

## Use of Safety Belts: Laws Mandating Use

### Summary Evidence Tables

#### Studies measuring the effect of safety belt laws on fatal and nonfatal injuries

Author and year Study period Design suitability (design) Quality of execution Evaluation setting	Intervention and comparison elements	Study population description Sample size	Results				
			Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-Up Time
Barancik 1988 1984-1985 Least (before-after) Fair Suffolk County, NY	<i>Age:</i> Not stated <i>Position:</i> Front <i>Fines:</i> Not stated <i>Enforcement:</i> Primary <i>Effective Date:</i> 1/1/85 <i>Comparison:</i> Pre-law period	Emergency department (ED) admissions for motor vehicle crash (MVC) injuries  N = 1,473	Injury rate per 1,000 population	4.75	4.55	-4.2%	6 months
Bernstein 1989 1985-1986 Least (before-after) Fair Bernalillo County, NM	<i>Age:</i> >11 years old <i>Position:</i> Front-seat of passenger cars <i>Fines:</i> Not stated <i>Enforcement:</i> Primary <i>Effective Date:</i> Jan 1986 <i>Comparison:</i> Pre-law period	MVC-involved occupants treated at any of the six Bernalillo County hospitals  N = 436	Injuries	221	215	-2.7%	2 months
Campbell 1991 1978-1987 Greatest (time series with concurrent comparison) Fair TX, NY, IL, NC, MD, CT, WA, IA	<i>Age:</i> Not stated <i>Position:</i> Front <i>Fines:</i> Not stated <i>Enforcement:</i> Not stated <i>Effective Dates:</i> Varied by state <i>Comparison:</i> Pre-law period and persons not covered by law	Persons involved in MVCs  N not reported	Serious and fatal injuries	NA	Intervention: -5.4% Comparison: -2.8%	-2.6%	15-24 months

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Chorba 1988 Jan 1983-Sep 1987 Greatest (time series with concurrent comparison) Fair NC	Age: >5 years Position: Front Fines: \$25.00 Enforcement: Primary Effective Dates: Warnings 10/1/85; Fines 1/1/87 Comparison: Pre-law period and persons not covered by law	Persons involved in MVCs N = 111,076	Percent of occupants in MVCs who were seriously injured or killed  Intervention Comparison	  4.70 4.59	  3.95 3.90	-1.28%	1 year
Desai 1992 1986 Moderate (time-series) Fair OH	Age: Not stated Position: Front Fines: Not stated Enforcement: Secondary Effective Date: Feb 1986 Comparison: Pre-law period	MVC-involved occupants N = average 2002 crash-involved occupants per month	Severe and fatal injury rate	20 per 1000	16 per 1000, p<.05	-20%	21 months
Dodson 1988 1985-1986 Least (before-after) Fair San Francisco, CA	Age: Not stated Position: Not stated Fines: Not stated Enforcement: Not stated Effective Date: 1/1/86 Comparison: Pre-law period	Patients with MVC-related injuries N = 950	Number of patients with MVC injuries	451	499	+10.6%	3 months
Legge 1990 1975-1987 Moderate (time series) Fair NY	Age: Not stated Position: Not stated Fines: Yes, amount not stated Enforcement: Primary Effective Date: 1/1/85 Comparison: Pre law period	Persons covered by the law and killed in MVCs N not reported	Number of fatally injured drivers and front seat passengers	Not stated	-8.4%	-8.4%	2 years

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Lestina 1991 1987-1988 Least (before-after) Fair Charlottesville, VA, and surrounding counties	Age: All Position: Front Fines: \$25 Enforcement: Secondary Effective Date: 1/1/88 Comparison: Pre-law period	MVC-involved occupants  N = 1,184	Percent of drivers in MVCs who were seriously injured or killed	48%	38%	-10%	1 year
Loeb 1993 1982-1987 Greatest (time series with concurrent comparison) Fair CA	Age: Not stated Position: Not stated Fines: Not stated Enforcement: Secondary Effective Date: 1/1/86 Comparison: Pre-law period	Drivers injured in single vehicle crashes  N not reported	Serious and fatal injuries in single vehicle crashes	NA	-2.6%, N.S	-2.6%	1 year
Loeb 1995 1982-1987 Moderate (time series) Fair TX	Age: All ages Position: Front Fines: Not reported Enforcement: Primary Effective Date: 10/1/85 Comparison: Pre-law period	Serious and fatal injuries among drivers  N not reported	Percent change in serious and fatal injuries among drivers	NA	-.083	-8.3%	28 months
Lund 1987 Jan 1980-Sep 1985 Greatest (time series with concurrent comparison) Fair NY	Age: Not stated Position: Front Fines: Yes, amount not stated Enforcement: Primary Effective Date: 1/1/85 Comparison: OH and PA (no laws)	Persons killed in MVCs in vehicles covered by the law  N not reported	Number of fatalities	NA	-9.0%, p<0.10	-9.0%	9 months

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Margolis 1996 1980-1994 Moderate (time series) Fair NC	Age: All Position: Front Fines: Not stated Enforcement: Not stated Effective Date: Jul 1985 Comparison: Pre-law period	Front seat passengers over 16 years involved in MVCs who had child passengers  N not reported	Percent change in serious and fatal injuries	NA	-43.9% p<. 0001	-43.9%	9 years
Reinfurt 1990 Jan 1981-Jun 1988 Greatest (time series with concurrent comparison) Fair NC	Age: Not stated Position: Front Fines: \$25.00 Enforcement: Primary Effective Dates: Warning 10/1/85; Fines 1/1/87 Comparison: Pre-law period and persons not covered by law	All persons injured in MVCs  N not reported	Percent change in fatal injuries  Percent change fatal and serious injuries	NA  NA	Covered Non-cov.  Fatal Injury -11.6% +6.3 p<0.1 ns  Fatal and Serious: -14.6 -10.2 p<.01 p<.1	Fatal injury -17.9%  Fatal and serious injury -4.4%	18 months
States 1990 Jul 1983-Jun 1986 Greatest (before-after with concurrent comparison) Fair Monroe County, NY	Age: Not stated Position: Front Fines: Not stated Enforcement: Primary Effective Date: 1/1/85 Comparison: Pre-law period and persons not covered by law	Persons involved in MVCs who were admitted to a hospital in Monroe County, NY  N = 1,778	Percent change in hospital admissions for MVC injuries	NA	Percent change Intervention -11.9% Control +2.6%	-14.5%	18 months
Streff 1990 Jan 1978-Dec 1987 Moderate (time series) Good MI	Age: Not stated Position: Front Fines: Not stated Enforcement: Secondary Effective Date: Jul 1985 Comparison: Pre-law period	MVC-involved occupants  N not reported	Percent change in fatal and severe injuries	NA	Percent change (95% CI) Fatal injuries -1.54 (-9.19,+ 6.77)  Severe injury +0.3 (-3.76, + 4.54)	Fatal -1.54%  Severe +0.3%	30 months

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Thyer 1993 Sep 1987-Sep 1989 Moderate (time series) Fair GA	<i>Age:</i> Not stated <i>Position:</i> Front <i>Fines:</i> \$25 <i>Enforcement:</i> Secondary <i>Effective Date:</i> 9/1/88 <i>Comparison:</i> Pre-law period	MVC-related fatalities and injuries	Percent change in death rate per 100 million miles	Death rate 3.16	Death rate 2.99, $p=0.38$	Death rate -5%	1 year
			Percent change in number of injuries	Injuries 8,139	Injuries 8,108, $p=.90$	Injuries -.4%	
Wagenaar 1988 1976-1986 Greatest (time series with concurrent comparison) Fair NY, NJ, MI, IL, TX, NE, MO, NC	<i>Age:</i> Not stated <i>Position:</i> Not stated <i>Fines:</i> Not stated <i>Enforcement:</i> Primary and secondary <i>Effective Dates:</i> Varied <i>Comparison:</i> Pre-law period and states without laws (PA, MD, OH, IN, GA, KS, TN, VA)	All front seat occupants >10 years of age killed in MVCs  N not reported	Percent change in rate of fatalities	Not stated	-8.7%, $p<.05$	-8.7%	9-19 months
Wagenaar 1990 Jan 1980-Oct 1986 Moderate (time series) Good 14 hospitals in MI	<i>Age:</i> Not stated <i>Position:</i> Front <i>Fines:</i> Not stated <i>Enforcement:</i> Secondary <i>Effective Date:</i> 7/1/85 <i>Comparison:</i> Pre-law period	MVC-involved occupants admitted to 14 hospitals  N = 8,661	Percent change in hospital admissions	NA	-19.31, $<.05$	-19.31%	1 year

## Studies measuring the effect of safety belt laws on observed safety belt use

Author and year Study period Design suitability (design) Quality of execution Evaluation setting	Intervention and comparison elements	Study population description  Sample size	Results				
			Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-Up Time
Beaton 1988 Dec 1987-Mar 1988 Moderate (time series) Fair Norfolk, VA	<i>Age:</i> Not stated <i>Position:</i> Front <i>Fines:</i> \$25.00 <i>Enforcement:</i> Secondary <i>Effective Dates:</i> Law effective 7/1/87; enforcement began 1/1/88 <i>Comparison:</i> Pre-law period	University campus drivers  N = 21,659	Observed safety belt use among drivers	39.36%	59.17%	+19.81%	3 months
Brillhart 1988 1985 Moderate (time series) Fair TX	<i>Age:</i> All in front <i>Position:</i> Front <i>Fines:</i> \$25-50 <i>Enforcement:</i> Primary <i>Effective Date:</i> 12/1/85 <i>Comparison:</i> Pre-law period	Drivers in urban areas  N = 6,274	Observed safety belt use among drivers	20.8%	55.3%	+34.5%	1 year
Cope 1990 Sep 1986-Dec 1987 Moderate (time series) Fair NC	<i>Age:</i> ≥6 years <i>Position:</i> Front <i>Fines:</i> \$25.00 <i>Enforcement:</i> Primary <i>Effective Dates:</i> Warning 10/1/85; Fines 1/1/87 <i>Comparison:</i> Pre-law period	Drivers in two parking lots  N = 10,820	Observed safety belt use among drivers	42.2%	63.3%, p<. 0001	+21.1%	100 days
Kalfus 1987 Dec 1984-Mar 1985 Moderate (time series) Fair New York	<i>Age:</i> Not stated <i>Position:</i> Front <i>Fines:</i> \$50.00 <i>Enforcement:</i> Primary <i>Effective Dates:</i> 1/1/85 (fine began) <i>Comparison:</i> Pre-law period	University campus drivers  N = 8575	Observed safety belt use among drivers	44.2%	60.7%, p<.001	+16.5%	4 months

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Preusser 1987 May 1984-May 1985 Moderate (time series) Fair NY	Age: Not stated Position: Front Fines: \$50.00 Enforcement: Not stated (primary) Effective Dates: Warning 12/1/84; Fines 1/1/85 Comparison: Pre-law period	Drivers at intersections  N = 7,814	Observed safety belt use among drivers	28%	60%	+32%	5 months
Preusser 1988 Oct 1984-May 1985 Least (before-after) Fair Westchester County, NY	Age: Not stated Position: Front Fines: \$50.00 Enforcement: Not stated (primary) Effective Date: Warning 12/1/84 Citation 1/1/85 Comparison: Pre-law period	Drivers on restricted access highways  N = 17,679	Observed safety belt use among drivers	29%	63%, p < .05	+34%	4-5 months
Reinfurt 1990 Sep 1985-Aug 1988 Moderate (time series) Fair NC	Age: Not stated Position: Front Fines: \$25.00 Enforcement: Primary Effective Dates: Warning 10/1/85; Fines 1/1/87 Comparison: Pre-law period	Drivers at 72 randomly selected observation sites  N = 228,000	Observed safety belt use among drivers	25%	64%	+39%	20 months
Ulmer 1995 1985-1992 Moderate (time series) Fair Six communities in CA	Age: Not stated Position: Not stated Fines: Not stated Enforcement: Secondary Effective Date: 1986 Comparison: Pre-law period	Drivers in 6 communities  N not reported	Observed safety belt use among drivers	23.2%	58.0%	34.8%	6.5 years

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Wagenaar 1986 Dec 1984-Dec 1985 Moderate (time series) Fair MI	<i>Age:</i> Not stated <i>Position:</i> Front <i>Fines:</i> \$10.00 (1985); \$25.00 (1/86) <i>Enforcement:</i> Secondary <i>Effective Date:</i> 1/85 <i>Comparison:</i> Pre-law period	Drivers of covered vehicles at 240 intersections  N = 24,451	Observed safety belt use among drivers	26.0%	45.4%	+19.4%	6 months
Williams 1987 Sep 1984-Jan 1986 Moderate (time series) Fair NY, IL, TX	<i>Age:</i> All ages <i>Position:</i> Front <i>Fines:</i> NY: up to \$50; IL: up to \$25; TX: \$25-50 <i>Enforcement:</i> Not stated <i>Effective Dates:</i> NY: 1/1/85; IL: 8/1/85; TX: 12/1/85 <i>Comparison:</i> Pre-law period	Front seat occupants in vehicles on major state or interstate highways  NY: ~40,000 IL: ~10,000 TX: ~15,000	Observed safety belt use among front seat occupants	NY: 30% IL: 28% TX: 28% Average: 28.7%	NY: 76% IL: 59% TX: 65% Average: 66.7%	Average: +38%	1 month



### Studies measuring the effect of safety belt laws on police-reported safety belt use

Author and year (Study period) Design suitability (design) Quality of execution Evaluation setting	Intervention and comparison elements	Study population description  Sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-Up Time
Pace 1986  Oct 1984 – May 1985  Least (before-after)  Fair  Queens County, NY	<i>Age:</i> Not stated <i>Position:</i> Front <i>Fines:</i> \$50.00 <i>Enforcement:</i> Not stated (primary) <i>Effective Date:</i> 1/1/85 <i>Comparison:</i> Pre-law period	MVC-involved drivers admitted to hospital ED  N = 186	Police-reported safety belt use among injured drivers	21%	47%, p <.01	+26%	5 months
Winnicki 1995  1983-1994  Greatest (times series with concurrent comparison)  Fair  50 U.S. states	<i>Age:</i> Varied, not stated <i>Position:</i> Varied, not stated <i>Fines:</i> Varied by state, not stated <i>Enforcement:</i> Varied by state <i>Effective Dates:</i> Varied by state <i>Comparison:</i> Pre-law period and persons not covered by law	Fatally injured occupants of MVCs in U.S.  N not reported	Police-reported safety belt use	NA	Effect on safety belt use among fatally injured occupants of states with secondary belt laws vs. no law (reported as percent change, not percentage point difference) 0.216, p=0.0001	NA	Not reported

### Studies measuring the effect of safety belt laws on self-reported safety belt use

Author and year Study period Design suitability (design) Quality of execution Evaluation setting	Intervention and comparison elements	Study population description  Sample size	Effect measure	Reported baseline	Reported effect	Value used in summary	Follow-Up Time
Escobedo 1992 (1984-89)  Greatest (time series with concurrent comparison)  Fair  Statewide 39 states and D.C.	<i>Age:</i> Not stated <i>Position:</i> Front <i>Fines:</i> Varied <i>Enforcement:</i> Secondary <i>Effective Dates:</i> 1985 <i>Comparison:</i> Pre-law period and persons not covered by law	U.S. residents age 18 and over with telephones  N = 130,429	Self-reported restraint use = "always"	No Law Pre 21%  Secondary Law Pre 22%	No Law Post 35%  Secondary Law Post 49%	+13%	3 years
Fielding 1992  1988-1989  Least (cross-sectional)  Fair  50 U.S. states	<i>Age:</i> Not stated <i>Position:</i> Not stated <i>Fines:</i> Not stated <i>Enforcement:</i> Primary (7) and Secondary (26) <i>Effective Dates:</i> Varied <i>Comparison:</i> Persons not covered by law	Volunteer health profile participants in U.S. whose employers belonged to Johnson and Johnson Health Management  N = 17,830	Self-reported safety belt use of 80-100%	NA	States with laws +77% States without 61%	+16%	NA
Russell 1994  1988-1989  Least (cross-sectional)  Fair  ID, MD, PA, WA, NY	<i>Age:</i> > 5 years <i>Position:</i> Not stated <i>Fines:</i> Not stated <i>Enforcement:</i> Not stated <i>Effective Dates:</i> Various <i>Comparison:</i> States without laws (AZ, ME, KT, NE, RI, WV)	U.S. residents age 18 and over with telephones and at least one child < 11 years old  N = 5,449	Self-reported safety belt use = "always"	NA	States with laws 58.7% States without 43.2%	+15.5%	NA
Tipton 1990  Not stated  Moderate (time series)  Fair  VA	<i>Age:</i> Not stated <i>Position:</i> Not stated <i>Fines:</i> Not stated <i>Enforcement:</i> Not stated <i>Effective Dates:</i> Not stated <i>Comparison:</i> Pre-law period	Undergraduate students  N = 752	Self-reported safety belt use = "always"	48.2%	67.2%, p<.001	+19.0%	16 months