WHO RECOMMENDATIONS

ON

Newborn Health

GUIDELINES APPROVED BY THE WHO GUIDELINES REVIEW COMMITTEE

UPDATED MAY 2017

World Health Organization

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Abbreviations

GRADE	Grading of Recommendations, Assessment, Development and Evaluation
GRC	Guidelines Review Committee
HIV	human immunodeficiency virus
IM	intramuscular
IU	international units
IV	intravenous
LBW	low birth weight
NVP	nevirapine
VLBW	very low birth weight
WHO	World Health Organization

Introduction

This publication on WHO recommendations related to newborn health is one of four in a series; the others relate to maternal, child and adolescent health. The objective of this document is to make available WHO recommendations on newborn health in one easy-to-access document for WHO staff, policy-makers, programme managers, and health professionals. The compilation can also help better define gaps to prioritize guideline updates.

This document is meant to respond to the questions:

- What health interventions should be the newborn and young infants < 2 months of age receive and when should s/he receive it?
- What health behaviours should a mother/caregiver practise (or not practise)?

WHO produces guidelines according to the highest international standards for guideline development. The main principles are transparency and minimizing bias in every step of the process. The process of developing guidelines is documented in *WHO Handbook for guideline development.*[1] The development process includes the synthesis and assessment of the quality of evidence, and is based on the Grading of Recommendations, Assessment, Development and Evaluation (GRADE) approach. GRADE categorizes the quality (or certainty) of the evidence underpinning a recommendation as high, moderate, low or very low.

- High: further research is very unlikely to change our confidence in the estimate of effect;
- Moderate: further research is likely to have an impact on our confidence in the effect;
- Low: further research is very likely to have an important impact on our confidence in the effect and is likely to change the estimate of effect;
- Very low: any estimate of effect is very uncertain.

Once the quality of the body of evidence on benefits and harms has been assessed, an expert group formulates the recommendations using a structured evidence to decision framework. When determining whether to recommend an intervention or not, the expert group carefully considers the balance of benefits and harms of an intervention, and other factors such as values and preferences of persons affected by the recommendation, stakeholders' perceptions of the acceptability and feasibility of the options and interventions, resource implications, the importance of the problem, and equity and human rights considerations.

The expert group then decides on the strength of the recommendation – strong or conditional. A strong recommendation is one where the desirable effects of adhering to the recommendation outweigh the undesirable effects. Recommendations that are conditional or weak are made when the expert group is less certain about the balance between the benefits and harms or disadvantages of implementing a recommendation. Conditional recommendations generally

[1] *Handbook for guideline development, 2nd edition*. Geneva, WHO, 2014.

include a description of the conditions under which the end-user should or should not implement the recommendation.

The quality of evidence and strength of the recommendation, as well as the link to the source, are included in this publication. Different expert groups may employ different terminology in the guideline processes. We suggest the Reader refer to the Source where more details are available.

In this publication we have indicated publications which are New – published after 2013 and Update – to indicate that the recommendation has been revised since 2013.

Promotion of newborn and young infant health and prevention of newborn and young infant illnesses

1. CARE OF THE NEWBORN IMMEDIATELY AFTER BIRTH

Immediate drying and additional stimulation

- 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 recommendation, quality of evidence not graded).* Source

Suction in newborns who start breathing on their own

- Routine nasal or oral suction should **not** be done for babies born through clear amniotic fluid who start breathing on their own after birth. (*Strong recommendation, high quality evidence).* Source
- Intrapartum suction of mouth and nose at the delivery of head in neonates born through meconium is **not** recommended. (*Strong recommendation, low quality evidence).* Source
- Suctioning of mouth or nose is **not** recommended in neonates born through liquor with meconium who start breathing on their own. (*Weak recommendation, quality of evidence not graded).* Source
- Tracheal suctioning should **not** be performed in newly born babies born through meconium who start breathing on their own. (*Strong recommendation, moderate to low quality evidence).* Source

Suction in newborns who DO NOT start breathing on their own

- 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. (W*eak recommendation, Guideline Development Group consensus in absence of published evidence).* Source
- 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. (*Weak (in situations where endotracheal intubation is possible), very low quality evidence).* Source
- 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. (W*eak recommendation, Guidelines Development Group consensus in absence of published evidence).* Source

Cord clamping

- Late cord clamping (performed after 1 to 3 minutes after birth) is recommended for all births while initiating simultaneous essential newborn care. *(Strong recommendation, moderate quality evidence).* Source
- Early cord clamping (<1 minute after birth) is not recommended unless the neonate is asphyxiated and needs to be moved immediately for resuscitation. *(Strong recommendation, moderate-quality evidence).* Source

Skin-to-skin contact in the first hour of life

- Newborns without complications should be kept in skin-to-skin contact with their mothers during the first hour after birth to prevent hypothermia and promote breastfeeding. *(Strong recommendation, low quality evidence).* Source

Initiation of breastfeeding

- All newborns, including low-birth-weight babies who are able to breastfeed, should be put to the breast as soon as possible after birth when they are clinically stable, and the mother and baby are ready. *(Strong recommendation, low quality evidence).* Source

Vitamin K prophylaxis

- All newborns should be given 1 mg of vitamin K intramuscularly [IM] after birth [after the first hour during which the infant should be in skin-to-skin contact with the mother and breastfeeding should be initiated]. *(Strong recommendation, moderate quality evidence).* Source
- Neonates requiring surgical procedures, those with birth trauma, preterm newborns, and those exposed in utero to maternal medication known to interfere with vitamin K are at especially high risk of bleeding and must be given vitamin K [1 mg IM]. *(Strong recommendation, moderate quality evidence).* Source

2. POSTNATAL CARE

Timing of discharge from the health facility

- After an uncomplicated vaginal birth in a health facility, healthy mothers and newborns should receive care in the facility for at least 24 hours after birth. (*Weak recommendation, low quality evidence).* Source

Timing and number of postnatal contacts

- If birth is in a facility, the mother and newborn should receive postnatal care during the first 24 hours after birth before being discharged. If birth is at home, the first postnatal contact should be as early as possible within 24 hours of birth. At least three additional postnatal contacts are recommended for all mothers and newborns, on day 3 (48–72 hours), between day 7–14, and 6 weeks after birth. (*Strong recommendation, moderate quality evidence for newborn outcomes and low quality evidence for maternal outcomes).* Source

Home visits in the first week of life

- Home visits in the first week after birth are recommended for care of the mother and newborn. (*Strong recommendation, moderate quality evidence for newborn outcomes and low quality evidence for maternal outcomes).* Source

Assessment of the newborn

- The following signs should be assessed during each postnatal care contact and the newborn should be referred for further evaluation if any of the signs is present: (1) stopped feeding well, (2) history of convulsions, (3) fast breathing, (4) severe chest in-drawing, (5) no spontaneous movement, (6) temperature ≥37.5 °C, (7) temperature <35.5 °C, (8) any jaundice in first 24 hours of life, or yellow palms and soles at any age. The family should be encouraged to seek health care early if they identify any of the above danger signs inbetween postnatal care visits. (*Strong recommendation, low quality evidence).* Source

Exclusive breastfeeding

- All babies should be exclusively breastfed from birth until 6 months of age. Mothers should be counseled and provided support for exclusive breastfeeding at each postnatal contact. *(Strong recommendation, moderate quality evidence for neonatal outcomes; 6 month duration based on previous WHO recommendations and an updated Cochrane review).* Source

Cord care

- Daily chlorhexidine (4%) application to the umbilical cord stump during the first week of life is recommended for newborns who are born at home in settings with high neonatal mortality (neonatal mortality rate >30 per 1000). Clean, dry cord care is recommended for newborns born in health facilities, and at home in low neonatal mortality settings. Use of chlorhexidine in these situations may be considered only to replace application of a harmful traditional substance such as cow dung to the cord stump. *(Strong situational recommendation, moderate quality evidence).* Source

Keeping the newborn warm

- Bathing should be delayed to after 24 hours of birth. If this is not possible at all due to cultural reasons, bathing should be delayed for at least 6 hours. Appropriate clothing of the baby for ambient temperature is recommended, this should be 1–2 layers more than adults and a hat. The mother and baby should not be separated and should stay in the same room 24 hours a day. *(Strong situational recommendation, based on Guideline Development Group consensus).* Source

3. NEWBORN IMMUNIZATION

- All infants should receive their first dose of hepatitis B vaccine as soon as possible after birth,preferably within 24 hours. This is crucial in areas of high hepatitis B endemicity, but important even in intermediate and low endemicity areas. *(Strong recommendation, moderate quality evidence).* Source
- Oral polio vaccine, including a birth dose (known as zero dose because it does not count towards the primary series), is recommended in all polio-endemic countries and in countries at high risk for importation and subsequent spread. The birth dose should be administered at birth, or as soon as possible after birth. *(Strong recommendation, high quality evidence).* Source
- In settings where tuberculosis is highly endemic or in settings where there is high risk of exposure to tuberculosis a single dose of BCG vaccine should be given to all infants. *(Strong recommendation, high quality of evidence) Guidance for national tuberculosis programmes on the management of tuberculosis in children*, 2nd ed., 2012. Source

Other care

- Communication and play should be encouraged. Source
- Preterm and low-birth-weight babies should be identified immediately after birth and should be provided special care as per existing WHO guidelines. Source

Neonatal vitamin A supplementation

- At the present time, neonatal vitamin A supplementation (that is, supplementation within the first 28 days after birth) is not recommended as a public health intervention to reduce infant morbidity and mortality. (S*trong recommendation, moderate evidence for mortality-related outcomes*). Source

Management of newborn and young infant illnesses

4. NEWBORN RESUSCITATION

Immediate care after birth

- 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.[2] (S*trong recommendation, high to moderate quality of evidence).* Source
- 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. (*Weak recommendation, Guidelines Development Group consensus in absence of published evidence).* Source
- 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 recommendation, Guidelines Development Group consensus in absence of published evidence).* Source

Suctioning not needed

- 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. (S*trong recommendation, high quality evidence).* Source
- 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. (W*eak recommendation, Guideline Development Group consensus in absence of published evidence).* Source
- In the presence of meconium-stained amniotic fluid, intrapartum suctioning of the mouth and nose at the delivery of the head is not recommended. (S*trong recommendation, low quality evidence).* Source
- In neonates born through meconium-stained amniotic fluid who start breathing on their own, tracheal suctioning should not be performed. (S*trong recommendation, moderate to low quality of evidence).* Source

[2] "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 Guidelines Development Group clarified would normally take around 3 minutes.

In neonates born through meconium-stained amniotic fluid who start breathing on their own, suctioning of the mouth or nose is not recommended. (W*eak recommendation, GDG consensus in absence of published evidence).* Source

SUCTIONING NEEDED

- 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. (*Weak (in situations where endotracheal intubation is possible), very low quality evidence).* Source
- 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 recommendation, Guidelines Development Group consensus in absence of published evidence*). Source
- 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 recommendation, very low quality evidence).* Source

Positive-pressure ventilation

- 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. (S*trong recommendation, very low quality evidence).* Source
- In newly-born term or preterm (>32 weeks gestation) babies requiring positivepressure ventilation, ventilation should be initiated with air. *(Strong recommendation, moderate quality evidence).* Source
- In newly-born babies requiring positive-pressure ventilation, ventilation should be provided using a self-inflating bag and mask. *(Weak recommendation, very low quality evidence).* Source
- In newly-born babies requiring positive-pressure ventilation, ventilation should be initiated using a face-mask interface. *(Strong recommendation, based on limited availability and lack of experience with nasal cannulae, despite low evidence for benefits).* Source
- In newly-born babies requiring positive-pressure ventilation, adequacy of ventilation should be assessed by measurement of the heart rate after 60 seconds of ventilation with visible chest movements. *(Strong recommendation, very low quality evidence).* Source
- In newly-born babies who do not start breathing within one minute after birth, priority should be given to providing adequate ventilation rather than to chest compressions. *(Strong recommendation, low quality evidence).* Source

Stopping resuscitation

- In newly-born babies with no detectable heart rate after 10 minutes of effective ventilation, resuscitation should be stopped. *(Weak – relevant to resource-limited settings, very low quality evidence).* Source
- In newly-born babies who continue to have a heartrate below 60/minute and no spontaneous breathingafter 20 minutes of resuscitation, resuscitation should be stopped. *(Weak – relevant to resource-limited settings, very low quality evidence).* Source

Post resuscitation care

- Head or whole body cooling should not be done outside well-resourced, tertiary neonatal intensive care units, because there is potential for harm from this therapy in low-resource settings. *(Strong recommendation, moderate quality evidence).* Source

5. MANAGEMENT OF SUSPECTED NEONATAL SEPSIS

Prophylactic antibiotics for prevention of sepsis

- A neonate with risk factors for infection (i.e. membranes ruptured >18 hours before delivery, mother had fever > 38 ºC before delivery or during labour, or amniotic fluid was foul smelling or purulent) should be treated with the prophylactic antibiotics ampicillin (Intramuscular – IM – or intravenously, IV) and gentamicin for at least 2 days. After 2 days, the neonate should be reassessed and treatment continued only if there are signs of sepsis or a positive blood culture. *(Weak recommendation, very low quality evidence).* Source

Empirical antibiotics for suspected neonatal sepsis

- Neonates with signs of sepsis should be treated with ampicillin (or penicillin) and gentamicin as the first line antibiotic treatment for at least 10 days. *(Strong recommendation, low quality of evidence).* Source
- If a neonate with sepsis is at greater risk of staphylococcus infection (e.g. extensive skin pustules, abscess, or omphalitis in addition to signs of sepsis), they should be given cloxacillin and gentamicin instead of penicillin and gentamicin. *(Strong recommendation, quality of evidence not graded).* Source
- Where possible, blood cultures should be obtained before starting antibiotics. If an infant does not improve in 2–3 days, antibiotic treatment should be changed, or the infant should be referred for further management. *(Strong recommendation, quality of evidence not graded).* Source

UPDATE

Managing possible serious bacterial infection in young infants when referral is not feasible

Community health workers and home visits for postnatal care

- At home visits made as part of postnatal care, community health workers should counsel families on recognition of danger signs, assess young infants for danger signs of illness and promote appropriate care seeking. (*Strong recommendation, moderate quality evidence*). Source

Infants 0–6 days with fast breathing as the only sign of illness

- Young infants 0–6 days old with fast breathing as the only sign of illness should be referred to hospital. If families do not accept or cannot access referral care, these infants should be treated with oral amoxicillin, 50 mg/kg per dose twice daily for seven days, by an appropriately trained health worker. (*Strong recommendation, low quality evidence*). Source

Infants 7–59 days with fast breathing as the only sign of illness

- Young infants 7–59 days old with fast breathing as the only sign of illness should be treated with oral amoxicillin, 50 mg/kg per dose twice daily for seven days, by an appropriately trained health worker. These infants do not need referral. (*Strong recommendation, low quality evidence*). Source

Young infants 0–59 days old with clinical severe infection

- Young infants 0–59 days old with clinical severe infection whose families do not accept or cannot access referral care should be managed in outpatient settings by an appropriately trained health worker with one of the following regimens:

  Option 1: Intramuscular gentamicin 5–7.5 mg/kg (for low-birth-weight infants gentamicin 3–4 mg/kg) once daily for seven days and twice daily oral amoxicillin, 50 mg/kg per dose for seven days. Close follow-up is essential. (*Strong recommendation, moderate quality evidence*). Source

  Option 2: Intramuscular gentamicin 5–7.5 mg/kg (for low-birth-weight infants gentamicin 3–4 mg/kg) once daily for two days and twice daily oral amoxicillin,50 mg/kg per dose for seven days. Close follow-up is essential. A careful assessment on day 4 is mandatory. (*Strong recommendation, low quality evidence*). Source

Young infants 0–59 days old with critical illness

- Young infants 0–59 days old who have any sign of critical illness (at presentation or developed during treatment of clinical severe infection) should be hospitalized after pre-referral treatment. (*Strong recommendation, very low quality evidence*). Source

6. CARE OF THE PRETERM AND LOW-BIRTH-WEIGHT NEWBORN

Prevention of hypothermia immediately after birth

- LBW neonates weighing >1200g who do not have complications and are clinically stable should be put in skin-to-skin contact with the mother soon after birth and after drying them thoroughly to prevent neonatal hypothermia. *(Weak recommendation, low quality evidence).* Source

Kangaroo Mother Care and Thermal care for preterm/low birth weight newborns

UPDATE

- Kangaroo mother care is recommended for the routine care of newborns weighing 2000 g or less at birth, and should be initiated in health-care facilities as soon as the newborns are clinically stable. (*Strong recommendation, moderate-quality evidence*). Source
- Newborns weighing 2000 g or less at birth should be provided as close to continuous Kangaroo mother care as possible. (*Strong recommendation, moderate-quality evidence*). Source
- Intermittent Kangaroo mother care, rather than conventional care, is recommended for newborns weighing 2000 g or less at birth, if continuous Kangaroo mother care is not possible. (*Strong recommendation, moderate-quality evidence*). Source

- Unstable newborns weighing 2000 g or less at birth, or stable newborns weighing less than 2000 g who cannot be given Kangaroo mother care, should be cared for in a thermos-neutralenvironment either under radiant warmers or in incubators. (*Strong recommendation, very low-quality evidence*). Source
- There is insufficient evidence on the effectiveness of plastic bags/wraps in providing thermal care for preterm newborns immediately after birth. However, during stabilization and transfer of preterm newborns to specialized neonatal care wards, wrapping in plastic bags/wraps may be considered as an alternative to prevent hypothermia. (*Conditional recommendation, low-quality evidence*). Source

UPDATE

Oxygen therapy and concentration for preterm newborns

- During ventilation of preterm babies born at or before 32 weeks of gestation, it is recommended to start oxygen therapy with 30% oxygen or air (if blended oxygen is not available), rather than with 100% oxygen. (*Strong recommendation, very low-quality evidence*). Source
- The use of progressively higher concentrations of oxygen should only be considered for newborns undergoing oxygen therapy if their heart rate is less than 60 beats per minute after 30 seconds of adequate ventilation with 30% oxygen or air. (*Strong recommendation, very low-quality evidence*). Source

UPDATE

Continuous positive airway pressure for newborns with respiratory distress syndrome

- Continuous positive airway pressure therapy is recommended for the treatment of preterm newborns with respiratory distress syndrome. (*Strong recommendation, low-quality evidence*). Source
- Continuous positive airway pressure therapy for newborns with respiratory distress syndrome should be started as soon as the diagnosis is made. (*Strong recommendation, very low-quality evidence*). Source

UPDATE

Surfactant administration for newborns with respiratory distress syndrome

- Surfactant replacement therapy is recommended for intubated and ventilated newborns with respiratory distress syndrome. (*Conditional recommendation, (only in health-care facilities where intubation, ventilator care, blood gas analysis, newborn, nursing care and monitoring are available) based on moderate quality evidence*). Source
- Either animal-derived or protein-containing synthetic surfactants can be used for surfactant replacement therapy in ventilated preterm newborns with respiratory distress syndrome. (*Conditional recommendation, (only in health-care facilities, where intubation, ventilator care, blood gas analysis, newborn nursing care and monitoring are available), moderate quality evidence*). Source

- Administration of surfactant before the onset of respiratory distress syndrome (prophylactic administration) in preterm newborns is not recommended. (*Strong recommendation, low-quality evidence*). Source
- In intubated preterm newborns with respiratory distress syndrome, surfactant should be administered early (within the first 2 hours after birth) rather than waiting for the symptoms to worsen before giving rescue therapy. (*Conditional recommendation, (only in health-care facilities where intubation, ventilator care, blood gas analysis, newborn nursing care and monitoring are available), low-quality evidence*). Source

Feeding of Low-birth-weight (LBW) infants

- LBW infants, including those with VLBW, should be fed mother's own milk. *(Strong recommendation, moderate quality evidence).* Source
- LBW infants, including those with very low birth weight (VLBW), who cannot be fed mother's own milk should be fed donor human milk. (*Strong situational recommendation relevant to settings where safe and affordable milk-banking facilities are available or can be set up*, *high quality evidence*). Source
- LBW infants, including those with VLBW, who cannot be fed mother's own milk or donor human milk should be fed standard infant formula. (*Weak situational recommendation relevant for resource-limited settings*, *low quality evidence).* Source
- VLBW infants who cannot be fed mother's own milk or donor human milk should be given preterm infant formula if they fail to gain weight despite adequate feeding with standard infant formula. (*Weak situational recommendation relevant for resource-limited settings*,*low quality evidence).* Source
- LBW infants, including those with VLBW, who cannot be fed mother's own milk or donor human milk should be fed standard infant formula from the time of discharge until 6 months of age. *(Weak situational recommendation relevant for resource-limited settings, low quality evidence).* Source
- VLBW infants who are fed mother's own milk or donor human milk need not be given bovine milk-based human-milk fortifier. VLBW infants who fail to gain weight despite adequate breast-milk feeding should be given human-milk fortifiers, preferably those that are human milk based. *(Weak situational recommendation relevant to resource-limited settings, low to very low quality evidence).* Source
- VLBW infants should be given vitamin D supplements at a dose ranging from 400 i.u. to 1000 i.u. per day until 6 months of age. *(Weak recommendation, very low quality evidence).* Source
- VLBW infants who are fed mother's own milk or donor human milk should be given daily calcium (120–140 mg/kg per day) and phosphorus (60–90 mg/kg per day) supplementation during the first months of life. *(Weak recommendation, low quality evidence).* Source
- VLBW infants fed mother's own milk or donor human milk should be given 2–4 mg/kg per day iron supplementation starting at 2 weeks until 6 months of age. *(Weak recommendation, low quality evidence).* Source
- Daily oral vitamin A supplementation for LBW infants who are fed mother's own milk or donor human milk is not recommended at the present time because there is not enough evidence of benefits to support such a recommendation. *(Weak recommendation, low quality evidence).* Source

- Routine zinc supplementation for LBW infants who are fed mother's own milk or donor humanmilk is not recommended, because there is not enough evidence of benefits to support such a recommendation. *(Weak recommendation, moderate to low quality evidence).* Source
- VLBW infants should be given 10ml/kg per day of enteral feeds, preferably expressed breast milk, starting from the first day of life, with the remaining fluid requirement met by intravenous fluids. *(Weak situational recommendation relevant to resource-limited settings where total parenteral nutrition is not possible, low to very low quality evidence).* Source
- LBW infants should be exclusively breastfed until 6 months of age. *(Strong recommendation, very low quality evidence).* Source
- LBW infants who need to be fed by an alternative oral feeding method should be fed by cup (or *palladai* which is a cup with a beak) or spoon. (*Strong situational recommendation relevant to resource-limited settings, moderate quality evidence).* Source
- VLBW infants requiring intragastric tube feeding should be given bolus intermittent feeds. *(Weak recommendation, low quality evidence).* Source
- In VLBW infants who need to be given intragastric tube feeding, the intragastric tube may be placed either by the oral or nasal route, depending upon the preferences of health-care providers. *(Weak recommendation, very low quality evidence).* Source
- LBW infants who are fully or mostly fed by an alternative oral feeding method should be fed based on infants' hunger cues, except when the infant remains asleep beyond 3 hours since the last feed. *(Weak situational recommendation relevant to settings with adequate number of health care providers, moderate quality evidence).* Source
- In VLBW infants who need to be fed by an alternative oral feeding method or given intragastric tube feeds, feed volumes can be increased by up to 30 ml/kg per day with careful monitoring for feed intolerance. *(Weak recommendation, high quality evidence).* Source

7. CARE OF THE NEWBORN OF AN HIV-INFECTED MOTHER

UPDATE

HIV Diagnosis

Timing of virological testing

- Addition of nucleic acid testing (NAT) at birth to existing early infant diagnosis (EID) testing approaches can be considered to identify HIV infection in HIV-exposed infants (*Conditional recommendation, low-quality evidence*). Source

Point-of care technologies for the diagnosis of HIV infection in infants and children

- Nucleic acid testing (NAT) technologies that are developed and validated for use at or near to the point of care can be used for early infant HIV testing (*Conditional recommendation, low quality evidence*). Source
- Rapid diagnostic tests (RDTs) for HIV serology can be used to assess HIV exposure only in infants less than 4 months of age. HIV-exposure status in infants and children 4–18 months of age should be ascertained by undertaking HIV serological testing in the mother (*Conditional recommendation, low-quality evidence*).

- Rapid diagnostic tests for HIV serology can be used at 9 months to rule out HIV infection in asymptomatic HIV-exposed infants (*Conditional recommendation, low-quality evidence*). Source
- Rapid diagnostic tests for HIV serology can be used to diagnose HIV infection in children older than 18 months following the national testing strategy (*Strong recommendation, moderate quality evidence*). Source

Infant prophylaxis

- Infants born to mothers with HIV who are at high risk of acquiring HIV2 should receive dual prophylaxis with AZT (twice daily) and NVP (once daily) for the first 6 weeks of life, whether they are breastfed or formula fed (*Strong recommendation, moderate-quality evidence*).
- Breastfed infants who are at high risk of acquiring HIV, including those first identified as exposed to HIV during the postpartum period, should continue infant prophylaxis for an additional 6 weeks (total of 12 weeks of infant prophylaxis) using either AZT (twice daily) and NVP (once daily) or NVP alone (*Conditional recommendation, low-quality evidence*). Source

Infant feeding[3]

UPDATE

The duration of breastfeeding by mothers living with HIV

For how long should a mother living with HIV breastfeed if she is receiving ART and there is no evidence of clinical, immune or viral failure?

- Mothers living with HIV should breastfeed for at least 12 months and may continue breastfeeding for up to 24 months or longer (similar to the general population) while being fully supported for ART adherence (see the WHO consolidated guidelines on ARV drugs for interventions to optimize adherence). (*Strong recommendation, low quality of evidence 12 months, very low quality of evidence 24 months*).

The Guideline Development Group agreed that recommendation 1 should be framed by the following statement.

In settings where health services provide and support lifelong ART, including adherence counselling, and promote and support breastfeeding among women living with HIV, the duration of breastfeeding should not be restricted.

“Mothers known to be HIV-infected (and whose infants are HIV uninfected or of unknown HIV status) should exclusively breastfeed their infants for the first six months of life, introducing appropriate complementary foods thereafter and continue breastfeeding.”

“Breastfeeding should then only stop once a nutritionally adequate and safe diet without breast milk can be provided.”

Source

In settings where national authorities promote and support HIV-infected women to breast-feed and receive ARV interventions

- **Mothers known to be HIV-infected** should exclusively breastfeed their HIV uninfected infants or infants who are of unknown HIV status for the first 6 months of life. *(Strong recommendation, high quality evidence).* Source

[3] These recommendations were unchanged by the Guidelines Development Group in 2013.

In settings where national promote and support HIV-infected women to avoid all breastfeeding

- **Mothers known to be HIV-infected** should only give commercial infant formula milk as a replacement feed to their HIV-uninfected infants or infants who are of unknown HIV status, when specific conditions are met:

  a. safe water and sanitation are assured at the household level and in the community, and,

  b. the mother, or other caregiver can reliably provide sufficient infant formula milk to support normal growth and development of the infant; and,

  c. the mother or caregiver can prepare it cleanly and frequently enough so that it is safe and carries a low risk of diarrhoea and malnutrition; and,

  d. the mother or caregiver can, in the first six months, exclusively give infant formula milk; and

  e. the family is supportive of this practice; and,

  f. the mother or caregiver can access health care that offers comprehensive child health services.

  (Strong recommendation, low quality evidence). Source

8. MANAGEMENT OF OTHER SEVERE CONDITIONS

Neonatal seizures

- Clinically apparent seizures in the neonate should be treated if they last more than 3 minutes or are brief serial seizures. (*Strong recommendation, quality of evidence not graded).* Source
- In specialized care facilities where electroencephalography is available, all electrical seizures, even in the absence of clinically apparent seizures, should also be treated. (*Strong context-specific recommendation, quality of evidence not graded).* Source
- In all neonates with seizures, hypoglycaemia should be ruled out and treated if present before antiepileptic drug treatment is considered. *(Strong recommendation, quality of evidence not graded).* Source
- If facilities for measuring glucose are not available, consider empirical treatment with glucose. (*Weak context-specific recommendation, quality of evidence not graded).* Source
- If there are clinical signs suggestive of associated sepsis or meningitis, central nervous system infection should be rule out by doing a lumbar puncture, and treated if present with appropriate antibiotics. *(Strong recommendation, quality of evidence not graded).* Source
- If facilities for lumbar puncture are not available, consider empirical treatment with antibioticsfor neonates with clinical signs of sepsis or meningitis. (*Weak, context-specific recommendation, quality of evidence not graded).* Source
- In all neonates with seizures, serum calcium should be measured (if facilities are available) and treated if hypocalcaemia is present. *(Strong context-specific recommendation, quality of evidence not graded).* Source
- In the absence of hypoglycaemia, meningitis, hypocalcaemia or another obvious underlying etiology such as hypoxic-ischaemic encephalopathy, intracranial haemorrhage or infarction, pyridoxine treatment may be considered before antiepileptic drug treatment in a specialized centre where this treatment is available. *(Weak context-specific recommendation, quality of evidence not graded).* Source

- Phenobarbital should be used as the first-line agent for treatment of neonatal seizures; phenobarbital should be made readily available in all settings. *(Strong recommendation, very low quality evidence).* Source
- In neonates who continue to have seizures despite administering the maximal tolerated dose of phenobarbital, either midazolam or lidocaine may be used as the second-line agent for control of seizures [use of lidocaine requires cardiac monitoring facilities]. (*Weak recommendation, very low quality evidence).* Source
- In neonates with normal neurological examination and/or normal electroencephalography, consider stopping antiepileptic drugs if neonate has been seizure-free for >72 hours; the drug(s) should be reinstituted in case of recurrence of seizures. *(Weak recommendation, very low quality evidence).* Source
- In neonates in whom seizure control is achieved with a single antiepileptic drug, the drug can be discontinued abruptly without any tapering of the doses. *(Weak recommendation, quality of evidence not graded).* Source
- In neonates requiring more than one antiepileptic drug for seizure control, the drugs may be stopped one by one, with phenobarbital being the last drug to be withdrawn. *(Weak recommendation, quality of evidence not graded).* Source
- In the absence of clinical seizures, neonates with hypoxic-ischaemic encephalopathy need not to be given prophylactic treatment with phenobarbital. *(Strong recommendation, moderate quality evidence).* Source
- Where available, all clinical seizures in the neonatal period should be confirmed by electroencephalography. *(Strong context-specific recommendation, quality of evidence not graded).* Source
- Electroencephalography should not be performed for the sole purpose of determining the etiology in neonates with clinical seizures. *(Strong recommendation, quality of evidence not graded).* Source
- Radiological investigations (ultrasound, computed tomography and magnetic resonance imaging) of the cranium/head should not be performed to determine the presence or absence of clinical seizures or to evaluate the efficacy of treatment with antiepileptic drugs in neonates. *(Strong recommendation, quality of evidence not graded).* Source
- Radiological investigations may be done as a part of the comprehensive evaluation of theetiology of neonatal seizures or to determine prognosis in neonates with seizures. *(Weak context-specific recommendation, quality of evidence not graded).* Source

Neonatal jaundice

Monitoring jaundice and serum bilirubin

- Clinicians should ensure that all newborns are routinely monitored for the development of jaundice and that serum bilirubin should be measured in those at risk:
  - in all babies if jaundice appears on day 1
  - in preterm babies (<35 weeks) if jaundice appears on day 2
  - in all babies if palms and soles are yellow at any age

  (Strong recommendation, very low quality evidence). Source

Serum bilirubin cut-offs for phototherapy and exchange transfusion

- Term and preterm newborns with hyperbilirubinaemia should be treated with phototherapy or exchange transfusion guided by the following cut-off levels of serum hyperbilirubinaemia. *(Weak recommendation, very low quality evidence).* Source

AGE	PHOTOTHERAPY		EXCHANGE TRANSFUSION	
	HEALTHY NEWBORNS ≥35 WEEKS GESTATION	NEWBORNS <35 WEEKS GESTATION	HEALTHY NEWBORNS ≥35 WEEKS GESTATION	NEWBORNS <35 WEEKS GESTATION
Day 1	Any visible jaundice		260 mmol/L (15 mg/dL)	220 mmol/L (10 mg/dL)
Day 2	260 mmol/L (15 mg/dL)	170 mmol/L (10 mg/dL)	425 mmol/L (25 mg/dL)	260 mmol/L (15 mg/dL)
Day 3	310 mmol/L (18 mg/dL)	250 mmol/L (15 mg/dL)	425 mmol/L (25 mg/dL)	340 mmol/L (20 mg/dL)

Stopping phototherapy

- Phototherapy should be stopped once serum bilirubin is 50 mmol/l (3 mg/dl) or below the phototherapy threshold. *(Weak recommendation, quality of evidence not graded).* Source

Necrotizing enterocolitis

Antibiotics for treatment of necrotizing enterocolitis

- Young neonates with suspected necrotizing enterocolitis should be treated with IV or IM ampicillin (or penicillin) and gentamicin as first line antibiotic treatment for 10 days. *(Strong recommendation, low quality evidence).* Source

Congenital syphilis

Symptomatic or high risk infants

- In infants with confirmed congenital syphilis or infants who are clinically normal, but whose mothers had untreated syphilis, inadequately treated syphilis (including treatment within 30 days of delivery) or syphilis that was treated with non-penicillin regimens, the WHO STI guideline suggests aqueous benzyl penicillinor procaine penicillin.

  Dosages:

  — Aqueous benzyl penicillin 100 000–150 000 U/kg/day intravenously for 10–15 days

  — Procaine penicillin 50 000 U/kg/day single dose intramuscularly for 10–15 days

Remarks: If an experienced venipuncturist is available, aqueous benzyl penicillin may be preferred instead of intramuscular injections of procaine penicillin. *(Conditional recommendation, very low quality evidence).* Source

Asymptomatic or low risk infants

- In infants who are clinically normal and whose mothers had syphilis that wasadequately treated with no signs of reinfection, the WHO STI guideline suggestsclose monitoring of the infants.

Remarks: The risk of transmission of syphilis to the fetus depends on a number of factors, including maternal titres from non-treponemal tests (e.g. RPR), timing of maternal treatment and stage of maternal infection, and therefore this recommendation is conditional. If treatment

is provided, benzathine penicillin G 50 000 U/kg/day single dose intramuscularly is an option. *(Conditional recommendation, very low quality evidence).* Source

Ophthalmia neonatorum

Treatment of eye infection

- In neonates with gonococcal conjunctivitis, the WHO STI guideline suggests one of the following treatment options:
  - ceftriaxone 50 mg/kg (maximum 150 mg) IM as a single dose
  - kanamycin 25 mg/kg (maximum 75 mg) IM as a single dose
  - spectinomycin 25 mg/kg (maximum 75 mg) IM as a single dose.

Remarks: Due to the large net benefit with treatment, good practice dictates that neonates should be treated for gonococcal conjunctivitis. The choice of treatment may depend on the cost and quality of the medicine in different settings and on equity considerations. Side-effects should be monitored in neonates. (*Conditional recommendation, very low quality evidence).* Source

- In neonates with chlamydial conjunctivitis, the WHO STI guideline recommends treatment with azithromycin 20 mg/kg/day orally one dose daily for 3 days over erythromycin 50 mg/ kg/ day orally in 4 divided doses daily for 14 days.

Remarks: This is a strong recommendation given the potential for the risk of pyloric stenosis with the use of erythromycin in neonates. In some settings, azithromycin suspension is not available and therefore erythromycin may be used. Side effects should be monitored with the use of either medication. (*Strong recommendation, very low quality evidence).* Source

Prevention of ophthalmia neonatorum

- For all neonates, the WHO STI guideline recommends topical ocular prophylaxis for the prevention of gonococcal and chlamydial ophthalmia neonatorum. (*Strong recommendation, low quality evidence).* Source

For ocular prophylaxis, the WHO STI guideline suggests one of the following options for topical application to both eyes immediately after birth:

- tetracycline hydrochloride 1% eye ointment
- erythromycin 0.5% eye ointment
- povidone iodine 2.5% solution (water-based)
- silver nitrate 1% solution
- chloramphenicol 1% eye ointment.

Remarks: Recommendations 5 and 6 apply to the prevention of both chlamydial and gonococcal ophthalmia neonatorum. Cost and local resistance to erythromycin, tetracycline and chloramphenicol in gonococcal infection may determine the choice of medication. Caution should be taken to avoid touching eye tissue when applying the topical treatment and to provide a water-based solution of povidone iodine. DO NOT USE ALCOHOL-BASED POVIDONE IODINE SOLUTION.

(*Conditional recommendation, low quality evidence).* Source

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