What Evidence Supports State Laws to Enhance Public Access Defibrillation?

A Policy Evidence Assessment Report

National Center for Chronic Disease Prevention and Health Promotion
Division for Heart Disease and Stroke Prevention
Acknowledgments

Disclaimer
The findings and conclusions of this document are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention. Furthermore, this document is not intended to promote any particular legislative, regulatory, or other action.

Acknowledgments
This guide was developed by the Division for Heart Disease and Stroke Prevention within the Centers for Disease Control and Prevention (CDC). Contributions to the development and review of this guide were made by Siobhan Gilchrist, JD, MPH and Jennifer VanderVeur, JD (IHRC, Inc.); Nupur Maskara, MPH and Aunima Bhuiya, BSc (Oak Ridge Institute for Science and Education).

Suggested Citation
**The Big Picture**

Cardiac arrest substantially contributes to avoidable death and disability across the United States.\(^a\) Although estimates vary by location and study, an estimated 70-90% of people experiencing out-of-hospital cardiac arrest die before reaching the hospital.\(^a,b,c\) The application of cardiopulmonary resuscitation (CPR) and use of an automated external defibrillator (AED) within minutes of cardiac arrest can dramatically raise survival rates.\(^a\) Public Access Defibrillation (PAD) programs and policies work to ensure that AEDs are immediately available for use by lay bystanders when and where they are needed with the intention of increasing survival rates.\(^d\) Furthermore, cardiac emergency response planning improves the ability of organizations such as schools to render life-saving care.\(^e\)

While all states have enacted some type of law pertaining to PAD, more information is needed to understand which types of PAD interventions could be addressed in an evidence-informed state PAD law. This report assesses best available evidence aligning with state laws that address PAD.

**About This Report**

This report assesses best available evidence for seven types of PAD interventions addressed in existing state law. These interventions were all \(a\) recommended by experts for PAD programs and/or guidance provided by the American Heart Association\(^b\) and the Institutes of Medicine\(^a\) and \(b\) authorized by at least one state’s law as of December 31, 2016.

These PAD interventions include:

1. **Targeted AED Site Placement**
2. **Training Anticipated Responders**
3. **PAD Coordinated with Emergency Medical Services**
4. **Emergency Response Plans**
5. **Routine Maintenance and Testing of AEDs**
6. **Ongoing PAD Quality Improvement and Quality Assurance Monitoring**
7. **Limited Liability**

Among states with enacted legislation to support effective PAD programs, the relevant laws often address multiple PAD interventions or program elements. Evidence associated with each type of PAD intervention is assessed here for strength and quality. The evidence search included published journal articles, policy briefs, statements, recommendations, and guidelines available between February 2006 and February 2017. For more on the method used, see the Appendix.

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\(f\). The methodology for this QuIC Evidence Assessment is provided in Appendix A.
As of February 28, 2017, there are three PAD policy interventions found to have “best” evidence, and four found to have “promising” evidence (Figure 1). State laws that address the policy interventions with “best” evidence are expected to have the greatest potential for a positive health and associated economic impact. The policy interventions with “best” evidence bases include:

- Targeted AED Site Placement
- Training Anticipated Responders
- PAD Coordinated with Emergency Medical Services

State laws that address the policy interventions with “promising” evidence could also have positive impacts, but the quantity and quality of the evidence for them is limited at this time. These policy interventions include:

- Emergency Response Plans
- Routine Maintenance and Testing of AEDs
- Ongoing PAD Quality Improvement and Quality Assurance Monitoring
- Limited Liability

Researchers and evaluators could help build stronger evidence bases for these “promising” policy interventions. See the Appendix for how each evidence base could be strengthened.

**Figure 1. Seven types of PAD policy interventions that could be scaled up for statewide adoption through state law. Use the links in this figure to navigate to an evidence summary for each type of intervention.**

<table>
<thead>
<tr>
<th>Stronger Evidence for Potential Impact</th>
<th>Lower Evidence Quality</th>
<th>Higher Evidence Quality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Promising (Impact)</td>
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<td></td>
</tr>
<tr>
<td>Promising (Quality)</td>
<td>None</td>
<td></td>
</tr>
<tr>
<td>Emerging</td>
<td>None</td>
<td></td>
</tr>
<tr>
<td>Best</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Targeted AED Site Placement</td>
<td></td>
<td></td>
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<tr>
<td>Training Anticipated Responders</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PAD Coordinated with Emergency Medical Services</td>
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</tr>
</tbody>
</table>
How To Use This Report

State decision makers and public health organizations may consider presenting this report, along with facts about state cardiac arrest rates and existing PAD programs, to the state public health department, Emergency Medical Services Director, health care providers and payers, and others interested in improving health outcomes.

State decision makers and public health organizations may consider planning for a state PAD policy that addresses multiple evidence-based interventions. Many of the interventions presented here are expected to work together to improve cardiac arrest outcomes. State law is a tool that could help initiate policy change, reach whole populations, and increase consistency and coordination across a state. When reviewing or disseminating this report, consider the limitations of the evidence assessment:

- **The evidence about PAD policy was derived largely from non-experimental studies, so causality cannot be inferred.** That is, there were very few studies comparing the effectiveness of PAD policy interventions in jurisdictions with versus without the policies. Additionally, in the few studies that did include control groups, the policy interventions being studied were typically multi-faceted and did not examine the specific effects of a given PAD policy intervention.

- **Because PAD policy interventions are often multi-faceted and interconnected, the DHDP assessment team members worked with subject matter experts and examined existing state laws to define the seven PAD policy interventions included in this assessment. Ratings of the strength and quality of the evidence are directly tied to these seven PAD policy interventions. The evidence examined as part of this assessment varied by jurisdictional level (e.g., state and local) and content of the PAD policy interventions. Therefore, study findings might not be generalizable to all states or to other jurisdictions.**

- **Non-law approaches** may also be effective at increasing PAD and lay bystander use of AEDs. States may consider other factors, such as the legal, social, political, and fiscal environments, when deciding on a course of action.
Evidence Summaries

The next section provides evidence summaries for all of the PAD policy interventions included in this assessment. The evidence summaries could help state decision makers and public health organizations determine which PAD policy interventions may be useful in their state. The links in the Figure on the previous page can be used to navigate to the evidence summary for each policy intervention.

This report summarizes the evidence assessed for each of the seven PAD policy interventions listed above. Each summary provides the overall evidence assessment category, ratings for each of the public health impact and evidence quality criteria, a brief definition, reported public health outcomes, populations shown to benefit, states where the intervention was studied, examples of state laws addressing the policy intervention, and a listing of references included in the assessment.

How to use an evidence summary.

Evidence summaries describe the evidence used to score a policy intervention’s evidence base on potential public health impact and quality. Each evidence summary includes a full reference and evidence list and provides the positive outcomes observed in intervention studies, as well the specific states in which these outcomes were found. When there were no intervention studies of a policy intervention, an evidence summary instead includes the rationale for the policy intervention, as described by experts and practitioners. See the Appendix for more on the method used to develop evidence summaries.

The evidence summaries will help state decision makers and public health organizations to better understand each evidence base as it relates to an individual state. Before reviewing the summaries, it is helpful to have background knowledge about the status of health in the state. State-specific health information can be found on state health department websites. Additionally, CDC provides national, state, and county-level health information on its website.
Evidence Summaries
Targeted AED Site Placement

Evidence Level: BEST

Laws that require, authorize or otherwise encourage targeted AED site placement to increase access to AEDs in public locations such as schools, workplaces, airports, etc. based on specific criteria.1a

Example of state law addressing this type of intervention
Oregon law requires public access to AED in schools, health clubs, state owned or occupied facilities (including outdoor spaces), and other locations.1b Or. Rev. Stat. §§ 323-030-0105, 333-060-0210, 339.345, 431A.450, & 431A.455

Evidence for Potential Public Health Impact:

Effectiveness: 
Equity & Reach: 
Efficiency: 
Transferability: 
Weaker=-----  ➔  -----=Stronger

TOTAL: 
SCORE: VERY STRONG

Evidence Quality:

Evidence Type: 
Source: 
Evidence from Research: 
Evidence from Translation & Practice: 
Lower=-----  ➔  -----=Higher

TOTAL: 
SCORE: VERY HIGH

Reported health-related outcomes

- Average distance from a cardiac arrest to the nearest AED1,2,3
- Awareness that an AED is available,4 awareness of AED location4
- Access to AED,4,5 Public access to AEDs per 100,000 population6
- Bystander use of AED,4,6,7,8 Early defibrillation from publically available AED,4
- Time from collapse to first shock,6,9,10 Time to defibrillation prior to EMS arrival,2,6,11,12
- Return of spontaneous circulation,6,13
- Neurological outcome for patients4,6,14
- Cardiac arrest survival,4,8,9,11,15,16,17,18,19 survival to hospital discharge,4,13,20 30-day survival,4,6 and death from ventricular fibrillation5

Groups studied

General population,4 Employees and students in schools,1,3,4,10,20 Student athletes,9,15 Employees and customers in federal buildings, airports, casinos, fitness centers,8 churches, and workplace environments.4

Feasibility and related economic highlights

Targeted placement of AEDs improves cost-effectiveness4,19 when applied to locations where cardiac arrests are expected to occur more frequently, where arrests are likely to be witnessed18 and where AEDs can be strategically placed to decrease time to defibrillation.2

States where programs achieved positive health-related outcomes

Arizona,7 California,13 Iowa,21 Michigan,3 Nevada,12 Pennsylvania19

For more on how evidence for potential impact was assessed, see the Appendix

Score: VERY STRONG

For more on how evidence quality was assessed, see the Appendix

Score: VERY HIGH
Targeted AED Site Placement (cont.)

Evidence base

Research-based studies

None as of February 28, 2017

Practice-based reviews

1. Berger S. Cardiopulmonary resuscitation and public access defibrillation in the current era--can we do better yet? J Am Heart Assoc. 2014; 3(2).
Laws to encourage cardiopulmonary resuscitation (CPR) and AED training of anticipated lay responders who are likely to be present during an event; includes laws that encourage training for persons on-site in a specific type of setting (e.g., employees of a health club) or as part of their official duties (e.g., school officials).

Example of state law addressing this type of intervention
Arkansas law requires that expected AED users complete a course every 2 years on CPR and AED use that is based on American Heart Association, American Red Cross, or equivalent course standards. (Ark. Code Ann. § 20-13-1304(a)(1))

Evidence for Potential Public Health Impact:
Effectiveness: Weaker = •••• Stronger = ••••
Equity & Reach: ••••
Efficiency: ••••
Transferability: ••••
TOTAL: ••••
SCORE: VERY STRONG

Evidence Quality:
Evidence Type: ••••
Source: ••••
Evidence from Research: ••••
Evidence from Translation & Practice: ••••
TOTAL: ••••
SCORE: VERY HIGH

Reported health-related outcomes
• Enhanced competency in applying CPR and AED \(^{1,2,4,5,6,7}\)
• Improved bystander recognition of cardiac arrest \(^{2,3,8}\)
• Willingness of bystander to use AED \(^{3,8}\)
• Bystander use of AED \(^{3,8,10,11,12,13}\)
• Time to first chest compression \(^{8}\)
• Time to defibrillation prior to EMS arrival \(^{7,14,15,16}\)
• Return of spontaneous circulation \(^{10,17}\)
• Neurological outcome for patients \(^{10}\)
• Cardiac arrest survival \(^{2,5,7,8,9,12,13,14,17,18,19}\)

Groups studied
Communities experiencing higher burden of out-of-hospital cardiac arrest including older populations with lower median income as well as African American and Hispanic neighborhoods, \(^{5,8}\) and retirement communities. \(^{8}\) Schools are uniquely positioned to provide CPR and AED training which could directly benefit athletes, \(^{14,9}\) students, staff, and visitors within the school as well as the larger community. \(^{2,5,8,9,11,16,19,20}\)

Feasibility and related economic highlights
Community PAD training programs are a cost-effective means for saving lives when compared to other health care-related interventions. \(^{10}\)

States where programs achieved positive health-related outcomes
California, \(^{17}\) Iowa, \(^{6}\) Maryland, \(^{10}\) Michigan, \(^{16}\) Minnesota, \(^{12}\) Nevada, \(^{15}\) North Carolina \(^{20}\)
Training Anticipated Responders (cont.)

Evidence Base

Research-based studies


Practice-based studies


PAD Coordinated with Emergency Medical Services

Evidence Level: **BEST**

Includes (1) laws that encourage a state, local or other level PAD registry, or require EMS notification of placement/removal of AED, (2) laws that encourage activation of 911-EMS when an AED is used (excluding testing)

**Example of state law addressing this type of intervention**

California law requires that (1) anyone who acquires an AED notify EMS of the existence, location, and type of AED acquired, and (2) that any person who renders emergency care or treatment on a person in cardiac arrest by using an AED activates the emergency medical services system as soon as possible, reports any use of the AED to the licensed physician and to the local EMS agency, and reports clinical usage. (Cal. Health & Saf. Code § 1797.196 & Cal. Code Regs, tit. 22, § 100041-100042)

**Evidence for Potential Public Health Impact:**

- Effectiveness: ✅✅✅
- Equity & Reach: ✅✅✅
- Efficiency: ✅✅✅
- Transferability: ✅✅✅

**Evidence Quality:**

- Evidence Type: ✅✅✅
- Source: ✅✅✅
- Evidence from Research: ✅✅✅
- Evidence from Translation & Practice: ✅✅✅

**Reported health-related outcomes**

- Utilization rates for public access AEDs
- Bystander use of AED
- Delivery of first shock with an AED
- Time to defibrillation prior to EMS arrival
- Rate of return of spontaneous circulation
- Neurological outcomes for patients
- Cardiac arrest survival, survival to hospital discharge, survival from witnessed ventricular fibrillation sudden cardiac arrest, survival with favorable neurological outcome

**Groups studied**

- Rural communities
- Students, student athletes, staff, and visitors within the school setting

**Feasibility and related economic highlights**

In sparsely populated rural areas where EMS response includes larger geographic distances, a coordinated system utilizing PAD as part of initial care in a two-tiered system may be more cost-effective while providing a good standard of care.

**States where programs achieved positive health-related outcomes**

- Alabama
- Iowa
- Maryland
- Nevada
- New Hampshire
- North Carolina
- Oregon
- Pennsylvania
- Texas
- Utah
- Washington
- Wisconsin
Evidence Base

Research-based studies

None as of February 28, 2017

Practice-based studies


Emergency Response Plans

Evidence Level: **PROMISING EVIDENCE QUALITY**

Includes laws that encourage the AED program facilitator (or other) to develop emergency response plans for responding to a suspect cardiac arrest occurrence.

**Example of state law addressing this type of intervention**

North Carolina law requires the development and practice of emergency response plans for state buildings. *(N.C. Gen. Stat. § 143B-370.1)*

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**Evidence for Potential Public Health Impact:**

- Effectiveness: ★★★★★
- Equity & Reach: ★★★★★
- Efficiency: ★★★★★
- Transferability: ★★★★★

**Evidence Quality:**

- Evidence Type: ★★★★★
- Source: ★★★★★
- Evidence from Research: ★★★★★
- Evidence from Translation & Practice: ★★★★★

**Score: MODERATE**

**Reported health-related outcomes**

- Awareness and access to AED\(^1,2,3\)
- Utilization of AED by bystanders\(^1,2,4\)
- Time from collapse to first shock\(^5,6\)
- Time to defibrillation prior to EMS arrival\(^7,8\)
- Rate of return of spontaneous circulation\(^6\)
- Cardiac arrest survival,\(^1,2,3,4,5,6,7,9,10,11\) cardiac arrest survival to hospital discharge\(^1,4,6,9,10\)

**Groups studied**

Students, student athletes, staff, and visitors within the school setting.\(^2,3,4,5,7,8,10,11\) Employees and customers in airports and casinos,\(^5\) as well as employees in other types of workplaces.\(^6\)

**Feasibility and related economic highlights**

Comprehensive emergency planning promotes efficiency.\(^5\)

**States where programs achieved positive health-related outcomes**

Michigan,\(^8\) Wisconsin\(^5\)

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\(^1\) Reported outcomes are based on evidence from research.\(^2\) \(^3\) \(^4\) \(^5\) \(^6\) \(^7\) \(^8\) \(^9\) \(^10\) \(^11\)
Evidence Base

Research-based studies
None as of February 28, 2017

Practice-based studies

Evidence Level: **PROMISING EVIDENCE QUALITY**

Laws that encourage AED maintenance and testing, includes immunity provisions that only apply if the AED is maintained.

**Example of state law addressing this type of intervention**
Colorado law requires a person or entity that acquires an AED to regularly maintain and test AED devices according to the manufacturer guidelines. (Col. Rev. Stat. § 13-21-108.1)

### Evidence for Potential Public Health Impact:

**Effectiveness:**
- Weak:★★★★
- Strong:★★★★★

**Equity & Reach:**
- Weak:★★★★
- Strong:★★★★★

**Efficiency:**
- Weak:★★★★
- Strong:★★★★★

**Transferability:**
- Weak:★★★★
- Strong:★★★★★

**TOTAL:**
![Bar chart showing score Moderate]

**SCORE:** MODERATE

### Evidence Quality:

**Evidence Type:**
- Weak:★★★★
- Strong:★★★★★

**Source:**
- Weak:★★★★
- Strong:★★★★★

**Evidence from Research:**
- Weak:★★★★
- Strong:★★★★★

**Evidence from Translation & Practice:**
- Weak:★★★★
- Strong:★★★★★

**TOTAL:**
![Bar chart showing score High]

**SCORE:** HIGH

#### Reported health-related outcomes

- Utilization of AEDs¹,²,³
- Time to defibrillation,¹,⁴ arrival of the AED at the victim's side to delivery of the first shock⁵,⁶
- Neurological outcomes for patients¹
- Sudden cardiac arrest survival rates,²,³,⁵,⁷ cardiac arrest survival to hospital discharge⁵

#### Groups studied

Employees and customers in casinos and airports⁵,⁸ and in other types of workplaces,² and staff and students in schools.⁴,⁶

#### Feasibility and related economic highlights

*No feasibility or economic findings to report as of February 28, 2017*

#### States where programs achieved positive health-related outcomes

California,⁸ Michigan⁴
Evidence Base

Research-based studies

None as of February 28, 2017

Practice-based studies

**Ongoing Quality Improvement and Quality Assurance Monitoring**

Evidence Level: **PROMISING EVIDENCE QUALITY**

Includes laws that encourage PAD programs to develop and implement quality improvement and quality assurance plans for the purpose of evaluating and monitoring the effectiveness of the PAD program.

### Example of state law addressing this type of intervention

New Mexico law requires AED programs to include quality assurance and review of all cases in which AEDs are utilized. *(N.M. Stat. § 24-10C-4 & N.M. Code R. § 7.27.8.9)*

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### Evidence for Potential Public Health Impact:

| Effectiveness: | • • • | Weaker=••••=Stronger |
| Equity & Reach: | • • • | For more on how evidence for potential impact was assessed, see the Appendix |
| Efficiency: | • • • |
| Transferability: | • • • |

**TOTAL:**

| Weak | Moderate | Strong | Very Strong |

**SCORE:** **WEAK**

### Evidence Quality:

| Evidence Type: | • • • |
| Source: | • • • |
| Evidence from Research: | • • • |
| Evidence from Translation & Practice: | • • • |

**TOTAL:**

| Low | Moderate | High | Very High |

**SCORE:** **MODERATE**

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### Reported health-related outcomes

- Time from collapse to first shock\(^1,2\)
- Rate of return of spontaneous circulation\(^3,4\)
- Neurological outcomes for patients\(^5\)
- Cardiac arrest survival rates\(^1,3,4\)

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### Groups studied

Employees and customers in airports\(^3\), casinos, convention centers, and public sporting venues\(^1,3,4\), public businesses and offices\(^5\), and schools\(^2\)

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### Feasibility and related economic highlights

*No feasibility or economic findings to report as of February 28, 2017*

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### States where programs achieved positive health-related outcomes

- Arizona\(^5\)
- California\(^3\)
Evidence Base

**Research-based studies**

None as of February 28, 2017

**Practice-based studies**


Evidence Level: **PROMISING EVIDENCE QUALITY**

The American Heart Association (AHA) recommends that states provide immunity from civil liability for lay rescuers who act “in good faith, without specific compensation, as a reasonable and prudent person with the same level of training would respond” in an emergency, regardless of whether the lay rescuer was trained to provide CPR or use an AED. Good Samaritan laws provide this immunity by restricting the circumstances under which a lay rescuer can be sued for civil damages, thereby facilitating the use of AEDs by lay bystanders witnessing a cardiac arrest.

These policy interventions include state laws that provide civil immunity (or limit liability) for lay rescuers applying an AED to a suspected victim of cardiac arrest (acting in good faith and without compensation as an ordinary, reasonably prudent person would have acted under the same or similar circumstances, absent gross negligence or willful or wanton misconduct), and others involved with the AED purchase, acquisition, placement, premises management, ownership and/or control; PAD maintenance; PAD program management and/or other persons involved with the PAD program, excluding AED manufacturers.

**Example of state law addressing this type of intervention**

Ohio law provides immunity from civil liability for injury, death, or loss to person or property (absent any willful or wanton misconduct) for actions including providing AED training; authorizing, directing, or supervising AED placement; designing, operating, or managing AED programs; acquiring AEDs; having responsibility for the site on which the AEDs are located; or for intervening as a lay bystander regardless of training or certification. (Ohio Rev. Code Ann. §§ 2305.235, 3313.717, 3314.16)

**Evidence for Potential Public Health Impact:**

<table>
<thead>
<tr>
<th>Effectiveness:</th>
<th>Weak = ● ● ● ● ●</th>
<th>Stronger = ● ● ● ● ● ● ● ● ● ●</th>
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</thead>
<tbody>
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<td>For more on how evidence for potential impact was assessed, see the Appendix</td>
</tr>
<tr>
<td>Efficiency:</td>
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<td>Transferability:</td>
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</table>

**Evidence Quality:**

<table>
<thead>
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<th>Evidence Type:</th>
<th>Weak = ● ● ● ● ●</th>
<th>Stronger = ● ● ● ● ● ● ● ● ● ●</th>
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<tbody>
<tr>
<td>Source:</td>
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<td>For more on how evidence quality was assessed, see the Appendix</td>
</tr>
<tr>
<td>Evidence from Research:</td>
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</tr>
<tr>
<td>Evidence from Translation &amp; Practice:</td>
<td>● ● ●</td>
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</tr>
</tbody>
</table>

**Score:** WEAK

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**Reported health-related outcomes**

- Expansion of AED programs\(^1,2,3\)
- Bystander use of AED\(^1,2,4\)

**Groups studied**

- No health-related outcome studies as of February 28, 2017

**Feasibility and related economic highlights**

- No feasibility or economic findings to report as of February 28, 2017

**States where programs achieved positive health-related outcomes**

- No state-level health-related outcome studies as of February 28, 2017
Limited Liability (cont.)

Evidence Base

Research-based studies

None as of February 28, 2017

Practice-based studies


Appendix

Method

Public decision makers need to know which policies are feasible and most likely to achieve the desired effect. Because there are limited studies of the impact of state PAD laws, understanding the potential impact of PAD policy interventions requires assessment of early (best available) evidence. This report uses a novel approach to complete an early evidence assessment called the Quality and Impact of Component Evidence Assessment, or QuIC. For more on the QuIC method, contact CDC DHDS, email: dhdsprequests@cdc.gov.

The seven PAD policy interventions assessed in this report were identified by determining where the content of existing state laws aligned with guidance provided by the American Heart Association and the Institutes of Medicine. In this assessment, best available evidence included mainly programmatic studies of the types of PAD elements addressed in state law as well as subject matter expert opinion. To collect evidence for the policy interventions, an evidence search was conducted in February of 2017. This assessment included evidence from the previous eleven years. Figure 2 below documents the evidence search.

Figure 2. 2017 State Public Access Defibrillation evidence search

To assess the evidence level for a policy intervention, a QuIC Evidence Assessment appraises (1) evidence for potential public health impact and (2) evidence quality. In this assessment, two trained CDC policy staff independently developed coding rules and coded the evidence bases relevant to each of the seven policy interventions. Initial agreement across the evidence for potential impact codes was 83.3%; across the quality codes, it was 91.0%.

Consensus for each code was reached through discussion and reconciled coding was entered into the QuIC Evidence Assessment Tool (p.22). To calculate the evidence for potential impact level and the evidence quality level, the eight criteria from the QuIC Tool were each assigned a numeric score for the highest level reached (1-4 points). The four criteria scores for evidence for potential impact were summed, as were the four criteria scores for evidence quality.


The numeric scores were converted to ordinal evidence levels using the following approach: 1–4 points = weak evidence; 5–8 points = moderate evidence; 9–12 points = strong evidence; and 13–16 points = very strong evidence. The evidence quality level was determined using the following conversion: 1–4 points = low quality evidence; 5–8 points = moderate quality evidence; 9–12 points = high quality evidence; and 13–16 points = very high quality evidence. For example, if the Effectiveness criterion scored “very strong” and the Equity and Reach criterion scored “very strong” and the Efficiency criterion scored “strong” and the Transferability criterion scored “strong,” then 4+4+3+3 = 14 = “very strong” evidence for potential impact.

This procedure gave each of the seven PAD policy interventions an evidence for potential impact level and an evidence quality level, which were used to categorize them as “best,” “promising (quality),” “promising (impact),” or “emerging” (Table). Intervention evidence summaries were developed to describe the evidence bases. See page 23 for a description of the evidence summary template.

Table. Method for categorizing overall evidence level using evidence for potential impact and quality levels

<table>
<thead>
<tr>
<th>Evidence for Potential Public Health Impact Level</th>
<th>Evidence Quality Level</th>
<th>Evidence Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strong or Very Strong</td>
<td>High or Very High</td>
<td>Best</td>
</tr>
<tr>
<td>Weak or Moderate</td>
<td>High or Very High</td>
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<tr>
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<td>Low or Moderate</td>
<td>Promising Evidence for Potential Public Health Impact</td>
</tr>
<tr>
<td>Weak or Moderate</td>
<td>Low or Moderate</td>
<td>Emerging</td>
</tr>
</tbody>
</table>

n. Contact CDC DHDSP for the QuIC Evidence Assessment Handbook.

o. This method has been shown to achieve Very Good to Excellent inter-rater agreement within 3 previous QuIC assessments: Centers for Disease Control and Prevention. Division for Heart Disease and Stroke Prevention. What Could Be Addressed in an Evidence-Informed State Workplace Health Promotion Law? Atlanta, GA: Centers for Disease Control and Prevention; 2017; Centers for Disease Control and Prevention. Division for Heart Disease and Stroke Prevention. What Evidence Supports State Laws to Establish Community Health Worker Scope of Practice and Certification? Atlanta, GA: Centers for Disease Control and Prevention; 2017; & Centers for Disease Control and Prevention. Division for Heart Disease and Stroke Prevention. What Evidence Supports State Laws to Enhance Public Access Defibrillation? Atlanta, GA: Centers for Disease Control and Prevention; 2017.

p. The evidence for potential impact level was determined using the following conversion: 1–4 points = weak; 5–8 points = moderate; 9–12 points = strong; and 13–16 points = very strong. The evidence quality level was determined using the following conversion: 1–4 points = low; 5–8 points = moderate; 9–12 points = high; and 13–16 points = very high. For example, if the Effectiveness criterion scored “very strong” and the Equity and Reach criterion scored “very strong” and the Efficiency criterion scored “strong” and the Transferability criterion scored “strong,” then 4+4+3+3 = 14 = “very strong” evidence for potential impact.
# QuIC Evidence Assessment Tool

## Section 1. Evidence for Potential Public Health Impact

<table>
<thead>
<tr>
<th>Criterion and what it measures</th>
<th>Weak Evidence</th>
<th>Moderate Evidence</th>
<th>Strong Evidence</th>
<th>Very Strong Evidence</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Effectiveness</strong>&lt;br&gt;Does it work, i.e., improve outcomes relevant to health?</td>
<td>Indirect evidence for a positive expected outcome relevant to health</td>
<td>Direct evidence for a positive expected outcome relevant to health</td>
<td>Indirect evidence of mostly positive actual outcomes relevant to health</td>
<td>Direct evidence of mostly positive actual outcomes relevant to health</td>
</tr>
<tr>
<td><strong>Equity and Reach</strong>&lt;br&gt;Does it work for target population(s)?</td>
<td>Indirect evidence for a positive expected outcome relevant to equity and reach</td>
<td>Direct evidence for a positive expected outcome relevant to equity and reach</td>
<td>Indirect evidence of mostly positive actual outcomes relevant to equity and reach</td>
<td>Direct evidence of mostly positive actual outcomes relevant to equity and reach</td>
</tr>
<tr>
<td><strong>Efficiency</strong>&lt;br&gt;Is it a good use of resources?</td>
<td>Indirect evidence for a positive expected outcome relevant to efficiency</td>
<td>Direct evidence for a positive expected outcome relevant to efficiency</td>
<td>Indirect evidence of mostly positive actual outcomes relevant to efficiency</td>
<td>Direct evidence of mostly positive actual outcomes relevant to efficiency</td>
</tr>
<tr>
<td><strong>Transferability</strong>&lt;br&gt;Does it work across diverse settings?</td>
<td>Indirect evidence for a positive expected outcome relevant to health in two or more regions of the United States</td>
<td>Direct evidence for a positive expected outcome relevant to health in two or more regions of the United States</td>
<td>Indirect evidence of mostly positive actual outcomes relevant to health in two or more regions of the United States</td>
<td>Direct evidence of mostly positive actual outcomes relevant to health in two or more regions of the United States</td>
</tr>
</tbody>
</table>

Note: if none of its requirements are met, a criterion is assigned a score of 0 points.

## Section 2. Evidence Quality

<table>
<thead>
<tr>
<th>Criterion and what it measures</th>
<th>Low Quality</th>
<th>Moderate Quality</th>
<th>High Quality</th>
<th>Very High Quality</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Evidence Types</strong>&lt;br&gt;What is the most rigorous design?</td>
<td>A narrative review or commentary suggests a positive outcome</td>
<td>A non-experimental study suggests a positive outcome</td>
<td>An experimental or quasi-experiment suggests a positive outcome</td>
<td>A systematic review suggests a positive outcome</td>
</tr>
<tr>
<td><strong>Sources</strong>&lt;br&gt;What is the most credible source?</td>
<td>A peer-reviewed journal or conference publication without conflict of interest disclosure suggests a positive outcome</td>
<td>A publication by a nonprofit or government organization suggests a positive outcome</td>
<td>A peer-reviewed journal or conference publication with conflict of interest disclosure suggests a positive outcome</td>
<td>A publication by a public health authority suggests a positive outcome</td>
</tr>
<tr>
<td><strong>Evidence from Research</strong>&lt;br&gt;Relevance to controlled settings?</td>
<td>A small amount of evidence from research suggests positive outcomes</td>
<td>A moderate amount of evidence from research suggests positive outcomes</td>
<td>A large amount of evidence from research suggests positive outcomes</td>
<td>A very large amount of evidence from research suggests positive outcomes</td>
</tr>
<tr>
<td><strong>Evidence from Translation and Practice</strong>&lt;br&gt;Relevance to real world?</td>
<td>A small amount of evidence from translation and practice suggests positive outcomes</td>
<td>A moderate amount of evidence from translation and practice suggests positive outcomes</td>
<td>A large amount of evidence from translation and practice suggests positive outcomes</td>
<td>A very large amount of evidence from translation and practice suggests positive outcomes</td>
</tr>
</tbody>
</table>

Note: if none of its requirements are met, a criterion is assigned a score of 0 points.
### A Policy Evidence Assessment Report: Appendix

#### Evidence Summary Template

### Policy Intervention

**Evidence Level:** This field provides this type of intervention’s evidence level which can be used to inform its priority in policymaking. Evidence level can be “best”, “promising (quality)”, “promising (impact)”, or “emerging.”

A brief definition of the PAD intervention including (when applicable) specific elements is included under the type of PAD intervention.

**Example of state law addressing this type of intervention**

This field provides an example of a state law that typifies this type of PAD intervention. In addition to an abbreviated description of the content of the law, the entry includes a legal citation.

---

### Evidence for Potential Public Health Impact:

<table>
<thead>
<tr>
<th>Effectiveness:</th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Equity &amp; Reach:</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Efficiency:</td>
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<td>Transferability:</td>
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</tbody>
</table>

**TOTAL:**

<table>
<thead>
<tr>
<th>Weak</th>
<th>Moderate</th>
<th>Strong</th>
<th>Very Strong</th>
</tr>
</thead>
</table>

**SCORE:** Weak, Moderate, Strong, or Very Strong

### Evidence Quality:

<table>
<thead>
<tr>
<th>Evidence Type:</th>
<th></th>
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</thead>
<tbody>
<tr>
<td>Source:</td>
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<tr>
<td>Evidence from Research:</td>
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<td></td>
</tr>
<tr>
<td>Evidence from Translation &amp; Practice:</td>
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</tbody>
</table>

**TOTAL:**

<table>
<thead>
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<th>Low</th>
<th>Moderate</th>
<th>High</th>
<th>Very High</th>
</tr>
</thead>
</table>

**SCORE:** Low, Moderate, High, or Very High

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### Reported health-related outcomes

This field lists positive health-related outcomes associated with PAD interventions from the included studies. Note that in most studies, positive outcomes were not directly linked with specific PAD interventions.

### Groups studied

This field reports the groups for which intervention studies found positive health-related outcomes.

### Feasibility and related economic highlights

This field reports any positive feasibility findings and related economic outcomes of the interventions studied such as cost-effectiveness, cost savings, and improvement in quality of care.

### States where programs achieved positive health-related outcomes

This field provides a list of states in which the studies finding positive health-related outcomes were set, or absence of information on state setting is noted. For example, if a PAD intervention was found to improve health in Seattle, Washington, “Washington” would be listed here.

### References

Here you will find the references supporting the description of the policy intervention.

### Evidence Base on Potential Public Health Impact

**Research-based studies**

Here you will find the studies including this policy intervention that took place in a research context, in which researchers were able to allocate subjects into the intervention and the control groups.

**Practice-based studies**

Here you will find the studies of this policy intervention that took place under real-world circumstances. In these studies, evaluators were not able to allocate subjects into the intervention and the control groups.

**Narratives and commentaries**

Here you will find the evidence that provides recommendations for this policy intervention from subject matter experts and practitioners.