WHO recommendations on maternal health

guidelines approved by the WHO Guidelines Review Committee

second edition

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Contents

1. Part A: Maternal Health promotion and protection, and prevention of complications . . . 1
1.1 Antenatal Care . . . 2
1.1.1 WHO recommendations on antenatal care for a positive pregnancy experience . . . 2
1.2 Intrapartum Care and Casearean Section . . . 20
1.2.1 WHO recommendations: intrapartum care for a positive childbirth experience . . . 20
1.2.2 WHO recommendations: Induction of labour at or beyond term . . . 43
1.2.3 WHO recommendations for induction of labour . . . 44
1.2.4 WHO recommendations for augmentation of labour . . . 47
1.3 Postnatal Care . . . 49
1.3.1 WHO recommendations on maternal and newborn care for a positive postnatal experience . . . 49
1.4 Breastfeeding . . . 79
1.4.1 Guideline: counselling of women to improve breastfeeding practices . . . 79
1.4.2 Protecting, promoting and supporting breastfeeding in facilities providing maternity and newborn services . . . 85
1.5 Prevention of Maternal Health Complications . . . 90
1.5.1 WHO recommendation on advance misoprostol distribution to pregnant women for prevention of postpartum haemorrhage . . . 90
1.5.2 WHO recommendation on routes of oxytocin administration for the prevention of postpartum haemorrhage after vaginal birth . . . 91
1.5.3 WHO recommendations on uterotonics for the prevention of postpartum haemorrhage . . . 92
1.5.4 WHO recommendation on calcium supplementation before pregnancy for the prevention of pre-eclampsia and its complications . . . 103
1.5.5 WHO recommendation: calcium supplementation during pregnancy for prevention of pre-eclampsia and its complications 104
1.5.6 Diagnostic Criteria and Classification of Hyperglycaemia First Detected in Pregnancy . . . 104
1.5.7 Global guidelines for the prevention of surgical site infection, 2nd ed . . . 105
1.5.8 Prevention of mother-to-child transmission of hepatitis B virus: Guidelines on antiviral prophylaxis in pregnancy . . . 126
1.6 Other Guidelines for improving Maternal Health and Wellbeing . . . 127
1.6.1 Guideline: Use of multiple micronutrient powders for point-of-use fortification of foods consumed by pregnant women . . . 127
1.6.2 Nutritional interventions update: multiple micronutrient supplements during pregnancy . . . 128
1.6.3 Nutritional interventions update: vitamin D supplements during pregnancy . . . 129
1.6.4 Vitamin A supplementation in postpartum women . . . 129
1.6.5 Vitamin A supplementation during pregnancy for reducing the risk of mother-to-child transmission of HIV Guideline . . . 130
1.6.6 Responding to intimate partner violence and sexual violence against women: WHO clinical and policy guidelines . . . 131
1.6.7 WHO guidelines on physical activity and sedentary behaviour . . . 132
1.6.8 Guidelines for the identification and management of substance use and substance use disorders in pregnancy . . . 133
1.6.9 WHO recommendations for the prevention and management of tobacco use and second-hand smoke exposure in pregnancy . . . 133
1.6.10 Guidelines on mental health promotive and preventive interventions for adolescents . . . 134
1.6.11 WHO recommendations on health promotion interventions for maternal and newborn health . . . 134
1.6.12 Hepatitis B vaccines: WHO position paper . . . 137
1.6.13 Guidelines on Hepatitis B and C Testing . . . 137
1.6.14 WHO recommendations on home-based records for maternal, newborn and child health . . . 138
1.6.15 WHO recommendations: non-clinical interventions to reduce unnecessary caesarean sections . . . 139

2. Part B: Managing Complications during Pregnancy, Childbirth and Postnatal period 143
2.1 Haemorrhage 144
2.1.1 WHO recommendations for the prevention and treatment of postpartum haemorrhage 144
2.1.2 WHO recommendation on umbilical vein injection of oxytocin for the treatment of retained placenta 149
2.2 Hypertensive Disorders 150
2.2.1 WHO recommendations for prevention and treatment of pre-eclampsia and eclampsia 150
2.2.2 WHO recommendations on drug treatment for non-severe hypertension in pregnancy 154
2.2.3 WHO recommendations Policy of interventionist versus expectant management of severe pre-eclampsia before term. . . 155
2.2.4 WHO recommendations: Drug treatment for severe hypertension in pregnancy 157
2.3 Infections and Infectious Diseases during pregnancy, childbirth, and postnatal period 158
2.3.1 WHO recommendations for prevention and treatment of maternal peripartum infections 158
2.3.2 WHO guideline on syphilis screening and treatment for pregnant women 165
2.3.3 Consolidated guidelines on the use of antiretroviral drugs for treating and preventing HIV infection: recommendations for a public health approach 168
2.3.4 Guidelines for the treatment of malaria 170
2.3.5 Guidelines for the management of pregnant and breastfeeding women in the context of Ebola virus disease 172
2.3.6 Nutritional care and support for patients with tuberculosis 177
2.4 Preterm Birth 178
2.4.1 WHO recommendations on interventions to improve preterm birth outcomes 178

References 186

Part A

Maternal Health promotion and protection, and prevention of complications

1

1 Part A: Maternal Health promotion and protection, and prevention of complications

1.1 Antenatal Care

1.1.1 WHO recommendations on antenatal care for a positive pregnancy experience

[1]

New **Recommended**

Counselling about healthy eating and keeping physically active during pregnancy is recommended for pregnant women to stay healthy and to prevent excessive weight gain during pregnancy.

- *A healthy diet contains adequate energy, protein, vitamins and minerals, obtained through the consumption of a variety of foods, including green and orange vegetables, meat, fish, beans, nuts, whole grains and fruit [2].*
- *Stakeholders may wish to consider culturally appropriate healthy eating and exercise interventions to prevent excessive weight gain in pregnancy, particularly for populations with a high prevalence of overweight and obesity, depending on resources and women's preferences. Interventions should be woman-centred and delivered in a non-judgemental manner, and developed to ensure appropriate weight gain (see further information in points below).*
- *A healthy lifestyle includes aerobic physical activity and strength-conditioning exercise aimed at maintaining a good level of fitness throughout pregnancy, without trying to reach peak fitness level or train for athletic competition. Women should choose activities with minimal risk of loss of balance and fetal trauma [3].*
- *Most normal gestational weight gain occurs after 20 weeks of gestation and the definition of "normal" is subject to regional variations, but should take into consideration pre-pregnant body mass index (BMI). According to the Institute of Medicine classification [4], women who are underweight at the start of pregnancy (i.e. BMI < 18.5 kg/m2) should aim to gain 12.5–18 kg, women who are normal weight at the start of pregnancy (i.e. BMI 18.5–24.9 kg/m2) should aim to gain 11.5–16 kg, overweight women (i.e. BMI 25–29.9 kg/m2) should aim to gain 7–11.5 kg, and obese women(i.e. BMI > 30 kg/m2) should aim to gain 5–9 kg.*
- *Most evidence on healthy eating and exercise interventions comes from high-income countries (HICs), and the GDG noted that that there are at least 40 ongoing trials in HICs in this field. The GDG noted that research is needed on the effects, feasibility and acceptability of healthy eating and exercise interventions in LMICs.*
- *Pregnancy may be an optimal time for behaviour change interventions among populations with a high prevalence of overweight and obesity, and the longer-term impact of these interventions on women, children and partners needs investigation.*
- *The GDG noted that a strong training package is needed for practitioners, including standardized guidance on nutrition. This guidance should be evidence-based, sustainable, reproducible, accessible and adaptable to different cultural settings.*

New

Context-specific recommendation

In undernourished populations, nutrition education on increasing daily energy and protein intake is recommended for pregnant women to reduce the risk of low-birth- weight neonates.

- *Undernourishment is usually defined by a low BMI (i.e. being underweight). For adults, a 20–39% prevalence of underweight women is considered a high prevalence of underweight and 40% or higher is considered a very high prevalence [5]. Mid-upper arm circumference (MUAC) may also be useful to identify protein–energy malnutrition in individual pregnant women and to determine its prevalence in this population [6]. However, the optimal cut-off points may need to be determined for individual countries based on context-specific cost–benefit analyses [6].*
- *Anthropometric characteristics of the general population are changing, and this needs to be taken into account by regularly reassessing the prevalence of undernutrition to ensure that the intervention remains relevant.*
- *The GDG noted that a strong training package is needed for practitioners, including standardized guidance on nutrition. This guidance should be evidence-based, sustainable, reproducible, accessible and adaptable to different cultural settings.*
- *Stakeholders might wish to consider alternative delivery platforms (e.g. peer counsellors, media reminders) and task shifting for delivery of this intervention.*
- *Areas that are highly food insecure or those with little access to a variety of foods may wish to consider additional complementary interventions, such as distribution of balanced protein and energy supplements (see Recommendation A.1.3).*

New Context-specific recommendation

In undernourished populations, balanced energy and protein dietary supplementation is recommended for pregnant women to reduce the risk of stillbirths and small-for-gestational-age neonates.

- *The GDG stressed that this recommendation is for populations or settings with a high prevalence of undernourished pregnant women, and not for individual pregnant women identified as being undernourished.*
- *Undernourishment is usually defined by a low BMI (i.e. being underweight). For adults, a 20–39% prevalence of underweight women is considered a high prevalence of underweight and 40% or higher is considered a very high prevalence [5]. MUAC may also be useful to identify protein–energy malnutrition in individual pregnant women and to determine its prevalence in this population [6]. However, the optimal cut-off points may need to be determined for individual countries based on context-specific cost– benefit analyses [6].*
- *Establishment of a quality assurance process is important to guarantee that balanced energy and protein food supplements are manufactured, packaged and stored in a controlled and uncontaminated environment. The cost and logistical implications associated with balanced energy and protein supplements might be mitigated by local production of supplements, provided that a quality assurance process is established.*
- *A continual, adequate supply of supplements is required for programme success. This requires a clear understanding and investment in procurement and supply chain management.*
- *Programmes should be designed and continually improved based on locally generated data and experiences. Examples relevant to this guideline include:*
- *Improving delivery, acceptability and utilization of this intervention by pregnant women (i.e. overcoming supply and utilization barriers).*
- *Distribution of balanced energy and protein supplements may not be feasible only through the local schedule of ANC visits; additional visits may need to be scheduled. The costs related to these additional visits should be considered. In the absence of antenatal visits, too few visits, or when the first visit comes too late, consideration should be given to alternative platforms for delivery (e.g. community health workers, task shifting in specific settings).*
- *Values and preferences related to the types and amounts of balanced energy and protein supplements may vary.*
- *Monitoring and evaluation should include evaluation of household-level storage facilities, spoilage, wastage, retailing, sharing and other issues related to food distribution.*
- *Each country will need to understand the context-specific etiology of undernutrition at the national and sub-national levels. For instance, where seasonality is a predictor of food availability, the programme should consider this and adapt to the conditions as needed (e.g. provision of more or less food of different types in different seasons). In addition, a better understanding is needed of whether alternatives to energy and protein supplements – such as cash or vouchers, or improved local and national food production and distribution – can lead to better or equivalent results.*
- *Anthropometric characteristics of the general population are changing, and this needs to be taken into account to ensure that only those women who are likely to benefit (i.e. only undernourished women) are included.*
- *The GDG noted that it is not known whether there are risks associated with providing this intervention to women with a high BMI.*

New Not Recommended

In undernourished populations, high-protein supplementation is not recommended for pregnant women to improve maternal and perinatal outcomes.

- *The GDG noted that there is insufficient evidence on the benefits, if any, of high-protein supplementation.*
- *Further research on the effects of high-protein supplements in undernourished populations is not considered a research priority.*

New

Recommended

Daily oral iron and folic acid supplementation with 30 mg to 60 mg of elemental iron and 400 g (0.4 mg) of folic acid is recommended for pregnant women to prevent maternal anaemia, puerperal sepsis, low birth weight, and preterm birth.

New

Context-specific recommendation

Intermittent oral iron and folic acid supplementation with 120 mg of elemental iron and 2800 g (2.8 mg) of folic acid once weekly is recommended for pregnant women to improve maternal and neonatal outcomes if daily iron is not acceptable due to side-effects, and in populations with an anaemia prevalence among pregnant women of less than 20%.

- *This recommendation supersedes the previous WHO recommendation in the 2012 Guideline: intermittent iron and folic acid supplementation in non-anaemic pregnant women [7] and should be considered alongside Recommendation A.1.1.*
- *In general, anaemia prevalence of less than 20% is classified as a mild public health problem [8].*
- *Before commencing intermittent iron supplementation, accurate measurement of maternal blood Hb concentrations is needed to confirm the absence of anaemia. Therefore, this recommendation may require a strong health system to facilitate accurate Hb measurement and to monitor anaemia status throughout pregnancy.*
- *If a woman is diagnosed with anaemia (Hb < 110 g/L) during ANC, she should be given 120 mg of elemental iron and 400 µg (0.4 mg) of folic acid daily until her Hb concentration rises to normal (Hb 110 g/L or higher) [9][10]. Thereafter, she can continue with the standard daily antenatal iron and folic acid dose (or the intermittent regimen if daily iron is not acceptable due to side-effects) to prevent recurrence of anaemia.*
- *Stakeholders may need to consider ways of reminding pregnant women to take their supplements on an intermittent basis and of assisting them to manage associated side-effects.*

New Context-specific recommendation

Vitamin A supplementation is only recommended for pregnant women in areas where vitamin A deficiency is a severe public health problem, to prevent night blindness.

- *This recommendation supersedes the previous WHO recommendation found in the 2011 Guideline: vitamin A supplementation in pregnant women [11].*
- *Vitamin A is not recommended to improve maternal and perinatal outcomes.*
- *Vitamin A deficiency is a severe public health problem if 5% or more of women in a population have a history of night blindness in their most recent pregnancy in the previous 3–5 years that ended in a live birth, or if 20% or more of pregnant women have a serum retinol level below 0.70 µmol/L [12]. Determination of vitamin A deficiency as a public health problem involves estimating the prevalence of deficiency in a population by using specific biochemical and clinical indicators of vitamin A status.*
- *Pregnant women should be encouraged to receive adequate nutrition, which is best achieved through consumption of a healthy, balanced diet, and to refer to WHO guidance on healthy eating [2].*
- *In areas where supplementation is indicated for vitamin A deficiency, it can be given daily or weekly. Existing WHO guidance suggests a dose of up to 10 000 IU vitamin A per day, or a weekly dose of up to 25 000 IU [11].*
- *A single dose of a vitamin A supplement greater than 25 000 IU is not recommended as its safety is uncertain. Furthermore, a single dose of a vitamin A supplement greater than 25 000 IU might be teratogenic if consumed between day 15 and day 60 from conception [11].*
- *There is no demonstrated benefit from taking vitamin A supplements in populations where habitual daily vitamin A intakes exceed 8000 IU or 2400 µg, and the potential risk of adverse events increases with higher intakes (above 10 000 IU) if supplements are routinely taken by people in these populations [13].*

New Context-specific recommendation - Research

Zinc supplementation for pregnant women is only recommended in the context of rigorous research.

- *Many of the included studies were at risk of bias, which influenced the certainty of the review evidence on the effects of zinc supplementation.*
- *The low-certainty evidence that zinc supplementation may reduce preterm birth warrants further investigation, as do the other outcomes for which the evidence is very uncertain (e.g. perinatal mortality, neonatal sepsis), particularly in zinc-deficient populations with no food fortification strategy in place. Further research should aim to clarify to what extent zinc supplementation competes with iron and/or calcium antenatal supplements for absorption. The GDG considered that food fortification may be a more cost–effective strategy and that more evidence is needed on the cost–effectiveness of food fortification strategies.*

New Not Recommended

Vitamin B6 (pyridoxine) supplementation is not recommended for pregnant women to improve maternal and perinatal outcomes.

- *Pregnant women should be encouraged to receive adequate nutrition, which is best achieved through consumption of a healthy, balanced diet, and to refer to guidelines on healthy eating [2].*
- *The GDG agreed that there is insufficient evidence on the benefits and harms, if any, of routine vitamin B6 supplementation in pregnancy. However, research on the effects of routine vitamin B6 supplementation for pregnant women on maternal and perinatal outcomes is not considered a research priority.*

New

Not Recommended

Vitamin E and C supplementation is not recommended for pregnant women to improve maternal and perinatal outcomes.

- *The GDG noted that vitamin E and C combined supplements were evaluated mainly in the context of preventing pre-eclampsia. Vitamin C is important for improving the bioavailability of oral iron, but this was not considered within the context of the Cochrane reviews. In addition, low-certainty evidence on vitamin C alone suggests that it may prevent prelabour rupture of membranes (PROM). Therefore, the GDG agreed that future research should consider vitamin C supplements separately from vitamin E and C supplements.*
- *Pregnant women should be encouraged to receive adequate nutrition, which is best achieved through consumption of a healthy, balanced diet, and to refer to guidelines on healthy eating [2]. It is relatively easy to consume sufficient quantities of vitamin C from food sources.*

New

Context-specific recommendation

For pregnant women with high daily caffeine intake (more than 300 mg per day), a lowering daily caffeine intake during pregnancy is recommended to reduce the risk of pregnancy loss and low-birth-weight neonates.

- *Pregnant women should be informed that a high daily caffeine intake (> 300 mg per day) is probably associated with a higher risk of pregnancy loss and low birth weight.*
- *Caffeine is a stimulant found in tea, coffee, soft-drinks, chocolate, kola nuts and some over-the-counter medicines. Coffee is probably the most common source of high caffeine intake. A cup of instant coffee can contain about 60 mg of caffeine; however, some commercially brewed coffee brands contain more than 150 mg of caffeine per serving.*
- *Caffeine-containing teas (black tea and green tea) and soft drinks (colas and iced tea) usually contain less than 50 mg per 250 mL serving.*

New

Context-specific recommendation

Full blood count testing is the recommended method for diagnosing anaemia during pregnancy. In settings where full blood count testing is not available, onsite haemoglobin testing with a haemoglobinometer is recommended over the use of the haemoglobin colour scale as the method for diagnosing anaemia in pregnancy.

- *The GDG agreed that the high recurrent costs of Hb testing with haemoglobinometers might reduce the feasibility of this method in some low-resource settings, in which case the WHO haemoglobin colour scale method may be used.*
- *Other low-technology on-site methods for detecting anaemia need development and/or investigation.*

New

Context-specific recommendation

Midstream urine culture is the recommended method for diagnosing asymptomatic bacteriuria (ASB) in pregnancy. In settings where urine culture is not available, on-site midstream urine Gram-staining is recommended over the use of dipstick tests as the method for diagnosing ASB in pregnancy.

- *This recommendation should be considered alongside Recommendation C.1 on ASB treatment (see section C: Preventive measures).*
- *The GDG agreed that the higher resource costs associated with Gram stain testing might reduce the feasibility of this method in low-resource settings, in which case, dipstick tests may be used.*
- *The GDG agreed that ASB is a priority research topic, given its association with preterm birth and the uncertainty around urine testing and treatment in settings with different levels of ASB prevalence. Specifically, studies are needed that compare on-site testing and treatment versus testing plus confirmation of test with treatment on confirmatory culture, to explore health and other relevant outcomes, including acceptability, feasibility and antimicrobial resistance. In addition, better on-site tests need to be developed to improve accuracy and feasibility of testing and to reduce overtreatment of ASB. Research is also needed to determine the prevalence of ASB at which targeted testing and treatment rather than universal testing and treatment might be effective.*

New

Context-specific recommendation - Research

Daily fetal movement counting, such as with "count-to-ten" kick charts, is only recommended in the context of rigorous research.

- *Fetal movement counting is when a pregnant woman counts and records her baby's movements in order to monitor the baby's health. Various methods have been described, with further monitoring variously indicated depending on the method used, for example, if fewer than six distinct movements are felt within 2 hours [14] or fewer than 10 distinct movements are felt within 12 hours (the Cardiff "count to ten" method) [15].*
- *While daily fetal movement counting is not recommended, healthy pregnant women should be made aware of the importance of fetal movements in the third trimester and of reporting reduced fetal movements.*
- *Clinical enquiry by ANC providers at each ANC visit about maternal perception of fetal movements is recommended as part of good clinical practice. Women who perceive poor or reduced fetal movements require further monitoring (e.g. with daily fetal movement counting) and investigation, if indicated.*
- *The GDG agreed that more research is needed on the effects of daily fetal movement counting in the third trimester of pregnancy, particularly in LMIC settings with a high prevalence of unexplained stillbirths.*

New

Context-specific recommendation against

Replacing abdominal palpation with symphysis-fundal height (SFH) measurement for the assessment of fetal growth is not recommended to improve perinatal outcomes. A change from what is usually practiced (abdominal palpation or SFH measurement) in a particular setting is not recommended.

- *SFH measurement is routinely practiced in many ANC settings. Due to a lack of clear evidence of accuracy or superiority of either SFH measurement or clinical palpation to assess fetal growth, the GDG does not recommend a change of practice.*
- *The GDG agreed that there is a lack of evidence on SFH, rather than a lack of effectiveness, particularly in LMIC settings.*
- *Apart from false reassurance, which might occur with both SFH measurement and clinical palpation, there is no evidence of harm with SFH measurement.*
- *Research is needed to determine the role of SFH measurement in detecting abnormal fetal growth and other risk factors for perinatal morbidity (e.g. multiple pregnancy, polyhydramnios) in settings where antenatal ultrasound is not available.*

New Recommended

One ultrasound scan before 24 weeks of gestation (early ultrasound) is recommended for pregnant women to estimate gestational age, improve detection of fetal anomalies and multiple pregnancies, reduce induction of labour for post-term pregnancy, and improve a woman's pregnancy experience.

- *The benefits of an early ultrasound scan are not improved upon and cannot be replicated with a late ultrasound scan where there has not been an early ultrasound scan. Therefore, an ultrasound scan after 24 weeks of gestation (late ultrasound) is not recommended for pregnant women who have had an early ultrasound scan. However, stakeholders should consider offering a late ultrasound scan to pregnant women who have not had an early ultrasound scan, for the purposes of identifying the number of fetuses, presentation and placental location.*
- *The GDG noted that the effects of introducing antenatal ultrasound on population health outcomes and health systems in rural, low-resource settings are unproven. However, the introduction of ultrasound to detect pregnancy complications and confirm fetal viability to the woman and her family in these settings could plausibly increase ANC service utilization and reduce morbidity and mortality, when accompanied by appropriate gestational age estimation, diagnosis, referral and management.*
- *The ongoing multicountry trial that is under way should contribute further evidence on health effects, health care utilization and implementation-related information on ultrasound in rural, low-resource settings [16].*
- *The GDG acknowledged that the use of early pregnancy ultrasound has not been shown to reduce perinatal mortality. The GDG put emphasis on other benefits of ultrasound (mentioned in points above) and the increased accuracy of gestational age assessment, which would assist management in case of suspected preterm birth and reduce labour induction for post-term pregnancies.*
- *The GDG acknowledges that implementing and scaling up this recommendation in low-resource settings will be associated with a variety of challenges that may include political (budgeting for fees and tariffs), logistical (equipment maintenance, supplies, technical support), infrastructural (ensuring a reliable power supply and secure storage) and resources.*
- *The GDG noted that antenatal ultrasound is an intervention that can potentially be task shifted from trained sonographers and doctors to trained nurses, midwives and clinical officers, provided that ongoing training, staff retention, quality improvement activities and supervision are ensured.*
- *Stakeholders might be able to offset/reduce the cost of antenatal ultrasound if the ultrasound equipment is also used for other indications (e.g. obstetric emergencies) or by other medical departments.*
- *The implementation and impact of this recommendation on health outcomes, facility utilization and equity should be monitored at the health service, regional and country levels, based on clearly defined criteria and indicators associated with locally agreed targets.*[a]
- *For further guidance, please refer to the WHO Manual of diagnostic ultrasound [17], available at: https://www.who.int/publications/i/item/9789241548540*

New Not Recommended

Routine Doppler ultrasound examination is not recommended for pregnant women to improve maternal and perinatal outcomes.

- *The GDG noted that the evidence base for the use of Doppler ultrasound of fetal blood vessels in highrisk pregnancy is already established.*
- *The GDG agreed that the value of a single Doppler ultrasound examination of fetal blood vessels for all pregnant women in the third trimester needs rigorous evaluation, particularly in LMIC settings. Future trials should be designed to evaluate the effect of a single Doppler ultrasound on preventable perinatal deaths.*

New **Recommended**

A seven-day antibiotic regimen is recommended for all pregnant women with asymptomatic bacteriuria (ASB) to prevent persistent bacteriuria, preterm birth and low birth weight.

- *This recommendation should be considered alongside the recommendation on ASB diagnosis (Recommendation B.1.2).*
- *Stakeholders may wish to consider context-specific ASB screening and treatment based on ASB and preterm birth prevalence, as it may not be appropriate in settings with low prevalence.*
- *Evidence on preterm birth is of low certainty and large multicentre trials are needed to confirm whether screening and antibiotic treatment reduces preterm birth and perinatal mortality in LMICs. Such trials should also aim to evaluate the effects of group B streptococcus (GBS) screening and treatment.*
- *Studies have shown that GBS bacteriuria is a sign of heavy GBS colonization, which may not be eradicated by antibiotic treatment. GBS bacteriuria is a risk factor for having an infant with early onset GBS disease. WHO recommends that pregnant women with GBS colonization receive intrapartum antibiotic administration to prevent early neonatal GBS infection (see WHO recommendations for prevention and treatment of maternal peripartum infections [18].*
- *Preterm birth indicators should be monitored with this intervention, as should changes in antimicrobial resistance.*

New **Context-specific recommendation - Research**

Antibiotic prophylaxis is only recommended to prevent recurrent urinary tract infections in pregnant women in the context of rigorous research.

- *Further research is needed to determine the best strategies for preventing RUTI in pregnancy, including the effects of antibiotic prophylaxis on pregnancy-related outcomes and changes in antimicrobial resistance.*

New **Context-specific recommendation - Research**

Antenatal prophylaxis with anti-D immunoglobulin in non-sensitized Rh-negative pregnant women at 28 and 34 weeks of gestation to prevent RhD alloimmunization is recommended only in the context of rigorous research.

- *This context-specific recommendation relates to anti-D prophylaxis during pregnancy and not the practice of giving anti-D after childbirth, for which there is high-certainty evidence of its effect of reducing RhD alloimmunization in subsequent pregnancies [19]. Anti-D should still be given postnatally when indicated.*
- *Determining the prevalence of RhD alloimmunization and associated poor outcomes among women in LMIC settings, as well as developing strategies to manage this condition, is considered a research priority.*

New

Context-specific recommendation

In endemic areas, a preventive anthelminthic treatment is recommended for pregnant women after the first trimester as part of worm infection reduction programmes.

- *This recommendation is consistent with the WHO Guideline: preventive chemotherapy to control soil-transmitted helminth infections in high-risk groups [20], which states that:*
  "Preventive chemotherapy (deworming), using single-dose albendazole (400 mg) or mebendazole (500 mg) is recommended as a public health intervention for pregnant women, after the first trimester, living in areas where both: [21] the baseline prevalence of hookworm and/or T. trichiura infection is 20% or more and [22] where anaemia is a severe public health problem, with prevalence of 40% or higher among pregnant women, in order to reduce the burden of hookworm and T. trichiura infection (conditional recommendation, moderate quality of evidence)."
- *Endemic areas are areas where the prevalence of hookworm and/or whipworm infection is 20% or more. Anaemia is considered a severe public health problem when the prevalence among pregnant women is 40% or higher.*
- *Infected pregnant women in non-endemic areas should receive anthelminthic treatment in the second or third trimester on a case-by-case basis [20]. A single dose of albendazole (400 mg) or mebendazole (500 mg) should be used [20][23].*
- *The safety of these drugs in pregnancy has not been unequivocally established; however, the benefits are considered to outweigh the disadvantages [23][24].*
- *WHO recommends a treatment strategy comprising two treatments per year in high-risk settings with a prevalence of 50% for soil-transmitted helminthiasis, and once per year in areas with a 20–50% prevalence [20].*
- *For further guidance on soil-transmitted helminth infections, refer to the WHO Guideline: preventive chemotherapy to control soil-transmitted helminth infections in high-risk groups (currently in press) [21].*

New **Context-specific recommendation**

In malaria-endemic areas in Africa, intermittent preventive treatment with sulfadoxine-pyrimethamine (IPTp-SP) is recommended for all pregnant women. Dosing should start in the second trimester, and doses should be given at least one month apart, with the objective of ensuring that at least three doses are received.

- *This recommendation has been integrated from the WHO Guidelines for the treatment of malaria (2015), where it is considered to be a strong recommendation based on high-quality evidence [25].*
- *Malaria infection during pregnancy is a major public health problem, with substantial risks for the mother, her fetus and the newborn. WHO recommends a package of interventions for preventing and controlling malaria during pregnancy, which includes promotion and use of insecticide-treated nets, appropriate case management with prompt, effective treatment, and, in areas with moderate to high transmission of Plasmodium falciparum, administration of IPTp-SP [25].*
- *The high-quality evidence supporting this recommendation was derived from a systematic review of seven RCTs conducted in malaria-endemic countries, which shows that three or more doses of sulfadoxine-pyrimethamine (SP) is associated with reduced maternal parasitaemia, fewer low-birthweight infants and increased mean birth weight compared with two doses only [26].*
- *The malaria GDG noted that most evidence was derived from women in their first and second pregnancies; however, the limited evidence on IPTp-SP from women in their third and subsequent pregnancies was consistent with benefit [25].*
- *To ensure that pregnant women in endemic areas start IPTp-SP as early as possible in the second trimester, policy-makers should ensure health system contact with women at 13 weeks of gestation. Policy-makers could also consider supplying women with their first SP dose at the first ANC visit with instructions about the date (corresponding to 13 weeks of gestation) on which the medicine should be taken.*
- *SP acts by interfering with folic acid synthesis in the malaria parasite, thereby inhibiting its life-cycle. There is some evidence that high doses of supplemented folic acid (i.e. 5 mg daily or more) may interfere with the efficacy of SP in pregnancy [27]. Countries should ensure that they procure and distribute folic acid supplements for antenatal use at the recommended antenatal dosage (i.e. 0.4 mg daily).*
- *The malaria GDG noted that there is insufficient evidence on the safety, efficacy and pharmacokinetics of most antimalarial agents in pregnancy, particularly during the first trimester [25].*
- *Detailed evidence and guidance related to the recommendation can be found in the 2015 guidelines [25], available at: https://iris.who.int/handle/10665/162441*

New **Context-specific recommendation**

Oral pre-exposure prophylaxis (PrEP) containing tenofovir disoproxil fumarate (TDF) should be offered as an additional prevention choice for pregnant women at substantial risk of HIV infection as part of combination prevention approaches.

- *This recommendation has been integrated from the WHO guideline on when to start antiretroviral therapy and on pre-exposure prophylaxis for HIV (2015), where it is considered to be a strong recommendation based on high-quality evidence [28]. The evidence and further guidance related to the recommendation can be found in this guideline.*
- *"Substantial risk" is provisionally defined as HIV incidence greater than 3 per 100 person-years in the absence of PrEP, but individual risk varies within this group depending on individual behaviour and the characteristics of sexual partners. Local epidemiological evidence concerning risk factors and HIV incidence should be used to inform implementation.*
- *Thresholds for offering PrEP may vary depending on a variety of considerations, including resources, feasibility and demand.*
- *The level of protection is strongly correlated with adherence.*
- *Detailed evidence and guidance related to this recommendation can be found in the 2015 guideline [28], available at: https://www.who.int/publications/i/item/9789241509565*

New **Recommended**

Ginger, chamomile, vitamin B6 and/or acupuncture are recommended for the relief of nausea in early pregnancy, based on a woman's preferences and available options.

- *In the absence of stronger evidence, the GDG agreed that these non-pharmacological options are unlikely to have harmful effects on mother and baby.*
- *Women should be informed that symptoms of nausea and vomiting usually resolve in the second half of pregnancy.*
- *Pharmacological treatments for nausea and vomiting, such as doxylamine and metoclopramide, should be reserved for those pregnant women experiencing distressing symptoms that are not relieved by nonpharmacological options, under the supervision of a medical doctor.*

New **Recommended**

Advice on diet and lifestyle is recommended to prevent and relieve heartburn in pregnancy. Antacid preparations can be offered to women with troublesome symptoms that are not relieved by lifestyle modification.

- *Lifestyle advice to prevent and relieve symptoms of heartburn includes avoidance of large, fatty meals and alcohol, cessation of smoking, and raising the head of the bed to sleep.*
- *The GDG agreed that antacids, such as magnesium carbonate and aluminium hydroxide preparations, are probably unlikely to cause harm in recommended dosages.*
- *There is no evidence that preparations containing more than one antacid are better than simpler preparations.*
- *Antacids may impair absorption of other drugs [29], and therefore should not be taken within two hours of iron and folic acid supplements.*

New **Recommended**

Magnesium, calcium or non-pharmacological treatment options can be used for the relief of leg cramps in pregnancy, based on a woman's preferences and available options.

- *The review found no evidence on the effect of non-pharmacological therapies, such as muscle stretching, relaxation, heat therapy, dorsiflexion of the foot and massage.*
- *The evidence on magnesium and calcium is generally of low certainty. However, the GDG agreed that they are unlikely to be harmful in the dose schedules evaluated in included studies.*
- *Further research into the etiology and prevalence of leg cramps in pregnancy, and the role (if any) of magnesium and calcium in symptom relief, is needed.*

New **Recommended**

Regular exercise throughout pregnancy is recommended to prevent low back and pelvic pain. There are a number of different treatment options that can be used, such as physiotherapy, support belts and acupuncture, based on a woman's preferences and available options.

- *Exercise to prevent low back and pelvic pain in pregnancy can take place on land or in water. While exercise may also be helpful to relieve low back pain, it could exacerbate pelvic pain associated with symphysis pubis dysfunction and is not recommended for this condition.*
- *Regular exercise is a key component of lifestyle interventions, which are recommended for pregnant women as part of ANC to prevent excessive weight gain in pregnancy (see Recommendation A.9).*
- *Pregnant women with low back and/or pelvic pain should be informed that symptoms usually improve in the months after birth.*
- *Women should be informed that it is unclear whether there are side-effects to alternative treatment options due to a paucity of data.*
- *Standardized reporting of outcomes is needed for future research on treatment for low back and/or pelvic pain in pregnancy.*

New **Recommended**

Wheat bran or other fibre supplements can be used to relieve constipation in pregnancy if the condition fails to respond to dietary modification, based on a woman's preferences and available options.

- *Dietary advice to reduce constipation during pregnancy should include promoting adequate intake of water and dietary fibre (found in vegetables, nuts, fruit and whole grains).*
- *For women with troublesome constipation that is not relieved by dietary modification or fibre supplementation, stakeholders may wish to consider intermittent use of poorly absorbed laxatives.*

New **Recommended**

Non-pharmacological options, such as compression stockings, leg elevation and water immersion, can be used for the management of varicose veins and oedema in pregnancy based on a woman's preferences and available options.

- *Women should be informed that symptoms associated with varicose veins may worsen as pregnancy progresses but that most women will experience some improvement within a few months of giving birth.*
- *Rest, leg elevation and water immersion are low-cost interventions that are unlikely to be harmful.*

New Recommended

It is recommended that each pregnant woman carries her own case notes during pregnancy to improve continuity, quality of care and her pregnancy experience.

- *The GDG noted that women-held case notes are widely used and are often the only medical records available in various LMIC settings.*
- *The GDG agreed that the benefits of women-held case notes outweigh the disadvantages. However, careful consideration should be given as to what personal information it is necessary to include in the case notes, to avoid stigma and discrimination in certain settings. In addition, health-system planners should ensure that admission to hospitals or other health-care facilities do not depend on women presenting their case notes.*
- *Health-system planners should consider which form the women-held case notes should take (electronic or paper-based), whether whole sets of case notes will be held by women or only specific parts of them, and how copies will be kept by health-care facilities.*
- *For paper-based systems, health-system planners also need to ensure that case notes are durable and transportable. Health systems that give women access to their case notes through electronic systems need to ensure that all pregnant women have access to the appropriate technology and that attention is paid to data security.*
- *Health-system planners should ensure that the contents of the case notes are accessible to all pregnant women through the use of appropriate, local languages and appropriate reading levels.*

New Context-specific recommendation - Research

Group antenatal care provided by qualified health-care professionals may be offered as an alternative to individual antenatal care for pregnant women in the context of rigorous research, depending on a woman's preferences and provided that the infrastructure and resources for delivery of group antenatal care are available.

- *With the group ANC model, the first visit for all pregnant women is an individual visit. Then at subsequent visits, the usual individual pregnancy health assessment, held in a private examination area, is integrated into a group ANC session, with facilitated educational activities and peer support.*
- *Health-care facilities need to be seeing sufficient numbers of pregnant women, as allocation to groups is ideally performed according to gestational age.*
- *Health-care providers need to have appropriate facilities to deal with group sessions, including access to large, well ventilated rooms or sheltered spaces with adequate seating. A private space should be available for examinations, and opportunities should be given for private conversations.*
- *Group ANC may take longer than individual ANC, and this may pose practical problems for some women in terms of work and childcare. Health-care providers should be able to offer a variety of time slots for group sessions (morning, afternoon, evening) and should consider making individual care available as well.*
- *The GDG noted that group ANC may have acceptability and feasibility issues in settings where perceived differences keep people apart, e.g. women from different castes in India may not wish to be in a group together.*
- *Group ANC studies are under way in Nepal, Uganda and five other low-income countries, and the GDG was informed by a GDG member that some of these studies are due to report soon. Core outcomes of studies of group ANC should include maternal and perinatal health outcomes, coverage, and women's and providers' experiences.*

New **Context-specific recommendation**

The implementation of community mobilization through facilitated participatory learning and action (PLA) cycles with women's groups is recommended to improve maternal and newborn health, particularly in rural settings with low access to health services. Participatory women's groups represent an opportunity for women to discuss their needs during pregnancy, including barriers to reaching care, and to increase support to pregnant women.

- *Part of this recommendation was integrated from WHO recommendations on community mobilization through facilitated participatory learning and action cycles with women's groups for maternal and newborn health (2014) [30].*
- *The pathways of influence of this multifaceted, context-specific intervention on maternal and newborn outcomes are difficult to assess. Women meeting to identify their needs and seek solutions plays an important role; mechanisms related to additional activities that are organized based on the solutions identified at the meetings may also play a role.*
- *Detailed information and guidance related to the recommendation, including important implementation considerations, can be found in the 2014 WHO recommendations on PLA cycles [30], available at: https://iris.who.int/handle/10665/127939*

New **Context-specific recommendation**

Packages of interventions that include household and community mobilization and antenatal home visits are recommended to improve antenatal care utilization and perinatal health outcomes, particularly in rural settings with low access to health services.

- *The GDG agreed that the extent to which these packages improve communication and support for pregnant women is not clear.*
- *As a stand-alone intervention, the evidence does not support the use of antenatal home visits by lay health workers during pregnancy to improve ANC utilization health outcomes. While the quality and effectiveness of communication during home visits, and the extent to which they increase support for women, is not clear, antenatal home visits may be helpful in ensuring continuity of care across the antenatal, intrapartum and postnatal periods and in promoting other healthy behaviour.*
- *Stakeholders need to be clear that antenatal home visits by lay health workers do not replace ANC visits.*
- *Stakeholders should implement health system strengthening interventions alongside these community-based interventions.*
- *Health-care providers need initial and ongoing training in communication with women and their partners. For women's groups and community mobilization, providers also need training on group facilitation, in the convening of public meetings and in other methods of communication.*
- *Information for women and community members should be provided in languages and formats accessible to them and programme planners need to ensure that health-care providers/facilitators have reliable supplies of appropriate information materials.*
- *Programme planners should be aware of the potential for additional costs associated with home visits and community mobilization initiatives, including the potential need for extra staff and travel expenses.*
- *When considering the use of antenatal home visits, women's groups, partner involvement or community mobilization, programme planners need to ensure that these can be implemented in a way that respects and facilitates women's needs for privacy as well as their choices and their autonomy in decision-making. By offering pregnant women a range of opportunities for contact, communication and support, their individual preferences and circumstances should also be addressed.*
- *Further research is needed on the acceptability and feasibility of mixed-gender communication, the optimal methods for community mobilization, the best model for integration with health systems, continuity elements of home visits, and the mechanisms of effect of these interventions.*

New **Recommended**

Task shifting the promotion of health-related behaviours for maternal and newborn health to a broad range of cadres, including lay health workers, auxiliary nurses, nurses, midwives and doctors is recommended.

Recommended

Task shifting the distribution of recommended nutritional supplements and intermittent preventive treatment in pregnancy (IPTp) for malaria prevention to a broad range of cadres, including auxiliary nurses, nurses, midwives and doctors is recommended.

- *Recommendations E.5.1 and E.5.2 have been adapted and integrated from Optimizing health worker roles to improve access to key maternal and newborn health interventions through task shifting (OptimizeMNH) (2012) [31].*
- *The GDG noted that, while task shifting has an important role to play in allowing flexibility in health-care delivery in low-resource settings, policy-makers need to work towards midwife-led care for all women.*
- *Lay health workers need to be recognized and integrated into the system, and not be working alone, i.e. task shifting needs to occur within a team approach.*
- *The mandate of all health workers involved in task shifting programmes needs to be clear.*
- *In a separate guideline on HIV testing services [32], WHO recommends that lay providers who are trained and supervised can independently conduct safe and effective HIV testing using rapid tests (see Recommendation B.1.8).*
- *The GDG noted that it may be feasible to task shift antenatal ultrasound to midwives with the appropriate training, staffing, mentoring and referral systems in place.*
- *Further research is needed on the mechanism of effect of MLCC and whether continuity of care can be task shifted.*
- *Further information on this recommendation can be found in the OptimizeMNH guideline [31], available at: https://iris.who.int/handle/10665/77764*

New Context-specific recommendation

Policy-makers should consider educational, regulatory, financial, and personal and professional support interventions to recruit and retain qualified health workers in rural and remote areas.

- *Recommendation E.6 has been adapted and integrated for the ANC guideline from the 2010 WHO publication Increasing access to health workers in remote and rural areas through improved retention: global policy recommendations [33].*
- *Strong recommendations (abridged) on recruitment and staff retention from the above guideline include the following.*
- *Use targeted admission policies to enrol students with a rural background in education programmes for various health disciplines and/or establish a health-care professional school outside of major cities.*
- *Revise undergraduate and postgraduate curricula to include rural health topics and clinical rotations in rural areas so as to enhance the competencies of health-care professionals working in rural areas.*
- *Improve living conditions for health workers and their families and invest in infrastructure and services (sanitation, electricity, telecommunications, schools, etc.).*
- *Provide a good and safe working environment, including appropriate equipment and supplies, supportive supervision and mentoring.*
- *Identify and implement appropriate outreach activities to facilitate cooperation between health workers from better-served areas and those in underserved areas, and, where feasible, use tele-health to provide additional support.*
- *Develop and support career development programmes and provide senior posts in rural areas so that health workers can move up the career path as a result of experience, education and training, without necessarily leaving rural areas.*
- *Support the development of professional networks, rural health-care professional associations, rural health journals, etc., to improve the morale and status of rural providers and reduce feelings of professional isolation.*
- *Adopt public recognition measures such as rural health days, awards and titles at local, national and international levels to lift the profile of working in rural areas.*
- *Conditional educational, regulatory and financial recommendations from this guideline can be found in the WHO global policy recommendations document [33], available at: https://iris.who.int/handle/10665/44369*

New Recommended

Antenatal care models with a minimum of eight contacts are recommended to reduce perinatal mortality and improve women's experience of care.

- *The GDG stresses that the four-visit focused ANC (FANC) model does not offer women adequate contact with health-care practitioners and is no longer recommended. With the FANC model, the first ANC visit occurs before 12 weeks of pregnancy, the second around 26 weeks, the third around 32 weeks, and the fourth between 36 and 38 weeks of gestation. Thereafter, women are advised to return to ANC at 41 weeks of gestation or sooner if they experience danger signs. Each ANC visit involves specific goals aimed at improving triage and timely referral of high-risk women and includes educational components [34]. However, up-to-date evidence shows that the FANC model, which was developed in the 1990s, is probably associated with more perinatal deaths than models that comprise at least eight ANC visits. Furthermore, evidence suggests that more ANC visits, irrespective of the resource setting, is probably associated with greater maternal satisfaction than less ANC visits.*
- *The GDG prefers the word "contact" to "visit", as it implies an active connection between a pregnant woman and a health-care provider that is not implicit with the word "visit". In terms of the operationalization of this recommendation, "contact" can be adapted to local contexts through community outreach programmes and lay health worker involvement.*
- *The decision regarding the number of contacts with a health system was also influenced by the following:*
- *evidence supporting improving safety during pregnancy through increased frequency of maternal and fetal assessment to detect problems;*
- *evidence supporting improving health system communication and support around pregnancy for women and families;*
- *evidence from HIC studies indicating no important differences in maternal and perinatal health outcomes between ANC models that included at least eight contacts and ANC models that included more (11–15) contacts [35];*
- *evidence indicating that more contact between pregnant women and knowledgeable, supportive and respectful health-care practitioners is more likely to lead to a positive pregnancy experience.*
- *Implementation considerations related to this recommendation and the mapping of guideline recommendations to ANC contacts are presented in Chapter 4: Implementation of the ANC guideline and recommendations.*

1.2 Intrapartum Care and Casearean Section

1.2.1 WHO recommendations: intrapartum care for a positive childbirth experience [36]

Recommended

Respectful maternity care – which refers to care organized for and provided to all women in a manner that maintains their dignity, privacy and confidentiality, ensures freedom from harm and mistreatment, and enables informed choice and continuous support during labour and childbirth – is recommended.

Remarks

- *Provision of respectful maternity care (RMC) is in accordance with a human rights-based approach to reducing maternal morbidity and mortality. RMC could improve women's experience of labour and childbirth and address health inequalities.*
- *There is limited evidence on the effectiveness of interventions to promote RMC or to reduce mistreatment of women during labour and childbirth. Given the complex drivers of mistreatment during facility-based childbirth, reducing mistreatment and improving women's experience of care requires interventions at the interpersonal level between a woman and her health care providers, as well as at the level of the health care facility and the health system.*
- *Effective communication and engagement among health care providers, health service managers, women and representatives of women's groups and women's rights movements is essential to ensure that care is responsive to women's needs and preferences in all contexts and settings.*
- *Interventions should aim to ensure a respectful and dignified working environment for those providing care, acknowledging that staff may also experience disrespect and abuse in the workplace and/or violence at home or in the community.*

Recommended

Effective communication between maternity care providers and women in labour, using simple and culturally acceptable methods, is recommended.

- *In the absence of a standardized definition of "effective communication", the GDG agreed that effective communication between maternity care staff and women during labour and childbirth should include the following, as a minimum.*
- *Introducing themselves to the woman and her companion and addressing the woman by her name;*
- *Offering the woman and her family the information they need in a clear and concise manner (in the language spoken by the woman and her family), avoiding medical jargon, and using pictorial and graphic materials when needed to communicate processes or procedures;*
- *Respecting and responding to the woman's needs, preferences and questions with a positive attitude;*
- *Supporting the woman's emotional needs with empathy and compassion, through encouragement, praise, reassurance and active listening;*
- *Supporting the woman to understand that she has a choice, and ensuring that her choices are supported;*
- *Ensuring that procedures are explained to the woman, and that verbal and, when appropriate, written informed consent for pelvic examinations and other procedures is obtained from the woman;*
- *Encouraging the woman to express her needs and preferences, and regularly updating her and her family about what is happening, and asking if they have any questions;*
- *Ensuring that privacy and confidentiality is maintained at all times;*
- *Ensuring that the woman is aware of available mechanisms for addressing complaints;*
- *Interacting with the woman's companion of choice to provide clear explanations on how the woman can be well supported during labour and childbirth.*
- *Health systems should ensure that maternity care staff are trained to national standards for competency in interpersonal communication and counselling skills.*

Recommended

A companion of choice is recommended for all women throughout labour and childbirth.

Remarks

- *The companion in this context can be any person chosen by the woman to provide her with continuous support during labour and childbirth. This may be someone from the woman's family or social network, such as her spouse/partner, a female friend or relative, a community member (such as a female community leader, health worker or traditional birth attendant) or a doula (i.e. a woman who has been trained in labour support but is not part of the health care facility's professional staff).*
- *The GDG discussed the issues of privacy, cultural preferences and resource use, which are often raised as barriers to implementing this intervention, and agreed that simple measures to allow female relatives to accompany women during labour could be used as cost-effective and culturally sensitive ways to address these concerns. If labour companionship is implemented in settings where labour wards have more than one bed per room, care should be taken to ensure that all women have their privacy and confidentiality maintained (e.g. by consistent use of dividers/curtains).*
- *The GDG noted that countries and policy-makers are often reluctant to implement this intervention in clinical practice in spite of the supporting evidence, which has been available for many years, even though the intervention is routinely applied in private facilities. The group agreed that extra efforts are needed to encourage potential implementers at various levels of health care delivery to implement this intervention.*
- *It is important that women's wishes are respected, including those who prefer not to have a companion.*
- *Finding a companion of choice to support labour might not be easy for marginalized or vulnerable women, or if women live far from health care facilities, or if the companion requires payment. Health care facilities need to take this into account and consider steps to ensure that support is always available for all women during labour.*
- *A number of WHO guidelines recommend continuous companionship during labour and childbirth, including WHO recommendations: optimizing heath worker roles to improve access to key maternal and newborn health interventions through task shifting [32], WHO recommendations for augmentation of labour [37] and WHO recommendations on health promotion interventions for maternal and newborn health [37].*

New Integrated from WHO recommendations on antenatal care for a positive pregnancy experience

Midwife-led continuity-of-care models, in which a known midwife or small group of known midwives supports a woman throughout the antenatal, intrapartum and postnatal continuum, are recommended for pregnant women in settings with well functioning midwifery programmes.

- *This recommendation has been integrated from the WHO recommendations on antenatal care for a positive pregnancy experience [1].*
- *Midwife-led continuity-of-care (MLCC) models are models of care in which a known and trusted midwife (case-load midwifery), or small group of known midwives (team midwifery), supports a woman throughout the antenatal, intrapartum and postnatal period, to facilitate a healthy pregnancy and childbirth, and healthy parenting practices.*
- *MLCC models are complex interventions and it is unclear whether the pathway of influence that can produce these positive outcomes is the continuity of care, the midwifery philosophy of care or both. The midwifery philosophy inherent in MLCC models might or might not be enacted in standard midwife practice in other models of care. Policy-makers in settings without well functioning midwife programmes should consider implementing this model only after successfully scaling up the number (and improving the quality) of practising midwives. In addition, stakeholders might wish to consider ways of providing continuous care through providers other than midwives, because women value continuity of care.*
- *The panel noted that with this model of care it is important to monitor resource use, and provider burnout and workload, to determine whether caseload or team care models are more sustainable in individual settings.*
- *MLCC requires that well trained midwives are available in sufficient numbers for each woman to see one or only a small group of midwives throughout her pregnancy and during childbirth. This model may therefore require a shift in resources to ensure that the health system has access to a sufficient number of midwives with reasonable caseloads.*
- *The introduction of MLCC may lead to a shift in the roles and responsibilities of midwives as well as other health care professionals who have previously been responsible for antenatal and postnatal care. Where this is the case, implementation is likely to be more effective if all relevant stakeholders are consulted and human resources departments are involved. In some settings, government-level consultation with professional organizations could also aid the implementation process.*
- *The need for additional one-off or continuing training and education should be assessed, and any necessary training should be provided.*
- *The evidence supporting this recommendation can be found in the source guideline document, available at: http://apps.who.int/iris/bitstream/10665/250796/1/9789241549912-eng.pdf*

New Recommended

The use of the following definitions of the latent and active first stages of labour is recommended for practice.

- The latent first stage is a period of time characterized by painful uterine contractions and variable changes of the cervix, including some degree of effacement and slower progression of dilatation up to 5 cm for first and subsequent labours.
- The active first stage is a period of time characterized by regular painful uterine contractions, a substantial degree of cervical effacement and more rapid cervical dilatation from 5 cm until full dilatation for first and subsequent labours.
- *The GDG acknowledged that the "latent first stage" (or the "latent phase") is sometimes described as the "early" or "passive" first stage. However, the group favoured the continued use of "latent first stage" (or the "latent phase") since this is the oldest and most familiar terminology, and because introduction of a new term might require additional training with minimal or no additional value. Likewise, the use of "active first stage" (or the "active phase") to describe the period of accelerative labour during the first stage is preferred to other terms such as "established" labour.*

New Recommended

Women should be informed that a standard duration of the latent first stage has not been established and can vary widely from one woman to another. However, the duration of active first stage (from 5 cm until full cervical dilatation) usually does not extend beyond 12 hours in first labours, and usually does not extend beyond 10 hours in subsequent labours.

- *The GDG acknowledges the very low certainty of evidence on the duration of the latent phase of the first stage of labour, resulting in part from the difficulty in ascertaining the actual onset of labour, and chose not to establish a standardized duration for the latent first stage for the purpose of decisionmaking during labour.*
- *The expected duration of the active phase of the first stage of labour depends on the reference threshold used for its onset. The established boundaries for the active first stage were rounded 95th percentile values from evidence on the duration of the progress of cervical dilatation from 5 cm to 10 cm.*
- *The median duration of active first stage is 4 hours in first labours and 3 hours in second and subsequent labours, when the reference starting point is 5 cm cervical dilatation.*
- *The GDG emphasized that the decision to intervene when the first stage of labour appears to be prolonged must not be taken on the basis of duration alone.*
- *Health care professionals should support pregnant women with spontaneous labour onset to experience labour and childbirth according to each individual woman's natural reproductive process without interventions to shorten the duration of labour, provided the condition of the mother and baby is reassuring, there is progressive cervical dilatation, and the expected duration of labour is within the recommended limits.*
- *Health care professionals should advise healthy pregnant women that the duration of labour is highly variable and depends on their individual physiological process and pregnancy characteristics.*

New Not Recommended

For pregnant women with spontaneous labour onset, the cervical dilatation rate threshold of 1 cm/hour during active first stage (as depicted by the partograph alert line) is inaccurate to identify women at risk of adverse birth outcomes and is therefore not recommended for this purpose.

- *There is insufficient evidence to support the use of the alert line as a classifier to detect women at risk of adverse birth outcomes.*
- *The GDG acknowledged that in hospital settings the use of the alert line and attempts to maintain cervical dilatation progression of 1 cm/hour lead to unnecessary interventions due to the perception that labour progress is pathologically slow.*
- *While the GDG agreed to recommend not using the 1-cm/hour threshold and the alert line for assessing satisfactory cervical dilatation progress, the group identified the development and selection of an appropriate tool for monitoring labour progression (especially cervical dilatation patterns) as a research priority.*
- *Women with suspected slow labour progress should be carefully evaluated to exclude developing complications (e.g. cephalo-pelvic disproportion) and to determine whether their emotional, psychological and physical needs in labour are being met.*
- *The preset lines on the cervicograph are only one element of the existing WHO partograph. Health care professionals should continue to plot cervical dilatation versus time on the cervicograph as well as other partograph parameters (including fetal heart rate, caput succedaneum, moulding, status of amniotic fluid, fetal descent, maternal temperature, blood pressure and urinary output) to monitor the well-being of the woman and her baby and identify risks for adverse birth outcomes. In health care facilities where interventions such as augmentation and caesarean section cannot be performed and where referral-level facilities are difficult to reach, the alert line could still be used for triaging women who may require additional care. In this instance, plotting should commence from a cervical dilatation of 5 cm, which signifies the onset of active first stage of labour for most women.*
- *This recommendation supersedes the recommendation of active phase partograph with a four-hour action line in the WHO recommendations for augmentation of labour [37].*

New

Not Recommended

A minimum cervical dilatation rate of 1 cm/hour throughout active first stage is unrealistically fast for some women and is therefore not recommended for identification of normal labour progression. A slower than 1-cm/hour cervical dilatation rate alone should not be a routine indication for obstetric intervention.

Not Recommended

Labour may not naturally accelerate until a cervical dilatation threshold of 5 cm is reached. Therefore the use of medical interventions to accelerate labour and birth (such as oxytocin augmentation or caesarean section) before this threshold is not recommended, provided fetal and maternal conditions are reassuring.

- *These recommendations aim to prevent iatrogenic adverse maternal and perinatal outcomes by minimizing unnecessary medical interventions, and to improve maternal birth experience.*
- *Evidence shows important variations in the distribution of cervical dilatation patterns among women without risk factors for complications, with many women experiencing progression slower than 1 cm/ hour for the most part of their labours and yet still achieving vaginal birth with normal birth outcomes.*
- *Although this guidance offers health care professionals a benchmark against which to evaluate women in labour, it does not imply that labour facilitated accordingly cannot result in adverse outcomes. Other known and unknown variables can contribute to adverse outcomes.*
- *Before considering any medical interventions, women with suspected delay in labour progression should be carefully evaluated to exclude developing complications (e.g. cephalo-pelvic disproportion) and to determine whether their emotional, psychological and physical needs in labour are being met.*

New Context-specific recommendation - Research

For healthy pregnant women presenting in spontaneous labour, a policy of delaying labour ward admission until active first stage is recommended only in the context of rigorous research.

- *Until further evidence becomes available, a woman presenting to facilities in labour should be admitted and supported appropriately, even when in early labour, unless her preference is to await active labour at home.*
- *For women admitted to the labour ward during latent first stage, medical interventions to accelerate labour and childbirth should be avoided if maternal and fetal well-being are reassuring.*
- *The GDG made this a "research-context" recommendation as it was concerned that the limited evidence on effects applies to active first stage of labour with onset defined by a cervical dilatation of 4 cm or less, and not to active first stage with onset defined by a cervical dilatation of 5 cm or more, as recommended in this guideline. The group noted this as a research priority.*
- *It should be clear that this recommendation refers to delaying admission to the labour ward (i.e. to the childbirth area), not delaying admission to the maternity waiting areas, where women in early labour await active labour, or delaying admission to the health care facility. In addition, delaying labour ward admission does not mean delayed first contact with a health care provider or delayed assessment on admission. A comprehensive maternal and fetal assessment by a health care professional on presentation at a facility is essential to ensure undiagnosed or developing complications are excluded.*
- *Facilities currently applying a policy of delaying labour ward admission should consider implementing this research-context recommendation in the light of the revised definition of the onset of active labour.*
- *Routine observations to assess maternal and fetal well-being should be performed as needed on all women awaiting admission to the labour ward.*
- *Birth plans need to be individualized according to the woman's needs and preferences.*
- *For women in the latent first stage of labour and their companions, clean, comfortable waiting rooms should be available, with space for women to walk around, and easy access to clean, serviced toilets, and food and drinking water.*
- *Facility reorganization strategies, such as on-site midwife-led birthing units (OMBUs) and alongside midwifery units (AMUs), could be considered to meet the needs of women in early labour, instead of a policy of delaying labour ward admission.*

New Not Recommended

Routine clinical pelvimetry on admission in labour is not recommended for healthy pregnant women.

- *Indirect evidence derived from studies of X-ray pelvimetry suggests that routine clinical pelvimetry in healthy pregnant women on admission in labour may increase caesarean section without a clear benefit for birth outcomes.*
- *Clinical pelvimetry is the assessment of the adequacy of the shape and size of the maternal pelvis (inlet, mid-pelvis and outlet) for vaginal birth through internal pelvic examination and should not be confused with a standard pelvic examination, which is required for the clinical assessment of cervical status, amniotic fluid, and fetal station and position at labour admission.*
- *Clinical pelvimetry might have a role in triaging women at high risk of cephalo-pelvic disproportion who reside in rural and remote areas; however, there is currently no evidence that this practice improves outcomes.*
- *In settings where clinical pelvimetry is routinely performed among healthy pregnant women on admission in labour, health care providers should be made aware that there is insufficient evidence to support this practice.*
- *All women presenting to a facility in labour should be clinically assessed by the maternity-care provider according to recommended clinical practice, which includes performing a digital vaginal examination, with the woman's consent, to assess the status (onset and extent) of labour.*

New

Not Recommended

Routine cardiotocography is not recommended for the assessment of fetal well-being on labour admission in healthy pregnant women presenting in spontaneous labour.

Recommended

Auscultation using a Doppler ultrasound device or Pinard fetal stethoscope is recommended for the assessment of fetal well- being on labour admission.

- *Evidence shows that cardiotocography (CTG) on admission in labour probably increases the risk of caesarean section without improving birth outcomes. In addition, it increases the likelihood of a woman and her baby receiving a cascade of other interventions, including continuous CTG and fetal blood sampling, which adds to childbirth costs and might negatively impact a woman's childbirth experience.*
- *All stakeholders must be aware that the assessment of fetal condition at admission and regularly throughout labour, by auscultating the fetal heart rate, is a vital and integral part of providing quality intrapartum care. In the active first stage of labour, auscultation is usually performed every 15–30 minutes, whereas in the second stage it is usually performed every 5 minutes.*
- *The GDG was aware of the concern in the clinical and legal community about not performing an admission CTG because of the views of some clinicians that CTG is better at identifying at-risk babies than auscultation and that its use is therefore justified, even in women without apparent risk factors for labour complications. However, the GDG was confident that there is no evidence to support this view, and agreed that clinicians might be better protected from litigation by keeping good medical notes and records, which clearly indicate findings of auscultation, than by relying on admission CTG tracings in defence of clinical practice.*

New

Integrated from WHO recommendations for prevention and treatment of maternal peripartum infections

Routine perineal/pubic shaving prior to giving vaginal birth is not recommended.

- *This recommendation has been integrated from the WHO recommendations for prevention and treatment of maternal peripartum infections [38], in which the GDG for that guideline determined it to be a conditional recommendation based on very low-quality evidence.*
- *This recommendation applies to all hair shavings around the female external genital area within the context of vaginal birth. It does not apply to women being prepared for caesarean section.*
- *The decision regarding perineal/pubic shaving should be left to the woman and not the health care provider. In situations where a woman chooses to have perineal/pubic shaving prior to birth, she should be advised to arrange to be shaved wherever and by whomever she is most comfortable with (e.g. at home shortly before the time of labour and childbirth).*
- *The evidence supporting this recommendation can be found in the source guideline document, available at: http://apps.who.int/iris/bitstream/10665/186171/1/9789241549363_eng.pdf*

New Integrated from WHO recommendations for augmentation of labour

Administration of enema for reducing the use of labour augmentation is not recommended.

- *This recommendation has been integrated from the WHO recommendations for augmentation of labour [37], in which the GDG for that guideline determined it to be a strong recommendation based on very low-quality evidence.*
- *The GDG noted that the routine use of enema has neither been shown to reduce the duration of labour nor confer any other clinical benefits. It is considered invasive and associated with discomfort for women.*
- *The GDG placed its emphasis on the feasibility of implementing this recommendation, the reduction in health care resource use and acceptability among caregivers and women, and therefore made a strong recommendation against this intervention.*
- *The evidence supporting this recommendation can be found in the source guideline document, available at: http://apps.who.int/iris/bitstream/10665/112825/1/9789241507363_eng.pdf*

New Integrated from WHO recommendations for prevention and treatment of maternal peripartum infections

Digital vaginal examination at intervals of four hours is recommended for routine assessment of active first stage of labour in low-risk women.

- *This recommendation has been integrated from the WHO recommendations for prevention and treatment of maternal peripartum infections (40), in which the GDG for that guideline determined it to be a strong recommendation based on very low-quality evidence.*
- *There is currently no direct evidence on the most appropriate frequency of vaginal examinations to prevent infectious morbidity in the mother and baby, and therefore this recommendation was based on consensus reached by the GDG, and it is in agreement with a similar recommendation in the 2014 WHO recommendations for augmentation of labour [37].*
- *Priority must be given to restricting the frequency and total number of vaginal examinations. This is particularly crucial in situations when there are other risk factors for infection (e.g. prolonged rupture of amniotic membranes and long duration of labour).*
- *The GDG acknowledged that the frequency of vaginal examinations is dependent on the context of care and the progress of labour. The group agreed that vaginal examinations at intervals more frequent than specified in this recommendation may be warranted by the condition of the mother or the baby.*
- *Vaginal examinations of the same woman by multiple caregivers around the same time or at different time points should be avoided. The group noted that this practice is common in teaching settings where multiple cadres of staff (or students) perform vaginal examinations for learning purposes.*
- *The evidence supporting this recommendation can be found in the source guideline document, available at: http://apps.who.int/iris/bitstream/10665/186171/1/9789241549363_eng.pdf*

New Not Recommended

Continuous cardiotocography is not recommended for assessment of fetal well-being in healthy pregnant women undergoing spontaneous labour.

- *In making this recommendation, the GDG placed its emphasis on evidence that suggests that continuous CTG increases caesarean section and other medical interventions, without being costeffective, and with varying acceptability and feasibility. The GDG placed less emphasis on the small absolute reduction in neonatal seizures (1 fewer per 1000), which may or may not have further health consequences.*
- *Continuous CTG should not be used as a substitute for providing supportive, woman-centred intrapartum care.*
- *Continuous CTG can restrict other beneficial interventions during labour, such as having a choice of labour and birth positions, and being able to walk around freely, and can be stressful for women. While the GDG acknowledged that mobile continuous CTG is available, it agreed that the evidence on the effects of this newer technology is unknown.*
- *Stakeholders in countries with high perinatal mortality should consider how the coverage and documentation of intermittent auscultation (IA) could be improved.*
- *In countries and settings where continuous CTG is used defensively to protect against litigation, all stakeholders should be made aware that this practice is not evidence-based and does not improve birth outcomes. Clinicians might be better protected from litigation by keeping good medical notes and records, which clearly indicate findings of IA, than by relying on continuous CTG tracings in defence of clinical practice.*

New Recommended

Intermittent auscultation of the fetal heart rate with either a Doppler ultrasound device or Pinard fetal stethoscope is recommended for healthy pregnant women in labour.

- *There is some evidence to suggest that intermittent auscultation (IA) with a handheld Doppler ultrasound device, cardiotocography (CTG), or strict monitoring with Pinard fetal stethoscope could increase the detection of fetal heart rate (FHR) abnormalities, which may in turn reduce hypoxiaischaemia outcomes. However, the impact on other substantive early and long-term infant outcomes is unclear.*
- *The GDG stressed that IA of the FHR during labour is essential for intrapartum care, irrespective if the device used, with strict adherence to clinical protocols. The group noted that monitoring of the FHR during labour is inadequate in many low- and middle-income country (LMIC) settings, and this problem needs to be strongly addressed through quality improvement initiatives in these settings.*
- *The GDG acknowledged the lack of evidence of comparative benefits of different IA protocols and variations in protocols across health care settings. However, the group agreed that standardization of protocol is important for health care planning and medico-legal purposes and, therefore, adopted the following protocol [39].*
- *Interval: Auscultate every 15–30 minutes in active first stage of labour, and every 5 minutes in the second stage of labour.*
- *Duration: Each auscultation should last for at least 1 minute; if the FHR is not always in the normal range (i.e. 110–160 bpm), auscultation should be prolonged to cover at least three uterine contractions.*
- *Timing: Auscultate during a uterine contraction and continue for at least 30 seconds after the contraction.*
- *Recording: Record the baseline FHR (as a single counted number in beats per minute) and the presence or absence of accelerations and decelerations.*
- *Regardless of the method used, a clear explanation of the technique and its purpose should be provided to the woman. The findings of the auscultation should be explained to the woman and the subsequent course of action made clear, to enable shared decision-making.*
- *The GDG noted that in some low-resource settings it is common to see faulty equipment, multiple types of equipment (due to donation from different development partners, or procurement from nearby countries) and shortages of batteries and other supplies. Use of equipment that requires electricity can be negatively impacted by power cuts in low-income country settings. Therefore, before switching from Pinard fetal stethoscope to Doppler device, it is important to ensure the appropriate resources are available to sustain implementation.*

New **Recommended**

Epidural analgesia is recommended for healthy pregnant women requesting pain relief during labour, depending on a woman's preferences.

- *The GDG agreed that while there is limited evidence on the impact of epidural analgesia compared with no epidural analgesia for pain relief during labour, epidural analgesia is a proven method for relieving pain related to surgery, including abdominal surgery, and chose to recommend it as a pain relief option.*
- *Health care professionals should be aware that women's desire for epidural analgesia might be moderated by the clinical context in which they receive antenatal and intrapartum care, whether labour is spontaneous or not, and their access to and knowledge of a range of other forms of pain relief measures.*
- *It is likely that the care context and the type of care provision and care provider have a strong effect on the need for labour pain relief, and on the kinds of choices women make in relation to this need.*
- *Both commonly used pharmacological options for pain relief during labour – epidural and opioid analgesic options – have advantages and disadvantages. Epidural analgesia appears to be the more effective pain relief option but compared with opioid analgesia it also requires more resources to implement and to manage its adverse effects, which are more common with epidural analgesia.*
- *To avoid complications and preserve as much motor function as possible, the lowest possible effective concentration of local anaesthetic should be used when administering epidural analgesia [40].*
- *For women with epidural analgesia in the second stage of labour, it is recommended that a birth position of the individual woman's choice be facilitated, including an upright birth position. For women with epidural analgesia in the second stage of labour, delaying pushing for one to two hours after full dilatation or until the woman regains the sensory urge to bear down is recommended.*

New **Recommended**

Parenteral opioids, such as fentanyl, diamorphine and pethidine, are recommended options for healthy pregnant women requesting pain relief during labour, depending on a woman's preferences.

- *Many women appreciate some form of pain relief in labour and would like a choice of options. The evidence suggests that opioids probably provide some relief from pain during labour, despite having some undesirable side-effects, such as drowsiness, nausea and vomiting.*
- *Despite being widely available and used, pethidine is not the preferred opioid option, as shorter-acting opioids tend to have fewer undesirable side-effects.*
- *Before use, health care providers should counsel women about the potential side-effects of opioids, including maternal drowsiness, nausea and vomiting, and neonatal respiratory depression, and about the alternative pain relief options available.*
- *It is important that health care providers take care to ensure that the correct dosage is administered, as opioid overdose can have serious consequences.*
- *Stakeholders should be aware that the care context and the type of care provision and care provider might have a strong effect on the need for labour pain relief, and on the kinds of choices women make in relation to this need.*
- *The GDG agreed that for women who suffer from current or previous opioid addiction, non-opioid methods of pain relief are preferred.*
- *Health care providers need to be trained to manage side-effects if they arise and must be aware that opioid medication should be securely stored with a register kept of its dispensing, to reduce the risk of abuse.*

New **Recommended**

Relaxation techniques, including progressive muscle relaxation, breathing, music, mindfulness and other techniques, are recommended for healthy pregnant women requesting pain relief during labour, depending on a woman's preferences.

- *Most women desire some form of pain relief during labour, and qualitative evidence indicates that relaxation techniques can reduce labour discomfort, relieve pain and enhance the maternal birth experience.*
- *Health care professionals should be aware that the care context and the type of care provision and care provider could have a strong effect on the need for labour pain relief, and on the kinds of choices that women make in relation to this need.*
- *Non-pharmacological pain relief options can vary widely within and across settings and contexts, which might favour other techniques that are not considered in this guideline, such as water immersion, hypnobirthing, acupuncture and cultural and traditional practices that women might find soothing.*
- *Care providers should inform women that while relaxation techniques are unlikely to be harmful, the beneficial effects have very low certainty.*

New **Recommended**

Manual techniques, such as massage or application of warm packs, are recommended for healthy pregnant women requesting pain relief during labour, depending on a woman's preferences.

- *Most women desire some form of pharmacological or non-pharmacological pain relief during labour, and qualitative evidence indicates that massage can reduce labour discomfort, relieve pain and enhance the maternal birth experience.*
- *While the quantitative and qualitative evidence largely relates to massage, warm packs are unlikely to be harmful and some women might find these to be soothing.*
- *Health care professionals should be aware that the care context and the type of care provision and care provider could have a strong effect on the need for labour pain relief, and on the kinds of choices women make in relation to this need.*
- *Non-pharmacological pain relief options can vary widely across settings and contexts, which might favour other techniques not considered in this guideline, such as water immersion, hypnobirthing, acupuncture, and cultural and traditional practices that women might find soothing.*
- *Health care professionals should communicate to women the options available for pain relief in their birth facility, and discuss the advantages and disadvantages of these options as part of antenatal care.*
- *Care providers should inform women that while manual techniques for managing pain are unlikely to be harmful, evidence of the beneficial effects is of very low certainty.*

New **Integrated from WHO recommendations for augmentation of labour**

Pain relief for preventing delay and reducing the use of augmentation in labour is not recommended.

- *This recommendation has been integrated from the WHO recommendations for augmentation of labour [37], in which the GDG for that guideline determined it to be a conditional recommendation based on very low-quality evidence.*
- *The GDG noted that there is no clear evidence to suggest that any form of pain relief is associated with reductions in labour duration or frequency of labour augmentation.*
- *The GDG acknowledged that pain relief may not necessarily reduce the need for labour augmentation but it has other substantial benefits that make it an essential component of good intrapartum care.*
- *The evidence supporting this recommendation can be found in the source guideline document, available at: http://apps.who.int/iris/bitstream/10665/112825/1/9789241507363_eng.pdf*

New

Integrated from WHO recommendations for augmentation of labour

For women at low risk, oral fluid and food intake during labour is recommended.
This recommendation has been integrated from the WHO recommendations for augmentation of labour [37], in which the GDG for that guideline determined it to be a conditional recommendation based on very low-quality evidence.

- *Given that restriction of oral fluid and food intake has no beneficial effects on important clinical outcomes, including the use of labour augmentation, the GDG puts its emphasis on respect for the wishes of the woman and therefore made a positive recommendation.*
- *The GDG noted that no cases of Mendelson's Syndrome (inhalation of food and drink from the stomach into the lungs during general anaesthesia – the most important safety concern limiting oral intake during labour – were reported in over 3000 women participating in the trials included in the systematic review.*
- *The evidence supporting this recommendation can be found in the source guideline document, available at: http://apps.who.int/iris/bitstream/10665/112825/1/9789241507363_eng.pdf*

New

Integrated from WHO recommendations for augmentation of labour

Encouraging the adoption of mobility and an upright position during labour in women at low risk is recommended.

- *This recommendation has been integrated from the WHO recommendations for augmentation of labour [37], in which the GDG for that guideline determined it to be a strong recommendation based on very low-quality evidence.*
- *Although the evidence does not suggest that mobility and upright position in labour reduce the use of oxytocin augmentation, the GDG placed its emphasis on the clinical benefits in terms of reducing caesarean section.*
- *The GDG noted that in many settings, traditional practices of enforcing bed rest for all women in labour are common, rather than allowing women's choices to be informed by their knowledge of the benefits of mobility and upright position. The GDG puts its emphasis on providing women with the choice of an intervention that is beneficial, cheap and easy to implement, and therefore made a strong recommendation for this intervention.*
- *This recommendation should inform and support women's choices on what position to adopt during the first stage of labour.*
- *The evidence supporting this recommendation can be found in the source guideline document, available at: http://apps.who.int/iris/bitstream/10665/112825/1/9789241507363_eng.pdf*

New

Integrated from WHO recommendations for prevention and treatment of maternal peripartum infections

Routine vaginal cleansing with chlorhexidine during labour for the purpose of preventing infectious morbidities is not recommended.

- *This recommendation has been integrated from the WHO recommendations for prevention and treatment of maternal peripartum infections [38], in which the GDG for that guideline determined it to be a strong recommendation based on moderate-quality evidence.*
- *This recommendation was based on the lack of clinical benefits for the neonate and not on the potential effect of the intervention on group B Streptococcus (GBS)-related maternal infectious morbidity.*
- *The GDG acknowledged the considerable variations in policies regarding the screening for GBS colonization in pregnant women. Therefore, the group agreed that this recommendation should be implemented within the context of local policy and guidance on screening for GBS colonization.*
- *The evidence supporting this recommendation can be found in the source guideline document, available at: http://apps.who.int/iris/bitstream/10665/186171/1/9789241549363_eng.pdf*

New

Integrated from WHO recommendations for augmentation of labour

A package of care for active management of labour for prevention of delay in labour is not recommended.

- *This recommendation has been integrated from the WHO recommendations for augmentation of labour [37], in which the GDG for that guideline determined it to be a conditional recommendation based on low-quality evidence.*
- *The GDG agreed that this package of interventions has potential benefits in terms of reducing the duration of labour and possible caesarean section rate. However, the group did not support its recommendation as it considered the approach to be highly prescriptive and interventional and one that could undermine women's rights, choices and autonomy as recipients of care. In addition, the intervention is considered to be a complex package that exerts considerable demands on health resources, which may not be feasible in many settings. The GDG chose not to recommend the package because the reported clinical benefits do not clearly outweigh these other considerations. The GDG also noted that continuous one-to-one care is the only component of the package that has been shown to be beneficial, and is probably the component responsible for the benefits attributed to the package. Continuous support during labour as a separate intervention is recommended in the WHO recommendations for augmentation of labour [37].*
- *Evidence supporting this recommendation can be found in the source guideline document, available at: http://apps.who.int/iris/bitstream/10665/112825/1/9789241507363_eng.pdf*

New

Integrated from WHO recommendations for augmentation of labour

The use of amniotomy alone for prevention of delay in labour is not recommended.

- *This recommendation has been integrated from the WHO recommendations for augmentation of labour [37], in which the GDG for that guideline determined it to be a conditional recommendation based on very low-quality evidence.*
- *The GDG noted that in spite of the common use of amniotomy for prevention of labour delay in clinical practice, there is no clear evidence that the potential benefits outweigh the potential harms.*
- *As early amniotomy may increase the risk of perinatal HIV transmission, this recommendation could be strengthened in settings where HIV infection is prevalent and women may present in labour with unknown HIV status.*
- *The evidence supporting this recommendation can be found in the source guideline document, available at: http://apps.who.int/iris/bitstream/10665/112825/1/9789241507363_eng.pdf*

New

Integrated from WHO recommendations for augmentation of labour

The use of early amniotomy with early oxytocin augmentation for prevention of delay in labour is not recommended.

- *This recommendation has been integrated from the WHO recommendations for augmentation of labour [37], in which the GDG for that guideline determined it to be a conditional recommendation based on very low-quality evidence.*
- *The GDG noted that the variable reduction in the duration of the first stage of labour itself does not justify the intervention, given that no substantive differences were found in other important clinical outcomes.*
- *The GDG noted the substantial overlap between this intervention and the other components of the active management of labour, and considered it as equally highly prescriptive and interventional. Like the package of active management of labour, the group placed much emphasis on its potential to undermine women's rights, choices and autonomy as recipients of care, and therefore did not recommend the intervention. Additionally, the intervention is not considered feasible in many settings, as it requires considerable health care resources to implement.*
- *The evidence supporting this recommendation can be found in the source guideline document, available at: http://apps.who.int/iris/bitstream/10665/112825/1/9789241507363_eng.pdf*

New

Integrated from WHO recommendations for augmentation of labour

The use of oxytocin for prevention of delay in labour in women receiving epidural analgesia is not recommended.

- *This recommendation has been integrated from the WHO recommendations for augmentation of labour [37], in which the GDG for that guideline determined it to be a conditional recommendation based on low-quality evidence.*
- *Augmentation with oxytocin should be performed when indicated as treatment of confirmed delay of labour progress in women receiving epidural analgesia.*
- *The evidence supporting this recommendation can be found in the source guideline document, available at: http://apps.who.int/iris/bitstream/10665/112825/1/9789241507363_eng.pdf*

New

Integrated from WHO recommendations for augmentation of labour

The use of antispasmodic agents for prevention of delay in labour is not recommended.

- *This recommendation has been integrated from the WHO recommendations for augmentation of labour [37], in which the GDG for that guideline determined it to be a conditional recommendation based on very low-quality evidence.*
- *The GDG noted that the available data were too heterogeneous with respect to the participants and interventions to permit wide applicability of the results. The shortening in the length of the first stage of labour by one hour was considered clinically inconsequential, as it did not translate into improvement in the other critical maternal or infant outcomes. The GDG placed high value on safety issues, which were poorly reported, and chose not to recommend the practice until new information demonstrating clinical benefits with minimal risks becomes available.*
- *The GDG considers the effectiveness of the use of antispasmodic agents for the treatment of labour delay as a research priority.*
- *The evidence supporting this recommendation can be found in the source guideline document, available at: http://apps.who.int/iris/bitstream/10665/112825/1/9789241507363_eng.pdf*

New

Integrated from WHO recommendations for augmentation of labour

The use of intravenous fluids with the aim of shortening the duration of labour is not recommended.

- *This recommendation has been integrated from the WHO recommendations for augmentation of labour [37], in which the GDG for that guideline determined it to be a strong recommendation based on very low-quality evidence.*
- *The GDG did not recommend this intervention on the basis of no clear evidence of benefits over harms. The group noted that the risk of maternal fluid overload, particularly when intravenous oxytocin infusion becomes indicated during the course of labour, might become accentuated.*
- *The GDG agreed that low-risk women should be encouraged to drink fluids during labour.*
- *The GDG acknowledged that intravenous (IV) fluid may become necessary for other indications and for supportive care in labour even for low-risk women.*
- *The GDG placed its emphasis on the widespread and unnecessary use of routine administration of IV fluids for all women in labour and many health care facilities in low-, middle- and high-income settings that increases cost, has considerable impact on the resource use and reduces women's mobility, and therefore made a strong recommendation against this intervention.*
- *The evidence supporting this recommendation can be found in the source guideline document, available at: http://apps.who.int/iris/bitstream/10665/112825/1/9789241507363_eng.pdf*

New Recommended

The use of the following definition and duration of the second stage of labour is recommended for practice.

- The second stage is the period of time between full cervical dilatation and birth of the baby, during which the woman has an involuntary urge to bear down, as a result of expulsive uterine contractions.
- Women should be informed that the duration of the second stage varies from one woman to another. In first labours, birth is usually completed within 3 hours whereas in subsequent labours, birth is usually completed within 2 hours.

- *The description of the onset of the second stage based on research is an inexact science and the onset of the second stage of labour in clinical practice is often not precisely known. A woman may feel the urge to bear down before complete dilatation or she may not yet feel this urge at the moment when complete dilatation is diagnosed. If complete dilatation is found on vaginal examination, it remains uncertain for how long this cervical status has been present.*
- *Transportation from the labour room to a specific delivery room at the beginning of the second stage could be unpleasant to the woman and is unnecessary when labour is progressing normally.*
- *Birth attendants should be aware that a woman can feel the urge to bear down at a cervical dilatation earlier than 10 cm.*
- *A decision about curtailing the second stage of labour should be based on surveillance of the maternal and fetal condition, and on the progress of labour. When the woman's condition is satisfactory, the fetus is in good condition, and there is evidence of progress in the descent of the fetal head, there are no grounds for intervention. However, when the second stage has extended beyond the abovementioned standard durations, the chance of spontaneous birth within a reasonable time decreases, and intervention to expedite childbirth should be considered.*

New Recommended

For women without epidural analgesia, encouraging the adoption of a birth position of the individual woman's choice, including upright positions, is recommended.

- *The evidence suggests that upright birth positions during the second stage of labour might reduce episiotomy and instrumental vaginal births but might also be associated with increased risk of postpartum haemorrhage (PPH) and second-degree tears. However, most evidence is of low certainty and the GDG agreed that the difference in benefits and harms between upright and recumbent positions might not be clinically apparent.*
- *It is important that any particular position is not forced on the woman and that she is encouraged and supported to adopt any position that she finds most comfortable.*
- *The health care professional should ensure that the well-being of the baby is adequately monitored in the woman's chosen position. Should a change in position be necessary to ensure adequate fetal monitoring, the reason should be clearly communicated to the woman.*
- *A practical approach to positioning in the second stage for women desiring an upright birth position might be to adapt to a semi-recumbent or all-fours position just before expulsion of the fetus, to facilitate perineal techniques to reduce perineal tears and blood loss.*

New **Recommended**

For women with epidural analgesia, encouraging the adoption of a birth position of the individual woman's choice, including upright positions, is recommended.

- *Evidence suggests that there might be little or no difference in most birth outcomes according to birth position among women with epidural analgesia. Having a choice of birth positions during the second stage of labour might positively impact maternal birth experience and improve equity.*
- *Upright positions with traditional epidural analgesia, which provides a dense neuroaxial block, might not be feasible; however, most epidural analgesia currently provided are "low dose" and "mobile" epidural analgesia, which should enable a choice of birth positions.*
- *It is important that any particular position is not forced on the woman and that she is encouraged and supported to adopt any position that she finds most comfortable.*
- *The health care professional should ensure that the well-being of the baby can be adequately monitored in the woman's chosen position. Should a change in position be necessary to ensure adequate fetal monitoring, this should be effectively communicated to the woman.*

New **Context-specific recommendation**

For women with epidural analgesia in the second stage of labour, delaying pushing for one to two hours after full dilatation or until the woman regains the sensory urge to bear down is recommended in the context where resources are available for longer stay in second stage and perinatal hypoxia can be adequately assessed and managed.

- *Evidence on effects suggests that delaying pushing probably increases the likelihood of spontaneous vaginal birth after a slightly longer labour. The evidence that delaying pushing might increase the risk of low umbilical cord pH is of low certainty and the GDG agreed that the clinical importance of this limited evidence is very uncertain.*
- *Health care providers should avoid imposing immediate pushing on women in the second stage of labour, as there is no evidence of any benefit with immediate pushing and the practice might lead to further medical intervention.*

New **Recommended**

For women in the second stage of labour, techniques to reduce perineal trauma and facilitate spontaneous birth (including perineal massage, warm compresses and a "hands on" guarding of the perineum) are recommended, based on a woman's preferences and available options.

- *Evidence suggests that perineal massage may increase the chance of the keeping the perineum intact and reduces the risk of serious perineal tears, that warm perineal compresses reduce third- and fourth-degree perineal tears, and that a "hands-on" approach (guarding) probably reduces firstdegree perineal tears. Most women accept these low-cost preventative perineal techniques and highly value the outcomes that they impact.*
- *Evidence on Ritgen's manoeuvre (using one hand to pull the fetal chin from between the maternal anus and the coccyx, and the other hand placed on the fetal occiput to control speed of birth) is very uncertain; therefore, this technique is not recommended.*

New **Recommended**

Women in the expulsive phase of the second stage of labour should be encouraged and supported to follow their own urge to push.

- *Qualitative evidence on what matters to women during intrapartum care shows that women want to feel in control of their birth process, with the support of kind, reassuring staff who are sensitive to their needs [41].*
- *Health care providers should avoid imposing directed pushing on women in the second stage of labour, as there is no evidence of any benefit with this technique.*

New **Not Recommended**

Routine or liberal use of episiotomy is not recommended for women undergoing spontaneous vaginal birth.

- *Although the review evidence on comparative effects of episiotomy policies was presented as selective/ restrictive versus routine/liberal use of episiotomy, due to the beneficial effects of selective/ restrictive compared with routine/liberal episiotomy policy, the lack of evidence on the effectiveness of episiotomy in general, and the need to discourage the excessive use of routine episiotomy across all settings, the GDG felt that it was important to emphasize that routine/liberal use of episiotomy is "not recommended", rather than recommending the selective/restrictive use of episiotomy.*
- *The GDG acknowledged that, at the present time, there is no evidence corroborating the need for any episiotomy in routine care, and an "acceptable" rate of episiotomy is difficult to determine. The role of episiotomy in obstetric emergencies, such as fetal distress requiring instrumental vaginal birth, remains to be established.*
- *If an episiotomy is performed, effective local anaesthesia and the woman's informed consent is essential. The preferred technique is a medio-lateral incision, as midline incisions are associated with a higher risk of complex obstetric anal sphincter injury (OASI). A continuous suturing technique is preferred to interrupted suturing [42].*
- *Episiotomies do not warrant the routine use of prophylactic antibiotics, as general infection control measures should be respected at all times [38].*

New **Not Recommended**

Application of manual fundal pressure to facilitate childbirth during the second stage of labour is not recommended.

- *The GDG had serious concerns about the potential for harm to mother and baby with this procedure.*
- *The panel is aware of an ongoing trial, the Gentle Assisted Pushing (GAP) trial [43], which could help to provide important evidence on the effects of applying fundal pressure according to a specific protocol.*

New

Recommended

The use of uterotonics for the prevention of postpartum haemorrhage (PPH) during the third stage of labour is recommended for all births.

Recommended

Oxytocin (10 IU, IM/IV) is the recommended uterotonic drug for the prevention of postpartum haemorrhage (PPH).

Recommended

In settings where oxytocin is unavailable, the use of other injectable uterotonics (if appropriate, ergometrine/methylergometrine, or the fixed drug combination of oxytocin and ergometrine) or oral misoprostol (600 µg) is recommended.

- *These recommendations have been integrated from the WHO recommendations for the prevention and treatment of postpartum haemorrhage [44], in which the GDG for that guideline determined them to be strong recommendations based on moderate-quality evidence.*
- *Available comparisons are limited, but a significant difference between the benefits of oxytocin and ergometrine is unlikely. These recommendations place a high value on avoiding the adverse effects of ergometrine and assume a similar benefit from using oxytocin and ergometrine for the prevention of PPH.*
- *Caution should be exercised when opting for ergot derivatives for the prevention of PPH as these drugs have clear contraindications in women with hypertensive disorders. Thus, it is probably safer to avoid the use of ergot derivatives in unscreened populations.*
- *Oral misoprostol (600 µg) was regarded by the GDG as an effective drug for the prevention of PPH. However, the GDG considered the relative benefits of oxytocin compared to misoprostol in preventing blood loss, as well as the increased adverse effects of misoprostol compared to oxytocin. The GDG acknowledged that there is no evidence to show that a 600-µg dose of misoprostol provides greater efficacy over a 400-µg dose. Lower doses have a lower side-effect profile but the efficacy of lower doses of misoprostol has not been evaluated sufficiently.*
- *The recommendations concerning alternative uterotonics should not detract from the objective of making oxytocin as widely accessible as possible.*
- *In view of past concerns regarding the community-level distribution of misoprostol and the potential for serious consequences of administration before birth, the GDG places emphasis on training persons administering misoprostol and monitoring community distribution interventions with scientifically sound methods and appropriate indicators.*
- *The evidence supporting these recommendations can be found in the source guideline document, available at: http://apps.who.int/iris/bitstream/10665/75411/1/9789241548502_eng.pdf*

New Recommended

For all women giving birth, routine objective measurement of postpartum blood loss is recommended to improve the detection and prompt treatment of postpartum haemorrhage. Methods to objectively quantify blood loss, such as calibrated drapes for women having vaginal birth, can achieve this

- *Visual estimation of postpartum blood loss is frequently inaccurate, meaning that PPH often goes unrecognized or is identified when it is too late to provide a life-saving intervention. Objective methods of quantifying blood loss, which are superior to visual estimation, are more likely to detect PPH. For women who have had a vaginal birth, most of the available evidence on postpartum blood loss measurement comes from the use of a calibrated drape.*
- *Blood loss measurement is particularly critical in the first few hours after birth. Women should also be regularly monitored for early warning signs of excessive blood loss (e.g. tachycardia or hypotension).*
- *To be effective, measurement of postpartum blood loss must be linked with a standardized treatment approach or protocol, and vice versa. Detecting PPH, in the absence of prompt initiation of treatment, is unlikely to improve a woman's health outcomes.*
- *The available studies have been conducted in women giving birth vaginally. However, the measurement of blood loss in women undergoing a caesarean section is also clinically important.*
- *The process for postpartum blood loss measurement should ensure that a woman's customary or cultural requirements, including choice of birth position, are respected and maintained.*
- *Birth-related bleeding risks and the signs and symptoms of excessive blood loss should be discussed with women across the birth continuum (including antenatally) to foster shared decision-making.*
- *There should be consideration and investments made into the development and use of sustainable and climate-friendly drapes.*

New Recommended

A standardized and timely approach to the management of postpartum haemorrhage (PPH), comprising an objective assessment of blood loss and use of a treatment bundle supported by an implementation strategy, is recommended for all women having a vaginal birth. The care bundle for the first-line treatment of PPH should include rapid institution of uterine massage, administration of an oxytocic agent and tranexamic acid, intravenous fluids, examination of the genital tract and escalation of care.

- *All interventions included within the PPH treatment bundle are individually recommended in the existing 2012 and 2017 WHO PPH guidelines.*
- *In the context of this recommendation, the GDG emphasizes the need for a consistent use and interpretation of the term "bundle" as a clinical care bundle for the treatment of PPH. This should not be misconstrued with the usage of this term in other contexts.*
- *To ensure the maximal success of the PPH treatment bundle, early detection of PPH is a key and indissociable component of the first-response intervention. The available evidence on postpartum blood loss measurement is largely from trials that used calibrated drapes for women who had a vaginal birth .*
- *Clinical judgement is important to guide PPH treatment decision-making. In a large trial, the treatment bundle was initiated when measured blood loss was 500 ml or greater, or when measured blood loss was 300 ml or greater with early warning signs of excessive blood loss .*
- *The trial underlying this recommendation included multiple implementation and health system strengthening strategies that helped to achieve a high coverage in the consistent use of the treatment bundle. These included ensuring availability of the required human resources, strengthened by dedicated research staff, regular health-care facility-level audit and feedback, designated facility champions to oversee change, restocking of PPH trolleys or carry cases so that all necessary medicines and equipment were readily available in one place, and training for health workers.*
- *The PPH treatment bundle requires standardized and timely use of all included interventions. All bundle treatment interventions should ideally be initiated within the first 15 minutes after a diagnosis of PPH. However, health system readiness (e.g. availability of staff, equipment) varies across different settings. In the event that not all bundle interventions are available, available components should be initiated in a timely and standardized manner.*
- *In cases of refractory postpartum bleeding – where a woman has received all interventions within the PPH treatment bundle yet continues to bleed – prompt escalation to a higher-level healthcare facility or a senior clinical provider capable of providing further management is critical. WHO has made recommendations on the treatment of refractory PPH.*
- *The evidence supporting a treatment bundle is ref https://iris.who.int/bitstream/handle/10665/375231/9789240085398-eng.pdf?sequence*

New Recommended

Delayed umbilical cord clamping (not earlier than 1 minute after birth) is recommended for improved maternal and infant health and nutrition outcomes.

- *This recommendation has been integrated from the WHO Guideline: delayed cord clamping for improved maternal and infant health and nutrition outcomes [45], in which the GDG for that guideline determined it to be a strong recommendation based on moderate-quality evidence.*
- *Delayed cord clamping should be performed during the provision of essential newborn care.*
- *Some health care professionals working in areas of high HIV prevalence have expressed concern regarding delayed cord clamping as part of management of the third stage of labour. These professionals are concerned that during placental separation, a partially detached placenta could be exposed to maternal blood and this could lead to a micro-transfusion of maternal blood to the baby. It has been demonstrated that the potential for mother-to-child transmission of HIV can take place at three different points in time: micro-transfusions of maternal blood to the fetus during pregnancy (intrauterine HIV transmission), exposure to maternal blood and vaginal secretions when the fetus passes through the birth canal in vaginal deliveries (intrapartum transmission), and during breastfeeding (postnatal infection). For this reason, the main intervention to reduce the maternal-tochild transmission is the reduction of maternal viral load through the use of antiretroviral drugs during pregnancy, childbirth and postnatal period. There is no evidence that delaying cord clamping increases the possibility of HIV transmission from the mother to the newborn. Maternal blood percolates through the placental intervillous space throughout pregnancy with a relatively low risk of maternal– fetal transmission before delivery. It is highly unlikely that separation of the placenta increases exposure to maternal blood, and it is highly unlikely that it disrupts the fetal placental circulation (i.e. it is unlikely that during placental separation the newborn circulation is exposed to maternal blood). Thus, the proven benefits of a 1–3 minute delay, at least, in clamping the cord outweigh the theoretical, and unproven, harms. Late cord clamping is recommended even among women living with HIV or women with unknown HIV status.*
- *The evidence supporting this recommendation can be found in the source guideline document, available at: http://apps.who.int/iris/bitstream/10665/148793/1/9789241508209_eng.pdf*

New Recommended

In settings where skilled birth attendants are available, controlled cord traction (CCT) is recommended for vaginal births if the care provider and the parturient woman regard a small reduction in blood loss and a small reduction in the duration of the third stage of labour as important.

- *This recommendation has been integrated from the WHO recommendations for the prevention and treatment of postpartum haemorrhage [44], in which the GDG for that guideline determined it to be a strong recommendation based on moderate quality evidence.*
- *This recommendation is based on a large RCT in which oxytocin 10 IU was used for the prevention of postpartum haemorrhage (PPH) in all participants. Based on this evidence, CCT was regarded as safe when applied by skilled birth attendants as it provides small beneficial effects on blood loss (average reduction in blood loss of 11 ml) and on the duration of the third stage of labour (average reduction of 6 minutes). The care provider should discuss the decision to implement CCT in the context of a prophylactic uterotonic drug with the woman.*
- *If ergot alkaloids are used for the prevention of PPH, then CCT to minimize placenta retention is regarded as essential.*
- *There is insufficient evidence to determine the benefits or risks of CCT when used in conjunction with misoprostol.*
- *CCT is the first intervention to treat retained placenta; therefore, the teaching of CCT in medical and midwifery curricula is essential.*
- *Based on the most recent evidence, understanding about the contribution of each component of the active management of the third stage of labour package has evolved. The GDG considered that this package has a primary intervention: the use of a uterotonic. In the context of oxytocin use, CCT may add a small benefit, while uterine massage may add no benefit for the prevention of PPH. Early cord clamping is generally contraindicated.*
- *The evidence supporting this recommendation can be found in the source guideline document, available at: http://apps.who.int/iris/bitstream/10665/75411/1/9789241548502_eng.pdf*

New Not Recommended

Sustained uterine massage is not recommended as an intervention to prevent postpartum haemorrhage (PPH) in women who have received prophylactic oxytocin.

- *This recommendation has been integrated from the WHO recommendations for the prevention and treatment of postpartum haemorrhage [44], in which the GDG for that guideline determined it to be a conditional recommendation based on low-quality evidence.*
- *There is a lack of evidence regarding the role of uterine massage for PPH prevention when no uterotonic drugs are used, or if a uterotonic drug other than oxytocin is used.*
- *Although the GDG acknowledged that one small study reported that sustained uterine massage and clot expulsion were associated with a reduction in the use of additional uterotonics, there is lack of robust evidence supporting other benefits. However, the GDG considered that routine and frequent uterine tone assessment remains a crucial part of immediate postpartum care, particularly for the optimization of early PPH diagnosis.*
- *Based on the most recent evidence, understanding about the contribution of each component of the active management of the third stage of labour package has evolved. The GDG considered that this package has a primary intervention: the use of a uterotonic. In the context of oxytocin use, CCT may add a small benefit, while uterine massage may add no benefit for the prevention of PPH. Early cord clamping is generally contraindicated.*
- *The evidence supporting this recommendation can be found in the source guideline document, available at: http://apps.who.int/iris/bitstream/10665/75411/1/9789241548502_eng.pdf*

New **Not Recommended**

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.

- *This recommendation has been integrated from the WHO Guidelines on basic newborn resuscitation [46], in which the GDG for that guideline determined it to be a strong recommendation based on high-quality evidence.*
- *No further remarks were noted.*
- *The evidence supporting this recommendation can be found in the source guideline document, available at: http://apps.who.int/iris/bitstream/10665/75157/1/9789241503693_eng.pdf*

New **Recommended**

Newborns without complications should be kept in skin-to-skin contact (SSC) with their mothers during the first hour after birth to prevent hypothermia and promote breastfeeding.

- *This recommendation has been integrated from the WHO Recommendations for management of common childhood conditions: evidence for technical update of pocket book recommendations [47], in which the GDG for that guideline determined it to be a strong recommendation based on low-quality evidence.*
- *No further remarks were noted.*
- *The evidence supporting this recommendation can be found in the source guideline document, available at: http://apps.who.int/iris/bitstream/10665/44774/1/9789241502825_eng.pdf*

New **Recommended**

All newborns, including low-birth-weight (LBW) 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.

- *This recommendation has been integrated from the WHO recommendations on newborn health [48]. The evidence supporting this recommendation can be found in the WHO guidelines on optimal infant feeding for low birth weight infants in low- and middle-income countries [49]. This recommendation was determined to be a strong recommendation based on low-quality evidence.*
- *No further remarks were noted.*
- *The source and the evidence supporting this recommendation can be found in the above-mentioned guideline documents, which are available, respectively, at: https://iris.who.int/handle/10665/259269 and https://www.who.int/publications/i/item/9789240058262*

New **Recommended**

All newborns should be given 1 mg of vitamin K intramuscularly after birth (i.e. after the first hour by which the infant should be in skin-to-skin contact with the mother and breastfeeding should be initiated).

- *This recommendation has been integrated from the WHO Recommendations for management of common childhood conditions: evidence for technical update of pocket book recommendations [47], in which the GDG for that guideline determined it to be a strong recommendation based on moderate quality evidence.*
- *No further remarks were noted.*
- *The evidence supporting this recommendation can be found in the source guideline document, available at: http://apps.who.int/iris/bitstream/10665/44774/1/9789241502825_eng.pdf*

New **Recommended**

Bathing should be delayed until 24 hours after birth. If this is not possible due to cultural reasons, bathing should be delayed for at least six hours. Appropriate clothing of the baby for ambient temperature is recommended. This means one to two layers of clothes more than adults, and use of hats/caps. The mother and baby should not be separated and should stay in the same room 24 hours a day.

- *This recommendation has been integrated from the WHO recommendations on postnatal care of the mother and newborn [50], in which the GDG for that guideline determined it to be a strong situational recommendation based on GDG consensus.*
- *No further remarks were noted.*
- *The evidence supporting this recommendation can be found in the source guideline document, available at: http://apps.who.int/iris/bitstream/10665/97603/1/9789241506649_eng.pdf*

1.2.2 WHO recommendations: Induction of labour at or beyond term

[51]

Conditional Recommendation, low-certainty evidence

Induction of labour is recommended for women who are known with certainty to have reached 41 weeks (>40 weeks + 7 days) of gestation.

Remarks

- *This recommendation does not apply to settings where the gestational age cannot be reliably estimated.*
- *The potential need for induction of labour for women with a post-term pregnancy should be discussed with women in advance, so that they have an opportunity to ask questions and understand the benefits and possible risks.*

Conditional Recommendation against, low-certainty evidence

Induction of labour is not recommended for women with an uncomplicated pregnancy at gestational age less than 41 weeks.

Remarks

- *There is insufficient evidence to recommend induction of labour for women with uncomplicated pregnancies before 41 weeks of pregnancy.*

1.2.3 WHO recommendations for induction of labour

[51]

New **Weak Recommendation against, very low-quality evidence**

If gestational diabetes is the only abnormality, induction of labour before 41 weeks of gestation is not recommended.

- *Participants in the WHO technical consultation acknowledged that labour induction may be necessary in some women with diabetes – for example, those with placental insufficiency and uncontrolled diabetes.*

New **Weak Recommendation against, low-quality evidence**

Induction of labour at term is not recommended for suspected fetal macrosomia.

- *Confirmation of suspected macrosomia is based on reliable determination of fetal age and weight, which requires ultrasound assessments early in pregnancy and then at near term. Considering that in under-resourced settings ultrasound facilities may not be available or accessible to all women, the participants in the technical consultation preferred not to recommend induction of labour for suspected macrosomia, even though they acknowledged that in cases of confirmed macrosomia induction of labour could reduce the incidence of clavicle fracture due to shoulder dystocia.*

New **Strong Recommendation, high-quality evidence**

Induction of labour is recommended for women with prelabour rupture of membranes at term.

- *Participants in the WHO technical consultation noted that in the trials included in the Cochrane review, induction of labour had been initiated within 24 hours of rupture of membranes. They also noted that oxytocin should be regarded as the first option for induction of labour in women with prelabour rupture of membranes.*

New **Weak Recommendation, moderate low-quality evidence**

If prostaglandins are not available, intravenous oxytocin alone should be used for induction of labour. Amniotomy alone is not recommended for induction of labour.

- *Immediately after the initiation of intravenous oxytocin, it is advisable to monitor closely the oxytocin infusion rate, response of the uterus to oxytocin, and fetal heart rate. Specific guidance on how to use oxytocin for induction of labour can be found in the WHO manual Managing complications in pregnancy and childbirth: a guide for midwives and doctors [52].*

New

Strong Recommendation, moderate-quality evidence

1. Oral misoprostol (25 µg, 2-hourly) is recommended for induction of labour.

Weak Recommendation, moderate-quality evidence

2. Vaginal low-dose misoprostol (25 µg, 6-hourly) is recommended for induction of labour.

Strong Recommendation Against, low-quality evidence

3. Misoprostol is not recommended for women with previous caesarean section.

- *Recommendations Nos. 1 and 2 refer to women with a non-scarred uterus.*
- *The participants in the technical consultation noted the importance of closer monitoring of the mother and her fetus starting immediately after the administration of misoprostol. The participants noted also that labour induction with misoprostol in women with previous caesarean section had not been included as a priority topic in the process of scoping for the present guidelines. However, the participants felt that it was important to address this issue in these guidelines. The participants noted too that one randomized controlled trial [53] was interrupted at the early recruitment stage due to safety concerns (i.e. occurrence of uterine rupture) and that there were observational studies showing mixed results. The participants placed high value on safety and agreed not to recommend the use of misoprostol for induction of labour in women with a scarred uterus. The panel noted that a method with a low risk of uterine hyperstimulation (e.g. balloon catheter) may be preferred in women with a scarred uterus.*

New

Strong Recommendation, moderate-quality evidence

Low doses of vaginal prostaglandins are recommended for induction of labour.

- *Prostaglandin preparations other than misoprostol are expensive and may not be a priority for implementation, especially in low- and middle-income countries.*
- *When prostaglandins are used, close monitoring of the woman and fetus should begin immediately after administration of the drug.*

New

Strong Recommendation, moderate-quality evidence

1. Balloon catheter is recommended for induction of labour.

Weak Recommendation, low-quality evidence

2. The combination of balloon catheter plus oxytocin is recommended as an alternative method when prostaglandins (including misoprostol) are not available or are contraindicated.

- *The participants in the technical consultation noted that when using the balloon catheter for induction of labour it is important to monitor the woman and her fetus closely once labour is established. They also noted that balloon catheter and vaginal prostaglandins may have similar effectiveness. However, balloon catheter may be preferred for women with scarred uterus, since it is less likely to be associated with hyperstimulation of the uterus.*

New

Strong Recommendation, low-quality evidence

In the third trimester of pregnancy, in women with a dead or anomalous fetus, oral or vaginal misoprostol are recommended for induction of labour

- *The doses and regimens recommended for use of misoprostol for induction of labour at term also apply to the above recommendation.*
- *The participants in the technical consultation considered the risk of tachysystole and hypertonus and uterine rupture to be high during labour induction in women with a fetal anomaly or after fetal death. Hence, the participants noted the importance of close monitoring of the woman once labour is established.*
- *The participants noted also that the trials included in the systematic review that provided evidence for the above recommendation included women in the second and third trimesters of pregnancy. The participants re-discussed the body of evidence related to misoprostol for induction of labour at term and found it to be applicable to that section also. Hence, the evidence related to induction of labour at term using misoprostol was downgraded for indirectness when applied to termination of pregnancy in women with a fetal anomaly or after intrauterine fetal death.*

New

Strong Recommendation, moderate-quality evidence

Sweeping membranes is recommended for reducing formal induction of labour.

- *The panel acknowledged that maternal discomfort and bleeding associated with the procedure should be balanced with the anticipated benefits. Since the interval between intervention and result (i.e. sweeping membranes and initiation of labour) can be longer than with formal methods of induction of labour, this intervention would be suitable for non-urgent indications for pregnancy termination.*
- *Regarding breast stimulation, sexual intercourse and other similar methods of preinduction of labour, the participants in the technical consultation agreed that there was insufficient evidence for recommending those methods.*

New

Weak Recommendation, low-quality evidence

Betamimetics are recommended for women with uterine hyperstimulation during induction of labour.

- *There is insufficient evidence to recommend tocolytics other than betamimetics. The participants in the consultation acknowledged that caution should be exercised in using betamimetics because of their side-effects. Their contraindications (e.g. cardiac diseases) should be respected. The participants noted that various preparations of betamimetics are available in different countries.*

New

Weak Recommendation against, low-quality evidence

Outpatient induction of labour is not recommended for improving birth outcomes.

- *The participants in the consultation noted that research is ongoing on this issue. They placed a high value on safety issues and choose to recommend against the practice of outpatient induction of labour until new information becomes available.*

1.2.4 WHO recommendations for augmentation of labour

[37]

New **Strong Recommendation, moderate-quality evidence**

Continuous companionship during labour is recommended for improving labour outcomes.

- *The GDG acknowledged that continuous psychosocial support may not necessarily reduce the need for labour augmentation but made the recommendation on the basis of other substantial benefits for women and their babies.*
- *The GDG noted that countries and policy-makers are often reluctant to implement this intervention in practice in spite of the supporting evidence, which has been available for many years. The group agreed that extra efforts are needed to encourage potential implementers at various levels of health care delivery.*
- *The GDG discussed the issues of privacy, cultural inclinations and resource use often raised as concerns to implementing this intervention and agreed that simple measures to allow female relatives to accompany women during labour could be used as cost-effective and culturally sensitive ways to address these concerns.*
- *The evidence supports the use of any type of culturally appropriate companion, including husband and lay professionals, such as doulas.*

New **Weak Recommendation, very low-quality evidence**

The use of oxytocin alone for treatment of delay in labour is recommended.

- *The GDG noted that there is insufficient evidence to demonstrate the benefits of oxytocin augmentation for delayed labour, in spite of its widespread use in clinical practice. However, it was agreed that the ability of oxytocin to stimulate uterine contractions both before and during labour is undisputed and judicious oxytocin use in case of insufficient contractions can prevent unduly prolonged labour.*
- *The recommendation leaned on the evidence of some benefits of oxytocin when used as a single intervention for labour induction, compared with expectant management, and by inference the potential for benefit where the primary cause of delay in labour progress is insufficient uterine contractions.*

New **Weak Recommendation against, very low-quality evidence**

Augmentation with intravenous oxytocin prior to confirmation of delay in labour is not recommended.

- *The GDG noted that the clinical benefits of immediate, compared to delayed, commencement of oxytocin following a suspicion of slow labour progress do not clearly outweigh its potential harms.*
- *The GDG members placed emphasis on the need to confirm a delay in the progress of labour by allowing an interval of watchful expectancy before initiating oxytocin augmentation. The GDG members agreed such a course of action could reduce the frequency of premature diagnosis of labour dystocia and unnecessary oxytocin augmentation. Furthermore, early intervention on the basis of suspected labour dystocia may be associated with more uterine hyperstimulation and poorer maternal and neonatal morbidity in settings where interventions to manage the condition are not available.*

New

Weak Recommendation against, very low-quality evidence

High starting and increment dosage regimen of oxytocin is not recommended for labour augmentation.

- *The GDG considered the evidence in favour of high starting and increment dosage regimen of oxytocin (in terms of labour duration and overall caesarean section rate) to be uncertain and chose not to recommend the intervention. The group emphasised the need for caution in initiating and increasing oxytocin at high dosage levels, given the paucity of evidence on critical neonatal outcomes and the danger associated with injudicious use of oxytocin in clinical practice.*

New

Strong Recommendation against, very low-quality evidence

The use of oral misoprostol for labour augmentation is not recommended.

- *The GDG noted that there is no clear evidence that the potential benefits of oral misoprostol, compared to intravenous oxytocin, for labour augmentation outweigh its potential harms.*
- *The GDG concluded that oral misoprostol is unlikely to be a safe substitute to oxytocin for labour augmentation where skilled attendants are available. The group also noted that settings where skilled birth attendants are not available (and where misoprostol could have been useful in this regard) are also likely to lack the resources to manage complications that could arise in women undergoing augmentation.*
- *The GDG considers the dosage regimens used in the primary studies as not evidence based with potential for serious harms, given the high rate of uterine hyperstimulation with fetal heart rate changes. The group put its emphasis on the implications of such adverse effects for maternal and infant outcomes, particularly in low resource settings, and therefore strengthened the recommendation.*
- *Further pharmacological effects of orally ingested misoprostol, if found detrimental to the health of the mother or her baby during the course of labour, cannot be prevented by termination of the therapy as is possible with oxytocin infusion.*

New

Weak Recommendation against, very low-quality evidence

The use of internal tocodynamometry, compared with external tocodynamometry, with the aim of improving outcomes for augmented labour is not recommended.

- *The GDG noted that there is no evidence to suggest that the potential benefits of internal, compared with external, tocodynamometry in women undergoing labour augmentation clearly outweighs its potential harms. The group did not recommend one method over the other but noted that internal tocodynamometry is resource-intensive and currently not widely practiced in many settings.*
- *The GDG stressed the importance of ensuring that every woman undergoing labour augmentation should receive regular and frequent monitoring of uterine contraction pattern and fetal heart rate, within the limits of available resources.*

1.3 Postnatal Care

1.3.1 WHO recommendations on maternal and newborn care for a positive postnatal experience

[57]

New **Not Recommended**

For postpartum women, routine pelvic floor muscle training started after childbirth for the prevention of postpartum urinary and faecal incontinence is not recommended.

- *In this context, pelvic floor muscle training (PFMT) refers to the performance of repeated voluntary contractions of the pelvic floor muscles, according to a protocol that outlines the frequency (one or more sets of exercises per day), intensity and progression of exercises, as well as the duration of the training period (for example, at least several days of the week, for at least eight weeks) and may include maintenance pelvic floor muscle exercises after initial training.*
- *While PFMT started after childbirth is not recommended as a preventive measure, women with involuntary loss of small volumes of urine (urinary stress incontinence) after childbirth should be advised of the potential benefits of PFMT for treatment of urinary incontinence. In the absence of stronger evidence, the GDG agreed that unsupervised pelvic floor exercises performed at home may be beneficial, and unlikely to cause harmful effects. Pelvic floor muscle exercises may also positively affect sexual function in the postnatal period and promote self-care.*
- *All women should be informed during pregnancy and postnatally about potential pelvic floor problems, including urinary or faecal incontinence after childbirth.*
- *The GDG recognized that the effects of PFMT started in early pregnancy for pregnant women who do not have incontinence were not evaluated during the guideline process.*

New **Not Recommended**

The use of pharmacological interventions, such as subcutaneous oxytocin and proteolytic enzyme therapy, for the treatment of breast engorgement in the postpartum period is not recommended.

- *In making this recommendation, the GDG emphasized breastfeeding counselling and support as the treatment of choice for breast engorgement after childbirth (see Recommendation 8 in this guideline).*
- *All women should receive continued breastfeeding advice and support and decide on breast engorgement treatment options based on their individual preferences.*

New **Not Recommended**

Routine use of laxatives for the prevention of postpartum constipation is not recommended.

- *The GDG highlighted that the current recommendation is applicable in the context of prevention of functional postpartum constipation, defined as infrequent, hard, dry or bulky stools that are difficult or painful to pass, or a feeling of incomplete evacuation or obstruction.*
- *This recommendation does not apply to chronic constipation and acute constipation associated with other organ dysfunctions (that is, acute gastrointestinal dysfunction).*
- *In making this recommendation, the GDG took into account a stepwise approach for the prevention and treatment of constipation in the adult population, where use of laxatives is applied only used if dietary modifications or fibre supplementation fail to relieve the constipation. The GDG suggested that this approach be applied in the immediate postpartum to stimulate first maternal bowel movements after childbirth and through the entire postnatal period, after both vaginal and caesarean birth.*
- *All women should be asked about their bowel movements during their postpartum stay in health facilities, and at each postnatal care contact, and should receive dietary advice and information on factors associated with constipation as per Recommendation 12 in this guideline.*
- *The GDG agreed that further investigation on the effects of routine use of laxatives for preventing constipation in postpartum women is not a research priority.*

New **Recommended**

All postpartum women should have regular assessment of vaginal bleeding, uterine tonus, fundal height, temperature and heart rate (pulse) routinely during the first 24 hours starting from the first hour after birth. Blood pressure should be measured shortly after birth. If normal, the second blood pressure measurement should be taken within six hours. Urine void should be documented within six hours.

Recommended

At each subsequent postnatal contact beyond 24 hours after birth, enquiries should continue to be made about general well-being and assessments made regarding the following: micturition and urinary incontinence, bowel function, healing of any perineal wound, headache, fatigue, back pain, perineal pain and perineal hygiene, breast pain and uterine tenderness and lochia.

- *This recommendation has been adapted and integrated from the WHO guidelines on postnatal care of the mother and newborn [54] in which the recommendation was developed by GDG consensus based on existing WHO guidelines.*
- *No remarks were noted by the GDG responsible for the original recommendation.*
- *The postnatal care GDG noted that postpartum abdominal uterine tonus assessment for early identification of uterine atony is recommended for all women, as in the 2012 WHO recommendations for the prevention and treatment of postpartum haemorrhage [44].*

New

Context-specific recommendation

In high HIV burden settings,[a] catch-up HIV testing postpartum is needed for women of HIV-negative or unknown status who missed early antenatal contact test or retesting in late pregnancy at a third trimester visit.

[a] High-prevalence settings are defined in the 2015 WHO publication Consolidated guidelines on HIV testing services as settings with greater than 5% HIV prevalence in the population being tested.

Context-specific recommendation

In low HIV burden settings,[b] catch-up testing postpartum can be considered for women of HIV-negative or unknown status who missed early antenatal contact test or retesting in late pregnancy at a third trimester visit as part of the effort to eliminate mother-to-child transmission of HIV. Countries could consider this only for women who are in serodiscordant relationships, where the partner is not virally suppressed on ART, or have other known ongoing HIV risk in late pregnancy – at a third trimester visit.

[b] Low-prevalence settings are settings with less than 5% HIV prevalence in the population being tested

- *These recommendations have been adapted and integrated from the 2019 WHO consolidated guidelines on HIV testing services [55].*
- *The postnatal care GDG noted the following statements from the 2019 guideline:*
  - *All pregnant women should be tested for HIV, and hepatitis B surface antigen (HBsAg), particularly in settings with a ≥2% HBsAg seroprevalence in the general population, at least once and as early as possible as part of antenatal care. Maternal HIV retesting is advised in late pregnancy at a third trimester visit in high HIV burden settings. Maternal retesting is not advised in late pregnancy in low HIV burden settings. If implemented, it should address only members of key populations or women with a sexual partner with HIV who is not virally suppressed on ART or from a key population.*
  - *In specific districts or regions with high HIV burden or incidence and for HIV-negative women (or women of unknown status) from key populations and those whose partners have HIV that is not virally suppressed, an additional message could encourage retesting at 14 weeks, six months or nine months postpartum.*
  - *All women should be provided with pre-test information and consented before testing, with the option for women to decline testing.*
- *Following the 2016 WHO consolidated guidelines on the use of antiretroviral drugs for treating and preventing HIV infection [56], ART initiation should be offered to all women with HIV following a confirmed HIV diagnosis, clinical assessment and an assessment of a person's readiness in order to avoid high rates of loss to follow-up after HIV diagnosis. For HIV-exposed infants, virological testing for HIV as early as possible is recommended so that infants with an initial positive virological test result can start ART without delay to save lives.*

New

Context-specific recommendation

a. Systematic screening for TB disease may be conducted among the general population, including in women in the postpartum period in areas with an estimated TB prevalence of 0.5% or higher.

Context-specific recommendation

b. In settings where the TB disease prevalence in the general population is 100/100 000 population or higher, systematic screening for TB disease may be conducted among women postpartum as part of postnatal care.

Recommended

c. Household contacts and other close contacts of individuals with TB disease, including women in the postpartum period and newborns, should be systematically screened for TB disease.

- *These recommendations have been adapted and integrated from the 2021 WHO consolidated guid*elines on tuberculosis Module 2: Screening – Systematic screening for tuberculosis disease *[57] where Recommendations 3a and 3b were considered conditional recommendations based on low and very low certainty evidence, respectively; and Recommendation 3c was considered a strong recommendation based on moderate certainty evidence.*
- *Related recommendations from this guideline include the following:*
  - *In high-prevalence settings, systematic screening for active tuberculosis should be considered for pregnant women as part of antenatal care as per the 2016* WHO recommendations on antenatal care for a positive pregnancy experience *[1].*
  - *Systematic screening for tuberculosis (TB) disease may be conducted among women in the postpartum period in subpopulations with structural risk factors for TB. These include urban poor communities, homeless communities, communities in remote or isolated areas, Indigenous populations, migrants, refugees, internally displaced persons and other priority groups with limited access to health care.*
  - *Any newborn whose mother has tested positive or who has had close contact with someone with TB disease should be screened for TB with a symptom screen and/or chest radiograph (CXR) as part of active contact-tracing.*

New Recommended

Local cooling, such as with ice packs or cold pads, can be offered to women in the immediate postpartum period for the relief of acute pain from perineal trauma sustained during childbirth, based on a woman's preferences and available options.

- *The evidence reviewed included intermittent application of local cooling in the form of crushed ice between layers of a pad or gel packs for 10 to 20 minutes in a single application to multiple applications in the first 48 hours after childbirth.*
- *In making this recommendation, the GDG agreed that perineal pain relief should be individualized, considering the presence of perineal trauma, intensity of the pain, multiple sources of postpartum pain (such as perineal, uterine, breast pain), the and use of other forms of pain relief. Local cooling is low cost and unlikely to cause harmful effects if performed as instructed, and some women might find it to be soothing.*
- *Non-pharmacological pain relief options can vary widely across settings and contexts, which might favour other non-pharmacological pain relief interventions and traditional and complementary medicine that were not evaluated during the guideline process, such as sitz baths, acupuncture or acupressure, aromatherapy, music, relaxation techniques, therapeutic ultrasound, transcutaneous electrical nerve stimulation (TENS) and laser therapy.*
- *All women should be asked about perineal pain and other perineal conditions (such as perineal trauma healing and haemorrhoids) during their postpartum stay in health facilities and at each postnatal care contact. Women should be advised on danger signs and symptoms, including any exacerbation of perineal pain as manifestation of postpartum complications such as haematomas, haemorrhoids and infection.*

New Recommended

Oral paracetamol is recommended as first-line choice when oral analgesia is required for the relief of postpartum perineal pain.

- *In making this recommendation, the GDG agreed perineal pain relief should be individualized, considering the presence of perineal trauma, intensity of the pain, multiple sources of postpartum pain (such as perineal, uterine, breast pain), the use of the lowest effective dose for the shortest period of time, side-effects and contraindications, including breastfeeding. The use of single dose paracetamol given to the woman in the immediate postnatal period is unlikely to pose any significant risk to the newborn as the amount likely to be excreted in breastmilk would be very little and the volume of breastmilk consumed by the infant in first days after birth is likely to be small.*
- *Aspirin is contraindicated during breastfeeding based on evidence of potentially harmful effects on breastfeeding babies due to salicylate and salicylate metabolites excreted in breastmilk.*
- *All women should be advised about the use of local cooling as a non-pharmacological option to relieve acute pain from perineal trauma sustained during childbirth, based on availability and a woman's preferences (see Recommendation 4 in this guideline).*
- *In acknowledgement of the limited evidence on the comparative effectiveness of different oral analgesics, the GDG suggested that when local perineal cooling or paracetamol is not effective in relieving perineal pain, women should be advised of other pharmacological pain relief options based on safety profile (such as allergy, side-effects, contraindications), availability, experience with a particular analgesics, and cost.*
- *All women should be asked about perineal pain and other perineal conditions (such as perineal trauma healing and haemorrhoids) during their postpartum stay in health facilities, and at each postnatal care contact. Women should be advised on danger signs and symptoms, including any exacerbation of perineal pain as manifestation of postpartum complications such as haematomas, haemorrhoids, and infection.*

New **Recommended**

Oral non-steroidal anti-inflammatory drugs (NSAIDs) can be used when analgesia is required for the relief of postpartum pain due to uterine cramping after childbirth, based on a woman's preferences, clinician's experience with analgesics and availability.

- *In making this recommendation, the GDG agreed perineal pain relief should be individualized, considering the presence of pain due to uterine cramping/involution, intensity of the pain, multiple sources of postpartum pain (such as perineal, uterine, breast pain), the use of the lowest effective dose for the shortest period of time, side effects and contraindications, including breastfeeding.*
- *Aspirin is contraindicated during breastfeeding based on evidence of potentially harmful effects on breastfeeding babies due to salicylate and salicylate metabolites excreted in breastmilk.*
- *In acknowledgement of the limited evidence on the comparative effectiveness of different pharmacological and non-pharmacological interventions for postpartum uterine cramping pain relief, the GDG suggested that women should be advised of different options based on safety profile (such as allergy, side-effects, contraindications), availability, experience with a particular analgesics, and cost.*
- *The GDG noted that use of opioids for relief of pain due to uterine cramping pain should be discouraged as opioids showed no advantage over NSAIDs, are associated with maternal side-effects, are contraindicated during breastfeeding, and are associated with a risk of development of psychological and physical dependence.*
- *All women should be informed about uterine involution and changes in lochia postpartum. They should be asked about abdominal pain and vaginal discharge during their postpartum stay in health facilities, and at each postnatal care contact. Women should be advised on danger signs and symptoms, including any exacerbation of uterine pain as manifestation of postpartum complications such as endometritis.*

New **Recommended**

For treatment of breast engorgement in the postpartum period, women should be counselled and supported to practice responsive breastfeeding, good positioning and attachment of the baby to the breast, expression of breastmilk, and use of warm or cold compress, based on a woman's preferences.

- *In making this recommendation, the GDG acknowledged that the evidence was insufficient to conclude on the added value of cabbage-leaf cream, cold cabbage leaves, cold gel packs, warm herbal compress, and breast massage over usual breastfeeding counselling and support for the treatment of breast engorgement during breastfeeding, which were often incorporated into the control arms of the trials evaluated.*
- *Some women may find that the non-pharmacological interventions evaluated relieve breast pain and hardness and may choose to use these methods. Women should be informed that it is unclear whether there are side-effects of these treatment options for breast engorgement due to a paucity of data.*
- *In this context, responsive breastfeeding [58][59] refers to the mother responding to her baby's cues, as well as her own desire to breastfeed. Responsive feeding is distinct from demand feeding, as it recognizes the reciprocal mother-baby relationship and benefits of breastfeeding beyond alleviation of hunger.*
- *All women should be advised of common breast conditions associated with lactation, such as sore or cracked nipples, engorgement and mastitis, and encouraged to report any signs and symptoms to their care providers.*

New Recommended

For the prevention of mastitis in the postpartum period, women should be counselled and supported to practise responsive breastfeeding, good positioning and attachment of the baby to the breast, hand expression of breastmilk, and use of warm or cold compress, based on a woman's preferences.

- *In making this recommendation, the GDG acknowledged that the evidence was insufficient to conclude on the added value of probiotics, anti-secretory factor-inducing foods, acupoint massage and specialist breastfeeding education over usual breastfeeding advice and support for the prevention of mastitis during breastfeeding, which were often incorporated into the control arms of the trials evaluated.*
- *In this context, responsive breastfeeding [58][59] refers to the mother responding to her baby's cues, as well as her own desire to breastfeed. Responsive feeding is distinct from demand feeding, as it recognizes the reciprocal mother-baby relationship and benefits of breastfeeding beyond alleviation of hunger.*
- *All women should be advised of common breast conditions associated with lactation, such as sore or cracked nipples, engorgement and mastitis, and encouraged to report any signs and symptoms to their care providers.*
- *Providers should support women with breast engorgement who wish to continue breastfeeding as per the 2017 WHO guideline: Protecting, promoting and supporting breastfeeding in facilities providing maternity and newborn services [60].*
- *All women should receive breastfeeding counselling in accordance with the 2018 WHO guideline: Counselling of women to improve breastfeeding practices [61].*

New Not Recommended

Routine oral or topical antibiotic prophylaxis for the prevention of mastitis in the postpartum period is not recommended.

- *In making this recommendation, the GDG emphasized the risk of side-effects of use of antibiotics for the women and the newborn, and the negative public health impact of routine administration of antibiotics on the global efforts to contain antimicrobial resistance.*
- *The GDG agreed that further investigation on the effects of antibiotics for prevention of mastitis is not a research priority.*

New Recommended

Dietary advice and information on factors associated with constipation should be offered to women for the prevention of postpartum constipation.

- *Dietary advice and information to prevent constipation during the postnatal period should include promoting a healthy balanced diet with adequate intake of water and dietary fibre (found in vegetables, fruit, nuts and whole grains) [2]. Information should include factors related to constipation, as well as advice on toileting habits (for example responding to the urge to have a bowel movement, and complete evacuation) and engaging in low impact, physical activity (such as walking) for at least 150 minutes throughout the week (see Recommendation 22 in this guideline). Advice and information should be culturally sensitive, and tailored to a woman's needs (for example, considering mode of birth or birth complications) and to specific contexts.*
- *Constipation during the postpartum period could potentially result from a range of antepartum, intrapartum and postpartum-related events and circumstances, including haematinics used in pregnancy and postpartum, disrupted drinking and eating during active labour, enemas, narcotic drugs administered during labour or post caesarean birth, and perineal pain related to trauma, haemorrhoids, irregular and altered dietary patterns in the postnatal period, and psychosocial and situational factors. Prevention of constipation should include measures to address these common underlying factors.*
- *The GDG recognized the need to ensure that health workers adhere to existing WHO recommendations as part of the strategies to prevent postpartum constipation (2014 WHO recommendations for augmentation of labour [37], and the 2018 WHO recommendations on intrapartum care for a positive childbirth experience [36]):*
  - *For women at low risk, WHO recommends oral fluid and food intake and the adoption of mobility during labour.*
  - *Administration of an enema for reducing the use of labour augmentation is not recommended.*
- *All women should be asked about their bowel movements during their postpartum stay in health facilities, and at each postnatal care contact.*
- *In making this recommendation, the GDG took into account a stepwise approach for the prevention and treatment of constipation in the adult population, where the use of laxatives is applied only if dietary modifications or fibre supplementation fail to relieve the constipation, particularly given concerns about maternal and neonatal side-effects of laxatives. The GDG suggested that this approach be applied in the immediate postpartum to stimulate first maternal bowel movements after childbirth and through the entire postnatal period, after both vaginal and caesarean birth.*
- *Women with a history of constipation before or during pregnancy may benefit from continuing with treatments to relieve constipation. Women with a history of constipation before or during pregnancy may benefit from continuing with treatments to relieve postpartum constipation.*

New Not Recommended

Routine antibiotic prophylaxis for women with uncomplicated vaginal birth is not recommended.

- *This recommendation has been integrated from the 2015 WHO recommendations for prevention and treatment of maternal peripartum infections [18], where it was considered a strong recommendation based on very low certainty evidence.*
- *The following remarks were made by the GDG responsible for the original recommendation:*
  - *The GDG was concerned about the potential public health implications of the high rate of routine use of antibiotics following vaginal birth without any specific risk factors in some settings. The group places emphasis on the negative impact of such routine use on the global efforts to contain antimicrobial resistance and, therefore, made a strong recommendation against routine antibiotic prophylaxis.*
  - *In this context, "uncomplicated vaginal birth" refers to vaginal birth in the absence of any specific risk factor for, or clinical signs of, maternal peripartum infection.*
  - *monitoring of all women after birth is essential to promptly identify any sign of endometritis and institute appropriate antibiotic treatment.*
  - *Recommendations on antibiotic use for common intrapartum conditions or interventions that often raise concerns about increased risk of infection are available in the original WHO guideline [18].*

New

Context-specific recommendation

Preventive chemotherapy (deworming), using annual or biannual[a] single-dose albendazole (400 mg) or mebendazole (500 mg), is recommended as a public health intervention for all non-pregnant adolescent girls and women of reproductive age, including women postpartum and lactating women, living in areas where the baseline prevalence of any soil-transmitted helminth infection is 20% or more among adolescent girls and women of reproductive age, in order to reduce the worm burden of soil-transmitted helminths.

[a] Biannual administration is recommended where the baseline prevalence exceeds 50%.

- *This recommendation has been adapted and integrated from the 2017 WHO guideline: Preventive chemotherapy to control soil-transmitted helminth infections in at-risk population groups [20], where it was considered a strong recommendation based on moderate certainty evidence.*
- *Although the original recommendation was formulated for non-pregnant adolescent girls and women of reproductive age, it also applies for lactating women as studies reviewed found there is no harm for use (low concentration in breastmilk that are unlikely to be considered harmful for the breastfed infant).*
- *During the deliberations, the GDG responsible for the original recommendation took into particular consideration the following evidence that resulted in a strong recommendation:*
  - *non-pregnant adolescent girls and women of reproductive age benefit significantly from anthelminthic treatment in terms of a reduction in worm burden;*
  - *the morbidity caused by the different soil-transmitted helminth species in heavily infected individuals is well documented and severe;*
  - *albendazole and mebendazole are well tolerated among non-pregnant adolescent girls and non-pregnant women, with only minor and transient side-effects reported;*
  - *preventive chemotherapy is generally well accepted among women, health workers and policy-makers, though uncertainty exists around the feasibility of providing this intervention among adolescent girls, as existing infrastructure may vary by country and context;*
  - *logistical difficulties and additional costs of alternative methods to identify and treat infected individuals can be prohibitive; and*
  - *soil-transmitted helminth-endemic areas with at least 20% soil-transmitted helminth prevalence were considered the priority for large-scale programmes due to the presence of infections of moderate and heavy intensity and, therefore, soil-transmitted helminth-related morbidity.*
- *The postnatal care GDG agreed that, in endemic areas, preventive anthelminthic treatment could also be provided to pregnant women after the first trimester as part of worm infection reduction programmes, as per the 2017 WHO Guideline: preventive chemotherapy to control soil-transmitted helminth infections in at-risk population groups [20] and the 2016 WHO recommendations on antenatal care for a positive pregnancy experience [1].*

New

Context-specific recommendation

In endemic communities with Schistosoma spp. prevalence of 10% or higher, WHO recommends annual preventive chemotherapy with praziquantel in a single dose at ≥75% up to 100% coverage in pregnant women after the first trimester, and non-pregnant adolescent girls and women of reproductive age, including women postpartum and lactating women, to control schistosomiasis morbidity and towards eliminating the disease as a public health problem.

Context-specific recommendation

In endemic communities with Schistosoma spp. prevalence below 10%, WHO suggests one of two approaches based on the programmes' objectives and resources: (i) where there has been a programme of regular preventive chemotherapy, continuing preventive chemotherapy at the same or reduced frequency towards interruption of transmission; (ii) where there has not been a programme of regular preventive chemotherapy, a clinical approach of test-and-treat, instead of preventive chemotherapy targeting a population.

- *These recommendations have been adapted and integrated from the 2022 WHO guideline on control and elimination of human schistosomiasis [62]. Recommendation 16a for settings with prevalence above 10% was considered a strong recommendation based on moderate-certainty evidence. Recommendation 16b was considered a conditional recommendation based on low to very low-certainty evidence.*
- *The source guideline notes that, in endemic communities with Schistosoma spp. baseline prevalence of 10% or higher that demonstrate a lack of appropriate response to annual preventive chemotherapy despite adequate coverage (≥ 75%), WHO suggests biannual instead of annual preventive chemotherapy, in coordination with the interventions stated in Recommendation 3: Conditional recommendation (very low certainty evidence).*

New

Context-specific recommendation

Oral pre-exposure prophylaxis (PrEP) containing tenofovir disoproxil fumarate (TDF) should be started or continued as an additional prevention choice for women postpartum and lactating women at substantial risk[a] of HIV infection as part of combination HIV prevention approaches.

a Substantial risk is provisionally defined as HIV incidence greater than three per 100 person-years in the absence of PrEP

- *This recommendation has been adapted and integrated from the WHO 2016 Consolidated guidelines on the use of antiretroviral drugs for treating and preventing HIV infection: recommendations for a public health approach - Second edition [56], where it was considered a strong recommendation based on high certainty evidence.*
- *Pregnant and lactating women living in settings where HIV incidence is greater than three per 100 person-years, particularly in sub-Saharan Africa, often remain at substantial and increased risk of HIV acquisition during pregnancy and breastfeeding. Biological factors increase susceptibility, and social and behavioural factors may increase exposure to HIV infection.*
- *The source guideline states that there is no safety-related rationale for disallowing or discontinuing PrEP use during pregnancy and breastfeeding for HIV-negative women who are receiving PrEP and remain at risk of HIV acquisition. The GDG responsible for the original recommendation concluded that in such situations the risk of HIV acquisition and accompanying increased risk of mother-to-child HIV transmission (MTCT) outweigh any potential risks of PrEP, including any risks of fetal and infant exposure to TDF in PrEP regimens.*
- *The source guideline notes the need for active surveillance of postpartum and lactating women receiving PrEP as countries roll out PrEP to this population, including for maternal adverse outcomes and adverse infant outcomes.*

New **Recommended**

Screening for postpartum depression and anxiety using a validated instrument is recommended and should be accompanied by diagnostic and management services for women who screen positive.

- *Screening for common mental health conditions in the postnatal period should be performed using a validated instrument, such as Edinburgh Postnatal Depression Scale (EPDS) or Patient Health Questionnaire-9 (PHQ-9). All women should be asked about their emotional well-being at each postnatal care contact.*
- *The GDG noted that trials showing a reduction in postpartum depression and anxiety included universal screening for mental health conditions by trained health workers, coupled with confirmatory diagnosis and treatment strategies.*
- *Systems for referral, diagnosis and management of women should be established or strengthened to ensure adequate follow-up and management for those who screen positive, in accordance with principles of screening programmes [63]. Women identified at risk of postpartum depression or anxiety based on screening results should be offered psychosocial and/or psychological interventions to prevent these conditions as per Recommendation 19 in this guideline.*

New **Recommended**

Psychosocial and/or psychological interventions during the antenatal and postnatal period are recommended to prevent postpartum depression and anxiety.

- *All women during antenatal and postnatal care would benefit from psychosocial interventions such as psychoeducation[41] to foster the development of coping strategies, management of stress and building supportive networks, where feasible and with availability of resources. The GDG agreed that psychosocial interventions to support maternal mental health are an important component of early childhood health and development (see Recommendation 41 in this guideline).*
- *Women with clinically significant symptoms or risk factors should be offered psychological interventions (such as cognitive behaviour therapy or interpersonal therapy).*
- *The provision of these interventions should be decided in a collaborative manner based on the woman's preference and the ability to deliver the intervention in terms of health worker training, expertise and experience.*
- *Women at risk for postpartum depression and/or anxiety are women who either a) exhibited depressive symptoms but scoring below the cut-off for depressive disorder on screening tests or those with previous episodes of depression; that is, those who are at high risk for developing full blown depressive or anxiety symptoms or b) experience social risk factors such as low income, intimate partner violence, adolescents.*

New Context-specific recommendation

Oral iron supplementation, either alone or in combination with folic acid supplementation, may be provided to postpartum women for 6-12 weeks following childbirth for reducing the risk of anaemia in settings where gestational anaemia is of public health concern.[a]

[a] WHO considers a 20% or higher population prevalence of gestational anaemia to be a moderate public health problem

- *This recommendation has been integrated from the 2016 WHO publication: Iron supplementation in postpartum women [64], where it was considered a conditional recommendation based on low certainty evidence.*
- *The following remarks were among those made by the GDG responsible for the original recommendation:*
  - *This recommendation is applicable to all postpartum women, irrespective of their lactation status.*
  - *For ease of implementation and continuity of care, postpartum supplementation should begin as early as possible after birth and the iron supplementation regimen (that is, the dose and whether the supplement is consumed daily or weekly) should follow that used during pregnancy [1], or alternatively should start with that planned for non-pregnant adult women and adolescent girls [65][66].*
  - *In cases in which a woman is diagnosed with anaemia in a clinical setting [67], she should be treated in accordance with the country's policy, or the WHO recommendation of daily iron (120 mg of elemental iron plus 400 µg folic acid) supplements, until her haemoglobin concentration rises to normal [67][68].*
  - *Postpartum and lactating women should be encouraged to receive adequate nutrition, which is best achieved through consumption of a balanced healthy diet [2][68].*

New Not Recommended

Vitamin A supplementation in postpartum women for the prevention of maternal and infant morbidity and mortality is not recommended.

- *This recommendation has been integrated from the 2011 WHO publication: Vitamin A supplementation in postpartum women [69], where it was considered a strong recommendation based on very low certainty evidence.*
- *The GDG responsible for the original recommendation agreed that postpartum and lactating women should be encouraged to receive adequate nutrition, which is best achieved through consumption of a balanced healthy diet [2][68].*

New **Recommended**

All postpartum women without contraindication should:

- undertake regular physical activity throughout the postpartum period;
- do at least 150 minutes of physical activity throughout the week for substantial health benefits; and
- incorporate a variety of physical and muscle-strengthening activities. Adding gentle stretching may also be beneficial.

Recommended

Postpartum women should limit the amount of time spent being sedentary. Replacing sedentary time with physical activity of any intensity (including light intensity) provides health benefits.

- *These recommendations have been adapted and integrated from the 2020 WHO guidelines on physical activity and sedentary behaviour [70], where they were considered strong recommendations based on moderate and low certainty evidence, respectively.*
- *The postnatal care GDG noted the following based on original guideline:*
  - *For postpartum women, physical and muscle-strengthening activities can be undertaken as part of recreation and leisure (such as play, games, leisure sports or planned exercise), transportation (such as walking), work, household tasks, in the context of daily occupational, educational, home and/or community settings. Postpartum women should try to meet these recommendations where possible, as able, and without contraindication, and with the support of their partners and families. Clinical guidance should be sought for women with complications associated with pregnancy or childbirth.*
  - *150 minutes of physical activity per week is equivalent of approximately 20-25 minutes of walking per day. The 150 minutes does not need to be continuous physical activity, but rather can be accumulated over the course of the day.*
  - *Good practice statements:*
    - *If postpartum women are not meeting the level of physical activity in the recommendations, doing some physical activity will benefit their health.*
    - *Postpartum women should start by doing small amounts of physical activity, and gradually increase frequency, intensity and duration over time.*
  - *Additional safety considerations:*
    - *postpartum women should be informed by their health provider of the danger signs alerting them as to when to stop, or to limit physical activity and consult a qualified health worker immediately should they occur;*
    - *return to physical activity gradually after childbirth, and in consultation with a health worker, in particular in the case of caesarean birth; and*
    - *women should be advised by their provider on special considerations given their history and any contraindications to participating in physical activity during the postpartum period.*
  - *Related recommendations from this guideline include the following:*
    - *Women who, before pregnancy, habitually engaged in vigorous-intensity aerobic activity, or who were physically active, can continue these activities during pregnancy and the postpartum period.*
  - *Sedentary behaviour is defined as time spent sitting or lying with low energy expenditure while awake, in the context of occupational, educational, home and community settings and transportation.*

New Recommended

Provision of comprehensive contraceptive information and services during postnatal care is recommended.

- *This recommendation has been adapted and integrated from the 2014 WHO document: Ensuring human rights in the provision of contraceptive information and services: guidance and recommendations [71]. The current WHO recommendations on contraceptive methods for postpartum and lactating women (as of DATE) are specified in Box 3.6, based on the 2015 WHO publication: Medical eligibility criteria for contraceptive use [72]. WHO recommendations for postpartum contraception should be checked regularly for any updates.*
- *The postnatal care GDG noted the following based on existing WHO documents:*
  - *All postpartum women and couples should be offered evidence-based, comprehensive contraceptive information, education and counselling to ensure informed choice for their own use of modern contraception without discrimination. Privacy of individuals should be respected throughout the provision of contraceptive information and services, including confidentiality of medical and other personal information [71].*
  - *The mode of birth does not restrict a postpartum woman's contraceptive choice.*
  - *Breastfeeding women ≥ 6 months postpartum can use progestogen-only pills (POPs), progestogen-only injectable contraceptives (POIs), levonorgestrel (LNG), and etonogestrel (ETG) implants without restriction (medical eligibility criteria (MEC) Category 1) and can generally use combined hormonal contraception (CHCs) (MEC Category 2).*
  - *A woman's risk of HIV infections does not restrict her contraceptive choice, and women are eligible to use all progestogen-only contraceptive methods, copper-bearing intrauterine devices (Cu-IUDs) and levonorgestrel-releasing intrauterine device (LNG-IUDs) without restriction as per the WHO publication Contraceptive eligibility for women at high risk of HIV: Guidance statement - Recommendations on contraceptive methods used by women at high risk of HIV [73].*
  - *Self-administered injectable contraception should be made available as an additional approach to deliver injectable contraception for individuals of reproductive age, as per the 2019 WHO publication: WHO consolidated guideline on self-care interventions for health: sexual and reproductive health and rights [74], and based on eligibility according to the WHO MEC for contraceptive use.*
  - *The WHO guidance on MEC includes a range of other contraceptive methods that are self-administered, including the combined contraceptive patch, the combined contraceptive vaginal ring, the progesterone-releasing vaginal ring (PVR) and barrier methods, including condoms (male latex, male polyurethane and female condoms), the diaphragm (with spermicide) and the cervical cap. Women who are breastfeeding can also choose to use contraceptive methods together with lactational amenorrhea method during the first six months postpartum.*
  - *Ongoing competency-based training and supervision of health-care personnel on the delivery of contraceptive education, information and services, based on existing WHO guidelines.*

New Recommended

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:

- Not feeding well
- History of convulsions
- Fast breathing (breathing rate > 60 per minute)
- Severe chest in-drawing
- No spontaneous movement
- Fever (temperature > 37.5 °C)
- Low body temperature (temperature < 35.5 °C)
- Any jaundice in first 24 hours after birth, or yellow palms and soles at any age.

The parents and family should be encouraged to seek health care early if they identify any of the above danger signs in-between postnatal care visits.

- *This recommendation has been adapted and integrated from the 2013 WHO guidelines on postnatal care of the mother and newborn [50], where it was considered a strong recommendation based on low certainty evidence.*
- *No remarks were noted by the GDG responsible for the original recommendation.*

New Recommended

Universal newborn screening for abnormalities of the eye is recommended and should be accompanied by diagnostic and management services for children identified with an abnormality.

- *Universal newborn screening for abnormalities of the eye should be done prior to discharge after facility birth, and at first contact in the healthcare facility for home birth, ideally within first six weeks after birth. An external examination of the eye and red reflex test should be done using standard equipment (such as a direct ophthalmoscope) by a trained health worker.*
- *The GDG acknowledged the evidence reviewed related to screening for a single condition (congenital cataract). However, since red reflex test can detect a wide range of conditions, the GDG expanded the recommendation to cover all abnormalities of the eye which may be detected on a screening examination.*
- *The recommendation is based on evidence from studies in all newborns, irrespective of gestation or presence/absence of high-risk factors. However, evidence from studies conducted only in high-risk populations like preterm newborns or those with congenital anomalies was not considered.*
- *The extension of recommendation to diagnostics and management was made to incorporate the principles of screening.*
- *Systems for screening, referral, diagnosis and management should be established or strengthened to ensure adequate follow-up and management for those who screen positive.*

New **Recommended**

Universal newborn hearing screening (UNHS) with oto-acoustic emissions (OAE) or automated auditory brain stem response (AABR) is recommended for early identification of permanent bilateral hearing loss (PBHL). UNHS should be accompanied by diagnostic and management services for children identified with hearing loss.

- *In making this recommendation, regardless of gestation or risk factors, the GDG agreed that although evidence on the effects originated from HICs, the evidence on resources, cost effectiveness, values, equity, acceptability and feasibility demonstrate that UNHS could be successfully implemented in LMICs.*
- *PBHL is defined as bilateral permanent conductive or sensorineural hearing loss of 35 dB or greater in the better ear.*
- *If UNHS indicates possible PBHL, a follow-up definitive test must be done as soon as possible after screening. This involves testing by an audiologist with a more detailed diagnostic auditory brainstem response in a highly-controlled environment. It takes 30-60 minutes to complete the diagnostic test.*
- *The principles for screening programmes [63] must be implemented throughout UNHS introduction and scale-up. In settings where principles for screening are not met, implementation of universal screening may be considered unethical.*
- *Parents and caregivers of all children should be informed about age-appropriate hearing and language development and communication skills regardless of the screening results.*

New **Recommended**

Universal screening for neonatal hyperbilirubinemia by transcutaneous bilirubinometer (TcB) is recommended at facility discharge.

New **Not Recommended**

There is insufficient evidence to recommend for or against universal screening by total serum bilirubin (TSB) at facility discharge.

- *The postnatal age for universal TcB screening at discharge should be guided by the timing of facility discharge. The GDG considered that all healthy newborns should receive facility care for at least 24 hours after birth. The GDG considered that transcutaneous bilirubin screening at discharge should be followed up with serum bilirubin measurement, appropriate treatment, and follow-up as indicated by age-appropriate nomograms.*[40]
- *The GDG emphasized that the existing WHO recommendations on routine assessment of the newborn for danger signs, including jaundice and yellow palms and soles, still apply (See Recommendation 25 in this guideline). During facility stay, 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; that is, in all babies if jaundice appears on day one, and in all babies if palms and soles are yellow at any age [47].*
- *The GDG decided not to formulate a recommendation on universal screening for neonatal hyperbilirubinemia using TSB due to the lack of evidence comparing universal TSB with universal TCB measurement. There was uncertainty around the benefits of universal TSB screening compared with clinical screening for important clinical outcomes. Additionally, the GDG considered that the costs were large, and feasibility and acceptability varied markedly.*

[40] A nomogram is a chart that provides hour-specific TcB/TSB values. It helps to determine when to obtain serum bilirubin and decide the need for phototherapy or exchange transfusion based on the infant's postnatal age and clinical risk factors.

New **Recommended**

The first bath of a term healthy newborn should be delayed for more than 24 hours after birth.

- *The GDG noted that there is no evidence to support early first bath after birth for any special reason, such as meconium staining or for prevention of risk of transmission of infection from the mother.*
- *The GDG suggested that all measures should be taken to minimize heat loss during bathing, which include maintaining a neutral thermal environment, immediate drying, appropriate clothing of the newborn for the ambient temperature (this means 1-2 layers of clothes more than adults, and use of hats/caps), and allowing the mother and baby to remain together at all times.*

New **Not Recommended**

Routine application of topical emollients in term healthy newborns for the prevention of skin conditions is not recommended.

- *In this context emollients refers to routine application of creams, ointments, lotions, oils, gels, sprays and emulsions for skin care to whole or part of the body, without additional massage.*
- *In making this recommendation, the GDG agreed there was insufficient evidence on the benefits and harms, if any, of routine application of topical emollients in term healthy newborns for either preventing skin conditions (including atopic dermatitis, skin dryness, and others), or atopic sensitization to allergens (food or inhalation).*
- *The recommendation is based on evidence from studies in term healthy newborns. Evidence from studies conducted in high-risk populations, such as newborns with family history of allergic disease, preterm and small for gestational age newborns were not considered.*
- *The recommendation does not preclude further research on emollients use in term, healthy newborns given the lack of evidence on key neonatal outcomes.*
- *The studies included in the evidence base for this recommendation rarely reported harm. However, the GDG raised concerns about the potential risk of harm with certain types of emollients from pilot RCTs and observational studies in term newborns and adults, and studies in preterm newborns and animals.*

New **Recommended**

a. Clean, dry umbilical cord care is recommended.

Context-specific recommendation

b. Daily application of 4% chlorhexidine (7.1% chlorhexidine digluconate aqueous solution or gel, delivering 4% chlorhexidine) to the umbilical cord stump in first week after birth is recommended only in settings where harmful traditional substances (such as animal dung) are commonly used on the umbilical cord.

- *The GDG conclusions are based on moderate certainty evidence about the effects of the application of 4% chlorhexidine in the first week after birth on neonatal mortality in babies with non-hygienic (harmful) cord care. In babies without non-hygienic cord care, chlorhexidine did not reduce mortality.*
- *The recommendation is based on studies from Asia and Africa with high proportions of home births and low birthweight infants and neonatal mortality, the studies were conducted primarily between 2000 and 2010. The prevalence of omphalitis has decreased since that time.*

New **Recommended**

Putting the baby to sleep in the supine position during the first year after birth is recommended to prevent sudden infant death syndrome (SIDS) and sudden unexpected death in infants (SUDI).

- *This recommendation is based on studies from HICs regardless of the gestational age of the baby and other risk factors for SIDS (such as co-bedding, sleeping place, parental smoking, etc.) were not considered.*
- *In making this recommendation, the GDG also considered the evidence from ecological studies reporting the trends in post-neonatal mortality and SIDS rates from international vital statistics, epidemiologic studies of SIDS risk factors, and outcomes of public health interventions that advocated non-prone sleeping to reduce the risk for SIDS.*

New **Recommended**

Newborn immunization should be promoted as per the latest existing WHO recommendations for routine immunization.

- *This recommendation has been adapted and integrated from the 2013 WHO recommendations on postnatal care of the mother and newborn [50], based on GDG consensus on existing WHO guidelines.*
- *The current WHO guidance on newborn immunizations (as of January 2021) are specified in Box 3.11, based on the latest position papers recommending birth dose immunization for Hepatitis B (2017 Hepatitis B vaccines: WHO position paper [75]), polio (2016 Polio vaccines: WHO position paper [76]), and Bacille Calmette-Guérin vaccines (2018 BCG vaccines: WHO position paper [77]).*
- *WHO recommends the following vaccines as early as 6 weeks of age: DTP-containing vaccine, haemophilus influenzae type b, conjugate pneumococcal and rotavirus [78].*
- *WHO recommendations for routine immunization for children should be checked regularly for any updates [78].*

New **Not Recommended**

a. Routine neonatal vitamin A supplementation is not recommended to reduce neonatal and infant mortality in all settings.

Context-specific recommendation

b. In settings with recent (within the last five years) and reliable data that indicate a high infant mortality rate (greater than 50 per 1000 live births) and high prevalence of maternal vitamin A deficiency (> 10% of pregnant women with serum retinol concentrations < 0.70 µmol/L), providing newborns with a single oral dose of 50 000 IU of vitamin A within the first three days after birth may be considered to reduce infant mortality.

- *In making this recommendation, the GDG emphasized the avoidance of harm, given the uncertainty of the evidence and the conflicting results of research studies, as well as implementation costs.*
- *The proposed infant mortality rate of greater than 50 per 1000 live births was calculated based on several assumptions:*
  - *50% of the total infant mortality rate are neonatal deaths;*
  - *50% of neonatal mortality occurs within the first day after birth;*
  - *the post-neonatal mortality rate up to 6 months of age makes up two thirds (2/3) of the total infant mortality rate, and the mortality rate between 6 and 12 months of age makes up the remaining one third (1/3);*
  - *the rate of 30 deaths per 1000 used in the studies accounts for deaths between enrolment in the study up to 6 months of age; and*
  - *dosing/enrolment almost always occurred within the first 24 hours after birth.*

New Context-specific recommendation

Vitamin D supplementation in breastfed term infants is recommended for improving infant health outcomes only in the context of rigorous research.

- *The GDG acknowledged that vitamin D supplementation is currently recommended within the first weeks after birth as part of national guidance in many countries to improve vitamin D status and prevent rickets; however there was agreement that, at the present time, there is insufficient evidence on the benefits and harms, if any, of routine vitamin D supplementation on health outcomes of term, breastfed infants.*
  - *Vitamin D supplementation in infants was found to improve 25(OH)D concentrations and reduce the prevalence of serum 25(OH)D concentrations < 50 nmol/L.*
  - *However, there was no evidence that vitamin D supplementation in infants reduces the prevalence of serum 25(OH)D concentrations < 30 nmol/L, prevents rickets or improves bone health.*
  - *There was little evidence reported on adverse effects; however, adverse effects would not be expected with daily doses providing the safe and adequate intake level.*
  - *Evidence from non-breastfed infants was not considered by this guideline panel as standards for infant formula include fortification with vitamin D [79].*
- *In addition to variable acceptability of the intervention across stakeholders, the provision of vitamin D supplements to infants is likely to incur some costs, which does not support its use for all breastfed term infants.*
- *It is generally recommended that infants less than 6 months of age be protected from UV rays as much as possible, preferably being kept away from direct sunlight and having their skin protected by appropriate clothing and hats to reduce the risk of skin cancer and side-effects of excessive sunlight exposure (such as sun burn). Phototherapy for the treatment of neonatal jaundice is an exception to this general recommendation.*
- *Research in this context includes adequately powered studies of the effect of neonatal vitamin D supplementation on mortality, morbidity, growth and development, including clinically relevant outcomes (both benefits and harms), assessment of vitamin D status and cost effectiveness of this intervention in breastfed and non-breastfed infants.*

New Recommended

Gentle whole-body massage may be considered for term healthy newborns for its possible benefits on growth and development.

- *In this context, gentle whole-body massage refers to tactile stimulation by hands using rubbing and slow stroking of body parts or passive range of motion across limb joints, with or without emollients.*
- *In making this recommendation, the GDG considered the effects of whole-body massage on length, weight and head circumference to be large, clinically meaningful, and of critical importance for the newborn. The GDG acknowledged that evidence was of low to very low certainty and the biological mechanisms for the large effects are unclear.*
- *There is insufficient evidence on the effectiveness of the use of emollients for massage, type of health worker, frequency and duration of sessions, length of intervention, and techniques of massage. However, the GDG agreed that the use of emollients might facilitate massage.*
- *In most of the trials evaluated, the whole-body massage was given for 10 to 20 minutes per day for six to eight weeks by the mother after initial training.*
- *Babies' reactions to whole-body massage must be respected in line with the principles of responsive caregiving and respectful care. Massage should be used as an important opportunity to promote parental-infant interaction and stimulation for early child development.*

New **Recommended**

All infants and children should receive responsive care between 0 and 3 years of age; parents and other caregivers should be supported to provide responsive care.

- *This recommendation has been adapted and integrated from the 2020 WHO guideline: Improving early childhood development: WHO guideline [80], where it was considered a strong recommendation based on moderate certainty evidence for responsive care.*
- *The postnatal care GDG noted the following based on the original guideline:*
  - *Responsive caregiving incorporates anticipatory guidance for safety, education, development, and the establishment of a caring and understanding relationship with one's child. Parenting is not limited to biological parents but extends to guardians or caregivers providing consistent care for the child.*
  - *To provide responsive care for a newborn, parents and caregivers need to be aware of the newborn's signals, such as readiness for a feed, pain or stress, and be able to respond to these signals appropriately.*
  - *Interventions to support responsive caregiving during the postnatal period should focus on promoting positive caregiver-infant interactions and strengthening the parent-infant relationship. An emphasis should be placed on responsiveness between caregivers and the infant, and should target the caregiver-infant dyad rather than the caregivers or the child alone.*
  - *Health workers should encourage and support responsiveness (care that is prompt, consistent, contingent, and appropriate to the child's cues, signals, behaviours and needs). Interventions that improve parents' and caregivers' abilities to incorporate the child's signals and perspective can be undertaken in the context of, but not limited to, play and communication and feeding. For the newborn, they include, but are not limited to, facilitating the caregiver to be aware and receptive and appropriately respond to the baby's needs and wants, such as exclusive breastfeeding on demand.*

New **Recommended**

All infants and children should have early learning activities with their parents and other caregivers between 0 and 3 years of age; parents and other caregivers should be supported to engage in early learning with their infants and children.

- *This recommendation has been adapted and integrated from the WHO guideline: Improving early childhood development: WHO guideline [80], where it was considered a strong recommendation based on moderate certainty evidence for early learning.*
- *The postnatal care GDG noted the following based on the original guideline:*
  - *Early learning refers to any opportunity for the baby, toddler, or child to interact with a person, place, or object in their environment, recognizing that every interaction (positive or negative, or absence of interaction) is contributing to the child's brain development and laying the foundation for later learning.*
  - *Activities that support early learning in the newborn period include, but are not limited to, making eye contact, smiling, talking, singing, and gentle massage of the newborn infant (see Recommendation 37 in this guideline). Responding to the child's signals as discussed above also promotes early learning.*
  - *Health workers should enhance parents' and caregivers' knowledge, attitudes, practices or skills with respect to supporting early learning and development during the postnatal period. These interventions may either: a) directly support caregivers in providing new early learning opportunities for their children; or b) build caregiver capacities more generally, providing information and guidance around healthy newborn/child development or a range of nurturing care topics.*

New **Recommended**

Support for responsive care and early learning should be included as part of interventions for optimal nutrition of infants and young children.

- *This recommendation has been integrated from the WHO guideline: Improving early childhood development: WHO guideline [80], where it was considered a strong recommendation based on moderate certainty evidence.*
- *The postnatal care GDG noted the following based on the original guideline:*
  - *Responsive feeding is a part of responsive caregiving and is essential to adequate nutrition. To thrive, nutrition interventions alone are not enough to improve child development, but they have an impact on young children's development, particularly when combined with responsive caregiving and opportunities for early learning. For the newborn, exclusive breastfeeding on demand is a form of responsive feeding.*
  - *Health workers should support mothers to exclusively breastfeed their infant on demand, while encouraging and supporting sensitivity and responsiveness (care that is prompt, consistent, contingent, and appropriate to the child's cues, signals, behaviours and needs) and secure attachment.*
  - *In the postnatal period, interventions for optimal nutrition can be enhanced by including guidance on making eye contact, smiling, talking, singing, and gentle massage of the newborn infant (see Recommendation 37 in this guideline), during feeding times and beyond.*

New **Recommended**

Psychosocial interventions to support maternal mental health should be integrated into early childhood health and development services.

- *This recommendation has been integrated from the WHO guideline: Improving early childhood development: WHO guideline [80], where it was considered a strong recommendation based on moderate certainty evidence.*
- *The postnatal care GDG noted the following based on the original guideline:*
  - *Psychosocial interventions for common mental disorders in the postpartum period (depression and anxiety) should be provided (see Recommendations 18 and 19 in this guideline). These include routine enquiry about the mother's mental health and social well-being, and psychosocial support as part of every postnatal consultation, combined with referral to a skilled provider for conditions that require more intensive support, through strategies such as psychoeducation, cognitive behavioural therapy, interpersonal psychotherapy. Early childhood learning and postnatal services are important avenues to provide interventions for the prevention and treatment of maternal mental health conditions.*
  - *In addition, fathers/partners/caregivers should also be included in such interventions in order to target relevant risk factors for maternal and child health (such as intimate partner violence and lack of involvement of fathers in parental care) (see Recommendation 52 in this guideline).*

New **Recommended**

All babies should be exclusively breastfed from birth until 6 months of age. Mothers should be counselled and provided support for exclusive breastfeeding at each postnatal contact.

- *This recommendation has been integrated from the 2013 WHO recommendations on postnatal care of the mother and newborn [50], where it was considered a strong recommendation based on moderate certainty evidence for neonatal outcomes.*
- *The postnatal care GDG noted the following based on existing WHO documents:*
  - *Breastfeeding counselling should be provided in both the antenatal period and postnatally, as per existing WHO guidelines [60][61].*
  - *All mothers should be supported to initiate breastfeeding within the first hour after birth. Mothers should receive practical support to enable them to initiate and establish breastfeeding and manage common breastfeeding difficulties [60] (see Box 3.13).*
  - *Some exceptions to exclusive breastfeeding for term newborns are mentioned in the WHO document: Acceptable medical reasons for use of breast-milk substitutes [81]. These exceptions include: infants with classic galactosaemia, infants with maple syrup urine disease and infants with phenylketonuria.*

New **Recommended**

Facilities providing maternity and newborn services should have a clearly written breastfeeding policy that is routinely communicated to staff and parents.

Recommended

Health-facility staff who provide infant feeding services, including breastfeeding support, should have sufficient knowledge, competence and skills to support women to breastfeed.

- *These recommendations have been integrated from the 2017 WHO Guideline: protecting, promoting and supporting breastfeeding in facilities providing maternity and newborn services [60], where the overall certainty of evidence was judged to be very low.*
- *The postnatal care GDG noted the following based on existing WHO documents:*
  - *These recommendations provide an enabling environment for sustainable implementation of the* Ten steps to successful breastfeeding *within health facilities, and should be accompanied by the establishment of ongoing monitoring and data-management systems [82].*
  - *Facilities providing maternity and newborn services should fully comply with the* International code of marketing of breast-milk substitutes *and relevant World Health Assembly resolutions [83].*
  - *Additional recommendations on key clinical practices women and newborns should receive to successfully establish and maintain breastfeeding are included in the 2017* WHO Guideline: protecting, promoting and *supporting breastfeeding in facilities providing maternity and newborn services [60] (See Box 3.13).*

New Recommended

A minimum of four postnatal care contacts is recommended:

If birth is in a health facility, healthy women and newborns should receive postnatal care in the facility for at least 24 hours after birth. 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 healthy women and newborns, between 48 and 72 hours, days seven and 14, and during week six after birth.

- *The number, timing and content of postnatal care contacts should be tailored to each woman's and newborn's health outcomes and needs, and guided by the recommendations in this guideline, including:*
  - *the woman's and newborn's physical well-being and the woman's emotional well-being;*
  - *the skills and confidence of the woman to care for herself and the skills and confidence of parents/carers/family to care for the newborn;*
  - *the home environment and other factors that may influence the ability to provide care for the woman and the newborn in the home, and care-seeking; and*
  - *the place of birth and the time of discharge from health facility for a facility-based birth.*
- *In making this recommendation the GDG considered the following:*
  - *There was insufficient evidence from RCTs on the effects of more frequent postnatal care contacts compared with less frequent contacts.*
  - *Epidemiological data showing that most maternal and neonatal deaths occur in the first three days after birth, in particular on the day of birth, with another increase during the second week after birth.*
  - *Transition to well-women and well-infant care will usually occur around week six after birth, including referrals to infant immunization and family planning services.*
- *Postnatal care contacts, in particular during the first week, can occur at home or in outpatient services (such as the health facility or health worker's office) by skilled health personnel or trained community health workers as per Recommendation 48 in this guideline, according to the preferences of women/parent/carers and the organization of services as per the health system.*
- *Continuity of care is valued by women and health workers to establish supportive, caring, and trusting relationships and improve experience of care. In settings with well-functioning midwifery programmes, midwife-led continuity-of-care (MLCC) models provide an opportunity to ensure continuity of postnatal care, as per Recommendation 49 in this guideline.*
- *Routine postnatal care contacts may be complemented by phone follow-up or use of digital targeted client communication, as per Recommendation 54 in this guideline.*

New Recommended

Care for healthy women and newborns in the facility is recommended for at least 24 hours after vaginal birth.

- *Despite insufficient evidence, the GDG acknowledged that it was important to establish a minimum timing of discharge in light of wide variation in length of stay after birth [84], including lengths of stay that were considered too short for the delivery of interventions recommended in this guideline during the stay in the facility after birth.*
- *The GDG acknowledged that timing of discharge from the facility should be guided by the following:*
  - *The time needed to complete the assessment of a comprehensive set of criteria to evaluate maternal and newborn well-being and needs, and the findings of these assessments before discharge from the health facility, as per Recommendation 46 in this guideline.*
  - *The health system's capacity to organize postnatal care contacts after discharge through community-based services (such as home visits) or in outpatient services (such as in the health facility or provider's office). Most healthy women and newborns would be ready for discharge after 24 hours of birth, provided functioning and accessible follow-up services are available.*
  - *Unnecessary prolonged stay in health facilities after birth should be avoided considering increased risk of health-care related infections, costs to the health system and to service users, and women's and families' preferences.*
- *Given the paucity of evidence, the GDG was not able to recommend a minimum time of care in health facility after caesarean birth, but noted that discharge within 24 hours after caesarean birth increased the risk of adverse maternal and neonatal outcomes and reduced breastfeeding at six weeks. The content of postnatal discharge criteria and discharge preparation would also require additional consideration to post-operative outcomes and needs of women and newborns after a caesarean birth.*
- *As part of birth preparedness and complications readiness during pregnancy, women/partners/caregivers/families should be informed that stay in the heath facility after birth is recommended for a minimum of 24 hours, however length of stay in the facility will depend on individual health outcomes and needs, particularly after a caesarean birth, and the availability of postnatal care services for follow-up after discharge.*

New Recommended

Prior to discharging healthy women and newborns after birth from the facility to the home, health workers should assess the following criteria to improve maternal and newborn outcomes:

- the woman's and baby's physical well-being and the woman's emotional well-being;
- the skills and confidence of the woman to care for herself and the skills and confidence of parents and caregivers to care for the newborn;
- the home environment and other factors that may influence the ability to provide care for the woman and the newborn in the home and care-seeking.

- *In making this recommendation, the GDG considered discharge criteria for women and term newborns without complications described in policy and research documents as identified in a scoping review [85].*
- *These criteria should be assessed to guide health workers to identify and manage problems before discharge, to provide information as per the individual woman, newborn and family needs, and to establish links to follow-up care and additional support that may be required.*
- *Effective counselling and communication strategies, using culturally acceptable methods that respect and facilitate shared decision-making, are integral to the assessment of discharge criteria.*

New **Recommended**

Information provision, educational interventions and counselling are recommended to prepare women, parents and caregivers for discharge from the health facility after birth to improve maternal and newborn health outcomes, and to facilitate the transition home. Educational materials, such as written/digital education booklets, pictorials for semi-literate populations and job aids should be available.

- *The GDG agreed there was insufficient evidence to determine if any particular approach to strengthen preparation for discharge was more effective than others. Direct and indirect evidence identified approaches with the following components: counselling, education and information provision; the availability of educational resources including job-aids; activities to strengthen the skills of the health providers; and ensuring linkages are made to follow-up care after discharge.*
- *The GDG highlighted that linkages to ensure the continuity of care after discharge should be established including with the community health workforce, other social services or additional support as available and needed.*

New **Recommended**

Home visits during the first week after birth by skilled health personnel or a trained community health worker are recommended for postnatal care of healthy women and newborns. Where home visits are not feasible or not preferred, outpatient postnatal care contacts are recommended.

- *In making this recommendation, the GDG considered evidence from trials where home visits for the provision of postnatal care were conducted mainly during the first week after birth.*
- *The content of postnatal care during home visits in the trials included assessments of the woman and newborn's physical well-being and the woman's emotional well-being with referral for further care where necessary, health education, counselling and breastfeeding promotion and support.*
- *The GDG noted that most trials showing a reduction in neonatal mortality were conducted in rural, low-resource settings with low access to health services, and included community packages with home visits by community health workers, accompanied by antenatal home visits and community mobilization.*
- *The capacity of the health system to provide postnatal care home visits should be assessed based on local availability of skilled and trained health work force, distribution of tasks among the health workforce and the competing responsibilities with other health programmes, capacity to provide initial and continuous training and supervision, content of the postnatal care home visits, accessibility for hard to reach populations, coordination between facility- and community-based services, and sustainability of the home visits programme and of the supply systems.*

New **Context-specific recommendation**

Midwife-led continuity-of-care models, in which a known midwife or small group of known midwives supports a woman throughout the antenatal, intrapartum and postnatal continuum, are recommended for women in settings with well-functioning midwifery programmes.

- *This recommendation has been integrated from the 2016 WHO recommendations on antenatal care for a positive pregnancy experience (1), where it was considered a context-specific recommendation.*
- *The following remarks were made by the GDG responsible for the original recommendation:*
  - *Midwife-led continuity-of-care (MLCC) models are models of care in which a known and trusted midwife (caseload midwifery), or small group of known midwives (team midwifery), supports a woman throughout the antenatal, intrapartum and postnatal period, to facilitate a healthy pregnancy, childbirth and postnatal period and healthy self-care and parenting practices.*
  - *MLCC models are complex interventions and it is unclear whether the pathway of influence producing these positive effects is the continuity-of-care, the midwifery philosophy of care, or both. The midwifery philosophy inherent in MLCC models may or may not be enacted in standard midwife practice in other models of care.*
  - *Policy-makers in settings without well-functioning midwife programmes should consider implementing this model only after successfully scaling up the number and quality of practising midwives. In addition, stakeholders may wish to consider ways of providing continuous care through other care providers, because women value continuity-of-care.*
  - *The panel noted that, with this model of care, it is important to monitor resource use and health worker burnout and workload, to determine whether caseload or team care models are more sustainable in individual settings.*
  - *MLCC requires that well-trained midwives are available in sufficient numbers for each woman to see one or only a small group of midwives throughout pregnancy and during childbirth. This model may therefore require a shift in resources to ensure that the health system has access to a sufficient number of midwives with reasonable caseloads.*
  - *The introduction of MLCC may lead to a shift in the roles and responsibilities of midwives as well as other health workers who have previously been responsible for antenatal and postnatal care. Where this is the case, implementation is likely to be more effective if all relevant stakeholders are consulted and human resources departments are involved. In some settings, government-level consultation with professional organizations could also aid implementation processes.*
  - *The need for additional one-off or continuing training and education should be assessed, and should be provided where necessary.*

New **Recommended**

Task sharing the promotion of health-related behaviours for maternal and newborn health to a broad range of cadres, including lay health workers, auxiliary nurses, nurses, midwives and doctors is recommended.

Recommended

Task sharing the provision of recommended postpartum contraception methods to a broad range of cadres, including auxiliary nurses, nurses, midwives and doctors is recommended.

- *These recommendations have been adapted and integrated from the 2012 WHO publication: Optimizing health worker roles to improve access to key maternal and newborn health interventions through task shifting [31].*
- *The postnatal care GDG agreed that lay health workers who are trained and supervised can independently conduct safe and effective catch-up HIV testing postpartum, as per Recommendations 2a and 2b in this guideline, integrated from the 2019 WHO Consolidated guidelines on HIV testing services [55].*
- *The postnatal care GDG noted that universal access to and use of long-lasting insecticidal nets remains the goal for all people, including postnatal women and newborns in malaria-endemic settings [86].*

New Recommended

Policy-makers should consider a bundle of interventions covering education; regulation; incentives; and personal and professional support to improve health workforce development, attraction, recruitment and rendition in rural and remote areas.

- *This recommendation has been adapted and integrated from the updated 2021 WHO guideline on health workforce development, attraction, recruitment and retention in rural and remote areas [87].*
- *Recommendations from the source guideline (abridged) addressing education, regulation, incentives and support from the above guideline include the following:*
  - *Education: use targeted admission policies to enrol students who live or have spent some childhood years in rural areas in health worker education programmes, locate teaching and learning institutions closer to rural areas; expose students of a wide array of health worker disciplines to rural and remote communities and rural clinical practices; include rural health topics in health worker pre-service and in-service training of health workers; and design and enable access to continuing education and professional development programmes that meet the needs of rural health workers to support their retention in rural areas.*
  - *Regulation: introduce and regulate enhanced scopes of practice for health workers in rural and remote areas; introduce different types of health workers for rural practice to meet the needs of communities based on people-centred service delivery models; respect the rights of health workers when compulsory service in rural and remote areas exists with fair, transparent and equitable management, support and incentives; and provide scholarships, bursaries or other education subsidies to health workers with agreements for return of service in rural and remote areas.*
  - *Incentives: employ a package of fiscally-sustainable financial and nonfinancial incentives to influence health workers' decision to relocate to and remain in rural and remote areas.*
  - *Support: invest in rural infrastructure and services to ensure decent living conditions for health workers and their families; ensure a safe and secure working environment for health workers; provide decent work that respects the fundamental rights of health workers; foster the creation of health workforce support networks for health workers in rural and remote areas; develop and strengthen career development and advancement programmes, and career pathways for health workers in rural and remote areas; support the development of networks, associations and journals for health workers in rural and remote areas to facilitate knowledge exchange; and adopt social recognition measures at all levels for health workers in rural and remote areas to raise the profile of rural health workers.*

New Recommended with targeted monitoring and evaluation

Interventions to promote the involvement of men during pregnancy, childbirth and after birth are recommended to facilitate and support improved self-care of women, improved home care practices for women and newborns, improved use of skilled care during pregnancy, childbirth and the postnatal period for women and newborns, and increase the timely use of facility care for obstetric and newborn complications.

These interventions are recommended provided that they are implemented in a way that respects, promotes and facilitates women's choices and their autonomy in decision-making and supports women in taking care of themselves and their newborns.

- *This recommendation has been retained, following review of new evidence, from the 2015 WHO recommendations on health promotion interventions for maternal and newborn health [88].*
- *The GDG agreed that, despite the availability of additional studies specific to the postnatal period, the evidence base continues to be heterogeneous and of mixed certainty, and therefore the GDG decided not to modify the existing 2015 recommendation.*
- *A diverse set of interventions was identified in the effectiveness review and the qualitative evidence synthesis, but there was insufficient evidence to identify if any of the different implementation approaches were more effective for improving maternal and newborn health outcomes.*
- *The GDG indicated that both the benefits and the harms that can result from interventions are important, but that harms can be mitigated through a well-designed and closely monitored intervention, which involves women in the design and monitoring of male involvement interventions and asks women about their experiences of men's involvement.*
- *Through the qualitative evidence synthesis it was possible to identify specific elements of intervention design and implementation that increased acceptability of interventions to women, men, and/or health workers (see Web annex 5).*
- *The GDG refers to the important implementation considerations highlighted in the previous WHO guideline, particularly the call that these interventions are implemented in a way that respects, promotes and facilitates women's choices and autonomy in decision-making, and supports women in taking care of themselves and their newborns.*
- *The GDG recognized that involvement of fathers is an important component of early childhood health and development (see Recommendations 38 and 39 in this guideline).*

New Recommended

The use of home-based records, as a complement to facility-based records, is recommended for the care of pregnant and postpartum women, newborns and children to improve care-seeking behaviours, men's involvement and support in the household, maternal and child home care practices, infant and child feeding, and communication between health workers and women, parents and caregivers.

- *This recommendation has been adapted and integrated from the 2018 WHO recommendations on home-based records for maternal, newborn and child health [89], where the overall certainty of evidence was judged to be low.*
- *A home-based record, such as women-held case notes, vaccination cards, child health books or integrated maternal and child health books, is a health document used to record the history of health services received by an individual. It is kept in the household, in either paper or electronic format, by the individual or their caregiver and is intended to be integrated into the health information system and complement records maintained by health facilities.*
- *The source guideline notes that there was insufficient evidence available to determine if any specific type, format or design of home-based records is more effective. It noted that policy-makers should involve stakeholders to discuss the important considerations with respect to type, content and implementation of home-based records.*
- *The following remarks were among those made by the GDG responsible for the original recommendation:*
  - *Countries currently using home-based records should consider appropriate use, design and content, as well as sustainable financing to maximize their use and impact.*
  - *In remote and fragile settings, where health systems are weak or where health information systems are absent or poor, and in locations where caregivers may use multiple health facilities, home-based records may be of greater value than in more developed settings and health systems.*

New Context-specific recommendation

WHO recommends digital targeted client communication for behaviour change regarding sexual, reproductive, maternal, newborn and child health, under the condition that concerns about sensitive content and data privacy are adequately addressed.

- *This recommendation has been integrated from the 2019 WHO document: WHO guideline: recommendations on digital interventions for health system strengthening [90], where it was considered a context-specific recommendation.*
- *Digital targeted client communication refers to the transmission of customized health information for different audience segments (often based on health status or demographic categories). Targeted client communication may include:*
  - *transmission of health-event alerts to a specified population group;*
  - *transmission of health information based on health status or demographics;*
  - *alerts and reminders to clients; and/or*
  - *transmission of diagnostic results (or of the availability of results).*
- *The GDG responsible for the original recommendation considered this intervention to offer the potential to improve health behaviours and reduce inequities among individuals with access to mobile devices. However, it highlighted that measures should be taken to address inequities in access to mobile devices so that further inequity is not perpetuated in accessing health information and services, including mechanisms to ensure individuals who do not have access to mobile devices can still receive appropriate services.*
- *The GDG responsible for the original recommendation also raised the need to address potential concerns about sensitive content and data privacy, including potential negative unintended consequences. This could be done, for example, through mechanisms that actively allow individuals to opt out of services.*

New

Context-specific recommendation

WHO recommends the use of digital birth notification under these conditions:

- in settings where the notifications provide individual-level data to the health system and/or a civil registration and vital statistics (CRVS) system, and
- the health system and/or CRVS system has the capacity to respond to the notifications.

- *This recommendation has been integrated from the 2019 WHO document: WHO guideline: recommendations on digital interventions for health system strengthening [90], where it was considered a context-specific recommendation.*
- *The source guideline notes that:*
  - *Responses by the health system include the capacity to accept the notifications and trigger appropriate health and social services, such as initiating of postnatal services.*
  - *Responses by the civil registration and vital statistics (CRVS) system include the capacity to accept the notifications and to validate the information, in order to trigger the subsequent process of birth registration and certification.*
- *The following remarks were made by the GDG responsible for the original recommendation:*
  - *The GDG acknowledged the limited evidence but emphasized that birth notification represents a vital first step in a care cascade that can ultimately lead to increased and timely access to health services and other social services. The GDG also believed that the use of mobile devices to perform this task was likely to provide a more expedient means of effecting the notification and subsequent health services.*
  - *The GDG members noted that while birth notification should not be viewed as a substitute for legal birth registration, it could provide an opportunity to accelerate the registration by linking birth notifications to national civil registration systems. The GDG also recognized that digital notification of births could facilitate providing newborns with legal identity and future access to health and other social services.*
  - *It should also be noted that increases in the notification of births and deaths would also require that civil registration services have, in turn, the capacity to manage a higher demand for registration and certification services.*
  - *The ability for the health system and/or CRVS system to respond and act appropriately on the birth and death notification was seen as a critical component for successful implementation. If such linkages are not in place, the notification of birth and death events would not add any value and would incur an additional cost to the system.*

1.4 Breastfeeding

1.4.1 Guideline: counselling of women to improve breastfeeding practices

[61]

New **Recommended, moderate-quality evidence**

Breastfeeding counselling should be provided to all pregnant women and mothers with young children.

The remarks in this section are intended to give some considerations for implementation of the recommendation, based on the discussion of the guideline development group.

- *Counselling is a process and interaction between counsellors and pregnant women or mothers. Breastfeeding counselling is not intended to be a "top-down" intervention of "telling women what to do". The aim of breastfeeding counselling is to empower women to breastfeed, while respecting their personal situations and wishes. Breastfeeding counselling is, therefore, never forced upon any woman. This would be contrary to the concept of counselling. Rather, counselling is made available and accessible to all pregnant women and mothers, particularly those who are considering or already breastfeeding.*
- *Breastfeeding counselling for pregnant women can enable them to have the best start at breastfeeding, with support to allow mothers and their neonates to initiate breastfeeding as soon as possible after birth, stay together throughout the day and night, and establish and maintain breastfeeding with proper attachment and positioning.*
- *Sensitive and effective counselling can assist mothers who are considering or are already breastfeeding to overcome challenges. By emphasizing that breastfeeding provides protection and comfort as well as food, counselling can respond to the particular barriers that individual mothers face.*
- *Mothers who may not be considering breastfeeding could be supported to make informed choices about feeding their infants and children. Counselling can highlight the extensive and resounding evidence on the benefits of breastfeeding, as well as providing mothers with scientific, unbiased and factual information about other infant and young child feeding choices, so that they can safely and responsively feed their child.*
- *Those who are breastfeeding as well as giving additional foods or fluids (such as infant formula milk or other breast-milk substitutes) are encouraged to continue breastfeeding as much as they are able to, while they are supported with sensitivity and care to address challenges that they may be facing around feeding their child.*

Justification

The guideline development group took into consideration the factors listed next during the deliberations. These considerations apply to all key questions on breastfeeding counselling, whether the counselling is given during the antenatal period or postnatally or both, at a greater or lesser frequency, through face-to-face or remote counselling, or by a lay or non-lay health worker. They will thus not be repeated in the discussions of subsequent key questions.

- Breastfeeding counselling of pregnant women and mothers shows important benefits for breastfeeding practices. On the other hand, potential harms of breastfeeding counselling were deemed minimal.
- Both mothers and key stakeholders such as health-care workers value breastfeeding counselling. Healthcare workers would prefer to have more time and resources, in order to provide better quality counselling.
- Accessible and quality breastfeeding counselling, as part of universal health coverage, can improve equity among women and children and throughout the life-course.

Based on the evidence presented and the considerations discussed, the guideline development group recommended breastfeeding counselling for all pregnant women and mothers, in order to improve breastfeeding practices.

New Recommended, moderate-quality evidence

Breastfeeding counselling should be provided in both the antenatal period and postnatally, and up to 24 months or longer.

The remarks in this section are intended to give some considerations for implementation of the recommendation, based on the discussion of the guideline development group.

- *Counselling during pregnancy or soon after birth includes encouraging mothers and their families to start a nurturing, caring and responsive relationship with their infant. Feeding decisions at this time may be shaped by experiences, contexts and various influences around them, as well as having short- and long-term consequences. Breastfeeding counselling at this time aims to enable a positive and loving environment in which the neonate can thrive.*
- *Postnatal breastfeeding counselling further supports mothers and their families in enabling them to build closeness, with skin-to-skin contact and responsive feeding. Mothers may need extra support in establishing and boosting their confidence in breastfeeding, recognizing the milk ejection reflex (or letdown) and effective feeding, and understanding feeding patterns and growth spurts.*
- *Parents and caregivers need to be enabled to access appropriate help when they have concerns about feeding. This may be particularly important in the first few weeks after birth when breastfeeding is being established, and during potential changes in their situation (such as the mother's return to school or work), when they may have concerns about maintaining breastfeeding, according to their individual circumstance. An assessment of breastfeeding effectiveness may be valuable in reassuring parents and addressing issues around feeding.*

Justification

The guideline development group took into consideration standard points as presented in the rationale for the first key question. The following factors were, in addition, taken into consideration during the deliberations for this key question.

- Breastfeeding counselling of pregnant women and mothers shows important benefits for breastfeeding practices when provided during the antenatal period and postnatally. On the other hand, potential harms of breastfeeding counselling were deemed minimal or trivial.
- While both mothers and key stakeholders such as health-care workers value breastfeeding counselling, specific contexts may warrant an adjustment in the timing of the breastfeeding counselling (such as for women living with HIV, and adolescent girls). Health-care workers would prefer to have more time and resources, in order to provide better quality counselling.

Based on the evidence presented and the considerations discussed, the guideline development group recommended breastfeeding counselling for all pregnant women and mothers during the antenatal period and postnatally, up to 24 months or longer, in order to improve breastfeeding practices.

New Recommended, low-quality evidence

Breastfeeding counselling should be provided at least six times, and additionally as needed.

- *The remarks in this section are intended to give some considerations for implementation of the recommendation, based on the discussion of the guideline development group.*
- *Provision of at least six breastfeeding counselling contacts allows for a full range of support to breastfeeding mothers and their families, beginning in the antenatal period through to the introduction of complementary feeding and beyond. Policy-makers and implementers are duty-bound to ensure that breastfeeding counselling contacts are of sufficient quality and quantity to be effective, while ensuring that their use does not expose the mothers and their families to financial hardship.*
- *People-centred breastfeeding counselling means that the counselling responds to the individual mothers' and families' needs, preferences and values. If individual family situations preclude them from accessing at least six counselling contacts, they should nonetheless be encouraged and enabled to go to as many as they can, and maximize the benefit of this resource with meaningful engagement without stigma or recrimination.*
- *The minimum of six breastfeeding counselling contacts may occur at the following time points: before birth (antenatal period); during and immediately after birth (perinatal period up to the first 2–3 days after birth); at 1–2 weeks after birth (neonatal period); in the first 3–4 months (early infancy); at 6 months (at the start of complementary feeding); and after 6 months (late infancy and early childhood), with additional contacts as necessary (for instance, when planning to return to school or work, or any time that concerns or challenges related to breastfeeding arise) or when oppportunities for breastfeeding counselling occur (such as during child immunization visits).*
- *Breastfeeding counselling during the perinatal period and during the stay in the facility providing maternity and newborn services should be done in conjunction with other interventions that protect, support and promote breastfeeding, as outlined in the Baby-friendly Hospital Initiative [47][60][82][91][92][93] [94] and in the Essential newborn care course [95].*

Justification

The guideline development group took into consideration standard points as presented in the rationale for the first key question. The following factors were, in addition, taken into consideration during the deliberations for this key question.

- Breastfeeding counselling of pregnant women and mothers shows important benefits for breastfeeding practices when given four or more times. Additional evidence showed important benefits for six or more counselling contacts compared to three contacts.

Based on the evidence presented and the considerations discussed, the guideline development group recommended breastfeeding counselling for all pregnant women and mothers, at least six times, in order to improve breastfeeding practices.

New

Recommended, low-quality evidence

Breastfeeding counselling should be provided through face-to-face counselling.

Context-specific recommendation, moderate-quality evidence

Breastfeeding counselling may, in addition, be provided though telephone or other remote modes of counselling.

The remarks in this section are intended to give some considerations for implementation of the recommendation, based on the discussion of the guideline development group.

- *Individual face-to-face counselling may be complemented but not replaced by telephone counselling and/or other technologies.*
- *Preferences for different methods of counselling will vary with context. Health workers around the world are increasingly using other technologies. Telephone counselling and other technologies are very useful options as adjuncts and may empower end-users, as well as health workers and lay or peer counsellors.*
- *Telephone counselling will depend on the availability and accessibility of telephones for pregnant women and mothers.*
- *Telephone counselling and/or other technologies may be very useful in certain contexts where face-toface counselling capacity or access may be limited or absent, such as emergencies.*

Justification

The guideline development group took into consideration standard points as presented in the rationale for the first key question. The following factors were, in addition, taken into consideration during the deliberations for this key question.

- Breastfeeding counselling of pregnant women and mothers shows important benefits for breastfeeding practices when provided through either face-to-face counselling or telephone counselling or both.
- Local context, such as availability of resources, values and preferences of end-beneficiaries, and acceptability among health workers, could have an effect on the feasibility of providing telephone or other remote modes of counselling.

Based on the evidence presented and the considerations discussed, the guideline development group recommended breastfeeding counselling for all pregnant women and mothers, with face-to-face contact, and additional telephone or other modes of remote counselling in specific contexts, in order to improve breastfeeding practices.

New Recommended, moderate-quality evidence

Breastfeeding counselling should be provided as a continuum of care, by appropriately trained health-care professionals and community-based lay and peer breastfeeding counsellors.

The remarks in this section are intended to give some considerations for implementation of the recommendation, based on the discussion of the guideline development group.

- *What works best in terms of staff allocation will vary considerably, depending on the context and national health-care system. At country level, it is important to have a system that enables, where necessary, continuity of care and integration of lay and peer counsellors, with non-lay counsellors. Continuity of care is best brought about within a system of collaboration and communication between all providers.*
- *For breastfeeding counselling to be effective, a good training and mentoring programme, for both lay and non-lay counsellors, will be an essential first step. Careful planning and leadership will be important for those responsible for developing the skills, knowledge and confidence of counsellors in enabling mothers to achieve their goals for breastfeeding.*
- *A systems-based approach within the health-care system and at community level, with cascade training and support or supervision, may be a constructive way forward, with clearly defined skills, training and supervision for different levels of counsellors, and referral systems. Lactation consultants and other highly trained breastfeeding counsellors can play useful roles in training and supervision.*

Justification

The guideline development group took into consideration standard points as presented in the rationale for the first key question. The following factors were, in addition, taken into consideration during the deliberations for this key question.

- Reaching pregnant women and mothers who are considering or already breastfeeding with breastfeeding counselling, particularly those whom health services are not reaching, such as the marginalized, stigmatized and geographically isolated, could be improved by enabling and strengthening the competencies of both lay and non-lay counsellors.

Based on the evidence presented and the considerations discussed, the guideline development group recommended breastfeeding counselling for all pregnant women and mothers, provided as a continuum of care by appropriately trained lay and non-lay counsellors, in order to improve breastfeeding practices.

New

Context-specific recommendation, low-quality evidence

Breastfeeding counselling should anticipate and address important challenges and contexts for breastfeeding, in addition to establishing skills, competencies and confidence among mothers.

The remarks in this section are intended to give some considerations for implementation of the recommendation and best practice statement, based on the discussion of the guideline development group.

- *To some extent, all breastfeeding counselling is anticipatory. The goal of the counselling contact is to support mothers in achieving their individualized goals for breastfeeding, whether they are considering initiating breastfeeding, or they are already breastfeeding and are facing particular challenges for continuation of breastfeeding. Anticipatory counselling therefore refers to evaluating and assessing potential and existing challenges that may impact the mothers' breastfeeding goals. The anticipatory nature of breastfeeding counselling helps to reduce potential risks, problems or complications for optimal breastfeeding.*
- *In difficult or complicated circumstances, positive feedback and emotional support are especially needed to support the mothers' confidence and self-efficacy in breastfeeding.*
- *Using the principles of person-centred and quality-focused care, each Member State may need to identify which circumstances will require additional training and skills-building, based on their assessment of the primary challenges to optimal breastfeeding in their contexts.*
- *Advice and information for women who do not intend to breastfeed needs to be considered as a potential component of anticipatory counselling for pregnant women.*
- *During emergencies, appropriate and timely support to infant and young child feeding saves lives; protects child nutrition, health and development; and benefits mothers. Breastfeeding counselling is a vital intervention in emergency response and needs to be protected. Emergency preparedness is critical to a timely, efficient and appropriate response.*
- *Emergency preparedness includes training of personnel likely to be involved in providing support to mothers in an emergency and building the capacity of those delivering services during a response. As a minimum, staff in contact with mothers and children aged under 2 years are trained to be sensitive to psychosocial issues, on nutrition screening and on referral pathways to more specialist support.*
- *More specialist capacity to counsel mothers with heightened needs, such as stressed or traumatized mothers, malnourished infants and mothers, low-birth-weight infants and infants with disability and associated feeding difficulties, may be needed.*

Justification

The guideline development group took into consideration standard points as presented in the rationale for the first key question. The following factors were, in addition, taken into consideration during the deliberations for this key question.

- Appropriate and timely breastfeeding counselling of pregnant women and mothers that addresses specific challenges as and when they are needed could have important benefits for breastfeeding practices.
- A best practice statement on emergency contexts helps bring visibility to the heightened risk exposure for children and immense challenges faced by pregnant women and mothers in such circumstances, which warrants prioritization of breastfeeding counselling as an intervention in emergency response.

Based on the evidence presented and the considerations discussed, the guideline development group recommended anticipatory breastfeeding counselling for all pregnant women and mothers who may be facing specific challenging contexts, in order to improve breastfeeding practices.

1.4.2 Protecting, promoting and supporting breastfeeding in facilities providing maternity and newborn services

[60]

New **Recommended, moderate-quality evidence**

Early and uninterrupted skin-to-skin contact between mothers and infants should be facilitated and encouraged as soon as possible after birth.

Recommended, high-quality evidence

All mothers should be supported to initiate breastfeeding as soon as possible after birth, within the first hour after delivery.

Recommended, moderate-quality evidence

Mothers should receive practical support to enable them to initiate and establish breastfeeding and manage common breastfeeding difficulties.

Recommended, very low-quality evidence

Mothers should be coached on how to express breast milk as a means of maintaining lactation in the event of their being separated temporarily from their infants.

Recommended, moderate-quality evidence

Facilities providing maternity and newborn services should enable mothers and their infants to remain together and to practise rooming-in throughout the day and night. This may not apply in circumstances when infants need to be moved for specialized medical care.

Recommended, very low-quality evidence

Mothers should be supported to practise responsive feeding as part of nurturing care.

The remarks in this section are points to consider regarding implementation of the recommendations for immediate support to initiate and establish breastfeeding, based on the discussion of the guideline development group and the external experts.

- *Focused and optimal immediate support to initiate and establish breastfeeding in the first hours and days of life have positive effects far beyond the stay at the facilities providing maternity and newborn services.*
- *Although there is evidence of benefit for immediate and uninterrupted skin-to-skin contact starting at less than 10 minutes after delivery, this practice can often be started much sooner, by the second or third minute after delivery, while continued assessment, drying and suctioning (if needed) are done while the infant is in skin-to-skin contact. Uninterrupted skin-to-skin contact ideally lasts for more than 1 hour, and longer periods, when well tolerated by both mother and infant, should be encouraged.*
- *During early skin-to-skin contact and for at least the first 2 hours after delivery, sensible vigilance and safety precautions should be taken, so that health-care personnel can observe for, assess and manage any signs of distress.*
- *Early initiation of breastfeeding has been shown to have positive effects when done within the first hour after delivery. Among healthy term infants, feeding cues from the infant may be apparent within the first 15–20 minutes after birth, or may not be apparent until later.*
- *Because there is a dose–response effect in that earlier initiation of breastfeeding results in greater benefits, mothers who are not able to initiate breastfeeding during the first hour after delivery should still be supported to breastfeed as soon as they are able. This may be relevant to mothers who deliver by caesarean section, after an anaesthetic, or those who have medical instability that precludes initiation of breastfeeding within the first hour after birth.*

- *Mothers should be enabled to achieve effective breastfeeding, including being able to position and attach their infants to the breast, respond to their infants' hunger and feeding cues, and express breast milk when required.*
- *Expression of breast milk is often a technique used to stimuate attachment at the breast and effective suckling during the establishment of breastfeeding, not only when mothers and infants are separated.*
- *Mothers of infants admitted to the neonatal intensive care unit should be sensitively supported to enable them to have skin-to-skin contact with their infants, recognize their infants' behaviour cues, and effectively express breast milk soon after birth.*

Justification

The following factors were taken into consideration during the deliberations.

- Interventions to support the establishment of breastfeeding in the immediate period after birth have the strongest evidence for mortality prevention and positive breastfeeding outcomes beyond the stay at the facilities providing maternity and newborn services. Early skin-to-skin contact and early initiation of breastfeeding can increase the likelihood of any or exclusive breastfeeding up to 3–6 months of life. Showing mothers how to breastfeed in the immediate postnatal period makes them more likely to continue any or exclusive breastfeeding to 6 months of age. Mothers and infants who room-in together are almost twice as likely to be exclusively breastfeeding during the stay at the facilities providing maternity and newborn services. Fostering sensitive, reciprocal and nurturing relationships between mothers and infants results in considerable benefit to both.
- Supporting mothers to form an early and close relationship and feeding with their infants is highly valued by mothers. Mothers who experience early skin-to-skin contact or who have had a positive experience with being supported in the initial breastfeeds appreciate and would like to repeat these experiences. Mothers who are given conflicting advice or are given information in a mechanistic manner feel undermined.
- Many health workers report little knowledge about breastfeeding and have poor confidence in their skills to support a mother to breastfeed. Guidance to health workers on the minimum support that all mothers need, and competence towards addressing common breastfeeding problems, may be appropriate. This will allow health workers to assess infants' health and feeding, as well as to provide support to breastfeeding mothers tailored to their individual needs, sensitively given and considering their social and cultural context, in order that they may overcome any challenges they may face. Collaboration or referral to address more complex breastfeeding challenges may be useful.

New **Recommended, moderate-quality evidence**

Mothers should be discouraged from giving any food or fluids other than breast milk, unless medically indicated.

Recommended, high-quality evidence

Mothers should be supported to recognize their infants' cues for feeding, closeness and comfort, and enabled to respond accordingly to these cues with a variety of options, during their stay at the facility providing maternity and newborn services.

Recommended, low-quality evidence

For preterm infants who are unable to breastfeed directly, non-nutritive sucking and oral stimulation may be beneficial until breastfeeding is established.

Recommended, moderate-quality evidence

If expressed breast milk or other feeds are medically indicated for term infants, use of feeding methods such as cups, spoons or feeding bottles and teats may be used during their stay at the facility.

Recommended, moderate-quality evidence

If expressed breast milk or other feeds are medically indicated for preterm infants, feeding methods such as cups or spoons are preferable to feeding bottles and teats.

The remarks in this section are points to consider regarding implementation of the recommendations on feeding practices and additional needs of infants, based on the discussions of the guideline development group and the external experts.

- *Additional foods and fluids apart from breast milk should only be given when medically acceptable reasons exist. Lack of resources, staff time or knowledge are not justifications for the use of early additional foods or fluids.*
- *Proper guidance and counselling of mothers and other family members enables them to make informed decisions on the use or avoidance of pacifiers and/or feeding bottles and teats until the successful establishment of breastfeeding.*
- *Supporting mothers to respond in a variety of ways to behavioural cues for feeding, comfort or closeness enables them to build caring, nurturing relationships with their infants and increase their confidence in themselves, in breastfeeding and in their infants' growth and development. Ways to respond to infant cues include breastfeeding, skin-to-skin contact, cuddling, carrying, talking, singing and so forth.*
- *There should be no promotion of breast-milk substitutes, feeding bottles, teats, pacifiers or dummies in any part of facilities providing maternity and newborn services, or by any of the staff.*
- *Health facilities and their staff should not give feeding bottles, teats or other products within the scope of the International Code of Marketing of Breast-milk Substitutes and its subsequent related WHA resolutions [92][94] to breastfeeding infants.*

Justification

The following factors were taken into consideration during the deliberations.

- Early additional feeds other than breast milk have been shown to decrease rates of breastfeeding up to 20 weeks after birth.
- Avoidance of pacifiers or feeding bottles and teats during the stay in the facilities providing maternity and newborn services (in the first 5 days of life) make little or no difference to the rates of any breastfeeding among term infants at discharge, and any or exclusive breastfeeding outcomes at 3 or 6 months.
- Among preterm infants, use of non-nutritive sucking or oral stimulation did not have a significant effect on breastfeeding outcomes but was associated with a shorter length of hospital stay.

- When additional feeds are medically indicated, or when direct breastfeeding is not feasible, avoiding the use of feeding bottles and teats among preterm infants increases the likelihood of any or exclusive breastfeeding up to 6 months after discharge.
- Many mothers value pacifiers and a considerable number would introduce pacifiers even when discouraged to do so. Many also value the convenience of using feeding bottles and teats to provide breast milk when their infants are not on the breast. Mothers can be supported to make informed decisions regarding the use of pacifiers and bottles and teats during their stay at the facilities providing maternity and newborn services, by ensuring that they are aware of the slight risk of interfering with breastfeeding during these early days.

New **Recommended, very low-quality evidence**

Facilities providing maternity and newborn services should have a clearly written breastfeeding policy that is routinely communicated to staff and parents.

Recommended, very low-quality evidence

Health-facility staff who provide infant feeding services, including breastfeeding support, should have sufficient knowledge, competence and skills to support women to breastfeed.

Recommended, moderate-quality evidence

Where facilities provide antenatal care, pregnant women and their families should be counselled about the benefits and management of breastfeeding.

Recommended, low-quality evidence

As part of protecting, promoting and supporting breastfeeding, discharge from facilities providing maternity and newborn services should be planned for and coordinated, so that parents and their infants have access to ongoing support and receive appropriate care.

The remarks in this section are points to consider regarding implementation of the recommendations for creating an enabling environment, based on the discussions of the guideline development group and the external experts.

- *Creating an enabling environment for breastfeeding includes having policies and guidelines that underpin the quality standards for promoting, protecting and supporting breastfeeding in facilities providing maternity and newborn services. These policies and guidelines include provisions of the International Code of Marketing of Breast-milk Substitutes and its subsequent related WHA resolutions [92][94].*
- *Relevant training for health workers is essential to enable quality standards to be implemented effectively according to their roles.*
- *Parents should be offered antenatal breastfeeding education that is tailored to their individual needs and sensitively given and considers their social and cultural context. This will prepare them to address challenges they may face.*
- *Mothers should be prepared for discharge by ensuring that they can feed and care for their infants and have access to continuing breastfeeding support. The breastfeeding support in the succeeding days and weeks after discharge will be crucial in identifying and addressing early breastfeeding challenges that occur.*
- *Minimizing disruption to breastfeeding during the stay in the facilities providing maternity and newborn services will require health-care practices that enable a mother to breastfeed for as much, as frequently and for as long as she wishes.*
- *Coordination of clinical systems in facilities providing maternity and newborn services, so that standards of care for breastfeeding support are coordinated across the obstetric, midwifery and paediatric services, helps develop services that improve the outcomes for those using them.*

Justification

The following factors were taken into consideration during the deliberations.

- Few of the interventions on creating an enabling environment show a positive effect on short- or long-term breastfeeding outcomes.
- Providing antenatal education (without providing other forms of breastfeeding support) has not been shown to have a significant effect on breastfeeding rates, though there is evidence that support aimed specifically at promoting the initiation of breastfeeding given before the first feed may have positive results.
- Having a written policy, training of health workers and discharge planning with linkage to continuing support may not, by themselves, change breastfeeding practice. However, they help create an effective health-delivery system within the facilities providing maternity and newborn services that can respond to the needs of mothers and infants.

1.5 Prevention of Maternal Health Complications

1.5.1 WHO recommendation on advance misoprostol distribution to pregnant women for prevention of postpartum haemorrhage

[96]

Context-specific recommendation

In settings where women give birth outside of a health facility and in the absence of skilled health personnel, a strategy of antenatal distribution of misoprostol to pregnant women for self-administration is recommended for prevention of postpartum haemorrhage, only with targeted monitoring and evaluation.

Remarks

- *Antenatal distribution of misoprostol to pregnant women should not replace standard policies for scaling up effective uterotonic use, but it should be considered as a strategy for increasing coverage of uterotonic use in settings where a large proportion of women still give birth outside of health facilities and where it is highly likely that skilled health personnel will not be present at time of birth.*
- *While acknowledging that there is currently no clear evidence of harm with a strategy of antenatal misoprostol distribution, the Guideline Development Group agreed that, to address potential safety concerns, such programmes should only be implemented with appropriate monitoring and evaluation. This should consider:*
- *whether women are trained appropriately in the use of misoprostol;*
- *monitoring the distribution, use and potential misuse of misoprostol;*
- *the effect of the programme on utilization of health services and health outcomes – this should include (but is not limited to) the rate of antenatal care attendance and facility-based childbirth, maternal and perinatal mortality, and severe maternal morbidity and potential complications from inappropriate use (such as uterine rupture); and*
- *whether appropriate supervisory systems of health personnel involved in the distribution of misoprostol are in place.*
- *Within an antenatal distribution programme, misoprostol ideally should be provided to women during an antenatal care visit in the third trimester of pregnancy (typically as part of a safe delivery kit). It should be accompanied by clear, culturally appropriate instructions on its purpose, correct dose (400 or 600 micrograms [mg] for oral administration) and timing of use, possible side-effects and remedies for these, and prompt recognition of danger signs and how to access health services, while emphasizing the importance of giving birth in a health facility.*
- *In settings where a strategy of antenatal distribution of misoprostol will be initiated, prospective research that evaluates the impact of introducing these programmes on maternal health outcomes and health service utilization should be considered a priority.*

Justification

There is insufficient trial evidence to assess the benefits and possible harms of advance misoprostol distribution for postpartum haemorrhage prevention. However, misoprostol is known to be an effective uterotonic agent for postpartum haemorrhage prevention and is recommended by WHO in settings where oxytocin is unavailable, its quality cannot be guaranteed, or skilled health personnel are not present to administer it. Observational studies and evaluations of advance misoprostol distribution programmes in several countries indicate that this strategy can increase coverage of uterotonic use for postpartum haemorrhage prevention in remote and hard-to-reach areas where no skilled health personnel can attend, with very few reports of incorrect use of misoprostol or adverse events. As this strategy is specifically aimed at preventing postpartum haemorrhage in women in more remote or underserved areas who would otherwise not receive any uterotonic during birth, it is likely to increase health equity and improve health outcomes. These programmes are probably acceptable to women and providers. While the cost-effectiveness of this strategy is not known, it is likely to confer cost savings.

1.5.2 WHO recommendation on routes of oxytocin administration for the prevention of postpartum haemorrhage after vaginal birth

[97]

Context-specific recommendation

The use of oxytocin (10 international units [IU], intramuscular / intravenous) is recommended for the prevention of postpartum haemorrhage for all births. In situations where women giving birth vaginally already have intravenous access, the slow intravenous administration of 10 IU oxytocin is recommended in preference to intramuscular administration.

Remarks

- *The Guideline Development Group acknowledged that either intravenous or intramuscular oxytocin is effective in preventing postpartum haemorrhage and both routes of administration are currently recommended by WHO for this indication.*
- *While noting that the balance of effects favours intravenous oxytocin for important health outcomes, the Guideline Development Group placed its emphasis on other considerations (including feasibility and impacts on resources, health equity and women's comfort), as well as studies suggestive of possible safety concerns with a rapid intravenous bolus of oxytocin. In instances where women already have intravenous access (for another medical indication), it is recommended to administer oxytocin intravenously.*
- *The Guideline Development Group acknowledged existing WHO recommendations against the routine use of intravenous fluids during labour and childbirth, with emphasis on the widespread and unnecessary use of routine administration of intravenous fluids for all women in labour in many health facilities in low-middle and high-income settings that increases cost and impacts on resource use. The Guideline Development Group emphasized that intravenous access should not be placed routinely for the sole purpose of administering intravenous oxytocin for postpartum haemorrhage prevention.*
- *The Guideline Development Group noted that the previous trials considered for this question have all administered an oxytocin dose of 10 IU intravenously for postpartum haemorrhage prevention during vaginal birth. However, the speed of injection ranged from 1 minute (for bolus injection) to 40 minutes (for infusion) and volume of dilution from 1 mL (for bolus injection) to 1000 mL of saline (for infusion). There is no direct evidence comparing the different regimens for administering intravenous oxytocin during vaginal birth, and there were no safety concerns (such as hypotension or tachycardia) in trials comparing slow intravenous administration of 10 IU oxytocin over 1 minute with 10 IU intramuscular oxytocin. However, observational studies in women undergoing caesarean section suggest that rapid intravenous injection results in harmful haemodynamic effects. Therefore, the Guideline Development Group suggests avoiding a rapid injection, and agreed that the 10 IU oxytocin dose should preferably be diluted and administered slowly.*
- *This recommendation reflects available evidence from direct comparison of intravenous versus intramuscular oxytocin during vaginal birth. For women undergoing caesarean section, WHO currently recommends 10 IU for postpartum haemorrhage prevention without preference for intravenous or intramuscular.*
- *This recommendation does not relate to the use of oxytocin for other obstetric indications (such as labour induction, labour augmentation, or treatment of postpartum haemorrhage).*

Justification

There is clear evidence in favour of intravenous oxytocin in terms of health outcomes. When compared to intramuscular oxytocin, intravenous oxytocin reduces the risk of postpartum haemorrhage, severe postpartum haemorrhage, blood transfusion and severe maternal morbidity, with no clear differences in undesirable effects. While it is uncertain whether intravenous administration is more cost-effective, routine intravenous oxytocin use for postpartum haemorrhage prevention imposes additional resource requirements, may negatively impact women's comfort and can increase health inequities. The feasibility of intravenous administration may also vary in different settings. However, in situations where intravenous access is already in place at vaginal birth, the clinical benefits of intravenous administration outweigh these other considerations.

1.5.3 WHO recommendations on uterotonics for the prevention of postpartum haemorrhage

[98]

Efficacy and safety of uterotonics for prevention of postpartum haemorrhage (PPH)

Recommended

The use of an effective uterotonic for the prevention of PPH during the third stage of labour is recommended for all births. To effectively prevent PPH, only one of the following uterotonics should be used:

- oxytocin
- carbetocin
- misoprostol
- ergometrine/methylergometrine
- oxytocin and ergometrine fixed-dose combination.

Remarks

- *This recommendation applies to women undergoing a vaginal birth or caesarean section. For injectable uterotonics, skilled health personnel who are trained to administer them are required.*
- *To maximize efficacy, uterotonics are best given immediately (preferably within one minute) after the birth of the baby or babies. Administration of a uterotonic for prevention of PPH need not impede the delaying of cord clamping, as recommended by WHO [44].*
- *The GDG advised that all women are to be provided with information – ideally during antenatal care – on the need for an effective uterotonic to prevent PPH.*

Justification

When used for PPH prevention, oxytocin, carbetocin, misoprostol, ergometrine/ methylergometrine, and a fixed-dose combination of oxytocin and ergometrine demonstrated clinical benefits especially in terms of PPH reduction compared with no uterotonics. Although they all have variable undesirable effects, ranging from minor to significant, the Guideline Development Group (GDG) agreed that these undesirable effects do not outweigh the clinical benefits for any of these uterotonic options when considered in the context of not using any uterotonic. Evidence suggests that there is probably no important variability in, or uncertainty about, how much women value the health outcomes associated with these uterotonics. In spite of the differences in resource requirements, acceptability and feasibility of implementing the individual uterotonic options (as presented below), the GDG placed its emphasis on avoiding PPH and its complications where any of these uterotonic options is all that is available for care, and therefore recommended that any of these options can be applied for PPH prevention.

Recommended

The use of oxytocin (10 IU, IM/IV) is recommended for the prevention of PPH for all births.

Remarks

- *This recommendation applies to women undergoing a vaginal birth or caesarean section. Skilled health personnel who are trained to administer injectable uterotonics are required.*
- *The GDG noted that, to effectively prevent PPH and avoid potentially harmful haemodynamic side-effects at caesarean section, there was insufficient evidence from randomized controlled trials to recommend one oxytocin regimen over another. The group agreed that, in view of a number of observational studies suggesting dose-related side-effects (particularly hypotension and tachycardia), and potential effectiveness of oxytocin at doses much lower than 10 international units (IU), consideration needs to be given to dividing the recommended 10 IU dose between a smaller intravenous (IV) bolus and an infusion. A rapid IV bolus injection must be avoided. The GDG considered the identification of the optimal regimen of IV oxytocin at caesarean section to be an important research priority.*
- *For local adaptation of this recommendation as it applies to caesarean section, health systems need to ensure that adequate human resources exist to implement feasible IV oxytocin dosing strategies, without compromising the woman's safety. Personnel administering oxytocin at caesarean section must be alert to the potential haemodynamic side-effects associated with IV oxytocin use, exercise caution in its administration, and be prepared to provide effective resuscitation therapy should the need arise.*
- *Oxytocin is relatively inexpensive and widely available; however, it requires refrigerated transport and storage (2–8 °C) [99]. In settings where this cannot be guaranteed, the quality and effectiveness of oxytocin may be adversely affected. In these situations, another effective uterotonic may be considered.*

Justification

When used for PPH prevention, oxytocin is associated with a substantial reduction in PPH (≥ 500 ml), severe PPH (≥ 1000 ml), blood transfusion and the use of additional uterotonics when compared with placebo or no uterotonic. In the same context, oxytocin makes little or no difference to the risks of experiencing sideeffects commonly associated with uterotonics, including nausea, vomiting, abdominal pain, headache, hypertension, shivering, fever or diarrhoea. There is probably no important variability in, or uncertainty about, how much women value the health outcomes associated with oxytocin. Although there is no direct evidence, oxytocin is probably cost-effective because it is inexpensive and is associated with substantial clinical benefits and minimal side-effects. It is widely available in all settings at a low cost and probably increases health equity. While the currently available injectable form is feasible to implement in most settings, its acceptability by health personnel may vary in different settings, due to inconsistent supplies, limited electricity for appropriate storage or lack of experienced staff.

Context-specific recommendation

The use of carbetocin (100 µg, IM/IV) is recommended for the prevention of PPH for all births in contexts where its cost is comparable to other effective uterotonics.

Remarks

- *This recommendation applies to women undergoing a vaginal birth or caesarean section. Skilled health personnel who are trained to administer injectable uterotonics are required.*
- *This recommendation applies only to the use of carbetocin for the prevention of PPH. Carbetocin is not currently recommended for other obstetric indications (such as labour induction, labour augmentation or treatment of PPH).*
- *The GDG noted that both heat-stable and non-heat-stable formulations of carbetocin are available. The heat-stable formulation differs from the non-heatstable formulation only in its excipients [100]. Heat-stable carbetocin does not require refrigeration and therefore eliminates the costs associated with refrigerated storage and transport for non-heat-stable uterotonics.*
- *Previous trials of carbetocin have used both intramuscular (IM) and IV administration. A WHO multicountry trial of nearly 30 000 women used a regimen of 100 µg IM carbetocin (heat-stable formulation) in a range of high-, middle- and low-income settings.*
- *Previous trials of carbetocin have all been conducted in hospital settings. While the GDG acknowledged that the effectiveness of carbetocin in preventing PPH in community settings has not been evaluated in trials, the group agreed that there is no reason to expect differential effectiveness between hospital and community settings, provided that carbetocin is administered under similar conditions as other injectable uterotonics.*

Justification

- When used for PPH prevention, carbetocin is associated with a substantial reduction in PPH (≥ 500 ml), severe PPH (≥ 1000 ml), blood transfusion and the use of additional uterotonics when compared with placebo or no uterotonic. It makes little or no difference to the risks of experiencing side-effects such as nausea, abdominal pain, headache, shivering and fever. There is probably no important variability in, or uncertainty about, how much women value the health outcomes associated with carbetocin. However, it is currently not available in all settings – and where it is available, the current unit cost is high. There is no direct evidence to suggest that carbetocin is cost-effective in settings where the cost of PPH care is moderate. Given the substantial beneficial effects and minimal side-effects, carbetocin would probably be cost-effective if the unit cost is comparable to other effective uterotonics and in settings where the cost of PPH care is substantial. Carbetocin in the current injectable form is feasible to implement as its heat-stable formulation does not require cold chain transport or refrigerated storage. However, its acceptability and impact on equity would vary across settings as the current unit cost is high.
- The contextual nature of this recommendation was informed by the current cost of using carbetocin for PPH prevention, which surpasses that of other effective uterotonics. While acknowledging that carbetocin may be cost- effective in some high-income settings (where the cost of managing PPH and its complications is high), the GDG placed its emphasis on the uncertainties regarding its costeffectiveness in lower-income settings, where effective and cheaper uterotonic options are available. However, the GDG noted that this consideration may change on the basis of a signed memorandum of understanding between WHO and the manufacturer to make the heat-stable formulation of carbetocin available in public sector health care facilities in low- and low-middle income countries at an affordable and sustainable price (comparable to the United Nations Population Fund [UNFPA] price of oxytocin) [24].

New Recommended

The use of misoprostol (either 400 µg or 600 µg, PO) is recommended for the prevention of PPH for all births.

- *The GDG noted that evidence on the efficacy of misoprostol was largely derived from trials involving women having vaginal births. However, misoprostol has been used for women undergoing caesarean section in a few trials. The GDG emphasized that there may be a need for the use of alternative routes of administration, such as rectal for women under general anaesthesia for caesarean section, or rectal or sublingual for women under spinal anaesthesia for caesarean section.*
- *The GDG noted that previous trials have largely used 600 µg or 400 µg doses of misoprostol. While there is currently no clear evidence to demonstrate that a 600 µg dose provides greater efficacy over a 400 µg dose, there is some evidence that higher doses are likely to have worse side-effects.*
- *Although different routes of administration (i.e. oral, buccal, sublingual, rectal) have been evaluated in trials of misoprostol for PPH prevention, the recommended route of administration is based on the consideration of women's preferences for oral over rectal administration.*
- *Providers administering misoprostol need to ensure that women are aware of the possible adverse effects of misoprostol (including shivering, fever and diarrhoea), and must be prepared to manage these if they occur.*
- *Misoprostol for PPH prevention can be used in both hospital and community settings.*

Justification

- When used for PPH prevention, misoprostol is associated with a substantial reduction in PPH (≥ 500 ml), severe PPH (≥ 1000 ml), blood transfusion and the use of additional uterotonics when compared with placebo or no uterotonic. In the 19 same context, however, misoprostol substantially increases the risks of shivering, fever and diarrhoea, but makes little or no difference to other side-effects. There is probably no important variability in, or uncertainty about, how much women value the health outcomes associated with misoprostol. Overall, the balance of effects favours misoprostol as these side-effects are often self-limiting. As it is inexpensive and can also be used by lay health workers in community settings, it is associated with moderate savings and is probably cost-effective, especially when implemented in settings with a shortage of skilled health personnel. It probably increases health equity as it can be applied by all health care worker cadres in any birth setting and thus increases coverage. Its acceptability may be limited in settings where providers have concerns regarding potential misuse, or where health care providers are in need of more information on its effectiveness and implementation.
- The narrative evidence supporting this recommendation and the corresponding SoF table can be found in Web Annex 3.

Context-specific recommendation

The use of ergometrine/methylergometrine (200 µg, IM/IV) is recommended for the prevention of PPH in contexts where hypertensive disorders can be safely excluded prior to its use.

- *In the context of this recommendation, hypertensive disorders of pregnancy include chronic hypertension, gestational hypertension, pre-eclampsia and eclampsia.*
- *This recommendation applies to women undergoing a vaginal birth or caesarean section. Skilled health personnel who are trained to administer injectable uterotonics are required.*
- *Women need to be informed of the possible side-effects (including hypertension, nausea, headache, vomiting and abdominal pain) prior to use. Where other options are available, women may be offered the choice of an alternative uterotonic with a better side-effect profile.*
- *Ergometrine/methylergometrine is relatively inexpensive and widely available; however, it requires refrigerated transport and storage (2–8 °C). In settings where this cannot be guaranteed, the quality and effectiveness of ergometrine/ methylergometrine may be adversely affected. In these situations, another effective uterotonic can be considered.*

Justification

- When used for PPH prevention, ergometrine/methylergometrine is associated with substantial reductions in PPH (≥ 500 ml) and the use of additional uterotonics when compared with placebo or no uterotonic. However, it is also associated with side-effects including nausea, vomiting, hypertension, headache and abdominal pain. There is no evidence of uncertainty about how much women value the health outcomes associated with ergometrine/methylergometrine. Although ergometrine/methylergometrine in the injectable form is widely available and generally acceptable and feasible to use, its cost-effectiveness and impact on health equity are not known because of the increased likelihood of side-effects, particularly hypertension, which means that the presence of skilled health personnel is required for its safe use.
- The GDG placed its emphasis on the danger of the increased risk of hypertension (50 per 1000 births) associated with ergometrine/methylergometrine use and therefore made a context-specific recommendation. The group noted that women with underlying cardiovascular disorders may be prone to further exacerbation by ergot alkaloids.
- The narrative evidence supporting this recommendation and the corresponding SoF table can be found in Web Annex 4.

New Context-specific recommendation

The use of a fixed-dose combination of oxytocin and ergometrine (5 IU/500 µg, IM) is recommended for the prevention of PPH in contexts where hypertensive disorders can be safely excluded prior to its use.

- *In the context of this recommendation, hypertensive disorders of pregnancy include chronic hypertension, gestational hypertension, pre-eclampsia and eclampsia.*
- *This recommendation applies to women undergoing a vaginal birth or caesarean section. Skilled health personnel who are trained to administer injectable uterotonics are required.*
- *The majority of trials that evaluated the efficacy of this combination have used the synthetic, fixed-dose combination of oxytocin and ergometrine (5 IU/500 µg) IM.*
- *Oxytocin and ergometrine/methylergometrine require refrigerated transport and storage (2–8 °C). In settings where this cannot be guaranteed, the quality and effectiveness of ergometrine/methylergometrine may be adversely affected. In these situations, another effective uterotonic can be considered instead of this combination.*

Justification

- When used for PPH prevention, the fixed-dose combination of oxytocin and ergometrine demonstrated a substantial reduction in PPH (≥ 500 ml), severe PPH (≥ 1000 ml), blood transfusion and the use of additional uterotonics when compared with placebo or no uterotonic. However, it probably increases women's risk of experiencing nausea and vomiting and the impact on other side-effects ranges from substantial benefits to considerable harm. While there is no clear difference in the risk of hypertension when oxytocin plus ergometrine was compared with placebo or no uterotonic, the GDG expressed concern about the potential risk of hypertension associated with the ergometrine component of this combination. Nonetheless, the group agreed that the potential benefits of this combination outweigh the harms if hypertensive disorders can be excluded. Although there is no direct evidence, oxytocin plus ergometrine combination compared with no PPH prevention might be cost-effective because the desirable effects are substantial. The combination is probably acceptable to stakeholders given that the individual components are widely used and acceptable to health care providers. However, its feasibility may be restricted in settings with limited capacity for storage of heat-sensitive uterotonics, and it may reduce health equity where screening or care for hypertensive disorders in pregnancy is not possible.
- The narrative evidence supporting this recommendation and the corresponding SoF table can be found in Web Annex 5.

New Not Recommended

Injectable prostaglandins (carboprost or sulprostone) are not recommended for the prevention of PPH.

- *Trials of systemic injectable prostaglandins for PPH prevention have used carboprost or sulprostone.*
- *Local administration of injectable prostaglandins, such as intrauterine injections during caesarean section, was not considered.*
- *This recommendation relates to the use of injectable prostaglandins for prevention of PPH only; it does not relate to the treatment of PPH.*

Justification

- When used for PPH prevention, injectable prostaglandins (carboprost and sulprostone) are not beneficial for substantive priority outcomes (severe PPH [≥ 1000 ml], blood transfusion and the use of additional uterotonics) except PPH (≥ 500 ml), for which they show a 39% risk reduction compared with placebo or no uterotonic. However, they are associated with increased risk of vomiting and diarrhoea. The associated risk of diarrhoea is particularly high with a number needed to harm (NNH) of 6. Injectable prostaglandins are currently not available in all settings and where they are available, the unit cost is high. While there is no direct evidence on cost analysis regarding these uterotonics compared to no uterotonics, they are probably not cost-effective because of lack of benefits for most priority outcomes and substantial side-effects. As they are not widely available and not routinely used for obstetric indications, their acceptability is not known and the feasibility of implementation in clinical practice would vary according to local availability. The potential costs of these uterotonics may prohibit access for women in disadvantaged regions and thus would probably reduce equity.
- The narrative evidence supporting this recommendation and the corresponding SoF table can be found in Web Annex 6.

New Recommended

In settings where multiple uterotonic options are available, oxytocin (10 IU, IM/IV) is the recommended uterotonic agent for the prevention of PPH for all births.

- *This recommendation applies to women undergoing a vaginal birth or caesarean section. Skilled health personnel who are trained to administer injectable uterotonics are required.*
- *The remarks for Recommendation 1.1 apply to this recommendation.*
- *While the GDG acknowledged that there is evidence that a combination of misoprostol and oxytocin may be more effective than oxytocin alone for some priority outcomes, there are concerns that this combination also increases important side-effects for the woman. As misoprostol and oxytocin are not available as a fixed-dose combination, and the two agents have to be administered through separate routes (parenteral and oral), the GDG considered the application of this combination less feasible when used routinely in clinical settings compared with using either oxytocin or misoprostol as a single agent. However, if the care provider and the parturient woman regard the additional benefits of a combination of misoprostol and oxytocin (over either of these agents alone) as important in improving overall maternal outcomes, the use of this combination could be considered.*

Justification

- When used for PPH prevention, oxytocin, carbetocin, misoprostol, ergometrine/ methylergometrine, and a fixed-dose combination of oxytocin and ergometrine demonstrated variable clinical benefits and side-effects ranging from minor to significant when compared with one another. As oxytocin is the most widely used and most frequently investigated of all these uterotonics, different uterotonic options have been compared with oxytocin as the reference agent across all important considerations to determine the most efficacious uterotonic option with the best safety profile, which is also cost-effective, acceptable to stakeholders, feasible to implement and likely to increase health equity.

- Carbetocin has similar desirable effects compared with oxytocin, though it is likely to be superior to oxytocin in reducing PPH (≥ 500 ml) (41 fewer events per 1000 women), use of additional uterotonics (74 fewer per 1000 women) and blood loss after birth (81 ml less on average). The mean change in haemoglobin level (before versus after birth) may be smaller among women receiving carbetocin. There is no clear difference between carbetocin and oxytocin in terms of undesirable effects. While the balance of effects probably favours carbetocin, the supply cost of carbetocin is approximately 20 times more than oxytocin and it is uncertain whether the additional benefits justify the additional cost of routinely implementing carbetocin at the current unit price. As a consequence, acceptability among stakeholders and impact on health equity would vary across settings compared with oxytocin [100].
- Misoprostol has similar desirable effects to oxytocin, but it is less effective for reducing severe PPH (≥ 1000 ml) (7 more per 1000 women). Misoprostol causes more undesirable effects than oxytocin (including nausea, vomiting, shivering, fever and diarrhoea). While misoprostol is cheaper, heat-stable, can be used orally, and is probably acceptable and feasible to use, the lower effectiveness for severe PPH and greater undesirable effects may increase costs (these costs may vary according to the setting, depending on factors such as bed costs and the approach to managing these side-effects). Misoprostol has the advantage that it can be task-shifted to lay health workers and community health workers since it requires minimal training and no additional supplies for implementation.
- There is no clear evidence of any difference in desirable effects between ergometrine/methylergometrine and oxytocin when used for PPH prevention. However, women are more likely to experience nausea (143 more per 1000 women), vomiting (38 more per 1000), headache (152 more per 1000), hypertension (618 more per 1000) and diarrhoea (17 more per 1000) with ergometrine/methylergometrine. The costs associated with managing these undesirable effects, as well as the need to screen for high blood pressure, implies that oxytocin is probably more cost-effective. Ergometrine/methylergometrine may have negative effects on health equity in settings with high rates of – or lack of screening for – hypertensive disorders.
- The fixed-dose combination of oxytocin and ergometrine is similar to oxytocin in terms of desirable outcomes, though it is possibly more effective in preventing PPH (≥ 500 ml) (44 fewer per 1000). However, it has more undesirable effects than oxytocin, including nausea (105 more per 1000 women), vomiting (54 more per 1000) and diarrhoea (9 more per 1000). The balance of effects clearly favours oxytocin. The costs related to managing associated undesirable effects, as well as the need to screen for women with hypertensive disorders due to concern regarding the ergometrine component, imply that oxytocin is probably more cost-effective. Compared with oxytocin alone, the combination of oxytocin and ergometrine may have a negative impact on health equity, particularly in settings with limited capacity and capability to routinely screening for hypertensive disorders of pregnancy.
- The combination of oxytocin plus misoprostol is probably superior to oxytocin alone in terms of blood transfusion (11 fewer per 1000), additional uterotonic use (58 fewer per 1000) and blood loss (88 ml less on average). The combination may possibly prevent more PPH (≥ 500 ml) (44 fewer per 1000) and result in a smaller mean change in haemoglobin level (before versus after birth) compared with oxytocin. However, this combination is associated with more undesirable effects than oxytocin, including nausea (90 more per 1000), vomiting (31 more per 1000), diarrhoea (12 more per 1000), shivering (238 more per 1000) and fever (62 more per 1000). In view of the substantial side- effects, the balance of effects favours oxytocin. Consequently, the cost-effectiveness of the combination may vary in different settings – costs may be reduced due to some improved desirable outcomes, but costs may increase for management of undesirable effects. The feasibility of the oxytocin plus misoprostol combination is limited due to the complexity of using two separate medications through different routes of administration.
- The narrative evidence supporting these recommendations and the corresponding SoF tables can be found in Web Annex 7.

New Recommended

In settings where oxytocin is unavailable (or its quality cannot be guaranteed), the use of other injectable uterotonics (carbetocin, or if appropriate ergometrine/methylergometrine, or oxytocin and ergometrine fixed-dose combination) or oral misoprostol is recommended for the prevention of PPH.

- *This recommendation applies to women undergoing a vaginal birth or caesarean section. Skilled health personnel who are trained to administer injectable uterotonics are required for carbetocin, ergometrine/ methylergometrine or the fixed-dose combination of oxytocin and ergometrine.*
- *The GDG acknowledged recent evidence that oxytocin (as well as other uterotonics) in some settings may be of poor quality and would therefore be less effective or ineffective in preventing PPH. Health systems stakeholders need to ensure that the manufacture and cold-chain transport and storage of oxytocin is sufficiently rigorous to ensure good quality.*
- *The GDG emphasized that any other uterotonic agent that is considered as a potential alternative to oxytocin in the context of this recommendation needs to be quality certified. Where the quality of oxytocin is considered compromised due to inadequate cold-chain transport and storage conditions, heat-sensitive uterotonic agents such as ergometrine/methylergometrine or oxytocin and ergometrine fixeddose combination, which have been transported and stored under similar conditions as the oxytocin, are not suitable options either. In these situations, heat-stable uterotonic agents (heat-stable formulation of carbetocin or misoprostol) may be more suitable options, depending on the context.*
- *The recommended doses and routes of administration for these uterotonic options are:*
- *carbetocin, 100 µg (IM/IV), in contexts where its cost is comparable to other effective uterotonics (see Recommendation 1.2);*
- *misoprostol, either 400 µg or 600 µg (PO) (see Recommendation 1.3);*
- *ergometrine/methylergometrine, 200 µg (IM/IV), in contexts where hypertensive disorders can be safely excluded prior to its use (see Recommendation 1.4); and*
- *oxytocin and ergometrine fixed-dose combination, 5 IU/500 µg (IM), in contexts where hypertensive disorders can be safely excluded prior to its use (see Recommendation 1.5).*

Justification

- When used for PPH prevention, oxytocin, carbetocin, misoprostol, ergometrine/ methylergometrine, and a fixed-dose combination of oxytocin and ergometrine demonstrated variable clinical benefits and side-effects ranging from minor to significant when compared with one another. As oxytocin is the most widely used and most frequently investigated of all these uterotonics, different uterotonic options have been compared with oxytocin as the reference agent across all important considerations to determine the most efficacious uterotonic option with the best safety profile, which is also cost-effective, acceptable to stakeholders, feasible to implement and likely to increase health equity.
- Carbetocin has similar desirable effects compared with oxytocin, though it is likely to be superior to oxytocin inreducing PPH (≥ 500 ml) (41 fewer events per 1000 women), use of additional uterotonics (74 fewer per 1000 women) and blood loss after birth (81 ml less on average). The mean change in haemoglobin level (before versus after birth) may be smaller among women receiving carbetocin. There is no clear difference between carbetocin and oxytocin in terms of undesirable effects. While the balance of effects probably favours carbetocin, the supply cost of carbetocin is approximately 20 times more than oxytocin and it is uncertain whether the additional benefits justify the additional cost of routinely implementing carbetocin at the current unit price. As a consequence, acceptability among stakeholders and impact on health equity would vary across settings compared with oxytocin.
- Misoprostol has similar desirable effects to oxytocin, but it is less effective for reducing severe PPH (≥ 1000 ml) (7 more per 1000 women). Misoprostol causes more undesirable effects than oxytocin (including nausea, vomiting, shivering, fever and diarrhoea). While misoprostol is cheaper, heat-stable, can be used orally, and is probably acceptable and feasible to use, the lower effectiveness for severe PPH and greater undesirable effects may increase costs (these costs may vary according to the setting, depending on factors such as bed costs and the approach to managing these side-effects). Misoprostol has the advantage that it can be task-shifted to lay health workers and community health workers since it requires minimal training and no additional supplies for implementation.

- There is no clear evidence of any difference in desirable effects between ergometrine/methylergometrine and oxytocin when used for PPH prevention. However, women are more likely to experience nausea (143 more per 1000 women), vomiting (38 more per 1000), headache (152 more per 1000), hypertension (618 more per 1000) and diarrhoea (17 more per 1000) with ergometrine/methylergometrine. The costs associated with managing these undesirable effects, as well as the need to screen for high blood pressure, implies that oxytocin is probably more cost-effective. Ergometrine/methylergometrine may have negative effects on health equity in settings with high rates of – or lack of screening for – hypertensive disorders.
- The fixed-dose combination of oxytocin and ergometrine is similar to oxytocin in terms of desirable outcomes, though it is possibly more effective in preventing PPH (≥ 500 ml) (44 fewer per 1000). However, it has more undesirable effects than oxytocin, including nausea (105 more per 1000 women), vomiting (54 more per 1000) and diarrhoea (9 more per 1000). The balance of effects clearly favours oxytocin. The costs related to managing associated undesirable effects, as well as the need to screen for women with hypertensive disorders due to concern regarding the ergometrine component, imply that oxytocin is probably more cost-effective. Compared with oxytocin alone, the combination of oxytocin and ergometrine may have a negative impact on health equity, particularly in settings with limited capacity and capability to routinely screening for hypertensive disorders of pregnancy.
- The combination of oxytocin plus misoprostol is probably superior to oxytocin alone in terms of blood transfusion (11 fewer per 1000), additional uterotonic use (58 fewer per 1000) and blood loss (88 ml less on average). The combination may possibly prevent more PPH (≥ 500 ml) (44 fewer per 1000) and result in a smaller mean change in haemoglobin level (before versus after birth) compared with oxytocin. However, this combination is associated with more undesirable effects than oxytocin, including nausea (90 more per 1000), vomiting (31 more per 1000), diarrhoea (12 more per 1000), shivering (238 more per 1000) and fever (62 more per 1000). In view of the substantial side- effects, the balance of effects favours oxytocin. Consequently, the cost-effectiveness of the combination may vary in different settings – costs may be reduced due to some improved desirable outcomes, but costs may increase for management of undesirable effects. The feasibility of the oxytocin plus misoprostol combination is limited due to the complexity of using two separate medications through different routes of administration.
- The narrative evidence supporting these recommendations and the corresponding SoF tables can be found in Web Annex 7.

New Recommended

In settings where skilled health personnel are not present to administer injectable uterotonics, the administration of misoprostol (400 µg or 600 µg, PO) by community health workers and lay health workers is recommended for the prevention of PPH.

- *Skilled health personnel who provide care during childbirth are defined by the 2018 joint statement by WHO, the United Nations Population Fund (UNFPA), the United Nations Children's Fund (UNICEF), the International Confederation of Midwives (ICM), the International Council of Nurses (ICN), the International Federation of Gynecology and Obstetrics (FIGO) and the International Pediatric Association (IPA) as competent maternal and newborn health (MNH) professionals who hold identified MNH competencies; are educated, trained and regulated to national and international standards; and are supported within an enabling environment in the health system [101].*
- *The GDG acknowledged that there are settings where skilled health personnel may not be present, or where they may not have been trained to administer injectable uterotonics appropriately. In these settings, oral misoprostol would be the preferred uterotonic.*

Justification

- When used for PPH prevention, oxytocin, carbetocin, misoprostol, ergometrine/ methylergometrine, and a fixed-dose combination of oxytocin and ergometrine demonstrated variable clinical benefits and side-effects ranging from minor to significant when compared with one another. As oxytocin is the most widely used and most frequently investigated of all these uterotonics, different uterotonic options have been compared with oxytocin as the reference agent across all important considerations to determine the most efficacious uterotonic option with the best safety profile, which is also cost-effective, acceptable to stakeholders, feasible to implement and likely to increase health equity.
- Carbetocin has similar desirable effects compared with oxytocin, though it is likely to be superior to oxytocin in reducing PPH (≥ 500 ml) (41 fewer events per 1000 women), use of additional uterotonics (74 fewer per 1000 women) and blood loss after birth (81 ml less on average). The mean change in haemoglobin level (before versus after birth) may be smaller among women receiving carbetocin. There is no clear difference between carbetocin and oxytocin in terms of undesirable effects. While the balance of effects probably favours carbetocin, the supply cost of carbetocin is approximately 20 times more than oxytocin and it is uncertain whether the additional benefits justify the additional cost of routinely implementing carbetocin at the current unit price. As a consequence, acceptability among stakeholders and impact on health equity would vary across settings compared with oxytocin.
- Misoprostol has similar desirable effects to oxytocin, but it is less effective for reducing severe PPH (≥ 1000 ml) (7 more per 1000 women). Misoprostol causes more undesirable effects than oxytocin (including nausea, vomiting, shivering, fever and diarrhoea). While misoprostol is cheaper, heat-stable, can be used orally, and is probably acceptable and feasible to use, the lower effectiveness for severe PPH and greater undesirable effects may increase costs (these costs may vary according to the setting, depending on factors such as bed costs and the approach to managing these side-effects). Misoprostol has the advantage that it can be task-shifted to lay health workers and community health workers since it requires minimal training and no additional supplies for implementation.
- There is no clear evidence of any difference in desirable effects between ergometrine/ methylergometrine and oxytocin when used for PPH prevention. However, women are more likely to experience nausea (143 more per 1000 women), vomiting (38 more per 1000), headache (152 more per 1000), hypertension (618 more per 1000) and diarrhoea (17 more per 1000) with ergometrine/ methylergometrine. The costs associated with managing these undesirable effects, as well as the need to screen for high blood pressure, implies that oxytocin is probably more cost-effective. Ergometrine/ methylergometrine may have negative effects on health equity in settings with high rates of – or lack of screening for – hypertensive disorders.

- The fixed-dose combination of oxytocin and ergometrine is similar to oxytocin in terms of desirable outcomes, though it is possibly more effective in preventing PPH (≥ 500 ml) (44 fewer per 1000). However, it has more undesirable effects than oxytocin, including nausea (105 more per 1000 women), vomiting (54 more per 1000) and diarrhoea (9 more per 1000). The balance of effects clearly favours oxytocin. The costs related to managing associated undesirable effects, as well as the need to screen for women with hypertensive disorders due to concern regarding the ergometrine component, imply that oxytocin is probably more cost-effective. Compared with oxytocin alone, the combination of oxytocin and ergometrine may have a negative impact on health equity, particularly in settings with limited capacity and capability to routinely screening for hypertensive disorders of pregnancy.
- The combination of oxytocin plus misoprostol is probably superior to oxytocin alone in terms of blood transfusion (11 fewer per 1000), additional uterotonic use (58 fewer per 1000) and blood loss (88 ml less on average). The combination may possibly prevent more PPH (≥ 500 ml) (44 fewer per 1000) and result in a smaller mean change in haemoglobin level (before versus after birth) compared with oxytocin. However, this combination is associated with more undesirable effects than oxytocin, including nausea (90 more per 1000), vomiting (31 more per 1000), diarrhoea (12 more per 1000), shivering (238 more per 1000) and fever (62 more per 1000). In view of the substantial side- effects, the balance of effects favours oxytocin. Consequently, the cost-effectiveness of the combination may vary in different settings – costs may be reduced due to some improved desirable outcomes, but costs may increase for management of undesirable effects. The feasibility of the oxytocin plus misoprostol combination is limited due to the complexity of using two separate medications through different routes of administration.
- The narrative evidence supporting these recommendations and the corresponding SoF tables can be found in Web Annex 7.

1.5.4 WHO recommendation on calcium supplementation before pregnancy for the prevention of pre-eclampsia and its complications

[102]

New **Recommendation in Research Context**

Pre-pregnancy calcium supplementation for the prevention of pre-eclampsia and its complications is recommended only in the context of rigorous research.

- *The GDG noted that in 2018 WHO revalidated the recommendation that in populations with low dietary calcium intake, daily calcium supplementation (1.5–2.0 g oral elemental calcium) is recommended for pregnant women to reduce the risk of pre-eclampsia [103]. However, there is insufficient evidence to determine with precision at what gestational age calcium supplementation should be commenced in order to confer this benefit. The 2018 recommendation specified that stakeholders may wish to commence calcium supplementation at the first antenatal care contact, in order to optimize compliance with this regimen. Evidence review on initiation of calcium supplementation before pregnancy and continuing through pregnancy, however, shows that it remains uncertain whether this will confer additional health benefits, and further research is required.*
- *Food fortification of staple foods with calcium may be an important public health intervention in settings where dietary calcium intake is low. Dietary counselling of all women who are considering pregnancy should promote adequate calcium intake through locally available, calcium-rich foods. Adequate calcium intake could be easily achieved by the incorporation of dairy products in the diet on a daily basis. However, dairy products are not part of all regular diets, or are not available in certain populations. Likewise, a high-salt diet decreases bodycalcium retention compared to a diet that is low in salt. Caffeine and protein can also induce hypercalciuria, but to a much lesser extent. This has become more important in recent years due to the consumption of caffeine-containing beverages such as soda and energy drinks.*

Justification

- Low-certainty evidence suggests that starting calcium supplementation before and/or early in pregnancy (compared to placebo or no treatment) may make little or no difference to women's risk of developing hypertensive disorders during pregnancy. The estimate of effect of this intervention on the outcome "pre-eclampsia and/or pregnancy loss and/or stillbirth at any gestational age" included the possibility of a risk reduction, but the 95% confidence interval touched the line of no effect. There is a possibility of clinical benefit for those women with greater than 80% compliance with calcium supplementation. However, this is uncertain and needs further research. The maternal adverse effects of the intervention are not known.
- The acceptability of calcium supplementation by women may vary – while women may value nutritional interventions that can lead to a healthy baby and a positive pregnancy experience, calcium tablets can be large, have a powdery texture and be unpalatable to consume. Feasibility may also be limited in settings where calcium is not always available due to logistical or staff constraints or cost. In addition, limited access to pre-conception healthcare services may be a barrier to the provision of calcium supplements prior to pregnancy. The cost-effectiveness of this intervention is not known.

1.5.5 WHO recommendation: calcium supplementation during pregnancy for prevention of pre-eclampsia and its complications

[103]

Context-specific recommendation, moderate-certainty evidence

In populations with low dietary calcium intake, daily calcium supplementation (1.5–2.0g oral elemental calcium) is recommended for pregnant women to reduce the risk of pre-eclampsia.

Remarks

- *This recommendation is consistent with the 2016 WHO recommendations on antenatal care for a positive pregnancy experience [1].*
- *Dietary counselling of pregnant women should promote adequate calcium intake through locally available, calcium-rich foods.*
- *Dividing the dose of calcium may improve acceptability. The suggested scheme for calcium supplementation is 1.5-2.0g daily, with the total dose divided into three doses, preferably taken at mealtimes.*
- *Negative interactions between iron and calcium supplements may occur. Therefore, the two micronutrients should preferably be administered several hours apart rather than concomitantly [104].*
- *As there is no clear evidence on the timing of initiation of calcium supplementation, stakeholders may wish to commence supplementation at the first antenatal care contact, in order to improve compliance to the regimen.*
- *To reach the most vulnerable populations and ensure a timely and continuous supply of supplements, stakeholders may wish to consider task shifting the provision of calcium supplementation in community settings with poor access to healthcare professionals [31].*
- *The implementation and impact of this recommendation should be monitored at the health service, regional and country levels based on clearly defined criteria and indicators associated with locally agreed targets. Barriers, enablers and pathways should be evaluated to inform integration of this recommendation into the antenatal care package.*

1.5.6 Diagnostic Criteria and Classification of Hyperglycaemia First Detected in Pregnancy

[105]

New **Recommended; Strength and Quality not evaluated or graded**

Hyperglycaemia first detected at any time during pregnancy should be classified as either:

- Diabetes mellitus in pregnancy
- Gestational diabetes mellitus

1.5.7 Global guidelines for the prevention of surgical site infection, 2nd ed.

[106]

New **Conditional recommendation, moderate quality of evidence**

It is good clinical practice for patients to bathe or shower prior to surgery.

The panel suggests that either a plain or antimicrobial soap may be used for this purpose.

The panel decided not to formulate a recommendation on the use of chlorhexidine gluconate (CHG)-impregnated cloths for the purpose of reducing SSI due to the limited and very low quality evidence.

- *Although no study including paediatric patients was retrieved, the GDG believes that the Good practice statement on the importance of patient bathing applies also to paediatric patients. However, if performed with antimicrobial soap, the manufacturer's instructions should be followed regarding the suitability for this age category.*
- *The GDG identified possible harm associated with the use of CHG-containing solutions, although it was stressed that this is a rare occurrence. Two studies [107][108] found that CHG solutions may cause skin irritation, delayed reactions, such as contact dermatitis and photosensitivity, and hypersensitivity reactions in very rare cases, such as anaphylactic shock. Some of these potential adverse events may be induced also by ingredients of regular soap, such as fragrances. A concern of the GDG was the possible development of reduced susceptibility to CHG, particularly when using CHG-impregnated cloths [109].*
- *The GDG also expressed concern about the cost of CHG-impregnated cloths, in particular in settings with limited resources where other interventions may have a higher priority.*

Justification

- The GDG considers it good clinical practice to bathe or shower before surgery to ensure that the skin is as clean as possible and to reduce the bacterial load, especially at the site of incision. Moderate quality evidence shows that preoperative bathing with antimicrobial soap containing CHG has neither benefit nor harm compared to plain soap in reducing the SSI rate. As no study was available using antimicrobial agents other than CHG, the GDG unanimously agreed that either plain or antimicrobial soap may be used.
- Evaluation of the evidence from 3 observational studies showed that preoperative bathing with 2% CHG-impregnated cloths may have some benefit in reducing the SSI rate when compared to bathing with CHG soap or no preoperative bathing. However, in 2 of these studies, the comparison group was inadequate as it included patients who did not comply with instructions to use the cloths preoperatively. This limited and very low quality evidence was considered as insufficient to make any recommendation regarding the use of CHG cloths. All GDG members agreed not to formulate a recommendation on this topic, apart from one member who would have preferred to have a recommendation discouraging the use of CHG-impregnated cloths due to concerns about the waste of resources if these products are purchased, especially in developing countries.

New

Conditional recommendation, moderate quality of evidence

The panel suggests considering to treat also patients with known nasal carriage of S. aureus undergoing other types of surgery with perioperative intranasal applications of mupirocin 2% ointment with or without a combination of CHG body wash.

- *Included studies were performed in adult patients undergoing cardiac, orthopaedic, general, gynaecological, neurological, Mohs micrographic, vascular and gastrointestinal surgery. Based on this evidence, this recommendation is not applicable to paediatric patients.*
- *The available evidence focused on the nasal carriage of S. aureus. Other body sites of frequent and/or known colonization could be considered for decolonization. However, due to the lack of substantial evidence, no recommendation can be made in this direction.*
- *Studies were performed mostly in high-income countries.*
- *Mupirocin nasal ointment at a concentration of 2% was used in all included studies. In 2 of the included 6 studies [110][111] CHG 4% soap was used for full body wash in combination with the mupirocin nasal ointment. In one study [112] CHG 2% soap body wash was used as standard preoperative clinical practice.*
- *The application of mupirocin varied from 2 times a day for 5 days [111][113][114] to 7 days [112] before surgery or from the day of hospital admission until the day of surgery [115]. Daily administration was continued after surgery for a total of 5 days only in one trial [110]. In all studies, at least one administration took place in the immediate preoperative period. Given the variability of treatment protocols, the GDG was unable to give specific instructions about the frequency and duration of mupirocin administration.*
- *The GDG identified AMR as an important possible harm associated with the use of mupirocin [116]. It was emphasized that an approach to treat all patients, regardless of their carriage status, instead of carriers only increases the likelihood of resistance to mupirocin [117][118]. Consequently, monitoring of AMR is recommended in facilities where mupirocin is used [119][120][121]. The available evidence [112][114][115] and additional studies [122][123] showed no trend towards an increasing prevalence of mupirocin resistance following its short-term use in surgical patients. However, there is evidence that the increased short-term use of mupirocin leads to an increase of resistance to mupirocin and other antibiotics [124]. Moreover, in settings known to have a high prevalence of mupirocin resistance, the recommendation to use perioperative intranasal mupirocin ointment may not apply.*
- *Potential allergic reactions to mupirocin should be accounted for.*
- *One recent study [125] showed a reduction in mortality at one year in patients receiving mupirocin compared to patients receiving placebo. The present review of the evidence based on 3 studies [110][111][114] did not find an effect on short-term mortality (up to 8 weeks follow-up).*
- *The GDG identified a possible harm associated with the use of CHG-containing solutions, although it was stressed that this is a rare occurrence. Two studies [107][108] found that CHG solutions may cause skin irritation, delayed reactions (such as contact dermatitis and photosensitivity) and hypersensitivity reactions in very rare cases, such as anaphylactic shock. Some of these potential adverse events may be induced also by ingredients of regular soap, such as fragrances. A concern of the GDG was the possible development of reduced susceptibility to CHG [109].*

Justification

- Moderate quality evidence shows that the use of mupirocin 2% ointment with or without a combination of CHG body wash in surgical patients with S. aureus nasal carriage has significant benefit when compared to placebo/no treatment in reducing the S. aureus SSI rate, as well as the overall S. aureus HAI rate.
- The GDG carefully considered this evidence and the additional subgroup analysis conducted by the systematic review team. The GDG concluded that the evidence is most solid for the cardiothoracic and orthopaedic patient population and that recommending the intervention with the same strength for all surgical patients would pose cost and feasibility constraints, including diagnostic implications to identify carriers among all surgical patients.

- As a result, the GDG agreed to recommend that cardiothoracic and orthopaedic surgical patients with known nasal carriage of S. aureus should receive perioperative intranasal applications of mupirocin 2% ointment with or without a combination of CHG body wash. The strength of this recommendation was considered to be strong. Although the risk and consequences of postoperative S. aureus infection are more relevant in cardiothoracic and orthopaedic surgery, the GDG noted that the data from the meta-analysis and meta-regression show that patients with known S. aureus nasal carriage undergoing other types of surgery might also benefit from perioperative intranasal applications of mupirocin 2% ointment with or without a combination of CHG body wash. The strength of this recommendation was considered to be conditional and the GDG proposed to use the terminology "The panel suggests considering..." to highlight the need for careful local evaluation about whether and how to apply this recommendation, in particular regarding feasibility of carriers' identification in a broader surgical patient population and cost effectiveness.
- In patients undergoing other types of surgery to be targeted with this intervention, it is advisable to take other factors into account, such as the local rates of S. aureus and methicillin-resistant S. aureus (MRSA) and patient-related factors. Among the latter, the most important are past S. aureus infection, known carrier status of community-acquired MRSA, and patients colonized by S. aureus in sites other than the nose.
- The GDG emphasized that the recommendation to use mupirocin with or without a combination of CHG body wash is derived from the available evidence as CHG 4% soap was used for full body wash in combination with mupirocin nasal ointment in 2 of the included 6 studies. Moreover, in one study CHG 2% soap body wash was used as standard preoperative clinical practice.
- The GDG highlighted that the studies identified as the evidence base for these recommendations did not assess screening for S. aureus as part of the intervention. Consequently, no recommendation can be formulated on the role of screening in this context or the surgical patient population that should undergo screening for S. aureus carriage. The GDG noted also that standard operating procedures should be agreed upon according to national recommendations and the decision based on the local epidemiology, the patient's risk factors for S. aureus acquisition, the microbiological capacity and financial resources available at the health care facility. The GDG emphasized that this recommendation applies to facilities where screening for S. aureus is feasible. The GDG strongly believes also that decolonization with mupirocin ointment with or without a combination of CHG body wash should be performed on known S. aureus carriers only in order to avoid unnecessary treatment and the spread of resistance.

New

Strong recommendation, low quality of evidence

The panel recommends the administration of SAP prior to the surgical incision when indicated (depending on the type of operation).

Strong recommendation, moderate quality of evidence

The panel recommends the administration of SAP within 120 minutes before incision, while considering the half-life of the antibiotic.

- *It is not within the scope of these guidelines to provide recommendations on what type of operations require SAP and the antibiotics, doses and intraoperative redosing rules that should be used. Separate specific guidelines will be made available by WHO on this topic. Examples of procedures that do not require SAP are clean orthopaedic operations not involving implantation of foreign materials or low-risk elective laparoscopic procedures.*
- *The body of retrieved evidence focused on adult patients and no study was available in the paediatric population. However, the GDG considers this recommendation valid also for paediatric patients.*
- *In the included studies, the information was generally unclear regarding the duration of the procedure, re-dosing protocol, exact timing of the administration, infusion time and whether the half-life of the administered antibiotics was taken into account.*
- *Studies on caesarean section were not included in this review as they compared pre-incisional administration of SAP vs. administration after cord clamping. A recent systematic review on caesarean section indicated that SAP should be administered prior to incision in order to reduce maternal infectious morbidities [126]. This aligns with the recommendations in other surgical procedures where SAP is indicated.*
- *The guidelines of the American Society of Health-System Pharmacists (ASHSP) [127] recommend that intraoperative re-dosing is needed if the duration of the procedure exceeds 2 half-lives of the drug or if there is excessive blood loss during the procedure. While the benefit of this approach seems reasonable from a drug pharmacokinetic aspect, the reviewed studies have not addressed in SAP protocols the duration of surgical procedures or re-dosing in relation to SSI. No recommendation could be concluded on the benefit or harm of this approach.*
- *Some guidelines distinguish that some antibiotics require administration over 1-2 hours, such as fluoroquinolones and vancomycin. Therefore, the administration of these agents should begin within 120 minutes before the surgical incision. The literature search has not identified studies with SSI as an outcome that differentiate between the timing of administration of antibiotics requiring a longer period and those with a shorter administration timing. Clinicians should consider the half-life and protein binding as the most important pharmacokinetic parameters of any single SAP agent in order to ensure adequate serum and tissue concentration at the time of incision and during the entire surgical procedure.*

Justification

1. Overall low quality evidence shows that the administration of SAP after the incision causes harm with a significant increase of the SSI risk compared with administration of SAP prior to incision. Adequate tissue concentrations of the antibiotic should be present at the time of incision and throughout the procedure for SAP to be effective. This necessitates administration prior to incision. Further evidence shows that a low tissue concentration of antibiotics at the time of wound closure is associated with higher SSI rates (1, 2). As a result, the GDG unanimously agreed to recommend the administration of SAP prior to incision and decided that the strength of this recommendation should be strong, although the overall quality of evidence is low. It is unlikely that higher quality evidence will be available in the future and indeed it would be unethical to perform a study where SAP is only administered post-incision because of the risk to cause significant harm.

2. A moderate quality of evidence comparing different time intervals prior to incision shows significant harm when SAP is administered before 120 minutes compared to within 120 minutes pre-incision. Given the significant increase of SSI with SAP administration more than 120 minutes before incision, the GDG decided to recommend SAP administration within 120 minutes pre-incision. A further analysis of data from studies assessing the effect of SAP administration on SSI at different time intervals within the 120-minute pre-incision period was performed, that is, 120-60 minutes vs. 60-0 minutes and

60-30 minutes vs. 30-0 minutes. No significant difference was found. Therefore, based on the available evidence, it is not possible to establish more precisely the optimal timing within the 120-minute interval.

Several GDG members expressed concern that serum and tissue concentrations of antibiotics with a short half-life may be less effective than administration closer to the time of incision if given early in this time interval. For this reason, the GDG recommends to take into account the half-life of the administered antibiotics in order to establish the exact time of administration within 120 minutes pre-incision (for example, administration closer to the incision time [<60 minutes] for antibiotics with a short half-life, such as cefazolin, cefoxitin and penicillins in general).The same attention should be paid to the single antibiotic half-life when considering re-dosing during prolonged surgery. Concerns about antibiotic protein binding may arise when choosing highly-bound antimicrobials, such as ceftriaxone, teicoplanin or ertapenem. Under particular pathophysiological conditions (for example, patients with a low level of serum proteins, such as the critically ill or very elderly individuals), such drug disposition may indeed be affected. In addition, malnourishment, obesity, cachexia or renal disease with protein loss may result in suboptimal antibiotic exposure through increased antibiotic clearance in the presence of normal or augmented renal function, including overexposure and potential toxic effects in the presence of severely impaired renal function.

New

Strong recommendation against, moderate quality of evidence

The panel recommends that in patients undergoing any surgical procedure, hair should either not be removed or, if absolutely necessary, it should be removed only with a clipper. Shaving is strongly discouraged at all times, whether preoperatively or in the operating room (OR).

- *The body of retrieved evidence focused on adult patients and no study was available in the paediatric population. However, the GDG considers this recommendation valid also for paediatric patients.*
- *When analysed separately, there was no significant difference between clipping and shaving compared to no hair removal, but clipping was found to be significantly beneficial when compared to shaving. The GDG decided that no hair removal and clipping should be compared to shaving in the same group as they are both similar in nature.*
- *It was noted that only one study [128] compared different times of hair removal (night before vs. day of surgery for both shaving and clipping). This study showed no clear evidence favouring any of the times for either method. Therefore, the GDG agreed that no recommendation regarding the timing of hair removal could be given. However, it was acknowledged that if hair is removed, removal shortly before surgery could be the most practical and safest approach.*
- *No studies were identified evaluating the effect of settings where hair removal is performed (OR vs. ward or home) with the outcome of SSI. Thus, the GDG agreed that no recommendation could be developed regarding the location of hair removal with clippers when this is necessary.*
- *The GDG did not identify any possible harm associated with no hair removal or using clippers.*

Justification

- For the formulation of the recommendation, the GDG considered the meta-analysis comparing clipping and no hair removal vs. shaving to be the most relevant. Moderate quality evidence shows a clear benefit of either no hair removal or clipping when compared to shaving with a significant decrease of the SSI risk.
- As a result, the GDG unanimously agreed to recommend that hair should either not be removed or, if absolutely necessary, it should be removed only with a clipper and the strength of this recommendation should be strong.

New Strong recommendation, low to moderate quality of evidence

The panel recommends alcohol-based antiseptic solutions based on CHG for surgical site skin preparation in patients undergoing surgical procedures.

- *The body of retrieved evidence focused on adult patients and no study was available in the paediatric population. Therefore, the effectiveness of this intervention is not proven for paediatric patients.*
- *Although the systematic review time limits for inclusion were set to a publication date between 1 January 1960 and 15 August 2014, a relevant trial published on 4 February 2016 was exceptionally included after discussion with the WHO Guidelines Review Committee and the GDG. The GDG was confident that no additional relevant trial had been published since the systematic review set date and therefore the search was not fully updated.*
- *According to the available studies, a sub-analysis of the comparison of alcohol-based antiseptic solutions vs. aqueous solutions was performed. A significant benefit in reducing the risk of SSI was observed with CHG in an alcohol-based solution compared to PVP-I in an aqueous solution. No significant difference was found between alcohol-based vs. aqueous PVP-I solutions. Most of the included studies used isopropyl alcohol at a concentration of 70-74%. Concentrations of the iodophor compound ranged from 0.7-10% and from 0.5-4% for CHG. Due to this heterogeneity and the lack of data to confirm any one direction, the GDG did not feel comfortable to include a statement about the concentration of the antiseptic compound in the recommendation.*
- *Washing the patient's skin with detergents or antiseptics is dealt with in chapter 4.1 and should be performed separately outside of the OR, whereas surgical site skin preparation is done prior to surgery within the OR.*
- *The GDG identified possible harms associated with the use of alcohol-based solutions and it was highlighted that they should not be used on neonates or be in contact with mucosa or eyes. CHG solutions must not be allowed to come into contact with the brain, meninges, eye or middle ear. As alcohol is highly flammable, alcohol-based antiseptic preparations may ignite if used in the presence of diathermy and they must be allowed to dry by evaporation. Therefore, it is advisable to ensure that the drapes are not saturated with alcohol or that the alcohol-based solution has not formed a pool underneath the patient before operating. While possible allergies should be accounted for (for example, to PVP-I), it should be noted that CHG has a potential risk of causing skin irritation. OR staff should be trained and informed about the potential harms associated with the solutions used for surgical site preparation.*

Justification

- Moderate quality evidence shows that the use of alcohol-based antiseptic solutions for surgical site skin preparation is more effective compared to aqueous solutions in reducing SSI. A meta-analysis of available studies (low quality of evidence) showed that alcohol-based CHG is beneficial in reducing SSI rates compared to alcohol-based povidone- iodine (PVP-I). As a result, the GDG agreed to recommend the use of an alcohol-based antiseptic solution preferably based on CHG for surgical site preparation on intact skin. The strength of this recommendation was considered to be strong.
- The GDG discussed whether to formulate the recommendation for adult patients only or to make a recommendation for all patients. The body of evidence focused on adult patients. The paediatric population was not represented as most commercially-available products have no indications for use in these patients due to the lack of studies in this population. By contrast, the GDG emphasized that it is unlikely that high quality evidence will be available in the future on paediatric patients, mainly due to ethical reasons.

New

Conditional recommendation against, very low quality of evidence

The panel suggests that antimicrobial sealants should not be used after surgical site skin preparation for the purpose of reducing SSI.

- *The body of retrieved evidence mainly focused on adult patients, but one study also included children. This recommendation is valid for both patient populations.*
- *The GDG observed that most studies investigating cyanoacrylate-based antimicrobial sealants were funded by manufacturers of commercial sealants.*
- *All included studies investigated the use of antimicrobial sealants on the skin of the surgical site before incision.*
- *Although the type and concentration of the antiseptics used for skin preparation varied among the included studies, the GDG underlined that the intervention and control groups in each of the studies received the same skin preparation technique, while antimicrobial sealants were added in the intervention group.*
- *The GDG identified skin irritation and allergic reactions as possible harms associated with the use of antimicrobial sealants.*

Justification

- Overall very low quality evidence from eight RCTs and one quasi-randomized trial shows that the preoperative application of antimicrobial skin sealants, in addition to standard surgical site skin preparation, produces neither benefit nor harm in reducing the SSI rate. The GDG unanimously agreed that there is no advantage in using antimicrobial sealants and suggested not using them. Given the quality of the evidence, the GDG decided that the strength of this recommendation should be conditional.

New

Strong recommendation, moderate quality evidence

The panel recommends that surgical hand preparation should be performed by scrubbing with either a suitable antimicrobial soap and water or using a suitable alcohol-based handrub before donning sterile gloves.

- *The available evidence on SSI as an outcome is limited to three RCTs. The trials compared handrubbing (with alcohol-based preparations) vs. handscrubbing (with PVP-I, CHG or plain soap) for surgical hand preparation and showed no significant difference between the two methods.*
- *Evidence from additional studies using the bacterial load on participants' hands as the outcome demonstrated that some ABHR formulations are more effective to reduce colony-forming units than scrubbing with water and antimicrobial or plain soap. The relevance of this outcome to the risk of SSI remains uncertain and the GDG considered this as indirect evidence and concluded that the recommendation could not be developed based on this surrogate outcome. Only evidence from RCTs with an SSI outcome was taken into account for the recommendation development.*
- *The WHO hand hygiene guidelines recommend preferably using "a product ensuring sustained activity". It was assumed that the sustained activity ensured by certain products (for example, CHG) was desirable, but there was no evidence that these products were more effective in directly reducing the risk of SSI. In the absence of such evidence, the GDG decided not to make any recommendations on specific products with or without a sustained effect and it emphasized the need to define what is considered a "suitable" product.*
- *The hands of the surgical team should be clean upon entering the OR by washing with a nonmedicated soap. Once in the operating area, repeating handrubbing or scrubbing without an additional prior handwash is recommended before switching to the next procedure.*
- *It should be kept in mind that the activity of ABHRs may be impaired if hands are not completely dried before applying the product or by the handwashing itself. Hence, surgical handscrub and surgical handrub with alcohol-based products should not be combined sequentially [129].*

- *When choosing ABHR, health care facilities should regularly procure products with proven efficacy (that is, complying with European norms or those of the American Society for Testing and Materials or equivalent international standards) to implement this recommendation and position no-touch or elbow-operated dispensers in surgical scrub rooms. Alternatively, antimicrobial soap, clean running water and disposable or clean towels for each health care worker should be available in the scrub room.*
- *In LMICs where ABHR availability is limited, WHO strongly encourages facilities to undertake the local production of an alcohol-based formulation according to WHO guidance, which has been demonstrated to be a feasible and low-cost solution [129][130].*
- *Skin irritation, dryness, dermatitis and some rare allergic reactions are adverse events that can occur following frequent scrubbing for surgical hand preparation. Although these are less frequent with ABHRs and more frequent with iodophors, even well-tolerated ABHRs containing emollients may cause a transient stinging sensation at any site of broken skin (cuts, abrasions). Allergic contact dermatitis or contact urticaria syndrome caused by hypersensitivity to alcohol or to various additives present in some ABHRs are rare occurrences. ABHR preparations with strong fragrances may be poorly tolerated by a few health care workers with respiratory allergies. Studies of surgeon preferences indicate a primary preference for ABHRs with a higher tolerability and acceptability, due mostly to the shorter application time required and fewer skin reactions.*
- *Care must be taken to avoid contact with the eyes when using preparations with CHG 1% or greater as it may cause conjunctivitis or serious corneal damage. Ototoxicity precludes its use in surgery involving the inner or middle ear. Direct contact with brain tissue and the meninges should be avoided. The frequency of skin irritation is concentration-dependent, with products containing 4% most likely to cause dermatitis when used frequently for antiseptic handwashing. True allergic reactions to CHG are very uncommon [129].*
- *Alcohols are flammable and health care workers handling alcohol-based preparations should respect safety standards.*

Justification

- The GDG noted that surgical hand preparation is vitally important to maintain the lowest possible contamination of the surgical field, especially in the event of sterile glove puncture during the procedure. Appropriate surgical hand preparation is recommended in the WHO guidelines on hand hygiene in health care (1) issued in 2009 and in all other existing national and international guidelines on the prevention of SSI.
- Moderate quality evidence shows the equivalence of handrubbing with an ABHR and handscrubbing with antimicrobial soap and water for surgical hand preparation for the prevention of SSI.

New

Conditional recommendation, very low quality of evidence

The panel suggests considering the administration of oral or enteral multiple nutrient-enhanced nutritional formulas for the purpose of preventing SSI in underweight patients who undergo major surgical operations.

- *The body of retrieved evidence focused on adult patients and no study was available in the paediatric population. Therefore, the effectiveness of the intervention is not proven for paediatric patients and is valid for adult patients only.*
- *There is little evidence as to whether the timing of administration of multiple nutrient-enhanced nutritional formulas modifies the effect on the prevention of SSI. Therefore, the GDG was unable to identify an optimal timing and duration of the administration of these formulas.*
- *The GDG emphasized that most patients included in the studies were receiving enteral feeding through a tube for other reasons than the prevention of SSI. When inserting a feeding tube solely to administer multiple nutrient-enhanced nutritional formulas for the purpose of SSI prevention, it is important to be aware of the possible discomfort and harm ranging from mucosal irritation and the development of sinusitis to perforation. The GDG does not encourage the insertion of a feeding tube for the sole purpose of preventing SSI. In particular, it considers that improving nutritional status should not in any way lead to a delay in surgery.*
- *The GDG identified contaminated preparations as a potential harm, especially due to contaminated water and/or a break in the aseptic technique during preparation. This risk is increased when the feeding takes place at the patient's home. It is good practice to follow clinical and IPC guidelines and aseptic precautions when preparing nutritional formulas.*

Justification

- Multiple nutrient-enhanced nutritional formulas contain any combination of arginine, glutamine, omega-3 fatty acids and nucleotides.
- After careful appraisal of the included studies, the research team and the GDG decided to perform metaanalysis comparisons including only studies in which the oral and enteral routes were used and excluding those where the parenteral route was used. The main reason was that the parenteral route is very different and the experts considered it inappropriate to administer enhanced nutritional formulas only for the purpose of preventing SSI when considering the infectious risk related to intravenous access.
- Overall very low quality evidence from eight RCTs and two observational studies shows that multiple nutrient- enhanced formulas demonstrate a benefit in reducing the risk of SSI compared to standard nutritional support. The population studied were adult patients undergoing major surgical procedures (mainly cancer and cardiac patients).
- Overall low quality evidence from five RCTs and one observational study (very low quality) shows that a single nutrient-enhanced formula (containing either arginine or glycine or omega-3 fatty acids) produces neither benefit nor harm when compared to standard nutritional support in reducing the risk of SSI.
- As a result of these evaluations and comparisons, the GDG agreed to suggest that underweight patients who are undergoing major surgical operations (particularly oncology and cardiovascular procedures) may benefit from the administration of oral or enteral multiple nutrient-enhanced nutritional formulas for the purpose of preventing SSI. Given the very low quality of the evidence, the strength of this recommendation was considered to be conditional and the GDG proposed to use the terminology "The panel suggests considering..." to highlight the need for careful local and patient-by-patient evaluation about whether and how to apply this recommendation, in particular depending on the availability of nutritional formulas and costs. Note: "underweight" is a term describing a person whose body weight is considered too low to be healthy. The definition usually refers to people with a body mass index of under 18.5 or a weight 15-20% below the norm for their age and height group.

New

Conditional recommendation against, moderate quality of evidence

The panel suggests not discontinuing immunosuppressive medication prior to surgery for the purpose of preventing SSI.

- *The GDG emphasized that the decision to discontinue immunosuppressive medication may be made on an individual basis, involving the prescribing physician, the patient and the surgeon.*
- *No relevant evidence was found on the perioperative discontinuation of long-term corticosteroid therapy.*
- *The population investigated in the studies on MTX included patients with rheumatoid arthritis [131] [132][133][134][135] and Crohn's disease [136]. Studies on anti-TNF investigated a population with rheumatoid arthritis [137] and other inflammatory rheumatic diseases [138].*
- *The time point and time interval of discontinuation of the immunosuppressive agent were very heterogeneous across studies or not specified.*
- *The GDG identified the occurrence of a flare-up of the underlying disease as a potential harm associated with discontinuation of immunosuppressive therapy. The risk of major adverse events associated with discontinuation is high in patients taking immunosuppressive therapy after organ transplantation or for rheumatoid arthritis, whereas it might be lower in those taking immunosuppressive agents for inflammatory bowel disease [134][135][139][140][141][142][143][144].*

Justification

- Very low quality evidence shows that the perioperative discontinuation of methotrexate (MTX) might be harmful or have no effect on the risk of SSI compared to its continuation. Furthermore, very low quality evidence from two observational studies showed that the perioperative discontinuation of tumour necrosis factor (TNF) inhibitors (anti- TNF) might have a benefit for the reduction of the SSI rate when compared to the continuation of anti-TNF. Taking into consideration (1) the very limited evidence (for anti-TNF) or lack of evidence and even potential harm (for MTX) to support a discontinuation of treatment, and (2) the risk associated with the discontinuation of treatment on the patient's underlying disease/s, the GDG unanimously agreed to suggest that immunosuppressive medication should not be discontinued for the purpose of preventing SSI.

New

Conditional recommendation, moderate quality of evidence

The panel suggests that adult patients undergoing general anaesthesia with tracheal intubation for surgical procedures should receive an 80% fraction of inspired oxygen (FiO2) intraoperatively and, if feasible, in the immediate postoperative period for 2-6 hours to reduce the risk of SSI.

- *This recommendation has been updated in 2018 after the initial guideline publication in 2016 (see section 2 of Methods) [106][145]. The systematic review on the evidence of effectiveness of the use of high FiO2 previously used for the 2016 WHO recommendation was updated to April 2018 and an independent systematic review on adverse effects associated with the recommended intervention has been conducted [146][147].*
- *In the updated review, the evidence for a beneficial effect has become weaker, despite an increased number of patients. In the 2018 update, the exclusion of two studies by Schietroma M and colleagues included in the previous systematic review due to disputed credibility and the net addition of four new trials testing the effectiveness of the use of high FiO2 did not strengthen the evidence for effect modification found in the original review or for a benefit in patients undergoing general anaesthesia with tracheal intubation that led to the strong recommendation in the WHO guidelines.*
- *An independent systematic review on safety shows no substantive evidence to discourage the use of high FiO2 in this population. However, adverse events were not the primary focus of the original studies and the evidence is thus limited.*
- *Further high-quality RCTs are urgently needed.*
- *The body of retrieved evidence focused on adult patients and no study specifically performed in a paediatric population was identified. Therefore, the effectiveness of this intervention is not proven for paediatric patients.*

- *After careful appraisal of the included studies, the research team and the GDG decided to perform meta-analysis comparisons including only patients under general anaesthesia with tracheal intubation and mechanical ventilation. Studies using neuraxial anaesthesia with a facemask or nasal cannula were excluded. Indeed, according to a meta-regression analysis introducing general anaesthesia with tracheal intubation as a significant covariate, the type of anaesthesia proved to independently modify the effect of hyperoxygenation. In neuraxial anaesthesia with a nasal cannula or facemask, the control of ventilation (and thereby control of the actual administration of high FiO2 to the lungs) is limited and was therefore considered as different from an intervention with mechanical ventilation.*
- *The benefit of hyperoxygenation tended to be greater in open colorectal surgery than in other types of surgery, but no significant association was found between the type of surgery and the effect of hyperoxygenation.*
- *The GDG emphasized that reduced SSI was found only in studies of patients intubated for general anaesthesia who received 80% FiO2 during surgery and continued to receive the higher oxygen concentration through a high flux mask in the immediate postoperative period. This should be considered as part of the intervention.*
- *Other potential sources of heterogeneity were discussed, including the age of the population (older patients may benefit more) and duration of surgery. It is known that colorectal surgery has a higher risk for SSI compared to other surgical procedures and hyperoxygenation may be beneficial in this group of patients due to the predominance of anaerobic flora in the colonic flora.*
- *There was a considerable variation in the exclusion criteria for underlying lung disease, especially chronic obstructive pulmonary disease.*
- *The GDG highlighted that the benefits of hyperoxygenation would likely be maximized when normothermia and normovolemia are maintained (see chapters 4.13 and 4.15 for the recommendations on normothermia and normovolemia).*
- *The GDG acknowledged also that the studies were performed in high-income countries only.*
- *In settings where medical oxygen is scarce, policy-makers may not consider this recommendation as a priority.*
- *The GDG pointed out that FiO2 is not the ideal parameter to be measured; PaO2 better reflects the amount of O2 possibly delivered to the tissues and thus could influence the SSI risk more directly.*
- *Although monitoring oxygen saturation does not directly reflect the effect of this intervention, it is recommended as good practice, primarily to detect hypoxia in all patients undergoing general anesthesia during surgery and in the postoperative period, regardless of the concentration of inspired oxygen the patient receives.*
- *This recommendation is limited to the use of high FiO2 in the perioperative period for the prevention of SSI and does not cover administration of high FiO2 and its effects in other settings and populations.*

Justification

- A moderate quality of evidence shows that providing high FiO2 (80%) is beneficial in adult surgical patients under general anaesthesia with tracheal intubation and results in a significant decrease of the risk of SSI compared to 30-35% FiO2.
- There is low quality of evidence regarding no increased risk of major adverse events such as atelectasis, cardiovascular events, ICU admission, and death during the study period, associated with using high FiO2 in adult surgical patients under general anaesthesia with tracheal intubation. As a result, the GDG suggests that patients undergoing surgical procedures under general anaesthesia with tracheal intubation should receive 80% FiO2 intraoperatively and in the immediate postoperative period for 2-6 hours, if feasible, and that the strength of this recommendation should be conditional.
- This recommendation is based on FiO2 administered, rather than on arterial partial pressure of oxygen (PaO2) or arterial oxygen saturation measured by pulse oximeter, as the clinical trials that led to the recommendation development provided results based only on FiO2 administered.

New Conditional recommendation, moderate quality of evidence

The panel suggests the use of warming devices in the operating room and during the surgical procedure for patient body warming with the purpose of reducing SSI.

- *Included studies were conducted in high-income countries and in adult patient populations. However, the GDG considers this recommendation valid also for paediatric patients.*
- *The systematic review team and the GDG decided to exclude the study by Wong and colleagues [148] because the PICO question asks for a comparison of warming vs. non-warming, whereas the study by Wong applies warming procedures in both groups. Nevertheless, the GDG acknowledged that the study showed a tendency towards reduced SSI in the intervention group, which employed more intensive warming.*
- *The GDG identified a potential harm of skin burns, depending on the warming device (possible with conductive warming mattresses).*
- *It was mentioned also that the increased temperature within the work environment may be a concern for surgical staff. Of note, raising the room temperature is not an option to warm the patient as it causes thermal discomfort for the surgical staff, with an increased risk of dripping sweat onto the surgical site.*

Justification

- Overall moderate quality evidence from two RCTs shows that the maintenance of normothermia has a significant benefit in reducing the risk of SSI when compared to non-warming standard care. The GDG unanimously agreed that warming devices should be used to avoid patient hypothermia in the operating room and during the surgical procedure in order to reduce the risk of SSI and, more importantly, other complications associated with surgery (see below). Considering the quality of the evidence (moderate, but relying only on 2 small RCTs), the GDG did not reach full consensus about the strength of this recommendation and most members (11 vs. 4) voted for a conditional recommendation. The GDG appraised that the available evidence supporting this recommendation is limited. It was noted also that no observational studies investigating body warming with a SSI outcome were identified.
- However, the GDG emphasized that there are additional relevant benefits of warming strategies, such as a decrease in myocardial events, blood loss and transfusion requirements.
- The GDG agreed that the evidence was insufficient to identify a target temperature to be reached and maintained or an optimal device for warming the patient (for example, fluid warmers or simple blankets). The generally accepted target is core temperature >36ÆC, considering that “hypothermia” (or low body temperature) is defined as a core temperature below 36ÆC and is common during and after major surgical procedures lasting more than two hours. However, it was not possible to reach an agreement regarding the optimal pre- and postoperative time for warming.

New

Conditional recommendation, low quality of evidence

The panel suggests the use of protocols for intensive perioperative blood glucose control for both diabetic and non-diabetic adult patients undergoing surgical procedures to reduce the risk of SSI.

- *The GDG observed that most studies were done in intensive care settings, with no studies in paediatric populations. Therefore, the effectiveness of this intervention is not proven for paediatric patients.*
- *In general, blood glucose target levels in the intensive protocol group were ≤150 mg/dL (8.3 mmol/L), whereas blood glucose target levels in the conventional protocol group were all <220 mg/dL (12.2 mmol/L).*
- *Intravenous insulin administration was performed in the intensive protocol group in all studies and in the conventional protocol group in most studies. Three trials [149][150][151] used subcutaneous administration in the conventional group. Some studies used continuous insulin administration, whereas others used intermittent. One study [152] administered a fixed high dose of intravenous insulin with dextrose 20% infused separately to maintain a blood glucose level between 70 and 110 mg/dL ("insulin clamp").*
- *Duration and timing of glucose control differed between studies. The definitions of postoperative glucose control varied from 18 hours and "until enteral nutrition" to a maximum of 14 days.*
- *Five trials [149][150][151][152][153] studied diabetic patients, 8 studies [152][153][154][155][156] [157][158][159] included both diabetic and nondiabetic individuals, and 2 studies [160][161] concerned only non-diabetic patients. The most frequent surgical procedures were cardiac surgery. Some studies focused on patients undergoing other major surgical procedures, including abdominal surgery.*
- *The GDG emphasized that hypoglycaemia is a possible harm associated with protocols with strict blood glucose target levels. Hypoglycaemia has a serious risk of life-threatening complications, such as cardiac events. Different definitions for hypoglycaemic events were used in the studies and varied from blood glucose levels ≤ 40 mg/dL (2.2 mmol/L) to ≤ 80 mg/dL (4.4 mmol/L).*
- *Data from the available evidence showed no difference in the risk of death and stroke with the use of an intensive protocol compared to a conventional protocol.*

Justification

- Overall low quality evidence shows that a protocol with more strict blood glucose target levels has a significant benefit in reducing SSI rates when compared to a conventional protocol. There was evidence that the effect was smaller in studies that used intensive blood glucose controls intraoperatively only compared to studies that used an intensive protocol postoperatively or both intra- and postoperatively. Among the intensive protocols, the effect was similar in studies with a target blood glucose level of ≤110 mg/dL (6.1 mmol/L) and an upper limit target level of 110-150 mg/dL (6.1-8.3 mmol/L). Similar to meta-regression analysis, there was no evidence that the effect of intensive blood glucose control differed between studies of diabetic and non-diabetic patients. Thus, the GDG unanimously agreed that the recommendation to use protocols for intensive perioperative blood glucose control should apply to both diabetics and non-diabetics. However, the GDG decided that the available evidence did not allow the definition of an optimal target level of blood glucose. The strength of this recommendation was considered to be conditional.

New Conditional recommendation, low quality of evidence

The panel suggests the use of goal-directed fluid therapy (GDFT) intraoperatively to reduce the risk of SSI.

- *The body of retrieved evidence focused on adult patients and no study was available in the paediatric population. Therefore, this effectiveness of this intervention is not proven for paediatric patients.*
- *GDFT refers to a haemodynamic treatment based on the titration of fluid and inotropic drugs according to cardiac output or similar parameters.*
- *Restrictive fluid management refers to the administration of a regimen with a reduced volume of fluids in the bolus and/or over time compared to local standard fluid maintenance.*
- *Standard fluid maintenance in the control group refers to the administration of fluid regimens at the discretion of the treating medical team or according to the local standard.*
- *Most trials among the included studies compared the efficacy of specific fluid management strategies with standard fluid regimens in the intraoperative period. Fourteen RCTs investigated GDFT [162][163][164][165][166][167][168][169][170][171][172][173][174][175] and 5 RCTs focused on restrictive fluid management [176][177][178][179][180]. As the PICO question focused on fluid management during surgery, these comparisons were used to formulate the recommendation.*
- *Further trials compared specific fluid management strategies vs. standard fluid management in the preoperative [181] and/or postoperative period [182][183][184][185].*
- *It was discussed that the actual physiological effect of administered fluids may also differ, depending on several other factors, such as surgical stress, normothermia and tissue oxygenation.*
- *The GDG argued that both fluid overload and hypovolemia are likely to increase mortality and morbidity [186].*
- *Although the optimal strategy for GDFT cannot be identified from the published data due to the heterogeneity of the protocols used in the included studies, the panel suggests administering haemodynamic therapy based on a goal-directed approach during the entire surgical procedure. Optimization is preferably based on dynamic pre-load parameters (that is, pulse pressure variation, systolic pressure variation) derived from arterial catheter measurements (when an arterial line is indicated) or minimal invasive alternatives.*
- *The GDG felt that using an algorithm is helpful, while taking into account that local resources and expertise may vary and limit possibilities for the optimal strategy. Indeed, the variety of effective algorithms on a multitude of outcomes indicates that having an algorithm for a specific goal is the most important factor, more than any particular algorithm associated with the effect of GDFT.*

Justification

- Overall low quality evidence shows that intraoperative GDFT has significant benefit in reducing the SSI rate compared to standard fluid management. This effect is shown also for GDFT in the postoperative period.
- Considering that both fluid overload and hypovolemia are likely to affect other clinical outcomes, the GDG agreed to emphasize that specific fluid management strategies, such as GDFT or restrictive fluid management, may be used during surgery for purposes other than the reduction of SSI, for example, to support cardiovascular and renal functions.
- Considering the low quality evidence, as well as the above-mentioned factors, the GDG agreed to suggest the use of GDFT intraoperatively and decided that the strength of this recommendation should be conditional.

New

Conditional recommendation, moderate to very low quality of evidence

The panel suggests that either sterile, disposable, non-woven or sterile, reusable woven drapes and surgical gowns can be used during surgical operations for the purpose of preventing SSI.

Conditional recommendation against, low to very low quality of evidence

The panel suggests not to use plastic adhesive incise drapes with or without antimicrobial properties for the purpose of preventing SSI.

- *The GDG highlighted that if the material of the disposable and reusable surgical drapes and gowns is permeable to liquids, it can expose health care workers to body fluids and also represents a risk for patients. Ideally, the material should be impermeable to prevent the migration of microorganisms. The GDG remarked that both reusable and disposable drapes and gowns commercially available are in permeable or impermeable forms.*
- *The GDG identified possible harms associated with the use of disposable drapes in that the adhesive bands of single-use drapes may provoke skin rash or eczema and devices may be dislodged when removing adhesive drapes after the surgical procedure [187].*
- *Regarding plastic, adhesive incise drapes, the GDG identified allergic reactions as a possible harm associated with the use of iodophor-impregnated incise drapes [188]. The GDG noted also that a further possible harm could be that pieces of the adhesive film might remain in the wound.*

Justification

- It is good clinical practice to use sterile drapes and gowns for surgery. To determine what type of surgical drapes and gowns are the most effective for the purpose of preventing SSI, the GDG decided to focus on disposable non-woven and reusable woven drapes, including plastic adhesive incise drapes with or without antimicrobial properties. Non- woven and woven drapes and gowns with antimicrobial properties were not considered a priority and no relevant evidence was found.
- Available evidence from one RCT, one quasi-RCT and 2 observational studies (moderate quality for RCTs and very low for observational) shows that the use of sterile disposable non-woven drapes and sterile surgical gowns has neither benefit nor harm when compared to sterile reusable woven drapes and surgical gowns in reducing the SSI rate. Considering the quality of the evidence, the GDG unanimously agreed to suggest that either sterile disposable non-woven or sterile reusable woven drapes and surgical gowns can be used. The strength of this recommendation was considered to be conditional.
- The GDG pointed out that there is no evidence for the potential effect of the timing or usefulness of changing surgical drapes or gowns in the course of a surgical operation for the purpose of preventing SSI.
- Evidence available from one RCT, one quasi-RCT and 2 observational studies (overall very low quality for both RCTs and observational) shows that the use of adhesive iodophor-impregnated incise drapes has neither benefit nor harm when compared to no adhesive incise drapes in reducing the SSI rate.
- Available evidence from 2 RCTs (overall low quality) shows that the use of plastic, adhesive, nonimpregnated incise drapes has neither benefit nor harm when compared to no adhesive incise drapes in reducing the SSI rate.
- Considering the lack of evidence that plastic adhesive incise drapes (with or without antimicrobial properties) prevent SSI, the GDG unanimously agreed that they should not be used. Given the quality of the evidence (moderate to very low), the strength of this recommendation was considered to be conditional.

New

Conditional recommendation, very low quality of evidence

The panel suggests considering the use of wound protector (WP) devices in clean-contaminated, contaminated and dirty abdominal surgical procedures for the purpose of reducing the rate of SSI.

- *The body of retrieved evidence focused on adult patients and no study was available in the paediatric population. Therefore, the effectiveness of this intervention is not proven for paediatric patients.*
- *Two differently designed types of commercially-available WP devices have been used as an intervention in the included studies, that is, single- [189][190][191][192][193][194] and double-ring WPs [195][196] [197][198][199].*
- *With regard to the degree of wound contamination in abdominal surgery, 5 studies included cleancontaminated [191][192][193][194][195], 5 studies included contaminated [190][191][192][193] [194] and 6 studies investigated dirty procedures [190][191][192][193][194][197].*
- *The GDG identified possible harms associated with the use of WP devices, particularly in patients with abdominal adhesions. In these cases, the insertion of a WP device may be difficult and lead to the need to enlarge the incision, to injuries to the small bowel and to the prolongation of the procedure. A further concern is the limited space to access the surgical field after insertion of the WP.*
- *Although poorly assessed by the studies included, no serious adverse effects have been reported.*
- *The GDG emphasized that the operating surgeon needs to be familiar with handling a WP device during placement, in the operative phase and upon removal to avoid wound contamination at these critical time points, particularly when WP is used in patients with a high intra-abdominal bacterial load, such as diffuse peritonitis.*
- *The GDG highlighted that these are single-use devices that must not be reused.*

Justification

- Overall very low quality evidence shows that a single- or double-ring WP device has benefit in reducing the rate of SSI compared with regular wound protection. Meta-regression analysis showed no strong evidence for a difference in the effect between single- and double-ring WPs. There was also no evidence that the effect differed between clean- contaminated or contaminated or dirty surgery and other surgery.
- The GDG agreed to suggest the use of either WP device in abdominal surgery with laparotomy for the purpose of reducing SSI. Given the very low quality evidence, the strength of the recommendation was considered to be conditional and the GDG proposed to use the terminology "The panel suggests considering..." to highlight the need for careful local evaluation about whether and how to apply this recommendation, in particular regarding the availability of these devices and associated costs.

New

Conditional recommendation, low quality of evidence

The panel suggests considering the use of irrigation of the incisional wound with an aqueous PVP-I solution before closure for the purpose of preventing SSI, particularly in clean and clean-contaminated wounds.

Conditional recommendation against, low quality of evidence

The panel suggests that antibiotic incisional wound irrigation before closure should not be used for the purpose of preventing SSI.

- *The body of retrieved evidence focused on adult patients and no study was available in the paediatric population. Therefore, the effectiveness of irrigation of the incisional wound with an aqueous PVP-I solution is not proven for paediatric patients.*
- *The available evidence from 7 RCTs [200][201][202][203][204][205][206] (10 estimates) showed that irrigation of the incisional wound with an aqueous PVP-I solution was beneficial in reducing the risk of SSI when compared to irrigation with a saline solution. Stratification of the evidence by contamination showed that the effect was attributable to incisional wound irrigation in clean and clean-contaminated procedures rated as wound classes I and II according to the CDC system [207].*

- *The evidence on irrigation of incisional wounds with aqueous PVP-I is available from studies investigating PVP-I 10% in open abdominal surgery (CDC wound classes I-IV; 3 RCTs), PVP-I 1% in appendectomies (CDC wound classes II-IV; one RCT) and PVP-I 0.35% in orthopaedic spine surgery (CDC wound class I; 3 RCTs). There was no evidence for a dose-response effect with regard to the concentration of the PVP-I solution used.*
- *Two RCTs showed that the pulse pressure irrigation of incisional wounds with a normal saline solution was beneficial in reducing the risk of SSI in CDC wound classes I and II-III compared to normal irrigation with a saline solution. One RCT showed that irrigation with a normal saline solution applied with pressure to the incisional wound was beneficial compared to no irrigation. Nevertheless, the GDG considered that there is insufficient evidence to issue a recommendation for or against the saline solution irrigation of incisional wounds as one RCT investigating regular irrigation with a saline solution showed neither benefit nor harm when compared to no irrigation. When saline solution irrigation is used, the use of pulse pressure irrigation may be considered.*
- *The available evidence from 5 RCTs shows that the antibiotic irrigation of the incisional wound has neither benefit nor harm in reducing SSI when compared to no or saline solution irrigation.*
- *Of the included studies, 3 RCTs [204][208][209] described sterility of the irrigation fluid. The other studies did not report whether the irrigation fluid was sterile or not.*
- *The GDG discussed allergic reactions and metabolic adverse events as potential harms of iodine uptake. However, clinical signs of iodine toxicity were not reported in the included studies [204]. In the case of known or presumed allergy to iodine, other products (for example, chlorhexidine) should be used if incisional wound irrigation is performed. PVP-I must not be allowed to come into contact with exposed meninges and neural tissues, such as the brain or spinal cord [210]. Based on in vitro studies [211][212], the GDG also raised concerns about the potential toxic effects of PVP-I on fibroblasts, the mesothelium and the healing of tissue. No study assessed undesirable outcomes for pulse pressure irrigation.*
- *The GDG highlighted the risk of emergence of AMR associated with the use of antibiotics for wound irrigation. Considering that the evidence shows that this procedure has no benefit with regard to SSI prevention, the GDG strongly emphasized that this practice is associated with an unnecessary risk of contributing to AMR. Furthermore, the GDG underlined that there is no standardized procedure to prepare an antibiotic solution for wound irrigation and no certainty of target attainment by using this method.*

Justification

- RCTs comparing wound irrigation vs. no wound irrigation or wound irrigation using different solutions with SSI as an outcome were evaluated. Evidence was available on intraperitoneal, incisional wound and mediastinal irrigation in patients undergoing various surgical procedures.
- Considering the substantial heterogeneity in the available evidence, the GDG decided to focus only on incisional wound irrigation. In particular, the GDG agreed not to consider intraperitoneal irrigation for the formulation of recommendations as the identified studies described contaminated and dirty intra-abdominal procedures (for example, peritonitis). Therefore, wound irrigation was likely to represent a therapeutic intervention, rather than a prophylactic measure.
- Very low quality evidence shows that incisional wound irrigation with saline solution has neither benefit nor harm compared to no irrigation.
- Low quality evidence shows that the irrigation of the incisional wound with an aqueous PVP-I solution is beneficial with a significant decrease of the risk of SSI when compared to irrigation with a saline solution.
- Very low quality evidence shows that the irrigation of the incisional wound with antibiotic solutions has neither benefit nor harm compared to irrigation with a saline solution or no irrigation.
- The GDG agreed that there is insufficient evidence to issue a recommendation for or against the saline solution irrigation of incisional wounds for the purpose of preventing SSI. The GDG also decided to suggest considering the use of irrigation of the incisional wound with an aqueous PVP-I solution. The term "considering" was proposed to highlight that a decision-making process is needed, especially focusing on clean and clean-contaminated wounds. Finally, the GDG agreed to suggest that antibiotic incisional wound irrigation should not be used for the purpose of preventing SSI. The strength of these recommendations should be conditional due to the low quality of the evidence.

New

Conditional recommendation, moderate quality of evidence

The panel suggests the use of triclosan-coated sutures for the purpose of reducing the risk of SSI, independent of the type of surgery.

- *The body of retrieved evidence mostly focused on adult patients and only one study was available in a paediatric population. This recommendation can be applied to paediatric patients, but the manufacturer's instructions should be checked to evaluate any contraindication for paediatric patients.*
- *The GDG discussed the available evidence and agreed to consider only studies comparing the same type of suture in order to prevent confounding by type of suture (monofilament or braided).*
- *The overall quality of evidence was moderate for the RCTs due to risk of bias and low for the observational studies. The GDG discussed whether or not to consider indirectness for the overall comparison of antimicrobial-coated vs. non-coated sutures. The agreement was that indirectness does not apply because the PICO question is very broad.*
- *Included studies were performed in high- and middle-income countries.*
- *Types of surgical procedures included were colorectal, abdominal, breast, head and neck, lower limb, spinal, cardiac, vascular and other surgery.*
- *The types of sutures investigated in the included studies were triclosan-coated polydioxanone suture vs. polydioxanone suture featuring a monofilament suture construction (3 RCTs [213][214][215]); triclosancoated polyglactin 910 suture vs. polyglactin 910 suture featuring a braided (multifilament) suture construction (7 RCTs [216][217][218][219][220][221][222]) and 4 observational studies ([223][224][225][226]); and polyglactin 910 and poliglecaprone 25 (both triclosan-coated) sutures vs. polyglactin 910 and poliglecaprone 25 sutures featuring a braided (polyglactin 910) and a monofilament (poliglecaprone 25) suture construction (3 RCTs [227][228][229][230] and one observational study [230]).*
- *No adverse events have been associated in the included studies with the use of antimicrobial-coated sutures. However, the GDG pointed out that there is limited evidence that triclosan may have negative effects on wound healing [231] or lead to contact allergy [232]. Although the development of resistance is mentioned as a concern, the daily absorption of triclosan from consumer products (for example, commercially-available hand soap) is higher than a single triclosan suture [233][234][235].*

Justification

- Overall low to moderate quality evidence shows that antimicrobial-coated sutures have significant benefits in reducing SSI rates in patients undergoing surgical procedures when compared to noncoated sutures. The effect seems to be independent of the type of suture, procedure or wound contamination classification. In meta-regression analysis, there was no evidence that the effect of antimicrobial-coated sutures differed between braided and monofilament sutures, clean, cardiac or abdominal surgery, and other surgeries. However, the GDG highlighted that the available trials examined triclosan-coated, absorbable sutures only. There were no studies identified that investigated other antimicrobial agents. Considering the low to moderate quality of the evidence and the low quality of comparisons in the subgroups of the RCTs included in the meta-regression analyses, the GDG agreed that the strength of the recommendation should be conditional.

New Strong recommendation against, moderate quality of evidence

The panel recommends against the prolongation of SAP administration after completion of the operation for the purpose of preventing SSI.

- *In the included studies, "single dose" usually refers to a preoperative dose with or without intraoperative re-dosing, depending on the duration of the operation and the half-life of the drug. The included studies always compared the same antibiotic agent in the same dose per administration.*
- *The guidelines of the American Society of Health-System Pharmacists [236] recommend that intraoperative re-dosing is needed if the duration of the procedure exceeds 2 half-lives of the drug or if there is excessive blood loss during the procedure. While the benefit of this approach seems reasonable from a drug pharmacokinetic aspect, the reviewed studies have not addressed the duration of surgical procedures or re-dosing in relation to SSI in standard antibiotic prophylaxis protocols. No recommendation could be concluded on the benefit or harm of this approach.*
- *For cardiac (2 RCTs [237][238]) and orthognathic surgery (3 RCTs [239][240][241]), there was some evidence that prolonging antibiotic administration after completion of the operation may be beneficial in reducing the risk of SSI when compared to single-dose prophylaxis. By contrast, other RCTs [242][243][244][245][246][247][248] showed no benefit of prolonging antibiotic prophylaxis beyond 24 hours compared to prophylaxis for up to 24 hours in these types of surgery.*
- *In vascular surgery, there was some evidence from one RCT [248] that prolonging antibiotic prophylaxis until intravenous lines and tubes are removed may be beneficial in reducing the risk of SSI when compared to single-dose prophylaxis.*
- *The GDG highlighted the risk of promoting AMR if antibiotics are prolonged in the postoperative period, both in the individual patient and at the health care facility level. In addition, this practice might negatively affect the patient microbiome and lead to short- and long-term gastrointestinal complications. A relevant harm possibly linked to prolonged SAP is the intestinal spread of C. difficile with a higher risk of a clinical manifestation of infection.*

Justification

- Moderate quality evidence from a high number of RCTs (44 studies included in the overall metaanalysis) shows that prolonged SAP postoperatively has no benefit in reducing SSI after surgery when compared to a single dose. However, there was some evidence (low to very low quality) that a prolonged postoperative administration of antibiotics may be beneficial to reduce the risk of SSI in cardiac, vascular and orthognathic surgery when compared to single-dose prophylaxis. Considering this limited and low to very low quality evidence in support of SAP prolongation in the above-mentioned procedures, as well as the possible harm associated with the prolonged duration of antibiotic administration, the GDG agreed to recommend against the prolongation of antibiotic administration after completion of the operation for the purpose of preventing SSI.
- Considering the possible adverse events, the risk of generating AMR linked to SAP prolongation and the high number of available studies of moderate quality showing no benefit, the strength of the recommendation was decided to be strong.

New

Conditional recommendation against, low quality of evidence

The panel suggests not using any type of advanced dressing over a standard dressing on primarily closed surgical wounds for the purpose of preventing SSI.

- *The body of retrieved evidence focused on adult patients and no study was available in the paediatric population. However, the GDG considered this recommendation valid also for paediatric patients.*
- *The GDG identified possible harms associated with the use of silver-containing dressings. Allergic reactions or skin irritations may develop in some patients [249].*
- *Regarding ionic silver dressings, the GDG was concerned about the possible exposure of patients and health care workers to nanoparticles. It was also pointed out that microbial resistance to silver and PHMB may develop.*
- *The GDG also highlighted that the availability of advanced dressings may be limited in LMICs and their purchase might represent a financial burden.*
- *The GDG emphasized that dressings used on primarily closed surgical wounds should be sterile and should be applied with an aseptic technique.*
- *The studies included did not investigate negative pressure dressings. pNPWT is dealt with in chapter 4.19 of these guidelines.*

Justification

- Advanced dressings used in the included studies were of the following types: hydrocolloid; hydroactive; silver- containing (metallic or ionic); and polyhexamethylene biguanide (PHMB) dressings. Standard dressings were dry absorbent dressings.
- Low quality evidence from 10 RCTs shows that advanced dressings applied on primarily closed incisional wounds do not significantly reduce SSI rates compared to standard wound dressings. The GDG unanimously agreed that advanced dressings should not be used as a preventive measure to reduce the risk of SSI. Given the low quality of the evidence, the GDG decided that the strength of this recommendation should be conditional.

Conditional recommendation against, low quality of evidence

The panel suggests that perioperative antibiotic prophylaxis should not be continued to the presence of a wound drain for the purpose of preventing SSI.

Conditional recommendation, very low quality of evidence

The panel suggests removing the wound drain when clinically indicated. No evidence was found to recommend an optimal timing of wound drain removal for the purpose of preventing SSI.

- *The body of retrieved evidence focused on adult patients and no study was available in the paediatric population. However, the GDG considers this recommendation valid also for paediatric patients.*
- *The GDG emphasized that the body of evidence does not identify an optimal time point of wound drain removal with regard to the reduction of SSI. Definitions for the early removal of drains varied across the studies from 12 hours to 5 days postoperatively. In addition, the definitions for the late removal of drains varied from removal when the drainage volume became minimal (that is, <30 or <50 mL/day) or at specific time points, such as postoperative days 2 to 10.*
- *The GDG pointed out that the evidence on the optimal time for drain removal consists of studies that were done with closed wound drains. Therefore, the related recommendation refers to the use of closed wound drainage systems.*
- *The available evidence on the optimal time for drain removal was limited to studies conducted in breast and orthopaedic surgery.*
- *It was noted that the great majority of available studies on the topics of these recommendations were conducted in high- and middle-income countries; only one study is available from a low-income country.*
- *The GDG identified possible harms associated with the prolonged duration of antibiotic administration, such as the selection and emergence of resistant bacteria, the risk of fungal superinfections and Clostridium difficile infection and side effects of antibiotics. Furthermore, early removal of the wound drain may be associated with possible postoperative complications, such as an increase of the occurrence of seroma and haematoma requiring treatment [250].*
- *The GDG highlighted that wound drains are single-use devices and must not be reused.*

Evidence to decision

Certainty of the Evidence **Very low**

Justification

- Overall low quality evidence (from 7 RCTs) indicates that prolonged antibiotic prophylaxis in the presence of a wound drain has neither benefit nor harm in reducing SSI when compared to perioperative prophylaxis alone (single dose before incision and possible intraoperative additional dose/s according to the duration of the operation). Considering the lack of evidence that prolonged antibiotic prophylaxis prevents SSI and the possible associated harms (see below), the GDG unanimously agreed that antibiotic prophylaxis should not be continued in the presence of a wound drain. Given the low quality of the evidence, the strength of this recommendation was considered to be conditional.
- Very low quality evidence (from 11 RCTs) shows that the early removal of wound drains has neither benefit nor harm in reducing the SSI rate when compared to late removal of drains (at postoperative day 6 or later). In particular, no benefit was shown when comparing early removal (from postoperative days 1 to 5) with removal on or after postoperative day 6. Results were also similar when comparing early removal with removal determined according to the volume of drainage. Considering the very low quality evidence and the finding that the body of evidence does not identify an optimal time point for wound drain removal with regard to the prevention of SSI, the GDG decided to suggest that the wound drain should be removed when clinically indicated. Given the very low quality of evidence, the strength of this recommendation was considered to be conditional.

1.5.8 Prevention of mother-to-child transmission of hepatitis B virus: Guidelines on antiviral prophylaxis in pregnancy

[251]

New **Conditional recommendation, moderate quality of evidence**

WHO recommends that pregnant women testing positive for HBV infection (HBsAg positive) with an HBV DNA ≥ 5.3 log10 IU/mL (≥ 200,000 IU/mL)1 receive tenofovir prophylaxis from the 28th week of pregnancy until at least birth, to prevent mother-to-child transmission of HBV. This is in addition to three-dose hepatitis B vaccination in all infants, including timely birth dose.

New **Conditional recommendation, moderate quality of evidence**

WHO recommends that in settings in which antenatal HBV DNA testing is not available, HBeAg testing can be used as an alternative to HBV DNA testing to determine eligibility for tenofovir prophylaxis to prevent mother-to-child transmission of HBV2.

1.6 Other Guidelines for improving Maternal Health and Wellbeing

1.6.1 Guideline: Use of multiple micronutrient powders for point-of-use fortification of foods consumed by pregnant women

[252]

New Not Recommended

Multiple micronutrient supplementation is not recommended for pregnant women to improve maternal and perinatal outcomes.

- *There is some evidence of additional benefit of MMN supplements containing 13–15 different micronutrients (including iron and folic acid) over iron and folic acid supplements alone, but there is also some evidence of risk, and some important gaps in the evidence. Although the GDG agreed that overall there was insufficient evidence to warrant a recommendation, the group agreed that policymakers in populations with a high prevalence of nutritional deficiencies might consider the benefits of MMN supplements on maternal health to outweigh the disadvantages, and may choose to give MMN supplements that include iron and folic acid.*
- *More research is needed to determine which micronutrients improve maternal and perinatal outcomes, and how these can be optimally combined into a single supplement.*

New Strong recommendation against, very-low quality of evidence

Routine use of multiple micronutrient powders during pregnancy is not recommended as an alternative to standard iron and folic supplementation during pregnancy for improving maternal and infant health outcomes.

This recommendation is based on the very limited evidence to directly assess the potential benefits or harms of the use of point-of-use fortification with multiple micronutrient powders in pregnant women for improving maternal and infant health outcomes.

- *Evidence to date shows no added value of multiple micronutrient powders over iron and folic acid supplementation in pregnant women.*
- *An efficient system for the routine collection of relevant data, including therapeutic adherence and measures of programme performance, is critical to ensure programmes are effective and sustained, especially iron and folic acid supplementation [253][7].*
- *Monitoring is key to identifying barriers that might be sustaining unequal access to antenatal care, including iron and folic supplementation. Sustained implementation and scale-up largely benefit from appropriate monitoring mechanisms, as well as sustained behaviour-change interventions.*

1.6.2 Nutritional interventions update: multiple micronutrient supplements during pregnancy

[254]

New **Context-Specific Recommendation - Research**

Antenatal multiple micronutrient supplements that include iron and folic acid are recommended in the context of rigorous research.[1]

[1] The GDG clarified that rigorous research includes implementation research using high-quality methods appropriate to the specific research questions.

- *This recommendation updates and supersedes the WHO recommendation found in the WHO ANC guideline issued in 2016 [1].*
- *The evidence is derived from trials using MMS containing 13 to 15 micronutrients (including iron and folic acid) and the widely available United Nations International Multiple Micronutrient Antenatal Preparation (UNIMMAP), which contains 15 micronutrients, including 30 mg of iron and 0.4 mg of folic acid (see Box 2).*
- *As the evidence was mainly derived from low- and middle-income countries, its applicability to high-income countries or to populations not at risk of micronutrient deficiencies – for example, due to an adequate diet and food fortification programmes – is unclear.*
- *Research in this context therefore includes:*
- *controlled clinical trials in which early pregnancy ultrasound is used to establish gestational age with certainty, with assessment of critical maternal and perinatal outcomes, and follow-up of infants sustained into childhood; and*
- *where programmes of MMS are being considered, implementation research to establish the impact of switching from iron and folic acid supplements to MMS, including evaluation of acceptability, feasibility, sustainability, equity and cost-effectiveness.*
- *Many MMS contain 30 mg or less of elemental iron and WHO recommends antenatal iron and folic acid supplements containing 60 mg of elemental iron in populations where anaemia is a severe public health problem (a prevalence of 40% or higher) [255]. Therefore, countries should consider their population magnitude and distribution of anaemia, its nutritional determinants (i.e. iron deficiency), as well as the magnitude and distribution of the complex low birthweight and its component parts (i.e. preterm, small for gestational age [SGA] or a combination of these) [256], when undertaking any research in the context of this recommendation.*
- *Pregnant women should be supported and encouraged to receive adequate nutrition, which is best achieved through consumption of a healthy, balanced diet consistent with guidelines on healthy eating [2].*

1.6.3 Nutritional interventions update: vitamin D supplements during pregnancy

[257]

New **Not recommended**

Oral vitamin D supplementation is not recommended for all pregnant women to improve maternal and perinatal outcomes.

- *This recommendation updates and does not alter the respective WHO recommendation on vitamin D supplementation during pregnancy found in the WHO ANC guideline [1].*
- *Pregnant women should be encouraged to receive adequate nutrition – which is best achieved through consumption of a healthy, balanced diet – and to refer to guidelines on healthy eating [2].*
- *Pregnant women should be advised that sunlight is the most important source of vitamin D. The amount of time needed in the sun is not known and depends on many variables, such as the amount of skin exposed, the time of day, latitude and season, skin pigmentation (darker skin pigments synthesize less vitamin D than lighter pigments) and sunscreen use [258].*
- *For pregnant women with suspected vitamin D deficiency, vitamin D supplements may be given at the current recommended nutrient intake of 200 IU (5 µg) per day [1][259]. This may include women in populations where direct sun exposure is limited.*

1.6.4 Vitamin A supplementation in postpartum women

[69]

New **Strong recommendation against, very low-quality to high-quality evidence**

Vitamin A supplementation in postpartum women is not recommended for the prevention of maternal and infant morbidity and mortality.

- *This guideline replaces and updates previous recommendations on vitamin A supplementation in mothers for the prevention of vitamin A deficiency [260] and for improving the vitamin A status of mothers and their infants [13].*
- *Postpartum women should be encouraged to receive adequate nutrition, which is best achieved through consumption of a balanced healthy diet, and to refer to guidelines on healthy eating during lactation [68].*
- *Recommendations for the treatment of xerophthalmia are not covered in this guideline. Existing guidelines for the treatment of xerophthalmia in women of reproductive age should be referred to in these cases [260].*

1.6.5 Vitamin A supplementation during pregnancy for reducing the risk of mother-to-child transmission of HIV Guideline

[261]

New **Strong recommendation against, very low to moderate-quality evidence**

Vitamin A supplementation in HIV-positive pregnant women is not recommended as a public health intervention for reducing the risk of mother-to-child transmission of HIV.

- *Women should be encouraged to receive adequate nutrition, which is best achieved through consumption of a healthy balanced diet, and to refer to guidelines on nutrient requirements for people living with HIV/AIDS [262] and guidelines on HIV and infant feeding [263].*
- *Recommendations for the treatment of xerophthalmia are not covered in this guideline. Existing guidelines for the treatment of xerophthalmia in women of reproductive age should be referred to in these cases [260].*

1.6.6 Responding to intimate partner violence and sexual violence against women: WHO clinical and policy guidelines

[264]

New **Strong recommendation, indirect evidence**

Health-care providers should ask about exposure to intimate partner violence when assessing conditions that may be caused or complicated by intimate partner violence (see Box 1, Examples of clinical conditions associated with intimate partner violence), in order to improve diagnosis/identification and subsequent care (see recommendation 30).

> ***Box 1: Examples of clinical conditions associated with intimate partner violence***[a]
>
> - Symptoms of depression, anxiety, PTSD , sleep disorders
> - Suicidality or self-harm
> - Alcohol and other substance use
> - Unexplained chronic gastrointestinal symptoms
> - Unexplained reproductive symptoms, including pelvic pain, sexual dysfunction
> - Adverse reproductive outcomes, including multiple unintended pregnancies and/or terminations, delayed pregnancy care, adverse birth outcomes
> - Unexplained genitourinary symptoms, including frequent bladder or kidney infections or other
> - Repeated vaginal bleeding and sexually transmitted infections
> - Chronic pain (unexplained)
> - Traumatic injury, particularly if repeated and with vague or implausible explanations
> - Problems with the central nervous system – headaches, cognitive problems, hearing loss
> - Repeated health consultations with no clear diagnosis
> - Intrusive partner or husband in consultations
>
> [a] Adapted from Black MC. Intimate partner violence and adverse health consequences: implications for clinicians. American Journal of Lifestyle Medicine, 2011, 5:428–439.

- *A minimum condition for health-care providers to ask women about violence is that it is safe to do so (i.e. the partner is not present); they must be trained on the correct way to ask and on how to respond to women who disclose violence (see Minimum requirements). This should at least include first-line support for intimate partner violence (see recommendation 1).*

Minimum requirements for asking about partner violence

- *A protocol/standard operating procedure*
- *Training on how to ask, minimum response or beyond*
- *Private setting*
- *Confidentiality ensured*
- *System for referral in place*

- *Providers need to be aware and knowledgeable about resources available to refer women to when asking about intimate partner violence.*

1.6.7 WHO guidelines on physical activity and sedentary behaviour

[70]

It is recommended that all pregnant and postpartum women without contraindication should:

Strong recommendation, moderate certainty evidence

- Undertake regular physical activity throughout pregnancy and postpartum.

Strong recommendation, moderate certainty evidence

- Do at least 150 minutes of moderate-intensity aerobic physical activity throughout the week for substantial health benefits.

Strong recommendation, moderate certainty evidence

- Incorporate a variety of aerobic and muscle strengthening activities. Adding gentle stretching may also be beneficial.

Strong recommendation, moderate certainty evidence

Women who, before pregnancy, habitually engaged in vigorous intensity aerobic activity, or who were physically active, can continue these activities during pregnancy and the postpartum period.

Strong recommendation, low-certainty evidence

It is recommended that: Pregnant and postpartum women should limit the amount of time spent being sedentary. Replacing sedentary time with physical activity of any intensity (including light intensity) provides health benefits.

1.6.8 Guidelines for the identification and management of substance use and substance use disorders in pregnancy

[265]

New **Strong recommendation, low-quality evidence**

Health-care providers should ask all pregnant women about their use of alcohol and other substances (past and present) as early as possible in the pregnancy and at every antenatal visit.

- *Asking at every visit is important as some women are more likely to report sensitive information only after a trusting relationship has been solidly established.*
- *Pregnant women should be advised of the potential health risks to themselves and to their babies posed by alcohol and drug use.*
- *Validated screening instruments for alcohol and other substance use and use disorders are available (see Annex 3).*
- *Health-care providers should be prepared to intervene or refer all pregnant women who are identified as using alcohol and/or drugs (past and present).*
- *It was decided that despite the low quality of evidence of effect, the benefit – potential reduction of alcohol and substance use – outweighed any potential harms of a brief psychosocial intervention, which were considered minimal. Therefore the balance of benefits versus harms was clearly positive despite uncertainty about the degree of benefit. In addition, the burden of implementation was minimal.*

1.6.9 WHO recommendations for the prevention and management of tobacco use and second-hand smoke exposure in pregnancy

[266]

New **Strong recommendation, low-quality evidence**

Health-care providers should ask all pregnant women about their tobacco use (past and present) and exposure to SHS as early as possible in the pregnancy and at every antenatal care visit.

- *Tobacco use includes all forms of smoking and use of smokeless tobacco.*
- *Second-hand smoke exposure includes exposure to smoke from combustible tobacco products at home, work and in public places.*
- *Tobacco use (smoking and smokeless) status of husbands/partners and other household members should also be assessed.*
- *At the first prenatal visit, health-care providers should ask all pregnant women about their tobacco use (past and present). Pregnant women with prior history of tobacco use should be asked about their present tobacco use at every antenatal care visit. Providers should ask women about their SHS exposure at the first prenatal visit, and whenever there is a change in living or work status and when SHS intervention has been initiated.*
- *Before assessment is initiated in a clinic setting:*
- *training and resource materials should be provided to clinicians and other health-care workers to enable effective and non-judgemental assessment of tobacco use; and*
- *clinicians and other health-care workers should be trained to refer or intervene with all pregnant women who are identified as tobacco users (past and present) or exposed to SHS.*

1.6.10 Guidelines on mental health promotive and preventive interventions for adolescents

[267]

Conditional recommendation, low quality evidence

Psychosocial interventions should be considered for pregnant adolescents and adolescent parents, particularly to promote positive mental health (mental functioning and mental well-being) and improve school attendance.

Remarks

- *Based on available evidence, cognitive behavioural skills-building programmes may be considered for pregnant adolescents and adolescent mothers [268].*

1.6.11 WHO recommendations on health promotion interventions for maternal and newborn health

[88]

New

Strong recommendation, very low-quality evidence

Birth Preparedness and Complication Readiness interventions are recommended to increase the use of skilled care at birth and to increase the timely use of facility care for obstetric and newborn complications.

Additional research is required.

New

Strong recommendation, very low-quality evidence

Interventions to promote the involvement of men during pregnancy, childbirth and after birth are recommended to facilitate and support improved self-care of the woman, improved home care practices for the woman and newborn, and improved use of skilled care during pregnancy, childbirth and the postnatal period for women and newborns.

These interventions are recommended provided that they are implemented in a way that respects, promotes and facilitates women's choices and their autonomy in decision-making and supports women in taking care of themselves and their newborns. In order to ensure this, rigorous monitoring and evaluation of implementation is recommended.

Additional research is required.

New

Conditional recommendation, very low-quality evidence

Maternity waiting homes are recommended to be established close to a health facility, where essential childbirth care and/or care for obstetric and newborn complications is provided, to increase access to skilled care for populations living in remote areas or with limited access to services.

Additional research is required.

New

Conditional recommendation, very low-quality evidence

Community-organized transport schemes are recommended in settings where other sources of transport are less sustainable and not reliable. However, measures should be taken to ensure the sustainability, efficacy and reliability of these schemes while seeking long term solutions to transport.

Additional research is recommended.

New

Strong recommendation, very low-quality evidence

Where TBAs remain the main providers of care at birth, dialogue with TBAs, women, families, communities and service providers is recommended in order to define and agree on alternative roles for TBAs, recognizing the important role they can play in supporting the health of women and newborns.

Additional research is required.

Recommended

The GDG also endorsed the recommendations from the existing WHO guideline WHO OptimizeMNH. [269]

The use of lay health workers including trained TBAs is recommended for promoting the uptake of a number of maternal and newborn-related health care behaviours and services, providing continuous social support during labour in the presence of a skilled birth attendant and administering misoprostol to prevent postpartum haemorrhage.

The use of lay health workers including trained TBAs to deliver the following interventions is recommended, with targeted monitoring and evaluation: distribution of some oral supplementtype interventions to pregnant women (calcium supplementation for women living in areas with known low levels of calcium intake, routine iron and folate supplementation for pregnant women, intermittent presumptive therapy for malaria for pregnant women living in endemic areas and vitamin A supplementation for pregnant women living in areas where severe vitamin A deficiency is a serious public health problem); and initiation and maintenance of injectable contraceptives using a standard syringe.

New

Strong recommendation, very low-quality evidence

Ongoing dialogue with communities is recommended as an essential component in defining the characteristics of culturally appropriate, quality maternity care services that address the needs of women and newborns and incorporate their cultural preferences.

Mechanisms that ensure women's voices are meaningfully included in these dialogues are also recommended.

Additional research is required.

New

Strong recommendation, moderate-quality evidence

Continuous companionship during labour and birth is recommended for improving women's satisfaction with services.

The GDG also endorsed the recommendations from an existing WHO guideline, WHO recommendations for augmentation of labour. [37]

Strong recommendation, moderate-quality evidence

Continuous companionship during labour and birth is recommended for improving labour outcomes.

New

Strong recommendation, moderate-quality evidence

Implementation of community mobilization through facilitated participatory learning and action cycles with women's groups is recommended to improve maternal and newborn health, particularly in rural settings with low access to health services.

New

Strong recommendation, low-quality evidence

Community participation in quality-improvement processes for maternity care services is recommended to improve quality of care from women's, communities' and health care providers' perspectives.

Communities should be involved in jointly defining and assessing quality. Mechanisms that ensure women's voices are meaningfully included are also recommended.

Additional research is required.

New

Strong recommendation, very low-quality evidence

Community participation in programme planning, implementation and monitoring is recommended to improve use of skilled care during pregnancy, childbirth and the postnatal period for women and newborns, increase the timely use of facility care for obstetric and newborn complications and improve maternal and newborn health.

Mechanisms that ensure women's voices are meaningfully included are also recommended.

Additional research is required.

New

Because of the paucity of evidence available, additional research is recommended.

The GDG affirms as a matter of principle the importance of sharing information on pregnancy related deaths with communities including discussion of the different factors causing these deaths and affecting access to skilled care.

New

Because of the paucity of evidence available, additional research is recommended.

The GDG affirms as a matter of principle the importance for MNH programmes to inform women about their right to health and to access quality skilled care and to continue to empower them to access such care.

1.6.12 Hepatitis B vaccines: WHO position paper

[75]

New **Recommended**

The birth dose should be followed by 2 or 3 additional doses to complete the primary series.

New **Recommended**

All infants (including low birth weight and premature infants) should receive their first dose of hepatitis B vaccine as soon as possible after birth, ideally within 24 hours.

- *If administration within 24 hours is not feasible, a late birth dose has some effectiveness. Although effectiveness declines progressively in the days after birth, after 7 days, a late birth dose can still be effective in preventing horizontal transmission and therefore remains beneficial.*
- *WHO recommends that all infants receive the late birth dose during the first contact with health-care providers at any time up to the time of the next dose of the primary schedule.*

New **Recommended**

The timely delivery (within 24 hours of birth) of the hepatitis B vaccine birth dose should be a performance measure for all immunization programmes, and reporting and monitoring systems should be strengthened to improve the quality of data on the birth dose.

- *To monitor accurately the delivery of doses given within 24 hours of birth, these doses should be recorded as "timely birth dose" of hepatitis B vaccine to differentiate them from birth doses given later ("late birth dose").*

1.6.13 Guidelines on Hepatitis B and C Testing

[270]

New **Strong Recommendation, low-quality evidence**

In settings with a ≥2% or ≥5%% HBsAg seroprevalence in the general population, it is recommended that HBsAg serological testing be routinely offered to all pregnant women in antenatal clinics, with linkage to prevention, care and treatment services. Couples and partners in antenatal care settings should be offered HBV testing services.

1. A threshold of ≥2% or ≥5% seroprevalence was based on several published thresholds of intermediate or high seroprevalence. The threshold used will depend on other country considerations and epidemiological context.

2. Many countries have chosen to adopt routine testing in all pregnant women, regardless of seroprevalence in the general population, and particularly where seroprevalence ≥2%. A full vaccination schedule including birth dose should be completed in all infants, in accordance with the WHO position paper on hepatitis B vaccines 2009 [75].

1.6.14 WHO recommendations on home-based records for maternal, newborn and child health

[89]

New **Recommended, low-certainty evidence**

The use of home-based records, as a complement to facility-based records, is recommended for the care of pregnant women, mothers, newborns and children, to improve care-seeking behaviours, male involvement and support in the household, maternal and child home care practices, infant and child feeding, and communication between health providers and women/caregivers.

There was insufficient evidence available to determine if any specific type, format or design of home-based records is more effective. Policy-makers should involve stakeholders to discuss the important considerations with respect to type, content and implementation of home-based records.

- *In remote and fragile settings, where health systems are weak or where health information systems are absent or poor, and in locations where caregivers may use multiple health facilities, home-based records may be of greater value than in more developed settings and health systems.*
- *Concerns about the privacy of online or electronic records were reported in studies. The GDG highlighted the potential sensitivity of information in home-based records on HIV testing, status or treatment. Careful consideration should be given as to what personal information is necessary to include in home-based records, to avoid stigma and discrimination.*
- *Countries currently using home-based records should consider appropriate use, design and content, as well as sustainable financing to maximize their use and impact.*
- *Additional research is needed on the benefits of using home-based records for recording information on single aspects of care, versus home-based records that include wider MNCH aspects for health education purposes. Evidence was not available at this time to inform this priority question for countries.*

Justification

The GDG considered the evidence presented and judged that, overall, the certainty of evidence of the effectiveness of home-based records was low. They recognized that the existing evidence base has limitations, including: the small number of studies found, half of which were conducted in high-income countries; the age of these, with some conducted before 2000; and the variety in the studies, which looked at different types of home-based records and measured a broad array of outcomes.

The impact varied by outcome. Some studies showed a positive effect on maternal health immunization care-seeking, outcomes related to a supportive home environment for maternal and child health (MCH) care, improved infant feeding and other child health care practices, improved child growth and development, improved continuity of care across MCH, and improved communication with health providers. However, there was also no significant effect reported on many maternal, newborn and child care-seeking and care practice outcomes. For many outcomes, no studies were found.

Although the evidence base has its limitations, the GDG determined that the desirable effects outweigh any undesirable effects, and also considered in their judgements the fact that home-based records have a long history and are implemented in at least 163 countries. Furthermore, they considered the qualitative evidence that reports women, caregivers and providers from a variety of settings value different forms of home-based records. The GDG also noted that home-based records contribute to a larger objective of ensuring the right to access to information, and are in line with global efforts for people-centred care, which WHO embraces.

1.6.15 WHO recommendations: non-clinical interventions to reduce unnecessary caesarean sections

[271]

New **Context-specific recommendation, low-certainty evidence**

Health education for women is an essential component of antenatal care. The following educational interventions and support programmes are recommended to reduce caesarean births only with targeted monitoring and evaluation.

- **Childbirth training workshops**
- **Nurse-led applied relaxation training programme**
- **Psychosocial couple-based prevention programme**
- **Psychoeducation**

Educational interventions and support programmes referred to in the included studies comprise the following, all delivered during the antenatal period.

- ***Childbirth training workshops.***
  - *Training comprised three four-hour weekly sessions in groups of 30 members.*
  - *Content included childbirth fear and pain, pharmacological pain-relief techniques and their effects, nonpharmacological pain-relief methods, advantages and disadvantages of caesarean and vaginal delivery, and indications and contraindications of caesareans, among other topics.*

- ***Nurse-led applied relaxation training programme.***
  - *Programme comprised seven 90-minute group education sessions over seven weeks led by a nurse, under the supervision of a clinical psychologist.*
  - *Content included group discussion of anxiety and stress-related issues in pregnancy and the purpose of applied relaxation and deep breathing techniques, among other relaxation techniques.*

- ***Psychosocial couple-based prevention programme.***
  - *The psychosocial programme consisted of nine classes, with four weekly classes conducted during the second or third trimester of pregnancy and four weekly classes conducted within the first six months postpartum.*
  - *Classes focused on emotional self-management, conflict management, problem solving, communication and mutual support strategies that foster positive joint parenting of an infant.*
  - *"Couple" in this recommendation includes couples, people in a primary relationship or other close people.*

- ***Psychoeducation for women with fear of childbirth.***
  - *The psychoeducative group therapy was led by four different psychologists with special group therapeutic skills in pregnancy-related issues. Six group sessions were held during pregnancy and one was held with the newborns six to eight weeks after delivery.*
  - *Each two-hour session consisted of a focused topic and a 30-minute guided relaxation exercise using an audio recording developed for this purpose. This relaxation exercise guided the participants through stages of imaginary delivery in a relaxed state of mind with positive, calming and supportive suggestions.*
  - *The topics covered included information about fear and anxiety, fear of childbirth, normalization of individual reactions, stages of labour, hospital routines, the birth process, and pain relief (led by a therapist and midwife), among others.*

- *When considering the educational interventions and support programmes targeted at women to reduce caesarean births, no specific format (e.g. pamphlet, videos, role play education) is recommended as more effective. (Low- to Moderate-certainty evidence)*
- *Further information on the educational interventions and support programmes is presented in Web annex 2.*

The following are according to the systematic review of qualitative studies [272].

- *Women think that learning new information about birth can be empowering. Women want educational tools (childbirth training workshops, booklets, decision-aids) and welcome multiple formats (although information on paper is ultimately needed for reflection with family, friends and health-care professionals).*
- *The content of educational materials should not provoke anxiety and needs to be consistent with advice from health-care professionals and provide the basis for more informed dialogue with them.*
- *Women want emotional support alongside the communication of facts and figures about birth.*

New

Context-specific recommendation, high-certainty evidence

Implementation of evidence-based clinical practice guidelines combined with structured, mandatory second opinion for caesarean section indication is recommended to reduce unnecessary caesarean sections in settings with adequate resources and senior clinicians able to provide mandatory second opinion for caesarean indication.

- *The GDG emphasized that this recommendation is for settings with adequate resources and senior clinicians (obstetrician-gynaecologists) able to provide mandatory second opinion for caesarean indication.*
- *The GDG noted that, although the effect size for this intervention is small, it might still translate into important impact on caesarean section rates, particularly in settings with adequate resources and high caesarean section rates.*
- *The following were components of the clinical practice guideline plus mandatory second opinion intervention.*
  - *Clinical practice guidelines were prepared as decision flow charts for six primary indications for caesarean section. The guidelines were developed by the investigators of the included study [273].*
  - *Mandatory second opinion was provided by the attending physician before caesarean section. The physician providing the second opinion had to be a person with clinical qualifications equal to or higher than those of the attending physician, working at the same hospital, selected by the obstetrics department and who agreed to follow the clinical guideline.*

- *Clinical practice guidelines in this recommendation refers to those implemented in the included study [273][1] and the relevant WHO guidelines listed in Annex 3.*

[1] The guidelines for dystocia, intrapartum fetal distress, previous caesarean section and breech presentation had the format of decision-making flow charts. For other maternal and fetal indications, general recommendations were provided. A seventh guideline for "other indications" was also developed for causes not included in the main six (e.g. maternal request).

New Recommended, high-certainty evidence

Implementation of evidence-based clinical practice guidelines, caesarean section audits and timely feedback to health-care professionals are recommended to reduce unnecessary caesarean sections.

- *The following were components of the evidence-based clinical practice guidelines[1] and audit and feedback intervention.*
  - *Onsite training in evidence-based clinical practice, facilitation of implementation by a local opinion leader (obstetrician-gynaecologist) and supportive supervision.*
  - *Audits of indications for caesarean births and provision of feedback to physicians and nurses involved in the decision-making process for deliveries. The audits were conducted by a local audit committee comprising two obstetrician-gynaecologists, one general practitioner and one nurse.*
- *The evidence supported audits of indications for caesarean sections; however, the GDG emphasized the need to assess all aspects of caesarean sections in audits (such as underlying health-care professional factors, women factors (e.g. maternal request) and organizational factors).*
- *Qualitative evidence [274] indicates that lack of training, skills or experience is a barrier to change and thus it is important that interventions have a training component tailored to local needs.*
- *Clinical practice guidelines in this recommendation refers to those implemented in the included study [275] and the relevant WHO guidelines listed in Annex 3.*

1 The guidelines were based on the Advances in Labour and Risk Management (ALARM) programme. Topics covered in the ALARM clinical practice guidelines and algorithms include: induction and stimulation of labour, fetal health surveillance, assisted vaginal delivery, prolonged pregnancy (> 42 weeks), active management of labour, partogram use, VBAC, breech and multiple pregnancy delivery. The training programme also sensitized participants to social, economic, organizational, cultural and legal factors contributing to the rise of the caesarean rate in Quebec. The training was provided by certified instructors from the Society of Obstetricians and Gynaecologists of Canada (SOGC).

New Context-specific recommendation, low-certainty evidence

For the sole purpose of reducing caesarean section rates, collaborative midwifery-obstetrician model of care (i.e. a model of staffing based on care provided primarily by midwives, with 24-hour back-up from an obstetrician who provides in-house labour and delivery coverage without other competing clinical duties) is recommended only in the context of rigorous research.

- *The collaborative midwifery-obstetrician staffing model comprised a midwife and an obstetrician being present in-house 24 hours a day, working collaboratively to provide primary labour care for all private and public patients [276]. This staffing model was compared with labour care provided by an on-call private physician or a covering partner.*
- *This recommendation is based on evidence from one interrupted time series study conducted in the United States [276]. There are uncertainties about the effectiveness, feasibility and acceptability of the intervention in other settings. Thus, the intervention should be implemented only in the context of well designed studies examining the impact on caesarean sections and exploring the acceptability to key stakeholders and the feasibility of implementation.*
- *This model of care primarily addresses intrapartum caesarean sections.*
- *The following are according to the systematic review of qualitative studies [274].*
- *Dysfunctional teamwork within the medical profession and lack of communication are important barriers that need to be addressed in the context of fostering change.*
- *Marginalization of midwives recurs across settings and acts as an important barrier to reducing caesareans. Collaborative staffing models can address this issue.*

New

Context-specific recommendation, very low-certainty evidence

For the sole purpose of reducing unnecessary caesarean sections, financial strategies (i.e. insurance reforms equalizing physician fees for vaginal births and caesarean sections) for health-care professionals or health-care organizations are recommended only in the context of rigorous research.

- *Financial strategies examined in the included studies comprised insurance reforms equalizing physician fees for vaginal births and caesarean sections.*
- *The GDG noted that only two interrupted time series studies assessed this intervention, conducted in countries with different health-care systems and resource capacities (Taiwan [China], the United States) – applicability in other settings is therefore uncertain. The certainty of evidence for caesarean section outcome was judged as very low in both studies (the effect on caesarean section rates is therefore uncertain). Despite these uncertainties, the GDG noted that financial incentive remains a major determinant of caesarean births in all settings.*
- *Given the uncertainties in the impact of financial strategies and their importance in caesarean births, the GDG recommended the implementation of financial strategies equalizing physician fees for vaginal births and caesarean sections only in the context of rigorous research examining the impact on caesarean births and exploring their acceptability to key stakeholders and the feasibility of their implementation.*

Part B

Managing Complications during Pregnancy, Childbirth and Postnatal period

2

2 Part B: Managing Complications during Pregnancy, Childbirth and Postnatal period

2.1 Haemorrhage

2.1.1 WHO recommendations for the prevention and treatment of postpartum haemorrhage

[44]

New **Strong recommendation, moderate low-quality evidence**

Intravenous oxytocin is the recommended uterotonic drug for the treatment of PPH.

Strong recommendation, low-quality evidence

If intravenous oxytocin is unavailable, or if the bleeding does not respond to oxytocin, the use of intravenous ergometrine, oxytocin-ergometrine fixed dose, or a prostaglandin drug (including sublingual misoprostol, 800 µg) is recommended.

- *The GDG recommended IV oxytocin as the first line uterotonic drug for the treatment of PPH, including when women have already received this drug for the prophylaxis of PPH.*
- *The GDG recognized that IV oxytocin may not be available in all settings. It encourages health care decision-makers in these settings to strive to make oxytocin available.*
- *In settings where IV oxytocin is unavailable to women who have received prophylactic IM oxytocin during the third stage of labour, the GDG considered misoprostol to be a valid alternative.*
- *If PPH prophylaxis with misoprostol has been administered and if injectable uterotonics are unavailable, there is insufficient evidence to guide further misoprostol dosing and consideration must be given to the risk of potential toxicity.*
- *There is no added benefit to offering misoprostol simultaneously to women receiving oxytocin for the treatment of PPH (i.e. adjunct misoprostol).*
- *The GDG noted that the two largest trials of misoprostol for the treatment of PPH (Winikoff 2010, Blum 2010) reported the use of a 800 µg dose administered sublingually. The majority of the GDG members agreed that 800 µg is an acceptable sublingual misoprostol dose for the treatment of PPH, though some members of the GDG expressed concern related to the risk of hyperpyrexia associated with this dosage.*
- *If IV oxytocin has been used for the treatment of PPH and the bleeding does not stop, there is a paucity of data to recommend preferences for second line uterotonic drug treatment. Decisions in such situations must be guided by the experience of the provider, the availability of the drugs, and by known contraindications.*
- *In situations in which IM oxytocin can be administered and there is no possibility of IV treatment with ergot alkaloids/injectable prostaglandins, there is a paucity of data to recommend a preference of IM oxytocin over misoprostol or other uterotonics. Decisions in such situations must be guided by the experience of the provider, the availability of the drugs, and by known contraindications.*

New

Strong recommendation, low-quality evidence

The use of isotonic crystalloids is recommended in preference to the use of colloids for the intravenous fluid resuscitation of women with PPH.

Weak Recommendation, moderate-quality evidence

The use of tranexamic acid is recommended for the treatment of PPH if oxytocin and other uterotonics fail to stop the bleeding or if it is thought that the bleeding may be partly due to trauma.

- *Evidence for the recommendation of tranexamic acid was extrapolated from the literature on surgery and trauma, which shows tranexamic acid to be a safe option for the treatment of trauma-related bleeding.*

New

Strong recommendation, very low-quality evidence

Uterine massage is recommended for the treatment of PPH.

Weak Recommendation, very low-quality evidence

If women do not respond to treatment using uterotonics, or if uterotonics are unavailable, the use of intrauterine balloon tamponade is recommended for the treatment of PPH due to uterine atony.

Weak Recommendation, very low-quality evidence

If other measures have failed and if the necessary resources are available, the use of uterine artery embolization is recommended as a treatment for PPH due to uterine atony.

Strong recommendation, very low-quality evidence

If bleeding does not stop in spite of treatment using uterotonics and other available conservative interventions (e.g. uterine massage, balloon tamponade), the use of surgical interventions is recommended.

Weak Recommendation, very low-quality evidence

The use of bimanual uterine compression is recommended as a temporizing measure until appropriate care is available for the treatment of PPH due to uterine atony after vaginal delivery.

Weak Recommendation, very low-quality evidence

The use of external aortic compression for the treatment of PPH due to uterine atony after vaginal birth is recommended as a temporizing measure until appropriate care is available.

Weak Recommendation, very low-quality evidence

The use of non-pneumatic anti-shock garments is recommended as a temporizing measure until appropriate care is available.

Weak Recommendation against, very low-quality evidence

The use of uterine packing is not recommended for the treatment of PPH due to uterine atony after vaginal birth.

- *The GDG noted that the application of these interventions requires training and that maternal discomfort and complications associated with these procedures have been reported.*

- *Uterine massage as a therapeutic measure is defined as the rubbing of the uterus achieved through the manual massaging of the abdomen. This is typically sustained until the bleeding stops or the uterus contracts. The GDP considered that uterine massage should be started once PPH has been diagnosed.*
- *The initial rubbing of the uterus and expression of blood clots are not regarded as therapeutic uterine massage.*
- *When rating the recommendation #17 as 'strong', the low cost and safety of uterine massage were taken into account.*
- *The use of balloon tamponade was considered by the GDG to be a measure that can potentially avoid surgery or as a temporizing measure while awaiting transfer to a higher level facility. The GDG acknowledges that balloon tamponade can be obtained with specific devices as well as with lower cost adaptations, including those based on the use of condoms and surgical gloves.*
- *The GDG noted that uterine artery embolization requires significant resources, in terms of the cost of the treatment, the facilities, and the training of health care workers.*
- *The GDG noted that conservative surgical approaches should be tried first. If these do not work, they should be followed by more invasive procedures. Compression sutures, for example, may be attempted as a first intervention, and if these fail, then uterine, utero-ovarian and hypogastric vessel ligation may be tried. If life-threatening bleeding continues even after ligation, then a subtotal (otherwise known as supracervical) or total hysterectomy should be performed.*
- *The GDG acknowledged that the level of health care provider skills will play a role in the selection and sequence of the surgical interventions.*
- *External aortic compression has long been recommended as a potential life-saving technique, and mechanical compression of the aorta, if successful, slows blood loss. The GDG placed a high value on this procedure as a temporizing measure in the treatment of PPH.*
- *The GDG noted that research evaluating the potential benefits and harms of non-pneumatic anti-shock garments is ongoing. Based on the evidence available, the GDG regarded non-pneumatic anti-shock garments as a temporizing measure while transfer is awaited.*
- *The GDG noted that there was no evidence of benefit of uterine packing and placed a high value on concerns regarding its potential harm.*

New

Weak recommendation, very low-quality evidence

If the placenta is not expelled spontaneously, the use of additional oxytocin (10 IU, IV/IM) in combination with controlled cord traction is recommended.

Weak Recommendation against, very low-quality evidence

The use of ergometrine for the management of a retained placenta is not recommended as this may cause tetanic uterine contractions which may delay the expulsion of the placenta.

Weak Recommendation against, very low-quality evidence

The use of prostaglandin E2 alpha (dinoprostone or sulprostone) in the management of retained placenta is not recommended.

Weak Recommendation, very low-quality evidence

A single dose of antibiotics (ampicillin or first-generation cephalosporin) is recommended if manual removal of the placenta is practised.

- *The GDG found no empirical evidence to support recommending the use of uterotonics for the management of a retained placenta in the absence of haemorrhage. The above recommendation was reached by consensus.*
- *The WHO guide, "Managing complications in pregnancy and childbirth" [52], states that if a placenta is not expelled within 30 minutes after the delivery of a baby, the woman should be diagnosed as having a retained placenta. Since there is no evidence for or against this definition, the delay used before this condition is diagnosed is left to the judgement of the clinician.*
- *The same WHO guide also suggests that in the absence of haemorrhage, the woman should be observed for a further 30 minutes after the initial 30 minutes, before the manual removal of the placenta is attempted. The GDG noted that spontaneous expulsion of the placenta can still occur, even in the absence of bleeding. A conservative approach is therefore advised and the timing of the manual removal of the placenta as a definitive treatment is left to the judgement of the clinician.*
- *The recommendation regarding the use of prostaglandin E2 is informed by a lack of evidence on this question and also by concerns related to adverse events, particularly cardiac events.*
- *Direct evidence of the value of antibiotic prophylaxis after the manual removal of the placenta was not available. The GDG considered indirect evidence of the benefit of prophylactic antibiotics from studies of caesarean section and abortion, as well as observational studies of other intrauterine manipulations.*
- *Current practice suggests that ampicillin or first-generation cephalosporins may be administered when the manual removal of the placenta is performed.*
- *This question was identified as a research priority for settings in which prophylactic antibiotics are not routinely administered and those with low infectious morbidity.*

New **Strong recommendation, moderate-quality evidence**

In settings where skilled birth attendants are not present and oxytocin is unavailable, the administration of misoprostol (600 µg PO) by community health care workers and lay health workers is recommended for the prevention of PPH.

Weak Recommendation, high-quality evidence

In settings where skilled birth attendants are available, controlled cord traction (CCT) is recommended for vaginal births if the care provider and the parturient woman regard a small reduction in blood loss and a small reduction in the duration of the third stage of labour as important.

Strong recommendation against, moderate-quality evidence

In settings where skilled birth attendants are unavailable, CCT is not recommended.

New **Strong recommendation, moderate-quality evidence**

Late cord clamping (performed after 1 to 3 minutes after birth) is recommended for all births while initiating simultaneous essential newborn care.

Strong recommendation against, moderate-quality evidence

Early cord clamping (< 1 minute after birth) is not recommended unless the neonate is asphyxiated and needs to be moved immediately for resuscitation.

New **Strong recommendation, very low-quality evidence**

Postpartum abdominal uterine tonus assessment for early identification of uterine atony is recommended for all women.

New **Strong recommendation, moderate-quality evidence**

CCT is the recommended method for removal of the placenta in caesarean section.

2.1.2 WHO recommendation on umbilical vein injection of oxytocin for the treatment of retained placenta

[277]

Research-context recommendation

Umbilical vein injection of oxytocin is recommended for the treatment of retained placenta only in the context of rigorous research.

Remarks

- *The Guideline Development Group acknowledged the potential of umbilical vein injectionof oxytocin in the treatment of retained placenta but considered the evidence of benefit in terms of manual removal of the placenta without impact on other priority outcomes insufficient to make a recommendation for routine clinical practice. The group agreed that high-quality randomized trials comparing umbilical vein injection of uterotonics with expectant management of women with retained placenta are needed, with the aim of demonstrating its impact on severe morbidity related to postpartum haemorrhage in addition to a reduction in manual removal of the placenta.*
- *When used in a research context, it is safer to consider the use of this intervention in situations in which retained placenta occurs in the absence of abnormal bleeding.*
- *There are three types of retained placenta, and umbilical vein injection is likely to be only effective in placenta adherens, the most common type of retained placenta, which occurs as a result of failed contraction of the retroplacental myometrium. To date, studies have not distinguished the subtypes before treatment, and this may have contributed to the results showing lack of efficacy of treatment with umbilical vein injection for retained placenta.*

Justification

Evidence from trials that compared both umbilical vein injection of oxytocin versus expectant management and umbilical vein injection of oxytocin versus umbilical vein injection of saline suggest that this intervention may lead to a reduction in manual removal of placenta. However, the effect of this intervention on other priority outcomes (including infections, maternal satisfaction and length of hospitalization) is unclear. While the cost-effectiveness is not known, additional costs in supplies required to implement this intervention are probably negligible. When compared with injection of other solutions and uterotonics, no other umbilical vein injection regimen was shown to be clearly better than umbilical vein injection of oxytocin.

2.2 Hypertensive Disorders

2.2.1 WHO recommendations for prevention and treatment of pre-eclampsia and eclampsia

[278]

New **Strong recommendation, moderate-quality evidence**

Low-dose acetylsalicylic acid (aspirin, 75 mg/day) is recommended for the prevention of pre-eclampsia in women at high risk of developing the condition.

Weak Recommendation, low-quality evidence

Low-dose acetylsalicylic acid (aspirin, 75 mg/day) for the prevention of pre-eclampsia and its related complications should be initiated before 20 weeks of pregnancy.

- *Women are regarded as being at high risk of developing pre-eclampsia if they have one or more of the following risk factors: previous preeclampsia; diabetes; chronic hypertension; renal disease; autoimmune disease; and multiple pregnancies. This is not an exhaustive list, but can be adapted/complemented based on the local epidemiology of pre-eclampsia.*
- *The guideline development group acknowledged that in settings where 75 mg aspirin tablets are not available, the available dose nearest to 75 mg should be used.*
- *While low-dose aspirin has been shown to be beneficial in women at high risk of preeclampsia, there is a paucity of evidence to suggest that any subset of women within the high-risk group would benefit from aspirin therapy.*
- *The guideline development group noted that it may be appropriate to initiate antiplatelet agents before 20 weeks of gestation, and, if possible, as early as 12 weeks of gestation.*

New **Weak Recommendation against, low-quality evidence**

Advice to rest at home is not recommended as an intervention for the primary prevention of pre-eclampsia and hypertensive disorders of pregnancy in women considered to be at risk of developing those conditions.

Weak Recommendation against, low-quality evidence

Strict bedrest is not recommended for improving pregnancy outcomes in women with hypertension (with or without proteinuria) in pregnancy.

- *The guideline development group acknowledged that there may be situations in which different levels of rest, either at home or in hospital, may be indicated for individual women. The above recommendations do not cover advice regarding overall physical activity and manual or office work.*
- *Women may need to be hospitalized for reasons other than bedrest, such as for maternal and fetal surveillance. The guideline development group agreed that hospitalization for maternal and fetal surveillance is resource intensive and should be considered as a priority for research and future recommendations.*

New

Weak Recommendation against, moderate-quality evidence

Restriction in dietary salt intake during pregnancy with the aim of preventing the development of pre-eclampsia and its complications is not recommended.

- *The guideline development group agreed that healthy dietary practices should be promoted in the general population, including among pregnant women.*
- *The group considered the avoidance of excessive dietary salt intake as a healthy dietary practice.*

New

Strong recommendation against, low-quality evidence

Diuretics, particularly thiazides, are not recommended for the prevention of preeclampsia and its complications.

- *The guideline development group considered that there is absence of clinical uncertainty over whether treatment of severe hypertension during pregnancy is beneficial. This recommendation was made based on expert opinion; the group considered that most maternal deaths related to hypertensive disorders are associated with complications of uncontrolled severe high blood pressure. Based on that, the group agreed that antihypertensive treatment should be recommended in all cases of severe acute hypertension.*
- *With regard to the treatment of mild/moderate hypertension in pre-eclampsia, a formal evidence review was conducted. The guideline development group considered the available evidence controversial, as there are potential harms and benefits associated with both lines of action. The group was aware of ongoing trials that might provide more robust data in the near future for guidance. Hence, they decided not to issue a recommendation on the treatment of mild/moderate hypertension until further evidence becomes available.*
- *In terms of the choice and route of administration of an antihypertensive drug for severe hypertension during pregnancy, the guideline development group noted that not only is the evidence base for this recommendation limited, but also some antihypertensive drugs may not be feasible options in many settings. The group acknowledged that hydralazine, alpha methyldopa, beta blockers (including labetalol) and nifedipine have been extensively used, and therefore, these agents would seem to be reasonable choices until further evidence becomes available. The group noted that there was no evidence to suggest that nifedipine interacts adversely with magnesium sulfate. In addition, the group considered that the use of angiotensin-converting enzyme inhibitors, angiotensin receptor blockers and sodium nitroprusside should be avoided due to safety concerns.*
- *In not recommending diuretics, particularly thiazides, for the for the prevention of preeclampsia and its complications, the group noted that this recommendation applies only to women at risk of developing preeclampsia who are not currently under treatment with diuretics. It does not apply to the use of diuretics for non-pre-eclampsia-related indications.*

New

Strong recommendation, high-quality evidence

Magnesium sulfate is recommended for the prevention of eclampsia in women with severe pre-eclampsia in preference to other anticonvulsants.

Strong recommendation, moderate-quality evidence

Magnesium sulfate is recommended for the treatment of women with eclampsia in preference to other anticonvulsants.

Strong recommendation, moderate-quality evidence

The full intravenous or intramuscular magnesium sulfate regimens are recommended for the prevention and treatment of eclampsia.

Strong recommendation, very low-quality evidence

For settings where it is not possible to administer the full magnesium sulfate regimen, the use of magnesium sulfate loading dose followed by immediate transfer to a higher level health-care facility is recommended for women with severe pre-eclampsia and eclampsia.

- *Magnesium sulfate is a lifesaving drug and should be available in all health-care facilities throughout the health system. The guideline development group believed that capacity for clinical surveillance of women and administration of calcium gluconate were essential components of the package of services for the delivery of magnesium sulfate.*
- *Clinical evidence supports the use of magnesium sulfate in all pre-eclampsia patients. In settings where there are resource constraints to manage the administration of magnesium sulfate safely in all women with pre-eclampsia, there may be a need to accord greater priority to the more severe cases. Magnesium sulfate is effective in preventing seizures in both mild and severe pre-eclampsia. However, the guideline development group noted that a higher number of women need to be treated to prevent one seizure. The group agreed on the need to treat women with severe preeclampsia, but the group members were divided on the use of magnesium sulfate as a prophylaxis for mild pre-eclampsia.*
- *Large trials have evaluated and demonstrated the effectiveness of full regimens of magnesium sulfate, which include a loading dose followed by 24-hour maintenance therapy. Specific guidance on how to administer magnesium sulfate can be found in the WHO manual entitled Managing complications in pregnancy and childbirth: a guide for midwives and doctors [279].*
- *The guideline development group deliberated on the best course of action in settings in which it is not possible to administer the full magnesium sulfate regimen. The group debated the possible (but yet unproven) benefits of administering only the loading dose versus transferring women with severe preeclampsia and eclampsia without any magnesium sulfate. The group felt that that, even in cases where immediate transfer of the woman to a higher-level facility was not possible, the patient was likely to be better off with only the loading dose than without it. The group felt that since this was a common scenario in many low-income countries, it should be given high priority for further research.*

New **Strong recommendation, very low-quality evidence**

In women with severe pre-eclampsia at term, a policy of early delivery is recommended.

Weak Recommendation, moderate-quality evidence

In women with mild pre-eclampsia or gestational hypertension at term, induction of labour is recommended.

- *The guideline development group considered that there is absence of clinical uncertainty over whether termination of pregnancy in women with severe pre-eclampsia at term is beneficial. Quality of evidence provided by the Hypitat trial [280] further downgraded for indirectness.*
- *The guideline development group considered that, in women with pre-eclampsia at term, expectant management is associated with a substantial risk of further maternal and fetal complications and absence of substantial maternal and fetal benefits.*
- *In settings where gestational age is difficult to determine accurately, special attention should be paid to avoid iatrogenic prematurity in infants.*
- *The guideline development group considered that, if induction of labour is contraindicated due to maternal or fetal conditions, early delivery by caesarean section is recommended (as opposed to expectant management).*

New **Strong recommendation, very low-quality evidence**

In women treated with antihypertensive drugs antenatally, continued antihypertensive treatment postpartum is recommended.

Strong recommendation, very low-quality evidence

Treatment with antihypertensive drugs is recommended for severe postpartum hypertension.

- *The guideline development group recognized the need for discharge instructions, including education concerning the signs and symptoms associated with postpartum hypertension.*
- *In women receiving postpartum antihypertensive treatment, at the present time it is not known at what point the treatment and monitoring of hypertension could be stopped. Hence, the group highlighted this topic as a research priority.*
- *The guideline development group put more emphasis on the frequency of postpartum deaths related to stroke and recognized that the maximum increase in blood pressure usually occurs towards the end of the first postpartum week (when, in most settings, women have been already discharged from facility care).*
- *In women diagnosed with mild pre-eclampsia antenatally, but not treated with antihypertensive drugs, the initiation of antihypertensive treatment postpartum should be considered for minimizing the risk of complications of severe high blood pressure (see remark 'c' above). That remark was made based on expert opinion and considering the evidence related to the treatment of mild/moderate hypertension during pregnancy. In the postpartum period, the maternal risk of a complication of hypertension is not counterbalanced by the risk of an adverse fetal effect produced by maternal hypotension.*
- *The guideline development group considered that there is little clinical uncertainty over whether treatment of severe postpartum hypertension is beneficial. This recommendation was made based on expert opinion and the guideline development group considered that most maternal deaths related to hypertensive disorders are associated with complications of uncontrolled severe high blood pressure. Based on that, the guideline development group agreed that antihypertensive treatment should be recommended in all cases of severe acute hypertension.*

New **Weak Recommendation against, very low-quality evidence**

The use of corticosteroids for the specific purpose of treating women with HELLP syndrome is not recommended.

- *The guideline development group noted that, in addition to the existing evidence, three small trials addressing this research question had been registered in the WHO International Clinical Trials Registry Platform [281]. In one trial (66 women) recruitment had been completed, in the second trial it was still ongoing (160 women) and in the third recruitment was yet to begin. In view of the very low quality of the evidence base on this topic and relative ease of use and availability/affordability of corticosteroids, the group accorded corticosteroids for the treatment of HELLP syndrome high priority for further research.*
- *The guideline development group emphasized that the use of corticosteroids for other indications, such as fetal lung maturation, are not included in the above recommendation.*

2.2.2 WHO recommendations on drug treatment for non-severe hypertension in pregnancy

[282]

Context specific recommendation

Women with non-severe hypertension during pregnancy should be offered antihypertensive drug treatment in the context of good quality antenatal care follow-up.

Context specific recommendation

Oral alpha-agonist (methyldopa) and beta-blockers should be considered as effective treatment options for non-severe hypertension during pregnancy.

Remarks

- *The Guideline Development Group (GDG) considered that while the use of an antihypertensive drug for the treatment of non-severe hypertension in pregnancy may confer health benefits, pregnant women who are prescribed these drugs require regular outpatient monitoring and review by an antenatal care provider. Access to antenatal care services for monitoring of blood pressure and complications (such as proteinuria), or side-effects due to treatment, is considered integral to initiating antihypertensive treatment.*
- *The GDG acknowledged that, based on available evidence, alpha-agonist (methyldopa) and beta-blockers are reasonable antihypertensive drug treatment options. The group considered it important that clinicians select an antihypertensive drug regimen appropriate to the woman's individual clinical situation. The choice of antihypertensive should be based on pre-existing antihypertensive treatment, side-effect profiles, risks (including potential fetal effects), cost, local availability and the woman's preferences. Methyldopa has the fewest safety concerns, is listed for use as an antihypertensive agent during pregnancy in the WHO Model List of Essential Medicines, and is widely available in many countries. Available evidence suggests that calcium channel blockers should be avoided.*
- *Available trials used several different oral beta-blockers (including acebutolol, atenolol, labetalol, mepindolol, metoprolol, oxprenolol, pindolol and propranolol) at different doses. It is therefore not possible to determine the optimal beta-blocker option or dosing regimen for this indication. Atenolol and metoprolol are listed on the WHO Model List of Essential Medicines and are widely available in many countries.*
- *The use of angiotensin-converting enzyme inhibitors, angiotensin receptor blockers and sodium nitroprusside should be avoided due to safety concerns.*

Justification

- When used for non-severe hypertension in pregnancy, use of an antihypertensive drug compared to placebo or no antihypertensive treatment probably reduces the development of severe hypertension, though there may be little or no difference in the risk of developing proteinuria or pre-eclampsia. There may be a slight increase in side-effects with the use of an antihypertensive drug.
- Several antihypertensive drug options have been evaluated for non-severe hypertension in pregnancy, though there is currently insufficient evidence to conclude which drug option is superior over the other. Compared to placebo or no treatment, methyldopa probably reduces severe hypertension. Beta-blockers probably reduce the onset of severe hypertension and pre-eclampsia, though side-effects may increase. Calcium channel blockers probably increase the risk of developing proteinuria/pre-eclampsia. Beta-blockers may reduce the risk of women developing severe hypertension compared to methyldopa.
- The acceptability of drug treatment of non-severe hypertension by women may vary, depending on their knowledge of potential risks of hypertension in pregnancy, the cost of medication and drug side-effects. Feasibility may also be limited by a lack of suitably trained staff and medical equipment (including blood pressure monitoring devices) and local availability of antihypertensive drugs.
- There are insufficient data on how much women value health outcomes associated with use of different classes of antihypertensive drugs, and no direct evidence on cost-effectiveness, acceptability, feasibility and impact on health equity with the use of different classes of antihypertensive drugs.

2.2.3 WHO recommendations Policy of interventionist versus expectant management of severe pre-eclampsia before term

[283]

New **Strong recommendation, very low-certainty evidence**

Induction of labour is recommended for women with severe pre-eclampsia at a gestational age when the fetus is not viable or unlikely to achieve viability within one or two weeks.

- *A policy of expectant management usually includes intra-hospital care with steroids for fetal lung maturation, magnesium sulfate (as necessary), antihypertensive drugs (as necessary), and close maternal and fetal monitoring to identify indications for delivery (e.g. uncontrolled hypertension, deterioration in the condition of the mother and the fetus, including organ dysfunction and fetal distress). As part of expectant management, in-utero transfer to a tertiary-level centre with neonatal intensive care capacity should be considered. The decision on the route of delivery should be made on a caseby- case basis, taking into account, among other factors, gestational age, fetal and cervical status and urgency.*
- *The guideline development group considered that the gestational age threshold for using expectant management in very preterm fetuses depends on the fetal viability status and on the anticipated prolongation of gestation with expectant management. The guideline development group acknowledged that the gestational age threshold of fetal viability should be locally agreed. In establishing this threshold, the local context, the availability of resources, and the local newborn survival rates by gestational age should be considered. The average gain in terms of prolongation of gestation with expectant management ranges from 1 week to 2 weeks. Hence, fetuses at a gestational age 1–2 weeks below the fetal viability threshold may benefit from expectant management.*

New

Conditional recommendation, very low-certainty evidence

In women with severe pre-eclampsia, a viable fetus and before 34 weeks of gestation, a policy of expectant management is recommended, provided that uncontrolled maternal hypertension, increasing maternal organ dysfunction or fetal distress are absent and can be monitored.

- *A policy of expectant management usually includes intra-hospital care with steroids for fetal lung maturation, magnesium sulfate (as necessary), antihypertensive drugs (as necessary), and close maternal and fetal monitoring to identify indications for delivery (e.g. uncontrolled hypertension, deterioration in the condition of the mother and the fetus, including organ dysfunction and fetal distress). As part of expectant management, in-utero transfer to a tertiary-level centre with neonatal intensive care capacity should be considered. The decision on the route of delivery should be made on a caseby- case basis, taking into account, among other factors, gestational age, fetal and cervical status and urgency.*
- *The guideline development group considered that the gestational age threshold for using expectant management in very preterm fetuses depends on the fetal viability status and on the anticipated prolongation of gestation with expectant management. The guideline development group acknowledged that the gestational age threshold of fetal viability should be locally agreed. In establishing this threshold, the local context, the availability of resources, and the local newborn survival rates by gestational age should be considered. The average gain in terms of prolongation of gestation with expectant management ranges from 1 week to 2 weeks. Hence, fetuses at a gestational age 1–2 weeks below the fetal viability threshold may benefit from expectant management.*

New

Conditional recommendation, very low-certainty evidence

In women with severe pre-eclampsia, a viable fetus and between 34 and 36 (plus 6 days) weeks of gestation, a policy of expectant management may be recommended, provided that uncontrolled maternal hypertension, increasing maternal organ dysfunction or fetal distress are absent and can be monitored.

- *A policy of expectant management usually includes intra-hospital care with steroids for fetal lung maturation, magnesium sulfate (as necessary), antihypertensive drugs (as necessary), and close maternal and fetal monitoring to identify indications for delivery (e.g. uncontrolled hypertension, deterioration in the condition of the mother and the fetus, including organ dysfunction and fetal distress). As part of expectant management, in-utero transfer to a tertiary-level centre with neonatal intensive care capacity should be considered. The decision on the route of delivery should be made on a caseby- case basis, taking into account, among other factors, gestational age, fetal and cervical status and urgency.*
- *The guideline development group considered that the gestational age threshold for using expectant management in very preterm fetuses depends on the fetal viability status and on the anticipated prolongation of gestation with expectant management. The guideline development group acknowledged that the gestational age threshold of fetal viability should be locally agreed. In establishing this threshold, the local context, the availability of resources, and the local newborn survival rates by gestational age should be considered. The average gain in terms of prolongation of gestation with expectant management ranges from 1 week to 2 weeks. Hence, fetuses at a gestational age 1–2 weeks below the fetal viability threshold may benefit from expectant management.*

2.2.4 WHO recommendations: Drug treatment for severe hypertension in pregnancy

[284]

New **Strong recommendation, very low-certainty evidence**

Women with severe hypertension during pregnancy should receive treatment with antihypertensive drugs.

- *The guideline development group considered that there is no clinical uncertainty over whether treatment of severe hypertension during pregnancy is beneficial. This recommendation was made based on expert opinion; the group considered that most maternal deaths related to hypertensive disorders are associated with complications of uncontrolled severe high blood pressure. Based on that, the group agreed that antihypertensive treatment should be recommended in all cases of severe hypertension.*

New **Conditional recommendation, very low-certainty evidence**

The choice and route of administration of an antihypertensive drug for severe hypertension during pregnancy, in preference to others, should be based primarily on the prescribing clinician's experience with that particular drug, its cost and local availability.
In terms of the choice and route of administration of an antihypertensive drug for severe hypertension during pregnancy, the guideline development group noted that not only is the evidence base for this recommendation limited, but also some antihypertensive drugs may not be feasible options in many settings.

- *The group acknowledged that hydralazine, alpha methyldopa, beta blockers (including labetalol) and nifedipine have been extensively used, and therefore, these agents would seem to be reasonable choices until further evidence becomes available.*
- *The group noted that there was no evidence to suggest that nifedipine interacts adversely with magnesium sulfate. In addition, the group considered that the use of angiotensin- converting enzyme inhibitors, angiotensin receptor blockers and sodium nitroprusside should be avoided due to safety concerns.*

2.3 Infections and Infectious Diseases during pregnancy, childbirth, and postnatal period

2.3.1 WHO recommendations for prevention and treatment of maternal peripartum infections

[18]

New **Conditional Recommendation against, very low-quality evidence**

Routine vaginal cleansing with chlorhexidine during labour in women with group B Streptococcus (GBS) colonization is not recommended for prevention of early neonatal GBS infection.

- *This recommendation was based on the lack of clinical benefits for the neonate and not on the potential effect of the intervention on GBS-related maternal infectious morbidity.*
- *The GDG acknowledged the considerable variations in policies regarding the screening for GBS colonization in pregnant women. Therefore, the group agreed that this recommendation should be implemented within the context of local policy and guidance on screening for GBS colonization.*

New **Conditional recommendation, very low-quality evidence**

Intrapartum antibiotic administration to women with group B Streptococcus (GBS) colonization is recommended for prevention of early neonatal GBS infection.

- *This recommendation was made based on clinical benefits for the neonates, as there was insufficient evidence on the effect of antibiotic administration on maternal infectious morbidities.*
- *As the evidence came from studies that tested ampicillin or penicillin G, either antibiotic should first be considered for treatment except where there are contraindications (e.g. allergy history) or GBS strain has been microbiologically shown to be penicillin-resistant.*
- *The GDG noted that although women with urethral GBS colonization were not included in the trials, the recommendation should also be applied to such women because urinary colonization is often persistent following identification and treatment during pregnancy.*
- *The GDG acknowledged the challenges of implementing GBS screening for all pregnant women, particularly in low-resource countries and in settings where the prevalence of maternal colonization is low, coupled with the limitations in providing appropriate preventive measures and follow-up to the majority of the women screened positive. Therefore, the group agreed that this recommendation should be implemented within the context of local policy and guidance on screening for GBS colonization. In deciding whether or not to administer antibiotics during labour to GBS-colonized women, clinicians should balance the risk and benefits of the use of antibiotics, taking into account different factors (e.g. colonization rates and factors associated with increased transmission).*

New **Strong recommendation against, very low-quality evidence**

Routine antibiotic prophylaxis during the second or third trimester to all women with the aim of reducing infectious morbidity is not recommended.

- *This recommendation applies to an unselected population of pregnant women in the second or third trimester of pregnancy.*
- *The GDG noted that prophylactic antibiotic use may be necessitated in a clearly defined group of women with high-risk pregnancy, but the description in the systematic review is inadequate to identify such a group.*
- *The GDG identified the evaluation of the effects of routine antibiotics in specific groups of women with high-risk pregnancy as a research priority.*

New Strong recommendation against, moderate-quality evidence

Routine antibiotic administration is not recommended for women in preterm labour with intact amniotic membranes.

- *This recommendation is in keeping with the WHO guideline on interventions to improve preterm birth outcomes [285].*
- *The GDG placed its emphasis on the potential risk of harm to the baby (i.e. cerebral palsy) and less value on the minimal benefit to mothers; therefore, it recommended against the intervention.*
- *It is critical for women with any diagnostic or clinical signs of infection to be treated accordingly with antibiotics.*

New Strong recommendation, moderate-quality evidence

Antibiotic administration is recommended for women with preterm prelabour rupture of membranes.

- *This recommendation is in keeping with the WHO guideline on interventions to improve preterm birth outcomes [285].*
- *For near-term (i.e. ≥36 weeks) PPROM where the clinical policy of immediate or early labour induction (within 12 hours of rupture) is in place, antibiotic use does not confer any benefit and should not be used (see Recommendation 9 in this guideline).*
- *Erythromycin is recommended as the antibiotic of choice for prophylaxis in women with preterm prelabour rupture of membranes according to the WHO recommendations on interventions to improve preterm birth outcomes [285].*
- *To avoid inadvertent antibiotic administration to women with intact amniotic membranes, antibiotics should not be prescribed unless a definite diagnosis of PPROM has been made. Therefore, a policy to prescribe antibiotics for women with PPROM should be accompanied by a protocol to reliably diagnose PPROM.*
- *Long latent phase (interval between rupture of membranes and onset of preterm labour) could predispose to intrauterine infection. Therefore, women should be closely monitored for signs of clinical chorioamnionitis.*

New Strong recommendation against, low-quality evidence

Routine antibiotic administration is not recommended for women with prelabour rupture of membranes at (or near) term.

- *"Routine" use implies administration of antibiotics in the absence of clinical signs of infection or any additional risk factors for infection.*
- *"Near term" in this context refers to 36 weeks gestation and above.*
- *Evidence for this recommendation was based on studies that included women with duration of ruptured membranes less than 12 hours. The GDG noted that while the available evidence clearly indicates that antibiotics do not confer any benefits under a clinical policy of immediate or early induction (within 12 hours of rupture), it is less clear for a policy of expectant or delayed induction longer than this timeframe. Nevertheless, the generally low rate of maternal infection in the control population in the included studies (< 5%) further supports the restriction of antibiotic use to women with PROM and clinical evidence of infections.*
- *The GDG noted that evidence is lacking on the potential benefits of antibiotic prophylaxis for women with prolonged rupture of membranes (> 18 hours) and active labour where the baseline risk of infection may be higher. As the risk of infection increases with the duration of labour, it is possible that women with prolonged labour and ruptured membranes may benefit from antibiotic prophylaxis, and this underlies the common clinical practice. The group acknowledges that in the light of current obstetric practice, it is unlikely that a randomized controlled trial will address the important question on the effect of antibiotic prophylaxis in prolonged prelabour rupture of membranes at term (> 12 hours) or prolonged labour with ruptured membranes.*
- *The GDG put its emphasis on potential sideeffects of antibiotics, particularly long-term effects among exposed children, as well as bacterial resistance and, therefore, made a strong recommendation.*

New Conditional Recommendation against, low-quality evidence

Routine antibiotic administration is not recommended for women with meconium-stained amniotic fluid.

- *In the absence of convincing evidence, the GDG puts its emphasis on the public health impact of routine administration of antibiotics (in terms of increasing antibiotic resistance) for a relatively common condition in labour and decided to recommend against the intervention.*
- *Antibiotics should be used in a situation where the passage of meconium by the fetus may be triggered by antepartum or intrapartum infectious morbidity – e.g. chorioamnionitis — or when the characteristics of the liquor suggest intrapartum infection.*
- *It is important that a personnel experienced in neonatal resuscitation attends the delivery of all infants in whom thick meconium liquor is noted, as the risk of meconium aspiration syndrome is higher in this situation.*

New

Strong recommendation, very low-quality evidence

Routine antibiotic prophylaxis is recommended for women undergoing manual removal of the placenta.

- *Although there is no clear indication of benefits from the available evidence, the GDG decided to recommend prophylactic antibiotic use for this condition based on consensus after considering the potentially higher risk of infection related to the invasive nature of intrauterine manipulation required for manual placental removal. The group also considered indirect evidence of the benefit of prophylactic antibiotics from studies of caesarean section and abortion, as well as observational studies of other intrauterine manipulations.*
- *This recommendation is based on updated evidence and is consistent with existing WHO guidance on the treatment of postpartum haemorrhage which recommends a single dose of antibiotics (ampicillin or firstgeneration cephalosporin) for manual placental removal [44].*
- *In addition to antibiotic use, health care providers should take into account other factors that could decrease the risk of infection, such as observing good hygiene and general aseptic technique during the procedure and prevention or treatment of anaemia in the woman.*
- *This question was considered a research priority for settings in which prophylactic antibiotics are not routinely administered and those where the baseline risk of infectious morbidity is low. However, the GDG acknowledged that conducting a randomized trial may be challenging given the current clinical practice.*

New

Conditional Recommendation against, very low-quality evidence

Routine antibiotic prophylaxis is not recommended for women undergoing operative vaginal birth.

- *"Operative vaginal birth" is the term used to describe delivery of the fetal head assisted by either vacuum extractor or forceps.*
- *Prophylactic antibiotics may be useful for other maternal conditions that could result from prolonged second stage of labour or the use of an instrument for vaginal birth (e.g. third- or fourth-degree perineal tear).*

New

Strong recommendation, very low-quality evidence

Routine antibiotic prophylaxis is recommended for women with third- or fourth-degree perineal tear.

- *Despite the insufficient evidence of benefits, the GDG agreed that women with third- or fourth-degree perineal tear are at higher risk of infection in the postpartum period and took a consensus view to recommend the routine use of antibiotic prophylaxis for these conditions. The group puts its emphasis on the reduction in wound infection which might aggravate long-term consequences of third- or fourth-degree perineal tears (e.g. involuntary loss of flatus and/or faeces which affects quality of life) and, therefore, made a strong recommendation.*
- *This recommendation is consistent with the WHO postnatal care guideline on treatment of third- or fourth-degree perineal tears [50].*
- *The GDG acknowledged that antibiotic administration following third- or fourthdegree tears is already a common clinical practice and, therefore, did not consider the question a research priority.*

New Strong recommendation against, based on consensus review

Routine antibiotic prophylaxis is not recommended for women with episiotomy.

- *The above recommendation was based on a consensus of the GDG in view of a high rate of episiotomy and the potential impact of antibiotics, in the absence of clinical benefits on public health. The GDG puts its emphasis on avoidance of emerging antimicrobial resistance at the global level and, therefore, made a strong recommendation.*
- *This recommendation applies to the use of antibiotics before or immediately after episiotomy repair following vaginal birth. Antibiotics should be administered when there are clinical signs of infection of an episiotomy wound.*
- *The GDG emphasized the need for health systems to adopt a policy of restrictive rather than routine use of episiotomy to reduce its potential complications and the use of additional resources for its treatment.*
- *Second-degree perineal tear is anatomically similar to an episiotomy and does not warrant the use of prophylactic antibiotics.*
- *In a situation where an episiotomy wound extends to become a third- or fourth-degree perineal tear, prophylactic antibiotics should be administered as recommended in this guideline (see Recommendation 13).*

New Strong recommendation against, very low-quality evidence

Routine antibiotic prophylaxis is not recommended for women with uncomplicated vaginal birth.

- *The GDG was concerned about the potential public health implication of the high rate of routine use of antibiotics following vaginal birth without any specific risk factors in some settings. The group puts its emphasis on the negative impact of such policy on the global efforts to contain antimicrobial resistance and, therefore, made a strong recommendation against routine antibiotic prophylaxis.*
- *"Uncomplicated vaginal birth" in this context connotes vaginal birth in the absence of any specific risk factor for or clinical signs of maternal peripartum infection.*
- *Careful monitoring of all women after birth is essential to promptly identify any sign of endometritis and institute appropriate antibiotic treatment (see Recommendation 20).*
- *Recommendations on antibiotic use for common intrapartum conditions or interventions that often raise concerns about increased risk of infection are available in this guideline.*

New

Conditional recommendation, moderate-quality evidence

Vaginal cleansing with povidone-iodine immediately before caesarean section is recommended.

- *The recommendation of the use of povidoneiodine out of the common antiseptics was because it was the only agent tested in all randomized controlled trials that evaluated the review question.*
- *The GDG noted that the main clinical benefit (reduction in post-caesarean endometritis) demonstrated in the review was largely driven by women at higher baseline risk of infections (i.e. those who were already in labour and those with ruptured membranes). However, in consideration of the similarity in the statistical findings between subgroups and the entire study population, the group acknowledged that women at lower baseline risk of infection are also likely to benefit from the intervention.*
- *Due to the staining of surrounding tissues, vaginal cleasing in this context may be regarded as a potentially invasive procedure, and implementation might not be easy.*
- *The GDG considers further evaluation of the benefits in high-risk women and potential adverse effects (especially among women with ruptured membranes and those planning to breastfeed) a research priority. Additionally, the group considers it essential to identify the most appropriate timing of the intervention to achieve benefit with minimal harm and whether other antiseptic agents (e.g. chlorhexidine) have similar beneficial effects. The group noted that shorter application and contact time are likely to be associated with less maternal and fetal exposure. Therefore, the group suggested vaginal application of povidone-iodine very close to the start of caesarean section (e.g. following bladder catheterization) to mimimize the discomfort to the woman. The specified duration of vaginal cleansing with povidone-iodine in three of the seven included studies in the Cochrane review was 30 seconds.*
- *The use of a high concentration and/or repeated applications of povidone-iodine should be avoided to minimize maternal and fetal exposure and possible interference with the results of neonatal thyroid screening.*

New

Conditional recommendation, low-quality evidence

The choice of an antiseptic agent and its method of application for skin preparation prior to caesarean section should be based primarily on the clinician's experience with that particular antiseptic agent and method of application, its cost and local availability.

- *Skin preparation is a vital part of the overall care that must be given to women undergoing surgery, to prevent surgical site infections before caesarean section. However, there is no strong evidence to recommend the use of one specific antiseptic agent over another.*
- *Maternal allergy to the preparation must be excluded prior to surgery.*
- *A standard preoperative skin preparation technique that is appropriate for the intended skin incision must be followed.*

New **Strong recommendation, moderate-quality evidence**

Routine antibiotic prophylaxis is recommended for women undergoing elective or emergency caesarean section.

- *Antibiotic prophylaxis in this context refers to antibiotic use prior to the initiation of/or during caesarean section in the absence of clinical signs of infection. The GDG noted that it is essential for clinicians to be clear about this description to avoid using antibiotic regimens that are most applicable for treating confirmed infection – i.e. therapeutic antibiotic use.*
- *The intravenous route should be used for antibiotic administration given that the evidence underpinning this recommendation was based on findings from trials where the majority used this route.*
- *The GDG emphasized the importance of using the simplest and shortest antibiotic regimen for prophylaxis. As the evidence suggests that single-dose regimens are as effective as multiple-dose regimens, the GDG favoured single-dose antibiotic regimens which can easily be given prior to/during caesarean section, rather than multiple-dose regimens which sometimes extend to the postoperative period. Clinical judgement is needed to evaluate other factors that might increase the risk of developing post-caesarean infections and are, therefore, more likely to benefit from multiple antibiotic doses (e.g. prolonged duration of surgery (long "skin-to-skin" interval), difficult surgical manipulation or massive blood loss).*

New **Strong recommendation, moderate-quality evidence**

For caesarean section, prophylactic antibiotics should be given prior to skin incision, rather than intraoperatively after umbilical cord clamping.

- *The GDG highlighted the importance of administering prophylactic antibiotics at least 15–60 minutes prior to skin incision in optimizing tissue and blood antibiotic concentrations. Based on the pharmacokinetics of common intravenous antibiotics, maximal benefit can be expected when administered between 30 and 60 minutes before skin incision.*
- *The GDG acknowledged that evidence also supports the effectiveness of prophylactic antibiotics after umbilical cord clamping for the prevention of post-caesarean infectious morbidities. Therefore, antibiotics are still beneficial when used outside the suggested timeframe (i.e. 15–60 minutes before incision) and should be applied as circumstances demand. This is particularly important in cases of emergency caesarean section where the available time to administer a prophylactic antibiotic might be limited.*
- *There are no data on the effects of preoperative administration on possible longer-term effects of antibiotic exposure on the baby, and women should be counselled as appropriate. The GDG considers this question a research priority and suggested that opportunities for longer-term followup of babies from previous trials should be explored.*

New **Conditional recommendation, very low-quality evidence**

For antibiotic prophylaxis for caesarean section, a single dose of first generation cephalosporin or penicillin should be used in preference to other classes of antibiotics.

- *The GDG noted that the available evidence on the effectiveness of antibiotics came largely from trials that tested first-generation cephalosporin or penicillin. Based on consensus, the group favoured these classes of antibiotics over other classes of antibiotics, as they have a broad spectrum of activities and are widely available in all settings.*
- *In acknowledgement of the lack of evidence on the comparative effectiveness of different classes of antibiotics, the GDG concluded that when the recommended antibiotic classes are not available, other classes of antibiotics may also be used. The group noted that the choice of such antibiotic class should be informed by the local bacteriologic patterns of postcaesarean infectious morbidity, the availability of such antibiotic class, the woman's allergy history, the clinician's experience with that particular class of antibiotics, and its cost.*
- *Due to the high risk of necrotizing enterocolitis among preterm babies, the use of "co-amoxiclav" for antibiotic prophylaxis should be avoided not only for caesarean delivery of preterm infants, but it might also be safer to avoid its use for caesarean delivery of term babies.*

New **Conditional recommendation, very low-quality evidence**

A simple regimen such as ampicillin and once-daily gentamicin is recommended as first-line antibiotics for the treatment of chorioamnionitis.

- *There is insufficient evidence to support the use of any antibiotic over another. Based on consensus, the GDG favoured a regimen that is simple, can be administered over a short duration and follows the principles of antibiotic use to reduce emergence of resistant strains of bacteria.*
- *Although there is no clear evidence as to whether antibiotics should be discontinued after birth or continued in the postpartum period, the GDG noted that women who remain symptomatic are likely to benefit from longer antibiotic treatment for at least 24 to 48 hours after the symptoms and signs of infection (e.g. fever, uterine tenderness) have subsided.*

New **Conditional recommendation, very low-quality evidence**

A combination of clindamycin and gentamicin is recommended for the treatment of postpartum endometritis.

- *The GDG acknowledged that availability and costs of clindamycin might be limiting factors in low-resource settings, and suggested the use of a penicillin class of drug as alternative treatment in such contexts.*
- *In the majority of studies that demonstrated benefits of clindamycin and gentamicin over other regimens, clindamycin was administered as 600 mg IV every six to eight hours, and gentamicin was administered as 1–1.5 mg/kg or 60–80 mg IV or IM every eight hours. Although the exact duration of the treatment was not specified in most cases, treatment was continued for as long as clinical symptoms and signs persisted. Similar to the remark regarding the treatment for chorioamnionitis, the GDG suggested that antibiotic treatment should continue for at least 24–48 hours after complete resolution of clinical signs and symptoms (e.g. fever, uterine tenderness, purulent lochia, leucocytosis).*

2.3.2 WHO guideline on syphilis screening and treatment for pregnant women

[286]

New **Strong recommendation, moderate-quality evidence**

The WHO STI guideline recommends screening all pregnant women for syphilis during the first antenatal care visit.

- *This recommendation applies to all settings, including settings with high or low prevalence of syphilis.*

Justification

Overall, the GDG agreed that universal screening is favoured over no screening because large reductions are likely for important serious adverse outcomes of pregnancy and congenital syphilis in settings with low or high prevalence of syphilis. Universal screening also probably increases equity and is cost-effective. It is likely to be acceptable to pregnant women and health-care providers, and also feasible with training and improved awareness of staff.

New

Conditional recommendation, low-quality evidence

In settings with low coverage of syphilis screening and treatment for pregnant women, high loss to follow-up of pregnant women, or limited laboratory capacity, the WHO STI guideline suggests on-site tests (Strategies A, B and C) rather than the standard off-site laboratory-based screening and treatment strategy.

Conditional recommendation, low-quality evidence

In settings with a low prevalence of syphilis (below 5%), the WHO STI guideline suggests a single on-site rapid syphilis test (RST) be used to screen pregnant women (Strategy A) rather than a single on-site rapid plasma reagin (RPR) test (Strategy B).

Conditional recommendation, low-quality evidence

In settings with a high prevalence of syphilis (5% or greater), the WHO STI guideline suggests an on-site rapid syphilis test (RST) and, if positive, provision of a first dose of treatment and a rapid plasma reagin (RPR) test, and then, if the RPR test is positive, provision of treatment according to duration of syphilis (Strategy C). The WHO STI guideline suggests this sequence of tests and treatment rather than a single on-site RST (Strategy A) or a single on-site RPR test (Strategy B).

- *These recommendations do not apply to countries that can provide appropriate/high-quality laboratory-based screening and treatment strategies. However, in some settings there may be challenges providing such strategies and/or a sequence of tests. When resources do not permit the use of a sequence of tests, a single on-site rapid syphilis test (RST) (Strategy A) is suggested to ensure greater screening coverage despite the number of pregnant women who will be over-treated due to the high rate of false-positive results. Treatment is based on duration of syphilis, according to the WHO guidelines for the treatment of Treponema pallidum (syphilis) [287].*

Justification

Overall, the GDG agreed that a strategy of using a single on-site RST followed by treatment if positive (Strategy A) or a strategy of using an on-site RST followed by a first dose of treatment if positive and also followed by an RPR test and then second and third doses of treatment if that test is also positive (Strategy C) may lead to greater numbers of people treated, fewer missed cases and fewer incidents of over-treatment compared to other strategies (Strategies B and D). In lower- prevalence settings, the single on-site RST (Strategy A) or a sequence of screening tests and treatment (Strategy C) yielded similar results. However, in higher-prevalence settings, there were fewer pregnant women over-treated when using a sequence of tests and treatment (Strategy C). The single on-site RST strategy (Strategy A) is costeffective, feasible to implement and acceptable to key stakeholders.

New

Strong recommendation, very low-quality evidence

In pregnant women with early syphilis, the WHO STI guideline recommends benzathine penicillin G 2.4 million units once intramuscularly over no treatment.

Conditional recommendation, very low-quality evidence

In pregnant women with early syphilis, the WHO STI guideline suggests using benzathine penicillin G 2.4 million units once intramuscularly over procaine penicillin 1.2 million units intramuscularly once daily for 10 days.

When benzathine or procaine penicillin cannot be used (e.g. due to penicillin allergy where penicillin desensitization is not possible) or are not available (e.g. due to stock-outs), the WHO STI guideline suggests using, with caution, erythromycin 500 mg orally four times daily for 14 days or ceftriaxone 1 g intramuscularly once daily for 10–14 days or azithromycin 2 g once orally.

- *Although erythromycin and azithromycin treat the pregnant women, they do not cross the placental barrier completely and as a result the fetus is not treated. It is therefore necessary to treat the newborn infant soon after delivery (see recommendations 9 and 10 in the WHO guidelines for the treatment of syphilis, which refer to congenital syphilis [287]). Ceftriaxone is an expensive option and is injectable. Doxycycline should not be used in pregnant women. Because syphilis during pregnancy can lead to severe adverse complications to the fetus or newborn, stock-outs of benzathine penicillin for use in antenatal care should be avoided.*

New

Strong recommendation, very low-quality evidence

In pregnant women with late syphilis (more than two years' duration) or unknown stage of syphilis, the WHO STI guideline recommends benzathine penicillin G 2.4 million units intramuscularly once weekly for three consecutive weeks over no treatment.

- *The interval between consecutive doses of benzathine penicillin should not exceed 14 days.*

New

Conditional recommendation, very low-quality evidence

In pregnant women with late syphilis (more than two years' duration) or unknown stage of syphilis, the WHO STI guideline suggests benzathine penicillin G 2.4 million units intramuscularly once weekly for three consecutive weeks over procaine penicillin 1.2 million units intramuscularly once a day for 20 days.

When benzathine or procaine penicillin cannot be used (e.g. due to penicillin allergy where penicillin desensitization is not possible) or are not available (e.g. due to stock-outs), the WHO STI guideline suggests using, with caution, erythromycin 500 mg orally four times daily for 30 days.

- *Although erythromycin treats the pregnant women, it does not cross the placental barrier completely and as a result the fetus is not treated. It is therefore necessary to treat the newborn infant soon after delivery (see recommendations 9 and 10 in the WHO guidelines for the treatment of syphilis, which refer to congenital syphilis [287]). Doxycycline should not be used in pregnant women. Because syphilis during pregnancy can lead to severe adverse complications to the fetus or newborn, stock-outs of benzathine penicillin for use in antenatal care should be avoided.*

2.3.3 Consolidated guidelines on the use of antiretroviral drugs for treating and preventing HIV infection: recommendations for a public health approach

[56]

New **Strong recommendation, low-quality evidence**

In antenatal care settings, couples and partners should be offered voluntary HIV testing services with support for mutual disclosure.

Sources:

Consolidated guidelines on HIV testing services. Geneva: World Health Organization; 2015 (https://www.who.int/publications/i/item/9789241508926).

Guidance on couples HIV testing and counselling, including antiretroviral therapy for treatment and prevention in serodiscordant couples. Geneva: World Health Organization; 2012 (https://iris.who.int/handle/10665/44646).

New **No strength, no quality of evidence**

High-prevalence settings

- PITC (Provider-initiated testing and counselling) for women should be considered a routine component of the package of care in all antenatal, childbirth, postpartum and paediatric care settings. In such settings, where breastfeeding is the norm, lactating mothers who are HIV negative should be retested periodically throughout the period of breastfeeding.
- All HIV-negative pregnant women should be retested in the third trimester, postpartum and/or during labour, because of the high risk of acquiring HIV during pregnancy.

Low-prevalence settings

- PITC can be considered for pregnant women in antenatal care as a key component of the effort:
  - to eliminate mother-to-child transmission of HIV
  - to integrate HIV testing with other key testing (for viral hepatitis, syphilis etc.) as relevant to the setting
  - to retest HIV negative pregnant women who are in a serodiscordant couple, from a key population group or have known ongoing HIV risk.

Consolidated guidelines on HIV testing services. Geneva: World Health Organization; 2015 (https://www.who.int/publications/i/item/9789241508926).

Delivering HIV test results and messages for re-testing and counselling in adults. Geneva: World Health Organization; 2010 (https://iris.who.int/bitstream/handle/10665/44278/9789241599115_eng.pdf).

New

Strong recommendation, moderate-quality evidence

ART should be initiated in all pregnant and breastfeeding women living with HIV regardless of WHO clinical stage and at any CD4 cell count and continued lifelong.

Source:

HIV and adolescents: guidance for HIV testing and counselling and care for adolescents living with HIV. Geneva: World Health Organization; 2013 (https://www.who.int/publications/i/item/9789241506168).

In review

No strength, no quality of evidence

In addition to receiving ART, pregnant women living with HIV should be offered the recommended package of pregnancy care, and additional interventions such as screening for STIs (such as hepatitis B and syphilis), nutritional support, infant feeding counselling and family planning guidance.

New

Recommended

ART should be initiated urgently in all pregnant and breastfeeding women, even if they are identified late in pregnancy or postpartum, because the most effective way to prevent mother-to-child HIV transmission is to reduce maternal viral load.

- *Whenever possible, all efforts should be made to identify pregnant women living with HIV early enough to avoid the need for high-risk prophylaxis.*

New

Strong recommendation, moderate-quality evidence for breastfeeding infants and low-quality evidence for infants receiving only replacement feeding

Infants of mothers who are receiving ART and are breastfeeding should receive 6 weeks of infant prophylaxis with daily NVP. If infants are receiving replacement feeding, they should be given 4–6 weeks of infant prophylaxis with daily NVP (or twice-daily AZT).

Consolidated guidelines on the use of antiretroviral drugs for treating and preventing HIV infection: recommendations for a public health approach. Geneva: World Health Organization; 2013 (https://www.who.int/publications/i/item/9789241549684).

New

Strong recommendation, very low-quality evidence

In generalized epidemic settings, ART should be initiated and maintained in eligible pregnant and postpartum women and in infants at maternal and child health-care settings, with linkage and referral to ongoing HIV care and ART, where appropriate.

Consolidated guidelines on the use of antiretroviral drugs for treating and preventing HIV infection: recommendations for a public health approach. Geneva: World Health Organization; 2013 (https://www.who.int/publications/i/item/9789241549684).

- *All people living with HIV are now eligible for initiating ART at any CD4 cell count.*

In review **Recommended**

Throughout pregnancy, key principles and practices of safe motherhood should be followed, including reinforcement of recommended antenatal clinic visits and facility-based delivery by skilled birth attendants. Instrumentation should be avoided unless essential, and newborns should be washed of any blood and cared for using non-invasive techniques as much as possible.

New **No strength, no quality of evidence**

Health workers should follow universal precautions for all deliveries, including deliveries by women living with HIV.

New **No strength, no quality of evidence**

Special efforts should be made to ensure that delivery care for women living with HIV is provided in a non-stigmatizing and supportive manner.

In review **No strength, no quality of evidence**

Although elective caesarean section has been shown to protect against HIV acquisition, especially in the absence of ARV drugs or in the case of a high viral load, WHO does not recommend it in resource-limited settings specifically for HIV infection; rather, it is recommended for obstetric and other medical indications.

New **Strong recommendation, low to moderate quality evidence**

A once-daily fixed-dose combination of TDF + 3TC (or FTC) + EFV is recommended as first-line ART in pregnant and breastfeeding women, including pregnant women in the first trimester of pregnancy and women of childbearing age. The recommendation applies both to lifelong treatment and to ART initiated for PMTCT and then stopped.

2.3.4 Guidelines for the treatment of malaria

[25]

New **Good practice statement**

The G6DP status of patients should be used to guide administration of primaquine to prevent relapse.

New **Strong recommendation, high-quality evidence**

To prevent relapse, treat P. vivax or P. ovale malaria in children and adults (except pregnant women, infants aged <6 months, women breastfeeding infants aged <6 months and people with G6DP deficiency with a 14-day course (0.25–0.5 mg/kg body weight daily) of primaquine in all transmission settings.

New

Conditional recommendation, very low-quality evidence

In people with G6PD deficiency, consider preventing relapse by giving primaquine base at 0.75 mg/kg body weight once a week for 8 weeks, with close medical supervision for potential primaquine-induced haemolysis.

New

Good practice statement

When G6PD status is unknown and G6PD testing is not available, a decision to prescribe primaquine must be based on an assessment of the risks and benefits of adding primaquine.

New

Strong recommendation

Treat pregnant women with uncomplicated P. falciparum malaria during the first trimester with 7 days of quinine + clindamycin.

- *Previous data indicated that the antimalarial medicines considered safe in the first trimester of pregnancy are quinine, chloroquine, clindamycin and proguanil. The evidence was not revisited during the guideline process.*
- *The limited data available on the safety of artemisinin-derivatives in early pregnancy allow for some reassurance in counselling women accidentally exposed to an artemisinin-derivative early in the first trimester, there is no need for them to have their pregnancy interrupted because of this exposure.*

Justification

Treat pregnant women with uncomplicated P. falciparum malaria during the first trimester with 7 days of quinine + clindamycin. (Strong recommendation).

New

Conditional recommendation, moderate-quality evidence

In women who are pregnant or breastfeeding, consider weekly chemoprophylaxis with chloroquine until delivery and breastfeeding are completed, then, on the basis of G6PD status, treat with primaquine to prevent future relapse.

2.3.5 Guidelines for the management of pregnant and breastfeeding women in the context of Ebola virus disease

[288]

New **Strong recommendation, very low-quality evidence**

Clinical management for all pregnant women should include optimized supportive care.

Strong recommendation, very low-quality evidence

In the context of rigorous research or in accordance with the MEURI protocol, the use of the investigational therapies REGN-EB3 or mAb114 may be offered to pregnant women with EVD.

1. *Optimized supportive care includes systematic assessment and re-assessment of patients with EVD, fluid resuscitation, electrolyte monitoring and correction, glucose monitoring and management, treatment of potential co-infections, and nutritional support. Symptomatic care, as well as prevention and management of complications, should always be provided [289].*
2. *Based on evidence from general adult populations, applying the principles of optimized supportive care to pregnant populations with EVD will likely decrease mortality and confer a beneficial impact on disease outcomes [289].*
3. *The use of fluid resuscitation in pregnant women with EVD, such as oral rehydration and parenteral administration of clinically appropriate fluids, has not been specifically evaluated. However, among adults with EVD, correction of intravascular depletion through adequate fluid resuscitation likely improves survival [289].*
4. *Where available, intensive critical care such as non-invasive ventilation, intubation with mechanical ventilation, central venous line insertion with vasopressor support, or renal replacement therapy will likely benefit pregnant women with EVD similar to that observed in adults with EVD.*
5. *The Monitored Emergency Use of Unregistered and Investigational Interventions (MEURI) expert panel recommends that "access to and use of investigational therapeutics under MEURI be carefully considered for each individual patient, including for vulnerable populations such as pregnant women and paediatric patients, as appropriate given the available data." In general, the expert panel recommends consideration of factors such as disease severity and risks/benefits of investigational therapy (including adverse effects in pregnant or paediatric populations) [290].*
6. *Pregnant women with acute EVD who are not treated with investigational or compassionate use agents experience very high (>95%) rates of spontaneous abortion, foetal or neonatal death.*

* *Further information regarding recommendations 1 and 2 can be found in the WHO publications: "Optimized Supportive Care for Ebola virus disease: Clinical management standard operating procedures" [289], "Notes for the record: Consultation on Monitored Emergency Use of Unregistered and Investigational Interventions (MEURI) for Ebola virus disease" [290], and "Guidance for managing ethical issues in infectious disease outbreaks" [291].*

New Strong recommendation, very low-quality evidence

Labour should not be induced for foetal indications in pregnant women with acute EVD.

1. *There is insufficient evidence to determine if induced abortion or induction of labour impacts maternal outcomes of acute EVD. No recommendation can be made.*
2. *Pregnant women with acute EVD or following recovery (with conception before EVD) who undergo an induced, incomplete, or spontaneous abortion should be provided with post-abortion care as described in the WHO guidelines "Safe abortion: technical and policy guidance for health systems" [292]. Women should be provided instructions on how to handle potentially infectious specimens (such as products of conception) using Ebola-specific IPC measures and personal protective equipment (PPE).*
3. *Pregnant women recovering from EVD should be provided with counselling and necessary information pertaining to the risks of EVD that affect pregnancy outcomes, such as the risk for persistent infectivity of pregnancy-related fluids and tissues after EVD recovery. This information is necessary for women to make an informed decision regarding their choice to continue the pregnancy or undergo induced abortion.*
4. *Health authorities should take steps to expand access to all relevant reproductive options to women during an Ebola outbreak including safe abortion and contraceptive access. Health authorities should also ensure that access to reproductive options are not limited by a woman's socioeconomic, cultural, racial, or religious status [292].*
5. *Women who have recovered from EVD but who wish to terminate a pregnancy should receive accurate information about their options and have access to safe abortion and post-abortion care [292][294]. They should be supported in the choices they make regarding continuation or termination of pregnancy.*
6. *Pregnant women who have recovered from EVD (with conception prior to EVD) may choose to proceed with an induced abortion. Due to the risk of viral persistence in pregnancy-related fluids and tissues, medical abortion (use of medications including misoprostol +/- mifepristone when possible) is preferred to surgical abortion (use of trans-cervical procedures), as surgical abortion may increase risk of EBOV transmission due to the invasiveness of the procedure.*
7. *Follow-up after an uncomplicated medical abortion using mifepristone and misoprostol is not required for obstetric indications. If only misoprostol is used, a follow-up visit is recommended to assess for completion of the abortion. Follow-up visits can be used to monitor symptoms, recovery, and assess the need for contraceptive services [293].*
8. *Induced abortions should be performed and managed at ETCs or healthcare facilities that are able to follow standard precautions in addition to Ebola-specific IPC measures, and that have the capability to provide obstetric care. Women who proceed with an induced abortion should stay at the facility in which the operation was performed until the abortion is completed due to the potential risk of infection from pregnancy-related fluids and tissues.*
9. *PPE (e.g. double gloves, face mask, gown or coverall and apron, head cover, eye protection (goggles or face shield) and boots) in addition to standard precautions [295] should be used when handling pregnancy-related fluids and tissues from women with acute EVD or following recovery (if conception was prior to EVD), given the potential for disease transmission [295].*
10. *Products of conception should be tested for EBOV using reverse transcriptase polymerase chain reaction (RT-PCR), and should be handled and disposed of using PPE in accordance with established recommendations [293].*
11. *Women discharged from ETCs should receive Ebola-specific advice and counselling related to pregnancy, abortion, post-abortion care, breastfeeding, and sexual transmission.*
12. *Engagement from multiple stakeholders such as national authorities, epidemic response, UNFPA, UNAIDS and WHO is recommended to provide adequate sexual and reproductive healthcare within the context of Ebola.*

New

Strong recommendation against, very low-quality evidence

Invasive procedures should not be performed for foetal indications in pregnant women with acute EVD.

Strong recommendation, very low-quality evidence

All pregnant women with acute EVD should be managed using both standard precautions and Ebola-specific IPC measures.

Strong recommendation, very low-quality evidence

Pregnant women who have recovered from EVD (with conception prior to EVD) should be enabled and encouraged to attend frequent Antenatal Care (ANC). If there is no risk of exposure to pregnancy-related fluids during the ANC visit, only standard precautions are required. Complications associated with childbirth and pregnancy should be managed at ETCs and Ebola IPC measures should be used in addition to standard precautions.

Strong recommendation, very low-quality evidence

Among women who become pregnant after EVD (with conception after acute EVD), standard IPC precautions should be used.

Strong recommendation against, very low-quality evidence*

Surgically removing foetal tissue from the uterus following maternal demise from EVD (occasionally termed 'post-mortem caesarean') may pose a risk of transmission to contacts and should be strongly discouraged.

1. *Although the actual risk of EVD transmission from pregnant women following recovery is unclear, there is evidence that Ebola RNA can remain detectable in amniotic fluid, placental tissue, foetal tissue, and vaginal secretions. This evidence enables WHO to make strong recommendations regarding the necessity of Ebola-specific IPC measures for pregnant women who have recovered from EVD (with conception prior to EVD) in situations with potential for pregnancy-related fluid or tissue exposure. However, if the pregnancy was conceived after EVD, there is no known risk of EVD transmission with exposure to pregnancy-related fluids and tissues, and therefore only standard precautions are necessary.*
2. *Effective IPC measures require a hierarchy of engineering, environmental and administrative controls in order to block viral spread in healthcare facilitates. In addition to PPE, IPC includes, but is not limited to, barrier nursing, hand hygiene, and waste management [297].*
3. *EVD transmission has been linked to traditional funeral ceremonies. Similarly, there is likely a high risk of transmission from post-mortem caesareans for pregnant women who have died from EVD. Guidelines on how to conduct safe and dignified burials for patients with suspected or confirmed EVD should be followed in the event of a maternal death from EVD, including the recommendation that only trained personnel should handle human remains, handling should be minimal, and cultural and religious considerations should be taken into account [51].*
4. *Actions (such as an invasive procedure) should not be taken in the event of foetal distress in pregnant women with acute EVD. As such, foetal monitoring during labour is not necessary.*

* Further information regarding recommendations 5, 6, and 7 can be found in the WHO publications: "Interim guidance: Interim infection prevention and control guidance for care of patients with suspected or confirmed filovirus haemorrhagic fever in healthcare settings, with focus on Ebola" [296], "Interim guidance: Clinical care for survivors of Ebola virus disease" [297], and "Standard precautions in health care. Aide-memoir" [295]. Further information regarding recommendation 8 can be found in the WHO publication "Interim guidance: How to conduct safe and dignified burial of a patient who has died from suspected or confirmed Ebola or Marburg virus disease" [51].

New

Strong recommendation, very low-quality evidence

Children without confirmed EBOV infection who are exposed to the breastmilk of women with confirmed EVD should be considered contacts. The child should stop breastfeeding and should undergo close monitoring for signs and symptoms of EVD for 21 days. The child should be given a breastmilk substitute as needed. Post-exposure prophylaxis for EVD can be considered for children exposed to the breastmilk of EBOV-infected women on a case-by-case basis and in accordance with existing research protocols.

Strong recommendation, very low-quality evidence

If a lactating woman and her breastfeeding child are both diagnosed with EVD, breastfeeding should be discontinued, the pair should be separated, and appropriate breastmilk substitutes should be provided. However, if the child is under six months of age and does not have safe and appropriate breastmilk substitutes, or the child cannot be adequately cared for, then the option to not separate and continue breastfeeding can be considered.

Strong recommendation, very low-quality evidence

A woman who has recovered from EVD, cleared viremia, and wants to continue breastfeeding should wait until she has had two consecutive negative RT-PCR breastmilk tests for EBOV by, separated by 24 hours. During this time, the child should be given a breastmilk substitute.

1. *The recommendation to discontinue breastfeeding in the event that both the breastfeeding woman and the breastfed child have acute EVD is based off a hypothetical risk of viral 'boosting' between two infected individuals. This viral boosting could theoretically increase disease severity through additional viremic exposure. Evidence to directly support this recommendation is lacking.*
2. *Infants younger than 6 months of age should be provided with a breastmilk substitute (eg, ready-to-use infant formula) that is acceptable, feasible, affordable, sustainable, and safe. Infants and young children between 6 months and 23 months of age should be provided with a ready-to use infant formula or ultra-high temperature full-cream (or whole) cow's milk along with complementary feeding (this food can be supplemented with micronutrient powders if the nutrient content is expected to be inadequate).*
3. *Rapid testing of breast milk of women with recovered EVD, who would like to continue to breastfeed, should be prioritized.*
4. *Women's choices related to stopping breastfeeding, or continuing after EVD recovery and testing of breast-milk, should be respected and supported by health care workers to facilitate the choice.*

New

Conditional recommendation, very low-quality evidence

Pregnant and breastfeeding women should be offered vaccination with the prequalified Ervebo (Merck) live-replicating rVSV-ZEBOV-GP vaccine during an active Zaire EBOV outbreak in affected areas, in the context of rigorous research or in accordance with a compassionate use protocol. Vaccination should occur with informed consent and in compliance with good clinical practice.

1. *The WHO prequalified the injectable Ebola vaccine Ervebo (manufactured by Merck) in November 2019 after the vaccine was deemed compliant with WHO standards for quality, safety and efficacy. This decision followed the European Medicines Agency (EMA) announcement recommending a conditional marketing authorization for the rVSV-ZEBOV-GP vaccine.*
2. *The Strategic Advisory Group of Experts (SAGE), the principal advisory group to WHO on vaccinations, recommends that pregnant and lactating women be included in research within the framework of clinical trial vaccine protocols. SAGE notes that protocols must include provisions for safety monitoring and documentation of EVD cases among vaccinated individuals, as well as follow-up of pregnant women and their offspring.*
3. *The MEURI expert panel recommends that "access to and use of investigational therapeutics under MEURI be carefully considered for each individual patient, including for vulnerable populations such as pregnant women and paediatric patients, as appropriate given the available data". In general, the expert panel recommends that factors including disease severity, available information on risks and benefits for the investigational therapy (including any available information on adverse effects in pregnancy or paediatrics) be considered [290].*
4. *There are no available studies that have determined the efficacy of rVSV-ZEBOV-GP vaccine in pregnant women; however, the vaccine is considered to have very good efficacy in the general population.*

2.3.6 Nutritional care and support for patients with tuberculosis

[57]

Nutritional care and support for patients with tuberculosis

New **Strong recommendation, very low-quality evidence**

Pregnant women with active TB and moderate undernutrition, or with inadequate weight gain, should be provided with locally available nutrient-rich or fortified supplementary foods, as necessary to achieve an average weekly minimum weight gain of approximately 300 g in the second and third trimesters.

Strong recommendation, very low-quality evidence

Patients with active multidrug-resistant TB and moderate undernutrition should be provided with locally available nutrient-rich or fortified supplementary foods, as necessary to restore normal nutritional status.

Micronutrient supplementation

New **Conditional recommendation, very low-quality evidence**

A daily multiple micronutrient supplement at 1×recommended nutrient intake should be provided in situations where fortified or supplementary foods should have been provided in accordance with standard management of moderate undernutrition but are unavailable.

Conditional recommendation, very low-quality evidence

All pregnant women with active TB should receive multiple micronutrient supplements that contain iron and folic acid and other vitamins and minerals, according to the United Nations Multiple Micronutrient Preparation, to complement their maternal micronutrient needs.

Strong recommendation, very low-quality evidence

For pregnant women with active TB in settings where calcium intake is low, calcium supplementation as part of antenatal care is recommended for the prevention of pre-eclampsia, particularly among those pregnant women at higher risk of developing hypertension, in accordance with WHO recommendations.

Conditional recommendation, very low-quality evidence

All lactating women with active TB should be provided with iron and folic acid and other vitamins and minerals, according to the United Nations Multiple Micronutrient Preparation, to complement their maternal micronutrient needs.

2.4 Preterm Birth

2.4.1 WHO recommendations on interventions to improve preterm birth outcomes

[285]

New

Strong recommendation, moderate-quality evidence for newborn health outcomes and low-quality evidence for maternal health outcomes

Antenatal corticosteroid therapy is recommended for women at risk of preterm birth from 24 weeks to 34 weeks of gestation when the following conditions are met:

- gestational age assessment can be accurately undertaken;
- preterm birth is considered imminent;
- there is no clinical evidence of maternal infection;
- adequate childbirth care is available (including the capacity to recognize and safely manage preterm labour and birth);
- the preterm newborn can receive adequate care if needed (including resuscitation, thermal care, feeding support, infection treatment and safe oxygen use).

- *This recommendation applies to all other recommendations relating to the use of antenatal corticosteroids in this guideline (i.e. Recommendations 1.1 to 1.10).*
- *The recommendation is largely based on evidence derived from settings where the certainty of gestational age estimation is high. Therefore, accurate and standardized gestational age assessment (ideally from first trimester ultrasound) is essential to ensure that all eligible mothers receive corticosteroids while avoiding unnecessary treatment of ineligible mothers. Antenatal corticosteroid should not be routinely administered in situations where the gestational age cannot be confirmed, particularly when gestational age is suspected to be more than 34 weeks, as the risk of harm may outweigh the benefits if mature fetuses are exposed to corticosteroid in-utero.*
- *Due consideration should be given to local limits of fetal viability when determining the lowest limit of gestational age when antenatal steroids should be administered, including reference to local data on newborn survival and morbidity. The GDG noted that the probability of survival without residual morbidity ("intact survival") at < 24 weeks is low, even in high-resource settings.*
- *The GDG acknowledged that the conditions listed above may not be operationalized in a standard and consistent manner across settings. Identifying the most critical and essential preconditions to achieve clinical benefits from antenatal corticosteroid is uncertain and would benefit from further research. In setting these preconditions, the panel's emphasis was on minimizing harm to the mother and the baby.*
- *An appropriate standard of childbirth care should be available to the mother in a facility that has a team of health-care providers competent in recognizing and safely managing preterm labour and imminent preterm birth. Safe care during labour and childbirth requires close monitoring of the mother and fetus to identify and appropriately manage complications, such as maternal infection and fetal hypoxia.*
- *Essential and special care for the management of preterm newborns should be available to prevent or address any newborn complications related to prematurity or otherwise.*
- *The GDG made a strong recommendation, having placed its emphasis on: the benefits to the preterm infants, in terms of reducing early morbidity and mortality outcomes; the low-cost and wide availability of corticosteroid globally; the feasibility of implementing the intervention; and the potential impact on health-care resource use across settings.*

New

Strong recommendation, low-quality evidence

For eligible women, antenatal corticosteroid should be administered when preterm birth is considered imminent within 7 days of starting treatment, including within the first 24 hours.

- *Antenatal corticosteroid therapy should be started even when the completion of a full course before preterm birth is uncertain.*
- *Tocolysis may be considered as an intervention to gain time to complete a single course of antenatal corticosteroids (see also Recommendation 2.0 on tocolytic treatments).*
- *The GDG acknowledged the limitations and potential bias of evidence derived from the subgroup analyses according to interval between steroid administration and preterm birth, which led to rating of the quality of evidence as "low". Nevertheless, the group made a strong recommendation on the basis of the balance being in favour of the benefits of antenatal corticosteroids (in terms of reducing respiratory morbidity and mortality for babies born within 24 hours and up to 7 days of starting treatment), the low resource requirements, and the feasibility of implementing the intervention.*

New

Strong recommendation, low-quality evidence

Antenatal corticosteroid therapy is recommended for women at risk of preterm birth irrespective of whether a single or multiple birth is anticipated.*This recommendation precludes the routine (or prophylactic) administration of antenatal corticosteroid to any woman with a multiple pregnancy, on the basis of increased risk of preterm birth.*

- *The GDG acknowledged the lack of clarity on the benefits of antenatal corticosteroids in the subgroup of women carrying multiple fetuses, but based its judgement on the overall improvement in critical outcomes among singleton infants, in addition to the fact that the point estimates were all in favour of reduced risks of adverse critical outcomes reported in multiple pregnancy. The group considered the potential impact of any clinical benefit in this group of women (who are inherently more likely to deliver preterm), albeit modest, on the overall preterm newborn survival and morbidity rates, and therefore made a strong recommendation.*
- *Although there remains some level of uncertainty about the effectiveness of antenatal corticosteroids in multiple pregnancy, the GDG does not consider this to be a research priority.*

New

Strong recommendation, moderate-quality evidence for newborn outcomes and low-quality evidence for maternal outcomes

Antenatal corticosteroid therapy is recommended in women with preterm prelabour rupture of membranes and no clinical signs of infection.

- *The use of prophylactic antibiotics should be included as part of standard care for the mother once preterm prelabour rupture of the membranes is confirmed (see Recommendation 5.0).*
- *The GDG noted the paucity of evidence on benefits with regard to the duration of membranes rupture due to the lack of such information from trials included in the review. However, the group placed its emphasis on the overall balance favouring benefits over harms of using antenatal corticosteroids in terms of reducing severe adverse neonatal outcomes without evidence of increased risk of infection to the mother or the baby, and with the consideration that a substantial proportion of women at risk of imminent preterm birth would present with ruptured membranes, and therefore made a strong recommendation.*
- *The GDG cautioned against the use of antenatal corticosteroids for women with prolonged rupture of the membranes and with features of sepsis.*

New Conditional Recommendation against, very low-quality evidence

Antenatal corticosteroid therapy is not recommended in women with chorioamnionitis who are likely to deliver preterm.

- *Timely delivery of the baby to avoid further intrauterine insult should be the priority when the diagnosis of clinical chorioamnionitis is made. Antenatal corticosteroid therapy should not be initiated at the expense of timely delivery when indicated by maternal or fetal condition.*
- *Antenatal corticosteroids should be avoided in women with evidence of ongoing systemic infection, e.g. septicaemia or tuberculosis.*
- *In the light of evidence from the Antenatal Corticosteroids Trial [271], the GDG reviewed the concern about the risk of exacerbating maternal infection, particularly in low- and middle-income settings where baseline risk of maternal infectious morbidity is higher than that of the settings where the evidence on women with chorioamnionitis was generated. The group felt that this potential risk may outweigh the known benefits of antenatal corticosteroids in the majority of populations where steroid use is essential for improving newborn survival. They acknowledged that the balance of benefits and harms may be context-specific and chose to make a conditional recommendation against the intervention in this situation.*

New Conditional Recommendation against, very low-quality evidence for newborn and maternal health outcomes

Antenatal corticosteroid therapy is not recommended in women undergoing planned caesarean section at late preterm gestations (34–36+6 weeks).

- *The GDG noted the paucity of evidence on the balance of benefits versus harms when antenatal corticosteroid is administered to mothers undergoing elective caesarean section (CS) in late preterm. The group acknowledged that while there might be some benefits, there might also be harms. Reference was made to the overall evidence on antenatal corticosteroid, which suggests potential harms in late preterm infants, and the fact that the population providing the evidence also included provider-initiated (elective) preterm birth.*
- *Elective CS should not normally be performed at any gestational age < 39 weeks.*
- *The GDG considered this to be a research priority but chose to recommend against the practice until further evidence becomes available.*

New Strong recommendation, moderate-quality evidence for newborn health outcomes and low-quality evidence for maternal health outcomes

Antenatal corticosteroid therapy is recommended in women with hypertensive disorders in pregnancy who are at risk of imminent preterm birth.

- *An appropriate standard of care for the management of women with hypertensive disorders in pregnancy should be provided to the mother in addition to corticosteroid therapy in a hospital setting.*
- *The GDG placed its emphasis on the benefits to the preterm infants in terms of reducing early morbidity and mortality outcomes, the low cost and wide availability of corticosteroid globally, the feasibility of implementing the intervention, and the potential impact on health-care resource use across settings, and therefore made a strong recommendation.*

New Strong recommendation, low-quality evidence

Antenatal corticosteroid therapy is recommended for women at risk of imminent preterm birth of a growth-restricted fetus.

- *The GDG noted the limited evidence on the benefits of antenatal corticosteroid in this subgroup of women. However, the group placed its emphasis on the overall benefits of antenatal corticosteroid, the potential benefits in terms of reduced handicap among surviving intrauterine growth-restricted (IUGR) infants, and evidence of reduced odds of adverse newborn mortality and morbidity outcomes, and therefore made a strong recommendation.*
- *The GDG acknowledged the concern about the effect of antenatal corticosteroids on fetal growth, but agreed that there is no evidence to suggest that steroids will perform differently in this subgroup compared to the overall preterm population.*

New Strong recommendation, very low-quality evidence

Antenatal corticosteroid therapy is recommended for women with pre-gestational and gestational diabetes who are at risk of imminent preterm birth, and this should be accompanied by interventions to optimize maternal blood glucose control.

- *The GDG acknowledged the paucity of evidence on the benefits of antenatal corticosteroid in this subgroup of women. However, the group placed its emphasis on the overall benefits of antenatal steroid in preterm, the potential benefits in terms of reducing the higher risk of newborn respiratory morbidity posed by maternal diabetes, and the potential impact on overall newborn survival, and therefore made a strong recommendation.*
- *The group considered the concern about the maternal hyperglycaemic effect of antenatal corticosteroids, but agreed that it was insufficient to counterbalance the potential benefits for the baby if appropriate measures are taken to ensure glycaemic control.*
- *Clinicians should ensure strict control of maternal blood glucose prior to and/or during pregnancy to reduce the risk of newborn respiratory distress syndrome.*
- *Delay in fetal lung maturity is generally more frequent in pregnant diabetic women compared with the general obstetric population. Therefore, in pregnant women with poorly controlled diabetes, the use of corticosteroids should also be considered at > 34 weeks of gestation if there is laboratory evidence of fetal lung immaturity.*

New Strong recommendation, low-quality evidence

Either intramuscular (IM) dexamethasone or IM betamethasone (total 24 mg in divided doses) is recommended as the antenatal corticosteroid of choice when preterm birth is imminent.

- *The GDG noted that there is no conclusive evidence on the comparative efficacy of dexamethasone and betamethasone that would support a recommendation of one over the other. The group acknowledged that dexamethasone has an advantage over betamethasone in terms of lower cost and wider availability, and it is currently listed for use in pregnant women on the WHO Essential Medicine List and in WHO's Managing complications in pregnancy and childbirth: a guide for midwives and doctors [52].*
- *The GDG acknowledged that the doses and regimens for both dexamethasone and betamethasone varied slightly across trials comparing the two, but noted that in the majority a total steroid dose of 24 mg was administered in divided doses 12 hours or 24 25 hours apart. Four doses of dexamethasone 6 mg IM 12 hours apart or two doses of betamethasone 12 mg IM 24 hours apart were the preferred choice in most of the studies. When deciding on the dosing frequency, consideration should be given to the likely timing of preterm birth to ensure that the woman completes the total dose of steroid or receives a substantial amount of the total dose before birth. Although there were no data on women's satisfaction, women are likely to prefer fewer injections.*
- *The GDG reviewed the important differences in the type and preparation of steroids across settings and emphasized that local protocols on the type and dosing regimen of antenatal steroid should be informed by the preparations that are readily available in the setting. This will not only encourage uptake and ease their use by health-care providers but also avoid incorrect dosing and wastage of resources.*
- *The panel felt there might be important differences in pharmacological properties of dexamethasone and betamethasone dosage regimens and therefore considered this as a research priority.*

New Conditional recommendation, moderate-quality evidence for newborn outcomes and low-quality evidence for maternal outcomes

A single repeat course of antenatal corticosteroid is recommended if preterm birth does not occur within 7 days after the initial dose, and a subsequent clinical assessment demonstrates that there is a high risk of preterm birth in the next 7 days.

- *The GDG acknowledged the lack of evidence on further reduction of neonatal mortality with the use of repeat corticosteroids. However, the group placed its emphasis on the associated further reduction in the respiratory morbidity and less surfactant use (which could save costs) and placed lower value on the small reduction in neonatal birth weight, and therefore recommended a single repeat course of steroid. Given that there are likely to be variations in these values across health system settings, the GDG lowered the strength of the recommendation and made it conditional.*
- *A single course in this context refers to a full dose of antenatal corticosteroid as recommended in this guideline.*
- *This recommendation should only be applied to women between 24 and 34 weeks of gestation.*
- *The GDG noted that only betamethasone was tested in this context, but concluded that there were no reasons not to extend the recommendation to dexamethasone. The group also noted the variations in the number of courses and doses of betamethasone used, but agreed that the recommendation should align with the previous recommendation on antenatal corticosteroid regimens.*

New

Conditional Recommendation against, low-quality evidence

Tocolytic treatments (acute and maintenance treatments) are not recommended for women at risk of imminent preterm birth for the purpose of improving newborn outcomes.

- *This recommendation was informed by the lack of substantive benefits of tocolytic treatment compared with no tocolytic treatment, in terms of reducing adverse perinatal and neonatal outcomes. The GDG agreed that prolongation of pregnancy for 2–7 days (which is achievable by few tocolytic agents) is an intermediate outcome that has not been demonstrated to improve critical neonatal outcomes.*
- *The GDG agreed that in women at risk of imminent preterm birth who have an otherwise uncomplicated pregnancy, the acute use of a tocolytic drug to prolong pregnancy (up to 48 hours) can be considered to provide a window for administration of antenatal corticosteroid and/or in-utero fetal transfer to an appropriate neonatal healthcare setting, although there is currently no direct evidence to show that this measure improves neonatal outcomes.*
  - *When tocolysis is considered in this context, nifedipine (a calcium channel blocker) is the preferred agent. There is considerable variation in the nifedipine regimens used in relevant trials. The most common regimen used in trials for acute tocolytic treatment was 10–30 mg as an initial dose, followed by 10–20 mg every 4–8 hours until contractions ceased or for up to 48 hours. The GDG suggested an initial oral dose of 20 mg followed by 10– 20 mg every 4–8 hours for up to 48 hours or until transfer is completed, whichever comes first.*
  - *Although betamimetics do appear effective in delaying birth for more than 48 hours, they should not be used for tocolysis because of the higher risk of adverse drug reactions, which may sometimes be life-threatening.*
  - *There is no evidence of additional benefit of using a combination of tocolytic agents over single agents. Therefore, when tocolysis is considered, a combination of tocolytic agents should not be used.*
  - *The available evidence regarding the potential risks and the lack of information on the long-term outcomes following tocolysis should be discussed with the woman and her partner in order for them to take an informed decision regarding the woman's care.*
  - *Consideration of the use of tocolytics should be individualized and tocolytics should not be used when there is any obstetric or medical contraindication to prolonging the pregnancy. Specifically, tocolytics may be associated with harm and should not be used in the following conditions:*
    - *preterm prelabour rupture of membranes (PPROM)*
    - *chorioamnionitis*
    - *placenta abruption*
    - *cardiac disease.*
  - *The GDG agreed that considerable uncertainty still exists around the value of tocolysis for newborns, particularly as it relates to taking advantage of the time gained for administration of antenatal corticosteroids and/or in-utero transfer, and whether a short prolongation of pregnancy of 2–7 days is more advantageous in one setting compared to another. The group considered studies on tocolytics (e.g. calcium channel blocker) + antenatal corticosteroids versus placebo + antenatal corticosteroids for improving neonatal outcomes a research priority. In addition, the GDG stressed the need for systematic collection of data on critical neonatal outcomes following tocolysis.*

New

Strong recommendation, moderate-quality evidence

The use of magnesium sulfate is recommended for women at risk of imminent preterm birth before 32 weeks of gestation for prevention of cerebral palsy in the infant and child.

- *Evidence suggests that the protective effects of magnesium sulfate on neurological complications (neuroprotection) are likely to be increased at earlier gestational ages. The GDG is aware of an ongoing trial on the neuroprotective effects of magnesium sulfate at gestational ages below 34 weeks.*
- *Magnesium sulfate for neuroprotection should only be given if preterm birth is likely within the next 24 hours. The median time from 35 magnesium sulfate administration to birth was reported in only two of the trials that generated the evidence (1 hour 38 minutes and 3.7 hours). However, the GDG felt that administering magnesium sulfate at any time from immediately prior to birth, up to 24 hours prior to anticipated birth is appropriate.*
- *Three dosing regimens (IV 4 g over 20 minutes, then 1 g/hour until delivery or for 24 hours, whichever came first; IV 4 g over 30 minutes or IV bolus of 4 g given as single dose; and IV 6 g over 20–30 minutes, followed by IV maintenance of 2 g/hour) have been tested in the available studies, which – on meta-analysis – show effect on cerebral palsy, and death or cerebral palsy. There was insufficient evidence to recommend one specific dosing regimen over others. The GDG is aware that an individual patient data analysis of these studies is underway, which may affect this guidance in the future.*
- *This recommendation applies to women carrying either singleton or multiple pregnancies.*
- *In women at imminent risk of preterm birth, magnesium sulfate should be considered as the preferred option whenever there is a valid obstetric indication (e.g. pre-eclampsia) and where it is considered safe and effective.*
- *There is a need for further research to establish whether repeated treatment with magnesium sulfate for neuroprotection is appropriate (i.e. in the event that delivery does not occur).*

New

Strong recommendation against, moderate-quality evidence

Routine antibiotic administration is not recommended for women in preterm labour with intact amniotic membranes and no clinical signs of infection.

- *It is important that women with any diagnostic or clinical signs of infection are treated accordingly with antibiotics.*
- *Management of group B streptococcal colonization is not within the scope of this recommendation.*
- *The GDG placed its emphasis on the potential risk of harm to the baby and placed less value on the minimal benefit to mothers, and therefore recommended against the intervention.*

New

Strong recommendation, moderate-quality evidence

Antibiotic administration is recommended for women with preterm prelabour rupture of membranes.

- *In order to avoid inadvertent antibiotics administration to women with intact amniotic membranes, antibiotics should not be prescribed unless a definite diagnosis of preterm prelabour rupture of membranes (PPROM) has been made. Therefore, a policy of prescribing antibiotics for women with PPROM should be accompanied by a protocol for reliably diagnosing PPROM.*
- *Women should be monitored for signs of clinical chorioamnionitis.*

New Conditional recommendation, moderate-quality evidence

Erythromycin is recommended as the antibiotic of choice for prophylaxis in women with preterm prelabour rupture of membranes.

- *The GDG acknowledged the paucity of evidence from the subgroup analysis to demonstrate comparative effectiveness of different classes and regimens of antibiotics used for prophylaxis in women with preterm prelabour rupture of membranes (PPROM). However, the choice of erythromycin was based on the findings of a study (the ORACLE I trial) with over 2000 women, which showed that erythromycin lessens the risk of necrotizing enterocolitis (NEC) in the newborn compared to co-amoxiclav. The recommendation was made conditional because antibiotic choice may be dependent on local availability of the drug and sensitivities of prevalent organisms.*
- *For antibiotic prophylaxis in women with PPROM, oral erythromycin 250 mg four times a day for 10 days (or until delivery) should be used. The choice of this regimen was informed by the regimen used in the ORACLE I trial.*
- *The management of group B streptococcal colonization is outside the scope of this guideline. However, when considering colonization with group B streptococcus, management decisions should be taken based on adequate microbiological coverage and sensitivities.*

New Strong recommendation against, moderate-quality evidence

The use of a combination of amoxicillin and clavulanic acid ("co-amoxiclav") is not recommended for women with preterm prelabour rupture of membranes.

- *This recommendation was based on the increased risk of NEC with co-amoxiclav when compared with placebo and with erythromycin.*
- *Where organisms are sensitive to other antibiotics, it would seem sensible to avoid using co-amoxiclav during pregnancy.*
- *Penicillins (excluding amoxiclav) were used in the pooled trials that showed benefits of antibiotics in this context. Therefore, where erythromycin is not available, penicillin (such as amoxicillin) can be used.*

New Conditional Recommendation against, very low-quality evidence

Routine delivery by caesarean section for the purpose of improving preterm newborn outcomes is not recommended, regardless of cephalic or breech presentation.

- *There is insufficient evidence to support the routine delivery of preterm infants by caesarean section instead of vaginal delivery, regardless of fetal presentation.*
- *Caesarean section should only be performed for obstetric indications.*

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