Consolidated guidelines for the prevention, diagnosis and treatment of postpartum haemorrhage

FIGO International Federation of Gynecology and Obstetrics
International Confederation of Midwives
World Health Organization

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Foreword

Every year, tens of thousands of women lose their lives to postpartum haemorrhage – a tragedy that is both preventable and unacceptable. These are not just statistics; they are mothers, daughters and sisters whose lives could have been saved with timely, effective care. The continued loss of life from postpartum haemorrhage is a call to action for all working to advance equity in maternal health.

Over the past decades, WHO, the International Federation of Gynecology and Obstetrics, and the International Confederation of Midwives have all issued guidelines on the prevention and treatment of postpartum haemorrhage, supporting international and national efforts to improve maternal health. This first edition of the *Consolidated guidelines for the prevention, diagnosis and treatment of postpartum haemorrhage* was developed with the purpose of informing national policies and driving effective implementation. It is a direct response to the *Roadmap to combat postpartum haemorrhage between 2023 and 2030*, which calls for a unified, evidence-based foundation to guide countries in reducing maternal deaths from postpartum haemorrhage. These guidelines consolidate 51 recommendations across the continuum of antenatal, intrapartum and postpartum care and are designed to move beyond policy into practice, supporting countries to translate global evidence into national action. This work also contributes directly to global commitments under the *Every Woman Every Newborn Everywhere* initiative, the *Global Strategy for Women's, Children's and Adolescents' Health* (2016–2030) and the third Sustainable Development Goal.

For the first time, WHO has co-published maternal health guidelines with the International Federation of Gynecology and Obstetrics and the International Confederation of Midwives. This unprecedented collaboration signals a new era of partnership – one that values interdisciplinary working and the vital role of professional associations in ensuring that global evidence is translated into country-level action. It empowers national professional associations to lead in adapting and adopting these guidelines to their contexts, and represents a bold step towards ensuring that every woman, everywhere, receives the care she needs.

The potential impact is profound. If countries with the highest burden of maternal mortality adopt and implement these guidelines at scale, we could achieve a significant reduction in maternal deaths globally. The evidence is clear, the tools are available and the time to act is now.

We call on governments, health system leaders, professional associations and communities to use these guidelines not just as a technical resource, but as a catalyst for change. Let this document be the starting point for a global movement to end preventable maternal deaths from postpartum haemorrhage.

Together, we can reimagine what is possible for maternal health and ensure that no woman dies while giving life. One preventable death is one too many.

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Acronyms and abbreviations

ANC	antenatal care
BP	blood pressure
CCT	controlled cord traction
DOI	declaration of interests
ERG	External Review Group
ESG	executive steering group
EtD	evidence-to-decision
FENSA	Framework for Engaging with Non-State Actors
FFP	fresh frozen plasma
FIGO	International Federation of Gynecology and Obstetrics
GDG	Guideline Development Group
GRADE	Grading of Recommendations Assessment, Development and Evaluation
IARHK	Inter-Agency Reproductive Health Kit
IAWG	Inter-Agency Working Group on Reproductive Health in Crises
ICM	International Confederation of Midwives
IU	international units
LMIC	low- and middle-income country
MISP	Minimum Initial Service Package for Sexual and Reproductive Health in Emergencies
MoU	memorandum of understanding
NASG	non-pneumatic anti-shock garment
PPH	postpartum haemorrhage
RBC	red blood cell
RCT	randomized controlled trial
TWG	technical working group
TXA	tranexamic acid
UNFPA	United Nations Population Fund
USAID	United States Agency for International Development
WHO	World Health Organization

Executive summary

Introduction

Postpartum haemorrhage (PPH) is one of the most common complications of childbirth. Globally, it accounts for nearly one fifth of all maternal deaths, and in most low-income countries it is the main cause of maternal mortality. Therefore, improving care before, during and after birth to prevent PPH and its complications is a necessary step towards the achievement of the health targets of the third Sustainable Development Goal, particularly target 3.1 (reduce the global maternal mortality ratio to less than 70 per 100 000 live births by 2030). Efforts to prevent and reduce the morbidity and mortality caused by PPH can help address the profound inequities in maternal health globally. To achieve this, health personnel, health managers, policy-makers and other stakeholders need up-to-date and evidence-based recommendations to guide clinical policies and practices.

Despite the existence of proven interventions for preventing, diagnosing and treating PPH, effective implementation of evidence-based interventions has been slow. Potentially life-saving interventions may be used inconsistently or deployed late because of delayed diagnosis of PPH. Current normative guidance is fragmented and, at times, contradictory across international guidelines, contributing to low uptake of evidence-based interventions. Broader health system challenges, such as weak supply chains, human resource constraints and limited capacity for ancillary infrastructure, hinder efforts to reduce PPH-related mortality and morbidity. Comprehensive normative guidance that addresses these health system challenges can significantly enhance the global response to PPH and help reduce maternal mortality and morbidity.

Target audience

These guidelines are intended to inform the development of relevant national and subnational health policies, clinical guidelines and programmatic guides. Therefore, the primary audience for these guidelines includes health professionals who are responsible for developing national and local health guidelines and protocols related to care during pregnancy, childbirth and the immediate postpartum periods, and those directly providing care to pregnant women and their newborns, including midwives, obstetricians, nurses, anaesthesiologists, general medical practitioners, and managers of maternal and child health programmes, in all settings. The guidelines will also be of interest to professional societies involved in the care of pregnant women, nongovernmental organizations concerned with the promotion of woman-centred maternal care, and implementers of maternal and child health programmes.

Guideline development methods

The development of these guidelines was guided by standardized operating procedures in accordance with the process described in the *WHO handbook for guideline development*. The recommendations were developed and updated using the following steps: (i) identification of priority questions and outcomes; (ii) retrieval of evidence; (iii) assessment and synthesis of evidence; (iv) formulation of the recommendations; and (v) planning for the dissemination, implementation, impact evaluation and future updating of the recommendations.

Updated and new systematic reviews were used to prepare evidence profiles for the prioritized questions. The quality of the scientific evidence underpinning the recommendations

was appraised using the Grading of Recommendations Assessment, Development and Evaluation (GRADE) approach. The GRADE evidence-to-decision (EtD) framework – an EtD tool that includes intervention effects, values, resource use, equity, acceptability and feasibility criteria – was used to guide the formulation of recommendations by the Guideline Development Group (GDG), an international group of experts assembled to review the evidence profiles at four GDG meetings in September, October and December 2024 and June 2025. In addition, relevant recommendations from existing WHO guidelines approved by the Guidelines Review Committee were systematically identified and integrated into these guidelines for the purpose of providing a comprehensive document for end-users.

Recommendations

These consolidated guidelines include a total of 51 recommendations for the prevention, diagnosis, treatment, supportive care and health system interventions for PPH. The recommendations are organized under 47 high-level recommendations, two of which include three distinct individual recommendations (7.1–7.3 and 9.1–9.3), bringing the total number of individually actionable recommendations to 51. This includes 20 new or updated recommendations adopted by the WHO GDG in 2024–2025 and 31 existing recommendations integrated from previously published WHO guidelines.

Recommendations are presented according to the care context to which they are relevant, that is, antenatal, intrapartum and postpartum interventions to prevent PPH; diagnosis of PPH; first-response treatment of PPH; treatment of refractory PPH; supportive care after PPH; and health systems interventions for PPH care. Based on assessments of the GRADE EtD criteria, which informed the direction and in some instances the specific context of the recommendation, the GDG classified each recommendation into one of the categories defined below:

- **Recommended:** This category indicates that the intervention or option should be implemented.
- **Not recommended:** This category indicates that the intervention or option should not be implemented.
- **Recommended only in specific contexts:** This category indicates that the intervention or option is applicable only to the condition, setting or population specified in the recommendation and should only be implemented in these contexts.
- **Recommended only in the context of rigorous research:** This category indicates that there are important uncertainties about the intervention or option. In such instances, implementation can still be undertaken on a large scale, provided that it takes the form of research that can address unanswered questions and uncertainties related both to the effectiveness of the intervention or option, and its acceptability and feasibility.

To ensure that each recommendation is correctly understood and applied in practice, the contributing experts provided additional remarks where needed. Where the GDG recommended an intervention or option only in specific contexts or only in the context of rigorous research, further detail was included about the particular context and which key issues needed to be examined, respectively. Users of the guidelines should refer to these remarks, which are presented directly beneath each recommendation in the full version of the guideline. The recommendations for the prevention, diagnosis and treatment of PPH are summarized in the table below. To support accurate interpretation

and implementation, each recommendation is labelled to indicate its development status, as defined below:

- **New:** A new topic, subgroup or intervention that needed to be covered. A new evidence synthesis was conducted and the GDG performed a full EtD procedure. The recommendation is new.
- **Updated:** A new evidence synthesis was conducted, and the topic and new evidence synthesis was reviewed by the GDG with a full EtD procedure. The resulting recommendation reflects the latest evidence.
- **Revalidated:** An existing WHO recommendation where there is no new, impactful evidence that warrants an update to the recommendation text. The recommendation is still valid and is thus retained unchanged.
- **Edited:** An existing WHO recommendation where there is no new, impactful evidence that warrants an update to the recommendation text; edits were introduced to clarify the text.

Summary list of recommendations for the prevention, diagnosis and treatment of postpartum haemorrhage

Context	Recommendation	Category of recommendation
Antenatal interventions to prevent postpartum haemorrhage	**1.** Full blood count testing is the recommended method for diagnosing anaemia in pregnancy. In settings where full blood count testing is not available, on-site haemoglobin testing with a haemoglobinometer is recommended over the use of the haemoglobin colour scale as the method for diagnosing anaemia in pregnancy.[a] **Revalidated**	Context-specific recommendation
	2. Daily oral iron and folic acid supplementation with 30 mg to 60 mg of elemental iron and 400 µg (0.4 mg) of folic acid is recommended for pregnant women to prevent maternal anaemia, puerperal sepsis, low birth weight and preterm birth.[a] **Revalidated**	Recommended
	3. Intermittent oral iron and folic acid supplementation with 120 mg of elemental iron and 2800 µg (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%.[a] **Revalidated**	Context-specific recommendation
	4. Intravenous iron therapy is recommended over oral iron therapy for women with iron-deficiency anaemia during pregnancy when oral iron cannot be used or is not tolerated, or there is a clinical need to correct the anaemia rapidly, provided the woman can be monitored for prompt identification of anaphylaxis. **New**	Context-specific recommendation

[a] Integrated from the *WHO recommendations on antenatal care for a positive pregnancy experience.*

Context	Recommendation	Category of recommendation
Intrapartum interventions to prevent postpartum haemorrhage	**5.** 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. **Updated**	Recommended
	6. Routine or liberal use of episiotomy is not recommended for women undergoing spontaneous vaginal birth.[b] **Revalidated**	Not recommended
Postpartum interventions to prevent postpartum haemorrhage	**7.** The use of a quality-assured uterotonic is recommended for the prevention of postpartum haemorrhage during the third stage of labour for all births. To effectively prevent postpartum haemorrhage, only ***one*** of the following uterotonics should be used: oxytocin, carbetocin and misoprostol, as outlined in the specific recommendations below: **7.1** Oxytocin (10 IU, intramuscularly/intravenously) is recommended for the prevention of postpartum haemorrhage for all births. **7.2** Carbetocin (100 µg, intramuscularly/intravenously) is recommended for the prevention of postpartum haemorrhage for all births; the heat-stable carbetocin formulation is recommended in settings where cold chain cannot be guaranteed. **7.3** Misoprostol (either 400 µg or 600 µg, orally) is recommended for the prevention of postpartum haemorrhage for all births. **Updated**	Recommended
	8. In situations where women giving birth vaginally already have intravenous access, the intravenous administration of 10 IU oxytocin – diluted and administered slowly over 1 to 2 minutes – is recommended in preference to intramuscular administration. **Edited**	Context-specific recommendation
	9. Uterotonic options that are not recommended for the prevention of postpartum haemorrhage include ergometrine/methylergometrine, fixed-dose combination of oxytocin and ergometrine, and injectable prostaglandins, as outlined in the specific recommendations below: **9.1** Ergometrine/methylergometrine is not recommended for the prevention of postpartum haemorrhage. **9.2** Fixed-dose combination of oxytocin and ergometrine (5 IU/500 µg, intramuscularly) is not recommended for the prevention of postpartum haemorrhage. **9.3** Injectable prostaglandins (carboprost or sulprostone) are not recommended for the prevention of postpartum haemorrhage. **Updated**	Not recommended
	10. In settings where multiple uterotonic options are available, oxytocin (10 IU, intramuscularly/intravenously) is the recommended uterotonic agent of choice for the prevention of postpartum haemorrhage for all births. **Updated**	Recommended

[b] Integrated from the *WHO recommendations on intrapartum care for a positive pregnancy experience.*

Context	Recommendation	Category of recommendation
	11. Heat-stable carbetocin (100 µg intramuscularly/intravenously) is the recommended choice for the prevention of postpartum haemorrhage in settings where the oxytocin cold chain cannot be consistently maintained. If heat-stable carbetocin is not available, misoprostol (400 µg or 600 µg, orally) can be used as an alternative. **Updated**	Context-specific recommendation
	12. The administration of misoprostol (400 µg or 600 µg, orally) by community health workers and lay health workers is recommended for the prevention of postpartum haemorrhage in settings where skilled health personnel are not present to administer injectable uterotonics. **Updated**	Context-specific recommendation
	13. In settings where women give birth outside 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 the prevention of postpartum haemorrhage, only with targeted monitoring and evaluation.[c] **Revalidated**	Context-specific recommendation
	14. Tranexamic acid is not recommended for the prevention of postpartum haemorrhage at vaginal birth. **New**	Not recommended
	15. Tranexamic acid is not recommended for the prevention of postpartum haemorrhage at caesarean birth. **New**	Not recommended
	16. In settings where skilled birth attendants are available, controlled cord traction is recommended for vaginal births if the health care provider and the woman consider a small reduction in blood loss and a small reduction in the duration of the third stage of labour as important.[d] **Revalidated**	Context-specific recommendation
	17. In settings where skilled birth attendants are unavailable, controlled cord traction is not recommended.[b] **Revalidated**	Not recommended
	18. Cord traction is the recommended method for the removal of the placenta in caesarean section.[b] **Revalidated**	Recommended
	19. Early cord clamping (<1 minute after birth) is not recommended unless the neonate is asphyxiated and needs to be moved immediately for resuscitation. **Revalidated**	Not recommended
	20. Sustained uterine massage is not recommended as an intervention to prevent postpartum haemorrhage in women who have received prophylactic oxytocin.[b] **Revalidated**	Not recommended

[c] Integrated from the *WHO recommendation on advance misoprostol distribution to pregnant women for prevention of postpartum haemorrhage.*

[d] Integrated from the *WHO recommendations for the prevention and treatment of postpartum haemorrhage.*

Context	Recommendation	Category of recommendation
Diagnosis of postpartum haemorrhage	**21.** 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.[e] **Revalidated**	Recommended
	22. To identify women at risk of adverse outcomes from postpartum bleeding and initiate first-response treatment, it is recommended to use the following criteria: objectively measured blood loss threshold of ≥300 mL with any abnormal haemodynamic sign (pulse >100 bpm, shock index >1, systolic blood pressure <100 mmHg, or diastolic blood pressure <60 mmHg), or objectively measured blood loss of ≥500 mL, whichever occurs first within 24 hours after birth, and with particular vigilance during the first 2 hours. **New**	Recommended
	23. Postpartum abdominal uterine tonus assessment for early identification of uterine atony is recommended for all women.[f] **Revalidated**	Recommended
First-response treatment of postpartum haemorrhage	**24.** Intravenous oxytocin is the recommended uterotonic drug for the treatment of postpartum haemorrhage.[b] **Revalidated**	Recommended
	25. If intravenous oxytocin is unavailable, or if the bleeding does not respond to oxytocin, the use of intravenous ergometrine, oxytocin and ergometrine fixed-dose combination, or a prostaglandin drug (including sublingual misoprostol, 800 µg) is recommended.[b] **Revalidated**	Recommended
	26. Uterine massage is recommended for the treatment of postpartum haemorrhage.[b] **Revalidated**	Recommended
	27. Early use of intravenous tranexamic acid (within 3 hours of birth) in addition to standard care is recommended for women with postpartum haemorrhage following vaginal birth or caesarean section.[g] **Edited**	Recommended
	28. Isotonic crystalloids are recommended in preference to colloids for intravenous fluid resuscitation of women with postpartum haemorrhage.[b] **Edited**	Recommended

[e] Integrated from the *WHO recommendations on the assessment of postpartum blood loss and use of a treatment bundle for postpartum haemorrhage.*

[f] Integrated from the *WHO recommendations for the prevention and treatment of postpartum haemorrhage.*

[g] Integrated from the *WHO recommendation on tranexamic acid for the treatment of postpartum haemorrhage.*

Context	Recommendation	Category of recommendation
	29. A standardized and timely approach to the management of postpartum haemorrhage, 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 first-line treatment of postpartum haemorrhage 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.[a] **Revalidated**	Recommended
	30. Administration of a uterotonic agent is recommended for the treatment of retained placenta after vaginal birth only in the presence of postpartum haemorrhage. **Updated**	Context-specific recommendation
	31. Routine antibiotic prophylaxis is recommended for women undergoing manual removal of the placenta. **Updated**	Recommended
	32. Umbilical vein injection of oxytocin is recommended for the treatment of retained placenta only in the context of rigorous research.[b] **Revalidated**	Research-context recommendation
Treatment of refractory postpartum haemorrhage	**33.** Bimanual uterine compression is recommended as a temporizing measure until appropriate care is available for the treatment of postpartum haemorrhage due to uterine atony after vaginal birth.[j] **Edited**	Context-specific recommendation
	34. External aortic compression is recommended as a temporizing measure until appropriate care is available for the treatment of postpartum haemorrhage due to uterine atony after vaginal birth.[c] **Edited**	Context-specific recommendation
	35. Non-pneumatic anti-shock garment is recommended as a temporizing measure until appropriate care is available for the treatment of postpartum haemorrhage.[c] **Edited**	Context-specific recommendation

[a] Integrated from the *WHO recommendations on the assessment of postpartum blood loss and use of a treatment bundle for postpartum haemorrhage.*

[b] Integrated from the *WHO recommendation on umbilical vein injection of oxytocin for the treatment of retained placenta.*

[j] Integrated from the *WHO recommendations for the prevention and treatment of postpartum haemorrhage.*

Context	Recommendation	Category of recommendation
	36. Uterine balloon tamponade is recommended for the treatment of postpartum haemorrhage due to uterine atony after vaginal birth in women who do not respond to standard first-line treatment, provided the following conditions are met: • Immediate recourse to surgical intervention and access to blood products is possible if needed. • A primary postpartum haemorrhage first-line treatment protocol (including the use of uterotonics, tranexamic acid, intravenous fluids) is available and routinely implemented. • Other causes of postpartum haemorrhage (retained placental tissue, trauma) can be reasonably excluded. • The procedure is performed by health personnel who are trained and skilled in the management of postpartum haemorrhage, including the use of uterine balloon tamponade. • Maternal condition can be regularly and adequately monitored for prompt identification of any signs of deterioration.[a] **Revalidated**	Context-specific recommendation
	37. Uterine packing with plain gauze or gauze impregnated with haemostatic agent(s) is not recommended for the treatment of postpartum haemorrhage. **Updated**	Not recommended
	38. If other measures have failed and if the necessary resources are available, the use of uterine artery embolization is recommended as a treatment for postpartum haemorrhage due to uterine atony.[b] **Revalidated**	Context-specific recommendation
	39. 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.[b] **Revalidated**	Recommended
	40. Cell salvage is recommended for the treatment of postpartum haemorrhage only in the context of rigorous research. **New**	Research-context recommendation
	41. For women experiencing acute or ongoing postpartum haemorrhage, the decision to initiate transfusion of blood products should be based on the underlying risk, continuous clinical and haematological assessments, and clear protocols for optimizing their use. **New**	Recommended

[a] Integrated from the *WHO recommendation on uterine balloon tamponade for the treatment of postpartum haemorrhage.*

[b] Integrated from the *WHO recommendations for the prevention and treatment of postpartum haemorrhage.*

Context	Recommendation	Category of recommendation
Supportive care after postpartum haemorrhage	**42.** Oral iron supplementation, either alone or in combination with folic acid, may be provided to postpartum women for 6–12 weeks after delivery for reducing the risk of anaemia in settings where gestational anaemia is of public health concern.[a] **Revalidated**	Context-specific recommendation
	43. Intravenous iron therapy is recommended over oral iron therapy for women with iron-deficiency anaemia after birth when oral iron cannot be used or is not tolerated or there is a clinical need to treat women with severe iron-deficiency anaemia rapidly, provided staff are trained to evaluate and manage anaphylactic reactions. **New**	Context-specific recommendation
Health systems interventions for postpartum haemorrhage	**44.** The use of formal protocols by health facilities for the prevention, diagnosis and treatment of postpartum haemorrhage is recommended.[b] **Edited**	Context-specific recommendation
	45. The use of formal protocols for referral of women to a higher level of care is recommended for health facilities.[b] **Revalidated**	Context-specific recommendation
	46. The use of simulations of postpartum haemorrhage treatment is recommended for pre-service and in-service training programmes.[b] **Revalidated**	Context-specific recommendation
	47. Monitoring the use of uterotonics after birth for the prevention of postpartum haemorrhage is recommended as a process indicator for programmatic evaluation.[b] **Revalidated**	Context-specific recommendation

[a] Integrated from the *WHO guideline on iron supplementation in postpartum women.*

[b] Integrated from the *WHO recommendations for the prevention and treatment of postpartum haemorrhage.*

Dissemination, implementation, monitoring and evaluation

For these guidelines to translate into improved health outcomes, they must be delivered through appropriate models of care that are responsive to national priorities, local contexts and the needs of women and their families. Dissemination of the consolidated (new, updated, revalidated and edited) recommendations and corresponding practical tools – such as job aids and clinical protocols – is essential to support health workers at the facility level. For successful implementation, health workers must not only be aware of the interventions but also view them as feasible and effective. Comprehensive pre-service and in-service training, supportive supervision, mentoring, peer learning and performance feedback can help change provider behaviour and ensure consistent delivery of PPH care.

In alignment with the PPH Roadmap (2023–2030), strong national leadership is needed to establish clear PPH policies in collaboration with WHO and partners. These must be adapted to local realities and disseminated effectively from national to subnational levels by champions who can raise awareness and drive uptake. Regulatory processes should ensure that PPH medicines and devices are registered, licensed and included in national essential medicines and devices lists. Strengthening procurement and supply chains – including for blood products – is critical to ensure the availability, affordability and quality of PPH commodities. This requires coordinated investment and expanded procurement mechanisms within the broader ecosystem of maternal health commodities. Ultimately, successful scale-up of PPH interventions depends on a coordinated, system-wide approach that integrates national policy, supply, training and community engagement.

To ensure measurable improvements in maternal health, implementation of these guidelines should be systematically monitored at facility, subnational and national levels. This requires clearly defined indicators aligned with locally agreed targets and priorities. For these guidelines, the GDG suggested a set of input, output and outcome indicators to assess the readiness, delivery and impact of PPH care. Input indicators include the availability of clinical protocols, blood loss measurement devices and key supplies, such as uterotonics, tranexamic acid and intravenous fluids. Output indicators include the proportion of women receiving a uterotonic within 1 minute of birth, those with objectively measured postpartum blood loss and those with PPH receiving the full complement of first-response bundle within 15 minutes of diagnosis. Outcome indicators include the proportion of women who experience PPH, severe PPH (≥1000 mL) and PPH-related mortality. Data should be collected through clinical audits, maternal death and near-miss reviews, and time-series analyses, to guide quality improvement.

1. Background

Postpartum haemorrhage (PPH) remains one of the most frequent and life-threatening complications of childbirth. While certain obstetric risk factors – such as multiparity, prolonged labour, history of PPH and multiple gestation – are known to increase the likelihood of excessive bleeding, most women who experience PPH have no identifiable risk factors. Anaemia, a common condition in many settings, further exacerbates the severity and consequences of postpartum blood loss. Given this unpredictability, it is essential that all health workers be equipped to diagnose and treat PPH in every birth. Effective treatment requires a timely, coordinated response that includes administration of appropriate medications and clinical interventions with the capacity to escalate care rapidly if initial measures fail. Importantly, many PPH-related complications can be prevented through the routine use of prophylactic uterotonics during the third stage of labour – the critical period between the birth of the baby and the complete delivery of the placenta.

Although PPH is a common complication of childbirth, deaths from PPH are largely preventable due to the availability of effective interventions for its prevention, diagnosis and treatment. Despite this, PPH remains one of the leading causes of maternal mortality globally, with approximately 80% of related deaths occurring in low- and middle-income countries (LMIC), particularly in sub-Saharan Africa and South Asia *(1)*. These deaths often occur in fragile health systems where access to essential medicines, trained personnel and timely care is limited. International human rights law obliges states to ensure that women and adolescent girls can survive pregnancy and childbirth as part of their right to sexual and reproductive health and a life of dignity. WHO envisions a world where every pregnant woman and newborn receives quality care throughout pregnancy, childbirth and the postnatal period. Achieving this goal requires that health workers at all levels are equipped with the necessary skills, resources and up-to-date, evidence-based guidelines to deliver life-saving care. Therefore, improving access to safe and effective PPH interventions is central to WHO's strategic priorities, particularly universal health coverage, and it is critical to achieving the third Sustainable Development Goal, which aims to reduce the global maternal mortality ratio to fewer than 70 per 100 000 live births.

Implementation of effective interventions for the prevention, diagnosis and treatment of PPH has been inconsistent and slow, contributing to preventable maternal deaths. Life-saving measures are often underused or applied too late because of delayed diagnosis and systemic barriers. Broader health system challenges, such as weak supply chains, shortages of trained personnel and limited access to blood transfusion, further hinder efforts to reduce PPH-related mortality and morbidity. These persistent gaps highlight the urgent need for stronger, more coordinated global action to improve the quality and timeliness of PPH care.

In response, WHO collaborated with several stakeholders to develop *A Roadmap to combat postpartum haemorrhage between 2023 and 2030 (2)*. This Roadmap outlines global research, normative, implementation and advocacy priorities to accelerate progress towards reducing maternal mortality caused by PPH. The Roadmap strongly recommends the development and release of a harmonized, consolidated set of guidelines for PPH prevention, diagnosis and treatment by leading international guideline developers – WHO, International Federation of Gynecology and Obstetrics (FIGO) and the International Confederation of Midwives (ICM). These consolidated guidelines integrate the latest scientific evidence for key priority questions for PPH care and are designed for easy adaptation to local contexts. By consolidating previously fragmented recommendations and enhancing collaboration among global normative bodies, this document aims to improve the consistency and quality of PPH care, particularly in PPH high-burden settings, and ultimately improve outcomes for women giving birth.

1.1 Target audience

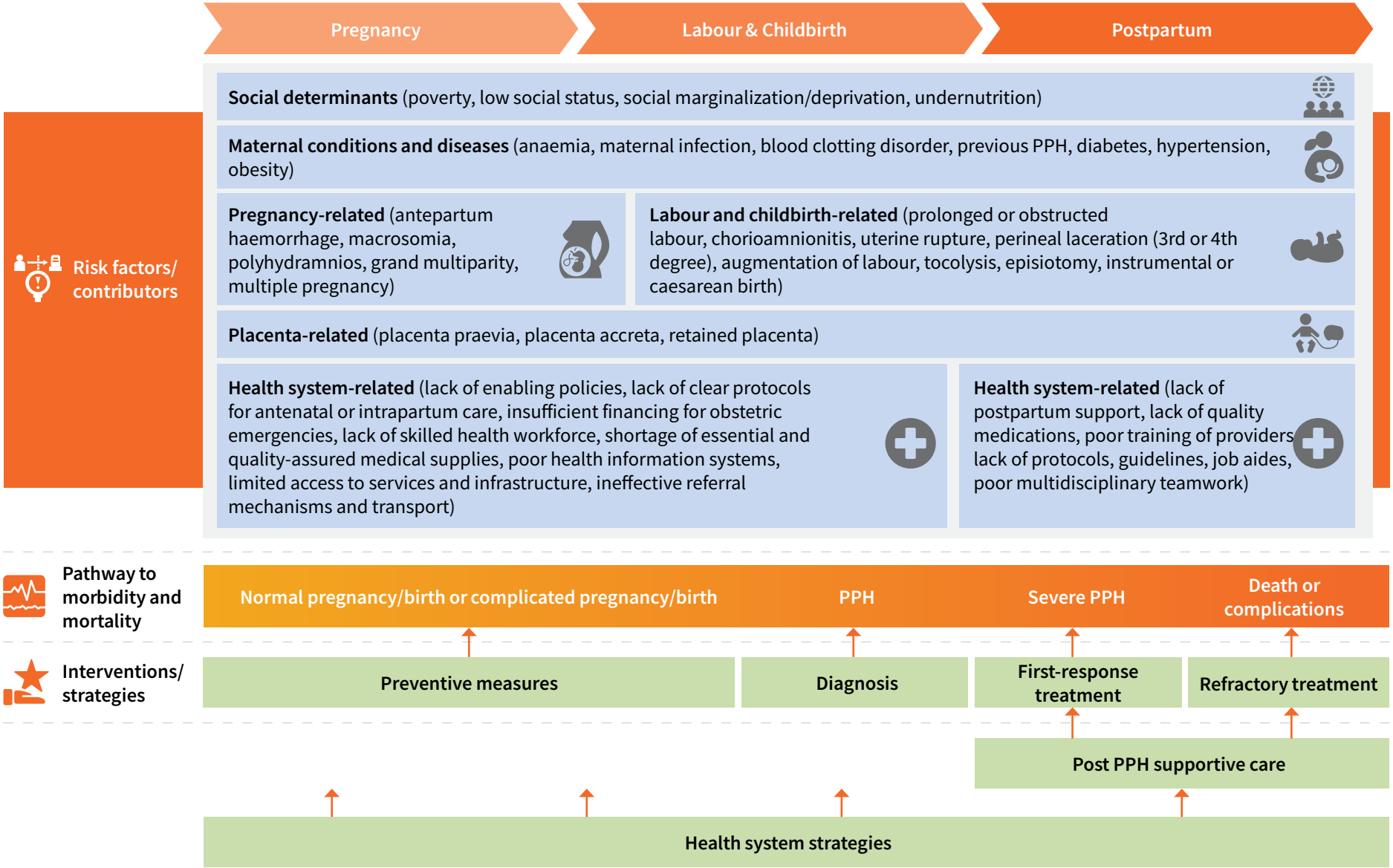
These guidelines are intended to inform the development of relevant national and subnational health policies, clinical protocols and programmatic guides. Therefore, the primary audience for the guidelines includes health professionals responsible for developing national and local health policies related to care during pregnancy, childbirth and the immediate postpartum period, and those directly providing care to pregnant women, including midwives, obstetricians, nurses, anaesthesiologists, general medical practitioners and managers of maternal health programmes, in all settings. The consolidated guidelines will also be of interest to professional societies involved in the care of pregnant women, nongovernmental organizations concerned with the promotion of woman-centred maternal care, and implementers of maternal health programmes.

1.2 Scope of the guidelines

The consolidated guidelines focus on the care of women during pregnancy, childbirth and the immediate postpartum period in any health care setting. Based on the premise that all women deserve comprehensive high-quality care, the guidelines include effective interventions for the prevention, diagnosis and treatment of PPH. The guidelines were scoped by the Technical Advisory Group for WHO Maternal and Perinatal Health Guidelines in November 2023 based on a comprehensive framework for reducing PPH morbidity and mortality (Fig. 1.1). The framework considers risk factors and contributors to PPH and potential complications across the antenatal, intrapartum and postpartum periods and highlights opportunities to intervene by implementing preventive measures, timely diagnosis and appropriate treatments. Hence, the scope of the guidelines encompasses antenatal interventions to prevent PPH, intrapartum interventions to prevent PPH, postpartum interventions to prevent PPH; diagnosis of PPH; first-response treatment of PPH; treatment of refractory PPH; supportive care after PPH; and health system interventions for PPH.

The priority questions and outcomes that guided the evidence synthesis and decision-making for these guidelines are presented in the Web Annexes, including those for existing WHO recommendations integrated into these guidelines. These guidelines are complementary to existing WHO guidelines on the immediate care of the woman and newborn after birth, as well as those on the management of complications during pregnancy, childbirth and the postnatal periods. Together with WHO recommendations on antenatal care (ANC) for a positive pregnancy experience *(3)*, intrapartum care for a positive childbirth experience *(4)* and maternal and newborn care for a positive postnatal experience *(5)*, these guidelines offer a set of integrated recommendations to assure quality essential respectful care along the pregnancy to postnatal continuum.

Fig. 1.1. Framework for reducing postpartum haemorrhage (PPH) morbidity and mortality



2. Methods

This document was developed using the standard operating procedures described in the *WHO handbook for guideline development (6)*. In summary, the development process included: (i) identification of priority questions and outcomes; (ii) retrieval of the evidence; (iii) assessment and synthesis of the evidence; (iv) formulation of the recommendations; and (v) planning for the dissemination, implementation, impact evaluation and updating of the guideline.

The groups involved in the development of the guidelines are described below. The members of these groups are listed in Annex 1.

2.1 WHO Steering Group

The WHO Steering Group, including staff members from the Departments of Sexual, Reproductive, Maternal, Child, Adolescent Health and Ageing, and Nutrition and Food Safety, supervised the guideline development process. The group drafted the initial scope of the guideline, identified priority questions and outcomes, prepared the guideline planning proposal, and identified systematic review teams, guideline methodologist and members of the GDG. Additionally, the Steering Group supervised the evidence retrieval, assessment and synthesis, organized the GDG meetings, prepared draft recommendations for the GDG to review, prepared the final guideline document, and managed the publication and dissemination of the guidelines.

2.2 Guideline Development Group

The WHO Steering Group identified 23 external experts and stakeholders from the six WHO regions to form the GDG. This was a diverse group of individuals with expertise in research, clinical practice, policy, programmes, guideline development methods relating to interventions for maternal care and service delivery, and patient/consumer representatives. The experts were identified in a way that ensured geographical representation, gender balance and no important conflicts of interest (see Annex 2). Consideration was also given to ensure inclusion of members who participated in the formulation of previous PPH guidelines to ensure continuity. A short biography of GDG members was published on the WHO website for public review and comment before the first GDG meeting.

Selected members of this group participated in a guideline scoping meeting of the Technical Advisory Group for WHO Maternal and Perinatal Health Guidelines held in November 2023 and provided input into the priority questions and outcomes that guided the evidence reviews. The GDG examined and interpreted the evidence and formulated the final recommendations at virtual and hybrid meetings held in September, October and December 2024, and June 2025. The group also reviewed existing WHO recommendations and decided the final set of recommendations that can be integrated into these consolidated guidelines. Finally, the group reviewed and approved the final guideline document.

2.3 External Review Group

The External Review Group (ERG) included six technical experts and stakeholders with an interest in the provision and experience of evidence-based care. The group was geographically balanced and gender-representative, and the members had no important conflicts of interest (see Annex 2). The ERG peer-reviewed the final document to identify any errors of fact and comment on clarity of language, contextual issues and implications for implementation. The group ensured that the guideline decision-making processes considered and incorporated

the contextual values and preferences of persons affected by the recommendations, including women and their families, health care professionals and policy-makers. It was not within the remit of this group to change the recommendations formulated by the GDG.

2.4 Technical Working Group

The Technical Working Group (TWG) included a guideline methodologist and systematic review teams. The group was responsible for the conduct or updating of systematic reviews, appraisal of evidence and development of the EtD frameworks. An independent consultant from Cochrane Denmark served as the guideline methodologist. In relation to quantitative evidence on the effects of different prioritized interventions, WHO commissioned and facilitated the updating and publication of relevant systematic reviews in the Cochrane Library to several systematic review teams following the standard processes of the Cochrane Collaboration. The guideline methodologist appraised the evidence using the GRADE methodology. Where there were no suitable systematic reviews for priority questions, new systematic reviews of quantitative evidence were commissioned by WHO. Additional systematic reviews were conducted for priority questions relevant to other domains of the GRADE EtD frameworks, including quantitative, qualitative and cost–effectiveness reviews *(7)*. The WHO Steering Group worked closely with members of the TWG to review and appraise the evidence and prepare the GRADE EtD frameworks.

2.5 Executive Steering Group

An Executive Steering Group (ESG) was formed, which included representatives from international guideline developers collaborating on these guidelines – WHO, FIGO and ICM. The ESG provided high-level strategic guidance and oversight of the guideline development operating within the remits of an established Memorandum of Understanding (MoU) and the Framework for Engaging with Non-State Actors for FIGO and ICM. Members of this group external to WHO did not contribute to the evidence review and formulation of the recommendations, but participated in the guideline scoping meetings and as observers at the GDG meetings. The ESG will be instrumental to guideline dissemination through their networks and will have a crucial role in country adaptation, adoption and implementation of the consolidated guidelines in accordance with the MoU signed with WHO.

2.6 External partners and observers

Representatives of FIGO, ICM, United States Agency for International Development (USAID), Gates Foundation, Jhpiego, Laerdal Global Health and Unitaid were invited to the guideline development meetings as observers. These organizations are potential implementers of the recommendations with a history of collaboration with WHO in guideline dissemination and implementation. These external partners participated as observers at the GDG meetings and throughout the guideline consultation process.

2.7 Identifying priority questions and outcomes

The priority questions for these guidelines were identified by the Technical Advisory Group for WHO Maternal and Perinatal Health Guidelines through a systematic prioritization process in November 2023 *(8)*. To support the prioritization process, a scoping exercise was first undertaken to identify risk factors and map interventions with health outcomes related to PPH. The identified risk factors were then used to develop a framework for reducing PPH morbidity and mortality (**Fig. 1.1**) where they were organized into five categories (social determinants, maternal

conditions and diseases, pregnancy, labour and childbirth-related factors, placenta-related factors and health systems factors). The categories of risk factors were further mapped across the antenatal, intrapartum and postpartum periods and included the opportunities to intervene at these periods by implementing preventive measures, timely diagnosis and appropriate treatments. To determine their relevance for inclusion in the priority questions for PPH guidelines, the risk factors were assessed based on whether they were strongly associated with PPH, could be modified by a health intervention, and whether the associated intervention could be feasibly operationalized within PPH mortality and morbidity reduction programmes.

To develop the final list of priority questions, existing WHO recommendations were mapped against the PPH framework to identify recommendations that could be integrated in the consolidated guidelines and identify possible gaps where new recommendations were needed. For all existing WHO recommendations published more than 2 years prior, literature searches were updated and appraisals of identified studies were conducted to identify where new publications could change the direction or certainty of the evidence underpinning the existing recommendation. For topics that had not yet been addressed by a WHO recommendation, guidelines from other guideline developers were reviewed to determine what, if any, recommendations had been issued and what underpinning evidence was cited in those recommendations. Where there were existing recommendations, the underpinning evidence was reviewed and updated searches were conducted using Medical Subject Heading terms to assess what additional impactful evidence might be available on each topic. If there was no new evidence that would change the recommendation, the existing evidence was considered valid for the corresponding recommendation. Where new, impactful evidence was identified, draft PICO (population, intervention, comparator, outcome) questions were formulated and presented for review and approval by the Technical Advisory Group for WHO Maternal and Perinatal Health Guidelines.

The priority outcomes were aligned with those from existing WHO recommendations for the prevention, diagnosis and treatment of PPH and the published core outcome set for the prevention and treatment of PPH *(9)*. These outcomes were initially identified through a search of key sources of relevant, published systematic reviews and a prioritization of outcomes by the 2012 WHO PPH guideline panel and further expanded by the 2018 WHO PPH guideline panel with the inclusion of women-centred outcomes (maternal well-being and maternal satisfaction) and alignment with the PPH core outcome set. For the question related to the diagnostic criteria for PPH, the priority outcomes also included standard test accuracy outcomes, such as sensitivity, specificity and diagnostic odds ratio. The selected priority outcomes ensured that the evidence synthesis and decision-making by the GDG were driven by outcomes that are important to women and that the final set of recommendations are woman-centred. All the outcomes were included in the scope of this document for evidence searching, retrieval, synthesis, grading and formulation of the recommendations. All the questions and outcomes are provided in the Web Annexes.

2.8 Integration of recommendations from published WHO guidelines

To harmonize and consolidate all recommendations relevant to the prevention, diagnosis and treatment of PPH into a single document, existing WHO recommendations that were within the scope of PPH preventive, diagnostic and treatment measures, and which were previously approved by the Guidelines Review Committee, were identified, presented to the GDG and integrated into the consolidated PPH guidelines. These integrated recommendations come from 12 WHO guideline documents (for PPH and routine antenatal, intrapartum and postnatal care)

published between 2012 and 2023 *(3–5,10–18)*. These integrated recommendations cover other critical components of PPH care from the antenatal through immediate postpartum periods for which questions were not prioritized. These include antenatal interventions to diagnose and manage modifiable risk factors, such as anaemia, intrapartum interventions to avoid or minimize risk factors for PPH (e.g. perineal tears and episiotomy) and postnatal supportive interventions to improve outcomes for women who experience PPH (e.g. iron supplementation). Recommendations and their corresponding remarks have been integrated directly from their parent guidelines. For some of the existing WHO PPH recommendations that are consolidated into these guidelines, minor editorial revisions of the text of the recommendations were performed to ensure consistency in the wording of the recommendations across the guideline document.

2.9 Focus and approach

The focus of these guidelines is on the essential antenatal, intrapartum and postnatal practices as they relate to the prevention, diagnosis and treatment of PPH, which all women and adolescent girls should receive to optimize clinical outcomes and experience of care. To help decision-makers consider a range of relevant criteria – including the benefits, harms, values, resources, equity, acceptability and feasibility of each intervention – the GRADE EtD framework tool was used *(7)*. The preparatory work for the guidelines was organized into five work streams to synthesize and examine evidence across the EtD framework domains (**Table 2.1**).

Table 2.1. WHO postpartum haemorrhage guidelines work streams

Work stream	Methodology	Assessment of evidence
Effects of individual interventions for clinical practices from pregnancy through the postpartum periods	Systematic reviews of effectiveness or observational studies	GRADE
Definition of PPH (test accuracy of clinical markers for diagnosing PPH)	IPD prognostic test accuracy meta-analysis	QUAPAS
Woman-centred and maternity staff-centred domains for values, acceptability and feasibility of implementing practices	Qualitative evidence synthesis; mixed-methods reviews	GRADE-CERQual; GRADE
Equity and human rights issues related to PPH	Literature searches of systematic reviews or single studies, review of studies and references included in effectiveness reviews, and 2015 WHO *State of Inequality* report *(19)*	Not applicable
Resource implications for individual interventions	Systematic reviews of cost–effectiveness or single-study economic evaluations on resource use/cost or cost–effectiveness	CHEC, as applicable

CERQual, Confidence in the Evidence from Reviews of Qualitative research *(20)*; CHEC, Consensus Health Economic Criteria *(22)*; GRADE, Grading of Recommendations Assessment, Development and Evaluation *(21)*; IPD, individual participant data; PPH, postpartum haemorrhage; QUAPAS, Quality Assessment of Prognostic Accuracy Studies *(23)*.

2.10 Evidence identification and retrieval

Evidence on the effects of interventions was derived mainly from Cochrane systematic reviews of randomized controlled trials (RCTs). The WHO Steering Group and guideline methodologist in collaboration with the Cochrane Central Group first identified all relevant Cochrane systematic reviews that addressed prioritized questions. In instances where the Cochrane reviews identified were out-of-date, review authors were invited to update their Cochrane reviews in accordance with the standard process of Cochrane and with the support of Cochrane Central staff. Where WHO commissioned new systematic reviews to systematic review teams, the teams were asked to prepare a standard protocol with a clear PICO question, criteria for identification of studies, including search strategies for different bibliographic databases, methods for assessing risk of bias and a data analysis plan, before embarking on the review. Evidence on the prognostic test accuracy of clinical markers of postpartum bleeding was derived from an individual participant data meta-analysis. The protocols for each systematic review, including their literature search strategies, were reviewed and approved by members of the WHO Steering Group before the conduct of the review by the systematic review teams.

Qualitative reviews focused on health care professionals' views of barriers and facilitators to the uptake and delivery of PPH interventions; the acceptability of practices to women and health workers; the feasibility of implementing the interventions; how the outcomes impacted by an intervention are valued by women and other stakeholders; and general or specific perceptions on equity relating to the interventions prioritized *(24)*. A qualitative evidence synthesis explored the perceptions and experiences of women, community members, lay health workers and skilled health workers with PPH experience or experience with preventing, detecting and managing PPH, in both community and health care facility settings *(25)*. This review was the primary source of evidence on acceptability, feasibility and equity. Evidence for these domains was also supplemented by findings from a qualitative systematic review on women's views and experiences during intrapartum care *(26)*.

Evidence on resource use and cost–effectiveness was based on a new systematic review of the literature *(27)*. The review aimed to synthesize all available evidence on the cost–effectiveness of interventions to prevent, diagnose and treat PPH. Eligible studies were identified from specialist health economic databases (NHS Economic Evaluation Database and EconLit) and medical databases (PubMed, Embase, CINAHL and PsycINFO). Eligible studies were full economic evaluations that assessed cost–benefit, cost–effectiveness or cost–utility. In the absence of specific economic evaluation evidence for clinical markers of postpartum bleeding, a cost–effectiveness modelling was undertaken based on test accuracy estimates derived from a large individual participant dataset *(28)*.

2.11 Quality assessment and grading of the evidence

Quality assessment of primary studies included in the reviews

The assessment of the quality of individual studies included in the systematic reviews follows a specific and explicit method of risk of bias assessment using standard criteria outlined in the *Cochrane Handbook for Systematic Reviews of Interventions (29)*. Each included study is assessed and rated by systematic reviewers to be at low, high or unclear risk of bias for domains such as sequence generation, allocation concealment, blinding of study personnel and participants, attrition, selective reporting and other sources of bias, such as publication bias. The assessment along these domains provides an overall risk of bias that indicates the likely magnitude and direction of the bias and how it is likely to impact on the review findings. In the case of the new systematic reviews on the effectiveness of interventions commissioned

by WHO, each study included was assessed for risk of bias according to the Cochrane review methodology for randomized or non-randomized studies. Quality assessment for qualitative studies used an adapted version of the Critical Appraisal Skills Programme tool.[a]

Grading of the review evidence

The GRADE approach to appraising the certainty of quantitative evidence was used for all the critical outcomes identified in the PICO questions *(30)*. For every priority question, a GRADE evidence profile was prepared for each quantitative outcome. Accordingly, the certainty of evidence for each outcome was rated as high, moderate, low or very low based on a set of criteria. As a baseline, RCTs provided high-certainty evidence, while non-randomized trials and observational studies provided low-certainty evidence. This baseline certainty rating was then downgraded based on consideration of study design limitations (risk of bias), inconsistency, imprecision, indirectness and publication bias. For observational studies, other considerations, such as magnitude of effect, could lead to upgrading of the rating if there were no limitations that indicated a need for downgrading. The systematic review teams and methodologist performed grading of quantitative review evidence, in accordance with standard operating procedures approved by the WHO Steering Group.

The findings of the qualitative reviews were appraised for quality using the GRADE-Confidence in the Evidence from Reviews of Qualitative research (GRADE-CERQual) tool *(21)*. The GRADE-CERQual tool, which uses a similar approach conceptually to other GRADE tools, provides a transparent method for assessing and assigning the level of confidence that can be placed in evidence from reviews of qualitative research. The systematic review team used the GRADE-CERQual tool to assess the confidence in qualitative review findings – a level of confidence was assigned to the evidence domains on values, acceptability and feasibility according to four components: methodological limitations of the individual studies; adequacy of the data; coherence; and relevance to the review question of the individual studies contributing to a review finding.

2.12 Formulation of the recommendations

The WHO Steering Group supervised and finalized the preparation of evidence profiles and evidence summaries in collaboration with the TWG using the GRADE EtD framework. The EtD tool includes explicit and systematic consideration of evidence on prioritized interventions in terms of specified domains: effects, values, resources, equity, acceptability and feasibility. For each priority question, judgements were made on the impact of the intervention on each domain (or criterion) to inform and guide the decision-making process. Using the EtD framework template, the WHO Steering Group and TWG created summary documents for each priority question covering evidence on each of these domains.

Effects: The evidence on the critical outcomes was summarized in this domain to answer the questions: “What are the desirable and undesirable effects of the intervention/option?” and “What is the certainty of the evidence on effects?” Where benefits clearly outweighed harms for outcomes that are highly valued by pregnant women, or vice versa, there was a greater likelihood of a clear judgement in favour of or against the intervention, respectively. Regarding the uncertainty about the net benefits or harms, small net benefits usually led to a judgement that did not favour the intervention or the comparator. The higher the certainty of evidence of benefits across outcomes, the higher the likelihood of a judgement in favour of the intervention. In the absence of evidence of benefit, evidence of potential harm led to a recommendation

[a] Critical Appraisal Skills Programme appraisal tools are available at https://casp-uk.net/casp-tools-checklists/

against the option. Where evidence of potential harm was found for interventions that were also found to have evidence of important benefits, depending on the level of certainty and likely impact of the harm, such evidence of potential harm was more likely to result in a context-specific recommendation for the intervention (and the context is explicitly stated in the recommendation).

Values: This relates to the relative importance assigned to the outcomes of the intervention by those affected by them, how such importance varies within and across settings, and whether this importance is surrounded by any uncertainty. The question asked was: "Is there important uncertainty or variability in how much women value the main outcomes associated with the intervention/option?" Interventions that resulted in outcomes that most women consistently value regardless of settings were more likely to lead to a judgement in favour of the intervention. This domain, together with the effects domain (see the previous paragraph), informed the balance of effects judgement.

Resources: This domain addressed the questions: "What are the resources associated with the intervention/option?" and "Is the intervention/option cost-effective?" The resources required to implement the reviewed intrapartum care interventions mainly include the costs of providing supplies, training, equipment and skilled human resources. A judgement in favour of or against the intervention was likely where the resource implications were clearly advantageous or disadvantageous, respectively. Cost evaluation relied on reported estimates obtained during the evidence retrieval process, as well as the experiences and opinions of the GDG members. Where available, direct evidence from cost–effectiveness analyses or systematic reviews of cost–effectiveness studies informed this domain.

Acceptability: This domain addressed the question: "Is the intervention/option acceptable to women and health care providers?" Qualitative evidence from the systematic reviews on women's and providers' views and experiences informed the judgements for this domain. The lower the acceptability, the lower the likelihood of a judgement in favour of the intervention. If it was deemed necessary to recommend an intervention that was associated with low acceptability, the recommendation is accompanied by a strategy to address concerns about acceptability during implementation.

Feasibility: The feasibility of implementing an intervention depends on factors such as the resources, infrastructure and training requirements. This domain addressed the question: "Is it feasible for the relevant stakeholders to implement the intervention/option?" Qualitative evidence from the systematic reviews on women's and providers' views and experiences was used to inform judgements for this domain. Where barriers were identified, it was less likely that a judgement would be made in favour of the intervention.

Equity: This domain encompasses evidence or considerations as to whether or not an intervention would reduce health inequities. Therefore, this domain addressed the question: "What is the anticipated impact of the intervention/option on equity?" The findings of qualitative systematic reviews on women's and providers' views and experiences on PPH *(25)* and the 2015 WHO report *State of inequality: reproductive, maternal, newborn and child health (19)*, and the experiences and opinions of the GDG members, were used to inform this domain. An intervention was likely to be recommended if its proven (or anticipated) effects reduce (or could reduce) health inequalities among different groups of women and their families.

For each of these six domains, additional evidence of potential harms or unintended consequences are described in the additional considerations subsections provided in the Web Annexes. Such considerations were derived from studies that might not have directly addressed the priority question but provided pertinent information in the absence of direct evidence. These were extracted from single studies, systematic reviews or other relevant sources.

The WHO Steering Group shared the EtD frameworks, including evidence summaries, GRADE evidence profiles and other documents related to each recommendation with GDG members in advance of GDG meetings. The GDG was asked to review and provide comments on the documents electronically before the GDG meetings. At the meetings, under the leadership of the GDG chair, GDG members collectively reviewed the EtD frameworks, the draft recommendations and any comments received through preliminary feedback. The purpose of the meeting was to reach consensus on each recommendation, including its direction and context, based on explicit consideration of all the domains within the EtD frameworks. In line with other recently published WHO guidelines using EtD frameworks, the GDG classified each recommendation into one of the following categories as defined below:

- **Recommended:** This category indicates that the intervention or option should be implemented.
- **Not recommended:** This category indicates that the intervention or option should not be implemented.
- **Recommended only in specific contexts:** This category indicates that the intervention or option is applicable only to the condition, setting or population specified in the recommendation, and should only be implemented in these contexts.
- **Recommended only in the context of rigorous research:** This category indicates that there are important uncertainties about the intervention or option. In such instances, implementation can still be undertaken on a large scale, provided that it takes the form of research that is able to address unanswered questions and uncertainties related both to the effectiveness of the intervention or option, and its acceptability and feasibility.

For consistency, integrated recommendations for existing WHO guidelines were also categorized by the GDG according to the typology described above. To support accurate interpretation and implementation, each recommendation is further labelled to indicate its development status, as defined below:

- **New:** A new topic, subgroup or intervention that needed to be covered. A new evidence synthesis was conducted and the GDG performed a full EtD procedure. The recommendation is new.
- **Updated:** A new evidence synthesis was conducted, and the topic and new evidence synthesis was reviewed by the GDG with a full EtD procedure. The resulting recommendation reflects the latest evidence.
- **Revalidated:** An existing WHO recommendation where there is no new, impactful evidence that warrants an update to the recommendation text. The recommendation is still valid and is thus retained unchanged.
- **Edited:** An existing WHO recommendation where there is no new, impactful evidence that warrants an update to the recommendation text; edits were introduced to clarify the text.

During the formulation of recommendations, the GDG identified important research gaps. Where the certainty of available evidence was rated as low or very low, the GDG considered whether further research should be prioritized, based on whether such research would contribute to improvements in the prevention, diagnosis and treatment of PPH, be likely to promote equity and be feasible to implement. Research gaps for specific recommendations are presented in Annex 3.

2.13 Decision-making during the GDG meetings

The GDG meetings were designed to allow participants to discuss the supporting evidence in all the domains of the EtD, and to agree on each of the recommendations drafted by the WHO Steering Group. As needed, each of these recommendations was revised through a process of group discussion. The final adoption of each recommendation was made by consensus – defined as the agreement by three quarters or more of the participants – provided that those who disagreed did not feel strongly about their position. All disagreements were resolved during the meetings and subsequent exchanges with the GDG members. No strong disagreements were recorded. If participants had been unable to reach a consensus, the disputed recommendation or any other decision would have been put to a vote in accordance with the procedures described in the *WHO handbook for guideline development (6)*. Where required, the GDG determined the context of recommendations using the same process of consensus, based on discussions around the balance of evidence on the benefits and disadvantages of the interventions across different contexts or in the context of rigorous research.

2.14 Declaration of interests by external contributors

In accordance with WHO procedures for declaration of interests (DOI), all GDG, ERG, TWG and ESG members and other external collaborators were asked to declare in writing any competing interests (whether academic, financial or other) using the standard WHO form, before engaging in the guideline development process. All experts were instructed to notify the responsible technical officer of any change in relevant interests during the process, to update and review conflicts of interest accordingly. In addition, experts were requested to submit an electronic copy of their curriculum vitae.

The names and short biographies of the GDG members were published on the WHO website for public review and comment two weeks before the first GDG meeting. The WHO Steering Group reviewed all DOI forms and curriculum vitae and determined whether a conflict of interest existed. All findings from the received DOI forms were managed in accordance with the WHO DOI guidelines on a case-by-case basis. To ensure consistency, the WHO Steering Group applied the criteria for assessing the severity of a conflict of interest in the *WHO handbook for guideline development (6)*.

No declared conflicts of interest were considered serious enough to pose any risk to the guideline development process or reduce its credibility; therefore, all experts were only required to declare such conflicts at the first GDG meeting. At each subsequent GDG meeting, members were required to verbally share any new conflict of interest with the group. Conflicts of interest that warranted action by WHO staff arose where experts had performed primary research or a systematic review related to any recommendations; in such cases, experts were restricted from participating in discussions or formulating any recommendation related to the area of their conflict of interest. A summary of DOI statements and information on how conflicts of interest were managed are included in Annex 2.

2.15 Document preparation and peer review

After the final GDG meeting, the WHO Steering Group members prepared a draft of the full guideline document to accurately reflect the deliberations and decisions of the GDG before it was sent electronically to the GDG members for further comments. The document was revised based on the feedback received from the GDG and then sent to the ERG for peer review. ERG members were asked to review the revised draft of the guidelines to identify any errors of fact, comment on the clarity of language and to raise any issues related to implementation, adaptation and contextual considerations. The WHO Steering Group carefully evaluated the input of the peer reviewers for inclusion in the final guideline document and made further revisions to the draft as needed. After the GDG meetings and external peer review, further modifications to the guidelines by the WHO Steering Group were limited to corrections of factual errors and improvements in language to address any lack of clarity. The revised final version was returned electronically to the GDG for their approval.

2.16 Presentation of guideline content

A summary list of the recommendations is presented in the executive summary of this document. For each recommendation, their justifications, if available, and corresponding remarks are presented in Section 3. Each recommendation is further labelled with the development status – new, updated, revalidated or edited – to facilitate interpretation and implementation. For integrated recommendations, references to the source document are provided in the remarks or as a footnote to the recommendation. For integrated recommendations from non-PPH guidelines, users of these guidelines are referred to the specific WHO guidelines for more details. A summary of the evidence on effects, values, resources, equity, acceptability, feasibility and other considerations reviewed at the GDG meetings can be found in the Web Annexes. The language used to present the evidence on effects is consistent with the Cochrane Effective Practice and Organization of Care approach *(31)*. Implementation of the guidelines is presented in Section 4; implementation considerations related to each recommendation can be found in the Web Annexes.

3. Recommendations and supporting evidence

These consolidated guidelines include a total of 51 recommendations for the prevention, diagnosis, treatment, supportive care and health system interventions for PPH. The recommendations are organized under 47 high-level recommendations, two of which include three distinct individual recommendations (7.1–7.3 and 9.1–9.3), bringing the total number of individually actionable recommendations to 51. This includes 20 new or updated recommendations adopted by the WHO Guideline Development Group (GDG) in 2024–2025 and 31 existing recommendations integrated from previously published WHO guidelines.

The corresponding GRADE tables for recommendations are presented separately in the Web Annexes to this document.[a] The Web Annexes also contain the EtD frameworks that narratively present the evidence for each recommendation. Summary of judgements tables are provided, indicating the final judgement corresponding to the evidence domains assessed.

This section provides the recommendations, justifications and remarks, which are grouped according to the broader context for PPH intervention in accordance with the framework for reducing mortality and morbidity due to PPH, namely: (1) antenatal interventions to prevent PPH; (2) intrapartum interventions to prevent PPH; (3) postpartum interventions to prevent PPH; (4) diagnosing PPH; (5) first-response treatment of PPH; (6) treatment of refractory PPH; (7) supportive care following PPH; and (8) health systems interventions for PPH.

3.1 Antenatal interventions to prevent postpartum haemorrhage

Preventing PPH begins well before the onset of labour. This section of the guidelines highlights four recommendations for addressing iron-deficiency anaemia, a major risk factor for PPH that should be identified and corrected early and before the time of birth to reduce the likelihood of serious consequences of excessive postpartum bleeding. While iron deficiency is a common cause of anaemia, in some settings, other causes and contributing factors such as other vitamin deficiencies, malaria or soil-transmitted helminths should also be taken into consideration and effectively addressed.

Equally important to addressing anaemia is the promotion of good clinical practices throughout pregnancy, including the early identification of risk factors (for example, placental abnormalities and inherited or acquired bleeding disorders), counselling on the prevention of obstetric complications, encouraging birth preparedness and supporting decisions to give birth in well-equipped health facilities with skilled personnel. Further guidance on providing quality ANC can be found in the *WHO recommendations on antenatal care for a positive pregnancy experience (3)*.

[a] Available at https://doi.org/10.2471/B09571

Full blood count testing for anaemia diagnosis during pregnancy

Recommendation 1

REVALIDATED

Full blood count testing is the recommended method for diagnosing anaemia in pregnancy. In settings where full blood count testing is not available, on-site haemoglobin testing with a haemoglobinometer is recommended over the use of the haemoglobin colour scale as the method for diagnosing anaemia in pregnancy. *(Context-specific recommendation)*

Remarks

- The GDG agreed that the high recurrent costs of haemoglobin 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.

The evidence base for this recommendation can be found in Web Annex A (Section 1.1).

Daily oral iron and folic acid supplementation during pregnancy

Recommendation 2

REVALIDATED

Daily oral iron and folic acid supplementation with 30 mg–60 mg of elemental iron[b] and 400 µg (0.4 mg) of folic acid[c] is recommended for pregnant women to prevent maternal anaemia, puerperal sepsis, low birth weight and preterm birth.[d] *(Recommended)*

Remarks

- This recommendation should be considered alongside Recommendation 3 on intermittent iron supplementation.
- In settings where anaemia in pregnant women is a severe public health problem (i.e. where at least 40% of pregnant women have a blood haemoglobin concentration <110 g/L), a daily dose of 60 mg of elemental iron is preferred over a lower dose.
- In the first and third trimesters, the haemoglobin threshold for diagnosing anaemia is 110 g/L; in the second trimester, the threshold is 105 g/L *(33)*.
- If a woman is diagnosed with anaemia during pregnancy, her daily elemental iron should be increased to 120 mg until her haemoglobin concentration rises to normal (110 g/L or higher) *(34, 35)*. Thereafter, she can resume the standard daily antenatal iron dose to prevent recurrence of anaemia.
- Effective communication with pregnant women about diet and healthy eating, including providing information about food sources of vitamins and minerals, and dietary diversity, is an integral part of preventing anaemia and providing quality ANC.
- Effective communication strategies are vital for improving the acceptability of, and adherence to, supplementation schemes.
- Stakeholders may need to consider ways of reminding pregnant women to take their supplements and of assisting them to manage associated side-effects.

[b] The equivalent of 60 mg of elemental iron is 300 mg of ferrous sulfate heptahydrate, 180 mg of ferrous fumarate or 500 mg of ferrous gluconate.

[c] Folic acid should be commenced as early as possible (ideally before conception) to prevent neural tube defects.

[d] This recommendation supersedes the previous WHO recommendation found in the 2012 Guideline: daily iron and folic acid supplementation in pregnant women *(32)*.

- In areas with endemic infections that may cause anaemia through blood loss, increased red cell destruction or decreased red cell production, such as malaria and hookworm, measures to prevent, diagnose and treat these infections should be implemented.
- Oral supplements are available as capsules or tablets (including soluble tablets, and dissolvable and modified-release tablets) *(36)*. Establishment of a quality assurance process is important to guarantee that supplements are manufactured, packaged and stored in a controlled and uncontaminated environment *(37)*.
- A better understanding of the etiology of anaemia (e.g. malaria endemicity, haemoglobinopathies) and the prevalence of risk factors is needed at the country level, to inform context-specific adaptations of this recommendation.
- Standardized definitions of side-effects are needed to facilitate monitoring and evaluation.
- Development and improvement of integrated surveillance systems are needed to link the assessment of anaemia and iron status at the country level to national and global surveillance systems.
- 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 iron supplementation in community settings with poor access to health care professionals.

The evidence base for this recommendation can be found in Web Annex A (Section 1.2).

Intermittent oral iron and folic acid supplementation during pregnancy

Recommendation 3

REVALIDATED

Intermittent oral iron and folic acid supplementation with 120 mg of elemental iron and 2800 µg (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 because of side-effects, and in populations with an anaemia prevalence among pregnant women of less than 20%. *(Context-specific recommendation)*

Remarks

- This recommendation should be considered alongside Recommendation 2.
- In general, anaemia prevalence of less than 20% is classified as a mild public health problem *(38)*.
- Before commencing intermittent iron supplementation, accurate measurement of maternal blood haemoglobin concentrations is needed to confirm the absence of anaemia. Therefore, this recommendation may require a strong health system to facilitate accurate haemoglobin measurement and to monitor anaemia status throughout pregnancy.
- If a woman is diagnosed with anaemia (haemoglobin <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 haemoglobin concentration rises to normal (110 g/L or higher) *(34, 35)*. Thereafter, she can continue with the standard daily antenatal iron and folic acid dose (or the intermittent regimen if daily iron is not acceptable because of 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.

The evidence base for this recommendation can be found in Web Annex A (Section 1.3).

Intravenous iron therapy for iron-deficiency anaemia in pregnancy

Recommendation 4

NEW

Intravenous iron therapy is recommended over oral iron therapy for women with iron-deficiency anaemia during pregnancy when oral iron cannot be used or is not tolerated, or there is a clinical need to correct the anaemia rapidly, provided the woman can be monitored for prompt identification of anaphylaxis. *(Context-specific recommendation)*

Justification

Intravenous iron may increase haemoglobin compared to oral iron and may also decrease the number of women with anaemia postpartum (number needed to treat = 6).

Even though intravenous iron causes fewer gastrointestinal side-effects, it carries a risk of hypersensitivity reaction and perhaps also life-threatening anaphylactic reaction. Properly trained health care workers must monitor treatment for signs of adverse reactions and be prepared and equipped to respond quickly if needed. Although anaphylaxis is a rare event, robust monitoring and surveillance systems should be in place to track safety data as the intervention is scaled up.

The treatment involves moderate costs compared to oral iron preparations and may reduce equity if not made more accessible and affordable to all women.

Remarks

- Intravenous iron should not be administered before confirmation of iron deficiency. Ferritin of less than 30 mg/mL was typically used in the studies included in the evidence base to identify women who would benefit from intravenous iron. If ferritin testing is not available, a peripheral blood smear demonstrating microcytic hypochromic anaemia typical of iron deficiency, while other causes of anaemia are reasonably excluded, can be an alternative. Alternatively, health workers may consider a treatment test where an improvement of anaemia is demonstrated after 2 weeks of oral iron treatment, if that is feasible.
- Oral iron may not be tolerated because of side-effects, and may be contraindicated or not absorbed (e.g. pre-existing condition leading to poor intestinal absorption).
- Rapid correction of anaemia may be required for women with severe anaemia close to the time of birth to avoid adverse outcomes from postpartum haemorrhage.
- Women need to be monitored during intravenous iron infusion and for at least 30 minutes after infusion for anaphylactic reactions; health systems need to have monitoring systems in place to track safety. Some intravenous preparations (e.g. iron dextran) appear to increase the risk of anaphylactic reactions more than others and should be avoided. The risk of anaphylaxis is estimated to be 9.8 per 10 000 for iron dextran, 1.5 per 10 000 for ferric gluconate, 1.2 per 10 000 for iron sucrose and 0.8 per 10 000 for ferric carboxymaltose.
- Intravenous iron preparations have been approved for treatment of iron-deficiency anaemia but not specifically for iron-deficiency anaemia in pregnancy. Therefore, treatment with intravenous iron should be confined to the second and third trimesters if the benefit is judged to outweigh the potential risk for both mother and fetus. The decision to use intravenous iron therapy should be made with the informed consent of the woman, ensuring that she fully understands the potential benefits and risks.
- Studies mostly used intravenous iron sucrose or ferric carboxymaltose. Iron sucrose was usually given as several 200-mg infusions on alternating days until the calculated iron deficit was reached. Ferric carboxymaltose was usually given as single infusion of 20 mg/kg body weight or up to a maximum of 1000 mg.
- The use of intravenous iron increases costs (related to both medication and infrastructure), and so the frequency of its use will need to be considered in the context of resources available.

The evidence base for this recommendation can be found in Web Annex A (Section 1.4).

3.2 Intrapartum interventions to prevent postpartum haemorrhage

Effective management of the first and second stages of labour can also reduce the risk of PPH and associated complications. This section outlines two key intrapartum interventions to help reduce trauma to the genital tract, which can cause or contribute to PPH.

In addition, careful monitoring of labour progression and maternal well-being during birth allows for early identification of abnormalities such as prolonged labour, which can increase the risk of uterine atony, a leading cause of PPH. Effective management of labour ensures timely interventions, avoids induction or augmentation of labour or episiotomy where not clinically indicated, and generally fosters a supportive environment for quality intrapartum care. Comprehensive guidance on intrapartum care is provided in *WHO recommendations: intrapartum care for a positive childbirth experience (4)*.

Techniques to reduce perineal trauma during second stage of labour

Recommendation 5

UPDATED

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. *(Recommended)*

Justification

Evidence suggests that perineal massage may increase the chance of keeping the perineum intact and reduces the risk of serious perineal tears, and that warm perineal compresses reduce third-degree and fourth-degree perineal tears. Most women accept these low-cost preventive perineal techniques and highly value the outcomes that they impact. Although the evidence on the effectiveness of these techniques to prevent PPH is uncertain, the GDG considered that these techniques are unlikely to cause harm and, as they reduce the incidence of perineal tears, are likely to reduce excessive bleeding. Consequently, they should be incorporated as part of a holistic approach to PPH prevention.

The evidence on the effect of a hands-on approach (guarding) on reducing perineal tears is uncertain. However, the GDG noted that this technique is unlikely to cause harm, requires minimal resources, may reduce traumatic injury and is embedded in clinical practice. In the absence of evidence of harm, the GDG determined that the existing recommendation on this technique should be maintained.

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.

Remarks

- Health workers will need to respect the preferences and choices of the woman in labour and tailor these techniques accordingly. Health workers will also need to provide clear and compassionate communication to ensure women are supported and informed about the available techniques and what they entail. Perineal techniques should be performed gently and always with the woman's consent, which ideally should be obtained before or in early labour.
- Warm compresses should be used with a temperature that is comfortable to the woman.
- Regular simulation-based training and education can enhance skills and improve outcomes for both mother and baby.

The evidence base for this recommendation can be found in Web Annex A (Section 2.1).

Routine or liberal use of episiotomy

Recommendation 6

REVALIDATED

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

Remarks

- Although the review evidence on comparative effects of episiotomy policies was presented as selective/restrictive versus routine/liberal use of episiotomy, because of 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 (although this is implied).
- 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 because midline incisions are associated with a higher risk of complex obstetric anal sphincter injury. A continuous suturing technique is preferred to interrupted suturing *(39)*.
- Episiotomies do not warrant the routine use of prophylactic antibiotics, as general infection control measures should be respected at all times *(40)*.

The evidence base for this recommendation can be found in Web Annex A (Section 2.2).

3.3 Postpartum interventions to prevent postpartum haemorrhage

The third stage of labour and immediate postpartum period is perhaps the most critical window for preventing PPH. Effective PPH prevention during this time begins with ensuring strong uterine contractions immediately after birth. Once the baby, placenta and membranes are delivered, the uterus must contract firmly to compress the maternal blood vessels at the placental site and minimize blood loss. Uterine atony, that is, the failure of the uterus to contract adequately, remains the leading cause of PPH globally and can occur in any birth setting *(41)*.

The interventions in this section focus primarily on preventing uterine atony through the timely administration of a uterotonic drug during the third stage of labour. Additional strategies related to the care of the umbilical cord and placenta are aimed at supporting physiological uterine contraction and reduce the risk of haemorrhage. This section presents recommendations on the use of uterotonics for PPH prevention, including specific agents that are recommended, those not recommended for prophylactic use but reserved for treatment when initial measures fail, appropriate dosing, routes of administration and health care provider considerations tailored to different health system contexts. These interventions are considered within the broader context of the care setting, the availability of skilled health personnel and feasibility of implementation, particularly in low-resource settings. In addition, the section provides guidance on the use of antifibrinolytics as prophylaxis for PPH at both vaginal and caesarean births.

A comprehensive approach to postpartum care not only reduces the incidence and severity of PPH, but also promotes maternal recovery and overall well-being. Immediate postpartum care should also include support for breastfeeding and routine postpartum maternal assessment. Further guidance on essential postpartum practices is available in *WHO recommendations on maternal and newborn care for a positive postnatral experience. (5)*.

Recommended uterotonics for the prevention of postpartum haemorrhage

Recommendation 7

UPDATED

The use of a quality-assured[e] uterotonic is recommended for the prevention of postpartum haemorrhage during the third stage of labour for all births. To effectively prevent postpartum haemorrhage, only **one** of the following uterotonics should be used: oxytocin, carbetocin or misoprostol, as outlined in the Recommendations 7.1–7.3:

Recommendation 7.1

UPDATED

Oxytocin (10 IU, intramuscularly/intravenously) is recommended for the prevention of postpartum haemorrhage for all births. *(Recommended)*

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 side-effects commonly associated with uterotonics, including nausea, vomiting, abdominal pain, headache, hypertension, shivering, fever and 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. The currently available injectable form is feasible to implement in most settings, and is probably acceptable to health personnel as it is given routinely to women after birth for PPH prevention.

Remarks

- This recommendation applies to women giving birth vaginally or via caesarean section. Skilled health personnel who are trained to administer injectable uterotonics are required.
- 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.
- To maximize efficacy, oxytocin is best given immediately (preferably within 1 minute) after the birth of the baby or babies. Administration for prevention of PPH need not impede the delaying of cord clamping.
- 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 bolus and an infusion. A rapid intravenous bolus injection must be avoided. The GDG considered the identification of the optimal regimen of intravenous oxytocin at caesarean section to be an important research priority.

[e] Quality-assured medicines are pharmaceutical products that are manufactured in compliance with Good Manufacturing Practices, have been authorized for use by a stringent regulatory authority or prequalified by the WHO Prequalification Programme, and are subject to ongoing quality control and monitoring to ensure their safety, efficacy and consistency.

- 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 intravenous 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 intravenous 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). In settings where this cannot be guaranteed, the quality and effectiveness of oxytocin may be adversely affected. In these situations, an effective heat-stable uterotonic should be considered as recommended in Recommendation 11.

The evidence base for this recommendation can be found in Web Annex A (Section 3.1).

Recommendation 7.2

UPDATED

Carbetocin (100 µg, intramuscularly/intravenously) is recommended for the prevention of postpartum haemorrhage for all births; the heat-stable carbetocin formulation is recommended in settings where cold chain cannot be guaranteed. *(Recommended)*

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. Given the substantial beneficial effects and minimal side-effects, carbetocin would probably be cost-effective in settings where the cost of managing PPH and its complications is substantial. However, its impact on equity would vary across settings as the current unit cost is high. Carbetocin in the current injectable form is acceptable and feasible to implement because its heat-stable formulation does not require cold-chain transport or refrigerated storage.

Remarks

- This recommendation applies to women giving birth vaginally or via caesarean section. Skilled health personnel who are trained to administer injectable uterotonics are required.
- 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.
- By "where cold chain cannot be guaranteed", the GDG refers to settings in which continuous refrigeration (typically 2–8 °C) during storage, transport and handling of temperature-sensitive medicines cannot be consistently maintained because of infrastructure limitations, unreliable electricity supply or lack of temperature-monitoring systems. Many low- and middle-income countries, particularly in rural or remote areas, fall into this category.
- To maximize efficacy, carbetocin is best given immediately (preferably within 1 minute) after the birth of the baby or babies. Administration for the prevention of PPH need not impede the delaying of cord clamping.
- 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-heat-stable formulation only in its excipients and not in the active pharmaceutical ingredients. Heat-stable carbetocin does not require refrigeration and therefore eliminates the costs associated with refrigerated storage and transport for non-heat-stable uterotonics.

- The evidence underpinning this recommendation included both heat-stable and non-heat-stable formulations of carbetocin because the active pharmaceutical ingredients in these formulations are the same. Therefore, the recommendation applies to both formulations. In settings where reliable cold-chain storage and transport can be consistently maintained, the heat-stable formulation may not offer additional advantages and is not specifically required.
- Previous trials of carbetocin have used both intramuscular and intravenous administration. A WHO multi-country trial of nearly 30 000 women used a regimen of 100 µg intramuscular 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.

The evidence base for this recommendation can be found in Web Annex A (Section 3.2).

Recommendation 7.3

UPDATED

Misoprostol (either 400 µg or 600 µg, orally) is recommended for the prevention of postpartum haemorrhage for all births. *(Recommended)*

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. However, in the same context, 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 because these side-effects are often self-limiting. Because 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 because 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 need more information on its effectiveness and implementation.

Remarks

- The GDG noted that evidence on the efficacy of misoprostol was largely derived from trials involving women giving birth vaginally. However, misoprostol has been used for women giving birth via 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 advised that all women are to be provided with information – ideally during antenatal care – on the need for an effective uterotonic to prevent PPH.
- 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.
- To maximize efficacy, misoprostol is best given immediately (preferably within 1 minute) after the birth of the baby or babies. Administration for the prevention of PPH need not impede the delaying of cord clamping.
- 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 a woman'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.

The evidence base for this recommendation can be found in Web Annex A (Section 3.3).

Route of oxytocin administration for prevention of postpartum haemorrhage

Recommendation 8

EDITED

In situations where women giving birth vaginally already have intravenous access, the intravenous administration of 10 IU oxytocin – diluted and administered slowly over 1 to 2 minutes – is recommended in preference to intramuscular administration. *(Context-specific recommendation)*

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 PPH, severe PPH, 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 PPH 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.

Remarks

- The GDG acknowledged that either intravenous or intramuscular oxytocin is effective in preventing PPH 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 GDG 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 GDG 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 has an impact on resource use *(42)*. The GDG emphasized that intravenous access should not be placed routinely for the sole purpose of administering intravenous oxytocin for PPH prevention.
- The GDG noted that the previous trials considered for this question have all administered an oxytocin dose of 10 IU intravenously for PPH 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 *(43, 44)*. However, observational studies in women undergoing caesarean section suggest that rapid intravenous results in harmful haemodynamic effects *(44, 45)*. Therefore, the GDG suggests avoiding a rapid injection, and agreed that the 10-IU oxytocin dose should preferably be diluted and administered slowly (over 1–2 minutes).

- 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 PPH prevention without preference for intravenous or intramuscular route *(10)*.
- This recommendation does not relate to the use of oxytocin for other obstetric indications (such as labour induction).

The evidence base for this recommendation can be found in Web Annex A (Section 3.4).

Uterotonics that are not recommended for the prevention of postpartum haemorrhage

Recommendation 9

UPDATED

Uterotonic options that are not recommended for the prevention of postpartum haemorrhage include ergometrine/methylergometrine, fixed-dose combination of oxytocin and ergometrine, and injectable prostaglandins, as outlined in the specific recommendations below:

Recommendation 9.1

UPDATED

Ergometrine/methylergometrine is not recommended for the prevention of postpartum haemorrhage. *(Not recommended)*

Justification

When used for PPH prevention, it is uncertain whether ergometrine/methylergometrine reduces the risk of PPH ≥500 mL or PPH ≥1000 mL, though it may slightly reduce mean blood loss when compared with placebo or no uterotonic. However, it is also associated with several side-effects, including nausea, vomiting, hypertension, headache and abdominal pain. There is no evidence of uncertainty regarding how much women value the health outcomes associated with its use. While ergometrine/methylergometrine in the injectable form is widely available 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 (43 per 1000 births) associated with ergometrine/methylergometrine use, and the potential harm to women with underlying cardiovascular disorders. Based on the balance between effectiveness and side-effect profiles, the GDG determined that the use of ergometrine/methylergometrine is not recommended to prevent PPH. The group also highlighted the importance of expanding access to safer and more effective uterotonics – oxytocin, carbetocin (heat-stable or non-heat-stable) and misoprostol – as preferable alternatives for PPH prevention.

Remarks

- Ergometrine/methylergometrine was previously included in the 2018 WHO recommendations on uterotonics as a context-specific option for PPH prevention, with the condition that it is used only when hypertensive disorders could be safely excluded. Upon review of updated evidence, the GDG noted that it offers limited clinical benefit and remains associated with a high risk of adverse effects, particularly hypertension. In view of these safety concerns, the GDG concluded that ergometrine/methylergometrine is not recommended for the prevention of PPH in current practice, in favour of uterotonics with a more favourable balance of effectiveness and safety.
- Effective prophylactic uterotonics with better safety profiles and less risk of concerning adverse effects – oxytocin, carbetocin (heat-stable or non-heat-stable formulations) and misoprostol – are available and should be prioritized for procurement by health systems for the prevention of PPH. The GDG emphasized that the prophylactic use of ergometrine cannot be justified, given the absence of clear added benefit over safer alternatives. Countries are encouraged to update national guidelines, essential medicines lists, formularies and procurement lists to reflect this recommendation, while recognizing that ergometrine may still be procured in limited quantities for treatment purposes, in line with WHO recommendations for the treatment of PPH.

- This recommendation applies to women undergoing a vaginal birth or caesarean section.
- The GDG acknowledged that ergometrine and methylergometrine injections (200–500 µg, intramuscularly/intravenously) continue to be widely used in some countries for the prevention of PPH, largely because of historical practice patterns and routine procurement systems. However, the current evidence does not support their continued use for this indication.
- Ergometrine/methylergometrine is associated with a range of undesirable side-effects – most notably hypertension – which may pose significant risks, particularly for women with undiagnosed or pre-existing cardiovascular conditions.
- This recommendation applies only to the use of ergometrine/methylergometrine for prevention of PPH; it does not relate to its use in the treatment of PPH, where it may still be considered as part of second-line management (see Recommendation 25).

The evidence base for this recommendation can be found in Web Annex A (Section 3.5).

Recommendation 9.2

UPDATED

Fixed-dose combination of oxytocin and ergometrine (5 IU/500 µg, intramuscularly) is not recommended for the prevention of postpartum haemorrhage. *(Not recommended)*

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; 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, especially for women with pre-existing hypertensive disorders. The group agreed that the potential benefits of this combination may outweigh the harms if hypertensive disorders can be safely excluded but acknowledged that such capacity does not exist in many settings. 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 health workers given that the individual components are widely used, but perhaps less so to women because of the nausea and vomiting. However, its feasibility may be restricted in settings with limited capacity for storage of heat-sensitive uterotonics, where it is not readily available, and it may reduce health equity where screening or care for hypertensive disorders in pregnancy is not possible.

As the fixed-dose combination includes even a larger dose of ergometrine than when ergometrine is used alone in routine practice, the GDG placed its emphasis on the danger of the increased risk of hypertension associated with the ergometrine component of the combination, especially in populations where capacity to exclude cardiovascular disorders before use is limited or non-existent, and therefore determined that the use of fixed-dose combination of oxytocin and ergometrine (5 IU/500 µg, intramuscularly) is not recommended for PPH prevention.

Remarks

- The fixed-dose combination of oxytocin and ergometrine (5 IU/500 µg, intramuscularly) (e.g. Syntometrine®) was previously included as a context-specific option in the 2018 WHO recommendations on uterotonics for the prevention of PPH, with the condition that hypertensive disorders could be safely excluded before use. However, in revisiting the evidence, the GDG decided to revise this recommendation by placing greater emphasis on the safety profile of uterotonics used for prophylaxis. The combination product contains a relatively high dose of ergometrine, which is now not recommended for routine use because of its association with adverse effects – particularly hypertension – and the availability of safer and comparably effective alternatives. In light of these concerns, and to ensure consistency across uterotonic guidance, the GDG recommended against the use of this fixed-dose combination for PPH prevention.

- Effective prophylactic uterotonics with better safety profiles and lower risk of serious adverse effects – such as oxytocin, carbetocin (heat-stable or non-heat-stable formulations) and misoprostol – are available and should be prioritized for procurement by health systems for the prevention of PPH. The GDG emphasized that the routine use of fixed-dose combination of oxytocin and ergometrine cannot be justified in light of its side-effect profile and the availability of safer alternatives. Countries are encouraged to update national guidelines, essential medicines lists, formularies and procurement lists accordingly, while recognizing that limited quantities of this combination may still be procured for treatment purposes, where clinically appropriate and aligned with WHO recommendations for the treatment of PPH.
- This recommendation applies to women giving birth vaginally or via caesarean section. The GDG highlighted that there is an added anaesthetic and surgical risk from nausea and vomiting for women having a caesarean birth, especially if under general anaesthesia, which further supports the recommendation against the prophylactic use of the fixed-dose combination.
- Most trials that evaluated the efficacy of this fixed-dose combination have used the synthetic, fixed-dose combination of oxytocin and ergometrine (5 IU/500 µg, intramuscularly), which informed the dose specified in this recommendation.
- This recommendation applies only to the use of fixed-dose combination of oxytocin and ergometrine for the prevention of PPH; it does not relate to its use in the treatment of PPH, where it may still be considered as part of second-line management (see Recommendation 25).

The evidence base for this recommendation can be found in Web Annex A (Section 3.6).

Recommendation 9.3

UPDATED

Injectable prostaglandins (carboprost or sulprostone) are not recommended for the prevention of postpartum haemorrhage. *(Not recommended)*

Justification

When used for PPH prevention, injectable prostaglandins (carboprost and sulprostone) are not beneficial for substantive priority outcomes (PPH ≥500 mL, severe PPH ≥1000 mL, and blood transfusion) except the use of additional uterotonics, for which they show a 69% risk reduction compared with placebo or no uterotonic. However, they are associated with increased risk of vomiting and diarrhoea. Injectable prostaglandins are currently not available in all settings; 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.

Remarks

- Trials of systemic injectable prostaglandins for the prevention of PPH have used carboprost or sulprostone.
- Local administration of injectable prostaglandins, such as intrauterine injections during caesarean section, was not considered.
- This recommendation applies only to the use of injectable prostaglandins for the prevention of PPH; it does not relate to its use in the treatment of PPH, where it may still be considered as part of second-line management (see Recommendation 25).

The evidence base for this recommendation can be found in Web Annex A (Section 3.7).

Choice of uterotonics for the prevention of postpartum haemorrhage

Recommendation 10

UPDATED

In settings where multiple uterotonic options are available, oxytocin (10 IU, intramuscularly/intravenously) is the recommended uterotonic agent of choice for the prevention of postpartum haemorrhage for all births. *(Recommended)*

Justification

When used for PPH prevention, oxytocin, carbetocin, misoprostol and the 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, although it is likely to be superior to oxytocin in reducing the need for additional uterotonics for PPH treatment (32 fewer per 1000 women). 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, especially in contexts where the subsidized supply cost of carbetocin is comparable to that of oxytocin, the non-subsidized supply cost is approximately 19 times more than oxytocin. It is uncertain whether the additional benefits justify the additional cost of routinely implementing carbetocin in settings where its cost is not comparable to that of other uterotonics.

Misoprostol has similar desirable effects to oxytocin, but it is less effective for reducing severe PPH (≥1000 mL) (11 more per 1000 women). Misoprostol causes more undesirable effects than oxytocin (including nausea, vomiting, 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 and community health workers because 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 (73 more per 1000 women), vomiting (25 more per 1000), headache (41 more per 1000), hypertension (442 more per 1000) and diarrhoea (5 more per 1000) with ergometrine/methylergometrine. The costs associated with managing these undesirable effects, as well as the need to screen for hypertension, 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 preventing severe PPH (≥1000 mL), although it is more effective in preventing PPH (≥ 500 mL) (28 fewer per 1000) and possibly superior to oxytocin in reducing blood transfusion (6 fewer per 1000) and the use of additional uterotonics (40 fewer per 1000). However, it has more undesirable effects than oxytocin, including nausea (49 more per 1000 women) and vomiting (43 more per 1000). The costs related to managing associated undesirable effects, and the need to screen for women with hypertensive disorders because of concern regarding the ergometrine component, imply that oxytocin is probably more cost-effective. Compared with oxytocin alone, the fixed-dose combination of oxytocin and ergometrine may have a negative impact on health equity, particularly in settings with limited capacity and capability to routinely screen for hypertensive disorders of pregnancy.

The combination of oxytocin and misoprostol is probably superior to oxytocin alone in terms of blood transfusion (13 fewer per 1000), need for additional uterotonics for PPH treatment (55 fewer per 1000) and blood loss (60 mL less on average). The combination may possibly prevent more PPH (≥500 mL) (35 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 (56 more per 1000), vomiting (25 more per 1000), diarrhoea (2 more per 1000) and fever (68 more per 1000). Consequently, the cost–effectiveness of the combination may vary in different settings – costs may be reduced due to improved desirable outcomes, but costs may increase for the management of undesirable effects. The feasibility of the oxytocin plus misoprostol combination is limited because of the complexity of using two separate medications through different routes of administration.

Oxytocin is the most extensively studied uterotonic and demonstrates a strong overall balance of efficacy, safety, feasibility, acceptability and cost–effectiveness across diverse settings. While alternatives like carbetocin and misoprostol have some benefits in specific contexts, they also present trade-offs related to cost (carbetocin), side-effects or lower efficacy (misoprostol). Uterotonics containing ergometrine or combinations involving oxytocin and misoprostol or ergometrine present higher risks of adverse effects and implementation challenges. Based on these trade-offs, the GDG identified oxytocin as the preferred uterotonic when multiple options are available.

Remarks

- This recommendation applies to women giving birth vaginally or via caesarean section. Skilled health personnel who are trained to administer injectable uterotonics are required.
- All remarks for Recommendation 7.1 apply to this recommendation.
- While the GDG acknowledged that there is evidence that fixed-dose combination of oxytocin and ergometrine and combination of oxytocin and misoprostol may be more effective than oxytocin alone for some priority outcomes, there are concerns that these combinations also increase important side-effects for women. The fixed-dose combination of oxytocin and ergometrine is not widely available and there is no fixed-dose combination of oxytocin and misoprostol, so the two agents have to be administered through separate routes (parenteral and oral). Hence, the GDG considered the applications of these combinations less feasible when used routinely in clinical settings compared with using oxytocin or misoprostol alone as a single agent. This is consistent with the GDG position not to recommend the prophylactic use of fixed-dose combination of oxytocin and ergometrine because of concerns about safety. However, if the health worker and the woman regard the additional benefits of a combination of oxytocin and misoprostol (over either of these agents alone) as important in improving overall maternal outcomes, the use of this combination could be considered.

The evidence base for this recommendation can be found in Web Annex A (Section 3.8).

Recommendation 11

UPDATED

Heat-stable carbetocin (100 µg, intramuscularly/intravenously) is the recommended choice for the prevention of postpartum haemorrhage in settings where the oxytocin cold chain cannot be consistently maintained. If heat-stable carbetocin is not available, misoprostol (400 µg or 600 µg, orally) can be used as an alternative. *(Context-specific recommendation)*

Justification

Both carbetocin and misoprostol are effective uterotonics for the prevention of PPH, offering substantial reductions in blood loss, severe PPH, blood transfusion and the need for additional uterotonics when compared with placebo or no uterotonic.

Carbetocin is associated with minimal side-effects and has a favourable balance of benefits and harms compared with oxytocin. Its heat-stable formulation does not require cold-chain transport or refrigeration, making it well suited for settings where maintaining the cold chain for oxytocin is not feasible. While its unit cost may limit its accessibility in some settings, it is likely to be cost-effective in contexts where the cost is comparable to that of oxytocin, where the cost associated with managing PPH and its complications is high or where the quality of oxytocin available for use is substandard. Its acceptability and feasibility are high in facilities with adequate capacity to deliver injectable uterotonics, similar to oxytocin. Misoprostol, while also effective for PPH prevention, is associated with increased risks of side-effects, such as shivering, fever and diarrhoea. However, these are typically self-limiting.

Misoprostol is inexpensive, does not require refrigeration and can be administered orally, making it particularly feasible for use in low-resource settings, including by lay health workers at the community level because it requires minimal training and no additional supplies for implementation. It is likely to be cost-effective and likely to increase equity, especially where skilled health personnel are limited and access to oxytocin or heat-stable carbetocin is not assured. However, its use may be constrained in settings where concerns about misuse persist.

Taking these factors into account, the GDG recommended heat-stable carbetocin as the first-line choice in settings where the oxytocin cold-chain requirements cannot be consistently met, and misoprostol as an appropriate alternative where heat-stable carbetocin is not available.

Remarks

- This recommendation applies to women giving birth vaginally or via caesarean section. Heat-stable carbetocin must be administered by skilled health personnel trained in the use of injectable uterotonics, while misoprostol can be administered by skilled, community or lay health workers.
- In the 2018 WHO recommendations on uterotonics for the prevention of PPH, additional injectable uterotonic options – ergometrine/methylergometrine and the fixed-dose combination of oxytocin and ergometrine – were included for use in settings where oxytocin is unavailable (or its quality cannot be guaranteed). In this updated recommendation, the GDG placed greater emphasis on the safety profile of uterotonics and the availability of safer and comparably or more effective alternatives. Consequently, these previously recommended options are no longer included; only heat-stable carbetocin or misoprostol is now recommended in settings where the oxytocin cold chain cannot be reliably maintained.
- "Where oxytocin cold chain cannot be consistently maintained" refers to settings where continuous refrigeration (typically 2–8 °C) during storage, transport and handling of oxytocin cannot be reliably ensured because of infrastructure limitations, unstable electricity supply or lack of temperature-monitoring systems. Many low- and middle-income countries, particularly their rural and remote areas, fall into this category.
- Both heat-stable carbetocin and misoprostol are most effective when administered immediately after the birth of the baby or babies, preferably within 1 minute. Administration for PPH prevention does not preclude delayed cord clamping.
- This recommendation applies only to the use of heat-stable carbetocin for the prevention of PPH. The heat-stable and non-heat-stable formulations of carbetocin are not currently recommended for other obstetric indications (such as labour induction, labour augmentation or treatment of PPH).
- The heat-stable formulation differs from the non-heat-stable formulation only in its excipients[a], and not the active pharmaceutical ingredients *(46)*. It does not require refrigeration; therefore, it eliminates the costs and logistic constraints associated with cold-chain storage and transport for non-heat-stable uterotonics.
- Clinical trials of carbetocin have used both intramuscular and intravenous routes of administration, including a WHO multi-country trial of nearly 30 000 women that used a regimen of 100 µg intramuscular heat-stable carbetocin in a range of high-, middle- and low-income settings. Thus, the available evidence supports the recommendation of either intramuscular or intravenous route of administration for heat-stable carbetocin, depending on the clinical setting and available expertise.

[a] An *excipient* is an inactive substance that serves as the vehicle or medium for the active ingredients.

- Although existing trials of carbetocin have been conducted exclusively in hospital settings, the GDG agreed that there are no biological or pharmacological reasons to expect different effectiveness in community settings, provided carbetocin is administered under conditions similar to other injectable uterotonics.

The evidence base for this recommendation can be found in Web Annex A (Section 3.9).

Community and lay health workers administration of misoprostol for the prevention of postpartum haemorrhage

Recommendation 12

UPDATED

The administration of misoprostol (400 µg or 600 µg, orally) by community health workers and lay health workers[a] is recommended for the prevention of postpartum haemorrhage in settings where skilled health personnel are not present to administer injectable uterotonics. *(Context-specific recommendation)*

Justification

Misoprostol is effective in reducing the risk of PPH (≥500 mL), severe PPH (≥1000 mL), blood transfusion and the need for additional uterotonics when compared with placebo or no uterotonic. In the context of community-level births where skilled health personnel are not available to administer injectable uterotonics, no uterotonic prophylaxis is often the default alternative. While misoprostol increases the risk of side-effects such as shivering, fever and diarrhoea, these are typically self-limiting and often do not require clinical intervention. Given its oral route of administration, stability at room temperature and low cost, misoprostol is particularly suitable for use in settings where injectable uterotonics cannot be administered because of the absence of skilled health personnel. Evidence supports its safe and effective use by trained community health workers and lay health workers. This task-sharing approach is likely to improve coverage and equity of PPH prevention interventions in remote or resource-limited areas. Although concerns about misuse or need for additional provider training may affect acceptability in some contexts, these can be addressed through appropriate training, supervision and community engagement.

Remarks

- The remarks for Recommendation 7.3 apply to this recommendation.
- Skilled health personnel who provide care during childbirth are defined by the 2018 joint statement by WHO, the United Nations Population Fund, the United Nations Children's Fund (UNICEF), the ICM, the International Council of Nurses (ICN), 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 *(47)*.
- 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.
- Community and lay health workers should receive appropriate training and supervision to safely administer misoprostol for PPH prevention, including education on correct dosing, timing, potential side-effects and referral procedures in the event of complications.

[a] *Community and lay health workers* are individuals who provide basic health services within their communities but do not have formal professional or paraprofessional certification. They may be volunteers or salaried workers trained to perform specific health-related tasks, such as administering oral misoprostol for PPH prevention, under supervision and in line with national policies and protocols. Their role is often critical in settings with limited access to skilled health personnel.

- The availability of misoprostol at the community level should be supported by consistent supply chain management and integration into national essential medicines lists and procurement plans.
- Engagement with women, families and community leaders is important to promote awareness, acceptability and trust in community-based PPH prevention efforts involving misoprostol.
- Where feasible, implementation of misoprostol by lay health workers should be accompanied by mechanisms for monitoring and evaluation to assess safety, coverage and effectiveness.

The evidence base for this recommendation can be found in Web Annex A (Section 3.10).

Self-administration of misoprostol for the prevention of postpartum haemorrhage

Recommendation 13

REVALIDATED

In settings where women give birth outside 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 the prevention of postpartum haemorrhage, only with targeted monitoring and evaluation. *(Context-specific recommendation)*

Justification

There is insufficient trial evidence to assess the benefits and possible harms of advance misoprostol distribution for PPH prevention. However, misoprostol is an effective uterotonic agent for PPH prevention and is recommended by WHO in settings where oxytocin is unavailable, its cold chain cannot be consistently maintained 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 PPH prevention in remote and hard-to-reach areas where no skilled health personnel can attend birth, with very few reports of incorrect use of misoprostol or adverse events. As this strategy is specifically aimed at preventing PPH 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.

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 health facilities and where it is highly likely that skilled health personnel will not be present at the time of birth.
- While acknowledging that there is currently no clear evidence of harm with a strategy of antenatal misoprostol distribution, the GDG agreed that to address potential safety concerns, such programmes should only be implemented with appropriate monitoring and evaluation. These 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 the use of health services and health outcomes – this should include (but is not limited to) the rate of ANC 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 ANC 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 µg for oral administration) and timing of use, possible side-effects and remedies for these, 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 use should be considered a priority.

The evidence base for this recommendation can be found in Web Annex A (Section 3.11).

Antifibrinolytics for the prevention of postpartum haemorrhage

Recommendation 14

NEW

Tranexamic acid is not recommended for the prevention of postpartum haemorrhage at vaginal birth.
(Not recommended)

Justification

When used for PPH prevention at vaginal birth, tranexamic acid (TXA) demonstrated no clinical benefits over and above standard prophylactic measures in terms of PPH reduction compared to no TXA.

While there is no clear evidence of increased risk of maternal or newborn harms, or serious life-threatening adverse events with TXA, the GDG agreed that a modest increase in potentially fatal and non-fatal thromboembolic events with the use of TXA cannot be confidently ruled out, and that this risk outweighs the theoretical benefit of TXA for reducing postpartum blood loss at childbirth when the baseline risk of thromboembolism is increased.

Evidence suggests that there may be important variability in, or uncertainty about, the degree to which women value the health outcomes that could be impacted by TXA.

Although resource requirements would vary according to setting, routine application of TXA for all vaginal births is likely to be associated with a moderate increase in health system costs (i.e. human resources and procurement of quality-assured TXA). The cost–effectiveness of TXA for PPH prevention at vaginal birth is uncertain because of invalid and non-generalizable assumptions applied in available health economic evaluation evidence. However, the GDG considered TXA for PPH prevention unlikely to be cost-effective given the lack of clinical benefits for priority outcomes.

TXA is not yet widely available for the recommended PPH treatment indication. Consequently, the GDG noted that the additional health system costs implied by introducing TXA as an additional prophylactic measure for the entire obstetric population could further limit access for disadvantaged women (who may be more likely to need TXA for PPH treatment); thus, using TXA for PPH prevention would probably reduce equity.

Despite evidence suggesting that introduction of TXA for PPH prevention may be acceptable and feasible, the GDG placed its emphasis on the small yet important risk of serious adverse events of TXA when routinely applied at the population level, against the background of a lack on compelling evidence of superior clinical benefits for priority woman-centred outcomes over and above existing PPH prevention strategies, and therefore recommended against the use of TXA for the purpose of preventing PPH during vaginal birth.

Remarks

- The GDG recognizes that this recommendation applies at the population level to all vaginal births and depends on the capacity to accurately assess blood loss and diagnose PPH. Future research may identify specific subpopulations that may benefit from prophylactic use of TXA before the onset of significant bleeding.
- TXA remains recommended for treatment of PPH (Recommendation 27) and as part of the treatment bundle (Recommendation 29), where the balance of benefits and potential risks is well established and clearly favours its use.
- TXA is an antifibrinolytic – not a uterotonic – and should never be used as a substitute for first-line prophylactic uterotonics (oxytocin, carbetocin or misoprostol) when preventing PPH at vaginal birth. Its mechanism does not promote uterine contraction and, as shown by the evidence, it provides no added preventive benefit.

The evidence base for this recommendation can be found in Web Annex A (Section 3.12).

Recommendation 15

NEW

Tranexamic acid is not recommended for the prevention of postpartum haemorrhage at caesarean birth. *(Not recommended)*

Justification

In the context of caesarean birth, the use of TXA for PPH prevention does not confer any additional benefit in reducing postpartum blood loss compared to standard prophylactic measures.

Although no clear increase in maternal or newborn life-threatening adverse events was observed, the GDG noted that a small but clinically important increase in thromboembolic risk associated with TXA use cannot be ruled out, which is particularly relevant during caesarean birth when baseline thrombotic risk is elevated.

The degree to which women value the potential outcomes associated with TXA use remains uncertain and may vary across populations.

Introducing TXA as a routine preventive measure for all caesarean births would likely entail moderate increases in health system costs, including procurement and training needs. The cost–effectiveness of this intervention remains unclear because existing economic evaluations are limited in quality and generalizability. Therefore, the GDG judged TXA to be an unlikely cost-effective option for this indication, given the lack of measurable benefit in key maternal outcomes.

Moreover, TXA is not yet broadly available for its role in PPH treatment. Scaling up its use for prevention across all caesarean births could place additional pressure on supply chains and divert access from women who may benefit most from PPH treatment, potentially worsening equity.

While the use of TXA for caesarean section may be technically feasible and acceptable in many health systems, the GDG placed its emphasis on the potential for rare but serious adverse events, and the lack of meaningful clinical benefit over current prevention strategies, in making this recommendation against TXA use for prophylaxis at caesarean birth.

Remarks

- The GDG recognizes that this recommendation applies at the population level to all caesarean births and depends on the capacity to accurately assess blood loss and diagnose PPH. Future research may identify specific subpopulations that may benefit from prophylactic use of TXA before the onset of significant bleeding.
- For caesarean sections, PPH prophylaxis typically means administering TXA before the incision (pre-incision). However, some studies administered TXA after cord clamping to avoid fetal exposure, which could address some bleeding, aligning more with treatment than true prophylaxis.

- Clinical judgement should be used because individual woman needs and circumstances can vary. For certain high-risk women, benefits may outweigh the harms, and clinicians could consider using TXA to control bleeding even before the diagnostic criteria of PPH are met.
- Further, the GDG noted the increasing frequency of published reports on fatal and non-fatal medication errors regarding intrathecal administration of TXA. These reports seem to be concentrated in certain contexts where procured TXA is manufactured in ampoules that appear similar to bupivacaine ampoules. Consequently, care should be taken to ensure that TXA and bupivacaine are stored separately in the operating theatre. Additionally, TXA manufacturers are encouraged to improve product labelling and packaging to ensure they are easily distinguishable from bupivacaine *(48)*.
- TXA remains recommended for treatment of PPH (Recommendation 27) and as part of the treatment bundle (Recommendation 29).
- TXA is not a uterotonic and should not be used as a substitute for uterotonics recommended for PPH prevention during caesarean birth (such as oxytocin).
- Where TXA is currently included in national guidelines or facility protocols for prophylaxis at caesarean birth, these policies should be reviewed in light of this recommendation. National programmes are encouraged to ensure that TXA is reserved for evidence-based indications to support safe, effective and equitable PPH care.

The evidence base for this recommendation can be found in Web Annex A (Section 3.13).

Controlled cord traction for the prevention of postpartum haemorrhage

Recommendation 16

REVALIDATED

In settings where skilled birth attendants are available, controlled cord traction is recommended for vaginal births if the health care provider and the woman consider a small reduction in blood loss and a small reduction in the duration of the third stage of labour as important. *(Context-specific recommendation)*

Remarks

- This recommendation is based on a large randomized controlled trial in which oxytocin 10 IU was used for the prevention of PPH in all participants. Based on this evidence, controlled cord traction (CCT) was regarded as safe when applied by skilled birth attendants because it provides small beneficial effects on blood loss (average reduction of 11 mL on blood loss) and on the duration of the third stage of labour (average reduction of 6 minutes). The decision to implement CCT in the context of a prophylactic uterotonic drug should be discussed by the care provider and the woman herself before or early in labour.
- CCT should only be performed by skilled birth attendants who are trained in its correct technique. Incorrect use of CCT can increase the risk of uterine inversion or retained placenta.
- This recommendation does not apply in settings where skilled health personnel are not available or not trained to perform CCT safely.
- There is insufficient evidence to determine the benefit or risk of CCT when used in conjunction with misoprostol.
- CCT is the first intervention to treat the retained placenta; therefore, the teaching of CCT in medical and midwifery curricula is essential.
- The benefits of CCT may be more relevant in high-volume facilities where even small time savings in third-stage management may contribute to workflow efficiency.

The evidence base for this recommendation can be found in Web Annex A (Section 3.14).

Recommendation 17

REVALIDATED

In settings where skilled birth attendants are unavailable, controlled cord traction is not recommended. *(Not recommended)*

Remarks

- This recommendation is based on a large randomized controlled trial in which oxytocin 10 IU was used for the prevention of PPH in all participants. Based on this evidence, CCT was regarded as safe when applied by skilled birth attendants because it provides small beneficial effects on blood loss (average reduction of 11 mL on blood loss) and on the duration of the third stage of labour (average reduction of 6 minutes). The decision to implement CCT in the context of a prophylactic uterotonic drug should be discussed by the care provider and the woman herself before or early in labour.
- CCT should only be performed by personnel trained in its correct and safe use. When improperly performed, CCT carries a risk of complications, such as uterine inversion or retained placenta.
- In the absence of skilled birth attendants, expectant management of the third stage of labour is preferred, along with administration of a prophylactic uterotonic.
- There is insufficient evidence to determine the benefit or risk of CCT when used in conjunction with misoprostol.
- CCT is the first intervention to treat the retained placenta; therefore, the teaching of CCT in medical and midwifery curricula is essential.
- Based on the most recent evidence, the understanding of 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 an 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 base for this recommendation can be found in Web Annex A (Section 3.15).

Removal of the placenta at caesarean section

Recommendation 18

REVALIDATED

Cord traction is the recommended method for the removal of the placenta at caesarean section. *(Recommended)*

Remarks

- Cord traction at caesarean section refers to the gentle and steady pulling on the umbilical cord to assist removal of the placenta and membranes, after uterine incision and delivery of the baby.
- Cord traction in this context is preferred over manual removal of the placenta because it is associated with a lower risk of postoperative infection, particularly endometritis.
- Manual removal of the placenta may be necessary if the placenta does not separate spontaneously within a reasonable time or if cord traction is ineffective or unsafe.
- Cord traction should be performed under direct visualization of the uterine cavity and with concurrent uterotonic administration to promote uterine contraction and minimize blood loss.
- Proper training in technique and infection prevention, and readiness to manage complications (e.g. retained placenta or uterine atony), is essential for safe implementation.

The evidence base for this recommendation can be found in Web Annex A (Section 3.16).

Timing of cord clamping

Recommendation 19

REVALIDATED

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

Remarks

- The evidence base for recommendation for the timing of cord clamping includes both vaginal and caesarean births. The GDG considers this recommendation to be equally important for caesarean sections.
- Delayed cord clamping (for 1–3 minutes) should be performed during the provision of essential newborn care. For essential newborn care and resuscitation, please refer to the WHO *Guidelines on neonatal resuscitation (49)*.
- The recommendations for the timing of cord clamping apply equally to preterm and term births. The GDG considers the benefits of delayed clamping for infants born preterm to be particularly important *(50)*.
- Some health 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 births (intrapartum transmission); and during breastfeeding (postnatal infection). For this reason, the main intervention to reduce mother-to-child transmission is the reduction of maternal viral load through the use of antiretroviral drugs during pregnancy, childbirth and the 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 birth. 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 understanding of the contribution of each component of the active management of the third stage of labour package has evolved in light of established evidence. The GDG reaffirmed that the primary intervention within this package is the use of a uterotonic. When oxytocin is administered, controlled cord traction may offer a small additional benefit, while uterine massage appears to offer no added value in preventing PPH. Early cord clamping remains generally contraindicated.

The evidence base for this recommendation can be found in Web Annex A (Section 3.17).

Sustained uterine massage for the prevention of postpartum haemorrhage

Recommendation 20

REVALIDATED

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

Remarks

- Sustained uterine massage refers to the continuous, repetitive manual stimulation of the uterine fundus after birth to encourage uterine contraction.
- 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 (e.g. carbetocin or misoprostol). In such cases, close and ongoing monitoring of uterine tone and the woman's overall clinical status is essential, and any decision to perform uterine massage should be guided by clinical judgement rather than applied routinely.
- 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.
- Intermittent uterine tone assessment (e.g. periodic palpation) remains important as part of routine postpartum monitoring to detect uterine atony and guide further action if needed (see Recommendation 23).

The evidence base for this recommendation can be found in Web Annex A (Section 3.18).

3.4 Diagnosing postpartum haemorrhage

Accurate and timely diagnosis of PPH is critical to saving lives. Yet many women, particularly in low-resource settings, continue to experience preventable morbidity and mortality because of delays in recognizing and responding to excessive bleeding. Early identification of abnormal blood loss allows prompt initiation of treatment and can prevent life-threatening complications. Therefore, improving the diagnosis of PPH as a core element of routine postpartum care, and ensuring that all women receive timely assessment regardless of setting, are essential to reducing global inequities in maternal health outcomes.

Objective measurement of postpartum blood loss enhances the recognition of PPH and supports timely clinical action. Although some bleeding is expected after birth, the routine and systematic collection and quantification of blood loss are key to avoiding missed or delayed diagnoses. Visual estimation – still commonly used – is widely recognized as unreliable, especially at higher volumes of blood loss, and generally leads to underestimation *(51, 52)*.

New evidence has also called into question the exclusive use of the conventional ≥500 mL threshold to define and diagnose PPH. This fixed-volume threshold may not accurately reflect a woman's clinical risk because tolerance to blood loss varies depending on physiological factors such as circulating blood volume, baseline haemoglobin and general health status.

Most cases of PPH occur within the first 1–2 hours after birth *(53)*, highlighting the importance of close monitoring during this critical period. Regular assessments of the mother's condition and clinical markers of excessive bleeding are vital for the early diagnosis of PPH. This includes frequent palpation of the uterus to ensure that it is firm and contracted, quantitative

measurement of blood loss and continuous monitoring of vital signs such as pulse and blood pressure, which may indicate haemodynamic instability because of excessive blood loss. Regular monitoring after birth is part of the immediate postpartum care that should be delivered with empathy and respect, as outlined in WHO recommendations on maternal and newborn care for a positive postnatal experience *(5)*.

This section presents evidence-based recommendations on diagnostic criteria and clinical practices to support earlier and more accurate identification of PPH and ensure that effective first-line interventions are delivered without delay.

Measurement of blood loss for the diagnosis of postpartum haemorrhage

Recommendation 21

REVALIDATED

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. *(Recommended)*

Remarks

- 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.
- The GDG acknowledged that alternatives to calibrated drapes, such as blood collection trays and jars, are increasingly being promoted in some settings for measuring postpartum blood loss. However, current evidence does not support the diagnostic accuracy of these alternatives. By contrast, calibrated blood collection drapes have been shown to provide more accurate quantification of postpartum blood loss compared to visual estimation *(54)*. Countries or programmes considering the scale-up of postpartum blood loss measurement should ensure that any chosen device is evidence-based and fit for purpose, so that the intended impact of timely PPH detection and treatment is not undermined by the use of less reliable tools.
- There should be consideration and investments made into the development and use of sustainable and climate-friendly drapes.

The evidence base for this recommendation can be found in Web Annex A (Section 4.1).

Criteria for diagnosing postpartum haemorrhage

Recommendation 22

NEW

To identify women at risk of adverse outcomes from postpartum bleeding and initiate first-response treatment, it is recommended to use the following criteria: objectively measured blood loss threshold of ≥300 mL with any abnormal haemodynamic sign (pulse >100 bpm, shock index >1, systolic blood pressure <100 mmHg, or diastolic blood pressure <60 mmHg), or objectively measured blood loss of ≥500 mL, whichever occurs first within 24 hours after birth, and with particular vigilance during the first 2 hours. *(Recommended)*

Justification

This recommendation is based on a meta-analysis of individual participant data including over 300 000 women from 12 datasets across 23 countries *(28)*, offering moderate-certainty, individual-level evidence with global representativeness. The findings show that a threshold of ≥300 mL blood loss combined with any abnormal haemodynamic sign offers a good balance between sensitivity and specificity in identifying women at increased risk of severe adverse outcomes from postpartum bleeding, outperforming the conventional ≥500 mL threshold, in both accuracy and clinical utility. These diagnostic criteria may support earlier identification at lower thresholds, allowing prompt initiation of the first-response treatment bundle, which has been proven to prevent progression to severe morbidity or death from PPH *(55)*. The first-response treatment bundle is generally low risk, and affordable, and becoming widely available and feasible in most facility settings.

Prioritizing sensitivity in this context helps ensure that fewer women with life-threatening postpartum bleeding are missed, which is especially crucial in low-resource settings. While a lower blood loss threshold increases the number of women identified and treated, and thus raises concerns about overtreatment, this is outweighed by the benefits of preventing severe adverse outcomes, especially because first-response interventions are safe and well tolerated. Women and health workers are also more likely to prioritize sensitivity over specificity, underscoring the value of preventing missed cases over the risk of modest overtreatment, given the potential, severe consequences of PPH if it is not identified and treated in a timely manner.

The evidence supports the use of a threshold of ≥300 mL objectively measured blood loss with any abnormal haemodynamic signs as an add-on test to overcome the shortcomings of the conventional threshold of ≥500 mL across health care settings, with particular benefit in low-resource countries. Economic modelling and health system data suggest that earlier intervention may be cost-effective; increased identification may require more commodities for first-line treatment but this will reduce the need for costly, resource-intensive care such as blood or blood product transfusion or surgery.

Implementation of these diagnostic criteria is feasible, cost-effective and likely to increase equity by reducing severe PPH outcomes, particularly in low-resource settings. However, the findings are applicable across diverse settings, modes of birth (with some limitations for caesarean section) and health system contexts, and thus applicable for global use.

Evidence on the time horizon for this diagnostic criteria indicates that most bleeding events meeting the threshold occur within the first 1–2 hours after birth *(52)*. However, the 24-hour period remains relevant because it aligns with historical definitions and captures most acute maternal complications after birth.

Remarks

- This recommendation provides a **therapeutic definition** of PPH, that is, a diagnostic threshold designed to guide the decision to initiate treatment rather than to define the condition solely for classification purposes. The objective is to support timely clinical action by identifying women at increased risk of adverse outcomes from postpartum bleeding. This approach prioritizes early intervention and the woman's safety by aligning diagnosis with immediate treatment needs.

- The recommendation on the time horizon for this definition was informed by evidence showing that most postpartum bleeding events meeting the diagnostic criteria occur within the first 2 hours after birth. However, as life-threatening bleeding can still occur beyond this immediate postpartum period, continued monitoring for clinical signs of concealed or revealed blood loss is essential throughout the first 24 hours postpartum. The GDG acknowledged that the 24-hour time horizon is largely historical and conventional but noted that it also reflects evidence indicating that most acute maternal morbidity and mortality after birth occur within this window, underscoring the need for vigilant observation during this critical period, both inside and outside the labour ward, for optimal maternal care and outcomes.
- Abnormal haemodynamic signs in the context of these diagnostic criteria include any of the following: pulse rate >100 bpm, systolic BP <100 mmHg, diastolic BP <60 mmHg, or shock index >1 (calculated as pulse rate divided by systolic BP, which is >1 when pulse rate is higher than the systolic BP).
- These diagnostic criteria should be linked to the first-response treatment bundle because diagnosing PPH in the absence of timely treatment is unlikely to improve outcomes. The criteria are recommended as the basis for first-response PPH treatment and referral decisions (where needed), not as an absolute trigger for initiating advanced therapies or surgical interventions. Clinical judgement should guide the escalation of care.
- Although this recommendation offers diagnostic criteria for identifying women at risk of adverse outcomes from postpartum bleeding and initiating treatment, it is recognized that health system readiness for postpartum monitoring and treatment initiation (e.g. availability of staff, equipment) varies across different settings. Implementers may choose different thresholds for initiating treatment considering the realities of their local contexts (i.e. earlier intervention and faster escalation if referrals are difficult and time-consuming).
- Wider adoption of these diagnostic criteria may increase demand for basic monitoring equipment (e.g. calibrated drapes, BP devices), and may require additional staff training and resources for objective blood loss measurement and haemodynamic monitoring. However, this investment is offset by reduced demand for expensive, complex interventions for severe PPH that are not available in many settings.
- The diagnostic criteria can be applicable in the context of home-based or community-based births. Adaptations in care may be needed to obtain access to innovative tools for objective quantification of blood loss and monitoring of abnormal haemodynamic signs.
- The risks of bleeding 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 and support women in identifying warning signs and promptly seeking care.
- Implementation of the diagnostic test strategy may increase reported rates of PPH, particularly in settings simultaneously introducing objective assessment of blood loss. This should not be interpreted as a decline in care quality but as improved detection and prevention of severe maternal complications.
- The GDG acknowledged that the evidence base overwhelmingly represents facility-based vaginal births, with only one large study of caesarean births included, thus limiting the overall confidence in the generalizability of these criteria to the caesarean birth population. The group agreed that quantitative assessment of intraoperative blood loss can be challenging and changes to clinical signs may be anaesthesia-induced rather than indicative of haemodynamic instability. Nonetheless, the GDG noted that nearly all the components of the first-response treatment bundle that the new diagnostic criteria would trigger are already part of routine care for caesarean birth – uterine massage, oxytocic drugs, intravenous fluids and identification of the source(s) of bleeding – which are often implemented before detection of significant blood loss. The group further emphasized that although the pattern of blood loss may differ according to mode of birth, the physiological impact of a given volume of blood loss, and the associated risk of adverse outcomes, are not expected to differ between vaginal and caesarean births. Consequently, in making this recommendation, the GDG placed its emphasis on the clinical importance of standardized and consistent diagnostic criteria to identify PPH and initiate timely treatment for all births, while recognizing the need for additional research data for the caesarean section population. The GDG also cautioned that the relatively higher blood loss patterns that are associated with caesarean sections should not be normalized or considered acceptable because this may contribute to dangerous delays in intervention, particularly in view of the disproportionately high burden of PPH-related mortality associated with caesarean birth.

The evidence base for this recommendation can be found in Web Annex A (Section 4.2).

Uterine tone assessment for identifying uterine atony

Recommendation 23

REVALIDATED

Postpartum abdominal uterine tonus assessment for early identification of uterine atony is recommended for all women. *(Recommended)*

Remarks

- This recommendation emphasizes the importance of early detection of uterine atony, which is the most common cause of PPH. Immediately after the birth of the baby or babies and placenta, regular abdominal palpation to assess uterine firmness and ensure that the fundus is well contracted and centrally located should be initiated. The first hour after birth is particularly important; close regular assessment during this time, ideally every 15 minutes, is essential. Continued assessments should follow local protocols but typically extend through the first 1–2 hours postpartum, with reduced frequency thereafter if no abnormalities are detected. Finding of a soft or boggy uterus at any time should prompt further examination and clinical response to prevent severe blood loss and clinical deterioration.
- The frequency and duration of assessment may be adapted based on clinical judgement, local protocols and individual risk factors.
- Although uterine massage is not recommended as a routine prophylactic intervention, it remains a first-line response in cases where uterine atony is identified during uterine tonus assessment. This distinction should be clearly understood in clinical practice.
- The implementation of this recommendation is especially critical in settings where quantitative blood loss measurement is not yet accessible because changes in uterine tone can be an early and important clinical marker of ongoing bleeding.

The evidence base for this recommendation can be found in Web Annex A (Section 4.3).

3.5 First-response treatment of postpartum haemorrhage

Prompt and coordinated first-line management is essential to improving survival and reducing complications from PPH. Most cases of PPH result from one or more of four primary causes – uterine atony, genital tract trauma, retained placental tissue and coagulation abnormalities – commonly referred to respectively by the "4Ts" mnemonic (tone, trauma, tissue and thrombin). A structured clinical approach that rapidly determines and addresses these underlying causes is vital to effective care and is reflected in the treatment strategies included in this section.

This section presents a series of recommendations on the first-response treatment of PPH, including pharmacological and non-pharmacological interventions that together make up the PPH treatment bundle. While each component intervention, such as uterotonics, uterine massage, intravenous fluids and TXA, has been independently revalidated from earlier WHO recommendations on PPH, they are now consolidated into a single standardized intervention based on new evidence supporting their combined effectiveness when implemented rapidly and concurrently, rather than individually or sequentially.

The recommended interventions that are part of the treatment bundle are intended for all women with PPH and have complementary functions. Uterotonics stimulate uterine contractions while TXA assists with clotting. Uterine massage promotes tone and expels any clots that may be inhibiting contraction. Intravenous fluids help stabilize the woman's circulation and prevent shock, allowing time for further interventions. Examination is intended to identify the source of bleeding and stop it or escalate with no delay for advanced care if required.

The treatment bundle approach is intended to minimize delays and ensure a comprehensive first-response to PPH. However, the guideline acknowledges that full implementation of the bundle at scale may not yet be feasible in all settings because of human or material resource limitations. In such contexts, the individual recommendations remain applicable and should continue to guide practice until the full complement of the care bundle can be operationalized.

The recommendations also address key clinical scenarios that frequently arise during the treatment of PPH, including management of the retained placenta and timing of antibiotic prophylaxis after manual removal of a retained placenta. Collectively, this section equips providers with a robust suite of interventions for first-response care, supporting early recognition of the underlying cause of bleeding and escalation when necessary, with the goal of reducing preventable maternal morbidity and mortality from PPH.

Uterotonics for the treatment of postpartum haemorrhage

Recommendation 24

REVALIDATED

Intravenous oxytocin is the recommended uterotonic drug for the treatment of postpartum haemorrhage. *(Recommended)*

Remarks

- The GDG recommended intravenous 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. Repeated dosing is considered safe and effective when PPH develops despite prophylactic use.
- The GDG recognized that intravenous oxytocin may not be available in all settings. Health care decision-makers are encouraged to prioritize the procurement and distribution of quality-assured oxytocin.
- For the treatment of PPH, 10 IU oxytocin is commonly administered intravenously as the initial dose. Rapid intravenous injection should be avoided to reduce the risk of hypotension and other adverse effects. The dose should preferably be diluted and administered slowly over 1–2 minutes as a bolus or diluted in a small volume of crystalloids and infused over 5–10 minutes. A maintenance infusion of oxytocin (10–20 IU diluted in crystalloids) may be required over the subsequent 4 hours to sustain uterine contraction and prevent recurrence of bleeding after initial control of PPH. The infusion should be titrated based on uterine response and clinical condition. Ongoing monitoring of blood loss, uterine tone and haemodynamic status throughout this period is essential to ensure treatment effectiveness and to enable timely escalation if bleeding continues or the woman's condition deteriorates.
- The GDG acknowledged that there is limited evidence from studies on the best oxytocin regimen for the treatment of PPH and noted that variations in oxytocin regimen exist both in the initial and maintenance doses and the amount of fluids used for dilution. The regimen provided here reflects consensus and successful implementation in a large-scale PPH trial, which demonstrated its feasibility and favourable outcomes in four low- and middle-income countries.

The evidence base for this recommendation can be found in Web Annex A (Section 5.1).

Recommendation 25

REVALIDATED

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

Remarks

- In settings where intravenous oxytocin is unavailable to women who have received prophylactic intramuscular oxytocin during the third stage of labour, the GDG considered misoprostol to be a valid alternative for the treatment of PPH.
- If PPH prophylaxis with misoprostol has been administered and if injectable uterotonics are unavailable, there is insufficient evidence to guide additional misoprostol dosing. Providers should weigh the potential for toxicity when considering repeated doses.

- 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 reported the use of a 800-µg dose administered sublingually *(56, 57)*. Most of the GDG members agreed that 800 µg is an acceptable sublingual misoprostol dose for the treatment of PPH, although some members of the GDG expressed concern related to the risk of hyperpyrexia associated with this dosage.
- If intravenous oxytocin has been used for the treatment of PPH and the bleeding does not stop, there is 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 the known contraindications.
- In situations in which intramuscular oxytocin can be administered and there is no possibility of intravenous treatment with ergot alkaloids/injectable prostaglandins, there is a paucity of data to recommend a preference for intramuscular 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 the known contraindications.
- Carbetocin (heat-stable and non-heat-stable formulations), although recommended for PPH prevention, has not been adequately studied for repeated dosing for PPH treatment, when carbetocin has been used for PPH prophylaxis. Therefore, the use of carbetocin (heat-stable and non-heat-stable formulations) in this context should be discouraged until robust evidence on safety and efficacy for PPH treatment becomes available.
- While there is no evidence to suggest that carbetocin is less safe or less effective than the injectable uterotonics recommended here for PPH treatment, its use in this context has not been adequately studied. In contrast, ergometrine and the fixed-dose oxytocin and ergometrine combination have a longer history of clinical use for both the prevention and treatment of PPH, and their safety concerns are known and can be mitigated in clinical practice.

The evidence base for this recommendation can be found in Web Annex A (Section 5.2).

Uterine massage for the treatment of postpartum haemorrhage

Recommendation 26

REVALIDATED

Uterine massage is recommended for the treatment of postpartum haemorrhage. *(Recommended)*

Remarks

- 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 GDG emphasized that uterine massage should be started once PPH has been diagnosed, as part of the first-response treatment bundle, which includes administration of uterotonics, tranexamic acid, intravenous fluids and examination of the genital tract and escalation of care.
- The initial rubbing of the uterus and expression of blood clots are not regarded as therapeutic uterine massage.
- Uterine massage may be repeated or continued intermittently, based on the clinical response, particularly if bleeding persists despite administration of uterotonics.
- The GDG noted that the application of this intervention requires training and that maternal discomfort and complications associated with these procedures have been reported.
- When formulating this recommendation, the low cost and safety of uterine massage were considered.
- This recommendation is specific to the treatment of PPH and not intended for routine or sustained use as a preventive measure in women who have already received prophylactic uterotonics (see Recommendation 20 on uterine massage for PPH prevention).

The evidence base for this recommendation can be found in Web Annex A (Section 5.3).

Antifibrinolytics for the treatment of postpartum haemorrhage

Recommendation 27

EDITED

Early use of intravenous tranexamic acid (within 3 hours of birth) in addition to standard care is recommended for women with postpartum haemorrhage after vaginal birth or caesarean section. *(Recommended)*

Remarks

- Based on the dosing regimen used in the WOMAN trial *(58)*, the GDG supports the administration of TXA at a fixed dose of 1 g (100 mg/mL) intravenously at 1 mL per minute (i.e. administered over 10 minutes), with a second dose of 1 g intravenously if bleeding continues after 30 minutes or if bleeding restarts within 24 hours of completing the first dose.
- The GDG acknowledged that while the WOMAN trial used *clinically diagnosed PPH* based on estimated blood loss or signs of haemodynamic instability, the diagnosis of PPH should no longer rely solely on clinical estimation. Therefore, this recommendation has been aligned with the updated WHO guidance on objective blood loss assessment and diagnostic criteria for PPH, which include ≥300 mL blood loss with abnormal haemodynamic signs or ≥500 mL blood loss, whichever occurs first.
- Based on evidence from the WOMAN trial, the reference point for the start of the 3-hour window for starting TXA administration is time of birth. If time of birth is unknown, the best estimate of time of birth should be used as the reference point. Because most deaths due to PPH occur within the first 2–3 hours after birth, it is critical that TXA is given as soon as possible to achieve clinical benefits.

- Analysis of the effects of timing of administration in the WOMAN trial, as well as a meta-analysis of the individual participant data of 40 138 bleeding patients (including WOMAN trial participants), indicates that TXA administration beyond 3 hours does not confer any clinical benefit. Furthermore, the point estimates of effect of TXA use beyond 3 hours on death due to trauma or after PPH were both in the direction of harm, albeit not statistically significant for women with PPH. In view of this evidence, the GDG does not support the use of TXA more than 3 hours after birth.
- Administration of TXA should be considered as part of the first-response treatment bundle (massage, administration of oxytocin, TXA, intravenous fluids, examination of the genital tract and escalation of care, to ensure timely and coordinated care) (see Recommendation 29). Other standard care in the context of this recommendation includes non-surgical temporizing measures in the management of PPH (e.g. bimanual compression, intrauterine balloon tamponade, non-pneumatic anti-shock garment, external aortic compression) and surgical interventions (e.g. brace sutures, arterial ligation or hysterectomy) in accordance with WHO guidelines or adapted local PPH treatment protocols.
- TXA should be used in all cases of PPH, regardless of whether the bleeding is due to genital tract trauma or other causes. Therefore, administration does not require the confirmation of the source of bleeding.
- The use of TXA should be avoided in women with a clear contraindication to antifibrinolytic therapy (including TXA) (e.g. a known thromboembolic event during pregnancy).
- This recommendation applies only to intravenous use. The evaluation of benefits and potential harms of other routes of TXA administration (e.g. intramuscular regimen) is a research priority.
- Regardless of the level of health system resources, TXA should be recognized as a life-saving intervention and be made readily available for the management of PPH in settings where emergency obstetric care is provided.

The evidence base for this recommendation can be found in Web Annex A (Section 5.4).

Intravenous fluids for resuscitation of women with postpartum haemorrhage

Recommendation 28

EDITED

Isotonic crystalloids are recommended in preference to colloids for intravenous fluid resuscitation of women with postpartum haemorrhage. *(Recommended)*

Remarks

- This recommendation is based on indirect evidence from studies primarily involving trauma and critically ill patients, where isotonic crystalloids (e.g. Ringer's lactate or normal saline) were associated with similar or better outcomes compared to colloids, without the increased cost or risk of adverse events, such as anaphylaxis.
- The physiological rationale and safety profile of crystalloids support their use as the preferred first-line fluid resuscitation strategy in women with PPH. Colloids have not been shown to provide a significant clinical advantage and may pose greater risk in resource-poor settings.
- Crystalloids are widely available, inexpensive and simple to use, making them the most practical and scalable choice for volume replacement in both high-resource and low-resource settings. In contrast, colloids are more expensive, may require stricter storage conditions and are not universally accessible.
- The goal of fluid resuscitation in PPH is to stabilize circulation and maintain perfusion while definitive treatment of bleeding is underway. Isotonic crystalloids are effective for this purpose and should be administered alongside other components of the PPH treatment bundle (e.g. uterotonics, tranexamic acid, uterine massage and examination of the genital tract to identify the source of bleeding).
- Caution is needed to avoid fluid overload during resuscitation, particularly in women with pre-eclampsia or cardiac conditions. Clinical judgement and ongoing monitoring of haemodynamic status should guide the volume and rate of fluid administration.

The evidence base for this recommendation can be found in Web Annex A (Section 5.5).

First-response treatment bundle for postpartum haemorrhage

Recommendation 29

REVALIDATED

A standardized and timely approach to the management of postpartum haemorrhage, 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 first-line treatment of postpartum haemorrhage 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. *(Recommended)*

Remarks

- All interventions included in the PPH treatment bundle are individually recommended for PPH treatment (see Recommendations 24–28).
- The examination of the genital tract involves a thorough inspection of the birth canal and surrounding areas to identify any sources of bleeding. This examination typically includes checking for lacerations, tears or haematomas in the vagina, perineum and cervix, assessment of the uterus to ensure it is contracting properly, and examination of the placenta and membranes to ensure there are no retained placental fragments.
- 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 use 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 (see Recommendation 21).
- Clinical judgement is important to guide PPH treatment decision-making. In a large trial, the treatment care 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 (see Recommendation 22 and corresponding remarks).
- The trial underlying this recommendation included multiple implementation and health system strengthening strategies, which helped to achieve high coverage in the consistent use of the treatment bundle *(55)*. These included ensuring availability of 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 health care facility or a senior clinical provider capable of providing further management is critical.
- The GDG acknowledges that the evidence supporting the treatment bundle is largely from trials on vaginal births, and does not have any clear evidence to refute that the findings would be different for a caesarean section. The individual PPH treatment interventions included in the PPH treatment bundle are also recommended by WHO for women undergoing a caesarean section. However, the group acknowledged that additional research is required to confidently recommend bundle care for caesarean section births.
- National, regional, subregional and district-level health systems must be strengthened so that sufficient resources are available, ensuring the sustainability of treatment bundle implementation. Adequate numbers of staff and availability of commodities are essential to achieve the benefits of treatment bundles.

- The supporting evidence has largely been generated from studies conducted in secondary-level health care facilities. However, prompt recognition and treatment of PPH for women who give birth in primary care settings, in the community or at home are equally relevant. Appropriate resources and health worker training integrated with setting-specific implementation strategies are necessary to facilitate this.
- Engagement with women and their communities is paramount to promote women's human rights and agency in their health, and foster their participation in shared decision-making around PPH treatment.

The evidence base for this recommendation can be found in Web Annex A (Section 5.6).

Uterotonics for treatment of the retained placenta

Recommendation 30

UPDATED

Administration of a uterotonic agent is recommended for the treatment of retained placenta after vaginal birth only in the presence of postpartum haemorrhage. *(Context-specific recommendation)*

Justification

The evidence on the benefits of administering uterotonics for retained placenta in the absence of PPH is very uncertain. The effect of intravenous oxytocin – commonly regarded as standard practice – has not been established. There is limited evidence available to assess uterotonics other than intravenous oxytocin (e.g. prostaglandin E2 analogue (sulprostone), misoprostol, carbetocin). Available evidence suggests that these agents may have minimal or no clinical benefit in this context, and there is some low-certainty evidence of small undesirable effects.

Uterotonics are already recommended for PPH prevention in all women and as a core component of the first-response treatment bundle for women who are actively bleeding. However, in the absence of PPH or other complications, the GDG determined that the balance of effects does not favour the routine use of uterotonics for the retained placenta. There is no compelling evidence of improved outcomes, and their use may delay definitive management, such as manual removal of the placenta, and hinder effective clinical assessment or removal because of increased uterine tone.

The historical safety concerns related to agents such as ergometrine and prostaglandin E2 analogues (e.g. sulprostone or dinoprostone) remain relevant, particularly in settings where contraindications may not be easily ruled out. Until more robust evidence becomes available, the current evidence does not support the routine use of uterotonics solely to treat the retained placenta in the absence of active bleeding.

Remarks

- The first-response treatment bundle for PPH includes rapid institution of uterine massage, administration of a uterotonic agent and tranexamic acid, intravenous fluids, examination of the genital tract and escalation of care as needed. The bundle should be applied to all women diagnosed with PPH, regardless of cause (including those with a retained placenta) (see Recommendation 29).
- The GDG found very limited evidence to support recommending routine use of uterotonics for the treatment of the retained placenta in the absence of PPH. Recommendation 30 was reached by consensus.
- Ergometrine and prostaglandin E2 alpha (dinoprostone or sulprostone) should be avoided in the presence of the retained placenta. Ergometrine may cause tetanic uterine contractions, which may delay the expulsion of the placenta and may increase a woman's risk of adverse events, particularly cardiac events.
- If the placenta is not expelled spontaneously within 15 minutes after birth and PPH has not been diagnosed, health care workers should take steps to remove the placenta. These include controlled cord traction (CCT), mobilizing, squatting or emptying the bladder before manual removal of the placenta becomes clinically indicated. While undertaking these steps, health workers should monitor the woman for blood loss or other signs and symptoms consistent with PPH.

- If the placenta remains undelivered after 30 minutes and no PPH has been diagnosed, preparations for manual removal should be initiated. Delaying removal beyond 30 minutes has been associated in some studies with increased blood loss and higher rates of severe PPH; however, a longer wait time may also allow for more cases of spontaneous placental expulsion.
- In clinical practice, uterotonics are usually used immediately after manual removal of the placenta to support contraction of the uterus and reduce bleeding.

The evidence base for this recommendation can be found in Web Annex A (Section 5.7).

Antibiotic prophylaxis for manual removal of the retained placenta

Recommendation 31

UPDATED

Routine antibiotic prophylaxis is recommended for women undergoing manual removal of the placenta. *(Recommended)*

Justification

The evidence on the desirable and undesirable effects of using prophylactic antibiotics during manual removal of a retained placenta is limited. Specifically, the evidence on reducing the risk of postpartum endometritis is very uncertain.

Although the evidence is limited, the GDG placed its emphasis on the important concerns regarding the risk of infection after manual removal of the placenta and intrauterine exploration procedures. The group also considered indirect evidence from studies on prophylactic antibiotics in other obstetric contexts, such as caesarean section and abortion care, as well as observational studies involving intrauterine manipulation, which suggest potential benefit in reducing infectious morbidity.

Remarks

- For the purpose of administering prophylactic antibiotics, manual removal is intended as any form of uterine manipulation, either manual or instrumentation within the uterine cavity for removing the placenta or exploring the cavity for any residual fragments.
- Current practice suggests that ampicillin or first-generation cephalosporins may be administered when manual removal of the placenta is performed. Alternatively, a single dose of intravenous amoxicillin (1 g) and clavulanic acid (200 mg) could be used, like the regimen used for operative vaginal birth. All regimens have a broad spectrum of activities and are widely available. When the recommended antibiotic classes are not available, other classes of antibiotics may also be used. The choice of such an antibiotic class should be informed by the local bacteriological patterns of infectious morbidity, the availability of such antibiotic class, the woman's allergy history, the clinician's experience with that class of antibiotics and cost.
- Infection prevention during and after manual removal of the placenta should not rely on antibiotics alone. Adherence to standard infection prevention and control practices, including hand hygiene and aseptic technique, remains essential. Prevention or prompt management of conditions such as anaemia may further reduce infection risk and support recovery.

The evidence base for this recommendation can be found in Web Annex A (Section 5.8).

Umbilical oxytocin injection for the treatment of the retained placenta

Recommendation 32

REVALIDATED

Umbilical vein injection of oxytocin is recommended for the treatment of retained placenta only in the context of rigorous research. *(Research-context recommendation)*

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 the 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.

Remarks

- The GDG acknowledged the potential of umbilical vein injection of oxytocin solution in the treatment of the 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 a retained placenta are needed, with the aim of demonstrating its impact on severe postpartum haemorrhage-related morbidity 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 a retained placenta occurs in the absence of abnormal bleeding.
- There are three types of retained placenta; umbilical vein injection of oxytocin is likely to be only effective in treating placenta adherens, the most common type of retained placenta, which occurs because of failed contraction of the retroplacental myometrium. To date, studies have not distinguished the subtypes before treatment; this may have contributed to the results showing lack of efficacy of treatment with umbilical vein injection for the retained placenta.

The evidence base for this recommendation can be found in Web Annex A (Section 5.9).

3.6 Treatment of refractory postpartum haemorrhage

Most women with PPH respond well to first-response interventions (uterotonics, uterine massage, TXA and intravenous fluid with isotonic crystalloids). However, between 10% and 20% of these women are unresponsive to these interventions. These cases are considered *refractory PPH* and account for a substantial proportion of PPH-related morbidity and mortality overall. Uterine atony remains the leading underlying cause in these situations (in 30–50%). Surgical interventions, including laparotomy for compressive uterine sutures, uterine artery ligation or hysterectomy are frequently needed to prevent deaths among these women.

The timely and effective management of refractory PPH is critical, particularly in settings where surgical resources (e.g. operating theatres, anaesthesia, blood products) are limited or unavailable. In these cases, non-surgical, temporizing measures may help stabilize the woman, slow down bleeding and allow time for referral or escalation of care and definitive treatments to

stop the bleeding. These include bimanual uterine compression, external aortic compression, a non-pneumatic anti-shock garment (NASG) and uterine balloon tamponade. Such temporizing measures can be life-saving when promptly and appropriately applied.

Definitive treatments for refractory PPH include uterine compression (brace) sutures, arterial ligation; more invasive procedures like hysterectomy may be necessary to stop haemorrhage and save the woman's life. Rapid decision-making, clear protocols and well-coordinated teamwork are essential to managing refractory PPH effectively. In addition, where blood products are scarce, standardized, evidence-informed strategies for their use can support appropriate allocation and promote equitable care.

This section outlines both temporizing and definitive interventions for refractory PPH, with specific attention to strategies that are also suitable for low-resource contexts. Recommendations are framed around ensuring timely escalation, while maintaining the principles of respectful, person-centred maternity care, including informed consent wherever feasible, and preservation of the woman's dignity in life-threatening circumstances.

Temporizing measures in the management of postpartum haemorrhage

Recommendation 33

EDITED

Bimanual uterine compression is recommended as a temporizing measure until appropriate care is available for the treatment of postpartum haemorrhage due to uterine atony after vaginal birth.
(Context-specific recommendation)

Remarks

- Bimanual uterine compression is a simple, immediate, low-technology intervention that can be used by trained health personnel at all levels of the health system, including in settings with limited resources. This manoeuvre involves placing one hand inside the vagina to elevate and compress the uterus against the posterior wall of the abdomen, while the other hand applies firm pressure externally on the fundus. The goal is to mechanically compress the uterus to promote contraction and reduce bleeding.
- It is intended as a temporizing measure, not a definitive treatment, to stabilize the woman while preparing or arranging for additional interventions, such as uterotonics, balloon tamponade or surgical interventions.
- The GDG noted that the application of this intervention requires training in the proper technique and regular emergency drills to improve the correct and timely use of bimanual uterine compression in clinical practice.
- The procedure can be physically demanding for the health care provider and uncomfortable for the woman; complications associated with this procedure have been reported. Therefore, effective communication and use of pain relief, when feasible, are important. A less invasive, new device that could replicate bimanual compression is awaiting further evaluation *(59)*.

The evidence base for this recommendation can be found in Web Annex A (Section 6.1).

Recommendation 34

EDITED

External aortic compression is recommended as a temporizing measure until appropriate care is available for the treatment of postpartum haemorrhage due to uterine atony after vaginal birth.
(Context-specific recommendation)

Remarks

- External aortic compression is a non-invasive manoeuvre used to reduce blood flow to the uterus by applying firm downward pressure over the abdominal aorta, just above the umbilicus and slightly to the left of the midline.
- External aortic compression has long been recommended as a potential life-saving technique; mechanical compression of the aorta, if successful, slows down blood loss. The GDG placed a high value on this procedure as a temporizing measure in the treatment of PPH.
- The effectiveness of aortic compression can be assessed by a reduction in bleeding and diminished or absent femoral pulse. The GDG noted that the manoeuvre should be performed by trained personnel and monitored carefully.
- External aortic compression can be physically demanding to sustain and may cause maternal discomfort.

The evidence base for this recommendation can be found in Web Annexes (Section 6.2).

Recommendation 35

EDITED

Non-pneumatic anti-shock garment is recommended as a temporizing measure until appropriate care is available for the treatment of postpartum haemorrhage. *(Context-specific recommendation)*

Remarks

- The GDG noted that the application of this intervention requires training and that maternal discomfort and complications associated with this procedure have been reported.
- Based on the evidence available, the GDG recommended NASG as a temporizing measure until appropriate care is available. Temporizing may be required while awaiting transfer to a higher level of care, during the transfer and even while awaiting for blood transfusion or surgery within the facilities.

The evidence base for this recommendation can be found in Web Annex A (Section 6.3).

Mechanical interventions for the treatment of postpartum haemorrhage

Recommendation 36

REVALIDATED

Uterine balloon tamponade is recommended for the treatment of PPH due to uterine atony after vaginal birth in women who do not respond to standard first-line treatment, provided the following conditions are met:

- Immediate recourse to surgical intervention and access to blood products is possible, if needed.
- A primary postpartum haemorrhage first-line treatment protocol (including the use of uterotonics, tranexamic acid, intravenous fluids) is available and routinely implemented.
- Other causes of postpartum haemorrhage (retained placental tissue, trauma) can be reasonably excluded.
- The procedure is performed by health personnel who are trained and skilled in the management of postpartum haemorrhage, including the use of uterine balloon tamponade.
- Maternal condition can be regularly and adequately monitored for prompt identification of any signs of deterioration.

(Context-specific recommendation)

Justification

While there is insufficient evidence from randomized trials conducted in low-resource settings to assess the benefits and potential harms of uterine balloon tamponade when used for PPH treatment, several observational studies suggest a substantial reduction in the risk of maternal morbidity after uterine balloon tamponade use. It is unclear whether this disparity in findings reflects study design, balloon type or access to other essential components of PPH care.

The impact of uterine balloon tamponade for PPH treatment on health equity and cost is likely to vary according to uterine balloon tamponade designs (low-cost improvised or purpose-designed devices versus expensive purpose-designed devices). In contexts where standard PPH treatment protocols are available and implemented, uterine balloon tamponade use for PPH treatment is probably feasible and acceptable to women and providers.

Remarks

- The GDG acknowledged that the conditions listed above may not be operationalized in a standard and consistent manner across settings. It is uncertain which preconditions are the most important to obtain clinical benefits from uterine balloon tamponade, and this would benefit from further research. In setting these preconditions, the panel's emphasis was on minimizing harm to the woman, which could result from failure to or delay in implementing other temporizing and more invasive PPH treatment, incorrect patient selection for application of uterine balloon tamponade, poor monitoring or lack of other essential components for quality PPH care.
- In settings where these conditions cannot be met, the GDG agreed that additional rigorous research evidence is needed to determine if the clinical benefits outweigh the potential harms of uterine balloon tamponade in such settings.
- There is currently insufficient evidence to determine the comparative effectiveness and safety of improvised devices or purpose-designed devices. Evidence for this recommendation came from trials that used improvised devices for which there were reported concerns or problems in placement, including delays in inserting the device.

The evidence base for this recommendation can be found in Web Annex A (Section 6.4).

Recommendation 37

UPDATED

Uterine packing with plain gauze or gauze impregnated with haemostatic agent(s) is not recommended for the treatment of postpartum haemorrhage. *(Not recommended)*

Justification

There is currently insufficient evidence to warrant recommending uterine packing, either with plain gauze or gauze impregnated with haemostatic agent(s).

Given the lack of rigorous evidence of demonstrable benefit of this intervention, the GDG placed its emphasis on long-standing concerns about the potential for harm, particularly in low-resource settings with limited capacity to rapidly escalate interventions in the event of concealed haemorrhage, uterine trauma, infection or other complications.

Remarks

- On reviewing the available evidence, the GDG agreed that there is currently insufficient evidence to support the use of any form of uterine packing, whether with plain gauze or gauze impregnated with haemostatic agents, for the treatment of PPH.
- Uterine packing may delay escalation to other definitive interventions for PPH that have demonstrable evidence of benefit, thereby increasing the risk of adverse outcomes.
- The GDG recognizes that uterine packing may be useful as a temporizing measure when all medical treatment has failed in contexts where no other interventions for treating PPH are available. Priority should be placed on urgently transferring the woman to higher-level care where definitive life-saving interventions can be administered.
- Well-designed, prospective controlled studies are needed to assess the safety, effectiveness and potential added value of uterine packing, whether with plain gauze or gauze impregnated with haemostatic agents, when used in addition to or as a substitute for currently recommended non-surgical interventions for refractory PPH. Comparative research evaluating uterine packing against recommended interventions, such as uterine balloon tamponade or other conservative options, would be particularly valuable.

The evidence base for this recommendation can be found in Web Annex A (Section 6.5).

Definitive (invasive) interventions for the treatment of postpartum haemorrhage

Recommendation 38

REVALIDATED

If other measures have failed and if the necessary resources are available, the use of uterine artery embolization is recommended as a treatment for postpartum haemorrhage due to uterine atony. *(Context-specific recommendation)*

Remarks

- Uterine artery embolization is a highly specialized procedure that requires the availability of interventional radiology services, including trained personnel, appropriate imaging equipment and around-the-clock access. This limits its use to well-resourced, typically tertiary care facilities.
- The GDG noted that timely access is critical to the success of uterine artery embolization; delays in performing the procedure may reduce its effectiveness or increase the risk of adverse outcomes. Therefore, when uterine artery embolization is being considered, parallel preparations for surgical alternatives should not be delayed.
- Where the procedure is available, it may offer fertility-preserving advantages compared to hysterectomy. The GDG recognized this as an important consideration for some women, especially those who desire future pregnancies.

- The procedure is not a replacement for prompt initial treatment, including the PPH first-response bundle. It should be reserved for use after failure of medical and mechanical interventions or when surgical options carry a high risk.
- 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. Health systems considering uterine artery embolization as part of their PPH treatment strategy should invest in protocols to ensure timely referral and coordinated care between obstetrics, anaesthesia and interventional radiology teams.

The evidence base for this recommendation can be found in Web Annex A (Section 6.6).

Recommendation 39

REVALIDATED

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. *(Recommended)*

Remarks

- The GDG noted that the application of these interventions requires training and that maternal discomfort and complications associated with these procedures have been reported.
- 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; 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 have a role in the selection and sequence of the surgical interventions.

The evidence base for this recommendation can be found in Web Annex A (Section 6.7).

Supportive interventions for the treatment of postpartum haemorrhage

Recommendation 40

NEW

Cell salvage is recommended for the treatment of postpartum haemorrhage only in the context of rigorous research. *(Research-context recommendation)*

Justification

Evidence from trials that compared cell salvage versus no cell salvage or usual care for the treatment of PPH suggest that this intervention may lead to a reduction in average blood loss and higher postnatal haemoglobin. However, the effects of this intervention on other priority outcomes (particularly blood transfusion) are generally unclear.

Cell salvage is currently associated with large costs (including training and staffing requirements); cost–effectiveness evidence does not favour the use of cell salvage. However, allogenic blood transfusion is also associated with moderate-to-large costs and may not be readily available in some settings. Innovations that reduce the cost of intraoperative cell salvage may change the cost–effectiveness assessment of this intervention. Allogenic blood transfusion may be refused by women for religious or cultural reasons. The evidence from the available trials excluded women who refuse allogenic blood transfusion. Thus, the effects of cell salvage for this subgroup of women are not known.

Remarks

- The GDG acknowledged the potential of cell salvage in the treatment of PPH among women having caesarean births but considered the evidence on desirable effects insufficient to make a recommendation for routine clinical practice.
- The group agreed that rigorous research studies comparing cell salvage with no cell salvage, especially in women who are at high risk of PPH and likely to need blood transfusion intraoperatively, are needed. The aim of such studies would be to demonstrate the impact of cell salvage on blood transfusion related to PPH, in addition to improvements on other important outcomes, such as improved well-being and satisfaction. Given the challenges with designing large high-quality randomized trials on this topic, the GDG highlighted the added value of high-quality controlled non-randomized studies, especially those investigating the adverse effects of the intervention.
- To date, studies have used broad criteria for classifying women at risk of PPH, but it was unclear if these women were also at a higher risk for requiring a blood transfusion. If lower-risk women were included, this may have contributed to the results showing lack of efficacy of treatment with cell salvage. Additional research focusing on women at high risk for requiring blood transfusion (e.g. women with placenta accreta) is particularly needed.
- When cell salvage is used in a research context, it is important to monitor for adverse events from autotransfusion and evidence of fetomaternal haemorrhage to adjust the need for anti-D prophylaxis.

The evidence base for this recommendation can be found in Web Annex A (Section 6.8).

Transfusion of whole blood and/or fractionated blood products

Recommendation 41

NEW

For women experiencing acute or ongoing postpartum haemorrhage, the decision to initiate transfusion of blood products should be based on the underlying risk, continuous clinical and haematological assessments, and clear protocols for optimizing their use. *(Recommended)*

Justification

There is no direct evidence available to recommend any criteria or protocol for the transfusion of blood products over another in the context of PPH, obstetric haemorrhage or acute blood loss. Indirect evidence from general surgical and medical populations suggests that instituting restrictive criteria for initiating blood transfusion may reduce the use of blood products and costs compared with usual care, without adversely impacting clinical outcomes. However, it is unclear to what extent these findings can be extrapolated to obstetric populations. In the setting of rapid and massive ongoing PPH, restrictive haemoglobin-based transfusion is often not practical and measurement of haemoglobin may be unreliable. Use of restrictive criteria for initiating blood transfusions might help to ensure evidence-driven allocation of transfusion, which could help conserve scarce resources and improve equity. While there is no evidence on acceptability of health workers and women and their families on using specific criteria for transfusion of blood products, women and their families are more likely to accept criteria that limit receiving any blood transfusion product, and thus may be more favourable to restrictive criteria for transfusion of blood products. Restrictive criteria could improve availability of blood products and are likely to be feasible to implement. However, this would require access to laboratory equipment for closer monitoring of haematological parameters.

Remarks

Transfusion protocols, algorithms and processes:

- Given that no specific transfusion criterion or protocol has been proven to be more effective than another, each hospital will need to address its specific resources and make modifications specific to its unique setting. While acknowledging the lack of firm criteria for initiating transfusion, the GDG emphasizes the importance of judicious use of blood products and suggests that health facilities should favour policies that promote their equitable use.
- Local management algorithms taking a multidisciplinary approach should be established and made available to health workers.
- A massive transfusion protocol should be available in health facilities with adequate blood banking capabilities. Massive transfusion has been variously defined but generally includes transfusion of four units of packed red blood cells (RBCs) within 1 hour when ongoing need for more blood is anticipated, transfusion of 10 or more units of packed RBCs within 24 hours, replacement of more than 50% of the total blood volume of the woman by blood products within 3 hours, or replacement of a total blood volume. Protocols should be established in agreement with local haematology departments.
- All transfusions should be done according to the clinical picture, particularly if vital signs are unstable and blood loss is significant (≥1000 mL) and ongoing. It is important to note that blood loss can be underestimated or concealed.
- The transfusion of individual blood components is preferred to whole blood alone. In settings where only whole blood is available, it should be considered, provided blood is crossmatched or low-titre type O blood is available.
- Health workers should be familiar with the procurement processes, logistic channels and potential limitations of blood product availability within their health service or network of care.
- It is essential to develop strategies and protocols to manage situations where women decline blood products because of religious beliefs, such as those of Jehovah's Witnesses, or other personal reasons.

Screening and testing:

- To ensure rapid intervention should transfusion of blood products be indicated, blood groups, phenotypes and irregular antibody screening results must be verified on admission of a woman to the labour ward.

Monitoring of haematological response:

- In women with acute haemorrhage, haemoglobin levels may remain normal, making clinical evaluation crucial for timely decision-making. Point-of-care haemoglobin measurements in such cases could be falsely reassuring; therefore, they should be interpreted cautiously. Single haemoglobin or haematocrit measurements can be misleading and may delay the initiation of red cell transfusion; however, serial measurements are valuable for monitoring ongoing treatment.
- The decision to transfuse should not be based on haemoglobin levels alone, but also on the woman's clinical needs. The following factors must be considered: morbid status, obstetric history, stage of pregnancy, evidence of organ hypoperfusion or failure, and presence of infection (e.g. pneumonia, malaria).

Transfusion of blood products

Red blood cells:

- If available, transfusion of red blood cells (RBCs) should be considered. Fully crossmatched RBCs should be used preferentially. When the ABO and rhesus group is known but crossmatching is not possible, ABO and rhesus-compatible uncrossmatched blood should be used. In an emergency scenario when crossmatching is not possible, O-negative RhD-negative blood should be used. The therapeutic goal is often set as haemoglobin >70 g/L.
- Type-specific or type O RhD-negative blood should be readily available and accessible in health facilities providing childbirth services. Transfusion protocols are recommended to enable the timely release of emergency blood products.

Fibrinogen:

- If available, transfusion of fibrinogen can be considered. The therapeutic goal is ≥2 g/L. If fibrinogen is <2 g/L, administer cryoprecipitate to achieve a target fibrinogen level of ≥2 g/L. This typically requires 3–4 g of fibrinogen, corresponding to approximately 8–10 units of cryoprecipitate, depending on the fibrinogen content per unit. If available, pathogen-reduced cryoprecipitate should be chosen.
- The effectiveness of recombinant factor VIIa and prothrombin complex concentrate remain uncertain.

Fresh frozen plasma:

- If available, transfusion of fresh frozen plasma (FFP) should be considered. Transfusion of FFP should not be done for acute haemorrhage before haemostatic results are known and four units of RBCs have been transfused. AB plasma should be used if the ABO type is not known. If lab results are delayed, FFP can be administered at a ratio of 1 unit of FFP to 2 units of RBCs. The therapeutic goal is prothrombin time/activated partial thromboplastin time <1.5 and international normalized ratio ≤1.5.

Platelets:

- If available, transfusion of platelets should be considered when the patient shows clinical signs of microvascular bleeding and if concentrations fall below 50 × 109/L. The standard dose is 5–10 mL/kg.

Massive PPH:

In the management of massive PPH, haemostatic therapy should follow a stepwise approach:

1. Early TXA administration (1 g intravenously over 10 minutes).
2. If available, prioritization of fibrinogen replacement (fibrinogen concentrate or cryoprecipitate) over FFP when a coagulopathy is detected or highly suspected (e.g. amniotic fluid embolism, clinical symptoms).
3. FFP should be considered in cases of documented coagulation factor deficiency, guided by laboratory testing instead of empirical method ratios. For massive blood loss (needing to transfuse four units of RBCs) empirical ratios, for example, 1 unit of FFP to 2 units of RBCs could be used to lessen the development of dilutional coagulopathy.
4. If available, transfusion of platelets could be considered when the woman shows clinical signs of microvascular bleeding and if concentrations fall below 50 × 109 platelets/L. The standard dose is 5–10 mL/kg.

The evidence base for this recommendation can be found in Web Annex A (Section 6.9).

3.7 Supportive care after postpartum haemorrhage

Supportive care after PPH is essential to ensure full physical recovery and address the emotional and psychological effects of what is often a life-threatening event. In the immediate period after bleeding has been controlled, women should receive close monitoring, including continued assessment of blood loss, regular evaluation of vital signs for haemodynamic stability, fluid balance and uterine tone while still in the health facility.

Health workers should also assess for potential complications that commonly follow PPH, such as anaemia, peripartum infection and blood pressure abnormalities. A full blood count or point-of-care haemoglobin testing is recommended to identify anaemia. Depending on the severity of blood loss and clinical judgement, oral or intravenous iron therapy may be initiated. In some cases, blood transfusion may be needed. Expanded access to iron supplementation may reduce reliance on blood products, particularly in resource-limited settings.

Women who have experienced PPH may also face psychological distress, including fear, anxiety or trauma, especially in cases involving severe blood loss, emergency surgery or loss of fertility. Before discharge, health workers should ensure that the woman is medically stable,

understands what occurred and feels physically and emotionally prepared to return home. Counselling on danger signs, clear follow-up plans and a respectful space for debriefing should be routinely offered. Ongoing follow-up should include monitoring of haemoglobin levels, screening for delayed complications and support for mental health when needed.

Guidance on physical recovery, return to daily activities and emotional well-being should be tailored to the woman's experience and context. Further guidance on postnatal care and support is available in *WHO recommendations on maternal and newborn care for a positive postnatal experience (5)*.

Oral iron supplementation after postpartum haemorrhage

Recommendation 42

REVALIDATED

Oral iron supplementation, either alone or in combination with folic acid, may be provided to postpartum women for 6–12 weeks after delivery for reducing the risk of anaemia in settings where gestational anaemia is of public health concern.[a] *(Context-specific recommendation)*

Remarks

- 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; the iron supplementation regimen (e.g. dose and whether consumed daily or weekly) should follow that used during pregnancy *(3)*; alternatively, it should start with that planned for menstruating women *(61)*.
- Women should receive counselling on why and how to take iron and folic acid supplements. They should be informed of the common side-effects and be advised on how to manage them (e.g. take with meals or at bedtime) *(60)*.
- Once menses have returned, women should receive supplementation in accordance with the country's policy or WHO guidance on iron and folic acid supplementation for menstruating women *(61)*.
- In cases in which a woman is diagnosed with anaemia *(62)*, 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 haemoglobin concentrations rise to normal *(60, 63)*.
- In malaria endemic areas, provision of iron and folic acid supplements should be implemented in conjunction with measures to prevent, diagnose and treat malaria *(64, 65)*. In areas using sulfadoxine–pyrimethamine, high doses of folic acid should be avoided because they may interfere with the efficacy of this antimalarial drug *(66, 67)*.
- An iron and folic acid supplementation programme should ideally form part of an integrated programme for postnatal care *(68)* that promotes exclusive breastfeeding in the first 6 months and continued breastfeeding, screening of all women for anaemia at postpartum visits, use of complementary measures to control and prevent anaemia, and a referral system to manage cases of severe anaemia. Particular attention should be given to identifying potential barriers to equitable access to health care, including postnatal care, suffered by population groups most vulnerable to iron deficiency and iron-deficiency anaemia, such as women in rural areas, women in low-income groups, women from racial or ethnic groups discriminated against, or women in settings where prevailing gender norms greatly disempower them over their body and health. Country programmes should be culturally appropriate to the target populations, so that the intervention is accepted, adopted and sustained.

[a] WHO considers a 20% or higher population prevalence of gestational anaemia to be a moderate public health problem *(60)*.

- Oral supplements are available in capsules or tablets (soluble, dissolvable and modified-release tablets) *(69)*. A strong quality assurance process is important to guarantee that supplements are manufactured, packaged and stored in a controlled and uncontaminated environment *(37)*. Distributers and women should monitor the expiration dates of the supplements to ensure that they are not provided or taken after their expiration date.
- Iron supplements are prepared using several iron compounds, primarily containing ferrous compounds (e.g. fumarate, gluconate, sulfate) that are better absorbed then ferric iron *(70)*. The WHO Essential Medicines List specifies that iron supplements should contain a ferrous salt *(71)*.
- In all settings, breastfeeding mothers should be encouraged to receive adequate nutrition, which is best achieved through consumption of a healthy, balanced diet (one that includes meat, fish, poultry and legumes when available and culturally appropriate), and to refer to guidelines on healthy eating during breastfeeding *(72)*.
- An efficient system for the routine collection of relevant data, including therapeutic adherence and measures of programme performance, is critical to ensure that supplementation programmes are effective and sustained. Monitoring is key to identifying barriers that might be maintaining unequal access to postnatal care, including iron and folic acid supplementation, thus preserving health inequities. Sustained implementation and scale-up greatly benefit from appropriate monitoring mechanisms.

The evidence base for this recommendation can be found in Web Annex A (Section 7.1).

Intravenous iron therapy after postpartum haemorrhage

Recommendation 43

NEW

Intravenous iron therapy is recommended over oral iron therapy for women with iron-deficiency anaemia after birth when oral iron cannot be used or is not tolerated or there is a clinical need to treat women with severe iron-deficiency anaemia rapidly, provided staff are trained to evaluate and manage anaphylactic reactions. *(Context-specific recommendation)*

Justification

Although the evidence on the impact on key outcomes is limited or very uncertain, low-certainty evidence suggests that intravenous iron may improve haemoglobin concentrations more rapidly than oral iron at all measured timepoints, that is, within the first week, between 8 and 28 days, and beyond 28 days. Evidence also indicates that intravenous iron probably reduces postpartum fatigue during the first month, which may have meaningful clinical benefits by improving functional capacity, maternal well-being and the ability to care for the newborn child.

Intravenous iron therapy is also associated with fewer gastrointestinal side-effects (such as constipation and nausea) compared to oral iron, which may improve adherence. However, there is a small risk of hypersensitivity reactions, including rare cases of life-threatening anaphylaxis.

While the intervention may not be universally feasible because of cost and the need for more resources compared to oral iron, it is likely to be beneficial for targeted use, appropriate in cases where oral iron cannot be used or is not tolerated, or where clinical judgement indicates that rapid correction of anaemia is needed.

The available evidence suggests that acceptability and uptake of intravenous iron therapy may be influenced by factors such as knowledge of anaemia symptoms, decision-making autonomy, and provider experience and training. Health system barriers such as limited availability of intravenous iron, inadequate staffing and absence of standardized protocols may also affect implementation in some settings.

Remarks

- Intravenous iron should only be used in women who are likely to be deficient in iron because of pre-existing iron deficiency or acute blood loss from PPH. Iron-deficiency anaemia is usually diagnosed by a low ferritin test. This test is sensitive to inflammation, which will be increased after birth. Therefore, it is not suitable to diagnose iron-deficiency anaemia in the postpartum period; clinicians will have to rely on the severity of PPH and, in case of women with pre-existing anaemia, on a peripheral blood smear demonstrating microcytic hypochromic anaemia typical of iron deficiency while other causes of anaemia are reasonably excluded. Alternatively, health workers may consider a treatment test where an improvement of anaemia is demonstrated after 2 weeks of oral iron treatment.
- Severe anaemia postpartum is defined as a haemoglobin of 80 g/L or less where women are likely to suffer severe or debilitating symptoms of acute anaemia. Intravenous iron in this context may reduce the need for blood transfusion for some women; however, blood transfusion should still be considered as a treatment option where clinically indicated.
- Intravenous iron preparations have been approved for treatment of iron-deficiency anaemia but not specifically in lactating women. Treatment should be confined to women for whom the benefit is judged to outweigh the potential risk for both mother and neonate. The decision to use intravenous iron therapy should be made with the woman's informed consent, ensuring that she understands the benefits and potential risks. Health workers should clearly explain the rationale for choosing intravenous over oral iron, including how the woman's symptoms, level of anaemia and ability to tolerate oral iron informed the decision to initiate intravenous iron therapy.
- Some intravenous preparations (e.g. iron dextran) appear to increase the risk of anaphylactic reactions more than others and should be avoided. The risk of anaphylaxis is estimated to be 9.8 per 10 000 for iron dextran, 1.2 per 10 000 for iron sucrose and 0.8 per 10 000 for ferric carboxymaltose. Monitoring for anaphylaxis should occur during the time it takes to infuse the medicine and 30 minutes after the infusion. The available studies mostly used intravenous iron sucrose or ferric carboxymaltose. Iron sucrose was usually given as several 200-mg infusions on alternating days until the calculated iron deficit was reached. Ferric carboxymaltose was usually given as a single infusion of 20 mg/kg body weight or up to a maximum of 1000 mg.
- To safely implement this recommendation, health facilities should ensure availability of resuscitation equipment and staff trained to recognize and manage hypersensitivity or anaphylactic reactions, including Fishbane reactions. A protocol for intravenous iron administration and monitoring should be in place.
- As intravenous iron use expands postpartum, national programmes should ensure that systems are in place to monitor for and report adverse events, especially rare outcomes like anaphylaxis, to support ongoing safety assessment.
- The GDG noted that the availability and cost of intravenous iron may vary across settings. Policy-makers should take steps to ensure equitable access where its use is clinically indicated, especially in facilities managing women with severe PPH or anaemia.

The evidence base for this recommendation can be found in Web Annex A (Section 7.2).

3.8 Health system interventions for postpartum haemorrhage

Improving outcomes related to PPH requires more than clinical skill at the bedside; it depends on resilient health systems, effective policies and well-organized models of care. Timely prevention, diagnosis and treatment of PPH rely on clearly defined clinical protocols, efficient referral pathways and robust communication and coordination across all levels of the health system. Organizational readiness and provider preparedness are central to managing obstetric emergencies such as PPH, particularly in settings where delays can have serious consequences.

Health workers must be trained not only in the clinical management of PPH but also in effective teamwork, communication and decision-making in high-pressure situations. Multidisciplinary emergency drills that include the full care team, as well as strategies for involving women and their families, can prepare health workers for real-life emergencies.

At the national and subnational levels, health authorities and programme managers require reliable data and decision-support tools to understand the burden of PPH and assess the effectiveness of implemented strategies. Strengthening health information systems and embedding PPH-specific indicators into routine monitoring platforms are key to tracking progress. These indicators should measure inputs (e.g. drug availability), processes (e.g. timely diagnosis) and outcomes (e.g. severe maternal morbidity and mortality).

This section focuses on health system strategies that enable frontline teams and health systems to respond effectively to PPH. It highlights the role of structured protocols, coordinated referral pathways and targeted training approaches, including simulation-based learning, to ensure a skilled and cohesive response. It also addresses the importance of health information systems for tracking service readiness and evaluating the quality and effectiveness of PPH care at both facility and programmatic levels. Together, these interventions support a system-oriented approach to reducing preventable morbidity and mortality from PPH.

Formal protocols for the prevention, diagnosis and treatment of postpartum haemorrhage

Recommendation 44

EDITED

The use of formal protocols by health facilities for the prevention, diagnosis and treatment of postpartum haemorrhage is recommended. *(Context-specific recommendation)*

Remarks

- The GDG acknowledged that the implementation of formal protocols is a complex process that will require the local adaptation of general guidelines.
- Formal protocols should define clear roles and responsibilities within the PPH care team and include timelines for intervention, escalation procedures and referral pathways.
- Protocols should be simple, action-oriented and easy to implement in the clinical environment, especially in settings with high workloads or limited staffing.
- Protocols should be integrated into routine training, clinical supervision and continuous quality improvement activities to ensure consistent use and adherence.
- The GDG emphasized that protocols should be evidence-based and regularly updated in line with evolving recommendations and local audit findings.
- Facilities should monitor implementation of PPH protocols through routine audits and feedback loops to ensure that they are being followed and remain relevant to clinical realities.
- Protocols should also support respectful maternity care by incorporating practices that preserve dignity, informed decision-making and communication with women and their families during emergencies.

The evidence base for this recommendation can be found in Web Annex A (Section 8.1).

Formal protocol for referral of women with postpartum haemorrhage

Recommendation 45

REVALIDATED

The use of formal protocols for referral of women to a higher level of care is recommended for health facilities. *(Context-specific recommendation)*

Remarks

- The GDG acknowledged that the implementation of formal protocols is a complex process that will require the local adaptation of general guidelines.
- Transport for referrals from community and between facilities should be included in the protocols, together with provision of health workers who can provide ongoing care for women with PPH during the transfer. Transport should be arranged by the health facility, where possible, avoiding out-of-pocket expenses.
- Referral protocols should clearly define when escalation is needed, who initiates the referral, what stabilization measures must be provided before transfer, and what communication should take place between referring and receiving facilities.
- Protocols should be aligned with local health system capacities and include realistic timelines and contingency plans in case of delays or service unavailability.
- To ensure continuity of care, referral protocols should include mechanisms for documentation and handover, including clinical information, treatment provided and any complications encountered.
- Referral systems should be integrated into emergency preparedness planning and supported by training and regular simulation exercises involving both sending and receiving teams.
- Community-level awareness of referral pathways and emergency transport availability should be promoted so that women and families understand when and how to seek higher-level care.
- Facilities should monitor and audit the timeliness and outcomes of referrals to identify bottlenecks, improve coordination and strengthen the quality and responsiveness of the referral system.
- Where feasible, protocols should consider the use of telecommunication tools (e.g. phone applications such as WhatsApp, mobile phones, radios) to coordinate emergency referrals and provide remote support during transfer.

The evidence base for this recommendation can be found in Web Annex A (Section 8.2).

Simulation-based training programmes for postpartum haemorrhage

Recommendation 46

REVALIDATED

The use of simulations of postpartum haemorrhage treatment is recommended for pre-service and in-service training programmes. *(Context-specific recommendation)*

Remarks

- The GDG placed a high value on the costs of simulation programmes and acknowledged that there are different types of simulation programmes. Some programmes are high-tech, computerized and costly while others are less expensive and more likely to be affordable in low- and middle-income countries.
- The GDG identified improvement in communication between health care providers and women and their family members as an important priority in the training of health care providers in PPH management. Simulation-based programmes should incorporate communication, leadership and respectful maternity care as core components.

- The target audiences for training include community health workers, traditional birth attendants, nurses, midwives, doctors and emergency medical technicians or paramedics. Local adaptation of training curricula should align with the scope of practice of each cadre and reflect common causes and treatments of PPH in that context.
- Simulation-based training is especially valuable for improving team coordination in time-critical emergencies such as PPH. Regular, team-based drills that mirror real-life scenarios can enhance the clarity of roles, build confidence and reduce delays in implementing appropriate interventions.
- Integrating simulation exercises into routine quality improvement efforts, such as maternal death reviews or clinical audit processes, can enhance their relevance and sustainability, and help translate learning into better preparedness and outcomes.

The evidence base for this recommendation can be found in Web Annex A (Section 8.3).

Monitoring and evaluation of postpartum haemorrhage interventions

Recommendation 47

REVALIDATED

Monitoring the use of uterotonics after birth for the prevention of postpartum haemorrhage is recommended as a process indicator for programmatic evaluation. *(Context-specific recommendation)*

Remarks

- The GDG recommended monitoring the use of prophylactic uterotonics as a key process indicator to support programme evaluation and improvement. This indicator is calculated as the number of women receiving prophylactic uterotonic drugs after birth divided by all women giving birth.
- Health programmes are encouraged to integrate this indicator into existing data collection and monitoring systems. Regular analysis can support targeted efforts to improve coverage and quality of PPH prevention.
- The GDG developed a set of key input, output and outcome indicators for monitoring the implementation of PPH interventions. Users of these guidelines are referred to Section 6.3 for the full list of indicators.

The evidence base for this recommendation can be found in Web Annex A (Section 8.4).

4. Implementation of the guidelines

With these guidelines, WHO aims to improve the quality of care and outcomes for women giving birth, as it relates to PPH and its complications. For the guidelines to translate into improved outcomes, the evidence-based recommendations need to be delivered within an appropriate model of care and adapted to the needs of different countries, local contexts and individual women, caregivers and families.

Implementation considerations for each recommendation can be found in the Web Annexes. Alongside these considerations, members of the GDG also reflected on considerations for the adoption, adaptation and implementation of the full set of recommendations within these guidelines to ensure availability, accessibility, acceptability and quality of PPH care services for all women in accordance with a human rights-based approach. The GDG emphasized that achieving meaningful reductions in PPH-related morbidity and mortality requires a comprehensive, multilayered approach to implementation.

Implementation of the recommended interventions should span the continuum of care, from preventive measures during pregnancy to effective management and supportive care after a PPH. National policy-makers and programme managers are encouraged to use the framework for reducing PPH-related morbidity and mortality presented in Fig 1.1 of these guidelines as a strategic tool to guide the organization of PPH care. As with all aspects of maternal and newborn health, care delivery should be aligned with WHO's intrapartum and postnatal care models and should centre the needs, rights and preferences of the woman and her newborn child. Ensuring access to quality clinical care also requires a foundation of enabling policy and health system structures that can support the uptake, fidelity and sustainability of these recommendations.

4.1 Health policy and system considerations

Strong national leadership is essential to advancing maternal health priorities. The GDG underscored the importance of identifying national champions and cultivating political will at the highest levels to galvanize action. The GDG further noted the value of aligning national policies to facilitate implementation, for example, by ensuring that recommended PPH medicines are included in the national Essential Medicines List (with recommended devices incorporated into corresponding documents delineating priority medical devices), have the necessary regulatory approvals and are considered within universal health coverage benefit packages and other health financing mechanisms to avoid out-of-pocket costs to women and their families.

Effective implementation also depends on national procurement and supply systems. Many of the recommended PPH interventions are available through the United Nations Population Fund (UNFPA) Supplies Catalogue, which provides quality-assured commodities and can be leveraged to support national procurement efforts. Recommended interventions will ideally be explicitly considered within national procurement plans and distribution mechanisms. To guarantee availability at the point of care, PPH-related commodities should be integrated into ongoing efforts to strengthen logistics and supply chain systems, with particular attention to forecasting, warehousing and last-mile delivery.

4.2 Facility-level considerations

At the facility level, leadership plays a pivotal role. Securing the commitment of facility managers is vital to overcoming barriers to implementation. Leaders must provide both *technical leadership*, ensuring that clinical protocols (Recommendations 44 and 45) and resources are in place, and *adaptive leadership* (navigating organizational challenges, shifting norms and engaging staff to support change). This dual approach is particularly important in ensuring timely access to shared infrastructure, such as operating theatres and emergency transport services, which are often critical in the management of refractory PPH.

Robust data systems within health facilities can also support high-quality PPH care. When they are well designed, electronic health record systems and routine data collection processes can enhance clinical decision-making, inform supportive supervision and facilitate monitoring and evaluation (Recommendation 47). These systems can also serve broader reporting needs at the district and national levels, supporting surveillance and policy evaluation functions.

In addition, the provision of user-friendly job aids, clinical protocols and checklists at the point of care can support clinical adherence, streamline workflows and reduce variability in practice. These tools are particularly valuable in high-pressure settings and can help translate guidelines into routine clinical action.

4.3 Health worker-level considerations

PPH recommendations are more likely to be implemented when health workers perceive these interventions as both effective and feasible within the context of their daily clinical practice. Building this perception requires a deliberate focus on strengthening provider competence and confidence. Structured, hands-on, simulation-based, context-appropriate training (Recommendation 46), reinforced by ongoing supportive supervision that fosters problem-solving, accountability and a culture of continuous quality improvement, is effective at supporting behaviour change *(73)*.

Changing health worker behaviour is inherently complex and often influenced by individual, organizational and systemic factors. The realities of clinical workload, staffing constraints and the emotional demands of emergency care can pose barriers to the delivery of consistent-quality care *(25)*. Targeted implementation strategies that create an enabling environment where providers feel supported and empowered to deliver evidence-based care can support the adoption of new practices and enhance fidelity to clinical guidelines. This may involve redefining roles and responsibilities within care teams, recognizing exemplary performance and ensuring that staff have the resources and authority needed to respond effectively to PPH cases.

Detailed guidance for considering how to address each of the implementation bottlenecks is available in the implementation guide that accompanies this guideline.

5. Dissemination

The executive summary will be translated into the six UN languages for dissemination through the WHO regional and country offices and during meetings organized by, or attended by, staff of WHO. The main guideline document will be translated into French and Spanish for dissemination; technical assistance will be provided to any WHO regional office willing to translate these recommendations into any of the other UN languages.

All components of the guideline, including the recommendations, remarks and evidence bases, will be published in an interactive online digital platform to make the guidelines more accessible. This will facilitate the dissemination and uptake of the recommendations by making them available online in a user-friendly format.

WHO, in collaboration with external partners (e.g. FIGO, ICM, Jhpiego, Laerdal Foundation), will also develop derivative tools to aid the understanding and adaptation of these recommendations to local contexts, including a policy brief with highlights from the consolidated guidelines; an implementation guide and a toolkit for PPH prevention, diagnosis and treatment; and training workshops for scaling up implementation of the consolidated guidelines.

The recommendations and derivative tools will be disseminated through WHO regional and country offices, Ministries of Health, professional organizations, WHO collaborating centres, other United Nations agencies and nongovernmental organizations, among others. A package of dissemination materials will be developed for guideline publication, including press releases, infographics and a social media campaign supported by WHO Department of Communications. The recommendations and derrivative tools will also be routinely disseminated during international meetings and scientific conferences attended by WHO staff.

In addition, the publication of journal articles presenting the recommendations and key implementation considerations will be considered in compliance with WHO's open access and copyright policies. Relevant WHO clusters, departments and partnerships will also be part of this dissemination process.

To ensure that these recommendations have an impact on PPH at the country level, coordinated action between international agencies, national departments of health and key stakeholders is needed. National and subnational working groups should assess current national guidelines and protocols and determine whether the development of new guidelines or the updating of existing guidelines is required in line with these new WHO recommendations. WHO staff at the headquarters, regional and country levels, as well as international agency partners and international professional societies (e.g. FIGO and ICM), and national professional associations, can support national stakeholders in developing or revising existing national guidelines or protocols and optimizing their implementation.

6. Applicability issues

6.1 Anticipated impact of the guidelines on the organization of care

Multiple factors may hinder the effective implementation and scale-up of these guidelines in different settings. As part of efforts to implement these recommendations, health system stakeholders may wish to consider the following potential barriers to their application (**Table 6.1**).

Table 6.1 Potential barriers to the effective implementation and scale-up of the guidelines

Leadership/governance	Health care financing	Health workforce
• Lack of enabling national and subnational policies (e.g. regulatory approval for a recommended intervention) • Existence of national or subnational policies that hinder implementation (e.g. limited scope of practice that prevents health workers from providing care within their scope of competencies)	• Financing models that provide insufficient funds for managing obstetric emergencies • Insufficient funds to procure the needed commodities • Lack of resources to support active implementation strategies	• Lack of human resources with the necessary expertise, skills and legal authorizations to implement, supervise and support recommended practices • Lack of consistent staffing from high health worker turnover affecting the sustainability and scalability of the recommended interventions
Medical products, technologies	**Information and research**	**Service delivery**
• Lack of essential equipment, supplies and medicines to implement the recommendations	• Lack of health information management systems designed to document and monitor recommended practices (e.g. patient records, registers)	• Lack of access to health services and health workers for women, including lack of transport, geographical conditions, financial barriers • Lack of infrastructure to support interventions (e.g. lack of electricity for refrigeration, adequate waste management) • Lack of effective referral mechanisms and care pathways for women identified as needing additional care

Given the potential barriers noted in **Table 6.1**, a phased approach to adoption, adaptation and implementation of the guideline recommendations may be prudent. Various strategies for addressing these barriers and facilitating implementation are provided in the lists of implementation considerations in Section 4 and the Web Annexes.

6.2 Adaptation for emergency and humanitarian settings

The GDG noted that emergency and humanitarian settings, in particular, may require a higher degree of contextualization. Emergencies and humanitarian crises, such as extreme weather events and climate emergencies, armed conflicts, food insecurity, mass migration and disease outbreaks, often result in displacement, excess morbidity and mortality, widespread social and

economic instability, deeply disrupted or fractured health systems and services, and the need for international humanitarian assistance. Health emergencies and humanitarian crises often coexist with other non-crisis settings in a country; Ministries of Health must be prepared to steward both routine care and emergency and humanitarian responses.

In emergency and humanitarian settings, the adaptation of PPH recommendations will need to be integrated and aligned with emergency and humanitarian response strategies, including the Minimum Initial Service Package for Sexual and Reproductive Health in Emergencies (MISP) *(74)*. MISP is a package of priority life-saving services and activities to be implemented within 48 hours from the onset of the emergency to prevent excess sexual and reproductive health-related morbidity and mortality. Developed by the Inter-Agency Working Group on Reproductive Health in Crises (IAWG) and articulated in the Inter-Agency Field Manual on Reproductive Health in Humanitarian Settings *(75)*, MISP is largely regarded as a critical core package to be delivered through coordinated actions with all relevant partners.

Inter-Agency Reproductive Health Kits (IARHKs) may be available to help support access to supplies and equipment during an acute crisis. These kits include standard medical material and medicines to enable emergency obstetric and newborn care at community, basic and comprehensive levels. National policy environments, local population demographics and health needs are taken into consideration when procuring kits. However, medicines and medical material contained in IARHKs may vary from those habitually used in the context; health care workers may need guidance on the new medicines and material they will be using.

Technical support is available to adapt recommendations, as requested by Member States and the WHO Health Emergencies Department. This support is available through IAWG, the Sexual and Reproductive Health Task Team of the Global Health Cluster, part of the Cluster System of the United Nations Inter-Agency Standing Committee, WHO and UNFPA. Initial guidance on considerations for adapting the PPH recommendations included in these consolidated guidelines is available in the accompanying implementation guide.

6.3 Monitoring and evaluating the impact of the guidelines

The implementation and impact of these consolidated guidelines should be monitored at the health service, regional and country levels to improve quality of care. Monitoring should be based on clearly defined criteria and indicators that reflect locally agreed targets. The monitoring plan is to be developed in conjunction with the Ministries of Health, FIGO and ICM, as described in the *Roadmap to combat postpartum haemorrhage between 2023 and 2030 (2)*.

At the technical consultation, the GDG proposed developing a set of input, output and outcome indicators that could be adapted at regional and country levels to assess the impact of implementation and adherence to the recommendations. The long list of indicators underwent an expert-informed prioritization process and resulted in the selection of key input, output and outcome indicators to be proposed as monitoring indicators and adapted to suit regional-level and country-level monitoring plans. The indicators are shown in **Table 6.2**.

Table 6.2 Input, output and outcome indicators

Indicator type		
Input	***Output***	***Outcome***
The health facility has written up-to-date clinical protocols for PPH prevention, diagnosis and treatment that are consistent with WHO guidelines available in the childbirth and postnatal care areas	The proportion of women who received a quality-assured uterotonic drug for PPH prevention within 1 minute after the birth of the baby or babies	The proportion of all women who gave birth in the health facility who had PPH
The health facility has devices to objectively quantify postpartum blood loss in sufficient quantities at all times in the childbirth and postnatal care areas	The proportion of women giving birth whose postpartum blood loss was objectively quantified and documented	The proportion of all women who gave birth in the health facility who had severe PPH (≥1000 mL blood loss)
The health facility has quality-assured uterotonics drug(s), TXA and supplies for intravenous fluid administration in sufficient quantities at all times in the childbirth and postnatal care areas	The proportion of women with PPH who received the first-response treatment bundle within 15 minutes of PPH diagnosis (including at least a uterotonic drug and TXA)	The proportion of all women diagnosed with severe PPH (≥1000 mL blood loss) who died

This list provides an update to the indicators articulated in previous WHO guidelines, and the outcome and output measures described in the WHO document *Standards for improving quality of maternal and newborn care in health facilities (76)*. Information on the recommended indicators can generally be obtained at the local level using interrupted time series or clinical audits. WHO has developed specific guidance for evaluating the quality of care for severe maternal complications (including PPH) based on the near-miss and criterion-based clinical audit concepts *(77)*.

Data on country-level and regional-level implementation of the recommendations will be collected and evaluated in the short-to-medium term to evaluate the relevant impact on national policy of individual WHO Member States.

7. Updating the guidelines

In accordance with the prioritization and updating process, as per the WHO maternal and perinatal health living guideline process *(78)*, the WHO Technical Advisory Group for Maternal and Perinatal Guidelines convenes regularly to review WHO's current portfolio of maternal and perinatal health recommendations and to help WHO prioritize new and existing questions for recommendation development and updating. Priority questions (new or already in this consolidated guideline document) will be updated as significant new evidence emerges. The WHO Steering Group will continue to follow PPH-related research development, particularly related to those questions for which no evidence is found and those that are supported by low-certainty evidence (where new recommendations or a change in the published recommendation may be warranted, respectively). In the event that new evidence, which could potentially affect the current evidence base for any of the recommendations, is identified, the recommendation will be updated. If no new reports or information are identified for a particular recommendation, the recommendation will be revalidated.

After publication and dissemination of the guidelines, any concern about the validity of any recommendation will be promptly communicated to the guideline implementers in addition to plans to update the recommendation. WHO further welcomes suggestions regarding additional questions for inclusion in future updates of these guidelines.

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Annex 2. Summary and management of declared interests

Name	Expertise contributed to guideline development	Declared interest(s)	Management of conflict(s) of interest
Sadiah Ahsan	Content expert and end user (obstetrics)	Lead author of PPH guidelines for Pakistan in February 2024 in the supplement to the *Journal of Pakistan Medical Association.*	This declared conflict of interest was not considered significant enough to pose any risk to the guideline development process or to reduce its credibility.
Oluwarotimi Ireti Akinola	Content expert and end user (obstetrics)	None declared.	Not applicable.
Hadil Ali-Masri	Health system and policy	None declared.	Not applicable.
Ferdousi Begum	Content expert and end user (obstetrics)	Lead author of manuscript on a new calibrated drape in Bangladesh in 2024 in the *Bangladesh Journal of Obstetrics & Gynaecology.*	This declared conflict of interest was not considered significant enough to pose any risk to the guideline development process or to reduce its credibility.
Brendan Carvalho	Content expert and end user (anaesthesiology)	Past paid consultancy with Gauss Surgical (manufacturer of Triton AI and QBL devices that measure/quantify of blood loss); ended when Gauss Surgical was acquired by Stryker Corporation in 2021. Payment was in the form of hourly fees and stock options that were exercised when the company was sold.	This declared conflict of interest was not considered significant enough to pose any risk to the guideline development process or to reduce its credibility.
Catherine Deneux-Tharaux	Content expert (perinatal epidemiology)	None declared.	Not applicable.
Tao Duan	Content expert and end user (obstetrics)	None declared.	Not applicable.
María Fernanda Escobar Vidarte	Content expert and end user (obstetric intensive care)	None declared.	Not applicable.
Sue Fawcus	Content expert and end user (obstetrics)	None declared.	Not applicable.

Name	Expertise contributed to guideline development	Declared interest(s)	Management of conflict(s) of interest
Caroline Homer	Content expert and end user (midwifery)	None declared.	Not applicable.
Simon Lewin	Health systems and policy	Payment by WHO to travel to Guideline Review Committee workshops.	This declared conflict of interest was not considered significant enough to pose any risk to the guideline development process or to reduce its credibility.
Suellen Miller	Content expert and end user (midwifery)	Current intellectual property rights valued at 5800 US dollars per year for LifeWrap non-pneumatic anti-shock garment (NASG).	This declared conflict of interest was not considered significant enough to pose any risk to the guideline development process or to reduce its credibility. The guideline development process did not include any new or updated questions related to NASGs.
Suneeta Mittal	Content expert and end user (obstetrics)	None declared.	Not applicable.
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Name	Expertise contributed to guideline development	Declared interest(s)	Management of conflict(s) of interest
Hayfaa Wahabi	Content expert and end user (obstetrics)	None declared.	Not applicable.
Andrew Weeks	Content expert and end user (obstetrics)	Current intellectual property rights on a PPH Butterfly device. Not current value associated with this patent but there is the potential of future income or value.	This declared conflict of interest was not considered significant enough to pose any risk to the guideline development process or to reduce its credibility. The guideline development process did not include any new or updated questions related to uterine compression with Butterfly device to treat PPH.

Annex 3. Research gaps

Recommendation	Research priorities
Antenatal interventions to prevent postpartum haemorrhage (PPH)	
Full blood count testing for anaemia diagnosis during pregnancy	• Can better and more cost-effective on-site tests to diagnose anaemia be developed? • Can a rapid, portable, less invasive and field-friendly test for iron-deficiency anaemia be developed?
Daily oral iron and folic acid supplementation during pregnancy	• What are the effects, feasibility, acceptability and equity implications of healthy eating and exercise interventions in low- to middle-income countries (LMIC)? • Can an intervention package with standardized guidance on nutrition be developed that is evidence-based, sustainable, reproducible, accessible and adaptable to different cultural settings? • Do alternatives to energy and protein supplements, such as cash or vouchers for pregnant women, or improved local and national food production and distribution, lead to improved maternal and perinatal outcomes? • What is the most effective, acceptable and feasible regimen of recommended supplements (iron, calcium and folic acid)? Could micronutrients be combined into a single, or slow-release, formulation? To what extent do iron and calcium (or zinc) supplements compete for absorption? • What is the most cost-effective iron compound and formulation (coated versus not) in terms of benefits and side-effects? • Are there haemoconcentration risks associated with haemoglobin concentrations of more than 130 g/L in pregnancy?
Intravenous iron therapy for iron-deficiency anaemia in pregnancy	• What is the effect of antenatal intravenous iron on women's well-being and satisfaction? • For women with antenatal iron-deficiency anaemia, what is the effect of antenatal intravenous iron infusion compared to blood transfusion on maternal and perinatal outcomes? • What is the diagnostic test accuracy of different methods for identifying women with iron-deficiency anaemia (e.g. risk assessments in high-risk populations or peripheral blood smear features like microcytic hypochromic anaemia compared with a reference standard of iron studies, such as transferrin and ferritin assessments)? • Which implementation strategies are most effective at improving the implementation outcomes of fidelity, penetration and sustainability when it comes to implementing intravenous iron therapy at scale in LMICs? What resources are required to ensure consistent access to this intervention (implementation costs)?
Intrapartum interventions to prevent PPH	
Techniques to reduce perineal trauma during second stage of labour	• What is the effect of techniques for preventing perineal trauma on prioritized maternal outcomes for PPH? • What are the costs and cost–effectiveness of different techniques for preventing perineal trauma?

Recommendation	Research priorities
Routine or liberal use of episiotomy	• For pregnant women in the second stage of labour, does selective episiotomy based on clearly defined clinical indications compared with no episiotomy improve birth outcomes?
Postpartum interventions to prevent PPH	
Uterotonics for the prevention of PPH	• What are the main outcomes that women (and their families) value in relation to interventions to prevent PPH? • What are the effects of uterotonics for PPH prevention on other important outcomes, such as breastfeeding, maternal well-being and satisfaction, skin-to-skin contact and mother–baby bonding? • What is the most effective dose and route of administration for uterotonics for the prevention of PPH, according to mode of birth? In particular, what is the optimal regimen of intravenous oxytocin for women undergoing caesarean section? • What are the most effective strategies to promote sustainable use of uterotonics for PPH prevention? • What is the cost–effectiveness of different uterotonic options for PPH prevention in LMIC? • Can oxytocin be administered safely by unskilled attendants? • What is the appropriate time to administer oxytocin for PPH prevention, relative to cord clamping and placental delivery (i.e. before or after cord clamping, before or after placenta delivery)? • What is the optimal effective regimen of intravenous oxytocin for PPH prevention after vaginal birth? • What are the harms and benefits of advance misoprostol distribution for the prevention of PPH? Is one strategy of misoprostol distribution more effective than another? • In settings where antenatal misoprostol distribution programmes are initiated for the first time, what are the effects of introducing these programmes on maternal and perinatal health outcomes and use of health services (particularly facility-based childbirth)?
Tranexamic acid (TXA) for the prevention of PPH	• What is the effect of the interactions between TXA and other preventive drugs (e.g. oxytocin)? • What is the effect of TXA before cord clamping on the prioritized maternal outcomes? • What is the effect of TXA on women with placenta praevia on the prioritized maternal outcomes? • What is the effect and harm of TXA administration for the prevention of PPH outcomes in LMIC? • What is the effect of pre-incision administration of TXA for PPH prevention on maternal and newborn outcomes? • What is the effect of TXA for PPH prevention on specific subgroups of women at high risk of bleeding because of trauma (e.g. women with placenta praevia)?
Controlled cord traction	None.

Recommendation	Research priorities
Timing of cord clamping	• What is the optimal time for cord clamping in the third stage of labour?
Sustained uterine massage for prevention of PPH	• What are the effects of uterine massage for the prevention of PPH? • What are the effects of uterine massage to prevent PPH when oxytocin is not available? • What are the effects of uterine massage to prevent PPH, when only misoprostol is available? • What is the role of lay health workers in the prevention of PPH?
Diagnosis of PPH	
Objective measurement of blood loss	• What are the most accurate method(s) of objectively quantifying blood loss after childbirth, including for women experiencing a caesarean section? • Which methods of objective postpartum blood loss quantification are most acceptable for women and health workers, and feasible to use? • What is the most accurate approach for postpartum blood loss quantification for women giving birth at home or in community settings? • What are the main outcomes that women (and their families) value in relation to interventions to detect and treat PPH?
Criteria for diagnosing PPH	• What is the prognostic performance and clinical utility of lower blood loss thresholds (<500 mL) and clinical markers among women giving birth by caesarean section? • What are the barriers and facilitators to the uptake of new diagnostic criteria in diverse health system contexts, especially in low-resource and community settings? • What is the impact of earlier diagnosis and treatment on maternal satisfaction, acceptability, health system burden and equity in access to care? • What is the cost–effectiveness of the diagnostic test strategy as new evidence becomes available, particularly regarding resource implications of broader adoption of measurement tools and monitoring equipment? • How can digital, wearable or point-of-care technologies be further integrated for real-time detection and monitoring of postpartum bleeding and haemodynamic compromise? • How would revised diagnostic thresholds affect access, quality of care, equity and acceptability for women and families, including in low-income and marginalized populations?
Uterine tone assessment for diagnosing uterine atony	• What is the role of lay health workers in the diagnosis of PPH?

Recommendation	Research priorities
First-response treatment of PPH	
Uterotonic of choice	• Can oxytocin be administered safely by unskilled attendants? • What is the minimum effective dose of misoprostol for the treatment of PPH? • What are the effects and safety of misoprostol as treatment for PPH in women who received misoprostol as PPH prophylaxis?
Uterine massage	• What is the role of lay health workers in the management of PPH?
TXA for the treatment of PPH	• What are the effects of TXA according to other routes of administration (e.g. oral, intramuscular, topical, buccal) when used for PPH treatment? • What is the cost–effectiveness of TXA when used for PPH treatment? • What is the optimal dosing regimen of TXA for PPH treatment? • What are the longer-term effects (on women and breastfed neonates) of TXA when used for PPH treatment?
Intravenous fluids for resuscitation of women with PPH	• What is the role of lay health workers in the management of PPH?
First-response treatment bundle for PPH	• What are the main outcomes that women (and their families) value in relation to interventions to detect and treat PPH? • For women who experience PPH after a caesarean section, what care bundle is recommended? • What are the strategies necessary to sustain the use of PPH treatment bundles over time, outside a research context?
Uterotonics for the treatment of the retained placenta	• What is the efficacy and safety of uterotonics for the treatment of the retained placenta?
Antibiotic prophylaxis for manual removal of the retained placenta	• What is the efficacy and safety of prophylactic antibiotics to treat manual removal of the retained placenta, especially in settings where prophylactic antibiotics are not used routinely as part of care for manual removal of the retained placenta and where there is low infection-related morbidity?
Umbilical oxytocin injection for a retained placenta	In women with a retained placenta: • Is umbilical vein injection (UVI) of oxytocin more effective than expectant management in reducing PPH-related maternal mortality and morbidity? • Is UVI of oxytocin more effective than intramuscular or intravenous oxytocin administration in reducing PPH-related maternal mortality and morbidity? • Is UVI of other uterotonics (carbetocin, prostaglandins) more effective than UVI of oxytocin in reducing PPH-related maternal mortality and morbidity? • Is UVI effective in only certain types of retained placenta; if so, can that type be accurately diagnosed clinically before UVI?

Recommendation	Research priorities
Treatment of refractory PPH	
Bimanual uterine compression for PPH treatment	• What is the role of lay health workers in the management of refractory PPH?
External aortic compression for PPH treatment	
NASG for PPH treatment	
Uterine balloon tamponade for the treatment of refractory PPH	In settings where the uterine balloon tamponade treatment preconditions cannot be reasonably met: • What is the effectiveness and safety of purpose-designed uterine balloon tamponade devices as treatment for atonic refractory PPH in the reduction of PPH-related severe maternal morbidity and mortality? • What is the effectiveness and safety of uterine balloon tamponade when using it as a temporizing measure for the treatment of atonic refractory PPH in preparation for referral to a higher level of care, in the reduction of PPH-related severe maternal morbidity and mortality? • What are the essential preconditions that health services should meet in order for uterine balloon tamponade devices to be effective and safe in women with atonic refractory PPH? In adequately resourced settings with good-quality PPH care: • What is the comparative effectiveness of different types of uterine balloon tamponade devices (including improvised or low-cost purpose-designed devices) in the reduction of PPH-related maternal morbidity and mortality? • What is the comparative effectiveness of uterine balloon tamponades compared to other tamponade interventions (such as suction devices) in the reduction of PPH-related maternal morbidity and mortality? • What is the safety and comparative effectiveness of different tamponade devices for the treatment of refractory PPH at caesarean section in the reduction of PPH-related maternal morbidity and mortality? • What is the most effective modality for training and assuring competency in the use of uterine balloon tamponade?
Uterine packing for treatment of PPH	• What is the effectiveness and safety of uterine packing with plain gauze or new haemostatic gauze products versus uterine balloon tamponade as treatment for refractory PPH in the reduction of PPH-related severe maternal morbidity and mortality?
Cell salvage for the treatment of PPH	• What are the impacts of using cell salvage compared to allogenic blood transfusion on PPH-related morbidity and mortality? • What is the effect of using cell salvage in women at high risk of adverse outcomes (e.g. women with placenta accreta, women who refuse allogenic transfusion)?

Recommendation	Research priorities
Uterine artery embolization for the treatment of PPH	• None
Surgical interventions	
Transfusion of whole blood or fractionated blood products	• Among women actively experiencing PPH, which thresholds and criteria for initiating blood transfusion compared to usual care reduce adverse events while maintaining maternal outcomes?
Treatment of refractory PPH	
Oral iron supplementation after PPH	• What are the adverse effects of iron supplementation in the postpartum period, including iron overload? • What is the optimal dose, schedule and duration of iron supplementation to benefit both the mother and infant in the postpartum period? • What is the effect of iron supplementation on postpartum maternal and infant health (including maternal morbidity, productivity and time to return to regular activity, postpartum depression, maternal well-being, breastfeeding practices and infant function outcomes, such as cognitive and motor development)? • What implementation considerations support adequate coverage of and adherence to postpartum iron supplementation programmes?
Intravenous iron therapy after PPH	• What is the effect of postpartum intravenous iron therapy on other substantive health outcomes (e.g. fatigue, breastfeeding, anaemia symptoms), maternal well-being and maternal satisfaction? • For women with severe anaemia, what is the effect of postpartum intravenous iron on maternal and perinatal outcomes?[a] • Among women with postpartum iron-deficiency anaemia and women who have experienced PPH, what is the effect of postpartum intravenous iron infusion compared with blood transfusion on maternal and perinatal outcomes? • Which implementation strategies are most effective at improving the implementation outcomes of fidelity, penetration and sustainability when it comes to implementing intravenous iron therapy at scale in LMIC? What resources are required to ensure consistent access to this intervention (implementation costs)?

[a] These findings may have important implications for judgements on cost–effectiveness and impact on equity.

Recommendation	Research priorities
Health system interventions for PPH	
Formal protocols for PPH prevention and treatment	• What is the role of lay health workers in the prevention, detection and management of PPH?
Formal protocol for referral of women with PPH	
Simulations for PPH training programmes	
Monitoring and evaluation for PPH interventions	

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