

## SPECIAL ARTICLE

## Spanish 2026 guidelines for neonatal stabilization and resuscitation: analysis, adaptation, and position statement of the neonatal resuscitation Group of the Spanish Society of Neonatology

Alejandro Avila-Alvarez<sup>a,b</sup>, Gonzalo Zeballos-Sarrato<sup>c,\*</sup>,  
Montserrat Izquierdo Renau<sup>d,e</sup>, César Ruiz Campillo<sup>f</sup>, Celia Gómez Robles<sup>g</sup>,  
Eva González Colmenero<sup>h,i</sup>, María de la Asunción Pino Vázquez<sup>j</sup>,  
Miguel Sánchez Mateos<sup>k</sup>, Elena García Victori<sup>l</sup>, Raquel Escrig Fernández<sup>m</sup>,  
Nelia Navarro Patiño<sup>n</sup>, Sara Ansó Oliván<sup>o,p</sup>, Martín Iriondo Sanz<sup>d</sup>

<sup>a</sup> Unidad Neonatología, Servicio de Pediatría, Complejo Hospitalario Universitario de A Coruña (CHUAC), Servizo Galego de Saúde (SERGAS), A Coruña, Spain

<sup>b</sup> Grupo de Investigación en Pediatría y Neonatología, Instituto de Investigación Biomédica de A Coruña (INIBIC), A Coruña, Spain

<sup>c</sup> Servicio de Neonatología, Hospital General Universitario Gregorio Marañón de Madrid, Madrid, Spain

<sup>d</sup> Servicio de Neonatología, Hospital Universitari Sant Joan de Déu de Barcelona, BCNatal, Universitat de Barcelona, Barcelona, Spain

<sup>e</sup> Institut de Recerca Sant Joan de Déu, Barcelona, Spain

<sup>f</sup> Servicio de Neonatología, Hospital Universitari Materno-infantil Vall d'Hebron de Barcelona, Barcelona, Spain

<sup>g</sup> Servicio de Neonatología, Hospital Materno Infantil de Málaga, Málaga, Spain

<sup>h</sup> Unidad de Neonatología, Servicio de Pediatría. Hospital Universitario Álvaro Cunqueiro, Servizo Galego de Saúde (SERGAS), Vigo, Spain

<sup>i</sup> Grupo de Investigación Enfermedades Raras y Medicina Pediátrica, Instituto de Investigación Sanitaria Galicia Sur (IIS Galicia Sur), Servizo Galego de Saúde (SERGAS), Vigo, Spain

<sup>j</sup> Unidad de Neonatología y Unidad de Cuidados Intensivos Pediátricos, Servicio de Pediatría. Hospital Clínico Universitario de Valladolid, Valladolid, Spain

<sup>k</sup> Unidad de Neonatología, Servicio de Pediatría. Hospital Universitario Puerta de Hierro Majadahonda. Madrid, Spain

<sup>l</sup> Unidad de Neonatología, Servicio de Pediatría, Hospital Universitario Juan Ramón Jiménez. Huelva, Spain

<sup>m</sup> Servicio de Neonatología, Hospital Universitari i Politènic La Fe de Valencia, Valencia, Spain

<sup>n</sup> Unidad de Neonatología, Servicio de Pediatría, Complejo Hospitalario Universitario de Albacete, Albacete, Spain

<sup>o</sup> Unidad de Neonatología, Servicio de Pediatría, Hospital Universitario de Cruces, Barakaldo. Spain

<sup>p</sup> Grupo de Investigación de Medicina Perinatal. Instituto de Investigación Sanitaria (IIS) Biobizkaia, Vizcaya, Spain

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\* Corresponding author.

E-mail address: [gonzesa@hotmail.com](mailto:gonzesa@hotmail.com) (G. Zeballos-Sarrato).

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**Abstract:** The recommendations of the International Liaison Committee on Resuscitation (ILCOR) published at the end of 2025 provide the current scientific framework for neonatal resuscitation and support in the transition to extrauterine life. As in previous updates, the Neonatal Resuscitation Group of the Spanish Society of Neonatology (GRN-SENeo) presents a review and position document analyzing the changes introduced with respect to the previous guideline and adapting the current evidence to the specific circumstances and health care context of Spain. The aim of this document is to disseminate the position of the group on the implementation of these recommendations at the national level, reached by consensus and addressing the most controversial aspects through the nominal group technique. The management algorithms are reviewed and updated, incorporating new aspects in pre-delivery neonatal management planning and briefing, umbilical cord management, initial stabilization, ventilation and oxygen supplementation strategies, as well as the use of new devices and vascular access routes. Through this guideline, the GRN-SENeo establishes a sustained institutional reference framework aimed at ensuring homogeneity, safety and quality in the management of the newborn in the delivery room, while fulfilling its commitment to continuous updating as scientific knowledge evolves.

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**PALABRAS CLAVE**

Reanimación;  
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Recién nacido;  
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ILCOR 2025

### Guía española de estabilización y reanimación neonatal 2026. Análisis, adaptación y posicionamiento del Grupo de Reanimación Neonatal de la Sociedad Española de Neonatología

**Resumen** Las recomendaciones internacionales del *International Liaison Committee on Resuscitation* (ILCOR) publicadas a finales de 2025, proporcionan el marco científico actual para el soporte a la transición y la reanimación neonatal. Como en actualizaciones previas, el *Grupo de Reanimación Neonatal de la Sociedad Española de Neonatología* (GRN-SENeo) presenta un documento de revisión y posicionamiento que analiza los cambios introducidos respecto a la guía anterior y adapta la evidencia disponible a la realidad y contexto asistencial de nuestro país. El objetivo de este artículo es difundir el consenso del grupo para la aplicación de dichas recomendaciones en el ámbito nacional, abordando las áreas de mayor controversia mediante una metodología de grupo nominal. Se revisan y actualizan los algoritmos de actuación, incorporando novedades en la planificación previa, el manejo del cordón umbilical, la estabilización inicial, las estrategias de ventilación y oxigenoterapia, así como el uso de nuevos dispositivos y accesos vasculares. De este modo, el GRN-SENeo establece un marco de referencia institucional y continuista que busca garantizar la homogeneidad, seguridad y calidad en la atención del recién nacido en sala de partos, manteniendo el compromiso de actualización constante acorde a la evolución del conocimiento científico.

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## Introduction

In late 2025, the Neonatal Life Support Task Force of the International Liaison Committee on Resuscitation (ILCOR)<sup>1</sup> published, around the same time as the American Academy of Pediatrics (AAP), the American Heart Association (AHA)<sup>2</sup> and the European Resuscitation Council (ERC),<sup>3</sup> the most recent recommendations on neonatal resuscitation.

The Neonatal Resuscitation Group (NRG) of the Sociedad Española de Neonatología (SENeo, Spanish Society of Neonatology) was created in 2001, and, since 2004, has been publishing national guidelines on neonatal stabilization and life support in *Anales de Pediatría*<sup>4,5</sup> based on interna-

tional recommendations, adapting them to the Spanish context.

The aim of this document is to update the recommendations published in 2022 and express the position of the NRG-SENeo on the subjects of greatest interest or that are most controversial.

## Methods

The methodology was based on the nominal group technique with the addition of aspects of the focus group approach. These strategies are among the most widely used struc-

tured procedures to develop consensus documents.<sup>6</sup> The NRG-SENeo used the Consensus on Science and Treatment Recommendations (CoSTR) of the ILCOR 2025 consensus as the foundation to develop the following recommendations, with an approach closer to a systematic review for those subjects that were considered a priority for adaptation to Spain. The Spanish context can be briefly described as developed, with births attended in technologically advanced delivery rooms, most of them in the public health system, and variable human resources, although the team generally includes an on-site pediatrician, nurse, midwives, and other professionals such as anesthesiologists, nurse assistants or medical residents.

In November 2025, the 13 members of the NRG-SENeo analyzed the published guidelines with the advice of an international expert and member of the ILCOR. Changes to the current algorithms were agreed upon, and six subjects were identified that required the group to articulate well-reasoned positions. Each subject was evaluated remotely by the group until a final consensus was reached. The group also used the AGREE II Reporting Checklist, developed to guide the reporting of clinical practice guidelines and improve their integrity and transparency.

The review for each of the six selected subjects followed the same structure: background, summary of the scientific evidence, recommendations given in other guidelines and position of the NRG-SENeo. In those areas where the ILCOR recommendations were ambiguous or imprecise/undefined, expert consensus was prioritized in order to favor a single decision-making approach. Finally, the conclusions were integrated and submitted for approval by all authors, with the final version reflecting the official position of the NRG-SENeo.

## Main changes in the 2026 NRG-SENeo resuscitation algorithms

The following changes were made to the general algorithm for neonatal resuscitation and transition support (Fig. 1) compared to the previous 2021 guideline:

- none– The new guideline adds the requirement to plan umbilical cord management prior to birth, as some aspects may depend on local factors such as the availability of human or material resources and the agreement of the obstetrics team and the family.
- none– The question whether the delivery is a term birth has been replaced by whether the infant is born at or after 34 weeks. There is consensus that late preterm infants that breathe spontaneously and have an adequate muscle tone can be managed safely without transfer to a resuscitation bed. The group prioritized clarity by specifying the gestational age.
- none– The steps for initial stabilization and routine care during skin-to-skin contact have been simplified.
- none– “Gasping” was eliminated from the assessment in the first minute post birth due to the subjectivity in its interpretation.
- none– The use of laryngeal masks (LMs) has been added as an alternative to intubation.

- none– Intraosseous (IO) access has been added as an alternative when umbilical venous access cannot be established.

For the algorithm for preterm infants born before 32 weeks (Fig. 2), the group agreed to the following changes relative to the previous version from 2021:

- none– In the initial steps, the target room temperature has been changed from 26 to 23 °C, given the difficulty of reaching such high temperatures in our setting. As was done in the general algorithm, umbilical cord management planning has been added.
- none– The recommendation for gentle tactile stimulation at birth in all neonates prior to cord clamping and other stabilization measures has been highlighted in a separate box. These 30 seconds can prevent unnecessary interventions and promote spontaneous physiological transition, although they do delay the start of ventilation for 30 seconds in infants who are not breathing spontaneously.
- none– Recommendations for umbilical cord management have been modified, emphasizing delayed cord clamping (DCC) (>60 seconds) as the standard of care for newborns who are breathing/crying and showing spontaneous activity.
- none– Respiratory management has been simplified, recommending the use of continuous positive airway pressure (CPAP) in all preterm infants <32 weeks who are well, and the use of intermittent positive pressure ventilation (IPPV) in those who are not.
- none– Given the new evidence and the uncertainty regarding the optimal fraction of inspired oxygen (FiO<sub>2</sub>) for initiating resuscitation in preterm infants, the starting FiO<sub>2</sub> has been increased to 0.3 to 0.5 in all infants born before 32 weeks, regardless of the type of respiratory support (CPAP or IPPV).
- none– In this regard, emphasis has been placed on the need to readily adjust the initial FiO<sub>2</sub> based on right-hand pulse oximetry values starting from minute 3 post birth.

Finally, the NRG-SENeo decided to eliminate the specific algorithm for congenital diaphragmatic hernia, since the differences or peculiarities in the management of these patients (prophylactic intubation, oxygen management, and respiratory pressures) do not warrant having an algorithm other than the general one in place.

## Controversies and position of the NRG-SENeo

### Briefing before resuscitation

#### Background

Briefing, which includes reviewing the case, checking equipment and supplies, role allocation, use of checklists and anticipation of possible scenarios is a tool that improves teamwork. It can apply to different circumstances, from clinical simulation to health care delivery, and be integrated as part of care quality programs.<sup>7</sup>

## Transition support and resuscitation of newborn infants in the delivery room.

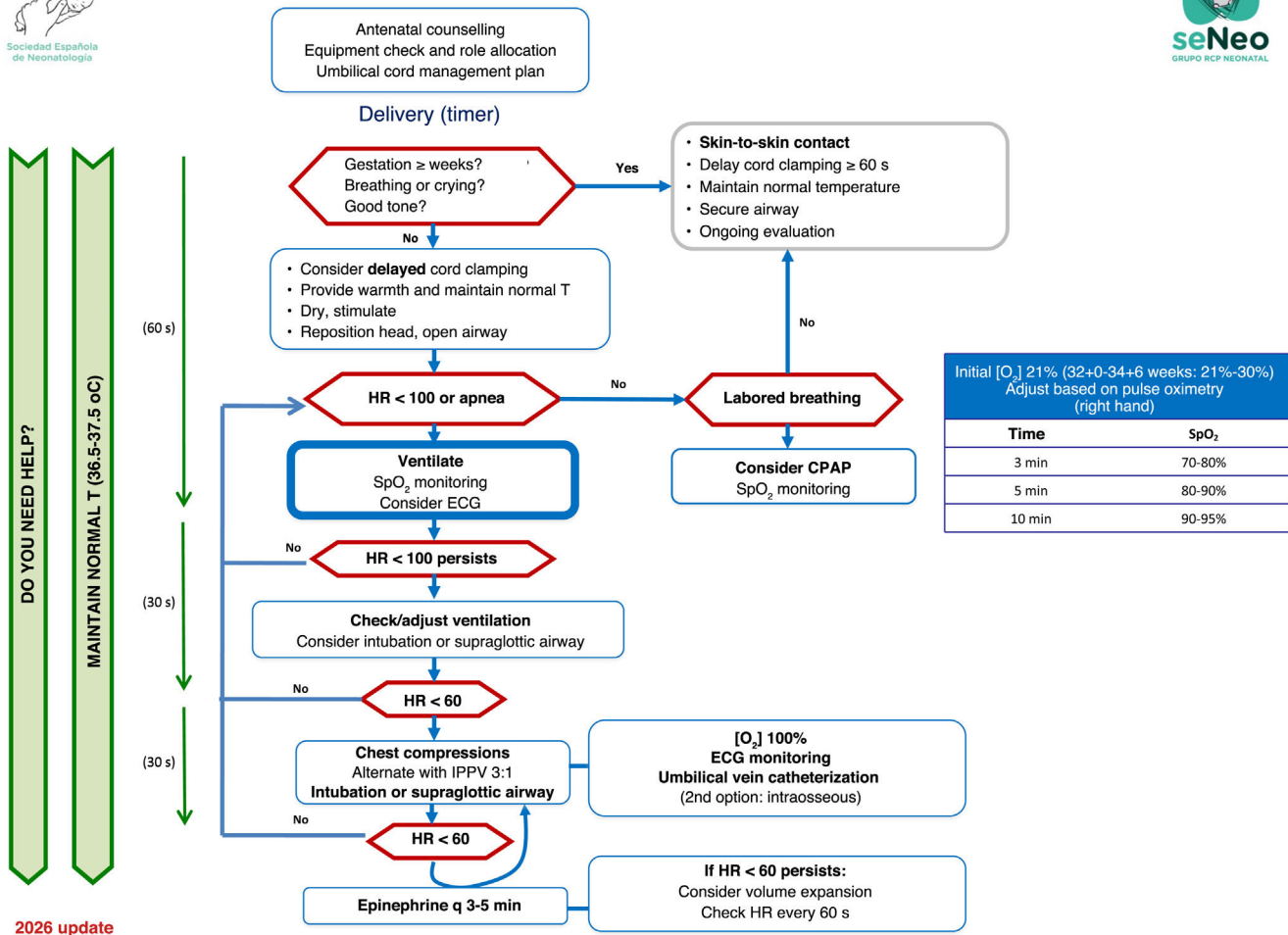


Figure 1 Transition support and resuscitation of newborn infants in the delivery room.

### What does the evidence say?

The evidence on the effect of briefing on neonatal outcomes is limited, and there are no data from controlled trials regarding its impact on neonatal mortality, neonatal care needs or adverse neurologic outcomes. In 2020, the ILCOR published a systematic review that did not find sufficient evidence to support its recommendation,<sup>8</sup> while the 2025 guideline cites four studies with observational data from before and after the implementation of an intervention, concluding that they were generally supportive of the use of briefing but that the evidence was insufficient to justify a new systematic review.<sup>9,10</sup>

### What do the 2025 guidelines say?

When anticipating the need for resuscitation, the guidelines recommend a prebirth briefing of the neonatal and obstetric care teams and midwives to plan neonatal care.<sup>1-3</sup> They recommend the use of checklists before each delivery to ensure the presence and function of equipment and supplies and allocate roles, including communication with the family during resuscitation.

### What does the NRG-SENeo recommend?

Performance of a structured briefing is recommended before high-risk deliveries, including the analysis of the case and risk factors, role allocation, communication with the family, checking material resources, reviewing algorithms and developing a care plan. This strategy, combined with debriefing and documentation of data following resuscitation, should be integrated in everyday practice.

### Umbilical cord management

#### Background

Delayed cord clamping (DCC) supports the transition to extrauterine life by maintaining the umbilical venous return during lung aeration, which contributes to an adequate cardiac preload. In addition, the transient connection to the placenta prevents abrupt changes in blood pressure and the associated bradycardia. The increase in placental transfusion is associated with a decreased frequency of iron-deficiency anemia, decreased need of red blood cell transfusions and lower mortality in preterm infants.<sup>11,12</sup> However, in neonates with low muscle tone or who are not

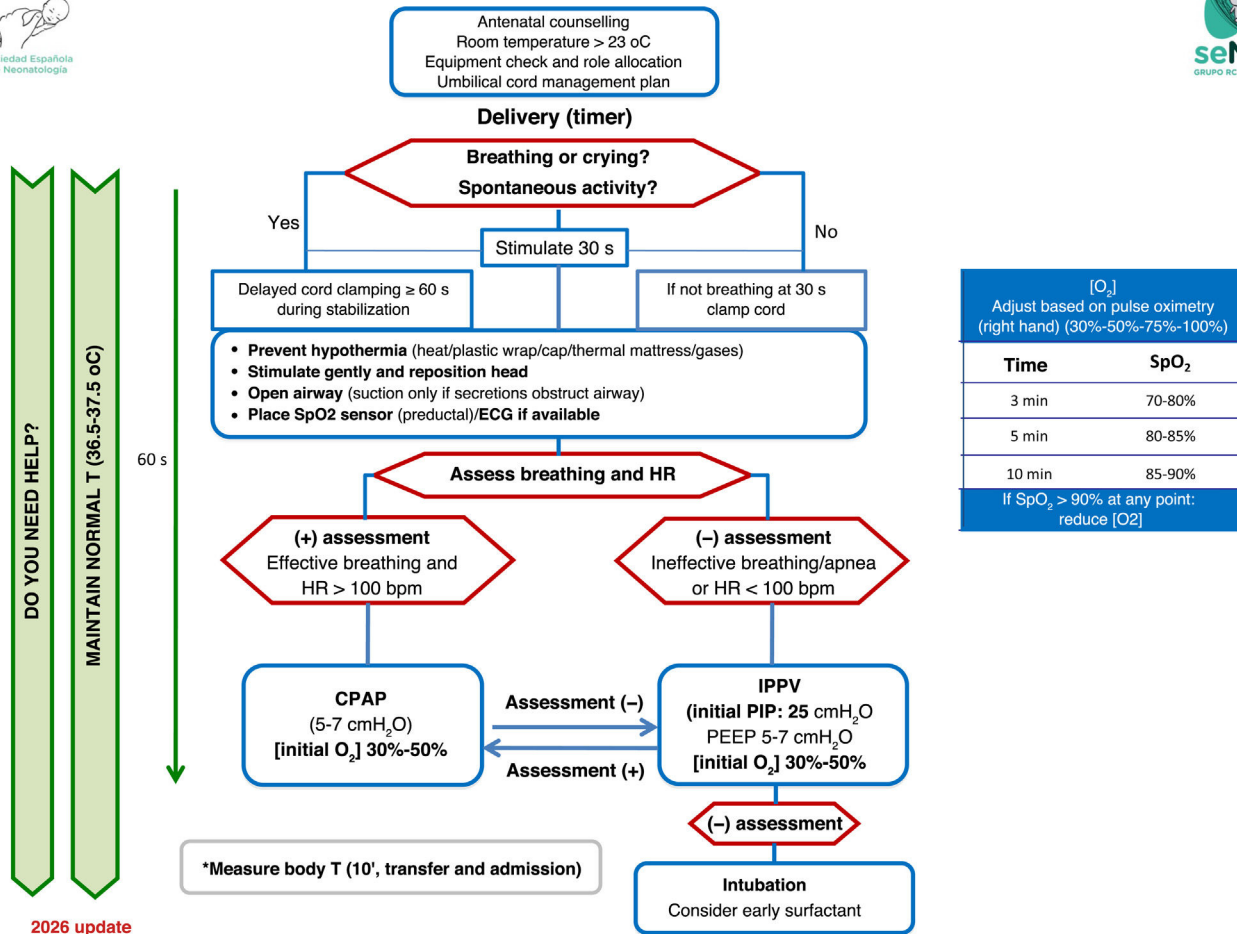


Figure 2 Initial stabilization and respiratory management of preterm infants <32 weeks in the delivery room.

breathing, DCC can delay the initial stabilization measures, so alternatives such as cord milking (CM) or intact cord resuscitation (ICR) are proposed for these cases.<sup>13</sup>

### What does the evidence say?

The evidence on umbilical cord management in preterm infants was evaluated in 2024 through a systematic review and the corresponding CoSTR.<sup>14</sup> Based on study-level and network meta-analyses (48 studies involving 6367 preterm infants), DCC is associated with a reduction in mortality compared to immediate cord clamping (ICC).<sup>15</sup> In infants born before 32 weeks, DCC (compared to ICC) is associated with a decreased need of transfusion but also an increased probability of hypothermia at admission, while CM (compared to DCC) is associated with an increased risk of intraventricular hemorrhage in infants born before 28 weeks.<sup>15</sup> A study in 1730 nonvigorous term neonates compared early cord clamping (ECC) with CM and found no significant differences in admission rates, although there were differences in some secondary outcomes.<sup>16</sup> Some studies have demonstrated the feasibility of stabilization maneuvers with an intact umbilical cord in preterm infants, but none have demonstrated the superiority of this approach

over DCC in reducing mortality or the incidence of intraventricular hemorrhage.<sup>17</sup>

### What do the 2025 guidelines say?

The ILCOR 2025 consensus proposes definitions to standardize the terminology and better reflect real-world clinical and research scenarios (Table 1).<sup>1</sup> For vigorous neonates, it recommends deferring clamping for at least 60 seconds after birth to decrease mortality in preterm infants and improve hematological outcomes in term infants. When this is not feasible due to factors related to the mother or child, CM is recommended rather than ICC. The recommendation to avoid CM in infants born before 28 weeks' gestation is maintained.

### What does the NRG-SENeo recommend?

The NRG-SENeo recommends planning umbilical cord management in collaboration with the obstetrics team and the family before the birth. For neonates who are breathing and have good tone, DCC ( $\geq 60$  seconds) is recommended, regardless of gestational age. In infants with poor tone and inadequate respiratory effort, initiating tactile stimulation for 30 seconds prior to umbilical cord clamping is recom-

**Table 1** Terms related to umbilical cord management.

Time-based decisions	Physiology-based decisions	Cord milking
Immediate cord clamping (ICC): $\leq 15$ s, without initiation of respiratory support	Intact cord resuscitation: Any time to cord clamping (usually $\geq 60$ s with previous respiratory support)	Intact umbilical cord milking (I-UCM): milking of the cord with the connection to the placenta intact
Early cord clamping (ECC): $< 60$ s, without initiation of respiratory support	Physiologically based cord clamping (PBCC): based on physiological observations (duration of breathing or PPV)	Cut umbilical cord milking (C-UCM): milking of the cord after clamping and cutting a long segment of umbilical cord
Deferred/delayed cord clamping (DCC): $\geq 60$ s, before respiratory support		

C-UCM, cut umbilical cord milking; DCC, deferred/delayed cord clamping; ECC, early cord clamping; ICC, immediate cord clamping; I-UCM, intact umbilical cord milking; PBCC, physiologically based cord clamping.

mended. Cord milking is not recommended for infants born before 28 weeks.

## Laryngeal mask

### Background

Laryngeal masks (LMs), also known as supraglottic airway devices (SGADs), have featured in neonatal resuscitation guidelines since 2000, proposed for use in infants born at or after 34 weeks or with weights of at least 2000 g as an alternative to tracheal intubation (TI) or face masks for IPPV when either of these two techniques is not possible or is ineffective.<sup>18</sup>

### What does the evidence say?

The ILCOR 2025 guideline considered three randomized controlled trials and one observational study comparing the use of SGADs with TI, and one quasi-randomized trial comparing SGAD to FM ventilation.<sup>19,20</sup> To date, no studies have been conducted in neonates comparing the performance of chest compressions or the administration of medication in relation to the use of SGADs in the delivery room. A systematic review published in 2022<sup>21</sup> showed that ventilation was more effective when delivered with SGADs versus FMs (higher probability of improvement and lower proportion of intubation).

### What do the 2025 guidelines say?

The ILCOR proposes replacing the term LM by SGAD and maintains the recommendations issued in 2015 (updated in 2022), adding some considerations as good practice statements.<sup>1</sup> It contemplates the use of SGADs if FM ventilation is ineffective or as an alternative to TI, including during chest compressions.

### What does the NRG-SENeo recommend?

Laryngeal masks are easy to insert and to use and should be available in all delivery rooms. Their use must be considered, even in infants who require chest compressions, as an alternative to FM ventilation if the latter is not effective and to IT if it is not feasible or is ineffective, either due to lack of experience or to the anatomical characteristics of the patient. To fit the patient, the size of the LM must be selected according to the manufacturer's directions.

## Uso de video laryngoscopy

### Background

The rate of successful neonatal intubation on the first attempt in the delivery room is low, especially in preterm infants and when performed by staff in training. Video laryngoscopy (VL) provides indirect visualization of the glottis on a screen, facilitating intubation and supervision by instructors and potentially improving success rates.<sup>22-25</sup>

### What does the evidence say?

The ILCOR 2025 systematic review included six randomized controlled trials (817 neonates, 862 intubations) and demonstrated that VL increased overall and first-attempt intubation success, in addition to reducing the number of attempts.<sup>26</sup> Most studies were conducted in neonatal units, so the evidence for delivery room intubation is indirect. There was no evidence of an increase in adverse events. The benefits seemed greater when the procedure was performed by inexperienced intubators and in the context of training.

### What do the 2025 guidelines say?

The ILCOR has updated its recommendation in 2025 and proposes the use of VL were training and resources allow, especially in settings where less-experienced clinicians are intubating.<sup>1</sup> The AHA/AAP 2025 guidelines state that VL "can be useful" for newborn infants who require intubation.<sup>2</sup> Lastly, the ERC 2025 recommends using VL if available, keeping conventional direct laryngoscopes available as an alternative.<sup>3</sup>

### What does the NRG-SENeo recommend?

Where resources allow, it is reasonable and warranted to consider VL as the preferred method for intubation in the delivery room, prioritizing its use when intubation is performed by staff in training or in the case of an anticipated difficult airway. The use of direct laryngoscopes is a valid alternative, and these devices should always be available. Specific training should be offered at regular intervals for both intubation with both direct and video laryngoscopy.

## Oxygen therapy in the delivery room

### Background

There is evidence since the 1990s that resuscitation with room air can be effective and reduce mortality and the adverse effects of hyperoxia.<sup>27</sup> In 2010, initiating resuscitation with room air was recommended for term infants. In preterm infants, studies did not find clear differences in outcomes between a higher and a lower  $\text{FiO}_2$ , and in 2015, the ILCOR recommended a low initial  $\text{FiO}_2$  (0.21–0.3). Since then, pulse oximetry has been introduced to gradually titrate the oxygen concentration. In 2019, the ILCOR reviewed the evidence on the initial  $\text{FiO}_2$ . In infants born at or after 35 weeks, initiating resuscitation with a  $\text{FiO}_2$  of 0.21 reduces mortality without increasing neurologic morbidity.<sup>28</sup> In infants born before 35 weeks, the evidence did not identify clear differences with the use of a lower  $\text{FiO}_2$ .<sup>29</sup> The 2020 guidelines maintained these recommendations and discouraged the use of high  $\text{FiO}_2$ .

### What does the evidence say?

A recent meta-analysis (2024) suggests that, in infants born before 32 weeks, a high initial  $\text{FiO}_2$  ( $\geq 0.90$ ) could reduce mortality compared to a low or intermediate initial  $\text{FiO}_2$ , although the heterogeneity between studies could limit the robustness of this conclusion.<sup>30</sup> On the other hand, failure to achieve an oxygen saturation ( $\text{SatO}_2$ ) greater than 80% at 5 min is associated with an increase in the risk of intraventricular hemorrhage and mortality,<sup>31</sup> and, at present, nearly half of patients do not reach target concentrations with the existing oxygen supplementation strategies, which suggests that they may need a higher initial  $\text{FiO}_2$ , more aggressive escalation or different  $\text{SatO}_2$  targets.<sup>32</sup> In the recent TORPIDO 30/60 trial, the incidence of hypoxemia and of bradycardia was lower in the group managed with an initial  $\text{FiO}_2$  of 0.6 compared to the group with an initial  $\text{FiO}_2$  of 0.3, but there were no differences in survival without brain injury.<sup>33</sup> The evidence in infants born between 32 and 34 weeks<sup>6</sup> is insufficient to make a recommendation regarding the initial  $\text{FiO}_2$ .

### What do the 2025 guidelines say?

For neonates born at or after 35 weeks, the ILCOR, AAP/AHA and ERC recommend an initial  $\text{FiO}_2$  of 0.21.<sup>1–3</sup> For infants born before 32 weeks, the ILCOR and ERC recommend an initial  $\text{FiO}_2$  of 0.3 or greater and the AAP/AHA a  $\text{FiO}_2$  of 0.3 to 1. For infants born between 32 to 34 weeks,<sup>6</sup> the ILCOR does not make a recommendation, the AHA recommends a  $\text{FiO}_2$  of 0.21 to 0.3, and the ERC maintains the recommendation of 0.21. On the other hand, the ILCOR eliminates the previous recommendation to exert caution regarding the use of a  $\text{FiO}_2$  of 1 for term infants.

### What does the NRG-SENeo recommend?

For infants born at or after 35 weeks, we recommend initiating resuscitation with a  $\text{FiO}_2$  of 0.21, and for infants born between 32 to 34 weeks,<sup>6</sup> an initial  $\text{FiO}_2$  of 0.21 to 0.3. For infants born before 32 weeks, we recommend an intermediate initial  $\text{FiO}_2$  of 0.3 to 0.5, independently of the respiratory support. We recommend preductal oximetry to adjust the  $\text{FiO}_2$  according to the target oxygen saturation range.

## Vascular access, glucose and bicarbonate

### Background

The IO route can be used to administer medication and fluids during neonatal resuscitation.<sup>34</sup>

In the context of hypoxic-ischemic encephalopathy, outcomes are poorer in neonates with hypoglycemia compared to those with glucose levels in the normal range.<sup>35</sup>

Since 2005, infusion of sodium bicarbonate has been recommended in prolonged resuscitations over not administering it.

### What does the evidence say?

Three observational studies have reported outcomes in infants managed with IO access without direct comparison to intravenous access. The most widely used IO access site is the proximal tibia, as it is feasible and relatively safe.<sup>36,37</sup>

There is evidence that neonates with dysglycemia are at increased risk following a hypoxic-ischemic insult.<sup>38</sup>

We found no new evidence supporting the use of sodium bicarbonate in neonatal resuscitation, while a potential mechanism of injury has been described in anesthetized newborn piglets.<sup>39</sup>

### What do the 2025 guidelines say?

The ERC and the AHA, in agreement with the ILCOR, continue to recommend umbilical venous catheterization as the preferred vascular access in neonates and, when not feasible, consider IO access a reasonable alternative. They also recommend measuring the blood glucose concentration early in the postresuscitation period and maintaining blood glucose in the normal range.<sup>1–3</sup> The recommendation to infuse sodium bicarbonate has been eliminated in the 2025 guidelines.

### What does the NRG-SENeo recommend?

Umbilical venous catheterization is still considered the primary method of vascular access in neonatal resuscitation, while the IO route is a reasonable alternative in certain settings or if umbilical venous catheterization is unsuccessful. In out-of-hospital settings, training by instructors experienced in umbilical venous catheterization should be promoted. Blood glucose should be monitored from the beginning of the postresuscitation period and maintained in the normal range (45–150 mg/dL). Administration of sodium bicarbonate during neonatal resuscitation is not recommended.

## Conclusions

This document summarizes the NRG-SENeo recommendations for neonatal resuscitation and stabilization in the delivery room. These recommendations are based on current scientific evidence and reflect the consensus of the expert group representing the SENeo. For more in-depth knowledge on neonatal resuscitation, this document should be supplemented with the information contained in the sixth edition of the neonatal resuscitation manual, to be published in 2026, and the official courses of the NRG-SENeo.

Over the years that these guidelines are in effect, new studies are likely to be published and change knowledge.

In fact, ILCOR conducts ongoing reviews that may lead to updates on various aspects of resuscitation, which will be reflected in periodic publications issued after these recommendations.

## Declaration of competing interest

The authors have no conflicts of interest to declare.

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