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Child Passenger Safety Laws in the United States, 1978–2010: Policy Diffusion in the Absence of Strong Federal Intervention

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Abstract

This article examines the diffusion of U.S. state child passenger safety laws, analyzing over-time changes and inter-state differences in all identifiable features of laws that plausibly influence crash-related morbidity and mortality. The observed trend shows many states' continuing efforts to update their laws to be consistent with latest motor vehicle safety recommendations, with each state modifying their laws on average 6 times over the 30-year period. However, there has been a considerable time lag in knowledge diffusion and policy adoption. Even though empirical evidence supporting the protective effect of child restraint devices was available in the early 1970s, laws requiring their use were not adopted by all 50 states until 1986. For laws requiring minors to be seated in rear seats, the first state law adoption did not occur until two decades after the evidence became publicly available. As of 2010, only 12 states explicitly required the use of booster seats, 9 for infant seats and 6 for toddler seats. There is also great variation among states in defining the child population to be covered by the laws, the vehicle operators subject to compliance, and the penalties resulting from non-compliance. Some states cover only up to 4-year-olds while others cover children up to age 17. As of 2010, states have as many as 14 exemptions, such as those for non-residents, non-parents, commercial vehicles, large vehicles, or vehicles without seatbelts. Factors such as the complexity of the state of the science, the changing nature of guidelines (from age to height/weight-related criteria), and the absence of coordinated federal actions are potential explanations for the observed patterns. The resulting uneven policy landscape among states suggests a strong need for improved communication among state legislators, public health researchers, advocates and concerned citizen groups to promote more efficient and effective policymaking.

Keywords

Child passenger safety law; child restraint; seat belt law; public health law; traffic safety; policy diffusion; United States

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Introduction

In the U.S., nearly 250,000 children are injured every year in car crashes, and approximately 2,000 die from their injuries. (NHTSA, 2011) Moreover, the child passenger fatality rate in the U.S. is at least double that of other comparable wealthy nations, including Sweden, Japan, U.K., Italy and Norway. (OECD, 2004) Most of these fatalities and injuries are preventable. (Winston, Kallan, Elliott, Xie, & Durbin, 2007) Studies have demonstrated that the proper use and placement of child restraint devices substantially reduces harm to child passengers in vehicle crashes. (Durbin, Chen, Smith, Elliott, & Winston, 2005; Valent, McGwin Jr., Hardin, Johnston, & Rue III, 2002; Zaloshnja, Miller, & Hendrie, 2007)

In the late 1970s, the U.S. public's increasing awareness of the high rates of morbidity and mortality for child passengers resulted in rapid proliferation of state laws on the issue. Between 1977 and 1985, all 50 states adopted one or more laws aimed at reducing harm to infants and child passengers by requiring the use of some sort of child restraint device. However, subsequent scientific findings showed the need for a more concerted effort to ensure proper seating position and restraint device usage (P. Agran, Castillo, & Winn, 1990; P. F. Agran, Dunkle, & Winn, 1985; Bull, Stroup, & Gerhart, 1988; Carlsson, Norin, & Ysander, 1991; Kahane, 1986; Roberts & Turner, 1984; Ross & Gloyns, 1986; Sprigg, 1985; Teret, Jones, Williams, & Wells, 1986).

Beginning in the 1990s, National Highway Traffic Safety Association (NHTSA), as well as professional associations like American Academy of Pediatrics (AAP), have developed child passenger safety standards and guidelines that cover a wider range of child passenger safety issues and better protect children from injuries. Among other things, they emphasized the importance of three types of safety practices in protecting child passengers: (1) device-based restraints that are tailored to the age/size of individual child passengers; (2) rear seating, and; (3) seatbelt wearing of minors who have outgrown child restraint devices but are still in need of supervision to comply with seatbelt requirements. However, the federal government's direct intervention to promote enactment of child restraint laws has been limited to providing modest financial incentives (Richardson & Houston, 2009) U.S. Congress would not likely enact federal law that regulates the behavior of vehicle operators in all 50 states. While Congress may have power to legislate such law under the Commerce Clause, it does not have constitutional power to "commandeer… state legislative or executive official" to enforce federal law, *Printz v. U.S.*, 521 U.S. 898 (1997). The federal government, however, can encourage or pressure states with funding or grants. The recent Moving Ahead for Progress in the 21st Century Act (MAP-21) is one of such examples, where the federal government continues its effort to provide grants to states that encourage and enforce the public's proper use of child restraints. But the monetary amount involved is relatively small and there have not been any penalties or diversionary tools such as conditioning the provision of the existing federal funding on a state's passage of child passenger safety laws.

In the absence of a strong federal intervention, the 50 states' laws on child passenger safety largely vary in their features, which provides a valuable opportunity to evaluate which part of the existing evidence was codified as a statutory requirement and whether some aspects were diffused more widely or rapidly than others. The aim of this study is to utilize this opportunity by conducting a systematic analysis of child passenger safety laws across 50 states in the U.S. and examining the possibilities and limits of public health policy diffusion.

In the 1960s, Everett Rogers introduced the idea of diffusion of innovation (Rogers, 1962) Political scientists have since conducted numerous empirical studies examining policy diffusion across states and theorizing new diffusion trends (Green, Ottoson, García, & Robert, 2009; Meseguer & Gilardi, 2009; Shipan & Volden, 2012). Regarding child

passenger safety, Teret's 50-state analysis of the scope of child restraint requirements in 1986 and Winston's 50-state evaluation of booster seat laws in 2007 are the main two studies exploring the variation in state child passenger safety laws that we have identified (Teret et al., 1986; Winston et al., 2007). We did not locate any previous research comparing the diffusion of multiple child passenger safety laws or examining state-to-state variation of such laws over time.

The U.S. child restraint laws provide a useful example of policy diffusion for the following reasons: (1) the problem is severe, with children accounting for 21% of traffic fatalities worldwide (WHO, 2008) and motor vehicle crashes being the leading cause of death for children under 14 in the U.S. (NHTSA, 2010); (2) the policy effect is highly visible—empirical evidence shows that, if correctly installed and used, child restraints reduce deaths among child passengers by 70–80% (Rice & Anderson, 2009; Richelderfer, 1976) and that mandatory child restraint laws and their enforcement increase the use of such devices (Winston et al., 2007); (3) with the exception of limited federal funding incentives, it has been largely up to each state to legislate and enforce laws regulating vehicle operators' child passenger safety behavior (Richardson & Houston, 2009); and (4) the continuing evolution of child passenger safety science and technology has presented state policymakers repeatedly with new knowledge that required the existing law to be changed, thus making this policy domain particularly suitable for investigating the relationship between changes in knowledge of best practices and state adoption of such knowledge.

Methods

We conceptualized this study with the purpose of documenting the evolution of three major categories of state laws and their features directly aimed at changing vehicle operators' behaviors to reduce the incidence and severity of harms to children in motor vehicle crashes. This study covers all 50 states in the U.S. over the period of 1978 until 2010. In determining when the law came into existence, we used the effective date, rather than the date of enactment.

For the purposes of this study, we defined "children" as those belonging to the age group 0–16 and included the three types of laws that have in the past been recommended by AAP or CDC Task Force on Community Preventive Services (Task Force), namely laws requiring the use of child restraints, seat belt laws targeting minor passengers and laws mandating child passengers to be in rear seats (AAP, 1996, 2002; Services, 2001) We measured and coded every identifiable substantive feature of the laws, including who needs to comply, what devices should be used, and how to use such devices. We also measured features of the laws associated with enforcement, including the amount of penalties and enforcement priority. The features we coded and the variables we used are discussed in the results section.

In order to investigate the child passenger safety laws of 50 states, the research team conducted a multi-source-based survey of state laws enacted between 1970 and 2010. Primarily using the current state statute databases in Westlaw (a U.S. proprietary online legal database), the research began with the then most up-to-date versions of the child passenger safety statutes. The following search phrase was used: "child! infant! baby youth / 20 restrain! seat! belt! booster passenger." We obtained the citations for prior versions of the statutes through Westlaw historical notes, and retrieved the full texts of those previous versions by utilizing additional online legal databases such as Westlaw, LexisNexis, and HeinOnline, and contacting law school libraries and state congressional libraries. For the statutes that had existed at some point during the 40-year period but were repealed or recodified in a different place in the statutory code, we used the same search phrases in the

Westlaw historical state statute databases. As the final process for ensuring the reliable capture of the earliest relevant laws, we used the session laws database on HeinOnline.

Following the first round of data collection, supervising researchers, who were licensed attorneys, conducted an initial review to define a list of variables for which each law would be coded. Based on the list, a protocol was developed to code the legal text into quantifiable data. Coding was conducted using a Google.doc web form, which guided coders through a series of coding questions that elicited information about the features of the law. This interface – which integrated the codebook and the data input sheet into an online questionnaire format –facilitated simultaneous coding at multiple sites. In addition, its structured and path-dependent nature seemed to increase the accuracy of coding by eliminating human error and reducing fatigue involved in inputting data into spreadsheets directly.

We periodically reviewed coding results and compared the data to the initial review summary chart and original legal texts. In addition, we compared the coding results to the law summary produced by NHTSA (Decina, Lococo, Ashburn, Hall, & Rose, 2008) and Insurance Institute for Highway Safety, a U.S. non-profit research organization funded by auto insurers. (IIHS, 2011) We discussed and resolved any inaccuracies and inconsistencies in team discussions with coders. When the data were updated in summer of 2011, we created a Microsoft Access database to catalogue the legal texts and to provide a query-able resource. To assess inter-coder reliability, an independent coder, masked to the previous coders' results, coded a randomly selected set of laws representing 15% of the total data. Rates of divergence for each variable were recorded as well as overall rates of divergence for all variables. Results showed high inter-rater reliability with rates of divergence no greater than 3% (Cohens Kappa=95%). Most divergences occurred in the coding of effective dates.

Results

Table 1 uses child restraint law as an example and presents the framework that we developed to categorize different aspects of the law and contains a summary of variables that were deduced from this framework. Our coding process revealed extensive variation among states in the way the laws were written, leading to 194 variables for all types of laws we examined (87 for device law, 55 for rear seating law, and 52 for minor seatbelt law). These variables can be collapsed into five categories for each law: which children are protected under the law; what action should be taken in order to comply with the law; how the law is enforced; what the penalties are for non-compliance; and who should comply with the law/who is exempted from doing so. Similar categorical breakdown was observed for rear seating law and minor seatbelt law.

The nature of the requirements in these categories has changed over time. For instance, in defining the child population covered by laws, all states initially only used age ranges. As researchers found that a child's weight and height were more accurate measures of children's size, states have begun to incorporate them into the laws. While the validity of using heights and weights as child passenger categorization criteria has recently been questioned (Zonfrillo, Elliott, Flannagan, & Durbin, 2011), the prevailing recommendation during the study period was to incorporate such distinctions into laws. (AAP, 2002; Arbogast, Moll, Morris, & Winston, 2001; NHTSA, 2000)

Likewise, the type of restraint device that operators are required to use has evolved from a generic "child restraint device" to multiple specific devices for different age/weight/height sub-groups of children (i.e. a rear-facing infant seat, forward-facing child restraint (FFCR)

and booster seat). In addition, states have increasingly referenced safety standards and appropriate installation methods.

Figure 1 describes the changing trend in the number of states with each type of child passenger safety laws from 1978 until 2010. The dark straight line displays the rapid proliferation of the earliest version of child-restraint laws in the late 1970s and early 1980s. Rear seating laws and minor seatbelt laws (represented as the thin double line and the light stitched line in Figure 1) were adopted far more slowly. As of 2010, 35 states required seatbelt use for minor passengers and only 14 states required rear seating of child passengers.

Since this initial wave of legislation, states have continuously refined their policies in light of emerging safety research. The dark stitched line provides an example of one such effort, representing the number of states that switched from a simple age-based categorization to an age, weight and/or height-based distinction, as recommended by the scientific community during our study period as a better way of ensuring protection of child passengers. (Ogden, Carroll, Curtin, Lamb, & Flegal, 2010; Pollack, Xie, Arbogast, & Durbin, 2008; Trifiletti et al., 2006) While the number of states using weight and/or height-based criteria has steadily increased since 1994, it plateaued at 39 in 2009 and remained so in 2010.

Another example of states' effort to incorporate new scientific findings has been to specifically designate the use of an infant, FFCR or booster seat for a child based on his age and/or size. The early version of child restraint laws had simply required that a child passenger under certain age should be restrained, without specifying which type device should be used. The dotted line represents the number of states that explicitly mandate the use of a booster seat for a child passenger over the age of 4, 40 lbs and/or 57 inches. While the number of states that merely require child passengers of a booster seat age/size to wear any child restraints has increased to 34 in 2010 (shown in the medium dark grey line), those explicitly mandating the use of booster seats are much fewer in number (13 in 2009, 12 in 2010). Likewise, while all 50 states have required the use of child restraints for passengers under the age of 2 since 1986, only 9 states explicitly require the use of infant seats.

Figure 2 shows the number of states engaging in legislative activities relating to child passenger safety laws in a given year. While there has been consistent legislative activity during the study period (1978–2010), the trend line graphs generally have a U shape, with the initial surge of legislative moments occurring from 1982 until 1984, and a second peak following around 2004 and 2005. The first wave was mostly related to creating laws that required the use of non-specific "child restraint devices" for all children under a certain age. The second wave in legislative changes was the result of the states' attempt to add provisions relating to rear seating and minor seat belt use, and specifying required devices by age, weight and/or height. On average, states modified their child passenger safety laws six times over the 30-year period.

Interestingly, while certain states enacted one type of child passenger safety laws earlier than others, these same states were not forerunners for other types of the laws. Table 2 shows the first ten states that adopted each type of child passenger safety laws. Apart from New Mexico and Wisconsin, no other states stand out as consistent early adopters. In addition, among the nine states that explicitly required the use of booster, infant and/or FFCR seats in 2010, only four of them (Washington, Colorado, South Carolina and Tennessee) enacted rear seating and minor seatbelt laws. None of them were ahead of the curve in doing so..

Another feature of the evolution of child passenger safety laws is the variety and complexity of exemptions. As shown in Table 3, 14 exemptions were identified for 50 states' child

restraint device laws (very similar exemptions also existed for rear seating laws and minor seat belt laws). As of 2010, Oregon and Rhode Island had none of the 14 exemptions, whereas Arizona, Hawaii, Massachusetts, Montana and Ohio had the largest number of exemptions (approximately 7). The latter group of states generally limited the application of the device law to non-commercial passenger vehicles. They also enforced the laws only for those driving on highways (except Arizona) and exempted any vehicle operator whose vehicle had insufficient space to install devices for all of child passengers (except Ohio).

Penalties for violation of child passenger safety laws consist of fines, license points and/or insurance points. Sometimes the laws required mandatory attendance of traffic safety education. The fine amount varied from $0 (i.e. no fine) to $2000, often subject to judicial sentencing discretion. Taking the median dollar amount in case the laws set a range, the average amount of fine for the initial offense as of 2010 was $46.51 and the same for the second offense was $65.31. In some states, these fines could be waived if one could later produce a proof of purchase of a child restraint device. Some states allowed substituting payment of the fine for attendance of traffic safety education courses.

Discussion

Our study identified and analyzed all of the major substantive features of multiple child passenger safety laws, thus marking a distinctive approach from the existing evaluations that define policy as merely dichotomous measures of a single law's presence or absence. This detailed approach allowed us to examine the change in 50 states' adoption pattern of specific features of laws, such as height/weight distinction in defining child population or explicitly mandating the use of infant, FFCR, or booster seats. The analysis reveals the complexity of the diffusion of knowledge about motor vehicle safety and the states' decision to adopt such knowledge into their policies, especially when there is no strong federal requirement or incentive for them to do so.

One of the notable aspects of child restraint laws is the long time lag between the publication of new scientific knowledge and its incorporation into state legislation. The first child restraint model for crash protection was developed in 1968, and NHTSA promulgated the first child restraint safety specification for manufacturers in 1970. Pediatricians and other experts called for the government's attention to the issue as early as in 1971. (W. F. Rowley, Jr., E. Lariviere, & C. W. Dietrich, 1971; W. F. Rowley, E. Lariviere, & C. W. Dietrich, 1971; Shelness & Charles, 1975) Empirical research supporting the use of child restraint devices was published in a number of articles throughout the 1970s (Arnberg, 1978; Christophersen, 1977; Scherz, 1976; Williams & Zador, 1977) Yet, the first child restraint law was passed in Tennessee in 1978 and the adoption of device laws by all 50 states did not occur until 1986.

One possible explanation of the delay in the first wave may be that states were awaiting the evaluation of the law in the early adopter states, given that, as shown in Figure 1, a surge occurred soon after reports of the positive health outcome of child restraint law in the early adopter states (Tennessee and Rhode Island). (A. F. Williams & J. A. K. Wells, 1981; A. F. Williams & J. K. Wells, 1981) Alternatively, this surge may be related to NHTSA's revised child restraint safety standard for manufacturers that went into effect in 1981. The amended rule significantly strengthened the safety requirements for child restraints, mandated the 30 mph crash test and distinguished rear-facing and forward-facing directions based on children's size.

However, the delay in the second wave of legislative change cannot be explained in the same way. The change could have occurred as early as the mid-1990s when the technology

became more sophisticated to provide different types of device for children of different ages, heights and/or weights. In response to the increasing scientific evidence supporting the importance of using correct devices for child passengers, AAP issued a child safety seat guideline in 1996, where it recommended the use of infant seats for children under the age of 1 or 20 lbs, FFCR for children older than 1 and weighing 20–40 lbs and booster seats for those who have outgrown FFCR. (AAP, 1996) In addition, the Congress enacted the TEA-21 Act in 1997, which provided a 10–15 million grant over 2 years to states that required a child to be restrained in a proper device. However, as can be observed in Figure 1, the increase in the number of states incorporating weight/height distinction was marginal throughout the 1990s and the number of states explicitly mandating infant, FFCR or booster seats remained very low (fewer than 5). It was not until 2001 that the adoption rates of these laws picked up. The turning point began in the early 2000s, around the time CDC Task Force "strongly" recommended states to adopt laws mandating the use of age and size appropriate child restraints (Services, 2001), NHTSA and AAP guidelines were updated with similar emphasis (AAP, 2002; NHTSA, 2000), and NHTSA promulgated new regulation requiring passenger vehicles manufactured after September 2002 to be equipped with anchors and tethers for child restraint devices. However, exactly how these events precipitated this outcome is beyond the scope of this study.

When the state laws that do not designate a specific device and merely refer to a generic "child restraint" are included in the analysis (so long as the laws cover the age/weight/height group that is supposed to use each device type), a more rapid increase in the number of states with implicit booster seat laws (i.e. any child restraint device laws covering children who should use booster) can be observed around 2003, soon after the publication of articles reporting the relative paucity of booster seat use (Durbin, Kallan, & Winston, 2001; NHTSA, 2002; Ramsey, Simpson, & Rivara, 2000) and after the Congress enacted Anton's Law in 2002, which required NHTSA to establish booster seat safety standards. The number of booster seat laws that cover children up to 8 years old, 80 lbs or 57 inches picked up around 2006–2007, soon after the passage of the SAFETY-LU Act that established the $25 million grant for states with child restraint laws covering children up to eight years old, perhaps indicating the importance of federal government's monetary incentives to enable a nationwide state law change. However, even in such a case, the rate of increase fell far behind the first wave and the number of states explicitly requiring the use of a booster seat remained low throughout the period.

The lag time is particularly long for rear seating laws. The safety benefits of rear seating were reported by scientists as early as 1977. (Williams & Zador, 1977) After a series of reports on the danger of airbag-associated injuries to children riding in the front seat (CDC, 1995, 1996a, 1996b; Hollands, Winston, Stafford, & Shochat, 1996), NHTSA launched a campaign encouraging rear seating of child passengers in 1996. (Kindelberger & Starnes, 2003) AAP's updated guideline also emphasized the importance of rear seating. (AAP, 1996) Yet, only two states, Delaware and Rhode Island, responded in 1997. As of 2010, only 14 states require rear seating of child passengers.

In contrast, the number of states with 21-year minimum legal drinking age (MLDA) increased from 17 in 1984 to 50 in 1988, 4 years after Congress passed the National MLDA Act conditioning states' enactment of such law to the continued full provision of the highway funds. (Wagenaar, 1993) Similarly, the number of states with the law limiting the legal blood alcohol concentration to 0.08% increased from 19 in 2000 to 50 in 2006, 6 years after Congress passed an act tying each state's enactment of such laws to the continued provision of federal highway funds. (Sleet et al., 2011)

One possible explanation for the persistent time lag is differential legislative capacity among states. As Shipan and Volden pointed out, “about a dozen states do not pay their legislators any annual salary at all, beyond covering per diem expenses; some legislatures do not meet for more than a few months every year or two; and many do not hire extensive legislative staff. Such circumstances profoundly influence policy diffusion processes.” (Shipan & Volden, 2012) Poor legislative infrastructure could lead to a delay in investigating and discovering new policy innovation, and even after such discovery, a legislative backlog may result in a longer time for a bill to be submitted, accepted, debated, voted and signed into law.

An additional explanation for the slow adoption of some child passenger laws may be the absence of credible laws to emulate. Even if scientific evidence support the effectiveness of a policy, state legislators’ attention to the issue may not occur at a significant level or materialize into legislation until such laws have shown to be successful or at least come into existence in another state (Moynihan, 2008; Volden, 2006). Given that very few states adopted some of these laws (rear seating mandates, for instance), they presented very few models for emulation. As to the reasons for the large number of exemptions and wide state-to-state variation in providing such exemptions, there are several hypotheses to suggest. First, despite the media’s increasing attention to child passenger safety over the past decades, legislators may not be equipped with the most up-to-date information on technology or scientific research in this area, leading to confusion about what actions should be taken to better protect child passengers. Second, the observed differences may have been driven, at least in part, by lobbying and advocacy, where the power struggle among different stakeholders, such as device manufacturers, commercial vehicle operators and parents, may have led to wide variation in the direction of legislative developments. Third, the lack of nationwide authority and guidance may have further contributed to the state-level variations.

Limitations

As with all studies, this one has limitations. First, this study is limited to state statutes, thus not accounting for the potential impact of common laws, regulations, or non-law-based programs by sub-local governments or agencies. Second, despite extensive efforts to collect the full texts of all versions of the laws, there were some difficulties tracking down all features of state laws because some of them were not included in the same code. For instance, whether violations result in a penalty of insurance points was not provided in the text of the child passenger laws themselves but in other statutes or court rules. Thus, our results may miss some provisions of laws if they were spread across different parts of the code. Some laws could not be located using our sources and are thus absent from our data, including Connecticut’s pre-1985 infraction rules, Idaho’s infraction rule, and Florida’s court rules concerning insurance demerit points. Third, this study is limited to a descriptive analysis of states’ legislative action and does not include determinant analysis. Nor does it statistically test any specific theories of diffusion. These are important areas for future research. Fourth, while we use the term “child passenger safety law” to refer to the set of laws examined in this study, they do not constitute the complete universe of laws that aim to promote child passenger safety. Likewise, the major publications and federal interventions plotted on our Figures do not represent all events that may have influenced the legislative activities. Lastly, this study is based on law “on the books.” Further empirical evaluations of the effect of these laws “on the street” would need to account for numerous other factors like enforcement intensity, education programs, and engineering innovation improving passenger safety.

Conclusions

This study identified child passenger safety laws as a complex, multifaceted set of interrelated policy interventions that have seen innovative changes over the last 40 years. The results suggest that the development of specificity of the laws tended to coincide with changes in scientific knowledge about best practices. However, uptake of new laws and the revision of existing laws to reflect the latest policy-relevant knowledge have been far from up-to-date or uniform. The slow learning-based diffusion, complexity of the state of science, and lack of strong federal guidance could be hypothesized as contributing factors. Uneven policy diffusion suggests that communication channels between public health researchers and local legislators should be improved to promote efficient evidence-based policymaking.

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Research Highlights

1. We examined the adoption trend of three major child passenger safety laws of 50 states in the U.S. from 1978 to 2010.
2. The results show that diffusion of child passenger safety policies occurred even without strong federal intervention.
3. However, there is a long time lag between the publication of scientific knowledge and its incorporation into state laws.
4. There is wide state-to-state variation in defining who should comply, what action is required and what the penalties are.
5. Complexity of the science, changing guidelines, and the absence of coordinated federal action are potential explanations.

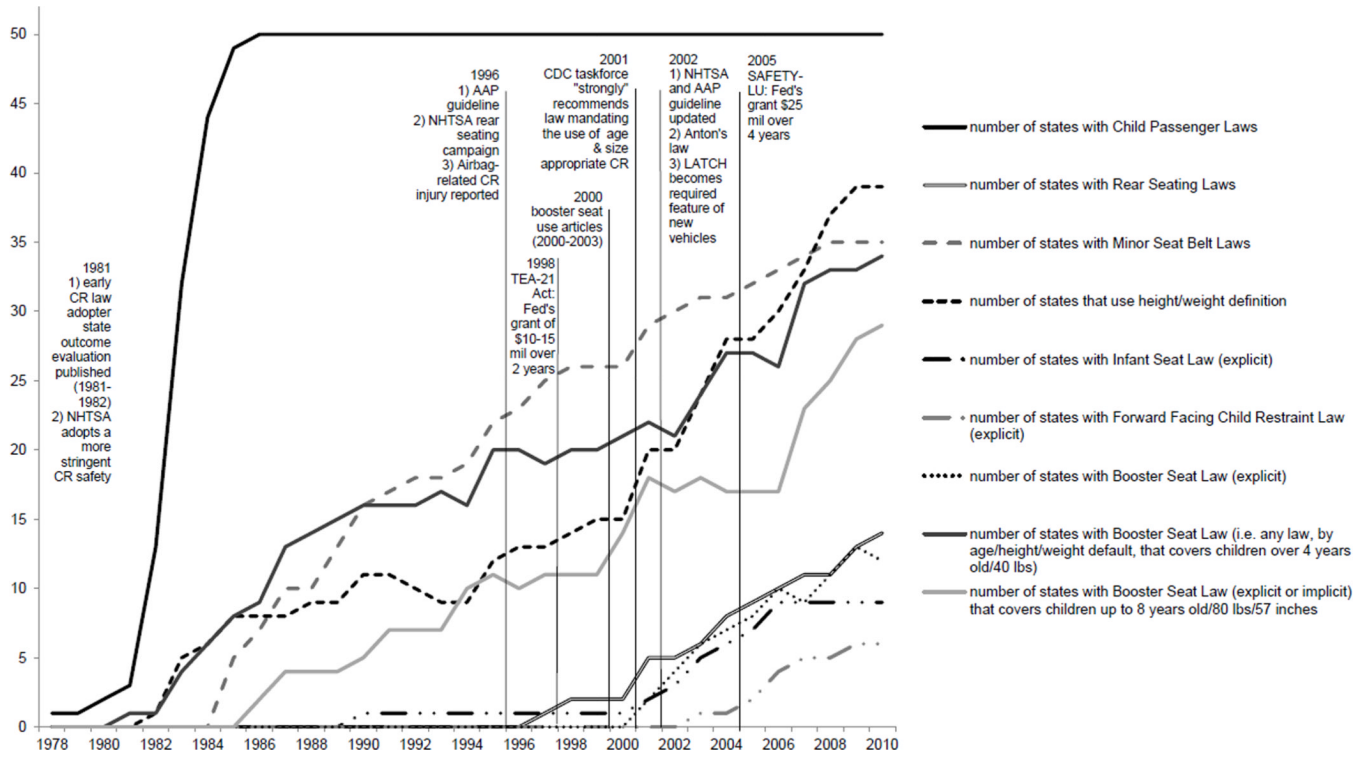

Figure 1.
U.S. States with Child Passenger Safety Laws in Effect: 1978–2010

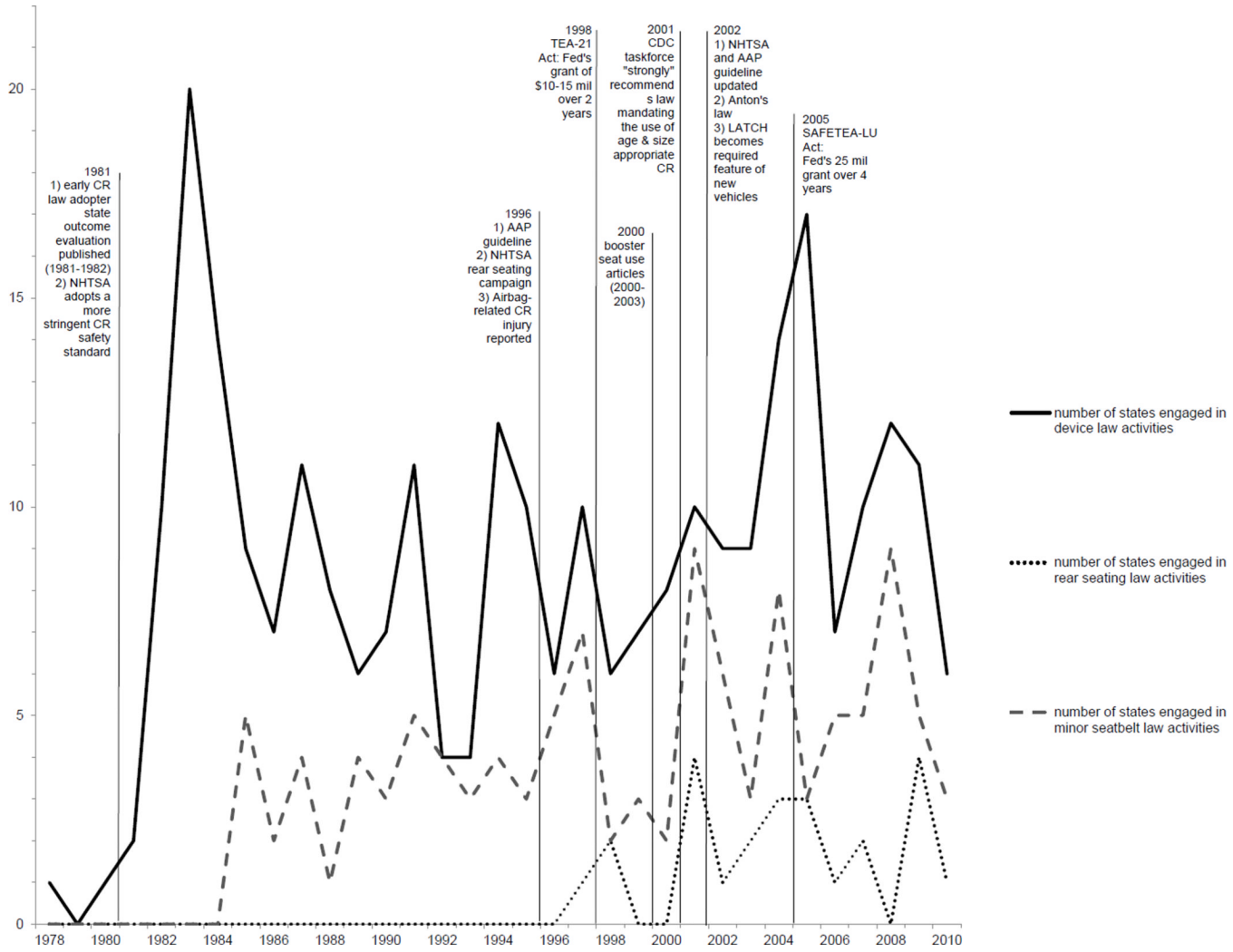

Figure 2.
U.S. States Engaged in Legislative Activities Relating to Child Passenger Safety Laws: 1978–2010

Table 1

Summary of Variables for Child Restraint Laws

Category	Sub-category	Description/Notes	Variables
Which children are protected under the law	Age of child [a]	The age range at which a child passenger is required to use a child restraint device/rear seat/seat belt	Minimum and maximum ages for infant seat, toddler seat, booster seat, and non-specified general child restraint (8 variables)
	Weight of child [a]	The weight range at which a child passenger is required to use a child restraint device/rear seat/seat belt	Minimum and maximum weights for infant seat, toddler seat, booster seat, and non-specified general child restraint (8 variables)
	Height of child [a]	The height range at which a child passenger is required to use a child restraint device/rear seat/seat belt	Minimum and maximum heights for infant seat, toddler seat, booster seat, and non-specified general child restraint (8 variables)
	Miscellaneous	Whether the law requires a child passenger to be restrained until the age AND height/weight requirements are met (as opposed to OR)	Yes/No binary variable for infant seat, toddler seat, booster seat, and non-specified general child restraint (4 variables)
What action should be taken in order to comply with the law	Type of restraint device required	Whether the law specifies a device type (such as a booster seat) depending on the child's age, weight and/or height	Yes/No binary variable for existence of explicit infant, toddler and booster seat laws, as well as implicit laws for each (6 variables)
	Quality of restraint device	Whether the law requires the operator to use only those devices that meet federal or state safety standards	Yes/no binary variable for infant seat, toddler seat, booster seat and general child restraint (4 variables)
	Method of installing and using a restraint device	Whether the law requires the operator to use devices in a manner consistent with physicians' and or scientists' recommendations (e.g. placing an infant seat in a rear-facing position)	Yes/no binary variable for infant seat (rear-facing), toddler seat (forward-facing) and booster seat (strapped with seatbelt) (3 variables)
	Seat belt substitution	Whether the law allows the operator to substitute a child restraint device with a seatbelt (usually when the child passenger at issue is above a certain age, weight and/or height limit).	min. age, max. age, min. weight, max. weight, min. height, max. height, whether the substitution is allowed after the age AND weight/ height requirements are met (7 variables)
How the law is enforced	Primary enforcement vs. secondary enforcement	Whether law enforcement officers can stop the vehicles solely based on noncompliance with child passenger safety laws or not	Yes/no binary variable for child restraint law (1 variable)
What the penalties are for non-compliance	Type of penalty	Whether there is a fine, license points, insurance points, or mandatory education requirement	min. fine, max. fine, min. license points, max. license points, min. insurance points, max. insurance points, existence of mandatory education for the violation (7 variables)
	Waiver	Whether there is a first-time waiver, a fee waiver for indigent populations, or a waiver for subsequent proof of restraint device purchase or education program attendance	existence of each waiver (3 variables)
Who should comply with the law and who is exempted from doing so	Exemptions	See Table	See Table 3 (23 variables)

[a] Some states combined two or more of the three categories in defining its target child group (e.g. "a child who is less than X years old and weighs less than Y is required to use a restraint device") or used either/or terms (e.g. "a child under the age of X or the height of Y is required to use a restraint device").

Table 2

The First Ten Adopter States for Each Type of Child Passenger Safety Laws

State	Any child restraint law	Explicit infant seat law	Explicit booster seat law	Rear seating law	Minor seatbelt law	Total
AK		1 (1990)				1
AL	9 (1982)	9 (2006)	10 (2006)			3
AR						0
AZ						0
CA				9 (2005)		1
CO		5 (2003)	6 (2003)			2
CT		7 (2005)			6 (1986)	2
DE	8 (1982)			2 (1998)		2
FL					7 (1986)	1
GA				7 (2004)		1
HI						0
IA		6 (2004)				1
ID						0
IL					2 (1985)	1
IN						0
KS	4 (1982)					1
KY	10 (1982)					1
LA			7 (2004)			1
MA	4 (1982)				8 (1987)	2
MD						0
ME						0
MI	4 (1982)					1
MN	4 (1982)					1
MO						0
MS						0
MT						0

State	Any child restraint law	Explicit infant seat law	Explicit booster seat law	Rear seating law	Minor seatbelt law	Total
NC						0
ND						0
NE						0
NH						0
NJ				5 (2001)	1 (1985)	2
NM		2 (2001)	8 (2005)	3 (2001)	2 (1985)	4
NV					2 (1985)	1
NY					2 (1985)	1
OH						0
OK						0
OR		10 (2007)	3 (2002)			2
PA			5 (2003)		9 (1987)	2
RI	2 (1980)			1 (1997)		2
SC			1 (2001)	3 (2001)		2
SD						0
TN	1 (1978)		1 (2001)	7 (2004)		3
TX						0
UT						0
VA						0
VT		4 (2003)				1
WA		3 (2002)*	4 (2002)			2
WI		8 (2006)	9 (2006)	10 (2006)	10 (1987)	4
WV	3 (1981)					1
WY				6 (2003)		1

*Washington's law explicitly requiring the use of a rear-facing infant seat was removed, effective June 1, 2007.

Table 3

State Child Restraint Device Laws: Exemptions

Category	Sub-category	Variables
Characteristics of a vehicle operator	Exempts non-state residents	Yes/no binary variable re: whether the law covers non-state residents; the same for state residents (2 variables)
	Exempts non-parent operators	Yes/no binary variable re: whether the law covers non-resident operators; the same for resident operators (2 variables)
	Exempts non-vehicle owners (rental vehicle operator)	Yes/no binary variable (1 variable)
Characteristics of a vehicle	Exempts vehicles not registered under the name of a child passenger's parent	Yes/no binary variable re: whether the law covers vehicles not registered under parents' name; the same for vehicles registered under parents' name (2 variables)
	Exempts commercial passenger vehicles (such as taxies, buses, day care center vehicles, vehicles for hire)	Yes/no binary variable (1 variable)
	Exempts non-passenger commercial vehicles (such as trucks, delivery vehicles)	Yes/no binary variable (1 variable)
	Exempts vehicles that are not designed to be operated on highways (such as motorcycles, electronic personal mobility vehicles, recreational vehicles)	Yes/no binary variable re: whether the law covers vehicles not designed to operate on highways; the same for those designed to operate on highways (2 variable)
	Exempts vehicles that were originally manufactured without seat belts	Yes/no binary variable re: whether the law covers vehicles manufactured without seatbelts; the same for those manufactured with seatbelts (2 variables)
	Exempts vehicles with capacity of more than X number of passengers	Yes/no binary variable re: whether the law covers vehicles with capacity of more than 6–8 passengers; the same for those with smaller capacity (2 variables)
Location of a vehicle (type of the road it is one)	Exempts vehicles that were not registered or being operated within the state at the time	Yes/no binary variable re: whether the law covers vehicles not registered/operated within the state; the same for those registered/operated within the state (2 variables)
	Exempts vehicles that were not being operated on highways at the time	Yes/no binary variable re: whether the law covers vehicles not on highways; the same for those on highways (2 variables)
Special circumstances that may exempt an operator or a child passenger	Exempts (i) emergency vehicles, (ii) vehicles that were transporting a child to obtain emergency care, or (iii) vehicle whose operator was in an emergency situation	Yes/no binary variable re: whether the law covers emergency vehicles/emergency situation; the same for those not in emergency situation (2 variables)
	Exempts children for whom a doctor or a commissioner decided that the use of a restraint device is impractical (often due to the children's disability)	Yes/no binary variable (1 variable)
	Exempts vehicle operators if more than one child was in a vehicle and there was not enough space/rear seats/seat belts to accommodate multiple child restraint devices (often, but not always, based upon the condition that the maximum number of those who could be seated in child restraint devices were seated in such devices)	Yes/no binary variable (1 variable)