Guidelines on

BASIC NEWBORN RESUSCITATION

2012

Avec résumé d'orientation en Français

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ACRONYMS

CI	Confidence interval
ES	Effect size
GDG	Guidelines Development Group
GRADE	The system for grading the quality of evidence and the strength of recommendations
HIE	Hypoxic ischaemic encephalopathy
HQ	Headquarters
ILCOR	International Liaison Committee on Resuscitation
MAS	Meconium aspiration syndrome
MCA	Department of Maternal, Newborn, Child and Adolescent Health
MD	Mean difference
NGO	Nongovernmental organization
NICU	Neonatal intensive care unit
NMR	Neonatal mortality rate
PICO	Population/Patient group, Intervention, Comparator and Outcome
PPV	Positive-pressure ventilation
RCT	Randomized controlled trial
RR	Relative risk
Sp02	Oxygen saturation
UNFPA	United Nations Population Fund
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development

EXECUTIVE SUMMARY

Globally, about one quarter of all neonatal deaths are caused by birth asphyxia. In this document, birth asphyxia is defined simply as the failure to initiate and sustain breathing at birth. Effective resuscitation at birth can prevent a large proportion of these deaths. The need for clinical guidelines on basic newborn resuscitation, suitable for settings with limited resources, is universally recognized. WHO had responded to this need by developing guidelines for this purpose that are contained in the document *Basic newborn resuscitation: a practical guide*. As this document is over a decade old, a process to update the guidelines on basic newborn resuscitation was initiated in 2009.

The International Liaison Committee on Resuscitation (ILCOR) published *Consensus on science and treatment recommendations for neonatal resuscitation* in 2000, 2005 and 2010. Regional resuscitation councils publish guidelines based on the ILCOR consensus; however, these generally are not designed for resource-limited settings, and require the presence of more than one health provider with extensive training as well as advanced technology. The objective of these updated WHO guidelines is to ensure that newborns in resource-limited settings who require resuscitation are effectively resuscitated. These guidelines will inform WHO training and reference materials, such as *Pregnancy, childbirth, postpartum and newborn care: a guide for essential practice*; *Essential newborn care course*; *Managing newborn problems: a guide for doctors, nurses and midwives;* and *Pocket book of hospital care for children: guidelines for the management of common illnesses with limited resources*. These guidelines will assist programme managers responsible for implementing maternal and child health programmes to develop or adapt national or local guidelines, standards and training materials on newborn care.

The Guideline Development Group considered evidence related to the 13 highest-priority research questions for development of recommendations. For each question, *mortality* and *severe morbidity* were considered to be critical outcomes. Benefits and harms in critical outcomes formed the basis of the recommendations for each question. Studies from low- and middle- income as well as high-income countries were considered for inclusion in evidence reviews. Studies that did not address any of the pre-defined outcomes, were unpublished or were available only as an abstract were excluded. Animal studies were included only when sufficient evidence from human studies was not available. Efforts were made to identify relevant English and non-English language articles. A standardized form was used to extract relevant information from studies. Systematically extracted data included: study identifiers, setting, design, participants, sample size, intervention or exposure, control or comparison group, outcome measures and results. Quality characteristics were also recorded for all studies: allocation concealment or risk of selection bias (observational studies); blinding of intervention or observers, or risk of measurement bias; loss to follow-up; intention to treat analysis or adjustment for confounding factors; and analysis adjusted for cluster randomization (the latter only for cluster-randomized controlled trials). The GRADE approach was used for assessing the quality of evidence and the recommendations (for details, see Methodology section). For each set of studies reporting results for a given outcome, the quality of studies was graded as high, moderate, low or very low.

The strength of a recommendation reflects the degree of confidence that the desirable effects of adherence to a recommendation outweigh the undesirable effects. Decisions on these issues were made by the Guidelines Development Group, which met in June 2011, on

the basis of evidence of benefits and harms; quality of evidence; values and preferences of policy-makers, health care providers and parents; and whether costs are qualitatively justifiable relative to benefits in low- and middle- income countries. Each recommendation was graded as *strong* when there was confidence that the benefits clearly outweigh the harms, or *weak* when the benefits probably outweigh the harms, but there was uncertainty about the trade-offs. The resulting recommendations are shown below.

2012 WHO Recommendations on Basic Newborn Resuscitation

No.	Recommendation*	Strength of recommendation	Quality of evidence
	IMMEDIATE CARE AFTER BIRTH		
1.	In newly-born term or preterm babies who do not require positive-pressure ventilation, the cord should not be clamped earlier than one minute after birth[1]. When newly-born term or preterm babies require positive-pressure ventilation, the cord should be clamped and cut to allow effective ventilation to be performed.	*Strong* *Weak*	*High to moderate* *Guidelines Development Group (GDG) consensus in absence of published evidence*
2.	Newly-born babies who do not breathe spontaneously after thorough drying should be stimulated by rubbing the back 2-3 times before clamping the cord and initiating positive-pressure ventilation.	*Weak*	*GDG consensus in absence of published evidence*
3.	In neonates born through clear amniotic fluid who start breathing on their own after birth, suctioning of the mouth and nose should not be performed. In neonates born through clear amniotic fluid who do not start breathing after thorough drying and rubbing the back 2-3 times, suctioning of the mouth and nose should not be done routinely before initiating positive-pressure ventilation. Suctioning should be done only if the mouth or nose is full of secretions.	*Strong* *Weak*	*High* *GDG consensus in absence of published evidence*
4.	In the presence of meconium-stained amniotic fluid, intrapartum suctioning of the mouth and nose at the delivery of the head is not recommended.	*Strong*	*Low*
5.	In neonates born through meconium-stained amniotic fluid who start breathing on their own, tracheal suctioning should not be performed. In neonates born through meconium-stained amniotic	*Strong* *Weak*	*Moderate to low* *GDG consensus in absence of*

[1] "Not earlier than one minute" should be understood as the lower limit supported by published evidence. WHO *Recommendations for the prevention of postpartum haemorrhage* (Fawole B et al. Geneva, WHO, 2007) state that the cord should not be clamped earlier than is necessary for applying cord traction, which the GDG clarified would normally take around 3 minutes.

	fluid who start breathing on their own, suctioning of the mouth or nose is not recommended. In neonates born through meconium-stained amniotic fluid who **do not** start breathing on their own, tracheal suctioning should be done before initiating positive-pressure ventilation. In neonates born through meconium-stained amniotic fluid who **do not** start breathing on their own, suctioning of the mouth and nose should be done before initiating positive-pressure ventilation.	*Weak (in situations where endotracheal intubation is possible)* *Weak*	*published evidence* *Very low* *GDG consensus in absence of published evidence*
6.	In settings where mechanical equipment to generate negative pressure for suctioning is not available and a newly-born baby requires suctioning, a bulb syringe (single-use or easy to clean) is preferable to a mucous extractor with a trap in which the provider generates suction by aspiration.	*Weak*	*Very low*
	POSITIVE-PRESSURE VENTILATION		
7.	In newly-born babies who do not start breathing despite thorough drying and additional stimulation, positive-pressure ventilation should be initiated within one minute after birth.	*Strong*	*Very low*
8.	In newly-born term or preterm (>32 weeks gestation) babies requiring positive-pressure ventilation, ventilation should be initiated with air.	*Strong*	*Moderate*
9.	In newly-born babies requiring positive-pressure ventilation, ventilation should be provided using a self-inflating bag and mask.	*Weak*	*Very low*
10.	In newly-born babies requiring positive-pressure ventilation, ventilation should be initiated using a face-mask interface.	*Strong*	*Based on limited availability and lack of experience with nasal cannulae, despite low quality evidence for benefits*