Appendix 1: Studies Measuring the Incremental Effect of Primary Enforcement Laws Relative to Secondary Enforcement Laws on Fatal Injuries

Author, 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[a]	Follow-up time[b]
Wagenaar 1988 [1] 1976-1986 Greatest (time series with concurrent comparison) Fair 12 states (Primary: IL, NY, TX; Secondary: MI, NE, NJ; No Law: GA, IN, KS, MD, OH, PA)	Age: Not stated (adults) Position: Front Vehicles: Passenger, vans, light trucks, utility vehicles Fines: Not stated Effective Dates: Varied Comparison: Primary vs secondary law states	Front seat motor vehicle occupants age 10 and over in U.S. 12 states	Fatalities per vehicle mile traveled (VMT) (Paper did not state the specific multiple of VMT used in calculating fatality rates)	NA	Percent change in fatalities per VMT: Secondary Law: -6.8 ($p<.05$) Primary Law: - 9.9 ($p<.05$)	-3.1%	9-19 months
Evans 1991 [2] 1975-1987 Greatest (time series with concurrent comparison) Fair 48 U.S. states (MA, NE excluded)	Age: All Position: Not stated Vehicles: Not stated Fines: Not stated Effective Dates: Varied Comparison: Primary vs secondary law states	All motor vehicle occupants in U.S. 48 states	Fatalities per 100 million VMTs	NA	Percent change in rate of fatalities per VMT: Primary Law: -17% ($p<.01$) Secondary Law: -3.1% (N.S.)	-13.9%	0-3 years
Winnicki 1995 Appendix Update of Hoxie 1987 [3] 1975-1994 Greatest (time series with concurrent comparison) Fair [based on Hoxie 1987] 50 U.S. states	Age: Not stated Position: Front Vehicles: Passenger Fines: Not stated Effective Dates: Varied [based on Hoxie 1987] Comparison: Primary vs secondary law states	Front seat motor vehicle occupants in U.S. 50 states	Fatalities	NA	Percent change in rate of fatalities (difference between primary and secondary law states): -7.7% ($p=0.0001$)	-7.7%	0-10 years

Appendix Continued

Author, 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[a]	Follow-up time[b]
Houston 1995 [4] 1967-1991 Greatest (time series with concurrent comparison) Fair 50 U.S. states	Age: All Position: Front Vehicles: Not stated Fines: Not stated Effective Dates: Varied Comparison: Primary vs secondary law states	All motor vehicle occupants in U.S. 50 states	Fatalities per billion vehicle miles traveled (bVMT)	NA	Change in number of fatalities per bVMT: Primary laws: -3.616 (p<.001), or 3.616 fewer deaths per bVMT compared with no law Secondary laws: -4.252 (p<.001), or 4.252 fewer deaths per bVMT compared with no law	NA[c]	0-7 years
Houston 1996 [5] 1975-1991 Greatest (time series with concurrent comparison) Fair 50 U.S. states	Age: All Position: Front Vehicles: Not stated Fines: Not stated Effective Dates: Varied Comparison: Primary vs secondary law states	All motor vehicle occupants in U.S. 50 states	Fatalities per bVMT	NA	Change in number of fatalities per bVMT: Primary laws: -0.639 (p<.001), or 0.6388 fewer deaths per bVMT compared with no law Secondary laws: -0.002 (N.S.), or .0023 fewer deaths per bVMT compared with no law	NA[c]	0-7 years

[a] Percent change
[b] Period following passage of primary enforcement law
[c] Percent change could not be calculated from the data provided

Abbreviations: bVMT, billion vehicle miles traveled; VMT, vehicle miles traveled

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Appendix 2: Studies Measuring the Incremental Effect of Primary Enforcement Laws Relative to Secondary Enforcement Laws on Safety Belt Use

Author, 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[a]	Follow-up time[b]
Campbell 1988 [1] 1985-1987 Least (cross-sectional) Fair 20 U.S. states (Primary: CT, HI, IL, IA, NM, NY, NC, TX; Secondary: CA, ID, LA, MD, MA, MI, NE, NJ, OH, UT, WA, and Washington, DC)	Age: All Position: Front Vehicles: Passenger Fines: Varied Effective Dates: Varied Comparison: Primary vs secondary law states	Front seat motor vehicle occupants in 20 U.S. states 20 states	Observed safety belt use	NA	Primary States: Intercept = 44.5% belt use (p<.01) Secondary States: Intercept = 31.9% belt use (p<.01)	+12.6%	NA
Ulmer 1995 [2] 1986-1993 Moderate (time series) Fair Six communities in California (Bakersfield, Fresno, Monterey, Riverside, Salinas, San Bernardino)	Age: All Position: Front Vehicles: Passenger cars (taxi, 6000+ lb trucks, police, postal exempt) Fines: $20-$50 Law went into effect: 1-1-93 Comparison: Change from secondary to primary enforcement within same state	Drivers in six communities in California Not reported	Observed safety belt use	Secondary Law: 58.0%	Primary Law: 76.2%	+18.2%	7 months
Preusser 1997 [3] 1992-1996 Moderate (time series) Fair Five communities in Louisiana (Baton Rouge, Lake Charles, Monroe, Shreveport, St. Tammany Parish)	Age: All Position: Front Vehicles: Passenger cars, light trucks, vans Fines: $25-$50 Effective Date: 11-1-95 Comparison: Change from secondary to primary enforcement within same state	Front seat motor vehicle occupants in five communities in Louisiana N = 45,662 observations	Observed safety belt use	Secondary Law: 51.9%	Primary Law: 66.0%	+14.1%	6 months

Appendix Continued

Author, 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[a]	Follow-up time[b]
Lange 1998 [4] 1991-1995 Moderate (time series) Fair Two communities in California (Oceanside, Salinas)	Age: All Position: Front Vehicles: Not stated Fines: Not stated Law went into effect: 1-1-93 Comparison: Change from secondary to primary enforcement within same state	Drivers in California N=18,469	Observed safety belt use	Secondary Law (95% CI): 73.0% (71.9, 74.1)	Primary Law (95% CI): 95.6% (95.2, 96.0)	+22.6%	2.5 years
Solomon 2000 [5] 1993-1998 Moderate (time series) Fair MD, OK, Washington, DC	Age: All Position: Front Vehicles: Varied Fines: MD $25 unchanged; OK lowered to $20; DC increased to $50 + 2 points on license. Law went into effect: MD 10-1-97 OK 11-1-97 DC 10-9-97 Comparison: Change from secondary to primary enforcement within same state	Front seat motor vehicle occupants N=3707 (OK) N=4945 (MD) N=unknown (DC)	Observed safety belt use	Secondary Law: MD 71% OK 47% DC 66%	Primary Law: MD 83% OK 56% DC 80%	+12%	9-10 months
Winnicki 1995 [6] 1983-1994 Greatest (time series with concurrent comparison) Fair 50 U.S. states	Age: All Position: Front Vehicles: Varied Fines: Varied Law went into effect: Various dates Comparison: Primary vs secondary law states	Fatally injured occupants of motor vehicle crashes in U.S. 50 states	Police-reported safety belt use	NA	Incremental increase in safety belt use in primary vs secondary law states (percent change estimated from regression model) 14.4% (p=0.0001)	NA[c]	0-10 years

Appendix Continued

Author, 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[a]	Follow-up time[b]
Fielding 1992 [7] 1988-1989 Least (cross-sectional) Fair 50 U.S. states	Age: All Position: Front Vehicles: Not stated Fines: Not stated Law went into effect: Various dates Comparison: Primary vs secondary law states	Volunteer health profile participants in U.S. whose employers belonged to Johnson and Johnson Health Management N=17,830	Self-reported safety belt use	NA	Primary Law: 78% Secondary Law: 77%	+1%	NA
Escobedo 1992 [8] 1984-1989 Greatest (time series with concurrent comparison) Fair 12 U.S. states (Primary: NC; Secondary: CA, ID, IL, IN, MN, MO, OH, SC, TN, UT, WI)	Age: All Position: Front Vehicles: Not stated Fines: Not stated Law went into effect: NC 10-85 Comparison: Primary vs secondary law states	U.S. residents age 18 and over with telephones N=~100,000	Self-reported safety belt use	Primary Law pre: 21% Secondary Law pre: 22%	Behavioral Risk Factor Surveillance System (BRFSS) "Always use": Primary Law post: 70% Secondary Law post: 49%	+22%	3 years

[a] Percentage point difference
[b] Period following passage of primary enforcement law.
[c] Percent change could not be calculated from the data provided

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