135 | 141,990 | 277,788 | 135,330 | 710,705 |

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Appendix D: Value of Safety Benefits Based on Comprehensive Costs

Appendix D tables show the comprehensive value of safety benefits by injury level broken out by vehicle type (passenger cars versus LTVs), technology category (CA versus CW), and attribution status (attributable to FMVSS versus voluntary).

Table D-1. Comprehensive cost – total CA benefits – passenger cars by CY (millions in 2019\$)

| Year | Fatal | MAIS5 | MAIS4 | MAIS3 | MAIS2 | MAIS1 | MAIS0 | PDO | Total |
|-------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|------------|--------------|
| 1968 | 36 | 4 | 6 | 118 | 141 | 395 | 21 | 164 | 885 |
| 1969 | 70 | 11 | 12 | 244 | 349 | 934 | 34 | 267 | 1,922 |
| 1970 | 113 | 17 | 17 | 415 | 644 | 1,350 | 49 | 381 | 2,987 |
| 1971 | 163 | 26 | 24 | 604 | 1,008 | 1,914 | 64 | 491 | 4,294 |
| 1972 | 214 | 34 | 30 | 813 | 1,440 | 2,410 | 80 | 611 | 5,633 |
| 1973 | 271 | 39 | 39 | 985 | 1,906 | 2,869 | 90 | 678 | 6,877 |
| 1974 | 316 | 38 | 42 | 1,190 | 2,287 | 3,086 | 94 | 709 | 7,763 |
| 1975 | 387 | 48 | 47 | 1,467 | 2,699 | 3,562 | 106 | 807 | 9,122 |
| 1976 | 477 | 61 | 58 | 1,654 | 3,094 | 3,916 | 117 | 892 | 10,269 |
| 1977 | 541 | 73 | 67 | 1,806 | 3,430 | 4,375 | 135 | 1,010 | 11,437 |
| 1978 | 610 | 90 | 80 | 2,026 | 3,528 | 4,919 | 151 | 1,117 | 12,522 |
| 1979 | 679 | 102 | 92 | 2,125 | 3,617 | 5,544 | 159 | 1,161 | 13,478 |
| 1980 | 720 | 113 | 102 | 2,403 | 3,756 | 5,513 | 164 | 1,200 | 13,971 |
| 1981 | 808 | 125 | 100 | 2,652 | 3,873 | 5,448 | 168 | 1,227 | 14,400 |
| 1982 | 881 | 144 | 102 | 2,860 | 4,091 | 5,198 | 174 | 1,260 | 14,711 |
| 1983 | 906 | 140 | 113 | 2,558 | 4,563 | 5,176 | 181 | 1,315 | 14,952 |
| 1984 | 956 | 185 | 126 | 2,824 | 4,786 | 5,222 | 191 | 1,366 | 15,657 |
| 1985 | 842 | 152 | 135 | 2,835 | 4,141 | 4,982 | 198 | 1,453 | 14,740 |
| 1986 | 820 | 143 | 141 | 2,688 | 4,261 | 5,092 | 217 | 1,580 | 14,944 |
| 1987 | 815 | 154 | 146 | 2,822 | 4,523 | 5,310 | 237 | 1,741 | 15,749 |
| 1988 | 818 | 166 | 134 | 2,582 | 4,507 | 5,242 | 260 | 1,899 | 15,607 |
| 1989 | 846 | 151 | 130 | 2,348 | 4,298 | 5,111 | 272 | 1,900 | 15,056 |
| 1990 | 892 | 145 | 127 | 2,513 | 4,276 | 4,711 | 294 | 2,084 | 15,042 |
| 1991 | 887 | 144 | 131 | 2,863 | 5,026 | 4,719 | 302 | 2,102 | 16,175 |
| 1992 | 918 | 137 | 136 | 2,923 | 6,370 | 5,157 | 312 | 2,126 | 18,079 |
| 1993 | 966 | 146 | 153 | 4,157 | 8,633 | 5,915 | 345 | 2,292 | 22,608 |
| 1994 | 988 | 203 | 178 | 4,219 | 9,017 | 6,672 | 383 | 2,573 | 24,232 |

| Year | Fatal | MAIS5 | MAIS4 | MAIS3 | MAIS2 | MAIS1 | MAIS0 | PDO | Total |
|-------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|------------|--------------|
| 1995 | 1,056 | 233 | 215 | 4,884 | 8,813 | 7,932 | 446 | 2,978 | 26,556 |
| 1996 | 1,130 | 272 | 251 | 4,805 | 7,649 | 9,592 | 480 | 3,115 | 27,294 |
| 1997 | 1,188 | 253 | 290 | 5,007 | 7,521 | 10,100 | 484 | 3,281 | 28,123 |
| 1998 | 1,230 | 241 | 299 | 5,545 | 6,792 | 9,451 | 454 | 3,245 | 27,256 |
| 1999 | 1,293 | 223 | 303 | 5,033 | 8,070 | 8,836 | 444 | 3,199 | 27,401 |
| 2000 | 1,395 | 228 | 245 | 5,260 | 8,971 | 8,410 | 481 | 3,499 | 28,489 |
| 2001 | 1,533 | 249 | 276 | 4,764 | 10,214 | 8,313 | 482 | 3,600 | 29,431 |
| 2002 | 1,587 | 290 | 266 | 5,105 | 10,124 | 7,855 | 476 | 3,722 | 29,425 |
| 2003 | 1,742 | 543 | 729 | 5,463 | 8,851 | 7,728 | 507 | 3,892 | 29,456 |
| 2004 | 1,996 | 571 | 819 | 6,081 | 8,192 | 7,679 | 492 | 3,944 | 29,774 |
| 2005 | 2,266 | 778 | 813 | 5,663 | 7,812 | 7,379 | 468 | 4,058 | 29,236 |
| 2006 | 2,482 | 533 | 495 | 6,119 | 7,911 | 7,032 | 462 | 4,049 | 29,083 |
| 2007 | 2,989 | 492 | 567 | 6,164 | 9,254 | 7,295 | 472 | 4,178 | 31,410 |
| 2008 | 3,331 | 515 | 585 | 6,446 | 9,377 | 7,369 | 475 | 4,264 | 32,362 |
| 2009 | 3,466 | 565 | 721 | 6,833 | 8,294 | 7,297 | 456 | 4,092 | 31,725 |
| 2010 | 4,032 | 1,316 | 761 | 6,828 | 7,886 | 7,588 | 489 | 4,487 | 33,389 |
| 2011 | 4,972 | 1,825 | 1,188 | 8,227 | 8,129 | 8,083 | 488 | 4,713 | 37,624 |
| 2012 | 6,096 | 1,815 | 1,776 | 8,268 | 8,251 | 9,181 | 572 | 5,331 | 41,291 |
| 2013 | 7,134 | 1,439 | 1,582 | 8,642 | 8,631 | 9,857 | 623 | 5,857 | 43,764 |
| 2014 | 8,806 | 2,299 | 2,027 | 9,459 | 9,659 | 11,315 | 741 | 6,869 | 51,176 |
| 2015 | 10,349 | 1,670 | 2,115 | 9,570 | 11,449 | 12,762 | 867 | 7,954 | 56,737 |
| 2016 | 11,188 | 2,080 | 2,630 | 12,243 | 13,211 | 14,526 | 994 | 8,156 | 65,027 |
| 2017 | 12,800 | 2,157 | 2,862 | 13,373 | 14,495 | 15,482 | 979 | 8,429 | 70,578 |
| 2018 | 13,743 | 2,258 | 3,412 | 15,769 | 15,780 | 16,148 | 1,002 | 9,193 | 77,306 |
| 2019 | 15,102 | 2,361 | 3,737 | 16,891 | 16,868 | 16,811 | 1,052 | 9,788 | 82,609 |

Table D-2. Comprehensive cost – voluntary CA benefits – passenger cars by CY (millions in 2019\$)

| Year | Fatal | MAIS5 | MAIS4 | MAIS3 | MAIS2 | MAIS1 | MAIS0 | PDO | Total |
|------|-------|-------|-------|-------|-------|-------|-------|-------|--------|
| 1968 | 36 | 4 | 6 | 77 | 103 | 277 | 15 | 118 | 637 |
| 1969 | 70 | 11 | 12 | 143 | 196 | 518 | 21 | 161 | 1,132 |
| 1970 | 113 | 17 | 17 | 229 | 324 | 711 | 26 | 204 | 1,641 |
| 1971 | 163 | 26 | 24 | 336 | 498 | 906 | 31 | 242 | 2,226 |
| 1972 | 214 | 34 | 30 | 457 | 674 | 1,070 | 37 | 285 | 2,801 |
| 1973 | 271 | 39 | 39 | 545 | 884 | 1,183 | 41 | 311 | 3,314 |
| 1974 | 316 | 38 | 42 | 638 | 1,007 | 1,210 | 43 | 322 | 3,616 |
| 1975 | 387 | 48 | 47 | 822 | 1,193 | 1,317 | 48 | 364 | 4,226 |
| 1976 | 477 | 61 | 58 | 953 | 1,319 | 1,477 | 53 | 401 | 4,798 |
| 1977 | 541 | 73 | 67 | 1,022 | 1,351 | 1,589 | 60 | 447 | 5,150 |
| 1978 | 610 | 90 | 80 | 1,112 | 1,366 | 1,706 | 66 | 486 | 5,517 |
| 1979 | 679 | 102 | 92 | 1,183 | 1,355 | 1,821 | 68 | 497 | 5,797 |
| 1980 | 720 | 113 | 102 | 1,288 | 1,402 | 1,811 | 69 | 509 | 6,014 |
| 1981 | 808 | 125 | 100 | 1,427 | 1,478 | 1,808 | 71 | 520 | 6,336 |
| 1982 | 881 | 144 | 102 | 1,476 | 1,556 | 1,717 | 74 | 532 | 6,480 |
| 1983 | 906 | 140 | 113 | 1,482 | 1,685 | 1,689 | 76 | 555 | 6,646 |
| 1984 | 956 | 185 | 126 | 1,649 | 1,701 | 1,736 | 80 | 575 | 7,009 |
| 1985 | 842 | 152 | 135 | 1,553 | 1,498 | 1,698 | 83 | 610 | 6,571 |
| 1986 | 820 | 143 | 141 | 1,456 | 1,474 | 1,766 | 88 | 641 | 6,529 |
| 1987 | 815 | 154 | 146 | 1,524 | 1,567 | 1,802 | 92 | 677 | 6,779 |
| 1988 | 818 | 166 | 134 | 1,423 | 1,597 | 1,736 | 97 | 710 | 6,680 |
| 1989 | 846 | 151 | 130 | 1,424 | 1,603 | 1,676 | 98 | 684 | 6,612 |
| 1990 | 892 | 145 | 127 | 1,465 | 1,628 | 1,577 | 101 | 713 | 6,647 |
| 1991 | 887 | 144 | 131 | 1,559 | 1,816 | 1,593 | 101 | 704 | 6,935 |
| 1992 | 918 | 137 | 136 | 1,603 | 2,070 | 1,712 | 108 | 734 | 7,419 |
| 1993 | 966 | 146 | 153 | 1,970 | 2,876 | 2,006 | 123 | 815 | 9,055 |
| 1994 | 988 | 203 | 178 | 2,165 | 3,132 | 2,333 | 142 | 954 | 10,093 |
| 1995 | 1,056 | 233 | 215 | 2,470 | 3,214 | 3,038 | 172 | 1,151 | 11,549 |
| 1996 | 1,130 | 272 | 251 | 2,559 | 3,225 | 3,744 | 195 | 1,264 | 12,641 |

| Year | Fatal | MAIS5 | MAIS4 | MAIS3 | MAIS2 | MAIS1 | MAIS0 | PDO | Total |
|-------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|------------|--------------|
| 1997 | 1,188 | 253 | 290 | 2,618 | 3,463 | 4,231 | 200 | 1,360 | 13,602 |
| 1998 | 1,230 | 241 | 299 | 3,052 | 3,304 | 4,103 | 200 | 1,431 | 13,860 |
| 1999 | 1,293 | 223 | 303 | 3,266 | 3,823 | 3,961 | 217 | 1,567 | 14,655 |
| 2000 | 1,395 | 228 | 245 | 3,463 | 4,369 | 4,087 | 248 | 1,804 | 15,838 |
| 2001 | 1,533 | 249 | 276 | 3,219 | 4,620 | 4,455 | 254 | 1,893 | 16,499 |
| 2002 | 1,587 | 290 | 266 | 3,314 | 4,925 | 4,402 | 255 | 1,996 | 17,035 |
| 2003 | 1,742 | 543 | 729 | 3,884 | 4,522 | 4,279 | 284 | 2,181 | 18,165 |
| 2004 | 1,996 | 571 | 819 | 4,196 | 4,394 | 4,271 | 279 | 2,241 | 18,768 |
| 2005 | 2,266 | 778 | 813 | 3,933 | 4,476 | 4,166 | 276 | 2,396 | 19,104 |
| 2006 | 2,481 | 533 | 495 | 4,275 | 4,475 | 4,099 | 281 | 2,465 | 19,105 |
| 2007 | 2,969 | 480 | 557 | 4,449 | 5,281 | 4,296 | 295 | 2,610 | 20,937 |
| 2008 | 3,227 | 486 | 516 | 4,702 | 5,446 | 4,341 | 299 | 2,684 | 21,701 |
| 2009 | 3,232 | 487 | 580 | 4,875 | 4,905 | 4,262 | 286 | 2,565 | 21,193 |
| 2010 | 3,418 | 1,097 | 629 | 4,739 | 4,484 | 4,328 | 300 | 2,749 | 21,743 |
| 2011 | 3,852 | 1,469 | 812 | 5,812 | 4,663 | 4,449 | 293 | 2,826 | 24,176 |
| 2012 | 4,237 | 1,528 | 956 | 6,030 | 4,539 | 4,868 | 333 | 3,108 | 25,600 |
| 2013 | 4,426 | 719 | 806 | 5,515 | 4,473 | 5,125 | 353 | 3,315 | 24,730 |
| 2014 | 5,052 | 1,027 | 919 | 5,704 | 5,220 | 5,944 | 406 | 3,761 | 28,033 |
| 2015 | 5,339 | 806 | 997 | 4,914 | 5,869 | 6,617 | 457 | 4,188 | 29,185 |
| 2016 | 5,788 | 915 | 1,082 | 5,791 | 6,322 | 7,399 | 515 | 4,224 | 32,036 |
| 2017 | 6,074 | 921 | 1,133 | 5,949 | 6,834 | 7,707 | 496 | 4,270 | 33,383 |
| 2018 | 6,158 | 883 | 1,222 | 6,400 | 7,356 | 7,913 | 488 | 4,476 | 34,896 |
| 2019 | 6,472 | 899 | 1,291 | 6,607 | 7,695 | 8,080 | 509 | 4,738 | 36,291 |

Table D-3. Comprehensive cost – attributable CA benefits – passenger cars by CY (millions in 2019\$)

| Year | Fatal | MAIS5 | MAIS4 | MAIS3 | MAIS2 | MAIS1 | MAIS0 | PDO | Total |
|------|-------|-------|-------|-------|-------|-------|-------|-------|--------|
| 1968 | - | - | - | 41 | 38 | 118 | 6 | 45 | 248 |
| 1969 | - | - | - | 101 | 153 | 416 | 14 | 106 | 790 |
| 1970 | - | - | - | 186 | 320 | 640 | 23 | 177 | 1,346 |
| 1971 | - | - | - | 268 | 511 | 1,009 | 32 | 249 | 2,069 |
| 1972 | - | - | - | 356 | 766 | 1,341 | 43 | 326 | 2,832 |
| 1973 | - | - | - | 440 | 1,022 | 1,686 | 49 | 367 | 3,563 |
| 1974 | - | - | - | 552 | 1,280 | 1,876 | 52 | 388 | 4,147 |
| 1975 | - | - | - | 645 | 1,506 | 2,244 | 58 | 443 | 4,896 |
| 1976 | - | - | - | 702 | 1,775 | 2,438 | 65 | 491 | 5,471 |
| 1977 | - | - | - | 784 | 2,078 | 2,786 | 75 | 564 | 6,287 |
| 1978 | - | - | - | 913 | 2,162 | 3,213 | 85 | 631 | 7,006 |
| 1979 | - | - | - | 942 | 2,262 | 3,723 | 91 | 664 | 7,681 |
| 1980 | - | - | - | 1,115 | 2,354 | 3,703 | 94 | 691 | 7,958 |
| 1981 | - | - | - | 1,225 | 2,395 | 3,640 | 97 | 708 | 8,064 |
| 1982 | - | - | - | 1,385 | 2,536 | 3,482 | 101 | 728 | 8,231 |
| 1983 | - | - | - | 1,077 | 2,878 | 3,487 | 105 | 760 | 8,306 |
| 1984 | - | - | - | 1,175 | 3,086 | 3,486 | 110 | 791 | 8,648 |
| 1985 | - | - | - | 1,283 | 2,644 | 3,284 | 115 | 843 | 8,168 |
| 1986 | - | - | - | 1,232 | 2,788 | 3,326 | 129 | 939 | 8,415 |
| 1987 | - | - | - | 1,298 | 2,956 | 3,508 | 145 | 1,064 | 8,971 |
| 1988 | - | - | - | 1,159 | 2,910 | 3,507 | 163 | 1,189 | 8,927 |
| 1989 | - | - | - | 924 | 2,695 | 3,435 | 174 | 1,216 | 8,444 |
| 1990 | - | - | - | 1,048 | 2,647 | 3,134 | 194 | 1,371 | 8,394 |
| 1991 | - | - | - | 1,304 | 3,210 | 3,127 | 201 | 1,399 | 9,240 |
| 1992 | - | - | - | 1,320 | 4,300 | 3,445 | 204 | 1,392 | 10,661 |
| 1993 | - | - | - | 2,187 | 5,757 | 3,909 | 223 | 1,478 | 13,553 |
| 1994 | - | - | - | 2,054 | 5,886 | 4,340 | 241 | 1,619 | 14,139 |
| 1995 | - | - | - | 2,413 | 5,599 | 4,893 | 274 | 1,827 | 15,007 |
| 1996 | - | - | - | 2,246 | 4,423 | 5,848 | 285 | 1,850 | 14,653 |

| Year | Fatal | MAIS5 | MAIS4 | MAIS3 | MAIS2 | MAIS1 | MAIS0 | PDO | Total |
|-------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|------------|--------------|
| 1997 | - | - | - | 2,389 | 4,058 | 5,869 | 283 | 1,921 | 14,520 |
| 1998 | - | - | - | 2,493 | 3,488 | 5,348 | 254 | 1,814 | 13,396 |
| 1999 | - | - | - | 1,767 | 4,247 | 4,874 | 227 | 1,632 | 12,746 |
| 2000 | - | - | - | 1,797 | 4,603 | 4,323 | 233 | 1,695 | 12,651 |
| 2001 | - | - | - | 1,544 | 5,594 | 3,858 | 229 | 1,707 | 12,932 |
| 2002 | - | - | - | 1,791 | 5,200 | 3,453 | 221 | 1,726 | 12,390 |
| 2003 | - | - | - | 1,578 | 4,329 | 3,449 | 223 | 1,711 | 11,290 |
| 2004 | 0 | - | 0 | 1,885 | 3,798 | 3,408 | 212 | 1,703 | 11,006 |
| 2005 | 0 | - | 0 | 1,730 | 3,336 | 3,212 | 192 | 1,663 | 10,132 |
| 2006 | 0 | - | 0 | 1,844 | 3,436 | 2,933 | 181 | 1,584 | 9,979 |
| 2007 | 20 | 11 | 10 | 1,714 | 3,974 | 2,998 | 177 | 1,568 | 10,474 |
| 2008 | 104 | 30 | 69 | 1,744 | 3,931 | 3,028 | 176 | 1,580 | 10,661 |
| 2009 | 234 | 78 | 141 | 1,957 | 3,389 | 3,035 | 170 | 1,527 | 10,531 |
| 2010 | 615 | 219 | 132 | 2,089 | 3,402 | 3,260 | 190 | 1,739 | 11,646 |
| 2011 | 1,120 | 356 | 376 | 2,414 | 3,465 | 3,634 | 195 | 1,887 | 13,448 |
| 2012 | 1,859 | 287 | 820 | 2,238 | 3,712 | 4,313 | 238 | 2,223 | 15,691 |
| 2013 | 2,709 | 719 | 776 | 3,128 | 4,158 | 4,732 | 270 | 2,542 | 19,034 |
| 2014 | 3,754 | 1,272 | 1,108 | 3,754 | 4,439 | 5,371 | 336 | 3,108 | 23,143 |
| 2015 | 5,010 | 864 | 1,119 | 4,657 | 5,580 | 6,145 | 411 | 3,766 | 27,552 |
| 2016 | 5,400 | 1,165 | 1,548 | 6,451 | 6,890 | 7,127 | 479 | 3,932 | 32,991 |
| 2017 | 6,726 | 1,237 | 1,730 | 7,423 | 7,661 | 7,776 | 483 | 4,159 | 37,195 |
| 2018 | 7,586 | 1,375 | 2,189 | 9,369 | 8,424 | 8,235 | 514 | 4,718 | 42,410 |
| 2019 | 8,630 | 1,463 | 2,446 | 10,284 | 9,172 | 8,732 | 543 | 5,049 | 46,319 |

Table D-4. Comprehensive cost – total CW benefits – passenger cars by CY (millions in 2019\$)

| Year | Fatal | MAIS5 | MAIS4 | MAIS3 | MAIS2 | MAIS1 | MAIS0 | PDO | Total |
|------|--------|--------|--------|--------|--------|--------|-------|-----|---------|
| 1968 | 304 | 87 | 93 | 821 | 1,070 | 441 | - | - | 2,816 |
| 1969 | 618 | 197 | 207 | 1,782 | 2,698 | 1,011 | - | - | 6,514 |
| 1970 | 1,013 | 307 | 330 | 2,853 | 5,200 | 1,578 | - | - | 11,281 |
| 1971 | 1,494 | 388 | 462 | 4,145 | 7,948 | 1,998 | - | - | 16,435 |
| 1972 | 2,029 | 482 | 583 | 5,353 | 10,856 | 2,472 | - | - | 21,775 |
| 1973 | 2,644 | 646 | 702 | 6,857 | 13,406 | 2,793 | - | - | 27,048 |
| 1974 | 3,302 | 889 | 890 | 8,160 | 14,960 | 3,069 | - | - | 31,269 |
| 1975 | 4,235 | 1,120 | 1,144 | 10,138 | 16,512 | 3,257 | - | - | 36,406 |
| 1976 | 5,152 | 1,479 | 1,470 | 11,912 | 17,532 | 3,665 | - | - | 41,210 |
| 1977 | 6,038 | 1,822 | 1,793 | 13,847 | 18,060 | 3,927 | - | - | 45,487 |
| 1978 | 6,952 | 2,114 | 2,022 | 15,684 | 18,464 | 4,399 | - | - | 49,635 |
| 1979 | 7,898 | 2,390 | 2,107 | 17,907 | 19,522 | 4,684 | - | - | 54,509 |
| 1980 | 8,740 | 2,622 | 2,182 | 19,778 | 20,741 | 4,701 | - | - | 58,764 |
| 1981 | 9,715 | 2,824 | 2,334 | 23,323 | 21,830 | 4,741 | - | - | 64,767 |
| 1982 | 10,767 | 2,855 | 2,621 | 25,138 | 24,000 | 4,663 | - | - | 70,044 |
| 1983 | 11,793 | 3,063 | 3,215 | 26,493 | 25,379 | 4,650 | - | - | 74,593 |
| 1984 | 13,263 | 3,219 | 3,427 | 29,716 | 26,900 | 5,145 | - | - | 81,670 |
| 1985 | 15,350 | 3,499 | 3,876 | 34,143 | 29,268 | 5,810 | - | - | 91,947 |
| 1986 | 17,880 | 4,438 | 4,625 | 39,168 | 32,329 | 7,020 | - | - | 105,460 |
| 1987 | 19,867 | 4,802 | 4,663 | 41,949 | 35,887 | 7,404 | - | - | 114,571 |
| 1988 | 21,628 | 5,370 | 4,759 | 46,283 | 39,513 | 7,699 | - | - | 125,252 |
| 1989 | 23,115 | 5,417 | 4,832 | 50,545 | 45,199 | 7,963 | - | - | 137,071 |
| 1990 | 25,064 | 5,209 | 5,041 | 55,263 | 52,292 | 8,191 | - | - | 151,060 |
| 1991 | 27,148 | 5,700 | 5,823 | 56,492 | 56,800 | 7,949 | - | - | 159,913 |
| 1992 | 29,551 | 7,272 | 8,424 | 61,741 | 57,868 | 8,246 | - | - | 173,101 |
| 1993 | 33,073 | 8,653 | 9,622 | 67,528 | 56,776 | 9,121 | - | - | 184,773 |
| 1994 | 35,661 | 10,177 | 10,443 | 71,437 | 56,113 | 9,749 | - | - | 193,580 |
| 1995 | 39,101 | 8,775 | 10,094 | 73,535 | 58,789 | 11,019 | - | - | 201,313 |
| 1996 | 44,346 | 8,648 | 11,043 | 82,945 | 66,759 | 12,317 | - | - | 226,057 |

| Year | Fatal | MAIS5 | MAIS4 | MAIS3 | MAIS2 | MAIS1 | MAIS0 | PDO | Total |
|-------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|------------|--------------|
| 1997 | 47,319 | 9,749 | 11,504 | 85,904 | 71,082 | 12,533 | - | - | 238,091 |
| 1998 | 50,461 | 12,056 | 11,487 | 90,704 | 71,507 | 12,648 | - | - | 248,862 |
| 1999 | 53,286 | 11,651 | 12,145 | 91,716 | 71,209 | 12,187 | - | - | 252,194 |
| 2000 | 56,685 | 12,533 | 10,825 | 101,953 | 73,532 | 12,057 | - | - | 267,585 |
| 2001 | 60,321 | 11,411 | 11,749 | 107,314 | 77,896 | 10,825 | - | - | 279,516 |
| 2002 | 63,450 | 12,787 | 13,803 | 112,548 | 81,459 | 10,068 | - | - | 294,114 |
| 2003 | 67,079 | 10,924 | 16,330 | 113,895 | 83,315 | 10,048 | - | - | 301,590 |
| 2004 | 72,552 | 12,412 | 17,764 | 115,613 | 85,192 | 10,431 | - | - | 313,963 |
| 2005 | 76,311 | 12,089 | 19,051 | 113,093 | 82,989 | 10,140 | - | - | 313,673 |
| 2006 | 78,632 | 15,350 | 19,815 | 113,278 | 78,505 | 9,158 | - | - | 314,738 |
| 2007 | 82,739 | 16,427 | 21,468 | 113,297 | 75,557 | 8,568 | - | - | 318,056 |
| 2008 | 83,341 | 17,976 | 21,885 | 114,328 | 73,754 | 8,371 | - | - | 319,655 |
| 2009 | 83,627 | 15,808 | 20,879 | 108,131 | 67,944 | 7,782 | - | - | 304,172 |
| 2010 | 84,017 | 18,902 | 21,071 | 103,163 | 65,164 | 8,160 | - | - | 300,478 |
| 2011 | 88,493 | 21,759 | 24,187 | 103,375 | 65,316 | 8,700 | - | - | 311,831 |
| 2012 | 91,778 | 23,404 | 25,291 | 105,193 | 63,128 | 9,242 | - | - | 318,036 |
| 2013 | 94,889 | 22,605 | 24,859 | 100,714 | 61,702 | 9,486 | - | - | 314,255 |
| 2014 | 99,945 | 24,708 | 27,711 | 106,117 | 63,769 | 9,890 | - | - | 332,141 |
| 2015 | 103,850 | 21,428 | 28,107 | 103,579 | 62,659 | 10,545 | - | - | 330,169 |
| 2016 | 107,500 | 23,881 | 29,698 | 103,946 | 68,679 | 11,014 | - | - | 344,718 |
| 2017 | 111,449 | 24,088 | 30,507 | 103,456 | 72,385 | 11,513 | - | - | 353,399 |
| 2018 | 110,487 | 23,080 | 31,794 | 103,981 | 75,493 | 11,695 | - | - | 356,530 |
| 2019 | 112,614 | 22,962 | 33,033 | 105,177 | 77,768 | 11,724 | - | - | 363,279 |

Table D-5. Comprehensive cost – voluntary CW benefits – passenger cars by CY (millions in 2019\$)

| Year | Fatal | MAIS5 | MAIS4 | MAIS3 | MAIS2 | MAIS1 | MAIS0 | PDO | Total |
|------|--------|-------|-------|--------|--------|-------|-------|-----|--------|
| 1968 | 246 | 57 | 56 | 587 | 936 | 325 | - | - | 2,209 |
| 1969 | 475 | 112 | 119 | 1,242 | 2,329 | 646 | - | - | 4,923 |
| 1970 | 755 | 198 | 219 | 1,835 | 4,580 | 865 | - | - | 8,452 |
| 1971 | 1,090 | 236 | 327 | 2,737 | 6,922 | 1,067 | - | - | 12,379 |
| 1972 | 1,441 | 297 | 403 | 3,411 | 9,467 | 1,221 | - | - | 16,240 |
| 1973 | 1,822 | 447 | 477 | 4,462 | 11,524 | 1,325 | - | - | 20,057 |
| 1974 | 2,155 | 648 | 638 | 5,198 | 12,632 | 1,349 | - | - | 22,620 |
| 1975 | 2,597 | 774 | 887 | 5,911 | 13,723 | 1,416 | - | - | 25,308 |
| 1976 | 3,211 | 1,080 | 1,112 | 6,859 | 14,266 | 1,605 | - | - | 28,133 |
| 1977 | 3,820 | 1,258 | 1,315 | 8,146 | 14,416 | 1,744 | - | - | 30,698 |
| 1978 | 4,395 | 1,400 | 1,449 | 8,989 | 14,492 | 1,916 | - | - | 32,641 |
| 1979 | 5,041 | 1,480 | 1,489 | 9,966 | 15,045 | 1,979 | - | - | 34,998 |
| 1980 | 5,539 | 1,571 | 1,516 | 10,650 | 15,924 | 1,985 | - | - | 37,185 |
| 1981 | 6,193 | 1,733 | 1,728 | 11,980 | 16,238 | 2,030 | - | - | 39,902 |
| 1982 | 6,740 | 1,729 | 2,003 | 13,045 | 16,688 | 1,942 | - | - | 42,147 |
| 1983 | 7,111 | 1,908 | 2,561 | 13,365 | 16,480 | 1,908 | - | - | 43,334 |
| 1984 | 7,564 | 1,675 | 2,607 | 13,310 | 16,789 | 2,033 | - | - | 43,979 |
| 1985 | 7,798 | 1,549 | 2,120 | 14,091 | 15,737 | 2,218 | - | - | 43,513 |
| 1986 | 8,500 | 2,223 | 2,349 | 14,919 | 15,601 | 2,487 | - | - | 46,079 |
| 1987 | 9,110 | 2,411 | 2,386 | 16,041 | 17,244 | 2,578 | - | - | 49,770 |
| 1988 | 9,682 | 2,555 | 2,417 | 17,621 | 18,551 | 2,636 | - | - | 53,462 |
| 1989 | 10,254 | 2,559 | 2,494 | 19,513 | 21,688 | 2,733 | - | - | 59,240 |
| 1990 | 10,934 | 1,854 | 2,418 | 23,552 | 26,584 | 2,710 | - | - | 68,053 |
| 1991 | 11,407 | 1,934 | 2,720 | 24,660 | 28,159 | 2,541 | - | - | 71,422 |
| 1992 | 12,187 | 2,769 | 3,230 | 28,044 | 26,843 | 2,529 | - | - | 75,602 |
| 1993 | 13,090 | 3,014 | 4,503 | 25,128 | 22,241 | 2,684 | - | - | 70,659 |
| 1994 | 13,874 | 3,556 | 4,733 | 25,195 | 21,318 | 2,887 | - | - | 71,563 |
| 1995 | 15,013 | 2,793 | 5,231 | 25,041 | 22,220 | 3,505 | - | - | 73,802 |
| 1996 | 16,482 | 2,745 | 4,190 | 31,799 | 27,053 | 4,265 | - | - | 86,534 |

| Year | Fatal | MAIS5 | MAIS4 | MAIS3 | MAIS2 | MAIS1 | MAIS0 | PDO | Total |
|-------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|------------|--------------|
| 1997 | 17,330 | 3,071 | 4,516 | 32,712 | 28,524 | 4,234 | - | - | 90,387 |
| 1998 | 18,236 | 3,585 | 4,224 | 32,986 | 27,292 | 4,472 | - | - | 90,795 |
| 1999 | 18,570 | 3,677 | 4,125 | 30,027 | 24,509 | 3,328 | - | - | 84,236 |
| 2000 | 19,576 | 4,149 | 3,355 | 33,980 | 24,830 | 3,329 | - | - | 89,220 |
| 2001 | 20,589 | 3,685 | 3,540 | 34,687 | 27,742 | 3,038 | - | - | 93,281 |
| 2002 | 21,386 | 4,739 | 4,558 | 37,045 | 30,822 | 2,780 | - | - | 101,331 |
| 2003 | 22,006 | 3,662 | 5,234 | 37,094 | 31,872 | 2,732 | - | - | 102,600 |
| 2004 | 23,637 | 4,462 | 5,750 | 36,480 | 30,628 | 2,604 | - | - | 103,561 |
| 2005 | 24,936 | 3,687 | 6,259 | 34,644 | 29,734 | 2,531 | - | - | 101,791 |
| 2006 | 25,488 | 4,628 | 6,522 | 35,129 | 28,379 | 2,272 | - | - | 102,418 |
| 2007 | 26,871 | 5,234 | 7,102 | 35,307 | 28,798 | 2,152 | - | - | 105,463 |
| 2008 | 26,885 | 5,664 | 7,454 | 35,527 | 28,307 | 2,134 | - | - | 105,972 |
| 2009 | 26,873 | 5,123 | 7,196 | 33,378 | 26,052 | 1,960 | - | - | 100,582 |
| 2010 | 26,813 | 6,264 | 7,181 | 32,344 | 25,052 | 1,997 | - | - | 99,651 |
| 2011 | 28,270 | 7,437 | 7,925 | 32,280 | 24,883 | 2,113 | - | - | 102,910 |
| 2012 | 29,284 | 7,695 | 8,158 | 34,622 | 22,650 | 2,284 | - | - | 104,693 |
| 2013 | 30,223 | 7,855 | 8,137 | 34,474 | 22,347 | 2,393 | - | - | 105,429 |
| 2014 | 31,807 | 7,432 | 9,879 | 37,953 | 23,468 | 2,564 | - | - | 113,103 |
| 2015 | 33,010 | 6,156 | 10,145 | 34,954 | 23,683 | 2,715 | - | - | 110,662 |
| 2016 | 33,864 | 7,191 | 10,394 | 35,167 | 26,403 | 2,938 | - | - | 115,957 |
| 2017 | 35,250 | 7,243 | 10,615 | 35,033 | 27,914 | 3,074 | - | - | 119,129 |
| 2018 | 35,058 | 6,939 | 10,996 | 35,520 | 29,323 | 3,072 | - | - | 120,906 |
| 2019 | 35,256 | 6,861 | 11,416 | 36,166 | 30,138 | 3,134 | - | - | 122,972 |

Table D-6. Comprehensive cost – attributable CW benefits – passenger cars by CY (millions in 2019\$)

| Year | Fatal | MAIS5 | MAIS4 | MAIS3 | MAIS2 | MAIS1 | MAIS0 | PDO | Total |
|------|--------|-------|-------|--------|--------|-------|-------|-----|---------|
| 1968 | 58 | 29 | 37 | 234 | 134 | 116 | - | - | 607 |
| 1969 | 143 | 85 | 88 | 541 | 369 | 365 | - | - | 1,591 |
| 1970 | 258 | 109 | 111 | 1,018 | 620 | 713 | - | - | 2,830 |
| 1971 | 404 | 153 | 134 | 1,408 | 1,026 | 931 | - | - | 4,055 |
| 1972 | 588 | 185 | 180 | 1,942 | 1,389 | 1,251 | - | - | 5,535 |
| 1973 | 822 | 199 | 224 | 2,395 | 1,883 | 1,468 | - | - | 6,991 |
| 1974 | 1,146 | 240 | 252 | 2,962 | 2,329 | 1,720 | - | - | 8,650 |
| 1975 | 1,638 | 346 | 257 | 4,227 | 2,789 | 1,841 | - | - | 11,098 |
| 1976 | 1,941 | 399 | 358 | 5,052 | 3,266 | 2,061 | - | - | 13,077 |
| 1977 | 2,218 | 564 | 478 | 5,701 | 3,644 | 2,183 | - | - | 14,788 |
| 1978 | 2,557 | 714 | 573 | 6,696 | 3,971 | 2,482 | - | - | 16,994 |
| 1979 | 2,857 | 910 | 618 | 7,942 | 4,477 | 2,706 | - | - | 19,510 |
| 1980 | 3,201 | 1,051 | 666 | 9,127 | 4,817 | 2,716 | - | - | 21,579 |
| 1981 | 3,522 | 1,091 | 606 | 11,342 | 5,592 | 2,711 | - | - | 24,865 |
| 1982 | 4,027 | 1,127 | 618 | 12,093 | 7,313 | 2,720 | - | - | 27,897 |
| 1983 | 4,682 | 1,155 | 654 | 13,128 | 8,899 | 2,741 | - | - | 31,259 |
| 1984 | 5,699 | 1,544 | 819 | 16,405 | 10,111 | 3,112 | - | - | 37,691 |
| 1985 | 7,552 | 1,950 | 1,756 | 20,053 | 13,531 | 3,592 | - | - | 48,434 |
| 1986 | 9,380 | 2,216 | 2,276 | 24,249 | 16,728 | 4,533 | - | - | 59,381 |
| 1987 | 10,757 | 2,391 | 2,276 | 25,908 | 18,643 | 4,826 | - | - | 64,801 |
| 1988 | 11,945 | 2,815 | 2,343 | 28,662 | 20,961 | 5,063 | - | - | 71,789 |
| 1989 | 12,861 | 2,858 | 2,338 | 31,032 | 23,512 | 5,230 | - | - | 77,831 |
| 1990 | 14,129 | 3,355 | 2,623 | 31,711 | 25,708 | 5,481 | - | - | 83,007 |
| 1991 | 15,741 | 3,766 | 3,103 | 31,832 | 28,641 | 5,408 | - | - | 88,491 |
| 1992 | 17,364 | 4,504 | 5,194 | 33,697 | 31,024 | 5,717 | - | - | 97,500 |
| 1993 | 19,983 | 5,639 | 5,119 | 42,400 | 34,535 | 6,438 | - | - | 114,113 |
| 1994 | 21,787 | 6,622 | 5,710 | 46,242 | 34,795 | 6,862 | - | - | 122,017 |
| 1995 | 24,089 | 5,983 | 4,863 | 48,494 | 36,568 | 7,514 | - | - | 127,511 |
| 1996 | 27,863 | 5,903 | 6,853 | 51,147 | 39,705 | 8,052 | - | - | 139,523 |

| Year | Fatal | MAIS5 | MAIS4 | MAIS3 | MAIS2 | MAIS1 | MAIS0 | PDO | Total |
|-------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|------------|--------------|
| 1997 | 29,990 | 6,678 | 6,988 | 53,193 | 42,558 | 8,299 | - | - | 147,704 |
| 1998 | 32,224 | 8,472 | 7,263 | 57,718 | 44,214 | 8,175 | - | - | 158,067 |
| 1999 | 34,716 | 7,974 | 8,020 | 61,689 | 46,700 | 8,859 | - | - | 167,958 |
| 2000 | 37,109 | 8,383 | 7,470 | 67,973 | 48,702 | 8,728 | - | - | 178,365 |
| 2001 | 39,732 | 7,725 | 8,209 | 72,627 | 50,154 | 7,787 | - | - | 186,235 |
| 2002 | 42,064 | 8,048 | 9,245 | 75,503 | 50,637 | 7,288 | - | - | 192,783 |
| 2003 | 45,073 | 7,262 | 11,096 | 76,801 | 51,443 | 7,316 | - | - | 198,990 |
| 2004 | 48,914 | 7,950 | 12,014 | 79,133 | 54,564 | 7,827 | - | - | 210,403 |
| 2005 | 51,374 | 8,401 | 12,792 | 78,450 | 53,255 | 7,609 | - | - | 211,882 |
| 2006 | 53,143 | 10,722 | 13,293 | 78,150 | 50,125 | 6,886 | - | - | 212,320 |
| 2007 | 55,868 | 11,193 | 14,366 | 77,990 | 46,760 | 6,416 | - | - | 212,593 |
| 2008 | 56,456 | 12,311 | 14,430 | 78,801 | 45,446 | 6,237 | - | - | 213,683 |
| 2009 | 56,754 | 10,685 | 13,683 | 74,753 | 41,892 | 5,822 | - | - | 203,590 |
| 2010 | 57,203 | 12,638 | 13,890 | 70,820 | 40,113 | 6,163 | - | - | 200,827 |
| 2011 | 60,223 | 14,321 | 16,262 | 71,095 | 40,433 | 6,587 | - | - | 208,921 |
| 2012 | 62,494 | 15,709 | 17,133 | 70,571 | 40,478 | 6,959 | - | - | 213,343 |
| 2013 | 64,666 | 14,749 | 16,722 | 66,240 | 39,355 | 7,093 | - | - | 208,825 |
| 2014 | 68,138 | 17,277 | 17,832 | 68,164 | 40,302 | 7,327 | - | - | 219,038 |
| 2015 | 70,841 | 15,272 | 17,962 | 68,625 | 38,976 | 7,830 | - | - | 219,507 |
| 2016 | 73,636 | 16,690 | 19,304 | 68,778 | 42,276 | 8,077 | - | - | 228,762 |
| 2017 | 76,199 | 16,846 | 19,892 | 68,423 | 44,471 | 8,439 | - | - | 234,270 |
| 2018 | 75,430 | 16,141 | 20,798 | 68,461 | 46,170 | 8,623 | - | - | 235,623 |
| 2019 | 77,359 | 16,101 | 21,617 | 69,011 | 47,630 | 8,591 | - | - | 240,307 |

Table D-7. Comprehensive cost – total benefits – passenger cars by CY (millions in 2019\$)

| Year | Fatal | MAIS5 | MAIS4 | MAIS3 | MAIS2 | MAIS1 | MAIS0 | PDO | Total |
|------|--------|--------|--------|--------|--------|--------|-------|-------|---------|
| 1968 | 340 | 91 | 100 | 939 | 1,211 | 836 | 21 | 164 | 3,701 |
| 1969 | 688 | 208 | 219 | 2,027 | 3,047 | 1,946 | 34 | 267 | 8,436 |
| 1970 | 1,127 | 323 | 347 | 3,268 | 5,845 | 2,928 | 49 | 381 | 14,268 |
| 1971 | 1,657 | 414 | 486 | 4,749 | 8,956 | 3,912 | 64 | 491 | 20,729 |
| 1972 | 2,243 | 516 | 613 | 6,166 | 12,296 | 4,883 | 80 | 611 | 27,409 |
| 1973 | 2,915 | 685 | 741 | 7,842 | 15,312 | 5,662 | 90 | 678 | 33,925 |
| 1974 | 3,618 | 927 | 932 | 9,350 | 17,247 | 6,155 | 94 | 709 | 39,032 |
| 1975 | 4,623 | 1,168 | 1,192 | 11,605 | 19,211 | 6,818 | 106 | 807 | 45,529 |
| 1976 | 5,628 | 1,540 | 1,529 | 13,566 | 20,626 | 7,581 | 117 | 892 | 51,480 |
| 1977 | 6,579 | 1,895 | 1,860 | 15,653 | 21,489 | 8,302 | 135 | 1,010 | 56,923 |
| 1978 | 7,563 | 2,204 | 2,102 | 17,710 | 21,992 | 9,318 | 151 | 1,117 | 62,157 |
| 1979 | 8,577 | 2,492 | 2,199 | 20,032 | 23,139 | 10,229 | 159 | 1,161 | 67,987 |
| 1980 | 9,460 | 2,735 | 2,285 | 22,181 | 24,498 | 10,214 | 164 | 1,200 | 72,736 |
| 1981 | 10,523 | 2,949 | 2,434 | 25,974 | 25,703 | 10,189 | 168 | 1,227 | 79,167 |
| 1982 | 11,648 | 2,999 | 2,723 | 27,998 | 28,092 | 9,861 | 174 | 1,260 | 84,755 |
| 1983 | 12,699 | 3,203 | 3,328 | 29,052 | 29,941 | 9,826 | 181 | 1,315 | 89,545 |
| 1984 | 14,219 | 3,404 | 3,553 | 32,540 | 31,687 | 10,368 | 191 | 1,366 | 97,327 |
| 1985 | 16,193 | 3,650 | 4,011 | 36,979 | 33,410 | 10,793 | 198 | 1,453 | 106,686 |
| 1986 | 18,700 | 4,582 | 4,766 | 41,856 | 36,590 | 12,112 | 217 | 1,580 | 120,404 |
| 1987 | 20,682 | 4,956 | 4,809 | 44,771 | 40,410 | 12,714 | 237 | 1,741 | 130,321 |
| 1988 | 22,446 | 5,537 | 4,893 | 48,864 | 44,019 | 12,941 | 260 | 1,899 | 140,859 |
| 1989 | 23,960 | 5,568 | 4,962 | 52,893 | 49,497 | 13,074 | 272 | 1,900 | 152,127 |
| 1990 | 25,955 | 5,354 | 5,168 | 57,776 | 56,568 | 12,902 | 294 | 2,084 | 166,101 |
| 1991 | 28,035 | 5,844 | 5,954 | 59,355 | 61,826 | 12,669 | 302 | 2,102 | 176,087 |
| 1992 | 30,469 | 7,410 | 8,560 | 64,664 | 64,238 | 13,402 | 312 | 2,126 | 191,180 |
| 1993 | 34,039 | 8,799 | 9,775 | 71,684 | 65,409 | 15,036 | 345 | 2,292 | 207,381 |
| 1994 | 36,649 | 10,380 | 10,620 | 75,656 | 65,130 | 16,421 | 383 | 2,573 | 217,811 |
| 1995 | 40,157 | 9,009 | 10,309 | 78,419 | 67,601 | 18,951 | 446 | 2,978 | 227,869 |
| 1996 | 45,476 | 8,919 | 11,294 | 87,751 | 74,407 | 21,909 | 480 | 3,115 | 253,351 |

| Year | Fatal | MAIS5 | MAIS4 | MAIS3 | MAIS2 | MAIS1 | MAIS0 | PDO | Total |
|-------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|------------|--------------|
| 1997 | 48,507 | 10,002 | 11,794 | 90,911 | 78,603 | 22,632 | 484 | 3,281 | 266,214 |
| 1998 | 51,690 | 12,297 | 11,786 | 96,249 | 78,298 | 22,099 | 454 | 3,245 | 276,118 |
| 1999 | 54,579 | 11,874 | 12,448 | 96,749 | 79,279 | 21,023 | 444 | 3,199 | 279,595 |
| 2000 | 58,080 | 12,761 | 11,070 | 107,213 | 82,503 | 20,467 | 481 | 3,499 | 296,075 |
| 2001 | 61,855 | 11,659 | 12,024 | 112,078 | 88,110 | 19,138 | 482 | 3,600 | 308,947 |
| 2002 | 65,037 | 13,077 | 14,069 | 117,653 | 91,583 | 17,922 | 476 | 3,722 | 323,539 |
| 2003 | 68,821 | 11,467 | 17,059 | 119,357 | 92,166 | 17,776 | 507 | 3,892 | 331,046 |
| 2004 | 74,548 | 12,982 | 18,583 | 121,694 | 93,384 | 18,110 | 492 | 3,944 | 343,737 |
| 2005 | 78,577 | 12,867 | 19,864 | 118,756 | 90,801 | 17,519 | 468 | 4,058 | 342,909 |
| 2006 | 81,114 | 15,883 | 20,310 | 119,398 | 86,416 | 16,191 | 462 | 4,049 | 343,822 |
| 2007 | 85,727 | 16,919 | 22,035 | 119,461 | 84,812 | 15,863 | 472 | 4,178 | 349,467 |
| 2008 | 86,672 | 18,491 | 22,470 | 120,774 | 83,130 | 15,740 | 475 | 4,264 | 352,016 |
| 2009 | 87,093 | 16,374 | 21,599 | 114,964 | 76,238 | 15,080 | 456 | 4,092 | 335,896 |
| 2010 | 88,049 | 20,219 | 21,832 | 109,992 | 73,050 | 15,748 | 489 | 4,487 | 333,866 |
| 2011 | 93,466 | 23,584 | 25,375 | 111,602 | 73,444 | 16,783 | 488 | 4,713 | 349,455 |
| 2012 | 97,874 | 25,219 | 27,067 | 113,461 | 71,379 | 18,424 | 572 | 5,331 | 359,327 |
| 2013 | 102,023 | 24,043 | 26,441 | 109,356 | 70,333 | 19,343 | 623 | 5,857 | 358,019 |
| 2014 | 108,752 | 27,008 | 29,738 | 115,576 | 73,429 | 21,206 | 741 | 6,869 | 383,317 |
| 2015 | 114,200 | 23,098 | 30,222 | 113,149 | 74,108 | 23,307 | 867 | 7,954 | 386,906 |
| 2016 | 118,688 | 25,961 | 32,328 | 116,188 | 81,890 | 25,540 | 994 | 8,156 | 409,746 |
| 2017 | 124,249 | 26,246 | 33,369 | 116,829 | 86,880 | 26,996 | 979 | 8,429 | 423,976 |
| 2018 | 124,231 | 25,338 | 35,206 | 119,749 | 91,273 | 27,843 | 1,002 | 9,193 | 433,836 |
| 2019 | 127,716 | 25,323 | 36,770 | 122,068 | 94,636 | 28,536 | 1,052 | 9,788 | 445,888 |

Table D-8. Comprehensive cost – total voluntary benefits – passenger cars by CY (millions in 2019\$)

| Year | Fatal | MAIS5 | MAIS4 | MAIS3 | MAIS2 | MAIS1 | MAIS0 | PDO | Total |
|------|--------|-------|-------|--------|--------|-------|-------|-------|--------|
| 1968 | 282 | 62 | 62 | 664 | 1,039 | 602 | 15 | 118 | 2,845 |
| 1969 | 545 | 123 | 130 | 1,385 | 2,525 | 1,165 | 21 | 161 | 6,055 |
| 1970 | 868 | 215 | 237 | 2,064 | 4,904 | 1,575 | 26 | 204 | 10,093 |
| 1971 | 1,253 | 261 | 352 | 3,073 | 7,420 | 1,973 | 31 | 242 | 14,605 |
| 1972 | 1,655 | 331 | 433 | 3,868 | 10,141 | 2,291 | 37 | 285 | 19,041 |
| 1973 | 2,092 | 487 | 517 | 5,007 | 12,408 | 2,508 | 41 | 311 | 23,371 |
| 1974 | 2,472 | 686 | 680 | 5,836 | 13,639 | 2,559 | 43 | 322 | 26,236 |
| 1975 | 2,984 | 821 | 935 | 6,733 | 14,916 | 2,733 | 48 | 364 | 29,535 |
| 1976 | 3,688 | 1,141 | 1,171 | 7,812 | 15,584 | 3,082 | 53 | 401 | 32,932 |
| 1977 | 4,360 | 1,331 | 1,382 | 9,168 | 15,768 | 3,333 | 60 | 447 | 35,848 |
| 1978 | 5,005 | 1,491 | 1,529 | 10,101 | 15,858 | 3,623 | 66 | 486 | 38,158 |
| 1979 | 5,720 | 1,582 | 1,581 | 11,148 | 16,400 | 3,800 | 68 | 497 | 40,795 |
| 1980 | 6,259 | 1,684 | 1,619 | 11,938 | 17,326 | 3,795 | 69 | 509 | 43,199 |
| 1981 | 7,001 | 1,858 | 1,828 | 13,407 | 17,716 | 3,838 | 71 | 520 | 46,238 |
| 1982 | 7,621 | 1,872 | 2,105 | 14,521 | 18,243 | 3,659 | 74 | 532 | 48,627 |
| 1983 | 8,017 | 2,048 | 2,674 | 14,847 | 18,165 | 3,597 | 76 | 555 | 49,980 |
| 1984 | 8,520 | 1,860 | 2,733 | 14,960 | 18,490 | 3,769 | 80 | 575 | 50,988 |
| 1985 | 8,641 | 1,700 | 2,254 | 15,643 | 17,235 | 3,917 | 83 | 610 | 50,084 |
| 1986 | 9,320 | 2,366 | 2,490 | 16,374 | 17,075 | 4,253 | 88 | 641 | 52,608 |
| 1987 | 9,925 | 2,565 | 2,532 | 17,565 | 18,811 | 4,380 | 92 | 677 | 56,549 |
| 1988 | 10,500 | 2,721 | 2,550 | 19,043 | 20,148 | 4,372 | 97 | 710 | 60,143 |
| 1989 | 11,100 | 2,710 | 2,624 | 20,936 | 23,291 | 4,410 | 98 | 684 | 65,852 |
| 1990 | 11,826 | 1,999 | 2,545 | 25,017 | 28,212 | 4,288 | 101 | 713 | 74,700 |
| 1991 | 12,294 | 2,078 | 2,852 | 26,219 | 29,975 | 4,134 | 101 | 704 | 78,357 |
| 1992 | 13,105 | 2,906 | 3,366 | 29,647 | 28,913 | 4,241 | 108 | 734 | 83,020 |
| 1993 | 14,057 | 3,160 | 4,656 | 27,098 | 25,117 | 4,690 | 123 | 815 | 79,715 |
| 1994 | 14,862 | 3,758 | 4,910 | 27,360 | 24,450 | 5,220 | 142 | 954 | 81,656 |
| 1995 | 16,068 | 3,026 | 5,446 | 27,511 | 25,434 | 6,543 | 172 | 1,151 | 85,351 |
| 1996 | 17,613 | 3,017 | 4,441 | 34,358 | 30,279 | 8,009 | 195 | 1,264 | 99,175 |

| Year | Fatal | MAIS5 | MAIS4 | MAIS3 | MAIS2 | MAIS1 | MAIS0 | PDO | Total |
|-------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|------------|--------------|
| 1997 | 18,518 | 3,324 | 4,805 | 35,330 | 31,987 | 8,465 | 200 | 1,360 | 103,989 |
| 1998 | 19,466 | 3,826 | 4,523 | 36,038 | 30,597 | 8,575 | 200 | 1,431 | 104,655 |
| 1999 | 19,863 | 3,900 | 4,428 | 33,293 | 28,332 | 7,290 | 217 | 1,567 | 98,891 |
| 2000 | 20,972 | 4,377 | 3,601 | 37,443 | 29,198 | 7,416 | 248 | 1,804 | 105,058 |
| 2001 | 22,122 | 3,934 | 3,816 | 37,906 | 32,362 | 7,493 | 254 | 1,893 | 109,780 |
| 2002 | 22,973 | 5,029 | 4,825 | 40,360 | 35,746 | 7,182 | 255 | 1,996 | 118,366 |
| 2003 | 23,748 | 4,205 | 5,963 | 40,978 | 36,394 | 7,012 | 284 | 2,181 | 120,766 |
| 2004 | 25,634 | 5,032 | 6,569 | 40,676 | 35,023 | 6,875 | 279 | 2,241 | 122,329 |
| 2005 | 27,202 | 4,465 | 7,072 | 38,577 | 34,210 | 6,698 | 276 | 2,396 | 120,895 |
| 2006 | 27,970 | 5,161 | 7,017 | 39,404 | 32,854 | 6,371 | 281 | 2,465 | 121,523 |
| 2007 | 29,840 | 5,714 | 7,659 | 39,756 | 34,078 | 6,448 | 295 | 2,610 | 126,400 |
| 2008 | 30,112 | 6,150 | 7,970 | 40,229 | 33,754 | 6,475 | 299 | 2,684 | 127,673 |
| 2009 | 30,104 | 5,611 | 7,776 | 38,254 | 30,957 | 6,222 | 286 | 2,565 | 121,775 |
| 2010 | 30,231 | 7,361 | 7,810 | 37,083 | 29,535 | 6,326 | 300 | 2,749 | 121,394 |
| 2011 | 32,123 | 8,906 | 8,736 | 38,093 | 29,547 | 6,562 | 293 | 2,826 | 127,086 |
| 2012 | 33,521 | 9,223 | 9,114 | 40,652 | 27,189 | 7,152 | 333 | 3,108 | 130,292 |
| 2013 | 34,649 | 8,575 | 8,942 | 39,989 | 26,820 | 7,518 | 353 | 3,315 | 130,160 |
| 2014 | 36,860 | 8,459 | 10,798 | 43,658 | 28,688 | 8,507 | 406 | 3,761 | 141,136 |
| 2015 | 38,349 | 6,961 | 11,142 | 39,867 | 29,551 | 9,332 | 457 | 4,188 | 139,847 |
| 2016 | 39,653 | 8,106 | 11,476 | 40,959 | 32,724 | 10,337 | 515 | 4,224 | 147,993 |
| 2017 | 41,324 | 8,164 | 11,748 | 40,982 | 34,748 | 10,781 | 496 | 4,270 | 152,511 |
| 2018 | 41,216 | 7,822 | 12,218 | 41,920 | 36,678 | 10,985 | 488 | 4,476 | 155,802 |
| 2019 | 41,727 | 7,760 | 12,707 | 42,773 | 37,834 | 11,213 | 509 | 4,738 | 159,262 |

Table D-9. Comprehensive cost – total attributable benefits – passenger cars by CY (millions in 2019\$)

| Year | Fatal | MAIS5 | MAIS4 | MAIS3 | MAIS2 | MAIS1 | MAIS0 | PDO | Total |
|------|--------|-------|-------|--------|--------|--------|-------|-------|---------|
| 1968 | 58 | 29 | 37 | 275 | 172 | 234 | 6 | 45 | 855 |
| 1969 | 143 | 85 | 88 | 642 | 522 | 781 | 14 | 106 | 2,381 |
| 1970 | 258 | 109 | 111 | 1,204 | 941 | 1,353 | 23 | 177 | 4,175 |
| 1971 | 404 | 153 | 134 | 1,676 | 1,537 | 1,939 | 32 | 249 | 6,124 |
| 1972 | 588 | 185 | 180 | 2,298 | 2,156 | 2,592 | 43 | 326 | 8,367 |
| 1973 | 822 | 199 | 224 | 2,835 | 2,904 | 3,154 | 49 | 367 | 10,554 |
| 1974 | 1,146 | 240 | 252 | 3,514 | 3,608 | 3,596 | 52 | 388 | 12,796 |
| 1975 | 1,638 | 346 | 257 | 4,872 | 4,294 | 4,085 | 58 | 443 | 15,994 |
| 1976 | 1,941 | 399 | 358 | 5,754 | 5,042 | 4,499 | 65 | 491 | 18,548 |
| 1977 | 2,218 | 564 | 478 | 6,485 | 5,722 | 4,969 | 75 | 564 | 21,075 |
| 1978 | 2,557 | 714 | 573 | 7,609 | 6,134 | 5,696 | 85 | 631 | 23,999 |
| 1979 | 2,857 | 910 | 618 | 8,884 | 6,739 | 6,429 | 91 | 664 | 27,192 |
| 1980 | 3,201 | 1,051 | 666 | 10,242 | 7,172 | 6,419 | 94 | 691 | 29,537 |
| 1981 | 3,522 | 1,091 | 606 | 12,567 | 7,987 | 6,351 | 97 | 708 | 32,929 |
| 1982 | 4,027 | 1,127 | 618 | 13,477 | 9,848 | 6,202 | 101 | 728 | 36,128 |
| 1983 | 4,682 | 1,155 | 654 | 14,205 | 11,776 | 6,229 | 105 | 760 | 39,565 |
| 1984 | 5,699 | 1,544 | 819 | 17,580 | 13,197 | 6,599 | 110 | 791 | 46,339 |
| 1985 | 7,552 | 1,950 | 1,756 | 21,335 | 16,175 | 6,876 | 115 | 843 | 56,602 |
| 1986 | 9,380 | 2,216 | 2,276 | 25,482 | 19,515 | 7,859 | 129 | 939 | 67,796 |
| 1987 | 10,757 | 2,391 | 2,276 | 27,205 | 21,599 | 8,334 | 145 | 1,064 | 73,772 |
| 1988 | 11,945 | 2,815 | 2,343 | 29,821 | 23,871 | 8,569 | 163 | 1,189 | 80,716 |
| 1989 | 12,861 | 2,858 | 2,338 | 31,957 | 26,207 | 8,664 | 174 | 1,216 | 86,275 |
| 1990 | 14,129 | 3,355 | 2,623 | 32,759 | 28,355 | 8,615 | 194 | 1,371 | 91,401 |
| 1991 | 15,741 | 3,766 | 3,103 | 33,136 | 31,850 | 8,535 | 201 | 1,399 | 97,731 |
| 1992 | 17,364 | 4,504 | 5,194 | 35,017 | 35,324 | 9,161 | 204 | 1,392 | 108,160 |
| 1993 | 19,983 | 5,639 | 5,119 | 44,587 | 40,291 | 10,346 | 223 | 1,478 | 127,666 |
| 1994 | 21,787 | 6,622 | 5,710 | 48,296 | 40,680 | 11,201 | 241 | 1,619 | 136,155 |
| 1995 | 24,089 | 5,983 | 4,863 | 50,907 | 42,167 | 12,407 | 274 | 1,827 | 142,518 |
| 1996 | 27,863 | 5,903 | 6,853 | 53,393 | 44,129 | 13,899 | 285 | 1,850 | 154,176 |

| Year | Fatal | MAIS5 | MAIS4 | MAIS3 | MAIS2 | MAIS1 | MAIS0 | PDO | Total |
|-------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|------------|--------------|
| 1997 | 29,990 | 6,678 | 6,988 | 55,582 | 46,616 | 14,167 | 283 | 1,921 | 162,225 |
| 1998 | 32,224 | 8,472 | 7,263 | 60,211 | 47,702 | 13,524 | 254 | 1,814 | 171,464 |
| 1999 | 34,716 | 7,974 | 8,020 | 63,456 | 50,947 | 13,733 | 227 | 1,632 | 180,704 |
| 2000 | 37,109 | 8,383 | 7,470 | 69,770 | 53,305 | 13,051 | 233 | 1,695 | 191,016 |
| 2001 | 39,732 | 7,725 | 8,209 | 74,171 | 55,748 | 11,645 | 229 | 1,707 | 199,166 |
| 2002 | 42,064 | 8,048 | 9,245 | 77,293 | 55,836 | 10,740 | 221 | 1,726 | 205,173 |
| 2003 | 45,073 | 7,262 | 11,096 | 78,379 | 55,772 | 10,764 | 223 | 1,711 | 210,280 |
| 2004 | 48,915 | 7,950 | 12,014 | 81,018 | 58,361 | 11,235 | 212 | 1,703 | 221,409 |
| 2005 | 51,375 | 8,401 | 12,792 | 80,179 | 56,591 | 10,821 | 192 | 1,663 | 222,014 |
| 2006 | 53,144 | 10,722 | 13,293 | 79,994 | 53,562 | 9,819 | 181 | 1,584 | 222,299 |
| 2007 | 55,888 | 11,204 | 14,377 | 79,705 | 50,733 | 9,415 | 177 | 1,568 | 223,067 |
| 2008 | 56,560 | 12,341 | 14,500 | 80,545 | 49,377 | 9,265 | 176 | 1,580 | 224,344 |
| 2009 | 56,988 | 10,763 | 13,823 | 76,710 | 45,281 | 8,857 | 170 | 1,527 | 214,121 |
| 2010 | 57,818 | 12,858 | 14,022 | 72,909 | 43,515 | 9,423 | 190 | 1,739 | 212,472 |
| 2011 | 61,343 | 14,678 | 16,638 | 73,509 | 43,898 | 10,221 | 195 | 1,887 | 222,369 |
| 2012 | 64,353 | 15,996 | 17,953 | 72,809 | 44,190 | 11,272 | 238 | 2,223 | 229,035 |
| 2013 | 67,374 | 15,469 | 17,499 | 69,367 | 43,513 | 11,824 | 270 | 2,542 | 227,859 |
| 2014 | 71,892 | 18,549 | 18,939 | 71,918 | 44,741 | 12,698 | 336 | 3,108 | 242,181 |
| 2015 | 75,851 | 16,137 | 19,080 | 73,282 | 44,556 | 13,976 | 411 | 3,766 | 247,059 |
| 2016 | 79,036 | 17,856 | 20,852 | 75,229 | 49,166 | 15,203 | 479 | 3,932 | 261,753 |
| 2017 | 82,925 | 18,082 | 21,621 | 75,847 | 52,132 | 16,215 | 483 | 4,159 | 271,465 |
| 2018 | 83,015 | 17,516 | 22,988 | 77,829 | 54,595 | 16,858 | 514 | 4,718 | 278,033 |
| 2019 | 85,989 | 17,563 | 24,063 | 79,295 | 56,802 | 17,322 | 543 | 5,049 | 286,626 |

Table D-10. Comprehensive cost – total CA benefits – LTVs by CY (millions in 2019\$)

| Year | Fatal | MAIS5 | MAIS4 | MAIS3 | MAIS2 | MAIS1 | MAIS0 | PDO | Total |
|------|-------|-------|-------|-------|-------|-------|-------|-------|--------|
| 1968 | 9 | 1 | 1 | 19 | 25 | 74 | 2 | 19 | 150 |
| 1969 | 17 | 2 | 2 | 38 | 55 | 191 | 4 | 32 | 342 |
| 1970 | 28 | 4 | 3 | 66 | 95 | 302 | 6 | 46 | 549 |
| 1971 | 40 | 5 | 4 | 97 | 152 | 386 | 7 | 60 | 751 |
| 1972 | 52 | 7 | 5 | 129 | 204 | 464 | 8 | 77 | 946 |
| 1973 | 68 | 7 | 7 | 164 | 280 | 548 | 9 | 88 | 1,171 |
| 1974 | 83 | 7 | 8 | 206 | 393 | 600 | 10 | 95 | 1,402 |
| 1975 | 89 | 6 | 7 | 230 | 446 | 772 | 12 | 112 | 1,674 |
| 1976 | 119 | 8 | 10 | 313 | 527 | 877 | 14 | 131 | 2,001 |
| 1977 | 150 | 12 | 13 | 418 | 594 | 915 | 16 | 156 | 2,274 |
| 1978 | 188 | 16 | 19 | 595 | 660 | 1,052 | 18 | 187 | 2,734 |
| 1979 | 226 | 18 | 25 | 630 | 749 | 1,131 | 19 | 202 | 3,000 |
| 1980 | 243 | 22 | 28 | 675 | 863 | 1,156 | 20 | 215 | 3,221 |
| 1981 | 269 | 30 | 32 | 541 | 928 | 1,128 | 21 | 226 | 3,177 |
| 1982 | 300 | 42 | 31 | 642 | 885 | 993 | 21 | 238 | 3,152 |
| 1983 | 310 | 42 | 33 | 614 | 959 | 953 | 23 | 249 | 3,183 |
| 1984 | 334 | 52 | 41 | 758 | 999 | 983 | 24 | 268 | 3,459 |
| 1985 | 312 | 42 | 39 | 703 | 888 | 1,209 | 30 | 292 | 3,515 |
| 1986 | 302 | 46 | 41 | 670 | 820 | 1,171 | 31 | 321 | 3,402 |
| 1987 | 326 | 54 | 48 | 762 | 884 | 1,245 | 34 | 346 | 3,699 |
| 1988 | 336 | 58 | 52 | 733 | 1,056 | 1,286 | 37 | 380 | 3,938 |
| 1989 | 372 | 60 | 63 | 868 | 1,310 | 1,252 | 38 | 406 | 4,368 |
| 1990 | 411 | 59 | 68 | 866 | 1,885 | 1,371 | 43 | 436 | 5,141 |
| 1991 | 422 | 68 | 65 | 984 | 2,187 | 1,427 | 43 | 433 | 5,629 |
| 1992 | 452 | 75 | 46 | 979 | 2,220 | 1,641 | 50 | 470 | 5,931 |
| 1993 | 490 | 77 | 51 | 977 | 2,799 | 1,830 | 52 | 536 | 6,814 |
| 1994 | 531 | 89 | 68 | 1,074 | 3,139 | 2,004 | 73 | 688 | 7,666 |
| 1995 | 605 | 110 | 120 | 1,411 | 4,311 | 2,204 | 94 | 898 | 9,753 |
| 1996 | 675 | 151 | 151 | 1,829 | 3,325 | 2,751 | 115 | 1,107 | 10,103 |

| Year | Fatal | MAIS5 | MAIS4 | MAIS3 | MAIS2 | MAIS1 | MAIS0 | PDO | Total |
|-------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|------------|--------------|
| 1997 | 754 | 158 | 180 | 2,291 | 4,223 | 3,340 | 133 | 1,267 | 12,347 |
| 1998 | 847 | 123 | 183 | 2,669 | 4,329 | 3,724 | 158 | 1,452 | 13,484 |
| 1999 | 945 | 140 | 185 | 3,189 | 4,446 | 4,503 | 186 | 1,625 | 15,218 |
| 2000 | 1,073 | 144 | 164 | 3,106 | 4,557 | 4,779 | 222 | 1,920 | 15,965 |
| 2001 | 1,158 | 181 | 174 | 3,303 | 4,417 | 4,839 | 252 | 2,171 | 16,495 |
| 2002 | 1,212 | 175 | 156 | 4,082 | 4,701 | 4,775 | 270 | 2,375 | 17,745 |
| 2003 | 1,504 | 199 | 202 | 4,373 | 5,171 | 5,323 | 333 | 2,681 | 19,786 |
| 2004 | 1,942 | 249 | 271 | 5,327 | 5,511 | 5,979 | 356 | 3,005 | 22,640 |
| 2005 | 2,175 | 261 | 411 | 5,721 | 5,844 | 6,679 | 382 | 3,260 | 24,734 |
| 2006 | 2,624 | 367 | 451 | 6,035 | 7,070 | 6,689 | 414 | 3,563 | 27,213 |
| 2007 | 3,158 | 390 | 530 | 6,197 | 7,824 | 6,442 | 431 | 3,975 | 28,946 |
| 2008 | 4,014 | 401 | 709 | 6,890 | 8,416 | 6,427 | 429 | 4,045 | 31,331 |
| 2009 | 4,391 | 419 | 718 | 7,377 | 9,347 | 6,793 | 459 | 4,243 | 33,747 |
| 2010 | 4,805 | 384 | 877 | 8,482 | 11,043 | 7,654 | 515 | 4,397 | 38,157 |
| 2011 | 5,570 | 596 | 916 | 10,141 | 11,489 | 9,084 | 569 | 4,665 | 43,030 |
| 2012 | 7,339 | 1,020 | 1,128 | 12,313 | 12,623 | 10,053 | 670 | 5,379 | 50,525 |
| 2013 | 8,142 | 1,283 | 1,626 | 18,112 | 13,865 | 10,376 | 718 | 5,886 | 60,010 |
| 2014 | 9,632 | 849 | 2,620 | 18,174 | 12,221 | 11,317 | 786 | 6,985 | 62,584 |
| 2015 | 10,434 | 843 | 3,252 | 21,485 | 13,120 | 12,646 | 914 | 8,284 | 70,977 |
| 2016 | 12,903 | 1,004 | 3,023 | 21,634 | 14,362 | 14,583 | 1,061 | 8,262 | 76,832 |
| 2017 | 13,674 | 1,719 | 3,132 | 22,666 | 15,633 | 15,766 | 1,019 | 8,576 | 82,184 |
| 2018 | 16,481 | 2,871 | 3,440 | 24,412 | 16,907 | 16,424 | 1,070 | 9,418 | 91,024 |
| 2019 | 20,213 | 3,617 | 3,632 | 26,942 | 19,179 | 18,323 | 1,206 | 10,368 | 103,480 |

Table D-11. Comprehensive cost – voluntary CA benefits – LTVs by CY (millions in 2019\$)

| Year | Fatal | MAIS5 | MAIS4 | MAIS3 | MAIS2 | MAIS1 | MAIS0 | PDO | Total |
|------|-------|-------|-------|-------|-------|-------|-------|-----|-------|
| 1968 | 9 | 1 | 1 | 15 | 19 | 55 | 2 | 15 | 116 |
| 1969 | 17 | 2 | 2 | 29 | 36 | 103 | 3 | 21 | 213 |
| 1970 | 28 | 4 | 3 | 47 | 61 | 141 | 3 | 27 | 314 |
| 1971 | 40 | 5 | 4 | 67 | 88 | 171 | 4 | 33 | 411 |
| 1972 | 52 | 7 | 5 | 85 | 117 | 197 | 4 | 40 | 507 |
| 1973 | 68 | 7 | 7 | 107 | 158 | 229 | 5 | 45 | 626 |
| 1974 | 83 | 7 | 8 | 135 | 193 | 244 | 5 | 48 | 722 |
| 1975 | 89 | 6 | 7 | 151 | 206 | 268 | 6 | 56 | 790 |
| 1976 | 119 | 8 | 10 | 196 | 244 | 318 | 7 | 66 | 968 |
| 1977 | 150 | 12 | 13 | 238 | 263 | 347 | 8 | 78 | 1,109 |
| 1978 | 188 | 16 | 19 | 301 | 302 | 398 | 9 | 91 | 1,324 |
| 1979 | 226 | 18 | 25 | 344 | 323 | 428 | 9 | 98 | 1,472 |
| 1980 | 243 | 22 | 28 | 379 | 358 | 431 | 10 | 103 | 1,574 |
| 1981 | 269 | 30 | 32 | 374 | 382 | 425 | 10 | 108 | 1,630 |
| 1982 | 300 | 42 | 31 | 404 | 391 | 397 | 10 | 113 | 1,688 |
| 1983 | 310 | 42 | 33 | 417 | 429 | 377 | 11 | 119 | 1,739 |
| 1984 | 334 | 52 | 41 | 471 | 433 | 404 | 11 | 127 | 1,873 |
| 1985 | 312 | 42 | 39 | 432 | 388 | 446 | 14 | 139 | 1,812 |
| 1986 | 302 | 46 | 41 | 417 | 359 | 465 | 15 | 152 | 1,797 |
| 1987 | 326 | 54 | 48 | 472 | 401 | 501 | 16 | 164 | 1,982 |
| 1988 | 336 | 58 | 52 | 460 | 446 | 500 | 18 | 180 | 2,050 |
| 1989 | 372 | 60 | 63 | 509 | 528 | 503 | 18 | 192 | 2,245 |
| 1990 | 411 | 59 | 68 | 549 | 635 | 522 | 19 | 196 | 2,460 |
| 1991 | 422 | 68 | 65 | 595 | 717 | 546 | 21 | 206 | 2,639 |
| 1992 | 452 | 75 | 46 | 631 | 745 | 587 | 23 | 220 | 2,779 |
| 1993 | 490 | 77 | 51 | 668 | 900 | 660 | 26 | 268 | 3,142 |
| 1994 | 531 | 89 | 68 | 798 | 1,013 | 759 | 36 | 341 | 3,635 |
| 1995 | 605 | 110 | 120 | 980 | 1,301 | 891 | 45 | 433 | 4,485 |
| 1996 | 675 | 151 | 151 | 1,163 | 1,366 | 1,257 | 59 | 569 | 5,390 |

| Year | Fatal | MAIS5 | MAIS4 | MAIS3 | MAIS2 | MAIS1 | MAIS0 | PDO | Total |
|-------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|------------|--------------|
| 1997 | 754 | 158 | 180 | 1,287 | 1,575 | 1,543 | 69 | 657 | 6,223 |
| 1998 | 847 | 123 | 183 | 1,536 | 2,219 | 1,953 | 84 | 775 | 7,720 |
| 1999 | 945 | 140 | 185 | 1,972 | 2,496 | 2,592 | 108 | 948 | 9,387 |
| 2000 | 1,073 | 144 | 164 | 2,065 | 2,934 | 2,902 | 134 | 1,158 | 10,575 |
| 2001 | 1,158 | 181 | 174 | 2,336 | 2,744 | 2,927 | 154 | 1,326 | 10,999 |
| 2002 | 1,212 | 175 | 156 | 2,840 | 2,696 | 2,842 | 165 | 1,453 | 11,541 |
| 2003 | 1,504 | 199 | 202 | 3,164 | 3,115 | 3,044 | 212 | 1,708 | 13,149 |
| 2004 | 1,942 | 249 | 271 | 3,729 | 3,632 | 3,477 | 229 | 1,929 | 15,457 |
| 2005 | 2,174 | 261 | 411 | 4,130 | 3,744 | 4,020 | 255 | 2,174 | 17,170 |
| 2006 | 2,621 | 367 | 451 | 4,475 | 4,516 | 4,485 | 285 | 2,456 | 19,656 |
| 2007 | 3,141 | 389 | 529 | 5,024 | 4,812 | 4,258 | 305 | 2,814 | 21,272 |
| 2008 | 3,904 | 379 | 671 | 5,577 | 5,363 | 4,294 | 310 | 2,921 | 23,419 |
| 2009 | 4,161 | 406 | 687 | 5,684 | 5,885 | 4,532 | 326 | 3,018 | 24,700 |
| 2010 | 4,328 | 367 | 815 | 6,528 | 7,376 | 5,144 | 362 | 3,085 | 28,004 |
| 2011 | 4,839 | 574 | 783 | 7,765 | 7,983 | 6,225 | 398 | 3,263 | 31,830 |
| 2012 | 6,034 | 885 | 898 | 9,547 | 9,060 | 6,715 | 466 | 3,745 | 37,351 |
| 2013 | 6,429 | 1,068 | 1,103 | 12,251 | 9,855 | 6,841 | 499 | 4,090 | 42,136 |
| 2014 | 7,458 | 589 | 1,909 | 13,386 | 8,449 | 7,703 | 533 | 4,742 | 44,769 |
| 2015 | 7,763 | 615 | 2,298 | 14,869 | 8,037 | 8,345 | 613 | 5,553 | 48,093 |
| 2016 | 9,287 | 683 | 2,126 | 15,442 | 9,100 | 9,560 | 704 | 5,483 | 52,384 |
| 2017 | 9,593 | 1,037 | 2,152 | 15,716 | 9,888 | 10,271 | 666 | 5,607 | 54,929 |
| 2018 | 11,403 | 1,618 | 2,360 | 16,202 | 10,619 | 10,705 | 684 | 6,020 | 59,610 |
| 2019 | 13,491 | 2,017 | 2,489 | 17,505 | 11,955 | 11,785 | 766 | 6,584 | 66,592 |

Table D-12. Comprehensive cost – attributable CA benefits – LTVs by CY (millions in 2019\$)

| Year | Fatal | MAIS5 | MAIS4 | MAIS3 | MAIS2 | MAIS1 | MAIS0 | PDO | Total |
|------|-------|-------|-------|-------|-------|-------|-------|-----|-------|
| 1968 | - | - | - | 3 | 6 | 19 | 1 | 5 | 33 |
| 1969 | - | - | - | 9 | 19 | 88 | 1 | 11 | 129 |
| 1970 | - | - | - | 19 | 34 | 161 | 2 | 19 | 235 |
| 1971 | - | - | - | 30 | 64 | 215 | 3 | 28 | 340 |
| 1972 | - | - | - | 44 | 88 | 267 | 4 | 37 | 439 |
| 1973 | - | - | - | 57 | 122 | 319 | 5 | 43 | 545 |
| 1974 | - | - | - | 71 | 200 | 357 | 5 | 47 | 680 |
| 1975 | - | - | - | 80 | 240 | 503 | 6 | 55 | 884 |
| 1976 | - | - | - | 118 | 284 | 559 | 7 | 65 | 1,032 |
| 1977 | - | - | - | 180 | 331 | 568 | 8 | 79 | 1,165 |
| 1978 | - | - | - | 294 | 358 | 653 | 9 | 96 | 1,410 |
| 1979 | - | - | - | 286 | 426 | 703 | 10 | 105 | 1,529 |
| 1980 | - | - | - | 295 | 505 | 724 | 11 | 112 | 1,648 |
| 1981 | - | - | - | 168 | 547 | 703 | 11 | 118 | 1,546 |
| 1982 | - | - | - | 238 | 494 | 596 | 11 | 124 | 1,464 |
| 1983 | - | - | - | 196 | 530 | 576 | 12 | 130 | 1,444 |
| 1984 | - | - | - | 287 | 566 | 579 | 13 | 140 | 1,585 |
| 1985 | - | - | - | 272 | 499 | 763 | 16 | 153 | 1,703 |
| 1986 | - | - | - | 253 | 461 | 707 | 16 | 168 | 1,605 |
| 1987 | - | - | - | 291 | 483 | 744 | 18 | 182 | 1,717 |
| 1988 | - | - | - | 274 | 610 | 785 | 19 | 200 | 1,888 |
| 1989 | - | - | - | 359 | 782 | 748 | 20 | 214 | 2,123 |
| 1990 | - | - | - | 317 | 1,250 | 849 | 24 | 240 | 2,680 |
| 1991 | - | - | - | 389 | 1,470 | 881 | 23 | 227 | 2,990 |
| 1992 | - | - | - | 348 | 1,474 | 1,053 | 27 | 250 | 3,152 |
| 1993 | - | - | - | 309 | 1,899 | 1,170 | 26 | 268 | 3,672 |
| 1994 | - | - | - | 276 | 2,125 | 1,246 | 37 | 347 | 4,031 |
| 1995 | - | - | - | 431 | 3,010 | 1,313 | 49 | 465 | 5,267 |
| 1996 | - | - | - | 666 | 1,959 | 1,493 | 56 | 538 | 4,712 |

| Year | Fatal | MAIS5 | MAIS4 | MAIS3 | MAIS2 | MAIS1 | MAIS0 | PDO | Total |
|-------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|------------|--------------|
| 1997 | - | - | - | 1,004 | 2,648 | 1,797 | 64 | 610 | 6,123 |
| 1998 | - | - | - | 1,134 | 2,109 | 1,771 | 74 | 677 | 5,764 |
| 1999 | - | - | - | 1,217 | 1,949 | 1,911 | 77 | 677 | 5,831 |
| 2000 | - | - | - | 1,041 | 1,622 | 1,877 | 88 | 761 | 5,389 |
| 2001 | - | - | - | 968 | 1,673 | 1,913 | 98 | 845 | 5,495 |
| 2002 | - | - | - | 1,241 | 2,004 | 1,932 | 105 | 922 | 6,205 |
| 2003 | - | - | - | 1,209 | 2,056 | 2,279 | 121 | 973 | 6,637 |
| 2004 | 0 | - | 0 | 1,599 | 1,878 | 2,502 | 127 | 1,076 | 7,183 |
| 2005 | 1 | - | 0 | 1,591 | 2,100 | 2,659 | 127 | 1,086 | 7,564 |
| 2006 | 3 | - | 0 | 1,560 | 2,555 | 2,203 | 129 | 1,108 | 7,558 |
| 2007 | 18 | 0 | 1 | 1,173 | 3,012 | 2,184 | 126 | 1,160 | 7,675 |
| 2008 | 110 | 22 | 38 | 1,313 | 3,053 | 2,133 | 119 | 1,124 | 7,912 |
| 2009 | 230 | 13 | 31 | 1,693 | 3,462 | 2,261 | 132 | 1,224 | 9,047 |
| 2010 | 477 | 17 | 62 | 1,954 | 3,668 | 2,510 | 154 | 1,312 | 10,153 |
| 2011 | 730 | 22 | 132 | 2,376 | 3,506 | 2,859 | 171 | 1,402 | 11,200 |
| 2012 | 1,305 | 134 | 230 | 2,766 | 3,563 | 3,338 | 203 | 1,634 | 13,174 |
| 2013 | 1,713 | 215 | 523 | 5,862 | 4,010 | 3,536 | 219 | 1,797 | 17,874 |
| 2014 | 2,174 | 260 | 711 | 4,789 | 3,772 | 3,614 | 252 | 2,243 | 17,815 |
| 2015 | 2,671 | 228 | 954 | 6,616 | 5,082 | 4,301 | 301 | 2,730 | 22,883 |
| 2016 | 3,617 | 322 | 897 | 6,192 | 5,262 | 5,023 | 357 | 2,779 | 24,448 |
| 2017 | 4,081 | 683 | 980 | 6,949 | 5,745 | 5,495 | 353 | 2,969 | 27,255 |
| 2018 | 5,078 | 1,253 | 1,080 | 8,211 | 6,288 | 5,720 | 386 | 3,398 | 31,414 |
| 2019 | 6,722 | 1,601 | 1,143 | 9,436 | 7,225 | 6,537 | 440 | 3,785 | 36,888 |

Table D-13. Comprehensive cost – total CW benefits – LTVs by CY (millions in 2019\$)

| Year | Fatal | MAIS5 | MAIS4 | MAIS3 | MAIS2 | MAIS1 | MAIS0 | PDO | Total |
|------|--------|-------|-------|--------|--------|-------|-------|-----|--------|
| 1968 | 35 | 3 | 12 | 138 | 130 | 47 | - | - | 365 |
| 1969 | 67 | 7 | 17 | 228 | 491 | 91 | - | - | 901 |
| 1970 | 109 | 12 | 22 | 337 | 674 | 120 | - | - | 1,273 |
| 1971 | 158 | 19 | 27 | 435 | 897 | 140 | - | - | 1,677 |
| 1972 | 207 | 27 | 52 | 550 | 1,068 | 158 | - | - | 2,062 |
| 1973 | 290 | 33 | 68 | 714 | 1,782 | 187 | - | - | 3,074 |
| 1974 | 381 | 63 | 70 | 944 | 2,229 | 209 | - | - | 3,896 |
| 1975 | 446 | 138 | 71 | 539 | 2,086 | 202 | - | - | 3,482 |
| 1976 | 613 | 171 | 81 | 1,098 | 2,581 | 267 | - | - | 4,811 |
| 1977 | 852 | 179 | 95 | 1,676 | 2,980 | 300 | - | - | 6,082 |
| 1978 | 1,064 | 197 | 142 | 2,382 | 3,524 | 325 | - | - | 7,634 |
| 1979 | 1,343 | 302 | 261 | 3,243 | 3,804 | 367 | - | - | 9,320 |
| 1980 | 1,465 | 330 | 307 | 3,437 | 3,903 | 411 | - | - | 9,852 |
| 1981 | 1,710 | 475 | 548 | 3,210 | 5,014 | 469 | - | - | 11,426 |
| 1982 | 1,901 | 706 | 586 | 3,947 | 4,249 | 484 | - | - | 11,874 |
| 1983 | 2,186 | 843 | 500 | 5,170 | 3,125 | 583 | - | - | 12,406 |
| 1984 | 2,799 | 1,020 | 725 | 4,914 | 3,233 | 602 | - | - | 13,293 |
| 1985 | 3,365 | 1,298 | 922 | 4,253 | 4,300 | 807 | - | - | 14,944 |
| 1986 | 4,308 | 1,064 | 632 | 5,355 | 6,260 | 1,016 | - | - | 18,634 |
| 1987 | 5,430 | 1,164 | 976 | 6,536 | 7,263 | 1,210 | - | - | 22,579 |
| 1988 | 6,067 | 845 | 1,467 | 7,051 | 9,058 | 1,278 | - | - | 25,766 |
| 1989 | 7,205 | 1,372 | 1,835 | 8,187 | 10,408 | 1,413 | - | - | 30,420 |
| 1990 | 8,371 | 2,400 | 2,743 | 9,383 | 10,463 | 1,440 | - | - | 34,802 |
| 1991 | 9,462 | 2,632 | 2,804 | 12,570 | 10,394 | 1,600 | - | - | 39,462 |
| 1992 | 10,939 | 2,084 | 1,418 | 14,007 | 13,385 | 1,781 | - | - | 43,615 |
| 1993 | 12,346 | 1,986 | 1,386 | 14,677 | 16,833 | 2,011 | - | - | 49,238 |
| 1994 | 14,551 | 1,063 | 1,730 | 16,483 | 19,404 | 2,585 | - | - | 55,815 |
| 1995 | 16,752 | 3,307 | 3,679 | 20,166 | 18,927 | 3,220 | - | - | 66,052 |
| 1996 | 20,132 | 4,621 | 3,993 | 22,711 | 18,389 | 3,718 | - | - | 73,563 |

| Year | Fatal | MAIS5 | MAIS4 | MAIS3 | MAIS2 | MAIS1 | MAIS0 | PDO | Total |
|-------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|------------|--------------|
| 1997 | 23,698 | 4,586 | 4,813 | 28,434 | 20,509 | 4,053 | - | - | 86,093 |
| 1998 | 27,543 | 3,815 | 6,142 | 33,504 | 25,742 | 4,618 | - | - | 101,365 |
| 1999 | 30,525 | 5,594 | 6,023 | 38,302 | 29,380 | 4,792 | - | - | 114,616 |
| 2000 | 35,817 | 6,753 | 6,953 | 36,766 | 31,426 | 4,915 | - | - | 122,630 |
| 2001 | 38,106 | 8,825 | 6,855 | 37,250 | 29,814 | 4,911 | - | - | 125,760 |
| 2002 | 43,251 | 9,019 | 6,867 | 37,946 | 30,354 | 4,903 | - | - | 132,341 |
| 2003 | 49,010 | 13,296 | 7,874 | 43,491 | 35,708 | 5,381 | - | - | 154,760 |
| 2004 | 56,317 | 14,577 | 12,274 | 51,352 | 40,262 | 5,760 | - | - | 180,542 |
| 2005 | 60,932 | 16,400 | 13,001 | 59,225 | 45,118 | 5,844 | - | - | 200,519 |
| 2006 | 63,351 | 13,642 | 18,146 | 59,755 | 44,671 | 5,496 | - | - | 205,060 |
| 2007 | 67,465 | 14,291 | 18,435 | 65,124 | 46,145 | 5,308 | - | - | 216,768 |
| 2008 | 69,577 | 13,548 | 19,823 | 63,064 | 43,241 | 5,050 | - | - | 214,302 |
| 2009 | 71,361 | 16,370 | 20,479 | 66,793 | 43,191 | 5,280 | - | - | 223,476 |
| 2010 | 72,754 | 13,971 | 20,258 | 68,160 | 40,485 | 5,538 | - | - | 221,166 |
| 2011 | 78,460 | 13,890 | 19,572 | 71,206 | 39,594 | 6,395 | - | - | 229,117 |
| 2012 | 80,032 | 13,968 | 18,666 | 68,591 | 38,544 | 6,965 | - | - | 226,766 |
| 2013 | 79,898 | 15,930 | 22,438 | 67,387 | 37,759 | 7,430 | - | - | 230,843 |
| 2014 | 85,982 | 15,605 | 27,841 | 68,523 | 42,062 | 7,182 | - | - | 247,195 |
| 2015 | 87,694 | 20,838 | 29,516 | 71,203 | 47,300 | 7,499 | - | - | 264,050 |
| 2016 | 93,869 | 20,457 | 29,509 | 74,481 | 48,102 | 8,040 | - | - | 274,458 |
| 2017 | 97,624 | 21,409 | 30,263 | 76,339 | 51,673 | 8,458 | - | - | 285,766 |
| 2018 | 105,355 | 23,495 | 31,592 | 78,836 | 53,930 | 8,817 | - | - | 302,024 |
| 2019 | 115,034 | 26,394 | 34,860 | 85,557 | 60,548 | 9,945 | - | - | 332,338 |

Table D-14. Comprehensive cost – voluntary CW benefits – LTVs by CY (millions in 2019\$)

| Year | Fatal | MAIS5 | MAIS4 | MAIS3 | MAIS2 | MAIS1 | MAIS0 | PDO | Total |
|------|-------|-------|-------|-------|-------|-------|-------|-----|--------|
| 1968 | 25 | 3 | 4 | 56 | 102 | 27 | - | - | 217 |
| 1969 | 45 | 6 | 6 | 93 | 443 | 55 | - | - | 648 |
| 1970 | 69 | 8 | 8 | 141 | 605 | 77 | - | - | 908 |
| 1971 | 95 | 11 | 10 | 193 | 805 | 94 | - | - | 1,208 |
| 1972 | 120 | 13 | 30 | 258 | 949 | 109 | - | - | 1,480 |
| 1973 | 169 | 14 | 38 | 328 | 1,617 | 131 | - | - | 2,298 |
| 1974 | 225 | 45 | 37 | 464 | 1,907 | 149 | - | - | 2,827 |
| 1975 | 250 | 85 | 43 | 320 | 1,914 | 157 | - | - | 2,768 |
| 1976 | 371 | 146 | 42 | 592 | 2,257 | 200 | - | - | 3,607 |
| 1977 | 538 | 151 | 51 | 981 | 2,389 | 225 | - | - | 4,334 |
| 1978 | 697 | 163 | 71 | 1,393 | 2,726 | 253 | - | - | 5,302 |
| 1979 | 883 | 234 | 153 | 1,862 | 3,019 | 290 | - | - | 6,441 |
| 1980 | 1,003 | 256 | 201 | 2,193 | 3,020 | 309 | - | - | 6,982 |
| 1981 | 1,174 | 400 | 295 | 2,096 | 3,823 | 367 | - | - | 8,154 |
| 1982 | 1,308 | 581 | 322 | 2,576 | 2,539 | 366 | - | - | 7,691 |
| 1983 | 1,393 | 676 | 179 | 3,356 | 1,727 | 457 | - | - | 7,788 |
| 1984 | 1,600 | 772 | 293 | 2,846 | 1,544 | 399 | - | - | 7,453 |
| 1985 | 1,697 | 786 | 321 | 2,279 | 1,781 | 447 | - | - | 7,310 |
| 1986 | 1,808 | 655 | 244 | 2,371 | 2,759 | 480 | - | - | 8,318 |
| 1987 | 2,154 | 697 | 439 | 2,970 | 3,063 | 592 | - | - | 9,915 |
| 1988 | 2,335 | 443 | 624 | 3,279 | 3,813 | 625 | - | - | 11,119 |
| 1989 | 2,661 | 525 | 845 | 3,759 | 4,111 | 713 | - | - | 12,612 |
| 1990 | 3,029 | 1,100 | 1,126 | 3,785 | 3,585 | 809 | - | - | 13,434 |
| 1991 | 3,346 | 1,342 | 1,115 | 4,657 | 3,222 | 880 | - | - | 14,561 |
| 1992 | 3,792 | 1,147 | 541 | 4,662 | 3,272 | 1,029 | - | - | 14,442 |
| 1993 | 4,160 | 971 | 519 | 5,219 | 3,930 | 1,067 | - | - | 15,867 |
| 1994 | 4,706 | 342 | 493 | 6,133 | 5,339 | 1,427 | - | - | 18,440 |
| 1995 | 5,229 | 1,182 | 913 | 7,216 | 5,667 | 1,867 | - | - | 22,074 |
| 1996 | 5,907 | 1,309 | 992 | 7,983 | 5,780 | 2,147 | - | - | 24,117 |

| Year | Fatal | MAIS5 | MAIS4 | MAIS3 | MAIS2 | MAIS1 | MAIS0 | PDO | Total |
|-------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|------------|--------------|
| 1997 | 7,183 | 1,794 | 1,055 | 11,222 | 5,056 | 2,236 | - | - | 28,546 |
| 1998 | 7,962 | 1,364 | 1,514 | 12,558 | 6,425 | 2,349 | - | - | 32,172 |
| 1999 | 8,710 | 1,777 | 1,576 | 13,904 | 7,244 | 2,321 | - | - | 35,532 |
| 2000 | 9,769 | 1,680 | 3,169 | 11,167 | 7,961 | 2,326 | - | - | 36,072 |
| 2001 | 10,165 | 2,180 | 3,168 | 12,759 | 8,207 | 2,163 | - | - | 38,641 |
| 2002 | 11,577 | 2,372 | 3,172 | 12,258 | 7,260 | 2,205 | - | - | 38,844 |
| 2003 | 12,324 | 2,552 | 2,762 | 15,210 | 7,839 | 2,435 | - | - | 43,122 |
| 2004 | 14,374 | 2,910 | 3,412 | 14,503 | 8,195 | 2,673 | - | - | 46,068 |
| 2005 | 15,227 | 2,456 | 3,777 | 15,239 | 10,183 | 2,633 | - | - | 49,515 |
| 2006 | 15,675 | 2,894 | 4,150 | 14,225 | 9,888 | 2,497 | - | - | 49,328 |
| 2007 | 16,758 | 3,190 | 4,276 | 14,828 | 10,441 | 2,326 | - | - | 51,820 |
| 2008 | 16,911 | 3,326 | 4,547 | 15,674 | 9,292 | 2,143 | - | - | 51,892 |
| 2009 | 17,788 | 4,465 | 5,379 | 17,376 | 9,848 | 2,245 | - | - | 57,100 |
| 2010 | 16,946 | 3,369 | 5,512 | 16,947 | 9,403 | 2,430 | - | - | 54,607 |
| 2011 | 18,243 | 2,534 | 4,880 | 16,946 | 9,053 | 2,688 | - | - | 54,344 |
| 2012 | 18,915 | 3,053 | 4,680 | 14,931 | 8,655 | 2,904 | - | - | 53,138 |
| 2013 | 18,686 | 3,545 | 5,195 | 13,812 | 8,658 | 3,022 | - | - | 52,919 |
| 2014 | 19,607 | 3,409 | 4,475 | 15,214 | 9,811 | 2,967 | - | - | 55,482 |
| 2015 | 20,438 | 4,449 | 4,734 | 18,685 | 11,898 | 3,077 | - | - | 63,282 |
| 2016 | 21,751 | 4,381 | 5,103 | 20,437 | 12,219 | 3,337 | - | - | 67,228 |
| 2017 | 21,756 | 4,582 | 5,327 | 20,791 | 13,355 | 3,495 | - | - | 69,306 |
| 2018 | 24,015 | 3,853 | 5,382 | 21,214 | 13,827 | 3,618 | - | - | 71,909 |
| 2019 | 25,972 | 4,151 | 5,683 | 22,937 | 15,428 | 4,074 | - | - | 78,244 |

Table D-15. Comprehensive cost – attributable CW benefits – LTVs by CY (millions in 2019\$)

| Year | Fatal | MAIS5 | MAIS4 | MAIS3 | MAIS2 | MAIS1 | MAIS0 | PDO | Total |
|------|--------|-------|-------|--------|--------|-------|-------|-----|--------|
| 1968 | 10 | 0 | 8 | 82 | 29 | 20 | - | - | 149 |
| 1969 | 22 | 1 | 11 | 135 | 48 | 36 | - | - | 253 |
| 1970 | 41 | 4 | 14 | 195 | 68 | 42 | - | - | 364 |
| 1971 | 62 | 8 | 17 | 242 | 93 | 46 | - | - | 469 |
| 1972 | 86 | 14 | 22 | 293 | 119 | 49 | - | - | 582 |
| 1973 | 121 | 20 | 30 | 386 | 164 | 56 | - | - | 776 |
| 1974 | 156 | 17 | 33 | 481 | 322 | 60 | - | - | 1,069 |
| 1975 | 195 | 54 | 29 | 219 | 172 | 45 | - | - | 714 |
| 1976 | 242 | 26 | 39 | 505 | 325 | 67 | - | - | 1,203 |
| 1977 | 314 | 28 | 44 | 695 | 592 | 75 | - | - | 1,748 |
| 1978 | 368 | 34 | 71 | 989 | 799 | 72 | - | - | 2,332 |
| 1979 | 460 | 69 | 108 | 1,381 | 785 | 77 | - | - | 2,879 |
| 1980 | 461 | 73 | 106 | 1,244 | 883 | 101 | - | - | 2,869 |
| 1981 | 536 | 74 | 253 | 1,114 | 1,191 | 102 | - | - | 3,271 |
| 1982 | 594 | 125 | 264 | 1,371 | 1,711 | 118 | - | - | 4,183 |
| 1983 | 793 | 166 | 321 | 1,814 | 1,397 | 126 | - | - | 4,618 |
| 1984 | 1,199 | 249 | 432 | 2,068 | 1,690 | 203 | - | - | 5,839 |
| 1985 | 1,668 | 512 | 601 | 1,973 | 2,519 | 360 | - | - | 7,634 |
| 1986 | 2,499 | 409 | 388 | 2,983 | 3,501 | 536 | - | - | 10,316 |
| 1987 | 3,275 | 467 | 537 | 3,567 | 4,200 | 618 | - | - | 12,664 |
| 1988 | 3,732 | 402 | 843 | 3,773 | 5,245 | 652 | - | - | 14,647 |
| 1989 | 4,544 | 848 | 990 | 4,428 | 6,297 | 701 | - | - | 17,807 |
| 1990 | 5,342 | 1,300 | 1,617 | 5,598 | 6,879 | 631 | - | - | 21,367 |
| 1991 | 6,116 | 1,291 | 1,689 | 7,913 | 7,173 | 720 | - | - | 24,901 |
| 1992 | 7,147 | 937 | 878 | 9,345 | 10,114 | 752 | - | - | 29,173 |
| 1993 | 8,185 | 1,015 | 866 | 9,458 | 12,903 | 943 | - | - | 33,370 |
| 1994 | 9,845 | 720 | 1,237 | 10,349 | 14,065 | 1,158 | - | - | 37,375 |
| 1995 | 11,522 | 2,126 | 2,766 | 12,950 | 13,260 | 1,353 | - | - | 43,978 |
| 1996 | 14,225 | 3,312 | 3,001 | 14,728 | 12,609 | 1,571 | - | - | 49,446 |

| Year | Fatal | MAIS5 | MAIS4 | MAIS3 | MAIS2 | MAIS1 | MAIS0 | PDO | Total |
|-------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|------------|--------------|
| 1997 | 16,515 | 2,792 | 3,758 | 17,212 | 15,453 | 1,817 | - | - | 57,547 |
| 1998 | 19,580 | 2,451 | 4,628 | 20,947 | 19,318 | 2,269 | - | - | 69,194 |
| 1999 | 21,816 | 3,817 | 4,446 | 24,398 | 22,137 | 2,471 | - | - | 79,084 |
| 2000 | 26,048 | 5,073 | 3,783 | 25,599 | 23,465 | 2,590 | - | - | 86,558 |
| 2001 | 27,941 | 6,645 | 3,688 | 24,491 | 21,607 | 2,748 | - | - | 87,119 |
| 2002 | 31,674 | 6,646 | 3,695 | 25,688 | 23,094 | 2,699 | - | - | 93,497 |
| 2003 | 36,686 | 10,744 | 5,112 | 28,281 | 27,869 | 2,946 | - | - | 111,638 |
| 2004 | 41,943 | 11,667 | 8,862 | 36,849 | 32,067 | 3,087 | - | - | 134,474 |
| 2005 | 45,705 | 13,944 | 9,224 | 43,985 | 34,935 | 3,211 | - | - | 151,004 |
| 2006 | 47,676 | 10,747 | 13,995 | 45,531 | 34,783 | 2,999 | - | - | 155,732 |
| 2007 | 50,707 | 11,102 | 14,159 | 50,295 | 35,704 | 2,981 | - | - | 164,948 |
| 2008 | 52,666 | 10,222 | 15,276 | 47,390 | 33,948 | 2,907 | - | - | 162,410 |
| 2009 | 53,573 | 11,906 | 15,100 | 49,417 | 33,343 | 3,036 | - | - | 166,375 |
| 2010 | 55,807 | 10,602 | 14,746 | 51,213 | 31,082 | 3,108 | - | - | 166,559 |
| 2011 | 60,217 | 11,356 | 14,692 | 54,260 | 30,541 | 3,706 | - | - | 174,773 |
| 2012 | 61,117 | 10,916 | 13,986 | 53,660 | 29,889 | 4,061 | - | - | 173,629 |
| 2013 | 61,212 | 12,385 | 17,243 | 53,576 | 29,100 | 4,408 | - | - | 177,924 |
| 2014 | 66,375 | 12,197 | 23,366 | 53,309 | 32,251 | 4,215 | - | - | 191,713 |
| 2015 | 67,256 | 16,389 | 24,782 | 52,518 | 35,402 | 4,422 | - | - | 200,768 |
| 2016 | 72,117 | 16,076 | 24,406 | 54,045 | 35,883 | 4,703 | - | - | 207,231 |
| 2017 | 75,868 | 16,827 | 24,936 | 55,548 | 38,318 | 4,963 | - | - | 216,460 |
| 2018 | 81,340 | 19,641 | 26,210 | 57,622 | 40,103 | 5,199 | - | - | 230,116 |
| 2019 | 89,062 | 22,243 | 29,178 | 62,620 | 45,120 | 5,871 | - | - | 254,094 |

Table D-16. Comprehensive cost – total benefits – LTVs by CY (millions in 2019\$)

| Year | Fatal | MAIS5 | MAIS4 | MAIS3 | MAIS2 | MAIS1 | MAIS0 | PDO | Total |
|-------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|------------|--------------|
| 1968 | 44 | 4 | 13 | 157 | 155 | 121 | 2 | 19 | 515 |
| 1969 | 84 | 10 | 19 | 265 | 546 | 282 | 4 | 32 | 1,242 |
| 1970 | 137 | 15 | 25 | 403 | 768 | 422 | 6 | 46 | 1,822 |
| 1971 | 197 | 24 | 32 | 532 | 1,050 | 526 | 7 | 60 | 2,428 |
| 1972 | 258 | 34 | 57 | 679 | 1,273 | 622 | 8 | 77 | 3,008 |
| 1973 | 358 | 41 | 76 | 878 | 2,061 | 735 | 9 | 88 | 4,246 |
| 1974 | 464 | 69 | 78 | 1,150 | 2,622 | 810 | 10 | 95 | 5,298 |
| 1975 | 534 | 144 | 79 | 769 | 2,532 | 974 | 12 | 112 | 5,156 |
| 1976 | 732 | 180 | 91 | 1,411 | 3,108 | 1,144 | 14 | 131 | 6,811 |
| 1977 | 1,002 | 191 | 108 | 2,094 | 3,574 | 1,215 | 16 | 156 | 8,355 |
| 1978 | 1,252 | 213 | 161 | 2,977 | 4,184 | 1,376 | 18 | 187 | 10,368 |
| 1979 | 1,570 | 320 | 287 | 3,873 | 4,553 | 1,497 | 19 | 202 | 12,321 |
| 1980 | 1,708 | 352 | 335 | 4,112 | 4,766 | 1,566 | 20 | 215 | 13,073 |
| 1981 | 1,979 | 505 | 580 | 3,751 | 5,943 | 1,597 | 21 | 226 | 14,602 |
| 1982 | 2,201 | 748 | 617 | 4,589 | 5,135 | 1,477 | 21 | 238 | 15,026 |
| 1983 | 2,496 | 885 | 532 | 5,784 | 4,084 | 1,536 | 23 | 249 | 15,589 |
| 1984 | 3,133 | 1,073 | 765 | 5,672 | 4,233 | 1,585 | 24 | 268 | 16,752 |
| 1985 | 3,677 | 1,340 | 961 | 4,956 | 5,188 | 2,015 | 30 | 292 | 18,459 |
| 1986 | 4,610 | 1,110 | 672 | 6,024 | 7,080 | 2,187 | 31 | 321 | 22,036 |
| 1987 | 5,755 | 1,218 | 1,025 | 7,299 | 8,146 | 2,455 | 34 | 346 | 26,278 |
| 1988 | 6,403 | 904 | 1,519 | 7,784 | 10,114 | 2,564 | 37 | 380 | 29,705 |
| 1989 | 7,577 | 1,433 | 1,898 | 9,055 | 11,717 | 2,665 | 38 | 406 | 34,788 |
| 1990 | 8,782 | 2,460 | 2,811 | 10,250 | 12,349 | 2,811 | 43 | 436 | 39,942 |
| 1991 | 9,884 | 2,700 | 2,869 | 13,553 | 12,582 | 3,026 | 43 | 433 | 45,092 |
| 1992 | 11,391 | 2,158 | 1,464 | 14,986 | 15,605 | 3,422 | 50 | 470 | 49,546 |
| 1993 | 12,836 | 2,063 | 1,437 | 15,654 | 19,632 | 3,841 | 52 | 536 | 56,052 |
| 1994 | 15,081 | 1,151 | 1,799 | 17,557 | 22,543 | 4,589 | 73 | 688 | 63,481 |
| 1995 | 17,357 | 3,418 | 3,799 | 21,578 | 23,238 | 5,424 | 94 | 898 | 75,805 |
| 1996 | 20,807 | 4,771 | 4,144 | 24,540 | 21,714 | 6,468 | 115 | 1,107 | 83,666 |

| Year | Fatal | MAIS5 | MAIS4 | MAIS3 | MAIS2 | MAIS1 | MAIS0 | PDO | Total |
|-------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|------------|--------------|
| 1997 | 24,452 | 4,744 | 4,992 | 30,726 | 24,732 | 7,393 | 133 | 1,267 | 98,439 |
| 1998 | 28,389 | 3,939 | 6,325 | 36,174 | 30,071 | 8,342 | 158 | 1,452 | 114,849 |
| 1999 | 31,470 | 5,735 | 6,208 | 41,490 | 33,826 | 9,294 | 186 | 1,625 | 129,833 |
| 2000 | 36,890 | 6,897 | 7,117 | 39,872 | 35,982 | 9,694 | 222 | 1,920 | 138,595 |
| 2001 | 39,264 | 9,005 | 7,030 | 40,553 | 34,230 | 9,750 | 252 | 2,171 | 142,254 |
| 2002 | 44,463 | 9,194 | 7,024 | 42,028 | 35,055 | 9,678 | 270 | 2,375 | 150,086 |
| 2003 | 50,513 | 13,495 | 8,075 | 47,864 | 40,879 | 10,704 | 333 | 2,681 | 174,545 |
| 2004 | 58,259 | 14,826 | 12,545 | 56,680 | 45,773 | 11,739 | 356 | 3,005 | 203,183 |
| 2005 | 63,106 | 16,661 | 13,412 | 64,946 | 50,962 | 12,523 | 382 | 3,260 | 225,253 |
| 2006 | 65,974 | 14,008 | 18,596 | 65,791 | 51,741 | 12,185 | 414 | 3,563 | 232,274 |
| 2007 | 70,623 | 14,681 | 18,965 | 71,320 | 53,969 | 11,750 | 431 | 3,975 | 245,714 |
| 2008 | 73,591 | 13,948 | 20,532 | 69,954 | 51,657 | 11,477 | 429 | 4,045 | 245,633 |
| 2009 | 75,752 | 16,790 | 21,197 | 74,170 | 52,538 | 12,074 | 459 | 4,243 | 257,222 |
| 2010 | 77,558 | 14,355 | 21,135 | 76,642 | 51,529 | 13,192 | 515 | 4,397 | 259,323 |
| 2011 | 84,029 | 14,486 | 20,488 | 81,347 | 51,083 | 15,479 | 569 | 4,665 | 272,147 |
| 2012 | 87,371 | 14,988 | 19,793 | 80,904 | 51,167 | 17,018 | 670 | 5,379 | 277,291 |
| 2013 | 88,040 | 17,214 | 24,065 | 85,500 | 51,624 | 17,807 | 718 | 5,886 | 290,853 |
| 2014 | 95,614 | 16,455 | 30,461 | 86,697 | 54,283 | 18,499 | 786 | 6,985 | 309,779 |
| 2015 | 98,128 | 21,681 | 32,768 | 92,687 | 60,420 | 20,145 | 914 | 8,284 | 335,026 |
| 2016 | 106,772 | 21,461 | 32,532 | 96,115 | 62,464 | 22,624 | 1,061 | 8,262 | 351,291 |
| 2017 | 111,297 | 23,128 | 33,396 | 99,005 | 67,306 | 24,224 | 1,019 | 8,576 | 367,950 |
| 2018 | 121,836 | 26,366 | 35,032 | 103,249 | 70,837 | 25,242 | 1,070 | 9,418 | 393,048 |
| 2019 | 135,246 | 30,011 | 38,493 | 112,498 | 79,727 | 28,268 | 1,206 | 10,368 | 435,817 |

Table D-17. Comprehensive cost – total voluntary benefits – LTVs by CY (millions in 2019\$)

| Year | Fatal | MAIS5 | MAIS4 | MAIS3 | MAIS2 | MAIS1 | MAIS0 | PDO | Total |
|------|-------|-------|-------|-------|-------|-------|-------|-----|--------|
| 1968 | 34 | 4 | 5 | 72 | 121 | 82 | 2 | 15 | 333 |
| 1969 | 62 | 8 | 8 | 122 | 479 | 159 | 3 | 21 | 861 |
| 1970 | 96 | 11 | 11 | 189 | 666 | 218 | 3 | 27 | 1,222 |
| 1971 | 135 | 16 | 15 | 260 | 893 | 265 | 4 | 33 | 1,620 |
| 1972 | 172 | 19 | 36 | 343 | 1,066 | 306 | 4 | 40 | 1,987 |
| 1973 | 237 | 21 | 46 | 435 | 1,775 | 360 | 5 | 45 | 2,924 |
| 1974 | 307 | 52 | 45 | 599 | 2,100 | 393 | 5 | 48 | 3,549 |
| 1975 | 339 | 91 | 50 | 470 | 2,120 | 425 | 6 | 56 | 3,558 |
| 1976 | 490 | 154 | 52 | 788 | 2,500 | 518 | 7 | 66 | 4,576 |
| 1977 | 688 | 162 | 64 | 1,219 | 2,652 | 572 | 8 | 78 | 5,442 |
| 1978 | 885 | 179 | 90 | 1,694 | 3,027 | 651 | 9 | 91 | 6,626 |
| 1979 | 1,110 | 252 | 179 | 2,206 | 3,342 | 717 | 9 | 98 | 7,913 |
| 1980 | 1,246 | 278 | 229 | 2,572 | 3,378 | 740 | 10 | 103 | 8,556 |
| 1981 | 1,443 | 430 | 327 | 2,469 | 4,205 | 792 | 10 | 108 | 9,785 |
| 1982 | 1,608 | 623 | 353 | 2,979 | 2,930 | 762 | 10 | 113 | 9,379 |
| 1983 | 1,704 | 719 | 211 | 3,773 | 2,156 | 834 | 11 | 119 | 9,527 |
| 1984 | 1,934 | 824 | 333 | 3,317 | 1,977 | 803 | 11 | 127 | 9,327 |
| 1985 | 2,009 | 828 | 360 | 2,711 | 2,169 | 893 | 14 | 139 | 9,122 |
| 1986 | 2,111 | 701 | 285 | 2,789 | 3,118 | 945 | 15 | 152 | 10,115 |
| 1987 | 2,480 | 751 | 488 | 3,441 | 3,464 | 1,093 | 16 | 164 | 11,897 |
| 1988 | 2,671 | 502 | 675 | 3,738 | 4,259 | 1,126 | 18 | 180 | 13,169 |
| 1989 | 3,033 | 585 | 908 | 4,268 | 4,638 | 1,216 | 18 | 192 | 14,858 |
| 1990 | 3,440 | 1,160 | 1,194 | 4,334 | 4,220 | 1,331 | 19 | 196 | 15,894 |
| 1991 | 3,768 | 1,409 | 1,180 | 5,252 | 3,939 | 1,426 | 21 | 206 | 17,201 |
| 1992 | 4,244 | 1,222 | 586 | 5,293 | 4,017 | 1,616 | 23 | 220 | 17,221 |
| 1993 | 4,651 | 1,049 | 571 | 5,887 | 4,830 | 1,728 | 26 | 268 | 19,009 |
| 1994 | 5,237 | 431 | 561 | 6,932 | 6,352 | 2,185 | 36 | 341 | 22,075 |
| 1995 | 5,834 | 1,292 | 1,033 | 8,197 | 6,968 | 2,758 | 45 | 433 | 26,560 |
| 1996 | 6,582 | 1,459 | 1,143 | 9,146 | 7,146 | 3,404 | 59 | 569 | 29,507 |

| Year | Fatal | MAIS5 | MAIS4 | MAIS3 | MAIS2 | MAIS1 | MAIS0 | PDO | Total |
|-------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|------------|--------------|
| 1997 | 7,937 | 1,952 | 1,235 | 12,509 | 6,631 | 3,779 | 69 | 657 | 34,769 |
| 1998 | 8,809 | 1,487 | 1,697 | 14,093 | 8,644 | 4,302 | 84 | 775 | 39,891 |
| 1999 | 9,654 | 1,918 | 1,762 | 15,876 | 9,740 | 4,913 | 108 | 948 | 44,918 |
| 2000 | 10,842 | 1,825 | 3,333 | 13,232 | 10,895 | 5,228 | 134 | 1,158 | 46,647 |
| 2001 | 11,323 | 2,360 | 3,342 | 15,094 | 10,951 | 5,090 | 154 | 1,326 | 49,641 |
| 2002 | 12,789 | 2,547 | 3,328 | 15,098 | 9,957 | 5,047 | 165 | 1,453 | 50,384 |
| 2003 | 13,827 | 2,751 | 2,963 | 18,375 | 10,955 | 5,479 | 212 | 1,708 | 56,270 |
| 2004 | 16,316 | 3,159 | 3,683 | 18,232 | 11,827 | 6,150 | 229 | 1,929 | 61,526 |
| 2005 | 17,401 | 2,717 | 4,188 | 19,370 | 13,927 | 6,653 | 255 | 2,174 | 66,685 |
| 2006 | 18,296 | 3,261 | 4,601 | 18,700 | 14,403 | 6,982 | 285 | 2,456 | 68,984 |
| 2007 | 19,899 | 3,579 | 4,805 | 19,852 | 15,253 | 6,584 | 305 | 2,814 | 73,092 |
| 2008 | 20,815 | 3,705 | 5,217 | 21,251 | 14,656 | 6,437 | 310 | 2,921 | 75,312 |
| 2009 | 21,949 | 4,871 | 6,066 | 23,060 | 15,733 | 6,777 | 326 | 3,018 | 81,800 |
| 2010 | 21,274 | 3,735 | 6,327 | 23,475 | 16,778 | 7,575 | 362 | 3,085 | 82,611 |
| 2011 | 23,082 | 3,108 | 5,663 | 24,711 | 17,036 | 8,914 | 398 | 3,263 | 86,174 |
| 2012 | 24,950 | 3,938 | 5,578 | 24,478 | 17,714 | 9,619 | 466 | 3,745 | 90,489 |
| 2013 | 25,115 | 4,613 | 6,298 | 26,062 | 18,514 | 9,863 | 499 | 4,090 | 95,055 |
| 2014 | 27,064 | 3,998 | 6,384 | 28,600 | 18,260 | 10,670 | 533 | 4,742 | 100,251 |
| 2015 | 28,201 | 5,064 | 7,032 | 33,554 | 19,936 | 11,422 | 613 | 5,553 | 111,375 |
| 2016 | 31,038 | 5,063 | 7,229 | 35,878 | 21,318 | 12,898 | 704 | 5,483 | 119,611 |
| 2017 | 31,348 | 5,619 | 7,479 | 36,508 | 23,243 | 13,766 | 666 | 5,607 | 124,236 |
| 2018 | 35,418 | 5,472 | 7,742 | 37,416 | 24,445 | 14,323 | 684 | 6,020 | 131,518 |
| 2019 | 39,463 | 6,168 | 8,172 | 40,442 | 27,382 | 15,859 | 766 | 6,584 | 144,835 |

Table D-18. Comprehensive cost – total attributable benefits – LTVs by CY (millions in 2019\$)

| Year | Fatal | MAIS5 | MAIS4 | MAIS3 | MAIS2 | MAIS1 | MAIS0 | PDO | Total |
|------|--------|-------|-------|--------|--------|-------|-------|-----|--------|
| 1968 | 10 | 0 | 8 | 85 | 35 | 39 | 1 | 5 | 182 |
| 1969 | 22 | 1 | 11 | 144 | 67 | 124 | 1 | 11 | 382 |
| 1970 | 41 | 4 | 14 | 214 | 102 | 203 | 2 | 19 | 600 |
| 1971 | 62 | 8 | 17 | 273 | 157 | 261 | 3 | 28 | 809 |
| 1972 | 86 | 14 | 22 | 336 | 206 | 316 | 4 | 37 | 1,021 |
| 1973 | 121 | 20 | 30 | 443 | 286 | 374 | 5 | 43 | 1,322 |
| 1974 | 156 | 17 | 33 | 551 | 522 | 417 | 5 | 47 | 1,749 |
| 1975 | 195 | 54 | 29 | 299 | 412 | 548 | 6 | 55 | 1,598 |
| 1976 | 242 | 26 | 39 | 623 | 608 | 625 | 7 | 65 | 2,236 |
| 1977 | 314 | 28 | 44 | 875 | 922 | 643 | 8 | 79 | 2,913 |
| 1978 | 368 | 34 | 71 | 1,283 | 1,157 | 725 | 9 | 96 | 3,742 |
| 1979 | 460 | 69 | 108 | 1,666 | 1,211 | 780 | 10 | 105 | 4,408 |
| 1980 | 461 | 73 | 106 | 1,539 | 1,388 | 826 | 11 | 112 | 4,517 |
| 1981 | 536 | 74 | 253 | 1,282 | 1,738 | 805 | 11 | 118 | 4,818 |
| 1982 | 594 | 125 | 264 | 1,609 | 2,205 | 715 | 11 | 124 | 5,647 |
| 1983 | 793 | 166 | 321 | 2,011 | 1,927 | 702 | 12 | 130 | 6,062 |
| 1984 | 1,199 | 249 | 432 | 2,355 | 2,255 | 782 | 13 | 140 | 7,425 |
| 1985 | 1,668 | 512 | 601 | 2,245 | 3,019 | 1,123 | 16 | 153 | 9,337 |
| 1986 | 2,499 | 409 | 388 | 3,236 | 3,962 | 1,242 | 16 | 168 | 11,921 |
| 1987 | 3,275 | 467 | 537 | 3,857 | 4,682 | 1,362 | 18 | 182 | 14,381 |
| 1988 | 3,732 | 402 | 843 | 4,046 | 5,855 | 1,438 | 19 | 200 | 16,536 |
| 1989 | 4,544 | 848 | 990 | 4,787 | 7,079 | 1,449 | 20 | 214 | 19,930 |
| 1990 | 5,342 | 1,300 | 1,617 | 5,916 | 8,129 | 1,480 | 24 | 240 | 24,048 |
| 1991 | 6,116 | 1,291 | 1,689 | 8,302 | 8,643 | 1,601 | 23 | 227 | 27,891 |
| 1992 | 7,147 | 937 | 878 | 9,693 | 11,588 | 1,806 | 27 | 250 | 32,325 |
| 1993 | 8,185 | 1,015 | 866 | 9,767 | 14,802 | 2,113 | 26 | 268 | 37,043 |
| 1994 | 9,845 | 720 | 1,237 | 10,625 | 16,191 | 2,404 | 37 | 347 | 41,405 |
| 1995 | 11,522 | 2,126 | 2,766 | 13,381 | 16,270 | 2,666 | 49 | 465 | 49,245 |
| 1996 | 14,225 | 3,312 | 3,001 | 15,394 | 14,568 | 3,064 | 56 | 538 | 54,158 |

| Year | Fatal | MAIS5 | MAIS4 | MAIS3 | MAIS2 | MAIS1 | MAIS0 | PDO | Total |
|-------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|------------|--------------|
| 1997 | 16,515 | 2,792 | 3,758 | 18,216 | 18,101 | 3,614 | 64 | 610 | 63,670 |
| 1998 | 19,580 | 2,451 | 4,628 | 22,080 | 21,427 | 4,040 | 74 | 677 | 74,957 |
| 1999 | 21,816 | 3,817 | 4,446 | 25,615 | 24,086 | 4,381 | 77 | 677 | 84,915 |
| 2000 | 26,048 | 5,073 | 3,783 | 26,640 | 25,087 | 4,466 | 88 | 761 | 91,947 |
| 2001 | 27,941 | 6,645 | 3,688 | 25,459 | 23,280 | 4,660 | 98 | 845 | 92,614 |
| 2002 | 31,674 | 6,646 | 3,695 | 26,930 | 25,098 | 4,631 | 105 | 922 | 99,702 |
| 2003 | 36,686 | 10,744 | 5,112 | 29,490 | 29,925 | 5,225 | 121 | 973 | 118,275 |
| 2004 | 41,943 | 11,667 | 8,862 | 38,448 | 33,945 | 5,590 | 127 | 1,076 | 141,657 |
| 2005 | 45,705 | 13,944 | 9,224 | 45,576 | 37,035 | 5,870 | 127 | 1,086 | 158,567 |
| 2006 | 47,679 | 10,747 | 13,996 | 47,091 | 37,338 | 5,203 | 129 | 1,108 | 163,290 |
| 2007 | 50,724 | 11,102 | 14,160 | 51,468 | 38,716 | 5,166 | 126 | 1,160 | 172,623 |
| 2008 | 52,776 | 10,243 | 15,314 | 48,703 | 37,001 | 5,039 | 119 | 1,124 | 170,322 |
| 2009 | 53,803 | 11,919 | 15,131 | 51,110 | 36,805 | 5,297 | 132 | 1,224 | 175,422 |
| 2010 | 56,284 | 10,620 | 14,808 | 53,167 | 34,750 | 5,617 | 154 | 1,312 | 176,712 |
| 2011 | 60,948 | 11,379 | 14,824 | 56,636 | 34,047 | 6,566 | 171 | 1,402 | 185,972 |
| 2012 | 62,422 | 11,050 | 14,216 | 56,426 | 33,453 | 7,400 | 203 | 1,634 | 186,802 |
| 2013 | 62,925 | 12,600 | 17,766 | 59,437 | 33,110 | 7,944 | 219 | 1,797 | 195,798 |
| 2014 | 68,550 | 12,457 | 24,077 | 58,098 | 36,023 | 7,829 | 252 | 2,243 | 209,528 |
| 2015 | 69,927 | 16,616 | 25,736 | 59,133 | 40,484 | 8,723 | 301 | 2,730 | 223,651 |
| 2016 | 75,734 | 16,398 | 25,303 | 60,237 | 41,146 | 9,726 | 357 | 2,779 | 231,679 |
| 2017 | 79,949 | 17,510 | 25,916 | 62,497 | 44,063 | 10,457 | 353 | 2,969 | 243,715 |
| 2018 | 86,418 | 20,895 | 27,290 | 65,833 | 46,391 | 10,919 | 386 | 3,398 | 261,530 |
| 2019 | 95,783 | 23,844 | 30,321 | 72,056 | 52,345 | 12,409 | 440 | 3,785 | 290,982 |

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Appendix E: Benefits Based on Economic Costs

Appendix E tables show the economic value of safety benefits by injury level broken out by vehicle type (passenger cars versus LTVs), technology category (CA versus CW), and attribution status (attributable to FMVSS versus voluntary).

Table E-1. Economic cost – total CA benefits – passenger cars by CY (millions in 2019\$)

| Year | Fatal | MAIS5 | MAIS4 | MAIS3 | MAIS2 | MAIS1 | MAIS0 | PDO | Total |
|-------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|------------|--------------|
| 1968 | 22 | 3 | 4 | 59 | 53 | 168 | 21 | 164 | 494 |
| 1969 | 36 | 4 | 7 | 96 | 105 | 336 | 34 | 267 | 887 |
| 1970 | 52 | 5 | 9 | 133 | 159 | 467 | 49 | 381 | 1,255 |
| 1971 | 70 | 7 | 12 | 173 | 217 | 651 | 64 | 491 | 1,685 |
| 1972 | 90 | 9 | 14 | 221 | 295 | 838 | 80 | 611 | 2,158 |
| 1973 | 110 | 10 | 17 | 251 | 355 | 981 | 90 | 678 | 2,492 |
| 1974 | 120 | 10 | 16 | 264 | 378 | 1,039 | 94 | 709 | 2,631 |
| 1975 | 145 | 12 | 18 | 305 | 436 | 1,207 | 106 | 807 | 3,037 |
| 1976 | 173 | 15 | 22 | 336 | 494 | 1,296 | 117 | 892 | 3,346 |
| 1977 | 193 | 17 | 25 | 371 | 566 | 1,473 | 135 | 1,010 | 3,791 |
| 1978 | 216 | 19 | 28 | 416 | 603 | 1,679 | 151 | 1,117 | 4,230 |
| 1979 | 236 | 21 | 31 | 426 | 633 | 1,887 | 159 | 1,161 | 4,554 |
| 1980 | 249 | 23 | 33 | 472 | 657 | 1,881 | 164 | 1,200 | 4,679 |
| 1981 | 272 | 24 | 32 | 500 | 659 | 1,852 | 168 | 1,227 | 4,736 |
| 1982 | 288 | 25 | 32 | 513 | 655 | 1,735 | 174 | 1,260 | 4,682 |
| 1983 | 293 | 25 | 34 | 448 | 707 | 1,755 | 181 | 1,315 | 4,757 |
| 1984 | 309 | 30 | 37 | 480 | 745 | 1,727 | 191 | 1,366 | 4,885 |
| 1985 | 278 | 26 | 40 | 501 | 688 | 1,670 | 198 | 1,453 | 4,855 |
| 1986 | 277 | 26 | 42 | 511 | 768 | 1,720 | 217 | 1,580 | 5,140 |
| 1987 | 276 | 27 | 43 | 534 | 811 | 1,783 | 237 | 1,741 | 5,452 |
| 1988 | 277 | 29 | 41 | 515 | 824 | 1,814 | 260 | 1,899 | 5,659 |
| 1989 | 280 | 28 | 40 | 463 | 771 | 1,773 | 272 | 1,900 | 5,526 |
| 1990 | 290 | 27 | 39 | 485 | 756 | 1,657 | 294 | 2,084 | 5,633 |
| 1991 | 285 | 26 | 40 | 536 | 849 | 1,665 | 302 | 2,102 | 5,805 |
| 1992 | 289 | 25 | 44 | 542 | 1,060 | 1,841 | 312 | 2,126 | 6,239 |
| 1993 | 302 | 27 | 48 | 757 | 1,366 | 2,091 | 345 | 2,292 | 7,228 |
| 1994 | 306 | 33 | 52 | 745 | 1,433 | 2,382 | 383 | 2,573 | 7,907 |

| Year | Fatal | MAIS5 | MAIS4 | MAIS3 | MAIS2 | MAIS1 | MAIS0 | PDO | Total |
|-------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|------------|--------------|
| 1995 | 323 | 37 | 57 | 839 | 1,417 | 2,843 | 446 | 2,978 | 8,941 |
| 1996 | 342 | 40 | 64 | 814 | 1,215 | 3,350 | 480 | 3,115 | 9,420 |
| 1997 | 355 | 38 | 71 | 843 | 1,170 | 3,471 | 484 | 3,281 | 9,713 |
| 1998 | 363 | 37 | 73 | 931 | 1,056 | 3,249 | 454 | 3,245 | 9,408 |
| 1999 | 378 | 35 | 75 | 814 | 1,273 | 3,077 | 444 | 3,199 | 9,296 |
| 2000 | 407 | 37 | 66 | 851 | 1,409 | 2,947 | 481 | 3,499 | 9,696 |
| 2001 | 446 | 38 | 75 | 785 | 1,595 | 2,915 | 482 | 3,600 | 9,937 |
| 2002 | 462 | 45 | 77 | 853 | 1,617 | 2,824 | 476 | 3,722 | 10,075 |
| 2003 | 505 | 89 | 211 | 902 | 1,384 | 2,806 | 507 | 3,892 | 10,296 |
| 2004 | 573 | 89 | 227 | 970 | 1,262 | 2,788 | 492 | 3,944 | 10,345 |
| 2005 | 649 | 118 | 223 | 905 | 1,186 | 2,675 | 468 | 4,058 | 10,283 |
| 2006 | 707 | 76 | 131 | 991 | 1,229 | 2,617 | 462 | 4,049 | 10,262 |
| 2007 | 842 | 71 | 147 | 989 | 1,409 | 2,734 | 472 | 4,178 | 10,841 |
| 2008 | 923 | 74 | 149 | 1,020 | 1,394 | 2,806 | 475 | 4,264 | 11,104 |
| 2009 | 946 | 82 | 181 | 1,066 | 1,252 | 2,839 | 456 | 4,092 | 10,916 |
| 2010 | 1,092 | 201 | 191 | 1,067 | 1,214 | 3,029 | 489 | 4,487 | 11,770 |
| 2011 | 1,331 | 282 | 290 | 1,258 | 1,233 | 3,197 | 488 | 4,713 | 12,792 |
| 2012 | 1,630 | 275 | 433 | 1,286 | 1,289 | 3,676 | 572 | 5,331 | 14,493 |
| 2013 | 1,893 | 209 | 384 | 1,364 | 1,377 | 3,920 | 623 | 5,857 | 15,627 |
| 2014 | 2,321 | 309 | 484 | 1,462 | 1,528 | 4,505 | 741 | 6,869 | 18,219 |
| 2015 | 2,729 | 229 | 510 | 1,558 | 1,886 | 5,174 | 867 | 7,954 | 20,909 |
| 2016 | 2,947 | 292 | 639 | 2,015 | 2,160 | 5,850 | 994 | 8,156 | 23,053 |
| 2017 | 3,359 | 304 | 698 | 2,216 | 2,327 | 6,223 | 979 | 8,429 | 24,535 |
| 2018 | 3,574 | 320 | 822 | 2,578 | 2,479 | 6,508 | 1,002 | 9,193 | 26,476 |
| 2019 | 3,874 | 328 | 896 | 2,711 | 2,564 | 6,750 | 1,052 | 9,788 | 27,963 |

Table E-2. Economic cost – voluntary CA benefits – passenger cars by CY (millions in 2019\$)

| Year | Fatal | MAIS5 | MAIS4 | MAIS3 | MAIS2 | MAIS1 | MAIS0 | PDO | Total |
|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1968 | 22 | 3 | 4 | 38 | 39 | 118 | 15 | 118 | 358 |
| 1969 | 36 | 4 | 7 | 56 | 59 | 186 | 21 | 161 | 531 |
| 1970 | 52 | 5 | 9 | 73 | 80 | 246 | 26 | 204 | 696 |
| 1971 | 70 | 7 | 12 | 96 | 107 | 308 | 31 | 242 | 874 |
| 1972 | 90 | 9 | 14 | 124 | 138 | 372 | 37 | 285 | 1,070 |
| 1973 | 110 | 10 | 17 | 139 | 165 | 405 | 41 | 311 | 1,197 |
| 1974 | 120 | 10 | 16 | 142 | 166 | 408 | 43 | 322 | 1,227 |
| 1975 | 145 | 12 | 18 | 171 | 193 | 447 | 48 | 364 | 1,398 |
| 1976 | 173 | 15 | 22 | 193 | 211 | 489 | 53 | 401 | 1,557 |
| 1977 | 193 | 17 | 25 | 210 | 223 | 535 | 60 | 447 | 1,710 |
| 1978 | 216 | 19 | 28 | 229 | 234 | 582 | 66 | 486 | 1,860 |
| 1979 | 236 | 21 | 31 | 237 | 237 | 620 | 68 | 497 | 1,948 |
| 1980 | 249 | 23 | 33 | 253 | 245 | 618 | 69 | 509 | 1,999 |
| 1981 | 272 | 24 | 32 | 269 | 252 | 615 | 71 | 520 | 2,055 |
| 1982 | 288 | 25 | 32 | 264 | 249 | 573 | 74 | 532 | 2,037 |
| 1983 | 293 | 25 | 34 | 260 | 261 | 573 | 76 | 555 | 2,076 |
| 1984 | 309 | 30 | 37 | 281 | 265 | 574 | 80 | 575 | 2,151 |
| 1985 | 278 | 26 | 40 | 275 | 249 | 569 | 83 | 610 | 2,130 |
| 1986 | 277 | 26 | 42 | 277 | 265 | 597 | 88 | 641 | 2,212 |
| 1987 | 276 | 27 | 43 | 288 | 281 | 605 | 92 | 677 | 2,290 |
| 1988 | 277 | 29 | 41 | 284 | 292 | 601 | 97 | 710 | 2,331 |
| 1989 | 280 | 28 | 40 | 280 | 288 | 582 | 98 | 684 | 2,279 |
| 1990 | 290 | 27 | 39 | 283 | 288 | 555 | 101 | 713 | 2,295 |
| 1991 | 285 | 26 | 40 | 292 | 307 | 562 | 101 | 704 | 2,317 |
| 1992 | 289 | 25 | 44 | 297 | 344 | 611 | 108 | 734 | 2,453 |
| 1993 | 302 | 27 | 48 | 359 | 455 | 709 | 123 | 815 | 2,836 |
| 1994 | 306 | 33 | 52 | 383 | 498 | 833 | 142 | 954 | 3,200 |
| 1995 | 323 | 37 | 57 | 424 | 517 | 1,089 | 172 | 1,151 | 3,771 |
| 1996 | 342 | 40 | 64 | 434 | 512 | 1,308 | 195 | 1,264 | 4,159 |

| Year | Fatal | MAIS5 | MAIS4 | MAIS3 | MAIS2 | MAIS1 | MAIS0 | PDO | Total |
|-------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|------------|--------------|
| 1997 | 355 | 38 | 71 | 441 | 539 | 1,454 | 200 | 1,360 | 4,458 |
| 1998 | 363 | 37 | 73 | 512 | 514 | 1,410 | 200 | 1,431 | 4,541 |
| 1999 | 378 | 35 | 75 | 528 | 603 | 1,380 | 217 | 1,567 | 4,784 |
| 2000 | 407 | 37 | 66 | 560 | 686 | 1,432 | 248 | 1,804 | 5,239 |
| 2001 | 446 | 38 | 75 | 531 | 722 | 1,562 | 254 | 1,893 | 5,520 |
| 2002 | 462 | 45 | 77 | 554 | 786 | 1,582 | 255 | 1,996 | 5,757 |
| 2003 | 505 | 89 | 211 | 641 | 707 | 1,554 | 284 | 2,181 | 6,172 |
| 2004 | 573 | 89 | 227 | 669 | 677 | 1,551 | 279 | 2,241 | 6,307 |
| 2005 | 649 | 118 | 223 | 629 | 680 | 1,511 | 276 | 2,396 | 6,481 |
| 2006 | 707 | 76 | 131 | 692 | 695 | 1,525 | 281 | 2,465 | 6,574 |
| 2007 | 836 | 69 | 144 | 714 | 804 | 1,611 | 295 | 2,610 | 7,082 |
| 2008 | 894 | 70 | 131 | 744 | 810 | 1,653 | 299 | 2,684 | 7,285 |
| 2009 | 882 | 71 | 146 | 761 | 741 | 1,658 | 286 | 2,565 | 7,110 |
| 2010 | 925 | 168 | 157 | 741 | 690 | 1,728 | 300 | 2,749 | 7,457 |
| 2011 | 1,031 | 227 | 198 | 889 | 707 | 1,760 | 293 | 2,826 | 7,931 |
| 2012 | 1,133 | 231 | 233 | 938 | 709 | 1,949 | 333 | 3,108 | 8,635 |
| 2013 | 1,175 | 104 | 195 | 870 | 714 | 2,038 | 353 | 3,315 | 8,764 |
| 2014 | 1,332 | 138 | 219 | 882 | 826 | 2,366 | 406 | 3,761 | 9,930 |
| 2015 | 1,408 | 111 | 240 | 800 | 967 | 2,683 | 457 | 4,188 | 10,853 |
| 2016 | 1,525 | 128 | 263 | 953 | 1,034 | 2,980 | 515 | 4,224 | 11,622 |
| 2017 | 1,594 | 130 | 276 | 986 | 1,097 | 3,098 | 496 | 4,270 | 11,946 |
| 2018 | 1,602 | 125 | 295 | 1,046 | 1,156 | 3,189 | 488 | 4,476 | 12,376 |
| 2019 | 1,660 | 125 | 310 | 1,060 | 1,170 | 3,244 | 509 | 4,738 | 12,816 |

Table E-3. Economic cost – attributable CA benefits – passenger cars by CY (millions in 2019\$)

| Year | Fatal | MAIS5 | MAIS4 | MAIS3 | MAIS2 | MAIS1 | MAIS0 | PDO | Total |
|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1968 | - | - | - | 21 | 14 | 50 | 6 | 45 | 136 |
| 1969 | - | - | - | 40 | 46 | 150 | 14 | 106 | 355 |
| 1970 | - | - | - | 60 | 79 | 221 | 23 | 177 | 559 |
| 1971 | - | - | - | 77 | 110 | 343 | 32 | 249 | 811 |
| 1972 | - | - | - | 97 | 157 | 466 | 43 | 326 | 1,089 |
| 1973 | - | - | - | 112 | 190 | 576 | 49 | 367 | 1,295 |
| 1974 | - | - | - | 123 | 211 | 632 | 52 | 388 | 1,405 |
| 1975 | - | - | - | 134 | 243 | 761 | 58 | 443 | 1,639 |
| 1976 | - | - | - | 143 | 284 | 807 | 65 | 491 | 1,789 |
| 1977 | - | - | - | 161 | 343 | 938 | 75 | 564 | 2,081 |
| 1978 | - | - | - | 188 | 370 | 1,097 | 85 | 631 | 2,371 |
| 1979 | - | - | - | 189 | 396 | 1,267 | 91 | 664 | 2,606 |
| 1980 | - | - | - | 219 | 412 | 1,263 | 94 | 691 | 2,680 |
| 1981 | - | - | - | 231 | 408 | 1,238 | 97 | 708 | 2,681 |
| 1982 | - | - | - | 248 | 406 | 1,162 | 101 | 728 | 2,645 |
| 1983 | - | - | - | 189 | 446 | 1,182 | 105 | 760 | 2,681 |
| 1984 | - | - | - | 200 | 480 | 1,153 | 110 | 791 | 2,734 |
| 1985 | - | - | - | 227 | 439 | 1,101 | 115 | 843 | 2,725 |
| 1986 | - | - | - | 234 | 502 | 1,124 | 129 | 939 | 2,928 |
| 1987 | - | - | - | 245 | 530 | 1,178 | 145 | 1,064 | 3,163 |
| 1988 | - | - | - | 231 | 532 | 1,214 | 163 | 1,189 | 3,328 |
| 1989 | - | - | - | 182 | 483 | 1,192 | 174 | 1,216 | 3,247 |
| 1990 | - | - | - | 202 | 468 | 1,102 | 194 | 1,371 | 3,337 |
| 1991 | - | - | - | 244 | 542 | 1,103 | 201 | 1,399 | 3,489 |
| 1992 | - | - | - | 245 | 715 | 1,230 | 204 | 1,392 | 3,786 |
| 1993 | - | - | - | 398 | 911 | 1,382 | 223 | 1,478 | 4,392 |
| 1994 | - | - | - | 363 | 936 | 1,549 | 241 | 1,619 | 4,707 |
| 1995 | - | - | - | 415 | 901 | 1,754 | 274 | 1,827 | 5,170 |
| 1996 | - | - | - | 381 | 703 | 2,042 | 285 | 1,850 | 5,261 |

| Year | Fatal | MAIS5 | MAIS4 | MAIS3 | MAIS2 | MAIS1 | MAIS0 | PDO | Total |
|-------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|------------|--------------|
| 1997 | - | - | - | 402 | 632 | 2,017 | 283 | 1,921 | 5,255 |
| 1998 | - | - | - | 418 | 542 | 1,839 | 254 | 1,814 | 4,867 |
| 1999 | - | - | - | 286 | 670 | 1,698 | 227 | 1,632 | 4,512 |
| 2000 | - | - | - | 291 | 723 | 1,515 | 233 | 1,695 | 4,457 |
| 2001 | - | - | - | 255 | 874 | 1,353 | 229 | 1,707 | 4,417 |
| 2002 | - | - | - | 299 | 830 | 1,241 | 221 | 1,726 | 4,317 |
| 2003 | 0 | - | 0 | 260 | 677 | 1,252 | 223 | 1,711 | 4,124 |
| 2004 | 0 | - | 0 | 301 | 585 | 1,237 | 212 | 1,703 | 4,038 |
| 2005 | 0 | - | 0 | 276 | 506 | 1,165 | 192 | 1,663 | 3,802 |
| 2006 | 0 | - | 0 | 299 | 534 | 1,092 | 181 | 1,584 | 3,689 |
| 2007 | 6 | 2 | 3 | 275 | 605 | 1,124 | 177 | 1,568 | 3,759 |
| 2008 | 29 | 4 | 18 | 276 | 584 | 1,153 | 176 | 1,580 | 3,819 |
| 2009 | 64 | 11 | 35 | 305 | 512 | 1,181 | 170 | 1,527 | 3,806 |
| 2010 | 166 | 34 | 33 | 327 | 524 | 1,301 | 190 | 1,739 | 4,313 |
| 2011 | 300 | 55 | 92 | 369 | 526 | 1,438 | 195 | 1,887 | 4,861 |
| 2012 | 497 | 43 | 200 | 348 | 580 | 1,727 | 238 | 2,223 | 5,858 |
| 2013 | 719 | 104 | 188 | 494 | 663 | 1,882 | 270 | 2,542 | 6,863 |
| 2014 | 990 | 171 | 264 | 580 | 702 | 2,138 | 336 | 3,108 | 8,290 |
| 2015 | 1,321 | 118 | 270 | 758 | 919 | 2,492 | 411 | 3,766 | 10,055 |
| 2016 | 1,422 | 164 | 376 | 1,062 | 1,127 | 2,870 | 479 | 3,932 | 11,431 |
| 2017 | 1,765 | 174 | 422 | 1,230 | 1,230 | 3,125 | 483 | 4,159 | 12,589 |
| 2018 | 1,973 | 195 | 528 | 1,531 | 1,324 | 3,318 | 514 | 4,718 | 14,101 |
| 2019 | 2,214 | 203 | 586 | 1,650 | 1,394 | 3,506 | 543 | 5,049 | 15,146 |

Table E-4. Economic cost – total CW benefits – passenger cars by CY (millions in 2019\$)

| Year | Fatal | MAIS5 | MAIS4 | MAIS3 | MAIS2 | MAIS1 | MAIS0 | PDO | Total |
|-------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|------------|--------------|
| 1968 | 181 | 55 | 63 | 387 | 349 | 136 | - | - | 1,172 |
| 1969 | 314 | 74 | 122 | 659 | 705 | 275 | - | - | 2,148 |
| 1970 | 457 | 95 | 168 | 857 | 1,122 | 415 | - | - | 3,115 |
| 1971 | 633 | 102 | 212 | 1,118 | 1,514 | 519 | - | - | 4,099 |
| 1972 | 839 | 123 | 261 | 1,369 | 1,980 | 654 | - | - | 5,226 |
| 1973 | 1,053 | 167 | 288 | 1,652 | 2,241 | 731 | - | - | 6,131 |
| 1974 | 1,234 | 226 | 339 | 1,724 | 2,246 | 793 | - | - | 6,562 |
| 1975 | 1,566 | 275 | 432 | 2,013 | 2,431 | 845 | - | - | 7,563 |
| 1976 | 1,840 | 346 | 538 | 2,313 | 2,547 | 933 | - | - | 8,518 |
| 1977 | 2,130 | 402 | 645 | 2,716 | 2,697 | 1,012 | - | - | 9,601 |
| 1978 | 2,425 | 441 | 694 | 3,078 | 2,844 | 1,145 | - | - | 10,626 |
| 1979 | 2,716 | 487 | 686 | 3,431 | 3,076 | 1,218 | - | - | 11,614 |
| 1980 | 2,981 | 521 | 694 | 3,715 | 3,273 | 1,229 | - | - | 12,413 |
| 1981 | 3,237 | 535 | 734 | 4,217 | 3,362 | 1,235 | - | - | 13,321 |
| 1982 | 3,484 | 492 | 792 | 4,329 | 3,503 | 1,198 | - | - | 13,799 |
| 1983 | 3,783 | 527 | 941 | 4,467 | 3,593 | 1,204 | - | - | 14,514 |
| 1984 | 4,248 | 520 | 972 | 4,867 | 3,808 | 1,304 | - | - | 15,720 |
| 1985 | 5,010 | 593 | 1,107 | 5,790 | 4,365 | 1,476 | - | - | 18,342 |
| 1986 | 5,959 | 788 | 1,332 | 7,093 | 5,161 | 1,785 | - | - | 22,119 |
| 1987 | 6,638 | 837 | 1,331 | 7,563 | 5,706 | 1,871 | - | - | 23,945 |
| 1988 | 7,222 | 933 | 1,416 | 8,771 | 6,395 | 1,984 | - | - | 26,720 |
| 1989 | 7,562 | 967 | 1,437 | 9,458 | 7,187 | 2,051 | - | - | 28,662 |
| 1990 | 8,057 | 952 | 1,511 | 10,146 | 8,191 | 2,124 | - | - | 30,981 |
| 1991 | 8,602 | 1,023 | 1,735 | 10,075 | 8,540 | 2,059 | - | - | 32,034 |
| 1992 | 9,202 | 1,298 | 2,633 | 10,902 | 8,565 | 2,139 | - | - | 34,740 |
| 1993 | 10,206 | 1,537 | 2,897 | 11,712 | 8,018 | 2,333 | - | - | 36,703 |
| 1994 | 10,921 | 1,639 | 2,971 | 12,046 | 7,930 | 2,498 | - | - | 38,005 |
| 1995 | 11,842 | 1,356 | 2,622 | 12,075 | 8,367 | 2,814 | - | - | 39,075 |
| 1996 | 13,283 | 1,257 | 2,732 | 13,419 | 9,372 | 3,064 | - | - | 43,127 |

| Year | Fatal | MAIS5 | MAIS4 | MAIS3 | MAIS2 | MAIS1 | MAIS0 | PDO | Total |
|-------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|------------|--------------|
| 1997 | 13,995 | 1,426 | 2,751 | 13,785 | 9,741 | 3,070 | - | - | 44,767 |
| 1998 | 14,738 | 1,830 | 2,746 | 14,479 | 9,771 | 3,082 | - | - | 46,647 |
| 1999 | 15,418 | 1,799 | 2,942 | 14,138 | 9,833 | 2,987 | - | - | 47,115 |
| 2000 | 16,372 | 1,957 | 2,812 | 15,688 | 10,099 | 2,955 | - | - | 49,882 |
| 2001 | 17,350 | 1,703 | 3,081 | 16,783 | 10,638 | 2,648 | - | - | 52,202 |
| 2002 | 18,260 | 1,918 | 3,835 | 17,800 | 11,312 | 2,495 | - | - | 55,620 |
| 2003 | 19,235 | 1,732 | 4,532 | 17,793 | 11,343 | 2,491 | - | - | 57,126 |
| 2004 | 20,611 | 1,877 | 4,745 | 17,481 | 11,416 | 2,571 | - | - | 58,700 |
| 2005 | 21,634 | 1,787 | 5,033 | 17,120 | 10,971 | 2,487 | - | - | 59,032 |
| 2006 | 22,155 | 2,147 | 5,067 | 17,361 | 10,587 | 2,285 | - | - | 59,603 |
| 2007 | 23,061 | 2,310 | 5,372 | 17,195 | 9,998 | 2,138 | - | - | 60,075 |
| 2008 | 22,873 | 2,526 | 5,397 | 17,144 | 9,565 | 2,103 | - | - | 59,609 |
| 2009 | 22,622 | 2,234 | 5,097 | 16,015 | 8,917 | 1,980 | - | - | 56,863 |
| 2010 | 22,540 | 2,808 | 5,123 | 15,304 | 8,670 | 2,104 | - | - | 56,550 |
| 2011 | 23,490 | 3,252 | 5,751 | 15,010 | 8,549 | 2,214 | - | - | 58,267 |
| 2012 | 24,330 | 3,435 | 6,001 | 15,477 | 8,441 | 2,361 | - | - | 60,045 |
| 2013 | 24,959 | 3,191 | 5,867 | 14,972 | 8,388 | 2,405 | - | - | 59,782 |
| 2014 | 26,108 | 3,252 | 6,437 | 15,445 | 8,574 | 2,489 | - | - | 62,306 |
| 2015 | 27,120 | 2,868 | 6,586 | 15,728 | 8,682 | 2,673 | - | - | 63,657 |
| 2016 | 28,026 | 3,261 | 7,009 | 15,902 | 9,436 | 2,763 | - | - | 66,397 |
| 2017 | 28,940 | 3,304 | 7,220 | 15,903 | 9,781 | 2,870 | - | - | 68,017 |
| 2018 | 28,438 | 3,173 | 7,440 | 15,745 | 10,010 | 2,907 | - | - | 67,713 |
| 2019 | 28,601 | 3,098 | 7,700 | 15,646 | 10,009 | 2,884 | - | - | 67,939 |

Table E-5. Economic cost – voluntary CW benefits – passenger cars by CY (millions in 2019\$)

| Year | Fatal | MAIS5 | MAIS4 | MAIS3 | MAIS2 | MAIS1 | MAIS0 | PDO | Total |
|------|-------|-------|-------|-------|-------|-------|-------|-----|--------|
| 1968 | 147 | 37 | 38 | 277 | 306 | 100 | - | - | 904 |
| 1969 | 241 | 42 | 70 | 459 | 609 | 176 | - | - | 1,596 |
| 1970 | 341 | 61 | 111 | 551 | 988 | 228 | - | - | 2,281 |
| 1971 | 462 | 62 | 150 | 739 | 1,319 | 277 | - | - | 3,009 |
| 1972 | 596 | 76 | 180 | 872 | 1,727 | 323 | - | - | 3,774 |
| 1973 | 726 | 115 | 196 | 1,075 | 1,926 | 347 | - | - | 4,384 |
| 1974 | 806 | 165 | 243 | 1,098 | 1,896 | 349 | - | - | 4,556 |
| 1975 | 960 | 190 | 335 | 1,173 | 2,021 | 367 | - | - | 5,047 |
| 1976 | 1,147 | 253 | 407 | 1,332 | 2,073 | 408 | - | - | 5,621 |
| 1977 | 1,347 | 277 | 473 | 1,598 | 2,153 | 449 | - | - | 6,298 |
| 1978 | 1,533 | 292 | 497 | 1,764 | 2,232 | 499 | - | - | 6,817 |
| 1979 | 1,733 | 302 | 485 | 1,910 | 2,370 | 515 | - | - | 7,314 |
| 1980 | 1,889 | 312 | 483 | 2,001 | 2,513 | 519 | - | - | 7,716 |
| 1981 | 2,064 | 329 | 543 | 2,166 | 2,501 | 529 | - | - | 8,132 |
| 1982 | 2,181 | 298 | 605 | 2,247 | 2,436 | 499 | - | - | 8,266 |
| 1983 | 2,281 | 328 | 750 | 2,253 | 2,333 | 494 | - | - | 8,440 |
| 1984 | 2,423 | 271 | 740 | 2,180 | 2,377 | 515 | - | - | 8,505 |
| 1985 | 2,545 | 263 | 606 | 2,390 | 2,347 | 564 | - | - | 8,713 |
| 1986 | 2,833 | 395 | 677 | 2,702 | 2,491 | 633 | - | - | 9,729 |
| 1987 | 3,044 | 420 | 681 | 2,892 | 2,742 | 651 | - | - | 10,430 |
| 1988 | 3,233 | 444 | 719 | 3,339 | 3,002 | 679 | - | - | 11,417 |
| 1989 | 3,355 | 457 | 742 | 3,651 | 3,448 | 704 | - | - | 12,357 |
| 1990 | 3,515 | 339 | 725 | 4,324 | 4,164 | 703 | - | - | 13,769 |
| 1991 | 3,614 | 347 | 811 | 4,398 | 4,234 | 658 | - | - | 14,062 |
| 1992 | 3,795 | 494 | 1,010 | 4,952 | 3,973 | 656 | - | - | 14,880 |
| 1993 | 4,040 | 535 | 1,356 | 4,358 | 3,141 | 687 | - | - | 14,116 |
| 1994 | 4,249 | 573 | 1,347 | 4,248 | 3,013 | 740 | - | - | 14,169 |
| 1995 | 4,547 | 431 | 1,359 | 4,112 | 3,162 | 895 | - | - | 14,506 |
| 1996 | 4,937 | 399 | 1,037 | 5,144 | 3,798 | 1,061 | - | - | 16,376 |

| Year | Fatal | MAIS5 | MAIS4 | MAIS3 | MAIS2 | MAIS1 | MAIS0 | PDO | Total |
|-------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|------------|--------------|
| 1997 | 5,125 | 449 | 1,080 | 5,249 | 3,909 | 1,037 | - | - | 16,850 |
| 1998 | 5,326 | 544 | 1,010 | 5,266 | 3,729 | 1,090 | - | - | 16,965 |
| 1999 | 5,373 | 568 | 999 | 4,629 | 3,384 | 816 | - | - | 15,768 |
| 2000 | 5,654 | 648 | 871 | 5,229 | 3,410 | 816 | - | - | 16,628 |
| 2001 | 5,922 | 550 | 928 | 5,425 | 3,789 | 743 | - | - | 17,357 |
| 2002 | 6,155 | 711 | 1,266 | 5,859 | 4,280 | 689 | - | - | 18,960 |
| 2003 | 6,310 | 581 | 1,453 | 5,795 | 4,339 | 677 | - | - | 19,155 |
| 2004 | 6,715 | 675 | 1,536 | 5,516 | 4,104 | 642 | - | - | 19,187 |
| 2005 | 7,070 | 545 | 1,654 | 5,244 | 3,931 | 621 | - | - | 19,064 |
| 2006 | 7,182 | 647 | 1,668 | 5,384 | 3,827 | 567 | - | - | 19,275 |
| 2007 | 7,489 | 736 | 1,777 | 5,359 | 3,811 | 537 | - | - | 19,709 |
| 2008 | 7,379 | 796 | 1,838 | 5,328 | 3,671 | 536 | - | - | 19,548 |
| 2009 | 7,269 | 724 | 1,757 | 4,943 | 3,419 | 499 | - | - | 18,611 |
| 2010 | 7,194 | 930 | 1,746 | 4,798 | 3,333 | 515 | - | - | 18,516 |
| 2011 | 7,504 | 1,112 | 1,884 | 4,687 | 3,257 | 538 | - | - | 18,982 |
| 2012 | 7,763 | 1,129 | 1,936 | 5,094 | 3,029 | 583 | - | - | 19,534 |
| 2013 | 7,950 | 1,109 | 1,920 | 5,125 | 3,038 | 607 | - | - | 19,749 |
| 2014 | 8,309 | 978 | 2,295 | 5,524 | 3,155 | 645 | - | - | 20,907 |
| 2015 | 8,620 | 824 | 2,377 | 5,307 | 3,281 | 688 | - | - | 21,098 |
| 2016 | 8,829 | 982 | 2,453 | 5,380 | 3,628 | 737 | - | - | 22,008 |
| 2017 | 9,153 | 993 | 2,512 | 5,385 | 3,772 | 766 | - | - | 22,582 |
| 2018 | 9,024 | 954 | 2,573 | 5,378 | 3,888 | 764 | - | - | 22,580 |
| 2019 | 8,954 | 926 | 2,661 | 5,380 | 3,879 | 771 | - | - | 22,571 |

Table E-6. Economic cost – attributable CW benefits – passenger cars by CY (millions in 2019\$)

| Year | Fatal | MAIS5 | MAIS4 | MAIS3 | MAIS2 | MAIS1 | MAIS0 | PDO | Total |
|------|-------|-------|-------|-------|-------|-------|-------|-----|--------|
| 1968 | 34 | 19 | 25 | 110 | 44 | 36 | - | - | 268 |
| 1969 | 73 | 32 | 52 | 200 | 96 | 99 | - | - | 552 |
| 1970 | 116 | 34 | 56 | 306 | 134 | 188 | - | - | 834 |
| 1971 | 171 | 40 | 62 | 380 | 195 | 242 | - | - | 1,090 |
| 1972 | 243 | 47 | 81 | 497 | 253 | 331 | - | - | 1,452 |
| 1973 | 328 | 51 | 92 | 577 | 315 | 384 | - | - | 1,747 |
| 1974 | 429 | 61 | 96 | 626 | 350 | 445 | - | - | 2,005 |
| 1975 | 606 | 85 | 97 | 839 | 411 | 478 | - | - | 2,515 |
| 1976 | 693 | 93 | 131 | 981 | 475 | 524 | - | - | 2,898 |
| 1977 | 782 | 124 | 172 | 1,118 | 544 | 562 | - | - | 3,304 |
| 1978 | 892 | 149 | 197 | 1,314 | 612 | 646 | - | - | 3,809 |
| 1979 | 983 | 185 | 201 | 1,522 | 705 | 704 | - | - | 4,300 |
| 1980 | 1,092 | 209 | 212 | 1,714 | 760 | 710 | - | - | 4,697 |
| 1981 | 1,174 | 207 | 190 | 2,051 | 861 | 706 | - | - | 5,189 |
| 1982 | 1,303 | 194 | 187 | 2,082 | 1,067 | 699 | - | - | 5,533 |
| 1983 | 1,502 | 199 | 191 | 2,213 | 1,260 | 710 | - | - | 6,075 |
| 1984 | 1,825 | 249 | 232 | 2,687 | 1,431 | 789 | - | - | 7,215 |
| 1985 | 2,465 | 331 | 502 | 3,401 | 2,018 | 913 | - | - | 9,628 |
| 1986 | 3,126 | 393 | 656 | 4,392 | 2,671 | 1,153 | - | - | 12,390 |
| 1987 | 3,594 | 416 | 650 | 4,671 | 2,964 | 1,219 | - | - | 13,515 |
| 1988 | 3,989 | 489 | 697 | 5,432 | 3,392 | 1,304 | - | - | 15,303 |
| 1989 | 4,207 | 510 | 696 | 5,807 | 3,738 | 1,347 | - | - | 16,305 |
| 1990 | 4,542 | 613 | 787 | 5,822 | 4,027 | 1,421 | - | - | 17,212 |
| 1991 | 4,988 | 676 | 924 | 5,677 | 4,306 | 1,401 | - | - | 17,972 |
| 1992 | 5,407 | 804 | 1,624 | 5,950 | 4,592 | 1,483 | - | - | 19,860 |
| 1993 | 6,167 | 1,002 | 1,541 | 7,354 | 4,877 | 1,647 | - | - | 22,587 |
| 1994 | 6,672 | 1,066 | 1,624 | 7,797 | 4,917 | 1,758 | - | - | 23,836 |
| 1995 | 7,295 | 924 | 1,263 | 7,963 | 5,204 | 1,919 | - | - | 24,569 |
| 1996 | 8,346 | 858 | 1,696 | 8,274 | 5,574 | 2,003 | - | - | 26,751 |

| Year | Fatal | MAIS5 | MAIS4 | MAIS3 | MAIS2 | MAIS1 | MAIS0 | PDO | Total |
|-------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|------------|--------------|
| 1997 | 8,870 | 977 | 1,671 | 8,536 | 5,832 | 2,033 | - | - | 27,918 |
| 1998 | 9,412 | 1,286 | 1,737 | 9,214 | 6,042 | 1,992 | - | - | 29,682 |
| 1999 | 10,045 | 1,231 | 1,943 | 9,509 | 6,448 | 2,171 | - | - | 31,347 |
| 2000 | 10,718 | 1,309 | 1,940 | 10,459 | 6,689 | 2,139 | - | - | 33,254 |
| 2001 | 11,428 | 1,153 | 2,152 | 11,358 | 6,850 | 1,904 | - | - | 34,846 |
| 2002 | 12,105 | 1,207 | 2,568 | 11,941 | 7,032 | 1,806 | - | - | 36,660 |
| 2003 | 12,925 | 1,151 | 3,080 | 11,998 | 7,004 | 1,813 | - | - | 37,971 |
| 2004 | 13,896 | 1,202 | 3,209 | 11,965 | 7,312 | 1,929 | - | - | 39,512 |
| 2005 | 14,565 | 1,242 | 3,380 | 11,876 | 7,040 | 1,866 | - | - | 39,968 |
| 2006 | 14,974 | 1,500 | 3,399 | 11,977 | 6,760 | 1,718 | - | - | 40,328 |
| 2007 | 15,572 | 1,574 | 3,595 | 11,837 | 6,187 | 1,601 | - | - | 40,366 |
| 2008 | 15,495 | 1,730 | 3,559 | 11,817 | 5,894 | 1,567 | - | - | 40,061 |
| 2009 | 15,353 | 1,510 | 3,340 | 11,071 | 5,498 | 1,481 | - | - | 38,253 |
| 2010 | 15,347 | 1,877 | 3,377 | 10,506 | 5,337 | 1,589 | - | - | 38,034 |
| 2011 | 15,986 | 2,140 | 3,867 | 10,323 | 5,292 | 1,676 | - | - | 39,285 |
| 2012 | 16,567 | 2,305 | 4,065 | 10,383 | 5,412 | 1,778 | - | - | 40,511 |
| 2013 | 17,009 | 2,082 | 3,947 | 9,847 | 5,350 | 1,798 | - | - | 40,034 |
| 2014 | 17,799 | 2,274 | 4,142 | 9,921 | 5,419 | 1,844 | - | - | 41,399 |
| 2015 | 18,500 | 2,044 | 4,209 | 10,420 | 5,400 | 1,985 | - | - | 42,558 |
| 2016 | 19,197 | 2,279 | 4,556 | 10,522 | 5,809 | 2,026 | - | - | 44,389 |
| 2017 | 19,787 | 2,310 | 4,708 | 10,518 | 6,009 | 2,104 | - | - | 45,435 |
| 2018 | 19,415 | 2,219 | 4,867 | 10,366 | 6,122 | 2,143 | - | - | 45,132 |
| 2019 | 19,647 | 2,173 | 5,039 | 10,266 | 6,130 | 2,113 | - | - | 45,368 |

Table E-7. Economic cost – total benefits – passenger cars by CY (millions in 2019\$)

| Year | Fatal | MAIS5 | MAIS4 | MAIS3 | MAIS2 | MAIS1 | MAIS0 | PDO | Total |
|------|--------|-------|-------|--------|--------|-------|-------|-------|--------|
| 1968 | 203 | 58 | 67 | 446 | 403 | 304 | 21 | 164 | 1,666 |
| 1969 | 350 | 78 | 129 | 755 | 810 | 611 | 34 | 267 | 3,034 |
| 1970 | 509 | 100 | 177 | 990 | 1,281 | 882 | 49 | 381 | 4,370 |
| 1971 | 704 | 109 | 224 | 1,292 | 1,731 | 1,171 | 64 | 491 | 5,784 |
| 1972 | 930 | 132 | 275 | 1,589 | 2,275 | 1,492 | 80 | 611 | 7,385 |
| 1973 | 1,163 | 177 | 305 | 1,903 | 2,596 | 1,712 | 90 | 678 | 8,623 |
| 1974 | 1,354 | 236 | 355 | 1,988 | 2,624 | 1,832 | 94 | 709 | 9,193 |
| 1975 | 1,712 | 287 | 451 | 2,317 | 2,868 | 2,052 | 106 | 807 | 10,600 |
| 1976 | 2,013 | 361 | 560 | 2,649 | 3,042 | 2,229 | 117 | 892 | 11,864 |
| 1977 | 2,323 | 418 | 670 | 3,087 | 3,263 | 2,485 | 135 | 1,010 | 13,392 |
| 1978 | 2,641 | 460 | 722 | 3,494 | 3,447 | 2,824 | 151 | 1,117 | 14,856 |
| 1979 | 2,952 | 508 | 717 | 3,858 | 3,709 | 3,105 | 159 | 1,161 | 16,168 |
| 1980 | 3,230 | 544 | 728 | 4,187 | 3,930 | 3,110 | 164 | 1,200 | 17,093 |
| 1981 | 3,510 | 560 | 766 | 4,718 | 4,022 | 3,087 | 168 | 1,227 | 18,057 |
| 1982 | 3,772 | 518 | 824 | 4,842 | 4,158 | 2,933 | 174 | 1,260 | 18,481 |
| 1983 | 4,076 | 551 | 975 | 4,915 | 4,300 | 2,959 | 181 | 1,315 | 19,272 |
| 1984 | 4,558 | 550 | 1,009 | 5,348 | 4,553 | 3,032 | 191 | 1,366 | 20,605 |
| 1985 | 5,288 | 620 | 1,147 | 6,291 | 5,053 | 3,147 | 198 | 1,453 | 23,196 |
| 1986 | 6,235 | 814 | 1,374 | 7,604 | 5,929 | 3,505 | 217 | 1,580 | 27,259 |
| 1987 | 6,913 | 864 | 1,374 | 8,096 | 6,518 | 3,653 | 237 | 1,741 | 29,397 |
| 1988 | 7,499 | 962 | 1,457 | 9,286 | 7,219 | 3,798 | 260 | 1,899 | 32,380 |
| 1989 | 7,842 | 994 | 1,477 | 9,921 | 7,958 | 3,825 | 272 | 1,900 | 34,188 |
| 1990 | 8,347 | 979 | 1,551 | 10,631 | 8,946 | 3,781 | 294 | 2,084 | 36,614 |
| 1991 | 8,887 | 1,049 | 1,775 | 10,612 | 9,389 | 3,724 | 302 | 2,102 | 37,839 |
| 1992 | 9,492 | 1,323 | 2,678 | 11,444 | 9,625 | 3,980 | 312 | 2,126 | 40,979 |
| 1993 | 10,508 | 1,564 | 2,945 | 12,468 | 9,384 | 4,425 | 345 | 2,292 | 43,931 |
| 1994 | 11,227 | 1,672 | 3,023 | 12,791 | 9,364 | 4,879 | 383 | 2,573 | 45,912 |
| 1995 | 12,165 | 1,392 | 2,680 | 12,914 | 9,784 | 5,657 | 446 | 2,978 | 48,016 |
| 1996 | 13,625 | 1,297 | 2,796 | 14,233 | 10,587 | 6,414 | 480 | 3,115 | 52,547 |

| Year | Fatal | MAIS5 | MAIS4 | MAIS3 | MAIS2 | MAIS1 | MAIS0 | PDO | Total |
|-------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|------------|--------------|
| 1997 | 14,350 | 1,464 | 2,821 | 14,629 | 10,911 | 6,541 | 484 | 3,281 | 54,481 |
| 1998 | 15,101 | 1,868 | 2,820 | 15,410 | 10,827 | 6,331 | 454 | 3,245 | 56,055 |
| 1999 | 15,797 | 1,834 | 3,017 | 14,951 | 11,105 | 6,064 | 444 | 3,199 | 56,411 |
| 2000 | 16,779 | 1,993 | 2,877 | 16,539 | 11,508 | 5,902 | 481 | 3,499 | 59,578 |
| 2001 | 17,796 | 1,741 | 3,156 | 17,568 | 12,234 | 5,563 | 482 | 3,600 | 62,139 |
| 2002 | 18,721 | 1,963 | 3,912 | 18,653 | 12,929 | 5,318 | 476 | 3,722 | 65,694 |
| 2003 | 19,740 | 1,821 | 4,743 | 18,695 | 12,727 | 5,297 | 507 | 3,892 | 67,422 |
| 2004 | 21,184 | 1,965 | 4,972 | 18,451 | 12,678 | 5,359 | 492 | 3,944 | 69,045 |
| 2005 | 22,284 | 1,906 | 5,256 | 18,025 | 12,157 | 5,162 | 468 | 4,058 | 69,315 |
| 2006 | 22,862 | 2,224 | 5,198 | 18,352 | 11,816 | 4,902 | 462 | 4,049 | 69,865 |
| 2007 | 23,903 | 2,381 | 5,519 | 18,184 | 11,407 | 4,873 | 472 | 4,178 | 70,916 |
| 2008 | 23,796 | 2,600 | 5,546 | 18,164 | 10,959 | 4,908 | 475 | 4,264 | 70,712 |
| 2009 | 23,568 | 2,315 | 5,278 | 17,081 | 10,169 | 4,819 | 456 | 4,092 | 67,779 |
| 2010 | 23,632 | 3,009 | 5,314 | 16,371 | 9,884 | 5,133 | 489 | 4,487 | 68,320 |
| 2011 | 24,821 | 3,534 | 6,042 | 16,268 | 9,782 | 5,411 | 488 | 4,713 | 71,059 |
| 2012 | 25,960 | 3,709 | 6,435 | 16,764 | 9,730 | 6,038 | 572 | 5,331 | 74,537 |
| 2013 | 26,853 | 3,400 | 6,251 | 16,336 | 9,765 | 6,325 | 623 | 5,857 | 75,409 |
| 2014 | 28,429 | 3,561 | 6,921 | 16,908 | 10,102 | 6,994 | 741 | 6,869 | 80,525 |
| 2015 | 29,849 | 3,097 | 7,096 | 17,286 | 10,568 | 7,848 | 867 | 7,954 | 84,565 |
| 2016 | 30,973 | 3,553 | 7,649 | 17,917 | 11,596 | 8,612 | 994 | 8,156 | 89,450 |
| 2017 | 32,298 | 3,608 | 7,917 | 18,119 | 12,108 | 9,093 | 979 | 8,429 | 92,552 |
| 2018 | 32,013 | 3,492 | 8,262 | 18,322 | 12,489 | 9,414 | 1,002 | 9,193 | 94,189 |
| 2019 | 32,475 | 3,427 | 8,596 | 18,357 | 12,573 | 9,634 | 1,052 | 9,788 | 95,901 |

Table E-8. Economic cost – total voluntary benefits – passenger cars by CY (millions in 2019\$)

| Year | Fatal | MAIS5 | MAIS4 | MAIS3 | MAIS2 | MAIS1 | MAIS0 | PDO | Total |
|------|-------|-------|-------|-------|-------|-------|-------|-------|--------|
| 1968 | 169 | 39 | 42 | 315 | 345 | 218 | 15 | 118 | 1,262 |
| 1969 | 277 | 46 | 77 | 515 | 668 | 362 | 21 | 161 | 2,127 |
| 1970 | 393 | 67 | 121 | 624 | 1,068 | 473 | 26 | 204 | 2,976 |
| 1971 | 533 | 69 | 162 | 835 | 1,426 | 586 | 31 | 242 | 3,883 |
| 1972 | 686 | 85 | 194 | 996 | 1,864 | 695 | 37 | 285 | 4,844 |
| 1973 | 835 | 126 | 213 | 1,214 | 2,091 | 751 | 41 | 311 | 5,582 |
| 1974 | 926 | 175 | 259 | 1,240 | 2,063 | 756 | 43 | 322 | 5,783 |
| 1975 | 1,106 | 202 | 354 | 1,344 | 2,214 | 814 | 48 | 364 | 6,445 |
| 1976 | 1,320 | 268 | 429 | 1,525 | 2,283 | 898 | 53 | 401 | 7,177 |
| 1977 | 1,541 | 294 | 498 | 1,808 | 2,376 | 984 | 60 | 447 | 8,007 |
| 1978 | 1,749 | 311 | 526 | 1,992 | 2,466 | 1,081 | 66 | 486 | 8,676 |
| 1979 | 1,970 | 323 | 516 | 2,147 | 2,607 | 1,134 | 68 | 497 | 9,262 |
| 1980 | 2,138 | 335 | 516 | 2,253 | 2,758 | 1,137 | 69 | 509 | 9,715 |
| 1981 | 2,336 | 353 | 576 | 2,436 | 2,753 | 1,143 | 71 | 520 | 10,187 |
| 1982 | 2,469 | 323 | 637 | 2,511 | 2,685 | 1,072 | 74 | 532 | 10,303 |
| 1983 | 2,574 | 353 | 784 | 2,513 | 2,594 | 1,067 | 76 | 555 | 10,516 |
| 1984 | 2,732 | 301 | 776 | 2,461 | 2,641 | 1,090 | 80 | 575 | 10,657 |
| 1985 | 2,823 | 289 | 645 | 2,664 | 2,596 | 1,133 | 83 | 610 | 10,843 |
| 1986 | 3,109 | 420 | 718 | 2,978 | 2,756 | 1,229 | 88 | 641 | 11,941 |
| 1987 | 3,320 | 448 | 724 | 3,180 | 3,023 | 1,256 | 92 | 677 | 12,720 |
| 1988 | 3,510 | 473 | 760 | 3,623 | 3,294 | 1,280 | 97 | 710 | 13,748 |
| 1989 | 3,635 | 484 | 782 | 3,932 | 3,736 | 1,286 | 98 | 684 | 14,636 |
| 1990 | 3,805 | 366 | 764 | 4,607 | 4,452 | 1,258 | 101 | 713 | 16,065 |
| 1991 | 3,899 | 373 | 851 | 4,690 | 4,540 | 1,220 | 101 | 704 | 16,379 |
| 1992 | 4,084 | 519 | 1,054 | 5,249 | 4,317 | 1,267 | 108 | 734 | 17,333 |
| 1993 | 4,341 | 562 | 1,404 | 4,717 | 3,596 | 1,396 | 123 | 815 | 16,952 |
| 1994 | 4,555 | 606 | 1,399 | 4,631 | 3,511 | 1,572 | 142 | 954 | 17,369 |
| 1995 | 4,870 | 468 | 1,416 | 4,536 | 3,679 | 1,984 | 172 | 1,151 | 18,277 |
| 1996 | 5,279 | 439 | 1,100 | 5,578 | 4,310 | 2,369 | 195 | 1,264 | 20,535 |

| Year | Fatal | MAIS5 | MAIS4 | MAIS3 | MAIS2 | MAIS1 | MAIS0 | PDO | Total |
|-------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|------------|--------------|
| 1997 | 5,481 | 487 | 1,151 | 5,690 | 4,448 | 2,491 | 200 | 1,360 | 21,308 |
| 1998 | 5,689 | 582 | 1,083 | 5,778 | 4,243 | 2,500 | 200 | 1,431 | 21,506 |
| 1999 | 5,751 | 603 | 1,074 | 5,157 | 3,987 | 2,195 | 217 | 1,567 | 20,552 |
| 2000 | 6,061 | 684 | 937 | 5,789 | 4,096 | 2,248 | 248 | 1,804 | 21,867 |
| 2001 | 6,368 | 588 | 1,003 | 5,955 | 4,510 | 2,305 | 254 | 1,893 | 22,877 |
| 2002 | 6,616 | 756 | 1,343 | 6,413 | 5,067 | 2,271 | 255 | 1,996 | 24,717 |
| 2003 | 6,815 | 669 | 1,663 | 6,436 | 5,047 | 2,231 | 284 | 2,181 | 25,327 |
| 2004 | 7,288 | 763 | 1,763 | 6,185 | 4,781 | 2,193 | 279 | 2,241 | 25,494 |
| 2005 | 7,719 | 663 | 1,877 | 5,873 | 4,610 | 2,131 | 276 | 2,396 | 25,545 |
| 2006 | 7,888 | 724 | 1,799 | 6,076 | 4,522 | 2,092 | 281 | 2,465 | 25,848 |
| 2007 | 8,326 | 805 | 1,921 | 6,072 | 4,615 | 2,148 | 295 | 2,610 | 26,791 |
| 2008 | 8,273 | 866 | 1,970 | 6,071 | 4,481 | 2,189 | 299 | 2,684 | 26,832 |
| 2009 | 8,152 | 794 | 1,902 | 5,704 | 4,160 | 2,157 | 286 | 2,565 | 25,721 |
| 2010 | 8,119 | 1,098 | 1,903 | 5,539 | 4,023 | 2,243 | 300 | 2,749 | 25,973 |
| 2011 | 8,536 | 1,338 | 2,083 | 5,576 | 3,964 | 2,297 | 293 | 2,826 | 26,913 |
| 2012 | 8,896 | 1,361 | 2,169 | 6,032 | 3,738 | 2,533 | 333 | 3,108 | 28,169 |
| 2013 | 9,124 | 1,213 | 2,116 | 5,995 | 3,751 | 2,645 | 353 | 3,315 | 28,512 |
| 2014 | 9,641 | 1,116 | 2,514 | 6,406 | 3,981 | 3,011 | 406 | 3,761 | 30,836 |
| 2015 | 10,028 | 934 | 2,618 | 6,107 | 4,248 | 3,371 | 457 | 4,188 | 31,952 |
| 2016 | 10,353 | 1,110 | 2,716 | 6,333 | 4,661 | 3,716 | 515 | 4,224 | 33,630 |
| 2017 | 10,747 | 1,123 | 2,788 | 6,371 | 4,869 | 3,864 | 496 | 4,270 | 34,528 |
| 2018 | 10,625 | 1,079 | 2,868 | 6,425 | 5,044 | 3,953 | 488 | 4,476 | 34,956 |
| 2019 | 10,614 | 1,051 | 2,971 | 6,441 | 5,049 | 4,015 | 509 | 4,738 | 35,387 |

Table E-9. Economic cost – total attributable benefits – passenger cars by CY (millions in 2019\$)

| Year | Fatal | MAIS5 | MAIS4 | MAIS3 | MAIS2 | MAIS1 | MAIS0 | PDO | Total |
|-------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|------------|--------------|
| 1968 | 34 | 19 | 25 | 131 | 58 | 86 | 6 | 45 | 404 |
| 1969 | 73 | 32 | 52 | 240 | 142 | 249 | 14 | 106 | 907 |
| 1970 | 116 | 34 | 56 | 365 | 213 | 409 | 23 | 177 | 1,393 |
| 1971 | 171 | 40 | 62 | 457 | 305 | 585 | 32 | 249 | 1,901 |
| 1972 | 243 | 47 | 81 | 593 | 410 | 797 | 43 | 326 | 2,541 |
| 1973 | 328 | 51 | 92 | 689 | 505 | 961 | 49 | 367 | 3,041 |
| 1974 | 429 | 61 | 96 | 748 | 561 | 1,076 | 52 | 388 | 3,410 |
| 1975 | 606 | 85 | 97 | 973 | 654 | 1,238 | 58 | 443 | 4,155 |
| 1976 | 693 | 93 | 131 | 1,124 | 758 | 1,332 | 65 | 491 | 4,687 |
| 1977 | 782 | 124 | 172 | 1,279 | 887 | 1,501 | 75 | 564 | 5,385 |
| 1978 | 892 | 149 | 197 | 1,502 | 981 | 1,743 | 85 | 631 | 6,180 |
| 1979 | 983 | 185 | 201 | 1,711 | 1,101 | 1,971 | 91 | 664 | 6,907 |
| 1980 | 1,092 | 209 | 212 | 1,933 | 1,172 | 1,973 | 94 | 691 | 7,377 |
| 1981 | 1,174 | 207 | 190 | 2,282 | 1,269 | 1,944 | 97 | 708 | 7,870 |
| 1982 | 1,303 | 194 | 187 | 2,331 | 1,474 | 1,861 | 101 | 728 | 8,178 |
| 1983 | 1,502 | 199 | 191 | 2,402 | 1,706 | 1,892 | 105 | 760 | 8,756 |
| 1984 | 1,825 | 249 | 232 | 2,887 | 1,911 | 1,942 | 110 | 791 | 9,949 |
| 1985 | 2,465 | 331 | 502 | 3,627 | 2,457 | 2,014 | 115 | 843 | 12,353 |
| 1986 | 3,126 | 393 | 656 | 4,626 | 3,173 | 2,276 | 129 | 939 | 15,318 |
| 1987 | 3,594 | 416 | 650 | 4,916 | 3,495 | 2,397 | 145 | 1,064 | 16,677 |
| 1988 | 3,989 | 489 | 697 | 5,663 | 3,925 | 2,518 | 163 | 1,189 | 18,632 |
| 1989 | 4,207 | 510 | 696 | 5,989 | 4,222 | 2,539 | 174 | 1,216 | 19,553 |
| 1990 | 4,542 | 613 | 787 | 6,024 | 4,495 | 2,523 | 194 | 1,371 | 20,549 |
| 1991 | 4,988 | 676 | 924 | 5,922 | 4,848 | 2,504 | 201 | 1,399 | 21,461 |
| 1992 | 5,407 | 804 | 1,624 | 6,195 | 5,307 | 2,713 | 204 | 1,392 | 23,646 |
| 1993 | 6,167 | 1,002 | 1,541 | 7,752 | 5,788 | 3,029 | 223 | 1,478 | 26,979 |
| 1994 | 6,672 | 1,066 | 1,624 | 8,160 | 5,853 | 3,307 | 241 | 1,619 | 28,543 |
| 1995 | 7,295 | 924 | 1,263 | 8,378 | 6,105 | 3,673 | 274 | 1,827 | 29,739 |
| 1996 | 8,346 | 858 | 1,696 | 8,655 | 6,277 | 4,045 | 285 | 1,850 | 32,012 |

| Year | Fatal | MAIS5 | MAIS4 | MAIS3 | MAIS2 | MAIS1 | MAIS0 | PDO | Total |
|-------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|------------|--------------|
| 1997 | 8,870 | 977 | 1,671 | 8,938 | 6,463 | 4,050 | 283 | 1,921 | 33,173 |
| 1998 | 9,412 | 1,286 | 1,737 | 9,632 | 6,584 | 3,831 | 254 | 1,814 | 34,549 |
| 1999 | 10,045 | 1,231 | 1,943 | 9,795 | 7,118 | 3,869 | 227 | 1,632 | 35,859 |
| 2000 | 10,718 | 1,309 | 1,940 | 10,750 | 7,412 | 3,654 | 233 | 1,695 | 37,710 |
| 2001 | 11,428 | 1,153 | 2,152 | 11,613 | 7,723 | 3,257 | 229 | 1,707 | 39,263 |
| 2002 | 12,105 | 1,207 | 2,568 | 12,240 | 7,862 | 3,047 | 221 | 1,726 | 40,977 |
| 2003 | 12,925 | 1,151 | 3,080 | 12,259 | 7,681 | 3,066 | 223 | 1,711 | 42,095 |
| 2004 | 13,896 | 1,202 | 3,209 | 12,266 | 7,896 | 3,167 | 212 | 1,703 | 43,551 |
| 2005 | 14,565 | 1,242 | 3,380 | 12,152 | 7,546 | 3,030 | 192 | 1,663 | 43,770 |
| 2006 | 14,974 | 1,500 | 3,399 | 12,276 | 7,294 | 2,810 | 181 | 1,584 | 44,017 |
| 2007 | 15,577 | 1,576 | 3,598 | 12,112 | 6,793 | 2,725 | 177 | 1,568 | 44,126 |
| 2008 | 15,523 | 1,734 | 3,577 | 12,093 | 6,478 | 2,720 | 176 | 1,580 | 43,880 |
| 2009 | 15,417 | 1,521 | 3,376 | 11,377 | 6,009 | 2,662 | 170 | 1,527 | 42,058 |
| 2010 | 15,513 | 1,911 | 3,410 | 10,832 | 5,861 | 2,891 | 190 | 1,739 | 42,346 |
| 2011 | 16,286 | 2,195 | 3,959 | 10,692 | 5,818 | 3,114 | 195 | 1,887 | 44,146 |
| 2012 | 17,064 | 2,349 | 4,265 | 10,731 | 5,992 | 3,505 | 238 | 2,223 | 46,368 |
| 2013 | 17,728 | 2,187 | 4,135 | 10,341 | 6,013 | 3,680 | 270 | 2,542 | 46,897 |
| 2014 | 18,789 | 2,445 | 4,407 | 10,502 | 6,121 | 3,982 | 336 | 3,108 | 49,689 |
| 2015 | 19,821 | 2,162 | 4,479 | 11,178 | 6,320 | 4,477 | 411 | 3,766 | 52,614 |
| 2016 | 20,620 | 2,443 | 4,932 | 11,584 | 6,935 | 4,896 | 479 | 3,932 | 55,820 |
| 2017 | 21,551 | 2,485 | 5,129 | 11,748 | 7,239 | 5,229 | 483 | 4,159 | 58,024 |
| 2018 | 21,388 | 2,414 | 5,395 | 11,898 | 7,445 | 5,462 | 514 | 4,718 | 59,233 |
| 2019 | 21,861 | 2,376 | 5,625 | 11,917 | 7,525 | 5,619 | 543 | 5,049 | 60,514 |

Table E-10. Economic cost – total CA benefits – LTVs by CY (millions in 2019\$)

| Year | Fatal | MAIS5 | MAIS4 | MAIS3 | MAIS2 | MAIS1 | MAIS0 | PDO | Total |
|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1968 | 5 | 1 | 1 | 9 | 9 | 31 | 2 | 19 | 79 |
| 1969 | 9 | 1 | 1 | 15 | 17 | 69 | 4 | 32 | 147 |
| 1970 | 13 | 1 | 2 | 21 | 23 | 105 | 6 | 46 | 217 |
| 1971 | 17 | 1 | 2 | 28 | 33 | 131 | 7 | 60 | 280 |
| 1972 | 22 | 2 | 3 | 35 | 42 | 161 | 8 | 77 | 349 |
| 1973 | 28 | 2 | 3 | 42 | 52 | 187 | 9 | 88 | 411 |
| 1974 | 31 | 2 | 3 | 46 | 65 | 202 | 10 | 95 | 455 |
| 1975 | 33 | 1 | 3 | 48 | 72 | 262 | 12 | 112 | 543 |
| 1976 | 43 | 2 | 4 | 64 | 84 | 290 | 14 | 131 | 633 |
| 1977 | 54 | 3 | 5 | 86 | 98 | 308 | 16 | 156 | 725 |
| 1978 | 67 | 3 | 7 | 122 | 113 | 359 | 18 | 187 | 876 |
| 1979 | 79 | 4 | 9 | 126 | 131 | 385 | 19 | 202 | 955 |
| 1980 | 84 | 5 | 9 | 132 | 151 | 394 | 20 | 215 | 1,010 |
| 1981 | 91 | 6 | 10 | 102 | 158 | 384 | 21 | 226 | 998 |
| 1982 | 98 | 7 | 10 | 115 | 142 | 331 | 21 | 238 | 962 |
| 1983 | 100 | 7 | 10 | 108 | 149 | 323 | 23 | 249 | 969 |
| 1984 | 108 | 9 | 12 | 129 | 155 | 325 | 24 | 268 | 1,030 |
| 1985 | 103 | 7 | 12 | 124 | 147 | 405 | 30 | 292 | 1,121 |
| 1986 | 102 | 8 | 12 | 127 | 148 | 396 | 31 | 321 | 1,145 |
| 1987 | 110 | 10 | 14 | 144 | 158 | 418 | 34 | 346 | 1,235 |
| 1988 | 114 | 10 | 16 | 146 | 193 | 445 | 37 | 380 | 1,341 |
| 1989 | 123 | 11 | 19 | 171 | 235 | 434 | 38 | 406 | 1,437 |
| 1990 | 134 | 11 | 21 | 167 | 333 | 482 | 43 | 436 | 1,628 |
| 1991 | 135 | 12 | 20 | 184 | 369 | 503 | 43 | 433 | 1,701 |
| 1992 | 142 | 14 | 15 | 181 | 369 | 586 | 50 | 470 | 1,827 |
| 1993 | 153 | 14 | 16 | 178 | 443 | 647 | 52 | 536 | 2,039 |
| 1994 | 165 | 15 | 20 | 190 | 499 | 715 | 73 | 688 | 2,364 |
| 1995 | 185 | 17 | 32 | 242 | 693 | 790 | 94 | 898 | 2,952 |
| 1996 | 204 | 22 | 38 | 310 | 528 | 961 | 115 | 1,107 | 3,285 |

| Year | Fatal | MAIS5 | MAIS4 | MAIS3 | MAIS2 | MAIS1 | MAIS0 | PDO | Total |
|-------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|------------|--------------|
| 1997 | 226 | 24 | 44 | 386 | 657 | 1,148 | 133 | 1,267 | 3,884 |
| 1998 | 250 | 19 | 45 | 448 | 673 | 1,280 | 158 | 1,452 | 4,324 |
| 1999 | 276 | 22 | 46 | 516 | 701 | 1,568 | 186 | 1,625 | 4,940 |
| 2000 | 313 | 23 | 44 | 502 | 716 | 1,674 | 222 | 1,920 | 5,415 |
| 2001 | 337 | 28 | 47 | 545 | 690 | 1,697 | 252 | 2,171 | 5,766 |
| 2002 | 353 | 27 | 45 | 682 | 751 | 1,716 | 270 | 2,375 | 6,219 |
| 2003 | 436 | 33 | 58 | 722 | 809 | 1,933 | 333 | 2,681 | 7,004 |
| 2004 | 557 | 39 | 75 | 850 | 849 | 2,171 | 356 | 3,005 | 7,902 |
| 2005 | 623 | 40 | 113 | 914 | 887 | 2,422 | 382 | 3,260 | 8,641 |
| 2006 | 747 | 52 | 119 | 978 | 1,099 | 2,489 | 414 | 3,563 | 9,462 |
| 2007 | 889 | 56 | 137 | 994 | 1,191 | 2,415 | 431 | 3,975 | 10,088 |
| 2008 | 1,112 | 58 | 180 | 1,090 | 1,251 | 2,447 | 429 | 4,045 | 10,613 |
| 2009 | 1,199 | 61 | 181 | 1,151 | 1,411 | 2,643 | 459 | 4,243 | 11,347 |
| 2010 | 1,301 | 59 | 219 | 1,326 | 1,699 | 3,055 | 515 | 4,397 | 12,571 |
| 2011 | 1,491 | 92 | 224 | 1,551 | 1,743 | 3,593 | 569 | 4,665 | 13,928 |
| 2012 | 1,963 | 154 | 275 | 1,916 | 1,972 | 4,025 | 670 | 5,379 | 16,354 |
| 2013 | 2,161 | 186 | 395 | 2,859 | 2,212 | 4,127 | 718 | 5,886 | 18,544 |
| 2014 | 2,539 | 114 | 626 | 2,810 | 1,933 | 4,505 | 786 | 6,985 | 20,297 |
| 2015 | 2,751 | 116 | 784 | 3,498 | 2,162 | 5,127 | 914 | 8,284 | 23,636 |
| 2016 | 3,399 | 141 | 735 | 3,561 | 2,348 | 5,873 | 1,061 | 8,262 | 25,379 |
| 2017 | 3,588 | 243 | 763 | 3,756 | 2,510 | 6,337 | 1,019 | 8,576 | 26,791 |
| 2018 | 4,286 | 407 | 829 | 3,990 | 2,656 | 6,619 | 1,070 | 9,418 | 29,275 |
| 2019 | 5,185 | 503 | 871 | 4,324 | 2,915 | 7,357 | 1,206 | 10,368 | 32,729 |

Table E-11. Economic cost – voluntary CA benefits – LTVs by CY (millions in 2019\$)

| Year | Fatal | MAIS5 | MAIS4 | MAIS3 | MAIS2 | MAIS1 | MAIS0 | PDO | Total |
|------|-------|-------|-------|-------|-------|-------|-------|-----|-------|
| 1968 | 5 | 1 | 1 | 8 | 7 | 23 | 2 | 15 | 61 |
| 1969 | 9 | 1 | 1 | 11 | 11 | 37 | 3 | 21 | 94 |
| 1970 | 13 | 1 | 2 | 15 | 15 | 49 | 3 | 27 | 125 |
| 1971 | 17 | 1 | 2 | 19 | 19 | 58 | 4 | 33 | 153 |
| 1972 | 22 | 2 | 3 | 23 | 24 | 69 | 4 | 40 | 186 |
| 1973 | 28 | 2 | 3 | 27 | 29 | 78 | 5 | 45 | 217 |
| 1974 | 31 | 2 | 3 | 30 | 32 | 82 | 5 | 48 | 234 |
| 1975 | 33 | 1 | 3 | 31 | 33 | 91 | 6 | 56 | 256 |
| 1976 | 43 | 2 | 4 | 40 | 39 | 105 | 7 | 66 | 306 |
| 1977 | 54 | 3 | 5 | 49 | 43 | 117 | 8 | 78 | 356 |
| 1978 | 67 | 3 | 7 | 62 | 52 | 136 | 9 | 91 | 426 |
| 1979 | 79 | 4 | 9 | 69 | 57 | 146 | 9 | 98 | 469 |
| 1980 | 84 | 5 | 9 | 75 | 63 | 147 | 10 | 103 | 494 |
| 1981 | 91 | 6 | 10 | 71 | 65 | 145 | 10 | 108 | 505 |
| 1982 | 98 | 7 | 10 | 72 | 63 | 132 | 10 | 113 | 506 |
| 1983 | 100 | 7 | 10 | 73 | 66 | 128 | 11 | 119 | 515 |
| 1984 | 108 | 9 | 12 | 80 | 67 | 134 | 11 | 127 | 548 |
| 1985 | 103 | 7 | 12 | 76 | 64 | 149 | 14 | 139 | 565 |
| 1986 | 102 | 8 | 12 | 79 | 65 | 157 | 15 | 152 | 590 |
| 1987 | 110 | 10 | 14 | 89 | 72 | 168 | 16 | 164 | 643 |
| 1988 | 114 | 10 | 16 | 92 | 82 | 173 | 18 | 180 | 684 |
| 1989 | 123 | 11 | 19 | 100 | 95 | 175 | 18 | 192 | 733 |
| 1990 | 134 | 11 | 21 | 106 | 112 | 184 | 19 | 196 | 783 |
| 1991 | 135 | 12 | 20 | 111 | 121 | 193 | 21 | 206 | 820 |
| 1992 | 142 | 14 | 15 | 117 | 124 | 210 | 23 | 220 | 864 |
| 1993 | 153 | 14 | 16 | 122 | 142 | 233 | 26 | 268 | 975 |
| 1994 | 165 | 15 | 20 | 141 | 161 | 271 | 36 | 341 | 1,149 |
| 1995 | 185 | 17 | 32 | 168 | 209 | 319 | 45 | 433 | 1,410 |
| 1996 | 204 | 22 | 38 | 197 | 217 | 439 | 59 | 569 | 1,746 |

| Year | Fatal | MAIS5 | MAIS4 | MAIS3 | MAIS2 | MAIS1 | MAIS0 | PDO | Total |
|-------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|------------|--------------|
| 1997 | 226 | 24 | 44 | 217 | 245 | 530 | 69 | 657 | 2,011 |
| 1998 | 250 | 19 | 45 | 258 | 345 | 671 | 84 | 775 | 2,447 |
| 1999 | 276 | 22 | 46 | 319 | 394 | 903 | 108 | 948 | 3,016 |
| 2000 | 313 | 23 | 44 | 334 | 461 | 1,017 | 134 | 1,158 | 3,485 |
| 2001 | 337 | 28 | 47 | 385 | 429 | 1,026 | 154 | 1,326 | 3,732 |
| 2002 | 353 | 27 | 45 | 475 | 431 | 1,022 | 165 | 1,453 | 3,970 |
| 2003 | 436 | 33 | 58 | 522 | 487 | 1,105 | 212 | 1,708 | 4,562 |
| 2004 | 557 | 39 | 75 | 595 | 559 | 1,262 | 229 | 1,929 | 5,246 |
| 2005 | 623 | 40 | 113 | 660 | 568 | 1,458 | 255 | 2,174 | 5,891 |
| 2006 | 746 | 52 | 119 | 725 | 702 | 1,669 | 285 | 2,456 | 6,755 |
| 2007 | 884 | 56 | 137 | 806 | 733 | 1,596 | 305 | 2,814 | 7,331 |
| 2008 | 1,082 | 55 | 171 | 882 | 797 | 1,635 | 310 | 2,921 | 7,852 |
| 2009 | 1,136 | 59 | 173 | 887 | 889 | 1,763 | 326 | 3,018 | 8,251 |
| 2010 | 1,172 | 56 | 204 | 1,020 | 1,135 | 2,053 | 362 | 3,085 | 9,087 |
| 2011 | 1,296 | 89 | 191 | 1,187 | 1,211 | 2,462 | 398 | 3,263 | 10,097 |
| 2012 | 1,614 | 134 | 219 | 1,485 | 1,415 | 2,689 | 466 | 3,745 | 11,768 |
| 2013 | 1,706 | 155 | 268 | 1,933 | 1,573 | 2,721 | 499 | 4,090 | 12,944 |
| 2014 | 1,966 | 79 | 456 | 2,070 | 1,336 | 3,067 | 533 | 4,742 | 14,249 |
| 2015 | 2,047 | 84 | 554 | 2,421 | 1,324 | 3,384 | 613 | 5,553 | 15,980 |
| 2016 | 2,446 | 96 | 517 | 2,542 | 1,488 | 3,850 | 704 | 5,483 | 17,125 |
| 2017 | 2,517 | 146 | 524 | 2,604 | 1,588 | 4,128 | 666 | 5,607 | 17,781 |
| 2018 | 2,966 | 229 | 569 | 2,648 | 1,668 | 4,314 | 684 | 6,020 | 19,097 |
| 2019 | 3,461 | 280 | 597 | 2,809 | 1,817 | 4,732 | 766 | 6,584 | 21,046 |

Table E-12. Economic cost – attributable CA benefits – LTVs by CY (millions in 2019\$)

| Year | Fatal | MAIS5 | MAIS4 | MAIS3 | MAIS2 | MAIS1 | MAIS0 | PDO | Total |
|------|-------|-------|-------|-------|-------|-------|-------|-----|-------|
| 1968 | - | - | - | 2 | 2 | 8 | 1 | 5 | 17 |
| 1969 | - | - | - | 4 | 6 | 32 | 1 | 11 | 54 |
| 1970 | - | - | - | 6 | 8 | 56 | 2 | 19 | 92 |
| 1971 | - | - | - | 9 | 14 | 73 | 3 | 28 | 126 |
| 1972 | - | - | - | 12 | 18 | 93 | 4 | 37 | 164 |
| 1973 | - | - | - | 14 | 23 | 109 | 5 | 43 | 194 |
| 1974 | - | - | - | 16 | 33 | 120 | 5 | 47 | 221 |
| 1975 | - | - | - | 17 | 39 | 171 | 6 | 55 | 287 |
| 1976 | - | - | - | 24 | 45 | 185 | 7 | 65 | 327 |
| 1977 | - | - | - | 37 | 55 | 191 | 8 | 79 | 369 |
| 1978 | - | - | - | 60 | 61 | 223 | 9 | 96 | 449 |
| 1979 | - | - | - | 57 | 75 | 239 | 10 | 105 | 486 |
| 1980 | - | - | - | 58 | 88 | 247 | 11 | 112 | 516 |
| 1981 | - | - | - | 32 | 93 | 239 | 11 | 118 | 493 |
| 1982 | - | - | - | 43 | 79 | 199 | 11 | 124 | 456 |
| 1983 | - | - | - | 34 | 82 | 195 | 12 | 130 | 454 |
| 1984 | - | - | - | 49 | 88 | 192 | 13 | 140 | 482 |
| 1985 | - | - | - | 48 | 83 | 256 | 16 | 153 | 556 |
| 1986 | - | - | - | 48 | 83 | 239 | 16 | 168 | 554 |
| 1987 | - | - | - | 55 | 87 | 250 | 18 | 182 | 591 |
| 1988 | - | - | - | 55 | 112 | 272 | 19 | 200 | 657 |
| 1989 | - | - | - | 71 | 140 | 260 | 20 | 214 | 704 |
| 1990 | - | - | - | 61 | 221 | 299 | 24 | 240 | 845 |
| 1991 | - | - | - | 73 | 248 | 311 | 23 | 227 | 882 |
| 1992 | - | - | - | 64 | 245 | 376 | 27 | 250 | 963 |
| 1993 | - | - | - | 56 | 300 | 414 | 26 | 268 | 1,064 |
| 1994 | - | - | - | 49 | 338 | 445 | 37 | 347 | 1,215 |
| 1995 | - | - | - | 74 | 484 | 471 | 49 | 465 | 1,542 |
| 1996 | - | - | - | 113 | 311 | 522 | 56 | 538 | 1,539 |

| Year | Fatal | MAIS5 | MAIS4 | MAIS3 | MAIS2 | MAIS1 | MAIS0 | PDO | Total |
|-------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|------------|--------------|
| 1997 | - | - | - | 169 | 412 | 618 | 64 | 610 | 1,873 |
| 1998 | - | - | - | 190 | 328 | 609 | 74 | 677 | 1,877 |
| 1999 | - | - | - | 197 | 307 | 665 | 77 | 677 | 1,924 |
| 2000 | - | - | - | 168 | 255 | 658 | 88 | 761 | 1,930 |
| 2001 | - | - | - | 159 | 261 | 671 | 98 | 845 | 2,034 |
| 2002 | - | - | - | 207 | 320 | 695 | 105 | 922 | 2,249 |
| 2003 | - | - | - | 200 | 322 | 827 | 121 | 973 | 2,442 |
| 2004 | 0 | - | 0 | 255 | 289 | 909 | 127 | 1,076 | 2,656 |
| 2005 | 0 | - | 0 | 254 | 319 | 964 | 127 | 1,086 | 2,750 |
| 2006 | 1 | - | 0 | 253 | 397 | 820 | 129 | 1,108 | 2,707 |
| 2007 | 5 | 0 | 0 | 188 | 459 | 819 | 126 | 1,160 | 2,757 |
| 2008 | 30 | 3 | 10 | 208 | 454 | 812 | 119 | 1,124 | 2,761 |
| 2009 | 63 | 2 | 8 | 264 | 523 | 880 | 132 | 1,224 | 3,096 |
| 2010 | 129 | 3 | 15 | 305 | 564 | 1,002 | 154 | 1,312 | 3,484 |
| 2011 | 196 | 3 | 32 | 363 | 532 | 1,131 | 171 | 1,402 | 3,831 |
| 2012 | 349 | 20 | 56 | 430 | 557 | 1,337 | 203 | 1,634 | 4,586 |
| 2013 | 455 | 31 | 127 | 925 | 640 | 1,406 | 219 | 1,797 | 5,600 |
| 2014 | 573 | 35 | 170 | 740 | 597 | 1,439 | 252 | 2,243 | 6,049 |
| 2015 | 704 | 31 | 230 | 1,077 | 837 | 1,744 | 301 | 2,730 | 7,656 |
| 2016 | 953 | 45 | 218 | 1,019 | 860 | 2,023 | 357 | 2,779 | 8,254 |
| 2017 | 1,071 | 96 | 239 | 1,152 | 922 | 2,208 | 353 | 2,969 | 9,010 |
| 2018 | 1,321 | 177 | 260 | 1,342 | 988 | 2,305 | 386 | 3,398 | 10,177 |
| 2019 | 1,724 | 223 | 274 | 1,514 | 1,098 | 2,625 | 440 | 3,785 | 11,683 |

Table E-13. Economic cost – total CW benefits – LTVs by CY (millions in 2019\$)

| Year | Fatal | MAIS5 | MAIS4 | MAIS3 | MAIS2 | MAIS1 | MAIS0 | PDO | Total |
|------|-------|-------|-------|-------|-------|-------|-------|-----|--------|
| 1968 | 21 | 2 | 8 | 65 | 43 | 14 | - | - | 153 |
| 1969 | 34 | 3 | 10 | 84 | 128 | 25 | - | - | 284 |
| 1970 | 49 | 4 | 11 | 101 | 145 | 31 | - | - | 342 |
| 1971 | 67 | 5 | 13 | 117 | 171 | 36 | - | - | 409 |
| 1972 | 86 | 7 | 23 | 141 | 195 | 42 | - | - | 493 |
| 1973 | 115 | 9 | 28 | 172 | 298 | 49 | - | - | 671 |
| 1974 | 142 | 16 | 27 | 199 | 335 | 54 | - | - | 773 |
| 1975 | 165 | 34 | 27 | 107 | 307 | 52 | - | - | 692 |
| 1976 | 219 | 40 | 30 | 213 | 375 | 68 | - | - | 945 |
| 1977 | 301 | 39 | 34 | 329 | 445 | 77 | - | - | 1,225 |
| 1978 | 371 | 41 | 49 | 467 | 543 | 85 | - | - | 1,556 |
| 1979 | 462 | 62 | 85 | 621 | 599 | 95 | - | - | 1,925 |
| 1980 | 500 | 66 | 98 | 646 | 616 | 107 | - | - | 2,032 |
| 1981 | 570 | 90 | 172 | 580 | 772 | 122 | - | - | 2,307 |
| 1982 | 615 | 122 | 177 | 680 | 620 | 124 | - | - | 2,339 |
| 1983 | 701 | 145 | 146 | 872 | 442 | 151 | - | - | 2,457 |
| 1984 | 897 | 165 | 206 | 805 | 458 | 152 | - | - | 2,682 |
| 1985 | 1,098 | 220 | 263 | 721 | 641 | 205 | - | - | 3,149 |
| 1986 | 1,436 | 189 | 182 | 970 | 999 | 258 | - | - | 4,034 |
| 1987 | 1,814 | 203 | 279 | 1,178 | 1,155 | 306 | - | - | 4,934 |
| 1988 | 2,026 | 147 | 436 | 1,336 | 1,466 | 329 | - | - | 5,741 |
| 1989 | 2,357 | 245 | 546 | 1,532 | 1,655 | 364 | - | - | 6,698 |
| 1990 | 2,691 | 439 | 823 | 1,723 | 1,639 | 373 | - | - | 7,687 |
| 1991 | 2,998 | 472 | 836 | 2,242 | 1,563 | 414 | - | - | 8,525 |
| 1992 | 3,406 | 372 | 443 | 2,473 | 1,981 | 462 | - | - | 9,138 |
| 1993 | 3,810 | 353 | 417 | 2,545 | 2,377 | 514 | - | - | 10,017 |
| 1994 | 4,456 | 171 | 492 | 2,779 | 2,742 | 662 | - | - | 11,303 |
| 1995 | 5,073 | 511 | 956 | 3,311 | 2,694 | 822 | - | - | 13,367 |
| 1996 | 6,030 | 672 | 988 | 3,674 | 2,582 | 925 | - | - | 14,870 |

| Year | Fatal | MAIS5 | MAIS4 | MAIS3 | MAIS2 | MAIS1 | MAIS0 | PDO | Total |
|-------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|------------|--------------|
| 1997 | 7,009 | 671 | 1,151 | 4,563 | 2,810 | 993 | - | - | 17,196 |
| 1998 | 8,044 | 579 | 1,469 | 5,348 | 3,518 | 1,125 | - | - | 20,083 |
| 1999 | 8,832 | 864 | 1,459 | 5,904 | 4,057 | 1,174 | - | - | 22,290 |
| 2000 | 10,345 | 1,054 | 1,806 | 5,657 | 4,316 | 1,205 | - | - | 24,383 |
| 2001 | 10,960 | 1,317 | 1,798 | 5,825 | 4,072 | 1,201 | - | - | 25,173 |
| 2002 | 12,447 | 1,353 | 1,908 | 6,001 | 4,215 | 1,215 | - | - | 27,139 |
| 2003 | 14,053 | 2,108 | 2,185 | 6,794 | 4,862 | 1,334 | - | - | 31,336 |
| 2004 | 15,999 | 2,204 | 3,278 | 7,765 | 5,395 | 1,420 | - | - | 36,060 |
| 2005 | 17,274 | 2,425 | 3,435 | 8,965 | 5,964 | 1,433 | - | - | 39,497 |
| 2006 | 17,850 | 1,908 | 4,640 | 9,158 | 6,024 | 1,371 | - | - | 40,952 |
| 2007 | 18,804 | 2,010 | 4,613 | 9,884 | 6,106 | 1,325 | - | - | 42,741 |
| 2008 | 19,096 | 1,904 | 4,889 | 9,457 | 5,608 | 1,268 | - | - | 42,221 |
| 2009 | 19,304 | 2,313 | 4,999 | 9,892 | 5,668 | 1,343 | - | - | 43,520 |
| 2010 | 19,518 | 2,075 | 4,926 | 10,111 | 5,387 | 1,428 | - | - | 43,446 |
| 2011 | 20,827 | 2,076 | 4,654 | 10,339 | 5,183 | 1,627 | - | - | 44,706 |
| 2012 | 21,216 | 2,050 | 4,429 | 10,092 | 5,154 | 1,779 | - | - | 44,720 |
| 2013 | 21,016 | 2,249 | 5,296 | 10,018 | 5,133 | 1,884 | - | - | 45,595 |
| 2014 | 22,460 | 2,054 | 6,467 | 9,974 | 5,655 | 1,808 | - | - | 48,418 |
| 2015 | 22,901 | 2,789 | 6,916 | 10,812 | 6,554 | 1,901 | - | - | 51,872 |
| 2016 | 24,472 | 2,793 | 6,964 | 11,394 | 6,609 | 2,017 | - | - | 54,250 |
| 2017 | 25,350 | 2,936 | 7,162 | 11,734 | 6,982 | 2,109 | - | - | 56,273 |
| 2018 | 27,117 | 3,230 | 7,393 | 11,937 | 7,151 | 2,192 | - | - | 59,020 |
| 2019 | 29,215 | 3,562 | 8,126 | 12,727 | 7,793 | 2,446 | - | - | 63,870 |

Table E-14. Economic cost – voluntary CW benefits – LTVs by CY (millions in 2019\$)

| Year | Fatal | MAIS5 | MAIS4 | MAIS3 | MAIS2 | MAIS1 | MAIS0 | PDO | Total |
|------|-------|-------|-------|-------|-------|-------|-------|-----|-------|
| 1968 | 15 | 2 | 3 | 26 | 33 | 8 | - | - | 87 |
| 1969 | 23 | 2 | 3 | 34 | 116 | 15 | - | - | 194 |
| 1970 | 31 | 2 | 4 | 42 | 131 | 20 | - | - | 231 |
| 1971 | 40 | 3 | 5 | 52 | 153 | 25 | - | - | 278 |
| 1972 | 50 | 3 | 14 | 66 | 173 | 29 | - | - | 335 |
| 1973 | 67 | 4 | 16 | 79 | 270 | 34 | - | - | 470 |
| 1974 | 84 | 12 | 14 | 98 | 286 | 39 | - | - | 532 |
| 1975 | 93 | 21 | 16 | 63 | 282 | 41 | - | - | 515 |
| 1976 | 132 | 34 | 15 | 115 | 328 | 51 | - | - | 676 |
| 1977 | 190 | 33 | 18 | 192 | 357 | 58 | - | - | 848 |
| 1978 | 243 | 34 | 24 | 273 | 420 | 66 | - | - | 1,060 |
| 1979 | 304 | 48 | 50 | 357 | 476 | 75 | - | - | 1,309 |
| 1980 | 342 | 51 | 64 | 412 | 477 | 81 | - | - | 1,426 |
| 1981 | 391 | 76 | 93 | 379 | 589 | 96 | - | - | 1,623 |
| 1982 | 423 | 100 | 97 | 444 | 371 | 94 | - | - | 1,529 |
| 1983 | 447 | 116 | 52 | 566 | 245 | 118 | - | - | 1,544 |
| 1984 | 513 | 125 | 83 | 466 | 219 | 101 | - | - | 1,506 |
| 1985 | 554 | 133 | 92 | 387 | 266 | 114 | - | - | 1,544 |
| 1986 | 603 | 116 | 70 | 429 | 440 | 122 | - | - | 1,781 |
| 1987 | 720 | 121 | 125 | 535 | 487 | 149 | - | - | 2,139 |
| 1988 | 780 | 77 | 185 | 621 | 617 | 161 | - | - | 2,442 |
| 1989 | 870 | 94 | 251 | 703 | 654 | 184 | - | - | 2,756 |
| 1990 | 974 | 201 | 338 | 695 | 561 | 210 | - | - | 2,979 |
| 1991 | 1,060 | 241 | 332 | 831 | 484 | 228 | - | - | 3,176 |
| 1992 | 1,181 | 205 | 169 | 823 | 484 | 267 | - | - | 3,129 |
| 1993 | 1,284 | 172 | 156 | 905 | 555 | 273 | - | - | 3,346 |
| 1994 | 1,441 | 55 | 140 | 1,034 | 755 | 366 | - | - | 3,791 |
| 1995 | 1,584 | 183 | 237 | 1,185 | 807 | 477 | - | - | 4,472 |
| 1996 | 1,769 | 190 | 245 | 1,291 | 811 | 534 | - | - | 4,842 |

| Year | Fatal | MAIS5 | MAIS4 | MAIS3 | MAIS2 | MAIS1 | MAIS0 | PDO | Total |
|-------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|------------|--------------|
| 1997 | 2,124 | 262 | 252 | 1,801 | 693 | 548 | - | - | 5,680 |
| 1998 | 2,326 | 207 | 362 | 2,005 | 878 | 572 | - | - | 6,350 |
| 1999 | 2,520 | 274 | 382 | 2,143 | 1,000 | 569 | - | - | 6,889 |
| 2000 | 2,821 | 262 | 823 | 1,718 | 1,093 | 570 | - | - | 7,289 |
| 2001 | 2,924 | 325 | 831 | 1,995 | 1,121 | 529 | - | - | 7,725 |
| 2002 | 3,332 | 356 | 881 | 1,939 | 1,008 | 546 | - | - | 8,062 |
| 2003 | 3,534 | 405 | 766 | 2,376 | 1,067 | 604 | - | - | 8,752 |
| 2004 | 4,084 | 440 | 911 | 2,193 | 1,098 | 659 | - | - | 9,385 |
| 2005 | 4,317 | 363 | 998 | 2,307 | 1,346 | 646 | - | - | 9,977 |
| 2006 | 4,417 | 405 | 1,061 | 2,180 | 1,333 | 623 | - | - | 10,019 |
| 2007 | 4,671 | 449 | 1,070 | 2,251 | 1,382 | 581 | - | - | 10,402 |
| 2008 | 4,641 | 467 | 1,121 | 2,350 | 1,205 | 538 | - | - | 10,324 |
| 2009 | 4,812 | 631 | 1,313 | 2,573 | 1,292 | 571 | - | - | 11,193 |
| 2010 | 4,546 | 500 | 1,340 | 2,514 | 1,251 | 627 | - | - | 10,779 |
| 2011 | 4,842 | 379 | 1,160 | 2,461 | 1,185 | 684 | - | - | 10,711 |
| 2012 | 5,014 | 448 | 1,110 | 2,197 | 1,157 | 742 | - | - | 10,669 |
| 2013 | 4,915 | 501 | 1,226 | 2,053 | 1,177 | 766 | - | - | 10,638 |
| 2014 | 5,122 | 449 | 1,040 | 2,214 | 1,319 | 747 | - | - | 10,890 |
| 2015 | 5,337 | 595 | 1,109 | 2,837 | 1,649 | 780 | - | - | 12,308 |
| 2016 | 5,671 | 598 | 1,204 | 3,126 | 1,679 | 837 | - | - | 13,116 |
| 2017 | 5,649 | 628 | 1,261 | 3,196 | 1,805 | 871 | - | - | 13,410 |
| 2018 | 6,181 | 530 | 1,259 | 3,212 | 1,833 | 899 | - | - | 13,915 |
| 2019 | 6,596 | 560 | 1,325 | 3,412 | 1,986 | 1,002 | - | - | 14,881 |

Table E-15. Economic cost – attributable CW benefits – LTVs by CY (millions in 2019\$)

| Year | Fatal | MAIS5 | MAIS4 | MAIS3 | MAIS2 | MAIS1 | MAIS0 | PDO | Total |
|------|-------|-------|-------|-------|-------|-------|-------|-----|--------|
| 1968 | 6 | 0 | 5 | 39 | 9 | 6 | - | - | 66 |
| 1969 | 11 | 1 | 7 | 50 | 12 | 10 | - | - | 90 |
| 1970 | 18 | 1 | 7 | 59 | 15 | 11 | - | - | 111 |
| 1971 | 26 | 2 | 8 | 65 | 18 | 12 | - | - | 132 |
| 1972 | 36 | 4 | 10 | 75 | 22 | 13 | - | - | 158 |
| 1973 | 48 | 5 | 12 | 93 | 27 | 15 | - | - | 201 |
| 1974 | 58 | 4 | 13 | 101 | 48 | 16 | - | - | 241 |
| 1975 | 72 | 13 | 11 | 44 | 25 | 12 | - | - | 177 |
| 1976 | 87 | 6 | 14 | 98 | 47 | 17 | - | - | 269 |
| 1977 | 111 | 6 | 16 | 136 | 88 | 19 | - | - | 377 |
| 1978 | 128 | 7 | 24 | 194 | 123 | 19 | - | - | 495 |
| 1979 | 158 | 14 | 35 | 265 | 124 | 20 | - | - | 616 |
| 1980 | 157 | 15 | 34 | 234 | 139 | 27 | - | - | 605 |
| 1981 | 179 | 14 | 80 | 201 | 183 | 27 | - | - | 684 |
| 1982 | 192 | 22 | 80 | 236 | 250 | 30 | - | - | 810 |
| 1983 | 254 | 29 | 94 | 306 | 198 | 33 | - | - | 913 |
| 1984 | 384 | 40 | 123 | 339 | 239 | 51 | - | - | 1,176 |
| 1985 | 544 | 87 | 172 | 335 | 376 | 91 | - | - | 1,605 |
| 1986 | 833 | 73 | 112 | 540 | 559 | 136 | - | - | 2,253 |
| 1987 | 1,094 | 81 | 153 | 643 | 668 | 156 | - | - | 2,796 |
| 1988 | 1,246 | 70 | 251 | 715 | 849 | 168 | - | - | 3,299 |
| 1989 | 1,487 | 151 | 294 | 829 | 1,001 | 181 | - | - | 3,943 |
| 1990 | 1,717 | 238 | 485 | 1,028 | 1,077 | 164 | - | - | 4,709 |
| 1991 | 1,938 | 232 | 503 | 1,411 | 1,078 | 186 | - | - | 5,349 |
| 1992 | 2,226 | 167 | 274 | 1,650 | 1,497 | 195 | - | - | 6,010 |
| 1993 | 2,526 | 180 | 261 | 1,640 | 1,822 | 241 | - | - | 6,671 |
| 1994 | 3,015 | 116 | 352 | 1,745 | 1,988 | 297 | - | - | 7,513 |
| 1995 | 3,490 | 328 | 719 | 2,126 | 1,887 | 346 | - | - | 8,896 |
| 1996 | 4,261 | 481 | 743 | 2,383 | 1,770 | 391 | - | - | 10,028 |

| Year | Fatal | MAIS5 | MAIS4 | MAIS3 | MAIS2 | MAIS1 | MAIS0 | PDO | Total |
|-------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|------------|--------------|
| 1997 | 4,884 | 408 | 898 | 2,762 | 2,118 | 445 | - | - | 11,516 |
| 1998 | 5,719 | 372 | 1,107 | 3,344 | 2,640 | 553 | - | - | 13,734 |
| 1999 | 6,312 | 589 | 1,077 | 3,761 | 3,057 | 605 | - | - | 15,401 |
| 2000 | 7,523 | 792 | 983 | 3,939 | 3,223 | 635 | - | - | 17,094 |
| 2001 | 8,037 | 992 | 967 | 3,830 | 2,951 | 672 | - | - | 17,448 |
| 2002 | 9,115 | 997 | 1,027 | 4,063 | 3,207 | 669 | - | - | 19,078 |
| 2003 | 10,520 | 1,703 | 1,419 | 4,418 | 3,794 | 730 | - | - | 22,585 |
| 2004 | 11,915 | 1,764 | 2,367 | 5,572 | 4,297 | 761 | - | - | 26,675 |
| 2005 | 12,957 | 2,062 | 2,437 | 6,658 | 4,618 | 787 | - | - | 29,520 |
| 2006 | 13,433 | 1,503 | 3,579 | 6,978 | 4,691 | 748 | - | - | 30,933 |
| 2007 | 14,133 | 1,561 | 3,543 | 7,633 | 4,725 | 744 | - | - | 32,339 |
| 2008 | 14,454 | 1,436 | 3,768 | 7,107 | 4,403 | 730 | - | - | 31,898 |
| 2009 | 14,492 | 1,682 | 3,686 | 7,319 | 4,376 | 772 | - | - | 32,327 |
| 2010 | 14,972 | 1,575 | 3,586 | 7,597 | 4,136 | 802 | - | - | 32,667 |
| 2011 | 15,984 | 1,697 | 3,494 | 7,879 | 3,998 | 943 | - | - | 33,994 |
| 2012 | 16,202 | 1,602 | 3,319 | 7,895 | 3,996 | 1,038 | - | - | 34,051 |
| 2013 | 16,101 | 1,749 | 4,070 | 7,964 | 3,956 | 1,118 | - | - | 34,957 |
| 2014 | 17,339 | 1,605 | 5,428 | 7,759 | 4,336 | 1,061 | - | - | 37,528 |
| 2015 | 17,564 | 2,193 | 5,807 | 7,974 | 4,905 | 1,121 | - | - | 39,564 |
| 2016 | 18,801 | 2,195 | 5,760 | 8,268 | 4,930 | 1,180 | - | - | 41,134 |
| 2017 | 19,701 | 2,308 | 5,901 | 8,539 | 5,178 | 1,237 | - | - | 42,863 |
| 2018 | 20,936 | 2,700 | 6,133 | 8,725 | 5,317 | 1,292 | - | - | 45,104 |
| 2019 | 22,619 | 3,001 | 6,801 | 9,315 | 5,807 | 1,444 | - | - | 48,989 |

Table E-16. Economic cost – total benefits – LTVs by CY (millions in 2019\$)

| Year | Fatal | MAIS5 | MAIS4 | MAIS3 | MAIS2 | MAIS1 | MAIS0 | PDO | Total |
|------|-------|-------|-------|-------|-------|-------|-------|-------|--------|
| 1968 | 26 | 3 | 9 | 74 | 52 | 46 | 2 | 19 | 232 |
| 1969 | 43 | 4 | 11 | 99 | 145 | 94 | 4 | 32 | 431 |
| 1970 | 62 | 5 | 13 | 122 | 169 | 136 | 6 | 46 | 559 |
| 1971 | 84 | 6 | 15 | 145 | 204 | 168 | 7 | 60 | 689 |
| 1972 | 107 | 9 | 26 | 176 | 237 | 203 | 8 | 77 | 842 |
| 1973 | 143 | 11 | 31 | 214 | 350 | 236 | 9 | 88 | 1,082 |
| 1974 | 174 | 18 | 30 | 245 | 400 | 256 | 10 | 95 | 1,228 |
| 1975 | 198 | 35 | 30 | 155 | 379 | 314 | 12 | 112 | 1,235 |
| 1976 | 262 | 42 | 33 | 277 | 459 | 358 | 14 | 131 | 1,578 |
| 1977 | 354 | 42 | 39 | 415 | 543 | 385 | 16 | 156 | 1,950 |
| 1978 | 438 | 44 | 55 | 590 | 656 | 444 | 18 | 187 | 2,431 |
| 1979 | 541 | 65 | 94 | 748 | 730 | 480 | 19 | 202 | 2,879 |
| 1980 | 583 | 70 | 107 | 778 | 767 | 502 | 20 | 215 | 3,042 |
| 1981 | 661 | 96 | 183 | 683 | 930 | 506 | 21 | 226 | 3,305 |
| 1982 | 713 | 129 | 187 | 795 | 762 | 456 | 21 | 238 | 3,301 |
| 1983 | 802 | 152 | 156 | 979 | 591 | 474 | 23 | 249 | 3,426 |
| 1984 | 1,004 | 173 | 217 | 934 | 613 | 478 | 24 | 268 | 3,712 |
| 1985 | 1,201 | 227 | 275 | 846 | 789 | 610 | 30 | 292 | 4,270 |
| 1986 | 1,538 | 197 | 194 | 1,097 | 1,147 | 654 | 31 | 321 | 5,178 |
| 1987 | 1,924 | 212 | 293 | 1,323 | 1,313 | 724 | 34 | 346 | 6,169 |
| 1988 | 2,140 | 157 | 452 | 1,483 | 1,659 | 774 | 37 | 380 | 7,082 |
| 1989 | 2,480 | 256 | 565 | 1,703 | 1,890 | 798 | 38 | 406 | 8,136 |
| 1990 | 2,825 | 450 | 844 | 1,890 | 1,972 | 856 | 43 | 436 | 9,315 |
| 1991 | 3,134 | 485 | 856 | 2,426 | 1,932 | 918 | 43 | 433 | 10,226 |
| 1992 | 3,549 | 386 | 458 | 2,655 | 2,350 | 1,048 | 50 | 470 | 10,966 |
| 1993 | 3,963 | 367 | 433 | 2,723 | 2,820 | 1,162 | 52 | 536 | 12,056 |
| 1994 | 4,621 | 186 | 512 | 2,969 | 3,241 | 1,378 | 73 | 688 | 13,667 |
| 1995 | 5,259 | 528 | 988 | 3,554 | 3,387 | 1,612 | 94 | 898 | 16,320 |
| 1996 | 6,234 | 694 | 1,026 | 3,984 | 3,110 | 1,885 | 115 | 1,107 | 18,156 |

| Year | Fatal | MAIS5 | MAIS4 | MAIS3 | MAIS2 | MAIS1 | MAIS0 | PDO | Total |
|-------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|------------|--------------|
| 1997 | 7,234 | 694 | 1,195 | 4,949 | 3,468 | 2,141 | 133 | 1,267 | 21,080 |
| 1998 | 8,294 | 598 | 1,513 | 5,796 | 4,191 | 2,406 | 158 | 1,452 | 24,408 |
| 1999 | 9,109 | 886 | 1,505 | 6,420 | 4,758 | 2,742 | 186 | 1,625 | 27,230 |
| 2000 | 10,658 | 1,078 | 1,850 | 6,160 | 5,032 | 2,879 | 222 | 1,920 | 29,797 |
| 2001 | 11,297 | 1,345 | 1,845 | 6,370 | 4,762 | 2,898 | 252 | 2,171 | 30,939 |
| 2002 | 12,799 | 1,380 | 1,953 | 6,684 | 4,966 | 2,931 | 270 | 2,375 | 33,358 |
| 2003 | 14,489 | 2,140 | 2,243 | 7,516 | 5,670 | 3,267 | 333 | 2,681 | 38,341 |
| 2004 | 16,556 | 2,243 | 3,353 | 8,614 | 6,244 | 3,591 | 356 | 3,005 | 43,962 |
| 2005 | 17,897 | 2,465 | 3,548 | 9,880 | 6,852 | 3,855 | 382 | 3,260 | 48,138 |
| 2006 | 18,597 | 1,961 | 4,759 | 10,136 | 7,123 | 3,861 | 414 | 3,563 | 50,413 |
| 2007 | 19,693 | 2,066 | 4,750 | 10,878 | 7,298 | 3,740 | 431 | 3,975 | 52,829 |
| 2008 | 20,208 | 1,961 | 5,069 | 10,547 | 6,859 | 3,716 | 429 | 4,045 | 52,834 |
| 2009 | 20,503 | 2,374 | 5,180 | 11,043 | 7,080 | 3,987 | 459 | 4,243 | 54,867 |
| 2010 | 20,819 | 2,134 | 5,145 | 11,437 | 7,086 | 4,483 | 515 | 4,397 | 56,017 |
| 2011 | 22,318 | 2,168 | 4,878 | 11,890 | 6,925 | 5,220 | 569 | 4,665 | 58,634 |
| 2012 | 23,179 | 2,204 | 4,704 | 12,008 | 7,125 | 5,805 | 670 | 5,379 | 61,074 |
| 2013 | 23,177 | 2,435 | 5,690 | 12,876 | 7,345 | 6,011 | 718 | 5,886 | 64,140 |
| 2014 | 24,999 | 2,168 | 7,093 | 12,784 | 7,588 | 6,313 | 786 | 6,985 | 68,716 |
| 2015 | 25,652 | 2,904 | 7,700 | 14,309 | 8,716 | 7,028 | 914 | 8,284 | 75,508 |
| 2016 | 27,871 | 2,934 | 7,699 | 14,955 | 8,957 | 7,890 | 1,061 | 8,262 | 79,629 |
| 2017 | 28,938 | 3,179 | 7,925 | 15,490 | 9,492 | 8,445 | 1,019 | 8,576 | 83,064 |
| 2018 | 31,404 | 3,636 | 8,222 | 15,928 | 9,807 | 8,810 | 1,070 | 9,418 | 88,294 |
| 2019 | 34,401 | 4,064 | 8,997 | 17,051 | 10,708 | 9,803 | 1,206 | 10,368 | 96,599 |

Table E-17. Economic cost – total voluntary benefits – LTVs by CY (millions in 2019\$)

| Year | Fatal | MAIS5 | MAIS4 | MAIS3 | MAIS2 | MAIS1 | MAIS0 | PDO | Total |
|------|-------|-------|-------|-------|-------|-------|-------|-----|-------|
| 1968 | 20 | 2 | 3 | 34 | 40 | 32 | 2 | 15 | 149 |
| 1969 | 32 | 3 | 5 | 46 | 127 | 52 | 3 | 21 | 287 |
| 1970 | 44 | 4 | 6 | 58 | 146 | 69 | 3 | 27 | 356 |
| 1971 | 57 | 4 | 7 | 71 | 172 | 83 | 4 | 33 | 431 |
| 1972 | 72 | 5 | 16 | 89 | 197 | 97 | 4 | 40 | 520 |
| 1973 | 95 | 5 | 19 | 106 | 300 | 113 | 5 | 45 | 688 |
| 1974 | 115 | 13 | 17 | 128 | 318 | 121 | 5 | 48 | 766 |
| 1975 | 126 | 22 | 19 | 95 | 315 | 132 | 6 | 56 | 771 |
| 1976 | 176 | 36 | 19 | 155 | 367 | 156 | 7 | 66 | 982 |
| 1977 | 243 | 36 | 23 | 241 | 400 | 175 | 8 | 78 | 1,204 |
| 1978 | 309 | 37 | 31 | 335 | 471 | 202 | 9 | 91 | 1,487 |
| 1979 | 383 | 51 | 58 | 426 | 532 | 221 | 9 | 98 | 1,778 |
| 1980 | 426 | 55 | 73 | 486 | 539 | 228 | 10 | 103 | 1,920 |
| 1981 | 482 | 82 | 103 | 449 | 654 | 240 | 10 | 108 | 2,128 |
| 1982 | 521 | 108 | 107 | 516 | 433 | 226 | 10 | 113 | 2,035 |
| 1983 | 547 | 124 | 62 | 639 | 311 | 246 | 11 | 119 | 2,059 |
| 1984 | 620 | 133 | 95 | 546 | 286 | 235 | 11 | 127 | 2,054 |
| 1985 | 657 | 141 | 103 | 463 | 330 | 263 | 14 | 139 | 2,109 |
| 1986 | 705 | 125 | 82 | 509 | 505 | 279 | 15 | 152 | 2,371 |
| 1987 | 830 | 131 | 140 | 625 | 559 | 318 | 16 | 164 | 2,782 |
| 1988 | 893 | 87 | 201 | 713 | 699 | 334 | 18 | 180 | 3,126 |
| 1989 | 994 | 105 | 271 | 804 | 748 | 358 | 18 | 192 | 3,489 |
| 1990 | 1,108 | 212 | 359 | 801 | 674 | 393 | 19 | 196 | 3,762 |
| 1991 | 1,196 | 253 | 352 | 942 | 606 | 420 | 21 | 206 | 3,996 |
| 1992 | 1,323 | 218 | 184 | 940 | 608 | 477 | 23 | 220 | 3,993 |
| 1993 | 1,437 | 187 | 172 | 1,027 | 697 | 506 | 26 | 268 | 4,321 |
| 1994 | 1,606 | 70 | 160 | 1,175 | 916 | 636 | 36 | 341 | 4,940 |
| 1995 | 1,769 | 200 | 269 | 1,353 | 1,016 | 796 | 45 | 433 | 5,882 |
| 1996 | 1,974 | 212 | 284 | 1,489 | 1,028 | 973 | 59 | 569 | 6,588 |
| 1997 | 2,350 | 286 | 296 | 2,018 | 938 | 1,078 | 69 | 657 | 7,692 |
| 1998 | 2,576 | 226 | 407 | 2,262 | 1,223 | 1,244 | 84 | 775 | 8,797 |

| Year | Fatal | MAIS5 | MAIS4 | MAIS3 | MAIS2 | MAIS1 | MAIS0 | PDO | Total |
|-------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|------------|--------------|
| 1999 | 2,796 | 297 | 428 | 2,462 | 1,394 | 1,472 | 108 | 948 | 9,905 |
| 2000 | 3,135 | 286 | 867 | 2,052 | 1,554 | 1,587 | 134 | 1,158 | 10,773 |
| 2001 | 3,261 | 353 | 878 | 2,380 | 1,549 | 1,555 | 154 | 1,326 | 11,457 |
| 2002 | 3,684 | 383 | 926 | 2,413 | 1,439 | 1,568 | 165 | 1,453 | 12,032 |
| 2003 | 3,970 | 437 | 825 | 2,898 | 1,555 | 1,709 | 212 | 1,708 | 13,314 |
| 2004 | 4,641 | 479 | 986 | 2,788 | 1,658 | 1,921 | 229 | 1,929 | 14,631 |
| 2005 | 4,940 | 403 | 1,111 | 2,967 | 1,915 | 2,103 | 255 | 2,174 | 15,867 |
| 2006 | 5,163 | 457 | 1,181 | 2,905 | 2,035 | 2,292 | 285 | 2,456 | 16,774 |
| 2007 | 5,555 | 505 | 1,207 | 3,056 | 2,114 | 2,177 | 305 | 2,814 | 17,733 |
| 2008 | 5,723 | 522 | 1,292 | 3,233 | 2,002 | 2,173 | 310 | 2,921 | 18,176 |
| 2009 | 5,948 | 690 | 1,486 | 3,460 | 2,181 | 2,335 | 326 | 3,018 | 19,444 |
| 2010 | 5,718 | 556 | 1,544 | 3,534 | 2,386 | 2,680 | 362 | 3,085 | 19,866 |
| 2011 | 6,138 | 467 | 1,352 | 3,648 | 2,396 | 3,146 | 398 | 3,263 | 20,809 |
| 2012 | 6,628 | 582 | 1,330 | 3,682 | 2,572 | 3,431 | 466 | 3,745 | 22,437 |
| 2013 | 6,621 | 656 | 1,494 | 3,987 | 2,750 | 3,487 | 499 | 4,090 | 23,583 |
| 2014 | 7,087 | 528 | 1,495 | 4,284 | 2,655 | 3,813 | 533 | 4,742 | 25,139 |
| 2015 | 7,384 | 680 | 1,663 | 5,258 | 2,973 | 4,164 | 613 | 5,553 | 28,288 |
| 2016 | 8,117 | 694 | 1,721 | 5,668 | 3,167 | 4,687 | 704 | 5,483 | 30,241 |
| 2017 | 8,166 | 775 | 1,785 | 5,800 | 3,392 | 5,000 | 666 | 5,607 | 31,191 |
| 2018 | 9,147 | 759 | 1,828 | 5,861 | 3,502 | 5,213 | 684 | 6,020 | 33,012 |
| 2019 | 10,057 | 841 | 1,921 | 6,222 | 3,803 | 5,734 | 766 | 6,584 | 35,927 |

Table E-18. Economic cost – total attributable benefits – LTVs by CY (millions in 2019\$)

| Year | Fatal | MAIS5 | MAIS4 | MAIS3 | MAIS2 | MAIS1 | MAIS0 | PDO | Total |
|------|-------|-------|-------|-------|-------|-------|-------|-----|--------|
| 1968 | 6 | 0 | 5 | 40 | 12 | 14 | 1 | 5 | 83 |
| 1969 | 11 | 1 | 7 | 53 | 18 | 41 | 1 | 11 | 144 |
| 1970 | 18 | 1 | 7 | 65 | 23 | 67 | 2 | 19 | 203 |
| 1971 | 26 | 2 | 8 | 74 | 31 | 85 | 3 | 28 | 258 |
| 1972 | 36 | 4 | 10 | 87 | 40 | 106 | 4 | 37 | 322 |
| 1973 | 48 | 5 | 12 | 107 | 50 | 124 | 5 | 43 | 394 |
| 1974 | 58 | 4 | 13 | 117 | 81 | 136 | 5 | 47 | 462 |
| 1975 | 72 | 13 | 11 | 60 | 64 | 182 | 6 | 55 | 464 |
| 1976 | 87 | 6 | 14 | 122 | 92 | 202 | 7 | 65 | 596 |
| 1977 | 111 | 6 | 16 | 173 | 143 | 211 | 8 | 79 | 746 |
| 1978 | 128 | 7 | 24 | 254 | 184 | 242 | 9 | 96 | 945 |
| 1979 | 158 | 14 | 35 | 322 | 198 | 259 | 10 | 105 | 1,101 |
| 1980 | 157 | 15 | 34 | 292 | 228 | 274 | 11 | 112 | 1,122 |
| 1981 | 179 | 14 | 80 | 233 | 277 | 266 | 11 | 118 | 1,177 |
| 1982 | 192 | 22 | 80 | 279 | 329 | 229 | 11 | 124 | 1,266 |
| 1983 | 254 | 29 | 94 | 340 | 280 | 228 | 12 | 130 | 1,367 |
| 1984 | 384 | 40 | 123 | 388 | 327 | 243 | 13 | 140 | 1,657 |
| 1985 | 544 | 87 | 172 | 383 | 459 | 347 | 16 | 153 | 2,161 |
| 1986 | 833 | 73 | 112 | 588 | 642 | 375 | 16 | 168 | 2,807 |
| 1987 | 1,094 | 81 | 153 | 698 | 754 | 406 | 18 | 182 | 3,387 |
| 1988 | 1,246 | 70 | 251 | 770 | 960 | 440 | 19 | 200 | 3,956 |
| 1989 | 1,487 | 151 | 294 | 899 | 1,142 | 440 | 20 | 214 | 4,647 |
| 1990 | 1,717 | 238 | 485 | 1,089 | 1,298 | 462 | 24 | 240 | 5,554 |
| 1991 | 1,938 | 232 | 503 | 1,484 | 1,327 | 497 | 23 | 227 | 6,231 |
| 1992 | 2,226 | 167 | 274 | 1,715 | 1,742 | 571 | 27 | 250 | 6,972 |
| 1993 | 2,526 | 180 | 261 | 1,697 | 2,123 | 655 | 26 | 268 | 7,735 |
| 1994 | 3,015 | 116 | 352 | 1,794 | 2,326 | 741 | 37 | 347 | 8,728 |
| 1995 | 3,490 | 328 | 719 | 2,200 | 2,371 | 816 | 49 | 465 | 10,438 |
| 1996 | 4,261 | 481 | 743 | 2,495 | 2,081 | 912 | 56 | 538 | 11,568 |

| Year | Fatal | MAIS5 | MAIS4 | MAIS3 | MAIS2 | MAIS1 | MAIS0 | PDO | Total |
|-------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|------------|--------------|
| 1997 | 4,884 | 408 | 898 | 2,931 | 2,530 | 1,063 | 64 | 610 | 13,389 |
| 1998 | 5,719 | 372 | 1,107 | 3,534 | 2,968 | 1,162 | 74 | 677 | 15,611 |
| 1999 | 6,312 | 589 | 1,077 | 3,958 | 3,364 | 1,271 | 77 | 677 | 17,326 |
| 2000 | 7,523 | 792 | 983 | 4,107 | 3,477 | 1,292 | 88 | 761 | 19,024 |
| 2001 | 8,037 | 992 | 967 | 3,990 | 3,212 | 1,343 | 98 | 845 | 19,482 |
| 2002 | 9,115 | 997 | 1,027 | 4,270 | 3,527 | 1,363 | 105 | 922 | 21,326 |
| 2003 | 10,520 | 1,703 | 1,419 | 4,618 | 4,116 | 1,558 | 121 | 973 | 25,027 |
| 2004 | 11,915 | 1,764 | 2,367 | 5,827 | 4,586 | 1,670 | 127 | 1,076 | 29,332 |
| 2005 | 12,958 | 2,062 | 2,437 | 6,913 | 4,937 | 1,751 | 127 | 1,086 | 32,271 |
| 2006 | 13,434 | 1,503 | 3,579 | 7,231 | 5,088 | 1,568 | 129 | 1,108 | 33,639 |
| 2007 | 14,138 | 1,561 | 3,543 | 7,822 | 5,183 | 1,563 | 126 | 1,160 | 35,096 |
| 2008 | 14,485 | 1,439 | 3,777 | 7,314 | 4,857 | 1,542 | 119 | 1,124 | 34,658 |
| 2009 | 14,555 | 1,684 | 3,694 | 7,583 | 4,899 | 1,652 | 132 | 1,224 | 35,423 |
| 2010 | 15,101 | 1,577 | 3,601 | 7,903 | 4,700 | 1,803 | 154 | 1,312 | 36,151 |
| 2011 | 16,180 | 1,701 | 3,526 | 8,242 | 4,529 | 2,074 | 171 | 1,402 | 37,825 |
| 2012 | 16,551 | 1,622 | 3,375 | 8,325 | 4,553 | 2,374 | 203 | 1,634 | 38,637 |
| 2013 | 16,556 | 1,780 | 4,197 | 8,890 | 4,596 | 2,524 | 219 | 1,797 | 40,557 |
| 2014 | 17,912 | 1,640 | 5,598 | 8,500 | 4,933 | 2,500 | 252 | 2,243 | 43,577 |
| 2015 | 18,268 | 2,225 | 6,037 | 9,051 | 5,743 | 2,865 | 301 | 2,730 | 47,220 |
| 2016 | 19,754 | 2,240 | 5,978 | 9,287 | 5,791 | 3,202 | 357 | 2,779 | 49,388 |
| 2017 | 20,771 | 2,404 | 6,140 | 9,690 | 6,100 | 3,446 | 353 | 2,969 | 51,873 |
| 2018 | 22,257 | 2,877 | 6,394 | 10,067 | 6,305 | 3,597 | 386 | 3,398 | 55,282 |
| 2019 | 24,343 | 3,224 | 7,075 | 10,830 | 6,906 | 4,069 | 440 | 3,785 | 60,672 |

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Appendix F: Registrations by Vehicle Type

Table F-1. Number of registrations by vehicle type

| Year | Cars | Trucks |
|-------------|-------------|---------------|
| 1920 | 8,131,522 | 1,107,639 |
| 1921 | 9,212,158 | 1,281,508 |
| 1922 | 10,704,076 | 1,569,523 |
| 1923 | 13,253,019 | 1,849,086 |
| 1924 | 15,436,102 | 2,176,838 |
| 1925 | 17,481,001 | 2,569,734 |
| 1926 | 19,267,967 | 2,907,863 |
| 1927 | 20,193,333 | 3,082,478 |
| 1928 | 21,362,240 | 3,294,409 |
| 1929 | 23,120,897 | 3,549,929 |
| 1930 | 23,034,753 | 3,674,593 |
| 1931 | 22,396,253 | 3,655,835 |
| 1932 | 20,901,401 | 3,446,123 |
| 1933 | 20,657,257 | 3,457,028 |
| 1934 | 21,544,727 | 3,665,453 |
| 1935 | 22,567,827 | 3,919,305 |
| 1936 | 24,182,662 | 4,261,611 |
| 1937 | 25,467,229 | 4,508,533 |
| 1938 | 25,250,477 | 4,475,577 |
| 1939 | 26,226,371 | 4,691,271 |
| 1940 | 27,465,826 | 4,886,262 |
| 1941 | 29,624,269 | 5,150,112 |
| 1942 | 27,972,837 | 4,894,862 |
| 1943 | 26,009,073 | 4,726,737 |
| 1944 | 25,566,464 | 4,760,250 |
| 1945 | 25,793,493 | 5,079,802 |
| 1946 | 28,213,336 | 5,986,081 |
| 1947 | 30,845,350 | 6,808,691 |

| Year | Cars | Trucks |
|-------------|-------------|---------------|
| 1948 | 33,350,894 | 7,537,911 |
| 1949 | 36,453,351 | 8,028,016 |
| 1950 | 40,333,591 | 8,604,448 |
| 1951 | 42,682,591 | 9,009,913 |
| 1952 | 43,817,580 | 9,207,341 |
| 1953 | 46,422,443 | 9,554,395 |
| 1954 | 48,461,219 | 9,800,688 |
| 1955 | 52,135,583 | 10,302,987 |
| 1956 | 54,200,784 | 10,694,262 |
| 1957 | 55,906,195 | 10,960,814 |
| 1958 | 56,870,684 | 11,158,561 |
| 1959 | 59,561,726 | 11,670,559 |
| 1960 | 61,558,847 | 11,937,589 |
| 1961 | 63,275,499 | 12,291,365 |
| 1962 | 65,928,547 | 12,809,150 |
| 1963 | 68,978,589 | 13,416,324 |
| 1964 | 71,950,198 | 14,041,445 |
| 1965 | 75,252,040 | 14,790,437 |
| 1966 | 78,331,488 | 15,522,114 |
| 1967 | 80,458,317 | 16,193,618 |
| 1968 | 83,698,100 | 16,998,546 |
| 1969 | 87,153,381 | 17,885,836 |
| 1970 | 89,309,101 | 18,747,781 |
| 1971 | 92,752,515 | 19,772,212 |
| 1972 | 96,948,813 | 21,261,643 |
| 1973 | 101,578,539 | 23,153,024 |
| 1974 | 104,898,256 | 24,598,284 |
| 1975 | 106,712,551 | 25,775,710 |
| 1976 | 110,351,327 | 27,719,597 |

| Year | Cars | Trucks |
|-------------|-------------|---------------|
| 1977 | 113,696,111 | 29,562,485 |
| 1978 | 116,574,999 | 31,702,604 |
| 1979 | 120,247,990 | 33,349,742 |
| 1980 | 121,723,650 | 33,637,241 |
| 1981 | 123,461,507 | 34,451,110 |
| 1982 | 123,697,863 | 35,252,765 |
| 1983 | 126,727,873 | 36,547,781 |
| 1984 | 127,866,900 | 38,047,099 |
| 1985 | 132,108,164 | 38,989,042 |
| 1986 | 135,431,112 | 40,166,499 |
| 1987 | 137,323,632 | 41,118,762 |
| 1988 | 141,251,695 | 42,529,368 |
| 1989 | 143,081,443 | 43,554,084 |
| 1990 | 143,549,627 | 44,478,848 |
| 1991 | 142,568,902 | 44,936,288 |
| 1992 | 144,213,429 | 45,504,067 |
| 1993 | 146,314,296 | 47,094,754 |
| 1994 | 133,929,662 | 63,445,280 |
| 1995 | 136,066,045 | 64,778,472 |
| 1996 | 129,728,341 | 75,940,206 |
| 1997 | 129,748,704 | 77,307,408 |
| 1998 | 131,838,538 | 79,062,475 |
| 1999 | 132,432,044 | 83,147,802 |
| 2000 | 133,621,420 | 87,107,628 |
| 2001 | 137,633,467 | 92,045,311 |
| 2002 | 135,997,127 | 94,091,488 |
| 2003 | 137,140,117 | 96,201,860 |
| 2004 | 137,908,083 | 101,430,420 |
| 2005 | 138,083,451 | 105,948,298 |

| Year | Cars | Trucks |
|-------------|-------------|---------------|
| 2006 | 136,893,995 | 109,856,736 |
| 2007 | 137,523,377 | 112,851,260 |
| 2008 | 138,731,243 | 112,315,576 |
| 2009 | 136,380,785 | 112,748,263 |
| 2010 | 130,892,240 | 110,322,254 |
| 2011 | 125,656,528 | 118,455,587 |
| 2012 | 111,289,906 | 133,130,032 |
| 2013 | 113,676,345 | 132,931,241 |
| 2014 | 113,898,843 | 137,531,011 |
| 2015 | 112,864,228 | 141,256,148 |
| 2016 | 112,961,266 | 146,182,276 |
| 2017 | 111,177,029 | 151,605,435 |
| 2018 | 111,242,132 | 152,701,631 |
| 2019 | 108,547,710 | 158,352,117 |
| 2020 | 105,143,990 | 161,456,620 |

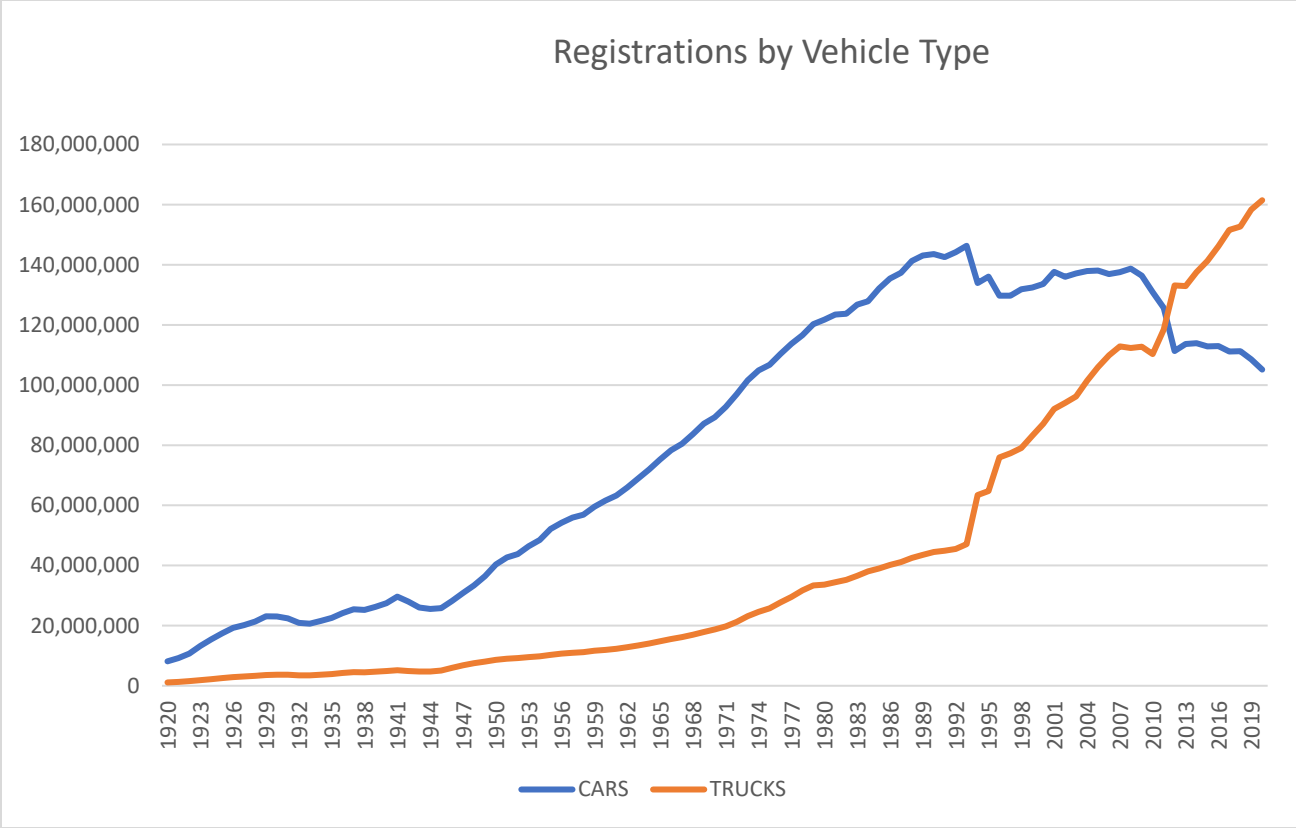


Figure F-1. Registrations by vehicle type

Appendix G: Multi-Year Impact Distributions

Appendix G tables show aggregate unit values assigned to each cost factor that has potential multi-year impacts. Lifetime per-unit costs adjusted for real changes in goods or services were distributed over several years as discussed in this report, and then divided by the incidence of safety benefits (fatalities or non-fatal injuries), experienced in that CY. Example: from Table G-1, for each fatality prevented in CY 1969, society experienced \$102,775 in workplace productivity gains from fatalities prevented in both MY 1968 and MY 1969 vehicles.

Table G-1. Unit value of fatality savings by CY (2019\$)

| CY | Lost Wages | Household Productivity | QALY | Medical | Ins Adm |
|-----------|-------------------|-------------------------------|-------------|----------------|----------------|
| 1968 | \$60,697 | \$14,198 | \$189,843 | \$17,289 | \$35,902 |
| 1969 | \$102,775 | \$24,309 | \$323,602 | \$17,289 | \$35,902 |
| 1970 | \$152,253 | \$35,987 | \$479,186 | \$17,289 | \$35,902 |
| 1971 | \$191,712 | \$45,083 | \$601,527 | \$17,289 | \$35,902 |
| 1972 | \$209,085 | \$49,435 | \$658,171 | \$17,289 | \$35,902 |
| 1973 | \$241,907 | \$57,388 | \$763,038 | \$17,289 | \$35,902 |
| 1974 | \$323,124 | \$75,909 | \$1,013,227 | \$17,289 | \$35,902 |
| 1975 | \$338,787 | \$79,836 | \$1,064,331 | \$17,289 | \$35,902 |
| 1976 | \$398,092 | \$94,588 | \$1,256,880 | \$17,289 | \$35,902 |
| 1977 | \$417,404 | \$100,446 | \$1,328,041 | \$17,289 | \$35,902 |
| 1978 | \$444,976 | \$106,955 | \$1,414,760 | \$17,289 | \$35,902 |
| 1979 | \$486,842 | \$116,555 | \$1,544,147 | \$17,289 | \$35,902 |
| 1980 | \$504,261 | \$121,675 | \$1,607,026 | \$17,289 | \$35,902 |
| 1981 | \$581,791 | \$140,861 | \$1,857,943 | \$17,289 | \$35,902 |
| 1982 | \$716,638 | \$173,934 | \$2,291,989 | \$17,289 | \$35,902 |
| 1983 | \$749,962 | \$183,914 | \$2,413,757 | \$17,289 | \$35,902 |
| 1984 | \$750,437 | \$184,778 | \$2,421,284 | \$17,289 | \$35,902 |
| 1985 | \$641,989 | \$158,920 | \$2,078,166 | \$17,289 | \$35,912 |
| 1986 | \$561,708 | \$138,298 | \$1,812,276 | \$17,289 | \$35,922 |
| 1987 | \$539,007 | \$134,394 | \$1,752,566 | \$17,289 | \$35,931 |
| 1988 | \$513,583 | \$130,495 | \$1,695,363 | \$17,289 | \$35,941 |
| 1989 | \$543,338 | \$142,072 | \$1,833,218 | \$17,289 | \$35,951 |
| 1990 | \$584,988 | \$154,712 | \$1,996,044 | \$17,289 | \$35,961 |
| 1991 | \$607,906 | \$163,821 | \$2,107,851 | \$17,289 | \$35,971 |

| CY | Lost Wages | Household Productivity | QALY | Medical | Ins Adm |
|-----------|-------------------|-------------------------------|-------------|----------------|----------------|
| 1992 | \$652,963 | \$178,223 | \$2,293,346 | \$17,289 | \$35,980 |
| 1993 | \$654,954 | \$181,851 | \$2,336,277 | \$17,289 | \$35,990 |
| 1994 | \$650,630 | \$184,159 | \$2,357,573 | \$17,289 | \$36,000 |
| 1995 | \$675,332 | \$193,185 | \$2,473,403 | \$17,289 | \$36,010 |
| 1996 | \$699,138 | \$202,599 | \$2,590,549 | \$17,289 | \$36,020 |
| 1997 | \$734,710 | \$215,493 | \$2,753,109 | \$17,289 | \$36,029 |
| 1998 | \$762,941 | \$227,668 | \$2,900,419 | \$17,289 | \$36,039 |
| 1999 | \$790,432 | \$237,954 | \$3,031,702 | \$17,289 | \$36,049 |
| 2000 | \$789,176 | \$237,567 | \$3,035,580 | \$17,289 | \$36,059 |
| 2001 | \$799,729 | \$241,532 | \$3,089,186 | \$17,289 | \$36,069 |
| 2002 | \$785,968 | \$238,039 | \$3,044,237 | \$17,289 | \$36,078 |
| 2003 | \$807,913 | \$244,515 | \$3,130,328 | \$17,289 | \$36,088 |
| 2004 | \$866,500 | \$263,187 | \$3,366,215 | \$17,289 | \$36,098 |
| 2005 | \$869,510 | \$264,663 | \$3,387,187 | \$17,289 | \$36,108 |
| 2006 | \$890,880 | \$272,332 | \$3,490,446 | \$17,289 | \$36,118 |
| 2007 | \$935,717 | \$288,770 | \$3,702,051 | \$17,289 | \$36,127 |
| 2008 | \$1,045,006 | \$323,704 | \$4,163,207 | \$17,289 | \$36,137 |
| 2009 | \$1,091,587 | \$346,310 | \$4,433,412 | \$17,289 | \$36,147 |
| 2010 | \$1,105,568 | \$355,445 | \$4,546,997 | \$17,289 | \$36,157 |
| 2011 | \$1,206,823 | \$388,030 | \$4,983,754 | \$17,289 | \$36,167 |
| 2012 | \$1,175,847 | \$379,203 | \$4,882,458 | \$17,289 | \$36,176 |
| 2013 | \$1,163,017 | \$382,411 | \$4,907,485 | \$17,289 | \$36,186 |
| 2014 | \$1,164,219 | \$387,623 | \$4,971,906 | \$17,289 | \$36,196 |
| 2015 | \$1,070,553 | \$362,370 | \$4,637,483 | \$17,289 | \$36,206 |
| 2016 | \$1,024,063 | \$349,953 | \$4,481,016 | \$17,289 | \$36,216 |
| 2017 | \$1,012,832 | \$348,526 | \$4,469,152 | \$17,289 | \$36,225 |
| 2018 | \$1,026,260 | \$358,296 | \$4,589,531 | \$17,289 | \$36,235 |
| 2019 | \$1,075,616 | \$382,903 | \$4,890,042 | \$17,289 | \$36,245 |

Table G-2. Unit value of MAIS5 savings by CY (2019\$)

| CY | Lost Wages | Household Productivity | QALY | Medical |
|-----------|-------------------|-------------------------------|-------------|----------------|
| 1968 | \$15,460 | \$4,335 | \$104,387 | \$10,090 |
| 1969 | \$28,575 | \$8,102 | \$353,224 | \$18,637 |
| 1970 | \$42,616 | \$12,075 | \$526,573 | \$26,329 |
| 1971 | \$62,212 | \$17,537 | \$766,348 | \$37,729 |
| 1972 | \$66,723 | \$18,911 | \$824,595 | \$42,190 |
| 1973 | \$65,233 | \$18,551 | \$807,818 | \$41,463 |
| 1974 | \$67,059 | \$18,884 | \$825,545 | \$40,853 |
| 1975 | \$72,593 | \$20,506 | \$895,350 | \$43,326 |
| 1976 | \$80,439 | \$22,911 | \$997,062 | \$46,359 |
| 1977 | \$93,119 | \$26,861 | \$1,163,163 | \$53,894 |
| 1978 | \$109,556 | \$31,566 | \$1,367,511 | \$63,906 |
| 1979 | \$117,847 | \$33,820 | \$1,467,461 | \$68,716 |
| 1980 | \$128,593 | \$37,195 | \$1,608,907 | \$78,269 |
| 1981 | \$149,708 | \$43,449 | \$1,876,967 | \$90,773 |
| 1982 | \$212,502 | \$61,825 | \$2,668,235 | \$126,564 |
| 1983 | \$211,871 | \$62,282 | \$2,677,150 | \$126,440 |
| 1984 | \$273,043 | \$80,590 | \$3,458,674 | \$157,390 |
| 1985 | \$213,188 | \$63,260 | \$2,709,334 | \$121,776 |
| 1986 | \$176,983 | \$52,234 | \$2,241,782 | \$99,264 |
| 1987 | \$188,967 | \$56,479 | \$2,412,201 | \$108,179 |
| 1988 | \$189,923 | \$58,088 | \$2,471,634 | \$116,259 |
| 1989 | \$165,465 | \$52,203 | \$2,206,132 | \$106,102 |
| 1990 | \$148,467 | \$47,430 | \$2,004,168 | \$96,910 |
| 1991 | \$155,604 | \$50,531 | \$2,129,390 | \$103,879 |
| 1992 | \$154,550 | \$50,636 | \$2,134,005 | \$102,941 |
| 1993 | \$151,044 | \$50,251 | \$2,114,389 | \$99,846 |
| 1994 | \$211,695 | \$72,285 | \$3,030,753 | \$142,217 |
| 1995 | \$240,603 | \$83,769 | \$3,512,673 | \$161,864 |
| 1996 | \$290,982 | \$104,069 | \$4,358,210 | \$190,400 |

| CY | Lost Wages | Household Productivity | QALY | Medical |
|-----------|-------------------|-------------------------------|-------------|----------------|
| 1997 | \$260,136 | \$95,297 | \$3,987,503 | \$172,023 |
| 1998 | \$204,926 | \$76,883 | \$3,207,899 | \$136,593 |
| 1999 | \$185,800 | \$70,689 | \$2,949,705 | \$126,253 |
| 2000 | \$173,314 | \$66,053 | \$2,764,279 | \$116,311 |
| 2001 | \$207,773 | \$79,739 | \$3,340,200 | \$142,688 |
| 2002 | \$202,554 | \$77,893 | \$3,262,584 | \$139,544 |
| 2003 | \$162,699 | \$62,220 | \$2,608,834 | \$110,648 |
| 2004 | \$193,075 | \$73,500 | \$3,078,893 | \$125,865 |
| 2005 | \$214,560 | \$81,477 | \$3,415,163 | \$140,535 |
| 2006 | \$286,079 | \$109,130 | \$4,580,952 | \$193,752 |
| 2007 | \$272,250 | \$104,519 | \$4,388,494 | \$185,147 |
| 2008 | \$279,726 | \$107,140 | \$4,512,987 | \$194,726 |
| 2009 | \$269,205 | \$105,263 | \$4,413,465 | \$195,473 |
| 2010 | \$211,478 | \$83,486 | \$3,497,808 | \$158,904 |
| 2011 | \$200,502 | \$78,602 | \$3,306,418 | \$145,520 |
| 2012 | \$216,471 | \$84,773 | \$3,574,846 | \$157,210 |
| 2013 | \$255,144 | \$101,943 | \$4,284,653 | \$190,811 |
| 2014 | \$362,432 | \$145,869 | \$6,127,827 | \$263,957 |
| 2015 | \$323,419 | \$131,190 | \$5,498,694 | \$238,403 |
| 2016 | \$285,095 | \$115,117 | \$4,827,656 | \$206,541 |
| 2017 | \$280,890 | \$112,979 | \$4,744,819 | \$203,518 |
| 2018 | \$270,046 | \$109,847 | \$4,608,356 | \$197,731 |
| 2019 | \$276,923 | \$114,901 | \$4,805,953 | \$200,938 |

Table G-3. Unit value of MAIS4 savings by CY (2019\$)

| CY | Lost Wages | Household Productivity | QALY | Medical | Ins Adm |
|-----------|-------------------|-------------------------------|-------------|----------------|----------------|
| 1968 | \$7,250 | \$2,913 | \$64,742 | \$7,845 | \$35,222 |
| 1969 | \$11,324 | \$4,600 | \$101,798 | \$12,246 | \$35,222 |
| 1970 | \$17,029 | \$6,913 | \$153,026 | \$17,445 | \$35,222 |
| 1971 | \$22,521 | \$9,096 | \$201,755 | \$22,646 | \$35,222 |
| 1972 | \$24,246 | \$9,846 | \$217,912 | \$25,420 | \$35,222 |
| 1973 | \$30,709 | \$12,513 | \$276,564 | \$32,365 | \$35,222 |
| 1974 | \$37,851 | \$15,272 | \$338,878 | \$38,234 | \$35,222 |
| 1975 | \$38,352 | \$15,523 | \$344,011 | \$37,954 | \$35,222 |
| 1976 | \$41,158 | \$16,797 | \$371,020 | \$39,331 | \$35,222 |
| 1977 | \$42,791 | \$17,686 | \$388,724 | \$41,065 | \$35,222 |
| 1978 | \$49,563 | \$20,461 | \$449,919 | \$47,938 | \$35,222 |
| 1979 | \$58,668 | \$24,124 | \$531,291 | \$56,722 | \$35,222 |
| 1980 | \$64,198 | \$26,606 | \$584,150 | \$64,791 | \$35,222 |
| 1981 | \$66,508 | \$27,657 | \$606,415 | \$66,865 | \$35,222 |
| 1982 | \$75,492 | \$31,470 | \$689,361 | \$74,553 | \$35,222 |
| 1983 | \$83,966 | \$35,367 | \$771,599 | \$83,087 | \$35,222 |
| 1984 | \$92,248 | \$39,013 | \$849,814 | \$88,170 | \$35,222 |
| 1985 | \$88,407 | \$37,588 | \$817,097 | \$83,734 | \$35,265 |
| 1986 | \$85,255 | \$36,053 | \$785,356 | \$79,285 | \$35,308 |
| 1987 | \$87,996 | \$37,684 | \$816,912 | \$83,528 | \$35,350 |
| 1988 | \$75,958 | \$33,149 | \$715,922 | \$76,778 | \$35,392 |
| 1989 | \$74,249 | \$33,433 | \$717,138 | \$78,637 | \$35,433 |
| 1990 | \$70,799 | \$32,329 | \$693,366 | \$76,441 | \$35,474 |
| 1991 | \$70,869 | \$33,026 | \$706,401 | \$78,569 | \$35,515 |
| 1992 | \$58,472 | \$27,583 | \$590,017 | \$64,891 | \$35,555 |
| 1993 | \$64,905 | \$30,901 | \$659,927 | \$71,051 | \$35,595 |
| 1994 | \$78,465 | \$37,792 | \$804,243 | \$86,043 | \$35,634 |
| 1995 | \$112,085 | \$54,234 | \$1,154,299 | \$121,272 | \$35,673 |
| 1996 | \$131,611 | \$64,361 | \$1,368,030 | \$136,265 | \$35,712 |

| CY | Lost Wages | Household Productivity | QALY | Medical | Ins Adm |
|-----------|-------------------|-------------------------------|-------------|----------------|----------------|
| 1997 | \$152,467 | \$75,344 | \$1,600,139 | \$157,389 | \$35,750 |
| 1998 | \$146,178 | \$73,313 | \$1,552,600 | \$150,729 | \$35,788 |
| 1999 | \$136,117 | \$68,538 | \$1,451,594 | \$141,657 | \$35,825 |
| 2000 | \$97,956 | \$48,854 | \$1,037,702 | \$99,550 | \$35,862 |
| 2001 | \$96,059 | \$47,666 | \$1,013,434 | \$98,705 | \$35,898 |
| 2002 | \$77,722 | \$38,296 | \$814,147 | \$79,393 | \$35,935 |
| 2003 | \$78,715 | \$38,403 | \$817,289 | \$79,032 | \$35,970 |
| 2004 | \$89,405 | \$43,485 | \$924,569 | \$86,175 | \$36,005 |
| 2005 | \$94,203 | \$45,679 | \$971,808 | \$91,177 | \$36,040 |
| 2006 | \$111,298 | \$53,746 | \$1,145,114 | \$110,425 | \$36,075 |
| 2007 | \$122,612 | \$59,216 | \$1,261,985 | \$121,390 | \$36,109 |
| 2008 | \$136,374 | \$66,796 | \$1,402,529 | \$137,975 | \$36,142 |
| 2009 | \$146,150 | \$73,949 | \$1,523,264 | \$153,820 | \$36,176 |
| 2010 | \$152,984 | \$79,125 | \$1,608,546 | \$166,610 | \$36,208 |
| 2011 | \$167,330 | \$87,239 | \$1,760,918 | \$176,699 | \$36,241 |
| 2012 | \$165,956 | \$88,161 | \$1,765,584 | \$177,028 | \$36,273 |
| 2013 | \$169,665 | \$92,893 | \$1,835,767 | \$186,395 | \$36,304 |
| 2014 | \$176,499 | \$98,382 | \$1,923,277 | \$188,886 | \$36,335 |
| 2015 | \$170,319 | \$96,189 | \$1,856,896 | \$183,556 | \$36,366 |
| 2016 | \$163,912 | \$92,760 | \$1,773,689 | \$173,012 | \$36,397 |
| 2017 | \$169,323 | \$95,112 | \$1,803,251 | \$176,347 | \$36,426 |
| 2018 | \$174,660 | \$98,234 | \$1,870,774 | \$180,314 | \$36,456 |

Table G-4. Unit value of MAIS3 savings by CY (2019\$)

| CY | Lost Wages | Household Productivity | QALY | Medical | Ins Adm |
|-----------|-------------------|-------------------------------|-------------|----------------|----------------|
| 1968 | \$5,787 | \$2,085 | \$80,314 | \$4,854 | \$27,467 |
| 1969 | \$9,795 | \$3,585 | \$137,457 | \$8,248 | \$27,467 |
| 1970 | \$15,222 | \$5,578 | \$213,959 | \$12,166 | \$27,467 |
| 1971 | \$19,427 | \$7,089 | \$272,461 | \$15,254 | \$27,467 |
| 1972 | \$22,223 | \$8,157 | \$312,854 | \$18,203 | \$27,467 |
| 1973 | \$25,765 | \$9,493 | \$363,611 | \$21,224 | \$27,467 |
| 1974 | \$36,721 | \$13,407 | \$515,513 | \$29,011 | \$27,467 |
| 1975 | \$43,832 | \$16,058 | \$616,661 | \$33,935 | \$27,467 |
| 1976 | \$45,666 | \$16,868 | \$645,663 | \$34,140 | \$27,467 |
| 1977 | \$43,578 | \$16,302 | \$620,869 | \$32,714 | \$27,467 |
| 1978 | \$43,776 | \$16,357 | \$623,263 | \$33,123 | \$27,467 |
| 1979 | \$44,676 | \$17,223 | \$657,278 | \$35,001 | \$27,467 |
| 1980 | \$45,065 | \$18,259 | \$694,668 | \$38,431 | \$27,467 |
| 1981 | \$47,514 | \$20,090 | \$763,333 | \$41,981 | \$27,467 |
| 1982 | \$53,996 | \$23,282 | \$883,751 | \$47,671 | \$27,467 |
| 1983 | \$56,434 | \$24,881 | \$940,663 | \$50,523 | \$27,467 |
| 1984 | \$59,495 | \$26,665 | \$1,006,531 | \$52,088 | \$27,467 |
| 1985 | \$51,905 | \$23,249 | \$875,757 | \$44,763 | \$27,482 |
| 1986 | \$42,516 | \$18,625 | \$703,041 | \$35,401 | \$27,498 |
| 1987 | \$43,890 | \$19,239 | \$722,691 | \$36,857 | \$27,516 |
| 1988 | \$38,135 | \$16,893 | \$632,210 | \$33,818 | \$27,534 |
| 1989 | \$39,079 | \$17,756 | \$659,987 | \$36,097 | \$27,554 |
| 1990 | \$41,262 | \$18,871 | \$701,323 | \$38,565 | \$27,575 |
| 1991 | \$45,354 | \$20,924 | \$775,513 | \$43,023 | \$27,597 |
| 1992 | \$46,861 | \$21,549 | \$798,749 | \$43,817 | \$27,621 |
| 1993 | \$49,763 | \$22,782 | \$843,120 | \$45,277 | \$27,645 |
| 1994 | \$55,342 | \$25,368 | \$935,507 | \$49,922 | \$27,671 |
| 1995 | \$61,435 | \$27,954 | \$1,030,982 | \$54,026 | \$27,698 |
| 1996 | \$61,597 | \$28,223 | \$1,039,538 | \$51,646 | \$27,726 |

| CY | Lost Wages | Household Productivity | QALY | Medical | Ins Adm |
|-----------|-------------------|-------------------------------|-------------|----------------|----------------|
| 1997 | \$60,341 | \$28,264 | \$1,040,192 | \$51,032 | \$27,755 |
| 1998 | \$58,234 | \$28,007 | \$1,027,816 | \$49,770 | \$27,786 |
| 1999 | \$64,157 | \$31,629 | \$1,160,824 | \$56,503 | \$27,817 |
| 2000 | \$62,641 | \$31,005 | \$1,141,235 | \$54,608 | \$27,850 |
| 2001 | \$58,557 | \$29,178 | \$1,075,003 | \$52,223 | \$27,884 |
| 2002 | \$56,688 | \$28,105 | \$1,035,362 | \$50,360 | \$27,919 |
| 2003 | \$59,665 | \$29,403 | \$1,084,335 | \$52,300 | \$27,956 |
| 2004 | \$66,063 | \$32,592 | \$1,200,813 | \$55,825 | \$27,993 |
| 2005 | \$66,700 | \$32,762 | \$1,207,827 | \$56,522 | \$28,032 |
| 2006 | \$66,330 | \$32,211 | \$1,189,239 | \$57,201 | \$28,072 |
| 2007 | \$69,393 | \$33,615 | \$1,241,394 | \$59,560 | \$28,113 |
| 2008 | \$74,683 | \$36,117 | \$1,338,061 | \$65,656 | \$28,155 |
| 2009 | \$77,615 | \$38,623 | \$1,424,297 | \$71,738 | \$28,199 |
| 2010 | \$78,394 | \$39,283 | \$1,447,562 | \$74,785 | \$28,243 |
| 2011 | \$83,695 | \$41,780 | \$1,545,755 | \$77,366 | \$28,289 |
| 2012 | \$77,580 | \$38,763 | \$1,437,688 | \$71,900 | \$28,336 |
| 2013 | \$71,258 | \$36,586 | \$1,352,471 | \$68,495 | \$28,384 |
| 2014 | \$73,386 | \$38,248 | \$1,413,220 | \$69,227 | \$28,433 |
| 2015 | \$60,955 | \$31,960 | \$1,178,218 | \$58,092 | \$28,484 |
| 2016 | \$59,125 | \$30,796 | \$1,135,920 | \$55,266 | \$28,536 |
| 2017 | \$58,864 | \$30,428 | \$1,123,943 | \$54,824 | \$28,589 |
| 2018 | \$59,649 | \$30,840 | \$1,154,994 | \$55,526 | \$28,643 |
| 2019 | \$62,811 | \$32,403 | \$1,221,225 | \$58,066 | \$28,698 |

Table G-5. Unit value of MAIS2 savings by CY (2019\$)

| CY | Lost Wages | Household Productivity | QALY | Medical | Ins Adm |
|-----------|-------------------|-------------------------------|-------------|----------------|----------------|
| 1968 | \$2,031 | \$773 | \$40,216 | \$2,123 | \$7,685 |
| 1969 | \$3,191 | \$1,151 | \$62,841 | \$3,327 | \$7,685 |
| 1970 | \$4,763 | \$1,667 | \$93,531 | \$4,734 | \$7,685 |
| 1971 | \$6,372 | \$2,192 | \$124,930 | \$6,259 | \$7,685 |
| 1972 | \$7,261 | \$2,477 | \$142,234 | \$7,412 | \$7,685 |
| 1973 | \$8,361 | \$3,029 | \$175,360 | \$9,227 | \$7,685 |
| 1974 | \$10,682 | \$4,011 | \$234,147 | \$12,094 | \$7,685 |
| 1975 | \$10,809 | \$4,162 | \$243,092 | \$12,429 | \$7,685 |
| 1976 | \$10,750 | \$4,205 | \$245,470 | \$12,201 | \$7,685 |
| 1977 | \$9,589 | \$3,842 | \$223,862 | \$11,289 | \$7,685 |
| 1978 | \$8,847 | \$3,551 | \$206,529 | \$10,626 | \$7,685 |
| 1979 | \$8,808 | \$3,419 | \$198,715 | \$10,358 | \$7,685 |
| 1980 | \$9,034 | \$3,485 | \$202,838 | \$10,909 | \$7,685 |
| 1981 | \$9,681 | \$3,730 | \$217,471 | \$11,610 | \$7,685 |
| 1982 | \$11,159 | \$4,347 | \$254,391 | \$13,397 | \$7,685 |
| 1983 | \$11,894 | \$4,710 | \$276,035 | \$14,352 | \$7,685 |
| 1984 | \$11,157 | \$4,495 | \$262,903 | \$13,132 | \$7,685 |
| 1985 | \$9,310 | \$3,766 | \$219,099 | \$10,736 | \$7,701 |
| 1986 | \$7,808 | \$3,127 | \$180,728 | \$8,795 | \$7,716 |
| 1987 | \$8,358 | \$3,230 | \$186,962 | \$9,141 | \$7,731 |
| 1988 | \$8,441 | \$3,181 | \$184,211 | \$9,313 | \$7,747 |
| 1989 | \$9,047 | \$3,385 | \$196,542 | \$10,076 | \$7,762 |
| 1990 | \$9,330 | \$3,532 | \$205,425 | \$10,625 | \$7,777 |
| 1991 | \$10,209 | \$3,970 | \$230,859 | \$11,991 | \$7,792 |
| 1992 | \$10,626 | \$4,143 | \$239,916 | \$12,213 | \$7,808 |
| 1993 | \$11,732 | \$4,633 | \$269,341 | \$13,214 | \$7,823 |
| 1994 | \$11,469 | \$4,565 | \$265,412 | \$12,923 | \$7,838 |
| 1995 | \$11,111 | \$4,474 | \$257,567 | \$12,412 | \$7,853 |
| 1996 | \$11,641 | \$4,645 | \$264,993 | \$12,235 | \$7,869 |

| CY | Lost Wages | Household Productivity | QALY | Medical | Ins Adm |
|-----------|-------------------|-------------------------------|-------------|----------------|----------------|
| 1997 | \$11,607 | \$4,637 | \$270,560 | \$11,946 | \$7,884 |
| 1998 | \$11,882 | \$4,681 | \$273,068 | \$11,869 | \$7,899 |
| 1999 | \$11,591 | \$4,564 | \$266,148 | \$11,678 | \$7,915 |
| 2000 | \$11,756 | \$4,640 | \$270,706 | \$11,882 | \$7,930 |
| 2001 | \$12,072 | \$4,755 | \$277,613 | \$12,249 | \$7,945 |
| 2002 | \$11,514 | \$4,547 | \$265,266 | \$11,868 | \$7,960 |
| 2003 | \$12,150 | \$4,795 | \$280,010 | \$12,322 | \$7,976 |
| 2004 | \$12,527 | \$4,973 | \$290,545 | \$12,578 | \$7,991 |
| 2005 | \$13,049 | \$5,187 | \$303,384 | \$13,083 | \$8,006 |
| 2006 | \$12,641 | \$5,020 | \$293,631 | \$13,199 | \$8,021 |
| 2007 | \$13,145 | \$5,289 | \$309,727 | \$13,875 | \$8,037 |
| 2008 | \$14,082 | \$5,682 | \$333,324 | \$14,965 | \$8,052 |
| 2009 | \$13,535 | \$5,508 | \$323,037 | \$14,798 | \$8,067 |
| 2010 | \$12,925 | \$5,272 | \$308,958 | \$14,248 | \$8,083 |
| 2011 | \$13,156 | \$5,407 | \$316,814 | \$14,163 | \$8,098 |
| 2012 | \$12,298 | \$5,037 | \$294,629 | \$13,138 | \$8,113 |
| 2013 | \$12,040 | \$4,842 | \$282,926 | \$12,611 | \$8,128 |
| 2014 | \$12,309 | \$4,922 | \$287,474 | \$12,393 | \$8,144 |
| 2015 | \$11,248 | \$4,482 | \$261,090 | \$11,217 | \$8,159 |
| 2016 | \$11,655 | \$4,584 | \$267,013 | \$11,228 | \$8,174 |
| 2017 | \$12,217 | \$4,797 | \$279,719 | \$11,609 | \$8,189 |
| 2018 | \$13,001 | \$5,087 | \$297,017 | \$12,221 | \$8,205 |
| 2019 | \$14,024 | \$5,476 | \$320,016 | \$12,664 | \$8,220 |

Table G-6. Unit value of MAISI savings by CY (2019\$)

| CY | Lost Wages | Household Productivity | QALY | Medical | Ins Adm |
|-----------|-------------------|-------------------------------|-------------|----------------|----------------|
| 1968 | \$1,258 | \$538 | \$11,942 | \$1,149 | \$1,478 |
| 1969 | \$1,979 | \$846 | \$18,792 | \$1,814 | \$1,478 |
| 1970 | \$2,185 | \$934 | \$20,749 | \$1,914 | \$1,478 |
| 1971 | \$2,289 | \$979 | \$21,735 | \$1,985 | \$1,478 |
| 1972 | \$2,189 | \$936 | \$20,790 | \$1,975 | \$1,478 |
| 1973 | \$2,317 | \$991 | \$22,002 | \$2,110 | \$1,478 |
| 1974 | \$2,412 | \$1,031 | \$22,906 | \$2,157 | \$1,478 |
| 1975 | \$2,346 | \$1,003 | \$22,275 | \$2,076 | \$1,478 |
| 1976 | \$2,495 | \$1,067 | \$23,691 | \$2,147 | \$1,478 |
| 1977 | \$2,392 | \$1,023 | \$22,717 | \$2,088 | \$1,478 |
| 1978 | \$2,327 | \$995 | \$22,098 | \$2,073 | \$1,478 |
| 1979 | \$2,363 | \$1,010 | \$22,435 | \$2,132 | \$1,478 |
| 1980 | \$2,377 | \$1,016 | \$22,566 | \$2,212 | \$1,478 |
| 1981 | \$2,399 | \$1,026 | \$22,778 | \$2,217 | \$1,478 |
| 1982 | \$2,521 | \$1,078 | \$23,941 | \$2,298 | \$1,478 |
| 1983 | \$2,403 | \$1,027 | \$22,818 | \$2,163 | \$1,478 |
| 1984 | \$2,553 | \$1,092 | \$24,245 | \$2,208 | \$1,478 |
| 1985 | \$2,495 | \$1,067 | \$23,688 | \$2,116 | \$1,490 |
| 1986 | \$2,483 | \$1,062 | \$23,579 | \$2,092 | \$1,502 |
| 1987 | \$2,583 | \$1,104 | \$24,525 | \$2,186 | \$1,515 |
| 1988 | \$2,447 | \$1,046 | \$23,235 | \$2,141 | \$1,528 |
| 1989 | \$2,492 | \$1,066 | \$23,666 | \$2,212 | \$1,541 |
| 1990 | \$2,455 | \$1,049 | \$23,306 | \$2,198 | \$1,555 |
| 1991 | \$2,483 | \$1,061 | \$23,574 | \$2,224 | \$1,569 |
| 1992 | \$2,427 | \$1,037 | \$23,041 | \$2,121 | \$1,584 |
| 1993 | \$2,521 | \$1,078 | \$23,933 | \$2,127 | \$1,599 |
| 1994 | \$2,504 | \$1,071 | \$23,778 | \$2,099 | \$1,615 |
| 1995 | \$2,516 | \$1,076 | \$23,894 | \$2,069 | \$1,631 |
| 1996 | \$2,724 | \$1,165 | \$25,867 | \$2,128 | \$1,647 |

| CY | Lost Wages | Household Productivity | QALY | Medical | Ins Adm |
|-----------|-------------------|-------------------------------|-------------|----------------|----------------|
| 1997 | \$2,888 | \$1,235 | \$27,422 | \$2,207 | \$1,665 |
| 1998 | \$2,938 | \$1,256 | \$27,898 | \$2,211 | \$1,682 |
| 1999 | \$2,908 | \$1,243 | \$27,611 | \$2,209 | \$1,700 |
| 2000 | \$2,926 | \$1,251 | \$27,786 | \$2,223 | \$1,719 |
| 2001 | \$2,990 | \$1,279 | \$28,395 | \$2,284 | \$1,739 |
| 2002 | \$2,873 | \$1,228 | \$27,282 | \$2,225 | \$1,759 |
| 2003 | \$2,852 | \$1,219 | \$27,078 | \$2,172 | \$1,779 |
| 2004 | \$2,911 | \$1,244 | \$27,637 | \$2,181 | \$1,800 |
| 2005 | \$2,992 | \$1,279 | \$28,406 | \$2,233 | \$1,822 |
| 2006 | \$2,888 | \$1,235 | \$27,422 | \$2,247 | \$1,845 |
| 2007 | \$2,900 | \$1,240 | \$27,538 | \$2,249 | \$1,868 |
| 2008 | \$2,849 | \$1,218 | \$27,054 | \$2,214 | \$1,892 |
| 2009 | \$2,765 | \$1,182 | \$26,252 | \$2,192 | \$1,917 |
| 2010 | \$2,648 | \$1,132 | \$25,145 | \$2,114 | \$1,943 |
| 2011 | \$2,763 | \$1,181 | \$26,233 | \$2,138 | \$1,969 |
| 2012 | \$2,737 | \$1,170 | \$25,988 | \$2,112 | \$1,996 |
| 2013 | \$2,852 | \$1,219 | \$27,082 | \$2,201 | \$2,024 |
| 2014 | \$2,898 | \$1,239 | \$27,514 | \$2,162 | \$2,053 |
| 2015 | \$2,834 | \$1,212 | \$26,913 | \$2,108 | \$2,083 |
| 2016 | \$2,946 | \$1,260 | \$27,973 | \$2,144 | \$2,114 |
| 2017 | \$3,025 | \$1,293 | \$28,723 | \$2,173 | \$2,146 |
| 2018 | \$3,078 | \$1,316 | \$29,224 | \$2,192 | \$2,178 |
| 2019 | \$3,162 | \$1,352 | \$30,022 | \$2,166 | \$2,212 |

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Appendix H: Injury Trends from Accident Facts

Table H-1. Accident facts – data on number of injuries

| Year | Millions | Factor to 1988 |
|-------------|-----------------|-----------------------|
| 1968 | 15 | 0.728 |
| 1969 | 15.5 | 0.752 |
| 1970 | 16 | 0.777 |
| 1971 | 16.3 | 0.791 |
| 1972 | 17 | 0.825 |
| 1973 | 16.6 | 0.806 |
| 1974 | 15.6 | 0.757 |
| 1975 | 16.5 | 0.801 |
| 1976 | 16.8 | 0.816 |
| 1977 | 17.6 | 0.854 |
| 1978 | 18.3 | 0.888 |
| 1979 | 18.1 | 0.879 |
| 1980 | 18.05 | 0.876 |
| 1981 | 18 | 0.874 |
| 1982 | 18.1 | 0.879 |
| 1983 | 18.5 | 0.898 |
| 1984 | 18.9 | 0.917 |
| 1985 | 19.3 | 0.937 |
| 1986 | 19.73 | 0.958 |
| 1987 | 20.17 | 0.979 |
| 1988 | 20.6 | 1.000 |

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