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A novel scoring system and correlative analysis of the strength and effectiveness of nationwide high school cardiopulmonary resuscitation mandates: Insights from a high school CPR study

Aashish Katapadi, MD,[1] Avani Lakkireddy,[2] Sneha Korlakunta, BA,[3] Lasya Maganti,[2] Rachad Ghazal, MD,[1] Aditya Mansabdar MUDR,[1] Nicholas Pham, BS,[1] Danish Bawa, MD,[4] Adnan Ahmed, MD,[4] Anjali Baratham,[2] Nikhila Chelikam, MBBS, MSCR,[1] Douglas Darden, MD,[1] Ehtesham Shan, MD,[1] Jalaj Garg, MD,[5] Rajesh Kabra, MD, FHRS,[1] Rakesh Gopinathannair, MD, FHRS,[1] Donita Atkins, RN,[1] Cathie Biga, MSN, RN,[6] Kenneth A. Ellenbogen, MD, FHRS,[7] Mina K. Chung, MD, FHRS,[8] Richard Kovacs, MD,[9] Dhanunjaya Lakkireddy, MD, MBA[1]

ABSTRACT

BACKGROUND Numerous states have introduced cardiopulmonary resuscitation (CPR) training mandates for high school students and staff to prevent sudden cardiac death (SCD). However, the content and implementation of these mandates vary substantially. Furthermore, a comprehensive and objective assessment of these mandates and their impact is lacking.

OBJECTIVE We aimed to conduct a thorough evaluation of CPR training mandates across the United States.

METHODS We developed a novel scoring system based on proposed CPR standards, training and certification requirements, and legislative action to assess current mandates. This was used to rate the CPR mandates across all 50 states and the District of Columbia. Mandate scores were then compared with available real-world registry data as a surrogate for efficacy from 2018 to 2021.

RESULTS State CPR mandate scores ranged from 0 to 47, with a higher score indicating more robust mandates. The median and mean scores were 24 (interquartile range, 19.5–27) and 21.52 ± 8.61, respectively, with 35 being the highest score. Intraobserver variability was 0.986 (95% CI, 0.944–1.028; $P < .001$). The year of implementation did not influence the strength of the score ($R^2 = -0.173$; 95% CI, −0.447 to 0.131; $P = .262$). Correlation with SCD rate ($R^2 = -0.76$; 95% CI, −0.492 to 0.367; $P = .742$), bystander-initiated CPR ($R^2 = -0.006$; 95% CI, −0.437 to 0.427; $P = .978$), automated external defibrillator use ($R^2 = -0.125$; 95% CI, −0.528 to 0.324; $P = .590$), and cardiovascular death rate ($R^2 = -0.13$; 95% CI, −0.379 to 0.21; $P = .355$) failed to reach statistical significance.

CONCLUSION Modest scoring consistency highlights the need for robust, standardized CPR requirements to potentially mitigate SCD. This study lays the groundwork for evidence-informed policy development in this area.

KEYWORDS Automated external defibrillator; Cardiopulmonary resuscitation; High school; Legislation; Out-of-hospital cardiac arrest; Scoring; Students; Sudden cardiac death

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Introduction

It has long been known that bystander-initiated cardiopulmonary resuscitation (CPR) significantly improves outcomes for individuals experiencing out-of-hospital cardiac arrest (OHCA) and reduces sudden cardiac death (SCD). When CPR is initiated in the field, overall survival to hospital discharge increases

From the [1]Kansas City Heart Rhythm Institute, Overland Park, Kansas, [2]Barston School, Kansas City, Missouri, [3]Boston University, Boston, Massachusetts, [4]Division of Cardiology, HCA Midwest Health, Overland Park, Kansas, [5]Loma Linda University Health, Loma Linda, California, [6]Cardiovascular Management of Illinois, Darien, Illinois, [7]Virginia Commonwealth University, Richmond, Virginia, [8]Cleveland Clinic Foundation, Cleveland, Ohio, and [9]Indiana University, Indianapolis, Indiana.

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substantially from 9.1% to 29.0%.[1] Despite its proven effectiveness, only 40.2% of CPR is initiated by an available bystander, and only 2.4% of the population has received CPR training.[1–6] Additional obstacles, such as the inability to recognize arrest, lack of dispatcher assistance, and fear of tongue swallowing, often lead to blatantly incorrect attempts at CPR.[7–9] Recent high-profile cases have underscored the importance of CPR education, with studies suggesting that prior training boosts bystanders' confidence in performing CPR. Recognizing the potential impact of CPR training in high schools, the International Liaison Committee on Resuscitation recommended its incorporation into the high school curriculum in 2003. Consequently, CPR instruction in schools has become widespread.[10,11]

Within the United States, 43 states have implemented mandatory CPR training for high school graduation, with the earliest mandate dating back to 1984.[12] Many of these mandates align with guidelines from the American Heart Association (AHA) and the American Red Cross (ARC).[13,14] However, despite the widespread adoption of high school CPR mandates, there is significant variability in the implementation methods because of differences in state-level legislation. For instance, more than half of the states do not include education on automated external defibrillators (AEDs) in their mandates. A comprehensive overview of these mandates is lacking, and their effectiveness in reducing the incidence of SCD remains uncertain. Therefore, our study aimed to evaluate the impact of high school CPR mandates.

Methods

Study design

We used this study to build a novel scoring system to quantify the strength of state-specific high school CPR education mandates. We then used this system to assess mandates across all 50 US states and the District of Columbia and correlated the composite scores with available SCD-related data.

Scoring system

The scoring system assesses the adequacy of CPR education mandates on the basis of their theoretical impact and existing evidence. It includes 13 different categories evaluating CPR standards (Table 1). These categories were formulated as a response to observed deficits in each state's legislation and previous related literature. Most categories are scored from 0 to 5, although not all are scored consecutively, and a few are binary. The lack of consideration for any of these categories results in a score of 0. Categories for which the scoring assignment is not obvious are discussed further later. The system was devised by a panel of 8, consisting of 3 practicing physicians (1 electrophysiologist, 2 cardiologists in training), 2 physicians in training, and 3 high school students.

Abbreviations

AED: automated external defibrillator

AHA: American Heart Association

ARC: American Red Cross

CARES: Cardiac Arrest Registry to Enhance Survival

CDC: Centers for Disease Control and Prevention

CPR: cardiopulmonary resuscitation

OHCA: out-of-hospital cardiac arrest

SCD: sudden cardiac death

Mandate status

Current legislation surrounding high school CPR training mandates differs by state. Direct observation of legislative language revealed that high school CPR training may be "mandatory" or only "recommended." Some states provide funding and resources only for CPR training without specifying implementation methods. States that make CPR training mandatory have the highest potential for effective CPR and are subsequently scored higher.

Year implemented

Earlier implementation of the mandate provides time to create robust and potentially effective high school CPR training programs. The earliest reports of single-state experiences with early adoption of CPR training occurred in 2017, providing ample time for improvement if needed.[15–17] The existence of legislature at 5, 10, and >20 years scored consecutively higher. Implementation after 2023 scored the next lowest score, next to having no legislation at all.

Frequency and school grade

Studies have investigated the optimal timing and effectiveness of frequent CPR training, suggesting that shorter training intervals are the most effective.[18] Similar results are seen for high school students when training occurs in 3- and 6-month intervals.[19] High school students also appear to be the most enthusiastic about CPR training.[20–22] Accordingly, a training frequency in high school of more than every 6 months was the most effective and scored the highest. Many states lacked legislative language specifying the training frequency and scored lower.

Adult and/or child/infant CPR education

Adult and/or child/infant CPR training education is a binary score. Most high school CPR training is done for the adult population. Adding child/infant training is advantageous but optional, thus scoring only an extra point if present.

CPR/AED instructor certification

After training, CPR performance assessment continues to rely on observers and checklists. This contrasts with literature that suggests considerable variability and reduced accuracy with instructor assessments.[23–25] Stærk and coworkers[26] reported that certified basic life support instructors have poor CPR/AED skills and several educational deficits. Nevertheless, instructors must have a qualification demonstrating some form of competency to teach CPR, and certification was used. Accordingly, mandates that required instructor certification scored higher than those that did not.

Table 1 CPR scoring system[a]

Category	Points					
	0	1	2	3	4	5
Mandate status	No mandate available (bill introduced or failed or killed)			CPR/AED training resources are available for public and/or charter schools but no recommendation is made	CPR/AED training is recommended for all public and/or charter schools	CPR/AED training is mandatory for all public and/or charter schools
Year implemented	No bill implemented		Bill was implemented in 2023 or earlier	Bill was implemented in 2019 or earlier	Bill was implemented in 2013 or earlier	Bill was implemented before 2000
Frequency and school grade	No school grades specified	Students have 1–2 or an unspecified number of classes during their K–12 education	Students have an unspecified number of classes during their middle and high school years (6–12)	Students have a class 1–2 times during their middle and high school years (6–12)	Students have a class 1–2 times during their high school years (9–12)	Students have a class >2 times during their high school years (9–12)
Graduation requirement	CPR/AED training completion is not required for graduation		CPR/AED training completion is required for graduation			
Hands-on training	Students are not required to have any hands-on training in CPR and/or AED use		Only nonvirtual students (or unspecified students) are required to complete hands-on training in CPR only	All students (including virtual) are required to complete hands-on training in CPR only	Only nonvirtual students (or unspecified students) are required to complete hands-on training in CPR and AED use	All students (including virtual) are required to complete hands-on training in CPR and AED use
Adult and/or child/infant CPR education	Students receive CPR/AED training for adults only or not specified	Students receive CPR/AED training for adults and children/infants				
First aid training	Students do not receive first aid training or not specified	Students receive first aid training				
Student certification	Students cannot receive AHA or ARC or nationally accredited certification through their state-provided CPR class			Students may gain AHA or ARC or nationally accredited certification through their state-provided CPR class if a certified instructor is provided		

CPR/AED instructor certification	Instructor certification and/or qualification is not required or not specified			All instructors must hold some form of qualification that demonstrates competency		All instructors are required to be certified in CPR/AED training and instruction
Teacher certification	No teachers or school staff are required to hold certification	At least 1 staff member is required to hold CPR/AED certification within the school	Teachers of limited subjects (such as health related) are required to hold CPR/AED certification	Teachers of specified grades (not including all K–12 grades) must be CPR/AED certified	All teachers are required to hold CPR/AED certification	All school staff (including teachers and administration) are required to hold CPR/AED certification
CPR standards	No standards are specified for CPR/AED curricula			Aspects but not all of the CPR/AED curricula are based on national guidelines		CPR/AED curricula are held to AHA or ARC or nationally recognized organization standards
Bill expiration	Bill has an expiry date within the next 2 years or has already expired	Bill does not have an expiry date				
Funding	The bill makes no provisions to fund CPR/AED training or does not specifically allot money for the program		The bill provides at least some funding specifically for in-school CPR/AED training			

AED = automated external defibrillator; AHA = American Heart Association; ARC = American Red Cross; CPR = cardiopulmonary resuscitation.
[a]We developed 13 categories based on empirical and evidence-based data to assess CPR legislation. Most categories range from 0 to 5, and the maximum score is 47.

CPR standards

The AHA and ARC have provided CPR/AED use and training guidelines.[27,28] The minimum mandate standards proposed by the legislation should resemble these guidelines. States that meet 1 or more of these standards are scored higher.

Funding

Funding is a binary score. Creating high school CPR training mandates requires funding for its resources, such as manikins and practice AEDs, and ideally, this funding should be included in legislation to enable effective implementation. As noted in a previous category, some states provided funding for schools only to create their programs, with no other continued funding. Conversely, the existence of a mandate does not mean funding exists.

Data collection

Individual state legislation regarding high school CPR is publicly available and accessible online. The respective list of legislation is provided in Supplemental Table 1. Three independent evaluators reviewed the mandates and calculated scores for each of the 50 US states and the District of Columbia. These scores were then combined into 1 composite score for each state. OHCA and survival-to-hospital discharge rates and bystander intervention rates for both CPR initiation and AED use were obtained from the Cardiac Arrest Registry to Enhance Survival (CARES) database as surrogates for the effectiveness of CPR training and validation of the scoring system. The CARES database is a voluntary and publicly available registry developed by the US Centers for Disease Control and Prevention (CDC) and Emory University, which now includes 30 states' standardized OHCA outcomes to measure the improvements in community and global emergency medical services.[29] A state's SCD rate was calculated using the incidence of HCA and survival-to-hospital discharge rates. Publicly available data for statewide all-cause cardiovascular death were also obtained from the CDC databases from years 2005 to 2010 before the average onset of CPR mandates and the most recent 2021 database to further validate scores.

Statistical analysis

Mandate scores were summarized by means and SDs. Cohen κ statistic was calculated to assess interobserver variability. Analysis of variance was performed between available OHCA and bystander intervention rates; a paired Student *t*-test was used to evaluate changes in cardiovascular death over time. Pearson correlation was used to determine whether the strength of the mandate was associated with the year it was passed. It was also conducted between scores and SCD, bystander-initiated CPR, AED use, and all-cause cardiovascular death rates. A P value $\leq$.05 was considered statistically significant. Statistical analysis was done with SPSS 29.0.1.0 software (IBM, Chicago, IL).

Results

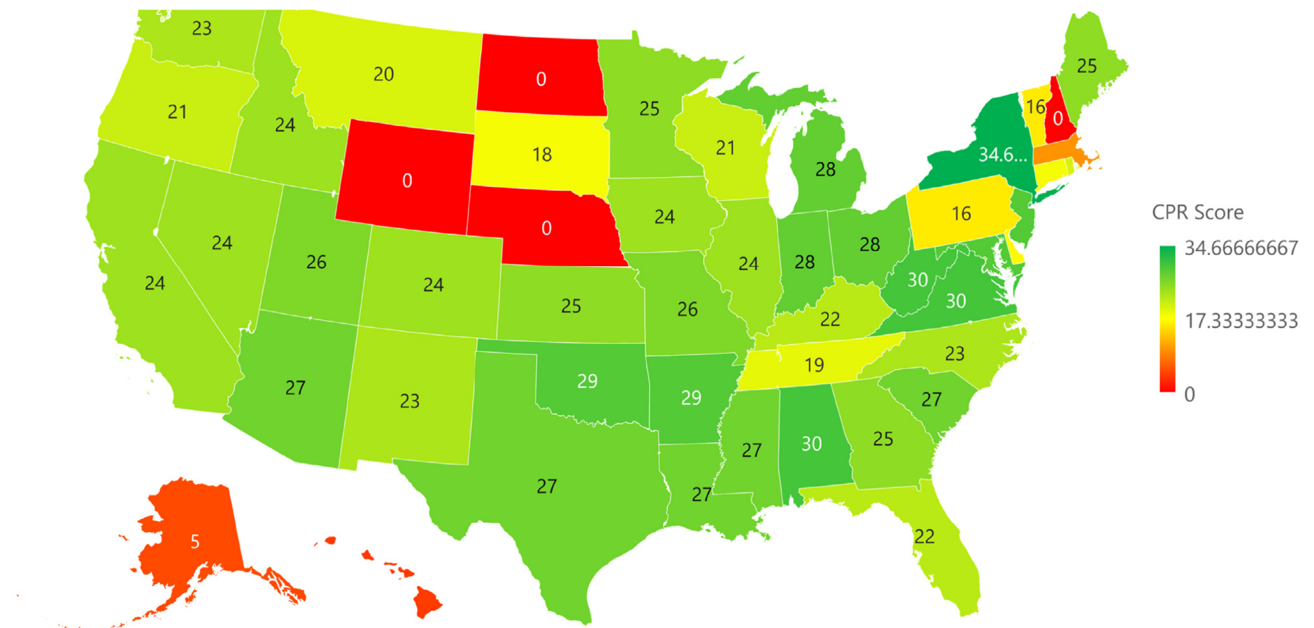
State CPR scores

The maximum possible high school CPR mandate score was 47. State scores ranged from 0 to 35 with a median of 24 (interquartile range, 19.5–27) and a mean of 21.5 ± 8.6 (Figure 1). Cohen κ statistic was 0.986 (95% CI, 0.944–1.028; P < .001), indicating low interobserver variability. Four states (7.84%; Nebraska, New Hampshire, North Dakota, and Wyoming) scored a 0 and had no state legislation for high school CPR training. Three states (5.88%; Alaska, Hawaii, and Massachusetts) also had no mandates. Still, they did specify certain aspects, such as certification requirements or the need for in-person training, thus scoring the next lowest (Supplemental Table 2). The highest score (35) was seen in New York, which implemented mandates in 2015. No states scored near the highest possible score. The median year in which high school CPR mandates took effect was 2015, but only 1 state (Alabama in 1984) implemented its legislation in high schools before 2009 (Supplemental Table 1). Nearly a quarter (23.53% [n = 12]) failed to meet AHA or ARC standards.

No state had CPR training more than twice during all 4 years of high school; half of all states had a class once. Only 3 states (5.88%; Colorado, Illinois, and Pennsylvania) did not require CPR training for high school graduation. Furthermore, whereas 33.33% (n = 17) required nonvirtual students to complete hands-on CPR and AED use training, just 1.96% (n = 1; Arizona) taught CPR and AED use for both adults and infants. A total of 9 states (17.65%; Florida, Kansas, Kentucky, Missouri, Montana, North Carolina, Ohio, Virginia, and West Virginia) taught additional first-aid training. CPR certification was granted to students at the end of training in only 25.49% (n = 13) of states. Eight states (15.69%; Alabama, Colorado, Iowa, Louisiana, New Jersey, New York, Oklahoma, and South Carolina) required certification of the high school CPR instructors. Last, 15.69% (n = 8; Alaska, Hawaii, Kentucky, Massachusetts, Nebraska, New Hampshire, North Dakota, and Wyoming) had expiration of their high school CPR legislation, and only 3.92% (n = 2; Colorado and Utah) included funding for high school CPR training within the mandate.

Annual SCD, CPR, and AED use rates

We further analyzed 41.18% (n = 21) of states that participated in the CARES registry from 2018 to 2021. Data for all 4 years exist for only 57.14% (n = 12) of these states. Incident rates of sudden cardiac arrest and survival to hospital discharge were used to calculate the SCD rates per 100,000. The average rate of change for SCD, bystander-initiated CPR, and AED use over time was 0.99 ± 14.05 per 100,000, −1.72% ± 2.20%, and −0.07% ± 1.09%, respectively. There was no significant change in either SCD rate (105 ± 109.8 [2018] vs 70.9 ± 21.6 [2019] vs 76.3 ± 23.2 [2020] vs 80.6 ± 20.6 [2021] per 100,000; 95% CI, 0–0.155; P_{trend} = 0.311) or bystander-initiated CPR (44.6% ± 12.2% [2018] vs 44.4% ± 10.4% [2019] vs 43.5% ± 11.3% [2020] vs



State	Score	State	Score
Alabama	30	Montana	20
Alaska	5	Nebraska	0
Arizona	27	Nevada	24
Arkansas	29	New Hampshire	0
California	24	New Jersey	29
Colorado	24	New Mexico	23
Connecticut	18	New York	35
Delaware	17	North Carolina	23
Florida	22	North Dakota	0
Georgia	25	Ohio	28
Hawaii	4	Oklahoma	29
Idaho	24	Oregon	21
Illinois	24	Pennsylvania	16
Indiana	28	Rhode Island	20
Iowa	24	South Carolina	27
Kansas	25	South Dakota	18
Kentucky	22	Tennessee	19
Louisiana	27	Texas	27
Maine	25	Utah	26
Maryland	29	Vermont	16
Massachusetts	10	Virginia	30
Michigan	28	Washington	23
Minnesota	25	West Virginia	30
Mississippi	27	Wisconsin	21
Missouri	26	Wyoming	0

Figure 1
Cardiopulmonary resuscitation mandate scores by state. The mapped states' scores reveal the 4 states without any mandates and other states with poor mandates.

42.4% ± 10.9% [2021]; 95% CI, 0–0.029; P_{trend} = .937) between the 4 years; there was a significant decrease in AED use (11.7% ± 2.4% [2018] vs 10.6% ± 3.7% [2019] vs 8.5% ± 3.1% [2020] vs 9.6% ± 2.2% [2021]; 95% CI, 0–0.266; P_{trend} = .025). Only the average change in CPR initiation and AED use (R^2 = 0.916; 95% CI, 0.801–0.966; $P < .001$) was significantly correlated over time. Neither the average change in SCD rate and CPR (R^2 = 0.430; 95% CI, −0.003 to 0.726; P = .052) nor the average change in AED use (R^2 = 0.411; 95% CI, −0.025 to 0.716; P = .064) was correlated.

Cardiovascular death rates

We additionally analyzed national data published by the CDC for cardiovascular death rates. Data were not available for the District of Columbia. The average death rate was 177.1 ± 33.3 and 210.3 ± 35.0 per 100,000 in 2005 and 2021, respectively. There was a decrease of 32.6 ± 18.0 per 100,000 ($P < .001$). Although only 9 states had absolute reductions in cardiovascular death (Connecticut, Illinois, Michigan, New Jersey, New York, North Dakota, Pennsylvania, Rhode Island, and South Dakota), only 1 (Montana) had increasing death rates from 2005 to 2021.

Score correlations

We determined whether there was any correlation between the high school CPR mandate score and the year enacted, SCD rate, bystander-initiated interventions, or all-cause cardiovascular death rates. There was no correlation between

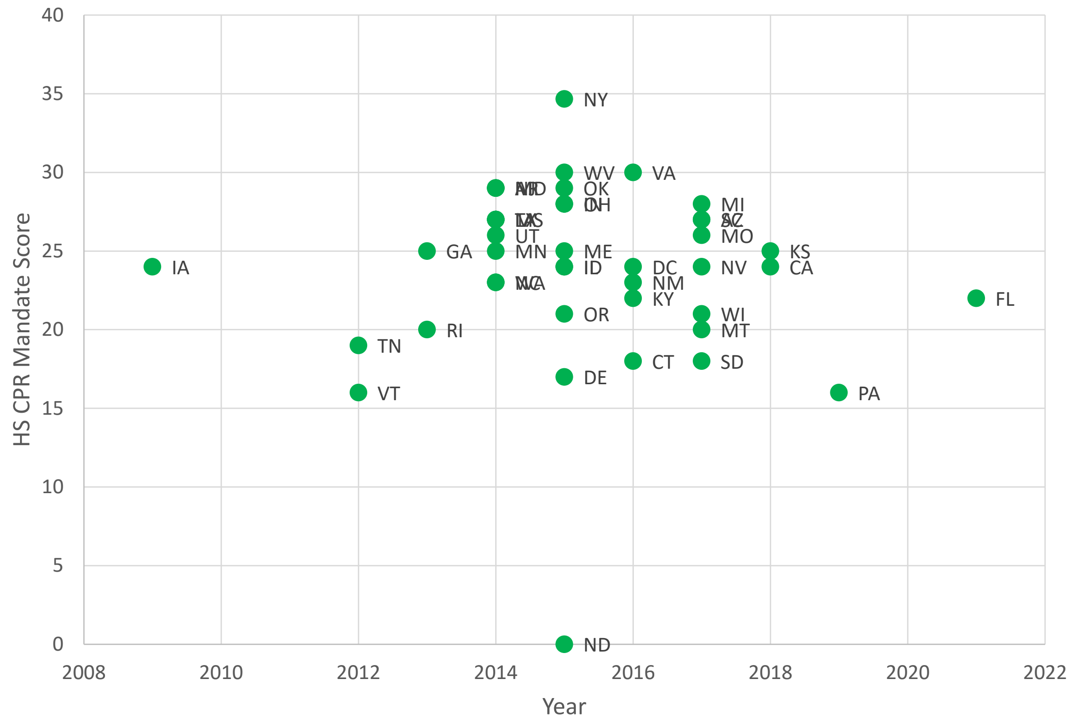


Figure 2
The high school cardiopulmonary resuscitation (HS CPR) mandates by year. There is no correlation between the CPR scores and the year the CPR mandate was approved. Alabama has been excluded as an outlier because of its enactment in 1984.

the year enacted and the mandate score (R^2 = 0.03; 95% CI, −0.522 to 0.147; P = .263; Figure 2). There was also no correlation between the scores and SCD rate (R^2 = −0.76; 95% CI, −0.492 to 0.367; P = .742; Figure 3A), bystander-initiated CPR (R^2 = to 0.006; 95% CI, −0.437 to 0.427; P = .978; Figure 3B), or AED use (R^2 = −0.125; 95% CI, −0.528 to 0.324; P = .590; Figure 3C). Last, there was no correlation between the cardiovascular death rates and mandate score (R^2 = −0.13; 95% CI, −0.379 to 0.21; P = .355).

Discussion

This is the first study to evaluate the real-world strength of the CPR mandates in high schools across the United States. We highlight several key findings using a novel scoring system

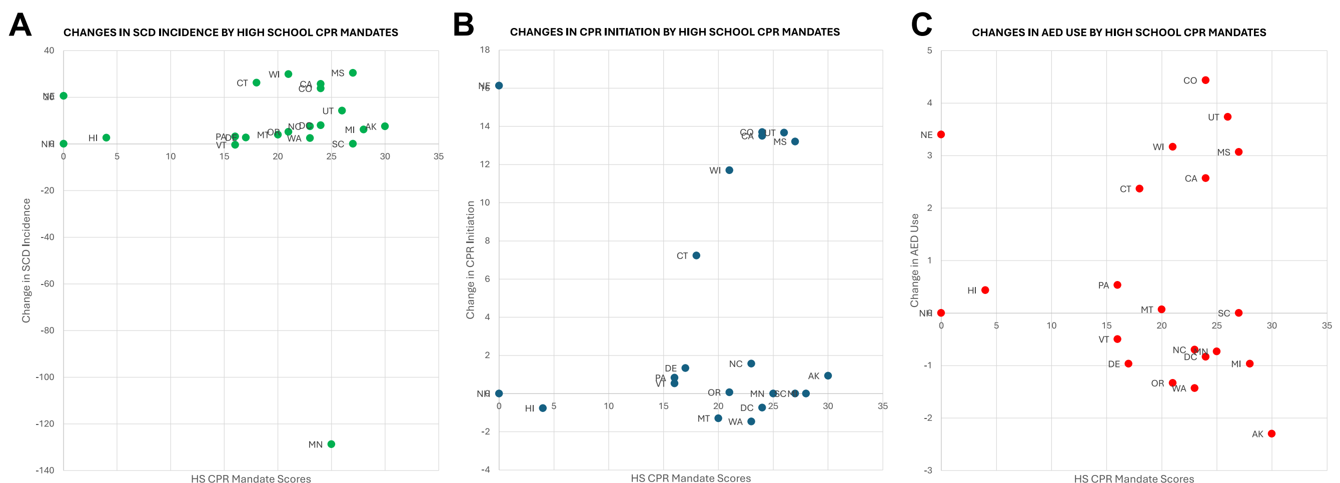


Figure 3
Correlations between the high school cardiopulmonary resuscitation (HS CPR) mandates and sudden cardiac death (SCD) rate (**A**), bystander-initiated CPR (**B**), and automated external defibrillator (AED) use (**C**). Calculated and correlated between the states for which the Cardiac Arrest Registry to Enhance Survival (CARES) data are available.

evaluating CPR education and mandates. First, the scoring system identifies and evaluates 13 pertinent categories to be considered that influence legislative CPR mandates with low interobserver variability. Second, the overall median and mean scores for the CPR mandates were only modest (24 and 21.5, respectively, of 47 possible points). New York scored the highest at only 35, whereas 3 states had no legislative mandates (Alaska, Hawaii, and Massachusetts). Third, although a quarter of the states offered annual CPR training, no state provided training more than twice annually. There is a lack of comprehensive training including hands-on training requirements for all students in just more than a third of states and no additional first aid training or certification for both students and teachers in almost all states. Last, no correlation was observed between state mandate scores and real-world outcomes from registry data, including SCD rates, bystander-initiated CPR, AED use, and cardiovascular death rates.

Training of high school students has been an important grassroots strategy to improve community awareness and the rate of early bystander-initiated CPR and ultimately to improve SCD outcomes. Indeed, Vetter and colleagues[30] reported that states mandating CPR training have improved bystander-initiated CPR rates. In a retrospective analysis of the CARES data set, they found a higher odds ratio (OR) of 1.12 (95% CI, 1.08–1.15) of bystander-initiated CPR in states with education laws than in states without. It has also been shown that even an untrained layperson can use an AED safely and effectively.[31] However, in a survey of 424 high school principals in states requiring CPR training by law, Brown and coworkers[32] found that only 77% of high schools underwent this training. They also found that 1 state did not require hands-on training, and 10 states did not specify the need for AED training. Multiple surveys of high school students and teachers, nationally and internationally, corroborate our findings. They have shown that even where CPR training is mandated, there is a lack of training standardization, and most students feel poorly prepared to perform CPR or to use AEDs despite recognizing its importance and being motivated to learn.[17,32–36] Thus, the need for better laws becomes evident, and comprehensive evaluations are needed.

Like prior studies, our results suggest that current mandates have room for improvement.[32,37] The low scores noted occurred for various reasons, of which the lack of adult and child/infant CPR training, funding, first aid training, and CPR/AED instructor certification are significant factors. In the 4 states (Nebraska, New Hampshire, North Dakota, and Wyoming) that scored the lowest, none have legislation mandating high school CPR training, and all except North Dakota have had legislation proposals for high school CPR mandates that have either failed or been indefinitely postponed (Nebraska). Interestingly, North Dakota had legislation (State Bill 2238, 2013 Regular Session) for CPR training but provided funding only from 2013 to 2017.[38] As discussed before, 3 additional states (Alaska, Hawaii, and Massachusetts) also do not have legislation and score the next lowest. All, though, had legislation (Alaska State Bill 43, 2023 Referred to Committee; Hawaii SCR 174, HCR 108, 2013 Regular Session; Massachusetts House Bill 492, 2017 Referred to Committee) introducing at least hands-only CPR that is still in the process of approval.[39–41] States that did well (New York, Alabama, Virginia, and West Virginia) still fell far short of the maximum possible score. For example, despite scoring the highest, New York still scored a zero regarding child/infant CPR, first aid training, and funding; it also scored lower on hands-on training and student certification. Like many other states, it had a maximum of only 2 classes for CPR training during 4 years of high school. Students may forget CPR education without reinforcement or yearly refreshers, worsened by potentially missing one of the training classes. This highlights the need for serial CPR education and why we believe that all categories must have high scores to have effective high school CPR training.

As part of our validation analysis, we performed a subset analysis of the CARES data to observe whether rates of bystander-initiated CPR and AED use changed. Multiple studies have used the CARES registry to evaluate OHCA, but these data are limited by states' willingness to participate and the lack of longitudinal data.[30,42–44] Surprisingly, we found that CPR and AED use decreased with sudden cardiac arrest rates. Moreover, we did not observe correlations between the high school CPR scores and individual state SCD, CPR initiation, AED use, or all-cause cardiovascular mortality. This does not suggest that addressing CPR training mandates is futile. Instead, the lack of correlation highlights the complexities of training and educating communities on CPR and why the factors we can control must be rigorous. Unless there is a uniform effort to raise standards, the impact on bystander CPR and AED use will remain suboptimal.

Limitations

Our scoring system was created by a diverse panel of invested individuals with low interobserver variability, but this study still has limitations. The data suggest other drivers of the decrease in SCD rates outside high school CPR mandates. The scoring evaluated the legislation directly, and a few external factors, such as community engagement and political interest, were not accounted for. This is still important to consider as initiatives for CPR training are often organized after an inciting event, such as a public figure or family member experiencing SCD. The success of the initiative is reliant on community engagement and perception. Even in Denmark, a country with mandated high school CPR training for the last 8 years, Hansen and coworkers[45] found in a 2017 survey of ninth-grade teachers that the spirit of competition with other schools ahead in completing training (OR, 9.68; 95% CI, 4.65–20.1), awareness of legislation (OR, 4.19; 95% CI, 2.65–6.62), access to training materials (OR, 2.08; 95% CI, 1.57–2.76), and even the presence of a designated high school CPR training coordinator (OR, 3.01; 95% CI, 1.84–4.92) were factors associated with improved uptake of CPR training. We must also recognize that individuals trained in CPR in a particular state may not live in the state long term,

affecting attempts at correlation. These factors can be challenging to assess and need further investigation before they become part of a comprehensive evaluation. In addition, national mandates extending support for CPR and AED training and access beyond high school may be necessary to increase the use of these lifesaving modalities to improve outcomes after OHCA.

Furthermore, attempts to evaluate and to validate the scoring system are limited by insufficient data. The CDC data report all-cause cardiovascular mortality rates, which contain other drivers of death that are not expected to change on the basis of recent legislative requirements. The CARES registry aims to solve this by providing SCD and bystander-initiated CPR and AED rates. Still, it is voluntary, and 17 states currently do not participate. The registry was implemented only 5 years ago, which is not enough time to expect change in outcomes related to education. Ideally, high school CPR education metrics, such as retention rates and those we evaluate, would be measured before and after CPR training legislation. As the CARES data mature, repeated evaluation will be prudent. Regardless of these limitations, this study highlights weaknesses in the current situation and provides areas for further growth. With refinement, we hope to use this scoring system to grade all versions of CPR-related legislation and its mandates.

Future directions

Our results suggest that the CPR and AED education mandates need an overhaul incorporating all 13 points that have been outlined, bringing uniformity and structure to this legislation to make it more effective. Additional considerations include but are not limited to creating structured training in partnership with professional medical societies and local health care institutions, extending training beyond high school to middle school and college, and repetitive training to ensure the retention and knowledge of the skills. This will require appropriate funding and training resources provided by the state and federal governments. For this, public-private partnerships will be of tremendous value to bear fruit. These steps will require continued efforts to have a positive impact on CPR and AED education and subsequent SCD.

Conclusion

Legislation for high school CPR training exists in many states in an attempt to improve bystander-initiated CPR, but it remains diverse and nonstandardized. The training mandates are weak and have no real attributes to improve the overall effectiveness of CPR training. This calls for a comprehensive reform and a private-public engagement with federal and state funds to create a meaningful program.

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Address reprint requests and correspondence: Dr Dhanunjaya Lakkireddy, Kansas City Heart and Rhythm Institute, 5100 W 110th St, Ste 200, Overland Park, KS 66211. E-mail address: dhanunjaya.lakkireddy@hcahealthcare.com

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