Newborn Health Guidelines approved by the WHO Guidelines Review Committee

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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.[1] (*Strong recommendation, high quality evidence)*

- Intrapartum suction of mouth and nose at the delivery of head in neonates born through meconium is not recommended.[1] (*Strong recommendation, low quality evidence)*

- Suctioning of mouth or nose is not recommended in neonates born through liquor with meconium who start breathing on their own.[1] (*Weak recommendation, quality of evidence not graded)*

- Tracheal suctioning should not be performed in newly born babies born through meconium who start breathing on their own.[1] (*Strong recommendation, moderate to low quality evidence)*

CORD CLAMPING

- In a newly born term or preterm baby who does not require positive pressure ventilation, the cord should not be clamped earlier than 1 minute after birth.[1] (*Strong recommendation, high to moderate quality evidence)*

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.[2] *(Strong recommendation, low quality evidence)*

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.[3] *(Strong recommendation, low quality evidence)*

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].[2] *(Strong recommendation, moderate quality evidence)*

- 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].[2] *(Strong recommendation, moderate quality evidence)*

II. 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[1]. (*strong recommendation, high to moderate quality of evidence)*

  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 (GDG) consensus in absence of published evidence)*

- 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 evidence, GDG consensus in absence of published evidence)*

- 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. (*strong recommendation, high quality evidence)*

  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.

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[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.

Suctioning should be done only if the mouth or nose is full of secretions. (*weak recommendation, GDG consensus in absence of published evidence)*

- 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 recommendation, low quality evidence)*

- In neonates born through meconium-stained amniotic fluid who start breathing on their own, tracheal suctioning should not be performed. (*strong recommendation, moderate to low quality of evidence)*

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

  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)*

  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, GDG consensus in absence of published evidence)*

- 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)*

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. (*strong recommendation, very low quality evidence)*

- In newly-born term or preterm (>32 weeks gestation) babies requiring positive pressure ventilation, ventilation should be initiated with air. *(strong recommendation, moderate quality evidence)*

- 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)*

- 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)*

- 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)*

- 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)*

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)*

III. 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. Delivery of hepatitis B vaccine within 24 hours of birth should be a performance measure for all immunization programmes.[4] *(Strong recommendation, moderate quality evidence)*

- OPV, 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, to increase the seroconversion rates of subsequent doses and to induce mucosal protection before enteric pathogens may interfere with the immune response.[5] *(Strong recommendation, high quality evidence)*

IV. POSTNATAL CARE

- Mothers who are known to be *HIV uninfected* or whose *HIV status is unknown* should be counselled to exclusively breastfeed their infants for the first six months of life and then introduce complementary foods while continuing breastfeeding for 24 months or beyond. [6] *(Strong recommendation, quality of evidence not graded)*

- For all home births a visit to a health facility for postnatal care as soon as possible after birth is recommended. [7] *(strength of recommendation and quality of evidence not graded)*

- In high mortality settings and where access to facility based care is limited, WHO and UNICEF recommend at least two home visits for all home births: the first visit should occur within 24 hours from birth and the second visit on day 3. If possible, a third visit should be made before the end of the first week of life (day 7). For babies born in a health facility, the first home visit should be made as soon as possible after the mother and baby come home. The remaining visits should follow the same schedule as for home births.[7] *(strength of recommendation and quality of evidence not graded)*

- Basic care for all newborns should include promoting and supporting early and exclusive breastfeeding, keeping the baby warm, increasing hand washing and providing hygienic umbilical cord and skin care, identifying conditions requiring additional care and counselling on when to take a newborn to a health facility.[7] *(strength of recommendation and quality of evidence not graded)*

- Newborns and their mothers should be examined for danger signs at home visits. At the same time, families should be counselled on identification of these danger signs and the need for prompt care seeking if one or more of them are present.[7] *(strength of recommendation and quality of evidence not graded)*

V. 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.[2] *(Weak recommendation, low quality evidence)*

KANGAROO MOTHER CARE

- Low birth weight (LBW) neonates weighing < 2000 g who are clinically stable should be provided Kangaroo Mother Care (KMC) early in the first week of life.[2] *(Strong recommendation, moderate quality evidence)*

FEEDING OF LBW INFANTS

- LBW infants, including those with VLBW, should be fed mother's own milk.[3] *(Strong recommendation, moderate quality evidence)*

- LBW infants, including those with VLBW, who cannot be fed mother's own milk should be fed donor human milk.[3] (*Strong situational recommendation relevant to settings where safe and affordable milk-banking facilities are available or can be set up*, *high quality evidence*)

- LBW infants, including those with VLBW, who cannot be fed mother's own milk or donor human milk should be fed standard infant formula.[3] (*Weak situational recommendation relevant for resource-limited settings*, *low quality evidence)*

- 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.[3] (*Weak situational recommendation relevant for resource-limited settings*, *low quality evidence)*

- 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.[3] *(Weak situational recommendation relevant for resource-limited settings, low quality evidence)*

- 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.[3] *(Weak situational recommendation relevant to resource-limited settings, low to very low quality evidence)*

- VLBW infants should be given vitamin D supplements at a dose ranging from400 i.u to 1000 i.u. per day until 6 months of age.[3] *(Weak recommendation, very low quality evidence)*

- 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.[3] *(Weak recommendation, low quality evidence)*

- 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.[3] *(Weak recommendation, low quality evidence)*

- 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.[3] *(Weak recommendation, low quality evidence)*

- Routine zinc supplementation for LBW infants who are fed mother's own milk or donor human milk is not recommended, because there is not enough evidence of benefits to support such a recommendation.[3] *(Weak recommendation, moderate to low quality evidence)*

- 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.[3] *(Weak situational recommendation relevant to resource-limited settings where total parenteral nutrition is not possible, low to very low quality evidence)*

- LBW infants should be exclusively breastfed until 6 months of age.[3] *(Strong recommendation, very low quality evidence)*

- 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.[3] (*Strong situational recommendation relevant to resource-limited settings, moderate quality evidence)*

- VLBW infants requiring intragastric tube feeding should be given bolus intermittent feeds.[3] *(Weak recommendation, low quality evidence)*

- 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.[3] *(Weak recommendation, very low quality evidence)*

- 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.[3] *(Weak situational recommendation relevant to settings with adequate number of health care providers, moderate quality evidence)*

- 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.[3] *(Weak recommendation, high quality evidence)*

VI. MANAGEMENT OF 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 > 38ºC before delivery or during labour, or amniotic fluid was foul smelling or purulent) should be treated with the prophylactic antibiotics ampicillin (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.[2] *(Weak recommendation, very low quality evidence)*

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.[2] *(Strong recommendation, low quality of evidence)*

- 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.[2] *(Strong recommendation, quality of evidence not graded)*

- 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.[2] *(Strong recommendation, quality of evidence not graded)*

VII. MANAGEMENT OF NEONATAL SEIZURES

- Clinically apparent seizures in the neonate should be treated if they last more than 3 minutes or are brief serial seizures.[8] (*Strong recommendation, quality of evidence not graded)*

- In specialized care facilities where electroencephalography is available, all electrical seizures, even in the absence of clinically apparent seizures, should also be treated.[8] (*Strong context-specific recommendation, quality of evidence not graded)*

- In all neonates with seizures, hypoglycaemia should be ruled out and treated if present before antiepileptic drug treatment is considered.[8] *(Strong recommendation, quality of evidence not graded)*

- If facilities for measuring glucose are not available, consider empirical treatment with glucose.[8] (*Weak context-specific recommendation, quality of evidence not graded)*

- 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.[8] *(Strong recommendation, quality of evidence not graded)*

- If facilities for lumbar puncture are not available, consider empirical treatment with antibiotics for neonates with clinical signs of sepsis or meningitis.[8] (*Weak, context-specific recommendation, quality of evidence not graded)*

- In all neonates with seizures, serum calcium should be measured (if facilities are available) and treated if hypocalcaemia is present.[8] *(Strong context-specific recommendation, quality of evidence not graded)*

- 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.[8] *(Weak context-specific recommendation, quality of evidence not graded)*

- Phenobarbital should be used as the first-line agent for treatment of neonatal seizures; phenobarbital should be made readily available in all settings.[8] *(Strong recommendation, very low quality evidence)*

- 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].[8] (*Weak recommendation, very low quality evidence)*

- 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.[8] *(Weak recommendation, very low quality evidence)*

- 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.[8] *(Weak recommendation, quality of evidence not graded)*

- 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.[8] *(Weak recommendation, quality of evidence not graded)*

- In the absence of clinical seizures, neonates with hypoxic-ischaemic encephalopathy need not to be given prophylactic treatment with phenobarbital. [8] *(Strong recommendation, moderate quality evidence)*

- Where available, all clinical seizures in the neonatal period should be confirmed by electroencephalography. [8] *(Strong context-specific recommendation, quality of evidence not graded)*

- Electroencephalography should not be performed for the sole purpose of determining the etiology in neonates with clinical seizures. [8] *(Strong recommendation, quality of evidence not graded)*

- 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. [8] *(Strong recommendation, quality of evidence not graded)*

- Radiological investigations may be done as a part of the comprehensive evaluation of the etiology of neonatal seizures or to determine prognosis in neonates with seizures. [8] *(Weak context-specific recommendation, quality of evidence not graded)*

VIII. MANAGEMENT OF 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 [2]

  (Strong recommendation, very low quality evidence)

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.[2]

	Phototherapy	**Exchange transfusion**

	Healthy newborns ≥35 weeks gestation	Newborns <35 weeks gestation or any risk factors	Healthy newborns ≥35 weeks gestation	Newborns <35 weeks gestation or any risk factors
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)

(Weak recommendation, very low quality evidence)

STOPPING PHOTOTHERAPY

- Phototherapy should be stopped once serum bilirubin is 50 mmol/l (3 mg/dl) or below the phototherapy threshold.[2] *(Weak recommendation, quality of evidence not graded)*

IX. MANAGEMENT OF 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.[2] *(Strong recommendation, low quality evidence)*

X. CARE OF AN HIV-EXPOSED NEWBORN

ANTIRETROVIRAL PROPHYLAXIS FOR NEWBORNS

- *Antiretroviral prophylaxis for infants born to women receiving ART (regardless of infant feeding choice):* A short duration of antiretroviral prophylaxis (for 4-6 weeks) is indicated for infants born to HIV infected women receiving ART, to further reduce peripartum and postpartum HIV transmission, in addition to the protection received from the mother's ART regimen.
- *Antiretroviral prophylaxis for breastfeeding infants born to women not eligible for ART but receiving maternal antenatal AZT prophylaxis (Option A):* Daily administration of NVP to the infant from birth or as soon as feasible thereafter, until

1 week after all exposure to breast milk has ended is recommended, or until 4 to 6 weeks of age if breastfeeding stops very early (but always continue for 1 week after breastfeeding ends).

- *Antiretroviral prophylaxis for breastfeeding infants born to women not eligible for ART but receiving maternal triple prophylaxis (Option B):* Daily administration of NVP or twice-daily AZT to the infant from birth (within 6 to 12 hours) or as soon as feasible thereafter until 4 to 6 weeks of age is recommended.
- *Antiretroviral prophylaxis for infants receiving replacement feeding only born to women not eligible for ART but receiving either antenatal AZT or triple prophylaxis:* Peripartum prophylaxis should be coupled with daily administration of NVP or twice-daily AZT to the infant from birth (within 6 to 12 hours) or as soon as feasible thereafter until 4 to 6 weeks of age.

[8] *(Strong recommendations, low-moderate quality of evidence)*

INFANT FEEDING

In settings where national authorities promote and support HIV-infected women to breastfeed 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. [6] *(Strong recommendation, high quality evidence)*

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.

  [These descriptions are intended to give simpler and more explicit meaning to the concepts represented by AFASS i.e. acceptable, feasible, affordable, sustainable and safe].[6] *(Strong recommendation, low quality evidence)*

REFERENCES OF ORIGINAL GUIDELINE DOCUMENTS

1 Guidelines on basic newborn resuscitation, 2012

2 Recommendations for management of common childhood conditions: evidence for technical update of pocket book recommendations: newborn conditions, dysentery, pneumonia, oxygen use and delivery, common causes of fever, severe acute malnutrition and supportive care, 2011

3 Guidelines on optimal feeding of low birth weight infants, 2011

4 Hepatitis B vaccines: WHO position paper 2009

5 Polio vaccines and polio immunization in the pre-eradication era: WHO position paper 2010

6 Guidelines on HIV and infant feeding. 2010. Principles and recommendations for infant feeding in the context of HIV and a summary of evidence.

7 Home visits for newborn care. A WHO/UNICEF Joint Statement, 2009

8 Guidelines for management of neonatal seizures, 2011

9 Antiretroviral drugs for treating pregnant women and preventing HIV infection in infants. Recommendations for a public health approach. 2010 version.