

## AHA AND AMERICAN RED CROSS FOCUSED UPDATE

# 2019 American Heart Association and American Red Cross Focused Update for First Aid: Presyncope

## An Update to the American Heart Association and American Red Cross Guidelines for First Aid

**ABSTRACT:** This 2019 focused update to the American Heart Association and American Red Cross first aid guidelines follows the completion of a systematic review of treatments for presyncope of vasovagal or orthostatic origin. This review was commissioned by the International Liaison Committee on Resuscitation and resulted in the development of an international summary statement of the International Liaison Committee on Resuscitation First Aid Task Force Consensus on Science With Treatment Recommendations. This focused update highlights the evidence supporting specific interventions for presyncope of orthostatic or vasovagal origin and recommends the use of physical counterpressure maneuvers. These maneuvers include the contraction of muscles of the body such as the legs, arms, abdomen, or neck, with the goal of elevating blood pressure and alleviating symptoms. Although lower-body counterpressure maneuvers are favored over upper-body counterpressure maneuvers, multiple methods can be beneficial, depending on the situation.

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This 2019 focused update to the American Heart Association and American Red Cross (Red Cross) first aid guidelines incorporates the systematic review conducted by the First Aid Task Force of the International Liaison Committee on Resuscitation (ILCOR).<sup>1</sup> Systematic reviews conducted by ILCOR provide a body of evidence to a panel of experts to develop a Consensus on Science With Treatment Recommendations document for international use. A North American team, with representatives from the American Heart Association and the Red Cross, then updates existing first aid guidelines for use domestically in curriculum and protocol development. Beginning in 2015, the ILCOR evidence evaluation process transitioned to a continuous evidence evaluation, with systematic reviews performed as new published evidence warrants or when an ILCOR Task Force prioritizes a topic.

*First aid* is defined as the initial care provided for an acute illness or injury. The goals of first aid include preserving life, alleviating suffering, preventing further illness or injury, and promoting recovery. First aid can be initiated by anyone in any situation and includes self-care. General characteristics of the provision of first aid, at any level of training, include recognizing, assessing, and prioritizing the need for first aid; providing care using appropriate competencies; and recognizing limitations and seeking additional care when needed, such as activating emergency medical services or other medical assistance.<sup>2</sup>

In 2019, the ILCOR First Aid Task Force conducted a systematic review of immediate interventions for presyncope of vasovagal or orthostatic origin. The resulting Consensus on Science With Treatment Recommendations evaluation was posted

\*This article represents the author's opinions and does not represent the official policy or position of the Uniformed Services University, Defense Department, or US government.

**Key Words:** AHA Scientific Statements  
■ first aid ■ hypotension, orthostatic  
■ Red Cross ■ syncope ■ syncope, vasovagal

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**Table 1.** Applying Class of Recommendation and Level of Evidence to Clinical Strategies, Interventions, Treatments, or Diagnostic Testing in Patient Care (Updated August 2015)\*

CLASS (STRENGTH) OF RECOMMENDATION	LEVEL (QUALITY) OF EVIDENCE‡
<b>CLASS 1 (STRONG)</b> <span style="float: right;"><b>Benefit &gt;&gt;&gt; Risk</b></span> <b>Suggested phrases for writing recommendations:</b> <ul style="list-style-type: none"> <li>• Is recommended</li> <li>• Is indicated/useful/effective/beneficial</li> <li>• Should be performed/administered/other</li> <li>• Comparative-Effectiveness Phrases†:                             <ul style="list-style-type: none"> <li>– Treatment/strategy A is recommended/indicated in preference to treatment B</li> <li>– Treatment A should be chosen over treatment B</li> </ul> </li> </ul>	<b>LEVEL A</b> <ul style="list-style-type: none"> <li>• High-quality evidence‡ from more than 1 RCT</li> <li>• Meta-analyses of high-quality RCTs</li> <li>• One or more RCTs corroborated by high-quality registry studies</li> </ul>
<b>CLASS 2a (MODERATE)</b> <span style="float: right;"><b>Benefit &gt;&gt; Risk</b></span> <b>Suggested phrases for writing recommendations:</b> <ul style="list-style-type: none"> <li>• Is reasonable</li> <li>• Can be useful/effective/beneficial</li> <li>• Comparative-Effectiveness Phrases†:                             <ul style="list-style-type: none"> <li>– Treatment/strategy A is probably recommended/indicated in preference to treatment B</li> <li>– It is reasonable to choose treatment A over treatment B</li> </ul> </li> </ul>	<b>LEVEL B-R (Randomized)</b> <ul style="list-style-type: none"> <li>• Moderate-quality evidence‡ from 1 or more RCTs</li> <li>• Meta-analyses of moderate-quality RCTs</li> </ul>
<b>CLASS 2b (WEAK)</b> <span style="float: right;"><b>Benefit ≥ Risk</b></span> <b>Suggested phrases for writing recommendations:</b> <ul style="list-style-type: none"> <li>• May/might be reasonable</li> <li>• May/might be considered</li> <li>• Usefulness/effectiveness is unknown/unclear/uncertain or not well-established</li> </ul>	<b>LEVEL B-NR (Nonrandomized)</b> <ul style="list-style-type: none"> <li>• Moderate-quality evidence‡ from 1 or more well-designed, well-executed nonrandomized studies, observational studies, or registry studies</li> <li>• Meta-analyses of such studies</li> </ul>
<b>CLASS 3: No Benefit (MODERATE)</b> <span style="float: right;"><b>Benefit = Risk</b></span> <b>(Generally, LOE A or B use only)</b> <b>Suggested phrases for writing recommendations:</b> <ul style="list-style-type: none"> <li>• Is not recommended</li> <li>• Is not indicated/useful/effective/beneficial</li> <li>• Should not be performed/administered/other</li> </ul>	<b>LEVEL C-LD (Limited Data)</b> <ul style="list-style-type: none"> <li>• Randomized or nonrandomized observational or registry studies with limitations of design or execution</li> <li>• Meta-analyses of such studies</li> <li>• Physiological or mechanistic studies in human subjects</li> </ul>
<b>Class 3: Harm (STRONG)</b> <span style="float: right;"><b>Risk &gt; Benefit</b></span> <b>Suggested phrases for writing recommendations:</b> <ul style="list-style-type: none"> <li>• Potentially harmful</li> <li>• Causes harm</li> <li>• Associated with excess morbidity/mortality</li> <li>• Should not be performed/administered/other</li> </ul>	<b>LEVEL C-E0 (Expert Opinion)</b> <ul style="list-style-type: none"> <li>• Consensus of expert opinion based on clinical experience</li> </ul>

COR and LOE are determined independently (any COR may be paired with any LOE).  
 A recommendation with LOE C does not imply that the recommendation is weak. Many important clinical questions addressed in guidelines do not lend themselves to clinical trials. Although RCTs are unavailable, there may be a very clear clinical consensus that a particular test or therapy is useful or effective.  
 \* The outcome or result of the intervention should be specified (an improved clinical outcome or increased diagnostic accuracy or incremental prognostic information).  
 † For comparative-effectiveness recommendations (COR 1 and 2a; LOE A and B only), studies that support the use of comparator verbs should involve direct comparisons of the treatments or strategies being evaluated.  
 ‡ The method of assessing quality is evolving, including the application of standardized, widely-used, and preferably validated evidence grading tools; and for systematic reviews, the incorporation of an Evidence Review Committee.  
 COR indicates Class of Recommendation; E0, expert opinion; LD, limited data; LOE, Level of Evidence; NR, nonrandomized; R, randomized; and RCT, randomized controlled trial.

online for public comment,<sup>3</sup> and a summary containing the final wording of the Consensus on Science With Treatment Recommendations has been published simultaneously with this focused update.<sup>4</sup> This focused update includes a new guideline because the treatment of presyncope has not previously been reviewed by ILCOR. Prior first aid guidelines are available in “Part 13: First Aid: 2010 American Heart Association and American Red Cross International Consensus on First Aid Science With Treatment Recommendations,”<sup>5</sup> “Part 17: First Aid: 2010 American Heart Association and American Red Cross Guidelines for First Aid,”<sup>6</sup> and “Part 15: First Aid: 2015 American Heart Association and American Red Cross Guidelines Update for First Aid.”<sup>7</sup> All American Heart Association and Red Cross guidelines use Classes

of Recommendation and Levels of Evidence according to the most recent recommendations of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines (Table 1)<sup>8</sup> by using the process detailed in the “2015 American Heart Association Guidelines Update for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care.”<sup>9</sup>

## FIRST AID INTERVENTIONS FOR PRESYNCOPE

### Background

Syncope, a transient loss of consciousness, results from global cerebral hypoperfusion and affects ≈35% of the

**Table 2. Typical Symptoms and Signs of Presyncope**

Typical symptoms of presyncope	Faintness, dizziness, nausea, feeling warm/hot or cold, abdominal pain, visual disturbance (black spots, blurred vision)
Typical signs of presyncope	Pallor/paleness, sweating, vomiting, shivering, sighing, diminished postural tone, confusion

general population at some point in their lives.<sup>10,11</sup> Syncope leads to the loss of postural tone and may result in physical injury, including fractures, intracranial hemorrhage, or other organ damage, if the individual is upright at the time of the syncopal episode. Injury is present in 30% of patients who present to an emergency department after syncope.<sup>12</sup> Syncope results in 2% to 6% of hospital admissions internationally and in the United States accounts for at least \$2.4 billion in annual hospital costs.<sup>11,13,14</sup> Recurrent syncopal episodes, occurring in ~20% of individuals during the first 4 years after an initial episode, are associated with additional morbidity and healthcare costs.<sup>11,14</sup>

Vasovagal syncope and orthostatic syncope result in 21.2% and 9.4% of syncopal episodes, respectively.<sup>15</sup> The underlying physiology of both conditions is decreased blood return to the heart, leading to decreased cardiac output, decreased global cerebral perfusion, and subsequent loss of consciousness.<sup>16</sup> Although other causes of syncope can represent more substantial underlying pathology, vasovagal syncope and orthostatic syncope are generally relatively benign; however, they can lead to injury and significant lifestyle impairment for those with recurrent episodes. The symptoms preceding loss of consciousness are known as presyncope and can last for a few seconds before the onset of vasovagal and orthostatic syncope. Associated signs and symptoms include pallor, sweating, lightheadedness, visual changes, and weakness (Table 2). Presyncope presents recognizable signs and symptoms and a period during which rapid first aid treatment could improve symptoms or prevent syncope from occurring.

### Evidence Summary—New 2019

The 2019 ILCOR systematic review of the adult and pediatric literature resulted in the inclusion of 2 randomized controlled trials and 6 observational studies on first aid interventions for the treatment of presyncope.<sup>1</sup> These studies enrolled a total of 246 participants between 15 and 75 years of age with a confirmed history of vasovagal or orthostatic-related syncope. Researchers across the studies applied a variety of physical counterpressure maneuvers (PCMs), including handgrip, arm tensing, abdominal muscle tensing, leg crossing with tensing, squatting, and neck flexion (Table 3). Overall, use of PCMs resulted in increased blood pressure, improved symptoms, and the ability to prevent syncope

compared with no intervention. Despite the lack of uniform results across all studies, benefit for these outcomes was found with the use of upper-body, lower-body, neck, and abdominal PCMs. In an evaluation of available comparative data, lower-body PCMs demonstrated a greater ability to increase blood pressure and to avoid syncope compared with upper-body PCMs. No adverse events or injuries were reported as a result of PCM use.

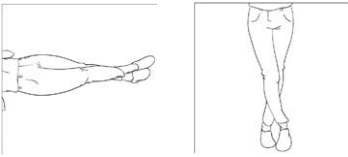

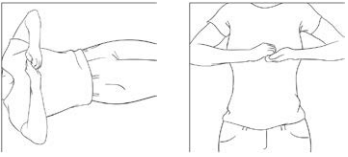
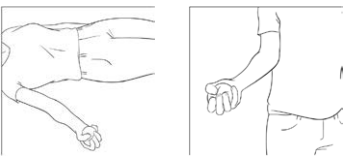
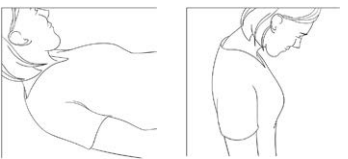
### Recommendations—New 2019

1. **If a person experiences signs or symptoms of presyncope (including pallor, sweating, lightheadedness, visual changes, and weakness) of vasovagal or orthostatic origin, the priority for that person is to maintain or assume a safe position, such as sitting or lying down. Once the person is in a safe position, it can be beneficial for that person to use PCMs to avoid syncope (Class 2a; Level of Evidence C-LD).**
2. **If a first aid provider recognizes presyncope of suspected vasovagal or orthostatic origin in another individual, it may be reasonable for the first aid provider to encourage that person to perform PCMs until symptoms resolve or syncope occurs. If no improvement occurs within 1 to 2 minutes, or if symptoms worsen or reoccur, providers should initiate a call for additional help (Class 2b; Level of Evidence C-EO).**
3. **If there are no extenuating circumstances, lower-body PCMs are preferable to upper-body and abdominal PCMs (Class 2b; Level of Evidence C-LD).**
4. **The use of PCMs is not suggested when symptoms of a heart attack or stroke accompany presyncope (Class 3: Harm; Level of Evidence C-EO).**

### Discussion

Consistent with the chain of survival behaviors,<sup>17</sup> educating individuals and at-risk populations about vasovagal and orthostatic presyncope, including signs and symptoms and associated risks with syncope, supports the first link of plan and prepare. Beyond first aid courses, medical providers can teach those at greater risk for syncope to perform PCMs. The second link, early recognition, allows those experiencing or observing the signs and symptoms of presyncope to initiate appropriate action to keep the person safe from a potential syncopal episode. The third links, early access to advanced care and first aid actions through the use of PCMs, are appropriate at the first aid level and can be

**Table 3. Description of Recommended PCMs**

Method	Description	Illustration
Lower-body PCMs		
Leg crossing with muscle tensing	Leg crossing with tensing of the leg, abdominal, and buttock muscles while lying down or, if necessary, while standing	
Squatting	Lowering the body into a squatting position. Adjunctive lower-body and abdomen muscle tensing can be done during the squat and then on standing once symptoms have resolved.	
Upper-body PCMs		
Arm tensing	Gripping opposing hands with fingers and pulling with arms in opposing directions with maximum force	
Isometric handgrip	Clenching fist at maximum contraction with or without an item in the hand	
Neck flexion	Touching the chin to the chest and tightening the neck musculature	

PCM indicates physical counterpressure maneuver.

done simultaneously. Emergency medical services or advanced care will support first aid providers if needed.

Contextually for curriculum designers and educators, syncope presents the potential for substantial morbidity, not only from loss of consciousness but also from injuries associated with falls. PCMs represent simple interventions that can be performed to alleviate and potentially terminate symptoms, reducing the risk of injury and associated healthcare costs. In syncope, the loss of postural tone can result in falls and significant injury. Although PCMs have been shown to be beneficial in preventing syncope, the studies do not report 100% success. Therefore, if possible, the person experiencing presyncope should be placed in a sitting or lying position before performing PCMs. This can reduce the risk of falls if presyncope progresses to syncope.

PCMs are maneuvers in which the individual contracts muscles of the body, including the legs, arms, abdomen, or neck, with the goal of elevating blood pressure and alleviating symptoms. PCMs are postulated to work through vascular compartment compression,

causing an increase in systemic vascular resistance, resulting in a rise in blood pressure to improve the immediate symptoms of presyncope of vasovagal or orthostatic origin.<sup>3</sup> Once learned, PCMs require no additional resources and have the potential to enhance health equity, although the evaluated studies have not assessed this outcome. Although this update is not intended to be a comprehensive review of the mechanics of performing PCMs, additional information can be found in articles by Jensen et al<sup>1</sup> and Wieling et al.<sup>18</sup>

In the evaluated studies, patients with orthostatic or vasovagal syncope were taught PCMs and were subsequently able to use these PCMs successfully when they experienced presyncopal symptoms.<sup>19–25</sup> Medical providers can deliver preemptive training for patients diagnosed with orthostatic or vasovagal syncope, with the goal of preventing future syncopal episodes.

There may be instances when a first aid provider trained in the use of PCMs can help an untrained person experiencing presyncope by directing that person to perform PCMs. Presyncope of vasovagal or orthostatic



origin is likely best recognized by a first aid provider if the symptomatic person can tell the first aid provider (eg, during a work physical or disclosure in medical forms) that he or she has previously been diagnosed by a healthcare provider. However, because approximately one-third of individuals experience syncope at some time, it is likely that a first aid provider will encounter a person with presyncopal symptoms and no prior diagnosis of vasovagal or orthostatic syncope.<sup>10,11</sup> The signs and symptoms that can be used by a first aid provider to recognize presyncope are listed in Table 2. Vasovagal syncope may be associated with a stimulating event such as the sight of blood or emotional stress.<sup>26</sup> Orthostatic syncope may occur with rapid transition to a standing position or standing for long periods of time, particularly in hot weather.<sup>27</sup> In 2 studies, paleness and sweating were the most common observable signs of presyncope of vasovagal origin.<sup>26,28</sup> However, these signs and symptoms may also occur with other pathologies, including arrhythmias and hypoglycemia. Therefore, if rapid and sustained improvement in signs and symptoms does not occur or the person's status deteriorates, the first aid provider should activate emergency medical services and use other first aid competencies as appropriate.

PCMs should be performed only in patients with isolated presyncopal symptoms; that is, without other accompanying symptoms that could be suggestive of another, more serious pathology. Chest pain is not a typical symptom of presyncope of vasovagal or orthostatic origin, so if chest pain accompanies symptoms of presyncope, the provider should follow first aid guidelines for chest pain and not encourage the performance of PCMs.<sup>7</sup> In addition, any patient with an accompanying injury, bleeding, or signs of stroke should be managed according to those first aid protocols.<sup>7</sup> Furthermore, if the person progresses to syncope, he or she should be placed or supported in a reclining position to aid cerebral blood flow, and the provider should activate emergency medical services.

Although none of the studies in the systematic review assessed the ability of a provider to direct the symptomatic person in real time to use PCMs to terminate symptoms of presyncope, research personnel were able to successfully teach participants to apply PCMs when presyncope symptoms developed. In addition, some individuals demonstrated retention of this skill over time, decreasing the rate of syncope in the subsequent months to years after initial instruction.<sup>19,21,25,29</sup> This suggests that providers can teach these techniques and that individuals can both recognize symptoms of presyncope in themselves and be taught to perform PCMs at the onset of symptoms. Continued research is needed to determine whether first aid providers can appropriately direct or help an individual experiencing presyncope to perform a PCM and avoid syncope.

In the 2019 Consensus on Science With Treatment Recommendations consensus document, a variety of PCMs resulted in improvement in blood pressure and symptoms and prevented syncope. For these guidelines, recommended PCMs were chosen on the basis of certainty of evidence, along with the underlying goal of positioning the person in a seated or lying position to minimize the risk of harm. The only PCM included that does not follow the process is squatting; however, there was a significant amount of evidence for this PCM, and although it is not done in the supine position, it brings the patient closer to the floor, reducing the risk of harm.

Although lower-body PCMs appeared to be favorable to upper-body PCMs in the few available studies, both types may be beneficial. There may be instances in which lower-body PCMs are not feasible, such as with little leg room in a seated position on an airplane or with an existing injury; in these circumstances, upper-body PCMs are an acceptable alternative. Conversely, if the person is standing and, for some reason, is unable to lie down, either a lower-extremity PCM such as leg crossing and tensing or upper-body PCMs such as neck flexion, arm tensing, or isometric hand grip could be used. Squatting as a PCM is an acceptable alternative for those who develop presyncope in the standing position because it is associated with improved blood pressure, symptom relief, and the prevention of syncope. It also places the individual closer to the ground, which may reduce injury should syncope develop.

It is important to note that in this review, PCMs were studied only for vasovagal or orthostatic syncope, thus limiting the generalizability of these maneuvers to other causes of syncope. Conditions such as cardiac arrhythmias, hypoglycemia, or drug overdose can produce symptoms that mimic vasovagal or orthostatic presyncope. However, it is not felt that performing these PCMs for a brief time period would result in any harm to an individual with these other conditions, provided that first aid treatment for the conditions is underway. No studies included in this review enrolled children <15 years of age.

## CONCLUSIONS

PCMs are a simple and effective way to improve symptoms and prevent syncope in adults with presyncope of vasovagal or orthostatic origin. First aid providers should be familiar with the signs and symptoms of presyncope and methods of PCMs that can be used. Although lower-body PCMs are favored over upper-body PCMs, multiple methods can be beneficial, depending on the situation. As with other first aid care, maintaining safety is essential; therefore, symptomatic individuals should lie down if possible, and providers should seek additional help if symptoms do not rapidly improve with the PCM, the symptoms worsen or reoccur, or the person becomes unresponsive.

## ARTICLE INFORMATION

The American Heart Association makes every effort to avoid any actual or potential conflicts of interest that may arise as a result of an outside relationship or a personal, professional, or business interest of a member of the writing panel. Specifically, all members of the writing group are required to complete and submit a Disclosure Questionnaire showing all such relationships that might be perceived as real or potential conflicts of interest.

This focused update was approved by the American Heart Association Science Advisory and Coordinating Committee on July 19, 2019, and the American Heart Association Executive Committee on August 9, 2019. A copy of the document is available at <https://professional.heart.org/statements> by using either "Search for Guidelines & Statements" or the "Browse by Topic" area. To purchase additional reprints, call 843-216-2533 or e-mail [kelle.ramsay@wolterskluwer.com](mailto:kelle.ramsay@wolterskluwer.com).

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## Disclosures

### Writing Group Disclosures

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Jonathan L. Epstein	American Red Cross	None	None	None	None	None	None	None
Gustavo E. Flores	Emergency & Critical Care Trainings LLC	None	None	None	None	None	None	None
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Aaron M. Orkin	University of Toronto Institute of Health Policy, Management & Evaluation (Canada)	SOONER (Surviving Opioid Overdose with Naloxone Education and Resuscitation) Project (coinvestigator on a CIHR-funded trial that receives in-kind drug and device donations from Adapt Pharma and resuscitation mannequin donation from Laerdal)*; Community-Based Emergency Care Project (PI on a program to develop and evaluate first aid and emergency care education programs with remote indigenous communities)*	None	None	Expert witness concerning first aid in opioid overdose for an inquest of the Ontario Office of the Chief Coroner, 2018*	None	None	None
Eunice M. Singletary	University of Virginia	None	American Red Cross Scientific Advisory Council (chair of First Aid Sub Council; volunteer, no financial benefit)*	None	None	None	None	None
Tammy M. Slater	Johns Hopkins University	None	None	None	None	None	None	None
Janel M. Swain	Emergency Health Services Nova Scotia (Canada)	None	None	None	None	None	None	None

This table represents the relationships of writing group members that may be perceived as actual or reasonably perceived conflicts of interest as reported on the Disclosure Questionnaire, which all members of the writing group are required to complete and submit. A relationship is considered to be "significant" if (a) the person receives \$10000 or more during any 12-month period, or 5% or more of the person's gross income; or (b) the person owns 5% or more of the voting stock or share of the entity, or owns \$10000 or more of the fair market value of the entity. A relationship is considered to be "modest" if it is less than "significant" under the preceding definition.

\*Modest.

## Reviewer Disclosures

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Susan P. Etheridge	University of Utah	None	None	None	None	None	None	None
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William J. Meurer	University of Michigan	None	None	None	None	None	None	None

This table represents the relationships of reviewers that may be perceived as actual or reasonably perceived conflicts of interest as reported on the Disclosure Questionnaire, which all reviewers are required to complete and submit. A relationship is considered to be "significant" if (a) the person receives \$10 000 or more during any 12-month period, or 5% or more of the person's gross income; or (b) the person owns 5% or more of the voting stock or share of the entity, or owns \$10 000 or more of the fair market value of the entity. A relationship is considered to be "modest" if it is less than "significant" under the preceding definition.

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