

New study examines child death rates in motor vehicle crashes by state

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Table II. State variation of key predictors for fatal crashes involving a child passenger, 2010-2014

States	No restraint use/misuse (%)	On rural road (%)	Vehicle type van (%)	On state highway (%)	Speed limit 65-80 mph (%)	Red light camera policy
Midwest	21	71	20	27	25	—
Illinois	22	45	21	29	11	Limited
Indiana	19	72	27	29	15	No law
Iowa	24	71	33	11	20	No law
Kansas	25	77	15	14	43	No law
Michigan	9	54	21	24	12	No law
Minnesota	21	74	19	28	17	No law
Missouri	20	62	13	49	19	Limited
Nebraska	34	86	15	15	41	No law
North Dakota	25	93	22	24	47	No law
Ohio	14	62	17	34	9	Limited
South Dakota	30	87	13	28	61	No law
Wisconsin	10	68	25	41	10	Prohibited
Northeast	11	50	18	44	11	—
Connecticut	10	20	11	39	15	No law
Maine	5	100	31	50	0	Prohibited
Massachusetts	13	17	25	36	23	No law
New Hampshire	2	50	15	53	10	Prohibited
New Jersey	13	18	20	26	14	Prohibited
New York	11	72	21	33	14	Limited
Pennsylvania	15	59	20	58	7	Limited
Rhode Island	17	17	6	56	0	Permitted
Vermont	18	100	11	46	14	No law
South	23	63	11	37	20	—
Alabama	33	64	9	26	23	Limited
Arkansas	17	83	9	43	20	Prohibited
Delaware	33	58	6	67	6	Permitted
Florida	16	39	15	30	20	Permitted
Georgia	23	48	13	38	17	Permitted
Kentucky	16	77	12	57	12	No law
Louisiana	32	51	8	51	13	Limited
Maryland	15	40	20	49	8	Permitted
Mississippi	38	81	5	29	32	Prohibited
North Carolina	15	71	14	30	12	Limited
Oklahoma	23	66	8	30	46	No law
South Carolina	19	79	13	40	18	Prohibited
Tennessee	21	53	12	32	13	Permitted
Texas	21	55	7	20	41	Limited
Virginia	26	66	17	22	14	Limited
West Virginia	21	67	11	30	24	Prohibited
West	22	63	10	32	37	—
Alaska	14	62	0	76	19	No law
Arizona	24	41	14	13	42	Permitted
California	13	46	14	27	32	Permitted
Colorado	26	50	11	22	36	Permitted
Hawaii	20	50	4	84	0	No law
Idaho	23	75	14	20	43	No law
Montana	30	92	8	21	73	Prohibited
Nevada	23	45	14	25	41	Prohibited
New Mexico	32	76	14	18	46	Limited
Oregon	13	77	12	27	9	Permitted
Utah	23	51	8	36	38	No law
Washington	5	59	14	33	17	Limited
Wyoming	37	89	9	16	80	No law
US Overall	20	62	14	35	24	—

New research finds that an estimated 1,100 pediatric deaths could be averted over five years with an absolute 10 percent improvement in child restraint use. Credit: The *Journal of Pediatrics*

Unintentional injury is the leading cause of pediatric death in the U.S. and motor vehicle crashes (MVCs) are the most common cause of injury. A new paper published in the *Journal of Pediatrics* by researchers at Center for Surgery and Public Health (CSPH) at Brigham and Women's Hospital (BWH) and UT Southwestern Medical Center in Dallas, is the first to examine state-level factors contributing to variation in pediatric mortality in motor vehicle crashes and to identify trends across states.

On average across all states, researchers found that 20 percent of children involved in a fatal [crash](#) were unrestrained or inappropriately restrained at the time of the crash. Thirteen percent were inappropriately seated in the front seat, and nearly 9 percent of drivers transporting a child passenger were under the influence of alcohol. The study's authors estimate that a 10 percent absolute improvement in child restraint use—decreasing the average number of unrestrained or inappropriately restrained children from 20 percent to 10 percent nationally—would avert approximately 232 pediatric deaths per year, or more than 1,100 over five years. These findings highlight the importance of child restraint use and reinforce guidelines on child restraints published by the American Academy of Pediatrics (AAP) in 2011.

"In order to prevent children from being killed in [motor vehicle crashes](#), we must understand the effects of state-level regulations, their implementation and enforcement," said Lindsey Wolf, MD, MPH,

general surgery resident at BWH, research fellow at CSPH and lead author of the study. "Since laws governing child traffic safety are made at the state level, we formulated a study design that would produce state-by-state geographic results, which could easily be utilized by policy makers aiming to reduce pediatric mortality and save children's lives in their states."

The authors found substantial state-level variation, and concluded overall that the percentage of children who were unrestrained or inappropriately restrained was a leading predictor of mortality. The percentage of children involved in a fatal crash who were unrestrained or inappropriately restrained varied from 2 percent in New Hampshire to 38 percent in Mississippi.

Crashes were most likely to occur on state highways (35 percent) and on roads classified as rural by the Federal Highway Authority (62 percent). Characteristics of the crashes also varied: the percentage of those that occurred on a rural road varied from 17 percent in Massachusetts and Rhode Island to 100 percent in Maine and Vermont; the percentage of those that occurred on state highways varied from 11 percent in Iowa to 84 percent in Hawaii; and the percentage of those that occurred on a road with a speed limit 65 to 80 miles per hour varied from 0 percent in Hawaii, Maine, and Rhode Island to 80 percent in Wyoming.

The number of fatal crashes over 2010-2014 ranged from 18 in Rhode Island to 2,017 in Texas, while the number of deaths ranged from 3 in Rhode Island to 346 in Texas. Age-adjusted, mean MVC-related pediatric mortality per 100,000 children varied from 0.25 in Massachusetts to 3.23 in Mississippi. The percentage of children that died of those involved in a fatal crash varied from 8 percent in New Hampshire to 30 percent in Nebraska.

The first-of-its-kind analysis included data from 18,116 children, ages

15 and younger, riding in a passenger vehicle involved in a fatal crash occurring from 2010-2014, as reported in the Fatality Analysis Reporting System (FARS) dataset. FARS is a nationwide census providing publicly-available data on fatalities associated with MVCs, compiled from various documents in each state, including police accident reports, death certificates, state vehicle registration files, medical examiner reports, state driver licensing files, state highway department data, emergency medical service reports and vital statistics. These data were used in conjunction with annual U.S. Census data to create population size estimates by age, state and region, and the percentage of households with a vehicle, in examining two outcomes: state-based, age-adjusted, mean MVC-related pediatric mortality per 100,000 children; and percentage of children involved in a fatal crash who died ("[fatal crashes](#)" were defined as crashes that occurred on a public road and resulted in at least one death, adult or pediatric, within 30 days). Both of these outcomes were calculated by region (Midwest, Northeast, South, West) and nationally.

An extensive list of factors potentially affecting MVC-related pediatric mortality were examined, including restraint use, road type, vehicle type, speed limit, red light camera policy and more. In order to understand the effects of individual factors on the desired outcomes, the study's authors leveraged an ecological study design, first employing multivariable linear regression to identify state characteristics associated with each outcome.

"The American Academy of Pediatrics has issued clear guidelines regarding child restraints and other factors in order to save children's lives in the event of motor vehicle crashes, and many [states](#) have implemented them in part, but no state has implemented them fully," said Faisal Qureshi, MD, MBA, associate professor of surgery at UT Southwestern Medical Center, and senior author of the study. "The significant state-level variation evident in our findings emphasizes the need for close collaboration between the injury prevention community

and those enacting and enforcing legislation, and suggests the potential for a federal intervention in the area of child traffic safety."

The authors note that further research is required to understand how factors like vehicle type, roadway characteristics, speed limits, and [red light camera](#) use may contribute to the overall risk of death.

Provided by Brigham and Women's Hospital

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