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ILCOR Summary Statement

2017 International Consensus on Cardiopulmonary Resuscitation and Emergency Cardiovascular Care Science With Treatment Recommendations Summary☆

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ABSTRACT

The International Liaison Committee on Resuscitation has initiated a near-continuous review of cardiopulmonary resuscitation science that replaces the previous 5-year cyclic batch-and-queue approach process. This is the first of an annual series of International Consensus on Cardiopulmonary Resuscitation and Emergency Cardiovascular Care Science With Treatment Recommendations summary articles that will include the cardiopulmonary resuscitation science reviewed by the International Liaison Committee on Resuscitation in the previous year. The review this year includes 5 basic life support and 1 paediatric Consensuses on Cardiopulmonary Resuscitation and Emergency Cardiovascular Care Science With Treatment Recommendations. Each of these includes a summary of the science and its quality based on Grading of Recommendations, Assessment, Development, and Evaluation criteria and treatment recommendations. Insights into the deliberations of the International Liaison Committee on Resuscitation task force members are provided in Values and Preferences sections. Finally, the task force members have prioritised and listed the top 3 knowledge gaps for each population, intervention, comparator, and outcome question.

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Until recently, the International Liaison Committee on Resuscitation (ILCOR) cardiopulmonary resuscitation (CPR) science review process has been undertaken in 5-year cycles, the last being published in 2015.[1,2] This batch-and-queue approach has the advantage of enabling a well-planned and systematic update of guidelines and training materials, but it could potentially delay the implementation of new effective treatments. In 2016, ILCOR adopted a new process that would enable a near-continuous review of resuscitation science by using task force–prioritised population, intervention, comparator, and outcome (PICO) questions. There will be 2 distinct pathways for evidence evaluation. Knowledge synthesis units (KSUs), organisations with expertise in searching scientific databases and performing systematic reviews and meta-analyses, will address PICOs that are large and complicated or topics for which several PICOs can be grouped together and addressed through sensitivity or subgroup analyses. Contracted systematic reviewers will undertake simple systematic reviews involving typically single PICO questions. Both pathways involve content experts, and critical steps during evidence evaluation are discussed with relevant task forces when needed.

The Grading of Recommendations, Assessment, Development, and Evaluation (GRADE) process that was adopted for the ILCOR "2015 International Consensus on Cardiopulmonary Resuscitation and Emergency Cardiovascular Care Science With Treatment Recommendations" (CoSTR) will also be used for the continuous review of CPR science.[3] In the GRADE approach, the quality of evidence supporting intervention effects (defined by the PICO question) is rated as high, moderate, low, or very low. Randomised controlled trials (RCTs) start as high-quality evidence, and observational studies start as low-quality evidence. Five factors may lead to downgrading of the quality of evidence, and 3 factors may enable an upgrade of the quality of evidence (Table).[4–9] The quality assessments for each outcome are summarised in GRADE evidence profile tables, which also include a summary of findings in the form of the numbers of patients, the relative risk (RR), and an indication of the absolute risk (described as the risk difference [RD]).

This is the first of a series of annual ILCOR CoSTR summary articles that will include the CPR science reviewed by ILCOR in the previous year. The review this year includes 5 basic life support (BLS) CoSTRs and 1 paediatric CoSTR. The CoSTRs were produced after a systematic review by the KSU at St. Michael's Hospital, Toronto, ON, Canada, in collaboration with ILCOR content experts and members of the ILCOR BLS and Paediatric Task Forces. All the evidence profile tables and meta-analyses were produced by the KSU and reviewed by ILCOR BLS and Paediatric Task Forces. The CoSTRs have been subjected to rigorous evaluation, peer review, and public comment. We anticipate that by 2018, ≈20 PICO questions will be addressed per year, and each question will generate a draft CoSTR that will be published on the ILCOR website.[10] The draft CoSTRs published online will provide the data for the annual CoSTR summary article that will be published each year. The summary article differs in several respects from the draft CoSTRs published on the ILCOR website: The language used to describe the science is not restricted to standard GRADE terminology, which makes it more accessible to a wider audience; the values and preferences have been expanded to provide greater insight into the rationale for treatment recommendations, particularly when high-quality evidence is lacking; and the top 3 knowledge gaps for each topic have been prioritised and ranked by the task force members.

The CoSTRs are based on the data summarised in the GRADE evidence profile tables for each of the key outcomes for each of the clinical scenarios. The pertinent outcome data are listed for each statement as RR (with 95% confidence interval [CI]) and RD (with 95% CI). The RD is the absolute difference between the risks and is calculated by subtracting the risk in the control group from the risk in the intervention group. This absolute effect enables a more clinically useful assessment of the magnitude of the effect of an intervention and enables calculation of the number needed to treat (=1/RD).

CPR Strategies: Background

One of the primary measures taken to improve survival after cardiac arrest has been focused efforts to improve the quality of CPR. Although the impact of high-quality chest compressions has been studied extensively,[11–14] the role of ventilation and oxygenation is less clear. Efforts to simplify resuscitation by delaying ventilation or by providing passive oxygenation have been implemented for both lay and professional rescuers. These strategies have been consistently associated with increased bystander CPR rates and fewer pauses in chest compressions, but effects on survival have been less clear.[15–18]

During the development of the 2015 CoSTR, several PICO questions were dedicated to reviewing evidence of continuous chest compression strategies for both lay and professional rescuers in various populations (adult, paediatric) and for various settings (in hospital, out of hospital).[19–22] Shortly after these reviews were completed, a 23711-patient RCT evaluating the effectiveness of continuous chest compressions in the emergency medical services (EMS) setting was published.[23] In parallel, developments of large national and regional registries are continually providing new insights into the epidemiology of cardiac arrest and bystander CPR.[24] These emerging publications generated an urgent need to review all available evidence on continuous compression strategies to provide updated evidence evaluations that included the latest science available. The systematic review and meta-analysis of this topic undertaken by St. Michael's Hospital KSU and ILCOR has been published separately.[25]

The Population, Intervention, Comparator, Outcome, Study Designs, and Time Frame

The following was used by St. Michael's Hospital KSU when undertaking the systematic review:

- Population: Patients of all ages (eg, neonates, children, adults) with cardiac arrest from any cause and across all settings (in

Table
GRADE Quality Assessment Criteria

Study Design	Quality of Evidence	Lower if	Higher if
Randomised trial	High Moderate	Risk of bias Inconsistency	Large effect Dose response
Observational study	Low Very low	Indirectness Imprecision Publication bias	All plausible confounding: would reduce a demonstrated effect or would suggest a spurious effect when results show no effect

GRADE indicates Grading of Recommendations, Assessment, Development, and Evaluation.
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