

2025 Korean Guidelines for Cardiopulmonary Resuscitation: Part 1. The update process and highlights

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In response to the expanding body of research on cardiopulmonary resuscitation (CPR) and updates from the International Liaison Committee on Resuscitation, the 2020 Korean CPR guidelines have been revised. This article presents the development process and summarizes the major updates in the 2025 Korean CPR guidelines. Seven task forces were established, with members nominated by professional societies involved in CPR. Each task force formulated key clinical questions and conducted systematic evidence reviews using the GRADE (Grading of Recommendations, Assessment, Development, and Evaluation) methodology. The 2025 CPR guidelines were finalized on the basis of the reviewed evidence and consensus discussions. The major updates are as follows: (1) addition of rehabilitation and recovery to the chain of survival; (2) inclusion of guidance for dispatchers on the use of automated external defibrillators; (3) recommendation that trained rescuers provide rescue breaths in cases of drowning-related cardiac arrest; (4) suggestion of double sequential defibrillation or vector-change defibrillation for refractory ventricular fibrillation; (5) revision of the target temperature range for post-resuscitation temperature management from 32–36 to 33–37.5 °C; (6) recommendation of public access defibrillation for children aged ≥1 year; (7) suggestion to use supraglottic airway devices and video laryngoscopy in neonatal resuscitation; (8) recommendation for the use of feedback devices in CPR training; and (9) addition of a first aid section addressing cardiac arrest-related emergencies. These guidelines reflect the most current evidence, and their implementation and dissemination are expected to improve survival after cardiac arrest.

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BACKGROUND AND UPDATE PROCESS OF THE GUIDELINES

Cardiopulmonary resuscitation and clinical practice guidelines

In Korea, the number of out-of-hospital cardiac arrest (OHCA) patients transported by emergency medical services (EMS) increased from 21,905 in 2008 to 33,034 in 2024. Despite this increase, the survival rate of patients with OHCA remains low at 9.2% as of 2024, and the rate of favorable neurological recovery is only 6.3% [1]. Cardiopulmonary resuscitation (CPR) is an emergency intervention that aims to delay irreversible death by maintaining circulation and ventilation, thereby providing a minimal supply of oxygen to vital organs during cardiac arrest. Hypoxic-ischemic brain injury begins approximately 4 to 5 minutes after the onset of cardiac arrest; therefore, early initiation of CPR by lay bystanders before the arrival of EMS personnel has a critical impact on patient outcomes. Higher rates of bystander-initiated CPR are associated with increased survival and improved neurological outcomes. Accordingly, many countries seek to improve outcomes after cardiac arrest by developing and disseminating CPR guidelines adapted to local communities and by providing widespread public education.

CPR guidelines have undergone periodic revision, primarily in the United States and Europe, based on the accumulation of scientific evidence in resuscitation medicine since their initial establishment in 1966 by the American Heart Association (AHA) and the National Academy of Sciences–National Research Council [2–5]. Since the 1990s, the International Liaison Committee on Resuscitation (ILCOR) has played a central role in coordinating and revising CPR guidelines. Korea participates in ILCOR guideline development through the Resuscitation Council of Asia, one of ILCOR's member councils. Since 2000, ILCOR has conducted systematic evidence reviews at 5-year intervals and has published the International Consensus on Cardiopulmonary Resuscitation and Emergency Cardiovascular Care Science With Treatment Recommendations (CoSTR) [6–8]. Since 2015, ILCOR has adopted a continuous evidence evaluation process and has issued annual evidence summaries and treatment recommendations that reflect newly published research [9–16].

ILCOR evidence summaries serve as the scientific foundation for member organizations when developing or revising CPR guidelines adapted to national or regional contexts. Informed by ILCOR treatment recommendations, each country or council establishes or updates its CPR guidelines after considering local cardiac arrest epidemiology, the structure of the EMS and health-

care systems, and relevant legal, cultural, and social factors.

In Korea, the first national CPR guidelines were published in 2006 and were subsequently revised in 2011. The Korean CPR guidelines were further revised in 2015 and 2020 under the leadership of the Korea Disease Control and Prevention Agency (KDCA) [17,18]. This chapter describes the process used to revise the existing guidelines into the 2025 Korean CPR guidelines and outlines the major updates introduced in this revision.

Rationale for revising the CPR guidelines

Interest in resuscitation medicine has increased steadily, accompanied by substantial growth in research activity. According to a recent bibliometric analysis, 1,299 articles related to resuscitation medicine were published in 2020 alone [19]. Since the release of the 2020 CPR guidelines, multiple important studies on cardiac arrest have been published, including not only observational studies but also several large-scale randomized controlled trials [20–30]. As clinically relevant evidence with the potential to influence the management of cardiac arrest continues to accumulate, this expanding evidence base has underscored the need to revise the existing CPR guidelines.

The incidence of OHCA varies by race, country, and region, with reported global estimates ranging from approximately 24 to 186 cases per 100,000 population [31]. In Korea, the number of acute cardiac arrest patients transported to hospitals by the national EMS (119 ambulance) increased from 44.3 per 100,000 population in 2008 to 64.7 per 100,000 population in 2024.

Survival after cardiac arrest varies substantially across countries and regions, reflecting sociodemographic factors, the performance of EMS and the availability and uptake of CPR training and public-access automated external defibrillators (AEDs). In countries and regions such as the United States, Europe, and Australia—where cardiac arrest surveillance systems were established early and sustained efforts have expanded CPR education and AED availability—survival after OHCA exceeds 10% [32–34].

In Korea, survival to hospital discharge after cardiac arrest increased from 4.8% in 2013 (favorable neurological outcome, 2.3%) to 9.2% in 2024 (favorable neurological outcome, 6.3%) [1]. Despite this improvement, outcomes remain suboptimal, underscoring the need for continued efforts to further enhance survival and neurological recovery after cardiac arrest.

As a major public health concern, OHCA occurs most frequently at home but also in public settings such as streets, public facilities, and sports venues. Consequently, lay bystanders play a critical role in the early community response to cardiac arrest. Survival after OHCA is strongly influenced by timely recognition,

prompt initiation of bystander CPR, rapid activation and response of the EMS system, and the quality of prehospital care, including the availability and on-site use of AEDs [35]. The ability of witnesses to recognize cardiac arrest and to perform CPR and use an AED represents a core element of the chain of survival. Accordingly, many countries and regions have implemented policies and programs to improve the public response to cardiac arrest through widespread basic life support education.

CPR guidelines provide evidence-based recommendations for the treatment of cardiac arrest. Unlike conventional clinical practice guidelines, which are primarily intended for healthcare professionals, CPR guidelines explicitly address the role of lay bystanders in emergency response. Accordingly, countries develop or revise CPR guidelines by integrating the latest scientific evidence with their EMS systems, healthcare environments, ethical considerations, and sociocultural contexts. Guideline revision therefore aims not only to update scientific knowledge but also to improve survival after cardiac arrest by supporting effective delivery of care in the community.

Scope of revision of the CPR guidelines

The ILCOR operates six task forces for CPR guideline development: Basic Life Support; Advanced Life Support; Pediatric Life Support; Neonatal Life Support; Education, Implementation, and Teams; and First Aid Task Forces [36]. The AHA guidelines for CPR and emergency cardiovascular care address resuscitation ethics, systems of care for cardiac arrest, adult and pediatric basic life support, adult and pediatric advanced life support, resuscitation in special circumstances, post-cardiac arrest care, neonatal resuscitation, and resuscitation education [37]. In 2024, the AHA published first aid guidelines separately in collaboration with the American Red Cross [38]. The European Resuscitation Council (ERC) guidelines cover cardiac arrest epidemiology, systems of care, adult basic life support, adult advanced life support, pediatric life support, neonatal resuscitation, resuscitation in special circumstances, post-resuscitation care, education, ethics, and first aid [39].

The 2020 Korean CPR guidelines included sections on basic life support, advanced life support, post-cardiac arrest care, pediatric life support, neonatal resuscitation, and education/implementation [18]. In the 2025 update, a first aid section was added, along with revisions to the existing sections.

Organization of the CPR guideline revision

The 2025 Korean CPR guidelines revision project was conducted with support from a 2024 policy research grant funded by the

KDCA. Expert selection for the guideline revision relied on recommendations from academic societies in resuscitation medicine and from the Korean Association of Cardiopulmonary Resuscitation. On the basis of these recommendations, a guideline revision committee was established. The revision structure comprised expert committees in the following areas: basic life support, advanced life support, post-cardiac arrest care, pediatric life support, neonatal resuscitation, education and implementation, and first aid. A steering committee was also established and included the principal investigator and the chairs of each expert committee. Members of the expert committees were nominated by academic societies relevant to each specialty. In total, 73 experts from 16 professional societies participated in the guideline revision.

Evidence review panels were established for each area to evaluate new evidence published after the 2020 guidelines. These panels included researchers in resuscitation medicine who agreed to participate in the revision process, as well as researchers recommended by relevant academic societies. The expert committees and the steering committee reviewed CPR guidelines published in Korea since 2020, together with those from AHA and ERC, as well as evidence review results from the ILCOR. On the basis of this review, the scope of revision for each section was defined (Table 1).

Online training was provided to support the evidence review process. The training covered methods for systematic literature review and the GRADE (Grading of Recommendations, Assessment, Development, and Evaluation) approach, which is widely used to determine the strength of recommendations and the certainty of evidence in clinical practice guidelines. In addition, a CPR terminology committee was established to collect, organize, and update CPR-related terms for use in the revised guidelines.

All individuals involved in the guideline revision submitted written disclosures of potential conflicts of interest, including employment, advisory roles, ownership interests, research funding, and honoraria related to resuscitation and cardiac arrest care.

The process of the guideline update

Each task force reviewed the ILCOR CoSTR and research articles published in the field of resuscitation medicine since the 2020 guidelines. Revision priorities were selected on the basis of clinical importance, relevance to the Korean CPR guidelines, and the need to incorporate new scientific evidence. PICO (population, intervention, comparator, and outcome) questions were formulated for systematic literature reviews addressing these priorities. The

Table 1. Topics of the 2025 Korean CPR guidelines

Field	Topic
Epidemiology and chain of survival	Epidemiology of cardiac arrest, chain of survival, cardiac arrest treatment system, survival environment
Basic life support	Basic life support algorithms, check scene safety and unresponsiveness, call for help and EMS activation, assessment of breathing and pulse, chest compressions, opening the airway and breathing, duration of scene resuscitation, automated external defibrillation, relief of foreign body airway obstruction, cardiac arrest from drowning, age definition, legal aspects of resuscitation, ethical issues, CPR in patients with suspected high-risk infection
Advanced life support	Advanced life support algorithms, monitoring during CPR, routes of drug administration, CPR drugs, defibrillation, advanced airway management, mechanical CPR devices, extracorporeal CPR
Special circumstances	Asthma, anaphylaxis, pregnancy, pulmonary embolism, electrolyte imbalances, poisoning, drowning, hypothermia, electrocution, cardiac tamponade, cardiac surgery, consciousness during CPR, prone position, physiology-guided CPR
Post-cardiac arrest care	Post-cardiac arrest care algorithm, post-cardiac arrest syndrome, secure airway, maintenance of ventilation and circulation, coronary angiography, targeted temperature management, prognostication of neurological outcomes, organ donation after cardiac arrest, rehabilitation of cardiac arrest survivors
Pediatric basic life support	Pediatric chain of survival, algorithms for pediatric OHCA and IHCA, chest compressions, airway management, artificial ventilation, compression-only CPR, treatment of foreign body airway obstruction, prevention of cardiac arrest
Pediatric advanced life support	Algorithms for pediatric advanced life support, advanced airway management, drugs during CPR, defibrillation, management of peri-cardiac arrest arrhythmias, extracorporeal CPR, special resuscitation situations, monitoring during resuscitation, post-cardiac arrest care, prognostication after ROSC, family attendance during CPR, sudden unexplained death, interhospital transfer, termination of resuscitation in children
Neonatal resuscitation	Predicting the need for resuscitation, umbilical cord management, first step, physiologic monitoring and feedback devices, positive pressure ventilation, oxygen administration, chest compressions, drug and fluid therapy, post-resuscitation care, withholding or withdrawal of resuscitation, neonatal resuscitation education program
Education and implementation	Core contents and principles of resuscitation training, strategies to increase willingness to perform CPR, development and evaluation of effective CPR programs, importance of quality improvement in CPR training, development and implementation of community-integrated resuscitation guidelines
First aid	Chest pain, acute stroke, asthma, anaphylaxis, seizure, shock, syncope

CPR, cardiopulmonary resuscitation; EMS, emergency medical services; OHCA, out-of-hospital cardiac arrest; IHCA, in-hospital cardiac arrest; ROSC, return of spontaneous circulation.

revision items and PICO questions proposed by each expert committee were finalized through discussions within the steering committee. In total, 64 PICO questions were selected: 15 for basic life support, 12 for advanced life support, 10 for post-cardiac arrest care, 8 for pediatric resuscitation, 6 for neonatal resuscitation, 8 for education and implementation, and 5 for first aid. Two members of the evidence review committee were assigned to each PICO question.

For each PICO question, evidence reviewers prepared evidence summaries and draft recommendations. These documents included summaries of ILCOR evidence reviews and recommendations, the rationale for any proposed modifications, recommendations adapted to the Korean context, and supporting references. The evidence summaries and draft recommendations were submitted to the relevant expert committees.

Each expert committee convened meetings to discuss the initial review findings for the proposed revision items. After committee-level review, the evidence summaries and recommendations were submitted to the steering committee. Following discussion at consensus meetings, the evidence reviewers revised the documents to reflect the agreed-upon conclusions.

On the basis of the final evidence summaries and recommendations, designated writing members of each expert committee

drafted the 2025 Korean CPR guidelines. Draft sections were presented at a public hearing, and feedback from designated discussants and attendees was collected. The expert committees then revised and finalized the guidelines by incorporating this feedback (Fig. 1).

Class of recommendation and certainty of evidence

The revision process of the 2025 Korean CPR guidelines followed the GRADE methodology, similar to that of the ILCOR [40,41]. In addition, given the ongoing international evidence review coordinated by ILCOR, the GRADE-ADOLOPMENT methodology was used to minimize duplication of review efforts [42,43]. During evidence synthesis, both the certainty of evidence and the class of recommendation were specified.

Certainty of evidence was classified into four levels according to GRADE definitions: high, moderate, low, and very low [44]. For intervention questions, randomized controlled trials were initially rated as high certainty, whereas observational studies were initially rated as low certainty. Certainty of evidence was downgraded according to GRADE criteria, considering risk of bias, inconsistency, indirectness, imprecision, and publication bias, or upgraded based on large effect size, residual confounding, and dose-response relationships. Certainty was determined for each outcome,

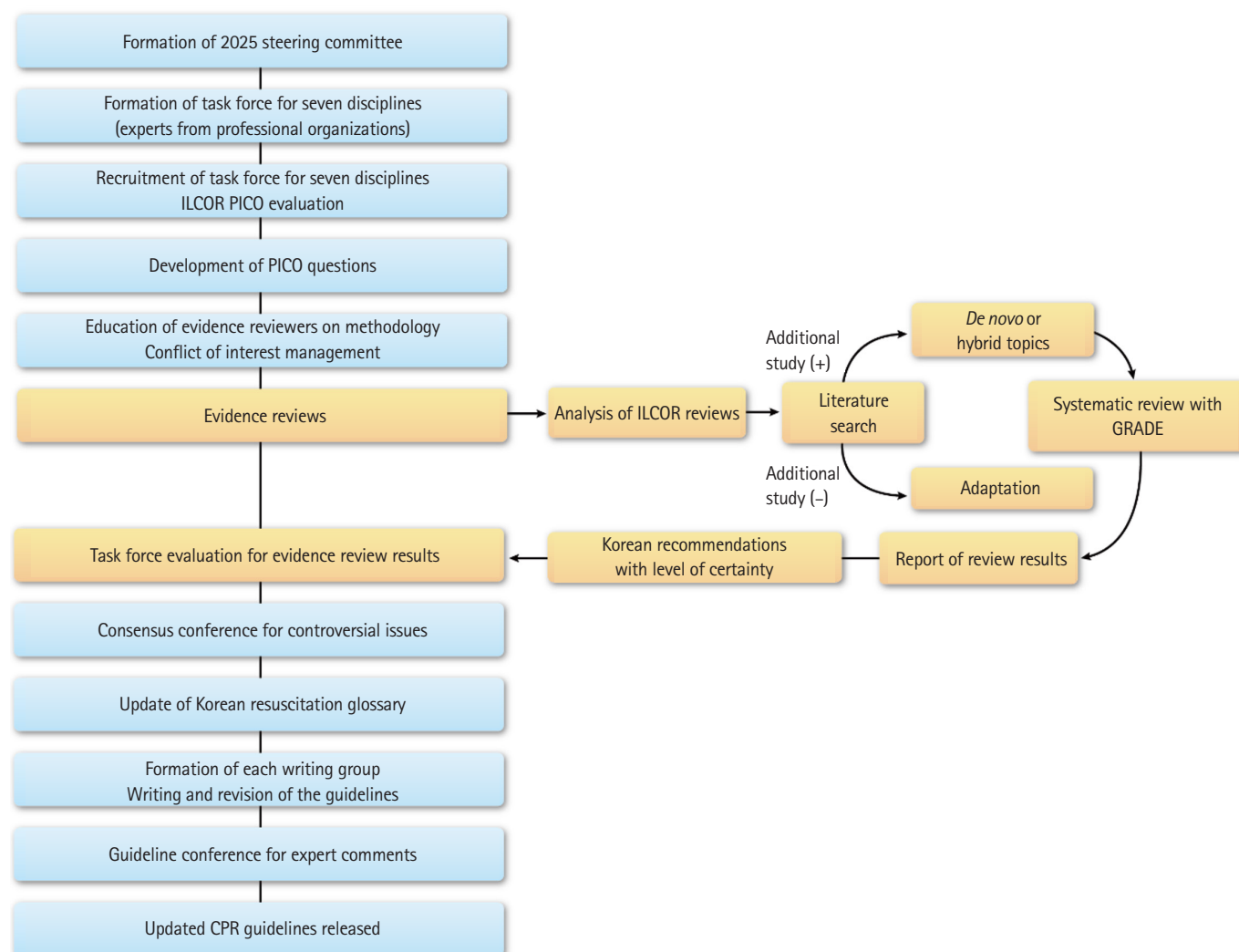


Fig. 1. The update process of 2025 Korean Guidelines for Cardiopulmonary Resuscitation (CPR). ILCOR, International Liaison Committee on Resuscitation; PICO, population, intervention, comparator, outcome; GRADE, Grading of Recommendations, Assessment, Development and Evaluation.

and the certainty assigned to critical outcomes was used as the overall certainty for each PICO question [44,45].

Recommendations were categorized into four groups based on direction (for or against an intervention) and strength (strong or weak). Key factors considered when determining recommendation strength included the balance between desirable and undesirable effects, certainty of the evidence, values and preferences, and resource requirements. Additional considerations included priority of the problem, cost-effectiveness, equity, acceptability, and feasibility. Strong recommendations indicate interventions that should be followed in most clinical situations, whereas weak (conditional) recommendations indicate interventions that may be applied selectively depending on clinical context, patient preferences, or societal values.

When determining recommendation strength, the evidence-to-decision framework proposed by ILCOR was used when available. To ensure consistent terminology during guideline development, the recommended wording for each grade was shared with the authors. Strong recommendations were expressed using terms such as "we strongly recommend" or "should/should not be performed," whereas weak recommendations were expressed as "we suggest," "may be considered," or "conditionally recommend" [44].

When direct clinical evidence was limited, but the balance of benefits and harms, certainty of evidence, values and preferences, and resource considerations supported a recommendation based on clinical experience and expert agreement, the recommendation was labeled as expert consensus. When an intervention was

considered self-evidently beneficial for patient health and appropriate for implementation without further research, it was presented as a good practice statement [46].

MAJOR CHANGES IN THE 2025 KOREAN CPR GUIDELINES

During the revision process of the 2025 guidelines, the research team incorporated major recent findings identified through systematic evidence reviews. In addition, because the 2020 CPR guidelines have been widely disseminated and used over the past 5 years by both healthcare professionals and the general public, the 2025 guidelines were designed to maintain consistency with the 2020 version whenever possible. When integrating new scientific evidence, recommendations accounted for the domestic healthcare environment, implementation feasibility, and relevant laws and regulations.

Chain of survival and basic life support

The chains of survival for adults and children, as well as for OHCA and in-hospital cardiac arrest, have been integrated into a single simplified chain. As in previous versions, the chain consists of five links: (1) recognition of cardiac arrest and activation of EMS; (2) bystander CPR; (3) defibrillation; (4) advanced life support with post-cardiac arrest care; and (5) rehabilitation and recovery. In this update, advanced life support and post-cardiac arrest care have been combined into a single link, and rehabilitation and recovery have been added as a new link.

In addition to dispatcher-assisted CPR, emergency dispatchers are now recommended to guide callers in locating and applying an AED. This recommendation reflects the low rate of prehospital AED use in Korea. Given the lower rate of AED application in female patients, AED pads should be applied to the bare chest, with adjustment of underwear without removing the bra.

For drowning victims, in whom respiratory arrest is likely, trained first responders and healthcare providers are advised to initiate resuscitation with rescue breathing. During chest compressions, rescuers are advised to place their dominant hand in the lower position. The chest compression fraction—the proportion of total CPR time spent performing chest compressions—should be maintained at least 60% and as high as possible. For ventilation, instead of the previous recommendation of one breath every 5 to 6 seconds, a simplified rate of one breath every 6 seconds (10/min) is recommended.

Advanced life support

For adult patients with cardiac arrest and refractory shockable rhythms, trained healthcare providers are advised to consider double sequential defibrillation or vector-change defibrillation when additional pads or defibrillators are immediately available. Routine use of vasopressin and corticosteroids as adjuncts to standard CPR, as well as routine administration of buffers, including sodium bicarbonate, or calcium is not recommended during resuscitation.

When cardiac arrest occurs in patients receiving mechanical ventilation, specific criteria permit continued use of mechanical ventilation rather than switching to manual ventilation. If chest compressions during CPR temporarily restore consciousness and thereby interfere with high-quality CPR or pose a risk to the patient or rescuer, sedatives or analgesics, alone or in combination, may be administered at the minimum effective dose.

For patients who experience cardiac arrest in the prone position and have an advanced airway in place, prone CPR is suggested when immediate repositioning to the supine position is not feasible or poses additional risk. When return of spontaneous circulation is not achieved with conventional CPR, extracorporeal CPR may be considered as rescue therapy in centers with appropriate resources. Guidance is also provided for cardiac arrest in special circumstances, including asthma, anaphylaxis, pregnancy, pulmonary embolism, electrolyte disturbances, toxic exposures, drowning, and hypothermia.

Post-cardiac arrest care

For adult patients who achieve return of spontaneous circulation, recommended targets include a mean arterial pressure of at least 60 to 65 mmHg, arterial oxygen saturation of 94% to 98%, arterial carbon dioxide tension of 35 to 45 mmHg, and blood glucose levels of 144 to 180 mg/dL. Targeted temperature management remains recommended for comatose patients after return of spontaneous circulation, with the target temperature maintained at 33 to 37.5 °C for at least 24 hours.

Emergency coronary angiography is recommended only for patients with ST-segment elevation on electrocardiography or evidence of cardiogenic shock. Routine prophylactic use of anticonvulsants, antibiotics, or corticosteroids is not recommended. Various clinical findings, electrophysiologic tests, biomarkers, and neuroimaging modalities for neurological prognostication after cardiac arrest are described.

Pediatric and neonatal resuscitation

For infants, both lay rescuers and healthcare providers are recom-

mended to use the two-thumb chest compression technique with both hands encircling the chest, regardless of the number of rescuers, rather than the two-finger technique. In cases of foreign body airway obstruction in infants, the sequence of five back blows and five chest thrusts is maintained; however, chest thrusts should be delivered using the heel of one hand rather than two fingers. Although layperson defibrillation was previously recommended only for adults, it is now also recommended for children aged 1 year and older. For pediatric patients with cardiac arrest who have an advanced airway in place, rescue breaths should be delivered at age-appropriate rates (under 1 year, 30/min; 1–8 years, 20–30/min).

Guidance on umbilical cord management in neonates is provided according to clinical circumstances. For example, umbilical cord milking is recommended before cord clamping in nonvigorous term and late preterm infants (≥ 34 weeks of gestation). When resources and training permit, the use of supraglottic airway devices and video laryngoscopy is recommended during neonatal resuscitation.

Education and implementation

On-site simulation-based resuscitation training is recommended, along with debriefing conducted either immediately after resuscitation or several days later. During CPR training, the use of feedback devices that provide real-time guidance on chest compression depth, rate, and hand position through voice prompts or a metronome is recommended. The routine use of self-directed, asynchronous online learning or blended learning approaches—widely adopted during pandemic-era social distancing—is no longer recommended as a standard substitute for traditional training. When establishing in-hospital resuscitation response teams, the inclusion of members trained in advanced life support is recommended.

First aid

First aid is included for the first time in the 2025 Korean CPR guidelines. Although the scope of first aid ranges from minor injuries to life-threatening emergencies, this guideline focuses on selected emergency situations related to cardiac arrest that lay responders can manage.

Assistance with the administration of prescribed nitroglycerin tablets or sublingual sprays is recommended for patients with chest pain. The use of validated screening tools is recommended for the early recognition of suspected acute stroke. For patients with asthma who recognize an asthma attack and have access to their inhaler, assistance with inhaler use is recommended.

When a person at risk of anaphylaxis requests help, first aid

providers are advised to assist with the use of an epinephrine autoinjector. In addition, maintaining an appropriate body position is recommended for patients with suspected shock.

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Author contributions

Conceptualization: SOH; Funding acquisition: SPC; Investigation: all authors; Project administration: SPC, YJ; Writing—original draft: SPC; Writing—review & editing: all authors. All authors read and approved the final manuscript.

Conflicts of interest

Sung Phil Chung, Chun Song Youn, Mi Jin Lee, Jisook Lee, and Sung Oh Hwang are editorial board members of this journal, but were not involved in the peer reviewer selection, evaluation, or decision process of this article. The authors have no other conflicts of interest to declare.

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Data availability

Data sharing is not applicable as no new data were created or analyzed in this study.

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