

Meeting to Develop a Global Consensus on  
**Preconception Care to Reduce Maternal  
and Childhood Mortality and Morbidity**



World Health  
Organization



**Meeting to Develop a Global Consensus on  
Preconception Care to Reduce Maternal  
and Childhood Mortality and Morbidity**

**World Health Organization Headquarters, Geneva**

**6-7 February 2012**

**Meeting report**



**World Health  
Organization**

## WHO Library Cataloguing-in-Publication Data

Meeting to develop a global consensus on preconception care to reduce maternal and childhood mortality and morbidity: World Health Organization Headquarters, Geneva, 6–7 February 2012: meeting report.

1.Preconception care. 2.Maternal mortality – prevention and control. 3.Child mortality – prevention and control. 4.Family planning services. 5.Pregnancy outcome. I. World Health Organization.

ISBN 978 92 4 150500 0

(NLM classification: WQ 200)

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Based on a design by Sandy Zimmerman

Editing and layout by Inís Communication – [www.iniscommunication.com](http://www.iniscommunication.com)

## ACKNOWLEDGEMENTS

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The meeting was organized by WHO Department of Maternal, Newborn, Child and Adolescent Health (MCA) in conjunction with the Aga Khan University, the Bill & Melinda Gates Foundation, the March of Dimes and the Preparing for Life Initiative.

Financial support was provided by the Bill & Melinda Gates Foundation. The Preparing for Life Initiative supported selected participants from countries not covered by other support.

Nine WHO departments provided inputs to the background document for the meeting. C. Christiansen and V. Chandra-Mouli worked with S. Dean (Aga Khan University) and J. Willumsen (independent technical writer) to compile the matrices in advance of the meeting.

Following the meeting, C. Christiansen and V. Chandra-Mouli worked with staff from the following WHO departments to revise and finalize the matrices: **HIV/AIDS; Mental Health and Substance Abuse (MSD); Immunization, Vaccine and Biologicals (IVB); Nutrition for Health and Development (NHD); Public Health and Environment (PHE); Reproductive Health and Research (RHR); Tobacco-Free Initiative (TFI); Violence and Injury Prevention (VIP);** and the **Partnership for Maternal, Newborn and Child Health**. E. Mason guided the work throughout the process.

This report was prepared by C. Christiansen, V. Chandra-Mouli, L. Ogbaselassie and J. Willumsen with the guidance of E. Mason.



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# 1. Introduction

## 1. INTRODUCTION

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### 1.1 Rationale for the meeting

There is widespread agreement that to reduce maternal and childhood mortality, a continuum of care needs to be provided through pregnancy, childbirth, the postnatal period (addressing both mothers and infants), infancy, childhood, adolescence and adulthood. There is also widespread agreement that actions are needed at the community, primary care and referral care level to deliver this continuum of care.

Based on these agreements, a package of health interventions for family planning, safe abortion care, and maternal, newborn and child health has been developed by the World Health Organization (WHO) in collaboration with the United Nations Children's Fund (UNICEF), the United Nations Population Fund (UNFPA), the World Bank and the Partnership on Maternal, Newborn and Child Health.

There is increasing realization that a gap exists in the continuum of care. A growing body of evidence is showing that preconception care – care before pregnancy – can increase the health and well-being of women and couples and improve subsequent pregnancy and child health outcomes. There is also growing experience in delivering preconception care in countries around the world.

As yet, however, there is not a global consensus on the place of preconception care as part of an overall strategy to prevent maternal and childhood mortality and morbidity, the package of promotive, preventive and curative interventions that could be delivered in the context of preconception care, and the feasibility of delivering these interventions through existing public health programmes in low- and middle-income countries.

### 1.2 Objectives of the meeting

1. To develop a shared understanding of the place of preconception care as part of an overall strategy to prevent maternal and childhood mortality and morbidity.
2. To develop consensus on a package of promotive, preventive and curative health interventions to be delivered in the context of preconception care (in both the pre-pregnancy and interpregnancy periods); and on mechanisms of delivering the package through existing public health programmes in low- and middle-income countries to prevent maternal and childhood mortality and morbidity.
3. To develop an agenda for action.

### 1.3 Participants at the meeting

The meeting brought together three groups of participants:

- representatives of groups who have led reviews and research on preconception care – the Centers for Disease Control and Prevention (the United States of America), Erasmus University (the Netherlands), the Health Council of the Netherlands, and the Division of Woman and Child Health, Aga Khan University (Pakistan);
- individuals with experience in carrying out preconception programmes in low- and middle-income countries and in high-income countries;

## 1. INTRODUCTION

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- organizations looking to move the agenda forward in this area, including WHO (both at headquarters and regional level), the Partnership on Maternal, Newborn and Child Health, the Bill & Melinda Gates Foundation, the United States Agency for International Development (USAID), UNFPA, UNICEF, the March of Dimes Foundation and the Preparing for Life Initiative.

### 1.4 Outputs of the meeting

The meeting set out to achieve consensus on the place of preconception care in strategies to prevent maternal and childhood mortality and morbidity; to achieve consensus on a package of interventions that could be delivered through existing public health programmes in low-, middle- and high-income countries; and to agree on the next steps to moving the agenda forward.

The meeting ended with a strong sense that adding preconception (or pre-pregnancy) care to the continuum that now extends from pregnancy care through childbirth care, postnatal care (for both the mother and the baby), infant care and childcare is important. Preconception care could be a useful adjunct to providing the continuum of care and in including important age groups such as adolescents and young adults. There was a sense that this is just as relevant for high-income countries as it is for middle- and low-income countries.

Meeting participants agreed that some key principles are applicable everywhere: first, preconception/pre-pregnancy care cannot replace efforts needed across the life-course to promote the health of babies, children, adolescents and adults as individuals in their own right (not just as potential parents); second, preconception/pre-pregnancy care should be communicated and delivered in a way that involves males and females and empowers girls and women. A lot of time was spent on discussing the content of a preconception/pre-pregnancy care package; it was agreed that although some interventions are required everywhere, others will need to be selected carefully from an evidence-based menu according to national or even subnational considerations such as epidemiology and feasibility.

Conclusions were reached and agreements on next steps were made. Meeting participants identified a concrete set of actions needed to move the preconception care agenda forward.

This report contains a synthesis of the issues raised in the discussion, the conclusions reached and the action points agreed upon. It also contains:

- the outputs of the group work sessions (Annex 1);
- the proceedings of the meeting and a list of the participants (Annex 2);
- a revised set of matrices on the health problems/problem behaviours/risk factors that contribute to maternal and childhood mortality and morbidity; effective interventions to identify and address these in the preconception period; and effective mechanisms to deliver interventions in low- and middle-income countries (Annex 3).

# 1. INTRODUCTION

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## 2. Issues discussed at the meeting

## 2. ISSUES DISCUSSED AT THE MEETING

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- What does preconception care mean, and what is its aim?
- What is the place of preconception care in preventing maternal and childhood mortality and morbidity?
- In which countries is preconception care relevant to prevent maternal and childhood mortality and morbidity?
- What is the evidence base for preconception care?
- Are there any country-level experiences in delivering preconception care?
- What are the potential benefits of preconception care?
- What are the potential risks of preconception care?
- Which preconception care interventions should be delivered?
- What are the mechanisms of delivering preconception care?
- Which groups in the population should be targeted for preconception care?
- What are the considerations in delivering preconception care in all countries, and especially in low- and middle-income countries?
- What are the considerations in raising the profile of preconception care?

### 2.1 What does preconception care mean, and what is its aim?

Preconception care is the provision of biomedical, behavioural and social health interventions to women and couples before conception occurs, aimed at improving their health status, and reducing behaviours and individual and environmental factors that could contribute to poor maternal and child health outcomes. Its ultimate aim is improved maternal and child health outcomes, in both the short and long term.

At least three overlapping terms are used in the reviews tabled at the meeting:

- *preconception care* – provision of preventive, promotive or curative health and social interventions before conception occurs;
- *periconception care* – provision of these interventions in the period extending from 3 months before to 3 months after conception occurs;
- *interconception care* – provision of these interventions between two pregnancies.

Although all these terms make good sense, it was agreed that it would be useful to have one term that can be used to communicate the idea simply and clearly. It was also agreed that having a generic term does not preclude regional and national adaptations.

Throughout this report, the term ‘preconception care’ includes both the period before conception and the interconception period. The term ‘proximal preconception care’ has been used to delineate a limited period (of up to 2 years) before conception occurs, to distinguish it from ‘distal preconception care’ (to which no limit has been ascribed).

## 2. ISSUES DISCUSSED AT THE MEETING

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### ‘Preconception care’ or ‘pre-pregnancy care’?

For ‘preconception care’:

- The term ‘preconception care’ could be seen to address both unmarried and married people.
- A ‘preconception care programme’ can begin early; a ‘pre-pregnancy care programme’, on the other hand, needs to start later. In some settings, a programme with the latter name can be used to address only married people.
- The term ‘pre-pregnancy care’ places all the onus on women.

For ‘pre-pregnancy care’:

- Although the term ‘preconception care’ is used by the scientific community, it may be more difficult for lay people to understand, who may understand the term ‘pre-pregnancy care’ more easily.
- The term ‘preconception care’ may be more difficult to translate into other languages than ‘pre-pregnancy care’.
- Neither ‘preconception care’ nor ‘pre-pregnancy care’: We need a term that not only focuses on healthy motherhood and childhood but also focuses on preparing for a healthy life and in doing so accommodates adolescents.
- Both ‘preconception care’ and ‘pre-pregnancy care’ point to a period just before pregnancy. We need a term that focuses on the lifespan as a whole.
- Rather than using either term, one could use a term appropriate to the target group, such as ‘adolescent health’, ‘women’s health’ or ‘couples’ health’.
- Whatever term is used must be sensitive to contextual considerations and should not infringe on the rights of women.

### 2.2 What is the place of preconception care in preventing maternal and childhood mortality and morbidity?

All babies and children – female and male – have the right to survive and to grow and develop in good health. Similarly, all women and men have the right to be healthy physically, psychologically and socially. For this to happen, strong public health programmes that use a life-course perspective from infancy through childhood and adolescence to adulthood are needed. The reality is that such programmes do not exist or are very weak in most low- and middle-income countries.

Even where strong public health programmes across the life-course are in place, they do not guarantee that women enter pregnancy in good health. For this reason, prenatal programmes are needed to promote good health during pregnancy, to prevent health problems and to respond to those problems that occur. The reality is that many women in low- and middle-income countries do not have adequate access to the prenatal care they need.

We need to strengthen public health programmes across the life-course. We also need to improve access to good-quality prenatal care services. In addition, there is growing evidence that extending the maternal, newborn and child health continuum with one step before prenatal care – i.e. before pregnancy occurs – can increase the well-being of women and couples and improve subsequent pregnancy and child health outcomes.

## 2. ISSUES DISCUSSED AT THE MEETING

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### 2.3 In which countries is preconception care relevant to reduce maternal and childhood mortality?

Preconception care can make a useful contribution to reducing maternal and childhood mortality and morbidity, and to improving maternal and child health in both high- and low-income countries.

In high-income countries, in addition to optimizing general preconception health and risk awareness of the population as a whole, preconception care can address the relatively higher levels of maternal and childhood mortality and morbidity that exist in some pockets of socially marginalized and economically deprived families and communities. In low-income countries, similar but larger effects may be achieved. Preconception care can contribute to improving maternal and child health outcomes in large segments of the population.

One size cannot fit all, however. The content and mechanisms of delivery of preconception will need to be tailored to the realities of different countries.

### 2.4 What is the evidence base for preconception care?

The Centers for Disease Control and Prevention, Erasmus University, the Health Council of the Netherlands and Aga Khan University have published exhaustive reviews of the evidence of preconception care interventions in contributing to a range of health and development outcomes.<sup>1,2,3,4</sup>

For the purposes of this meeting, information was drawn from these reviews and from the WHO guidelines to respond to the following four questions:

- What is the prevalence of (certain) health problems, behaviours or risk factors (individual or environmental)?
- What is the evidence that the presence of these health problems, behaviours or risk factors contributes to poor maternal and childhood mortality and morbidity?
- What is the evidence of the effectiveness of interventions to address these health problems, problem behaviours or risk factors?
- What is the evidence that addressing these health problems, behaviours or risk factors reduces the likelihood of maternal and childhood mortality and morbidity and improves maternal and child health outcomes?

In addition, WHO provided responses to a fifth question:

- What are the existing public health delivery mechanisms through which these evidence-based interventions could be delivered in low- and middle-income countries?

In many areas, gaps and weaknesses in the evidence base were pointed to.

It was agreed that the evidence base for effective interventions would be useful to advocate for action and to guide action. It was agreed that this evidence be published by WHO on a priority basis. It was also agreed that

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<sup>1</sup> Johnson K et al. Recommendations to improve preconception health and health care - United States: a report of the CDC/ATSDR Preconception Care Work Group and the Select Panel on Preconception Care. *Morbidity and Mortality Weekly Report*, 2006, 55:1-23.

<sup>2</sup> Jack BW et al. The clinical content of preconception care: an overview and preparation of this supplement. *American Journal of Obstetrics and Gynecology*, 2008, 199(Suppl. 2).

<sup>3</sup> Bhutta ZA et al. *A systematic review of preconception risks and interventions*. Karachi, Aga Khan University, 2011.

<sup>4</sup> *Preconception care: a good beginning*. The Hague, Health Council of the Netherlands, 2007.



## 2. ISSUES DISCUSSED AT THE MEETING

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it would be useful to list the gaps and weaknesses in the evidence base to stimulate research in these areas.

### 2.5 Are there any country-level experiences in providing preconception care?

There is growing experience in implementing preconception care initiatives both in high-income countries, such as Italy, the Netherlands and the United States, and in low- and middle-income countries, such as Bangladesh, the Philippines and Sri Lanka. It was agreed that it is important to identify and document these initiatives to inform others and to inspire them to take up work in this area.

### 2.6 What are the potential benefits of preconception care?

From the perspective of health outcomes, in the short term preconception care could reduce pregnancies that are too early<sup>5</sup>, pregnancies that are too close,<sup>6</sup> and unplanned pregnancies. Preconception care could contribute to reducing the risk of genetic disorders and environmental exposure, to reducing maternal and childhood mortality, and to improving maternal and child health outcomes. It could also contribute to improving the health and well-being of women in other areas of public health, such as nutrition, infertility and subfertility, mental health, intimate partner and sexual violence, and substance use. In this way, preconception care could make useful contributions to Millennium Development Goals (MDGs) 1, 3, 4 and 5. In the long term, preconception care could contribute to improving the health of babies and children as they grow into adolescence and adulthood.

By supporting women to make well-informed and well-considered decisions about their fertility and their health, preconception care could contribute to the social and economic development of families and communities. By creating awareness of the importance of men's health and men's behaviours on maternal and child health outcomes, and by promoting male involvement, preconception care could result in additional benefits.

From the programmatic perspective, preconception care provides a window to include interventions that have not traditionally been included in maternal, newborn and child health programmes, such as reduction in use of and exposure to tobacco.

### 2.7 What are the potential risks of preconception care?

Preconception care could be misused to limit the autonomy of women and to undermine their rights. A strong focus on preconception care could run the risk of defining girls as being in a preconception state even before their menarche, and women as being in a preconception state for the entire duration of their fertile period. This could lead to women being:

- barred from participating in situations and taking up work in some areas on the grounds that it would increase the risk of adverse maternal and child health outcomes;
- vilified or even prosecuted for their conduct, such as for smoking or drinking alcohol.

<sup>5</sup> "Too early pregnancies": pregnancies occurring before the age of 20 (*Preventing early pregnancy and poor reproductive outcomes among adolescents in developing countries*. Geneva, World Health Organization, 2011).

<sup>6</sup> "Too close": less than 24 months interval between pregnancies (*Report of a WHO technical consultation on birth spacing*, Geneva, Switzerland, 13-15 June 2005. Geneva, World Health Organization, 2007.)

## 2. ISSUES DISCUSSED AT THE MEETING

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Further, an emphasis on preconception care could reinforce the notion that the focus of all efforts to improve the health of girls and women should be at improving maternal and child health outcomes rather than at improving the health of girls and women as individuals in their own right. In addition, blanket approaches to preconception care could be seen to imply that all girls and women will inevitably become mothers.

Every effort must be made to prevent preconception care efforts from harming girls and women.

### 2.8 Which preconception care interventions should be delivered?

There is a menu of effective interventions to address the following health problems, behaviours and risk factors in the preconception period that increase the likelihood of maternal and childhood mortality and morbidity:

- nutritional deficiencies and disorders
- vaccine-preventable infections
- tobacco use
- environmental risks
- genetic disorders
- early pregnancies, unwanted pregnancies, and pregnancies in rapid succession
- sexually transmitted infections (STIs), including human immunodeficiency virus (HIV)
- infertility and subfertility
- female genital mutilation
- mental health disorders, including epilepsy
- psychoactive substance use
- intimate partner and sexual violence.

These interventions would need to be delivered using a mix of methods:

- health education and promotion
- vaccination
- nutritional supplementation and food fortification
- provision of contraceptive information and services
- screening, counselling and management (medical and social).

The preconception interventions delivered in a particular setting will depend on the local epidemiology, the interventions already being delivered, and the mechanisms and resources in place to deliver additional interventions.

It was agreed that it would be important for WHO to provide an evidence-based menu of health and social interventions along with some guidance in selecting from these interventions.

## 2. ISSUES DISCUSSED AT THE MEETING

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As a way forward, it was agreed that WHO should recommend a universal package of preconception care interventions that will meet two key criteria:

- interventions that will be relevant everywhere (e.g. folic acid supplementation, tobacco cessation advice, family planning services);
- interventions that can be delivered even in countries with human and financial resource constraints.

Alongside this, a list of other additional interventions could be provided for countries to consider using.

### 2.9 What are the mechanisms of delivering preconception care?

Preconception care interventions do not need to be delivered as one package. The selected preconception care interventions could be creatively included in delivery mechanisms that are currently being used to reach specific groups in the population. For example, folic acid supplementation could be included in contraceptive information and service delivery programmes directed at women of reproductive age; building confidence and skills to resist pressure for early marriage could be included in group sessions to empower adolescent girls who are not in school; and discussions on intimate partner and sexual violence and tobacco cessation could be included in educational sessions with young men and women in workplace programmes.

Interventions could be delivered both in health facilities and in community settings. Although traditional mechanisms can certainly be used, innovative mechanisms such as electronic and mobile technology should also be used where possible.

Within the health sector, efforts must be made to work with units outside the traditional maternal and child health programmes. Efforts must also be made to work with other sectors such as schools and workplaces and with civil society groups such as faith-based organizations.

### 2.10 Which groups in the population should be targeted with preconception care?

A logical target group for initiating work in this area is individuals and couples contemplating a pregnancy. As they are considering a pregnancy, they are likely to be receptive to inputs on what they could do to increase the likelihood of positive maternal and child health outcomes.

The next group to consider is individuals who are not currently contemplating a pregnancy. There are risks inherent in this, however: it assumes, incorrectly, that all men and women want to be parents, and it must also be remembered that individuals and couples seeking assistance for pregnancy prevention may not be ready to take on board advice on what they should consider if and when they do contemplate having a child.

In both groups – those who are and those who are not contemplating a pregnancy – both men and women should be targeted. Men's health and men's health behaviours have important implications for the health of their partners and their children, and men have important roles to play as husbands/partners, fathers and community members.

In both high- and low-income countries, preconception care should make a special effort to target individuals, couples, families and communities who are

## 2. ISSUES DISCUSSED AT THE MEETING

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socially and economically marginalized and so more vulnerable to health and social problems. Adolescent girls are especially vulnerable in many low- and middle-income settings, and without special attention their needs are likely to be neglected.

Finally, couples with previous adverse reproductive outcomes, and individuals with pre-existing genetic risks, genetic conditions such as thalassaemia, or health conditions such as diabetes or epilepsy need to be reached with interventions tailored to their special needs.

### 2.11 What are the considerations in delivering preconception care, especially in low- and middle-income countries?

One key consideration is whether a country that is struggling to provide prenatal care, delivery care, postnatal care and childcare should take up the additional challenge of providing preconception care. Another consideration is whether preconception care could inadvertently harm women and couples.

Actions are needed on at least three fronts. First, policy-makers and funders need to be convinced that there is a need to include preconception care in the existing national effort to prevent maternal and childhood mortality and morbidity, that it can be delivered successfully, and that its delivery will lead to tangible health outcomes and other benefits.

Second, decisions will need to be made with programme managers on the preconception interventions to be delivered, the population groups to be reached with these interventions, and the mechanisms through which the interventions could be delivered to reduce maternal and childhood mortality and morbidity, given the available human and financial resources.

Third, the social and cultural sensitivities need to be considered carefully in deciding how best to communicate about delivering preconception care in a way that empowers women and couples, rather than subjecting them to blame (including self-blame) and stigma.

### 2.12 What are the considerations in raising the profile of preconception care?

The health, economic and social benefits of preconception care need to be communicated effectively to decision-makers at the international level whose support is crucial for global and regional level action and research, and to decision-makers at the country level whose support is crucial to incorporating preconception care into existing programmes. Beyond that, lay people must be informed about preconception care, and ways of making them care about it must be found.

It was agreed that as a first step, an appealing document that clearly defines and explains preconception care, makes a case for it, and communicates the message that preconception care has a role in both developed and developing countries should be developed. This alone will not be enough, however. Key stakeholders must be reached to, and preconception care must be promoted actively using a variety of ways, including the mass media and social media.



### 3. Conclusions and agreements on action points

### 3. CONCLUSIONS AND AGREEMENTS ON ACTION POINTS

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#### 3.1 Develop consensus on a term and a definition for preconception care that are grounded in a conceptual framework

##### Conclusion

It was agreed that it is important for WHO to propose a term and a definition of preconception care that are grounded in a conceptual framework. The term, definition and framework must be simple and clear so they can be communicated to different stakeholders. In choosing the term, WHO should pay attention to ensuring it does not cause misunderstanding or inadvertently demean or disempower girls and women.

##### Action point

- Develop consensus around the use of a term and a definition for preconception care grounded in a conceptual framework.

#### 3.2 Publish the evidence base to facilitate advocacy and action and identify gaps in the evidence base to stimulate research

##### Conclusion

It was agreed that the evidence base for health problems, problem behaviours and risk factors to be addressed, effective interventions to address them, and mechanisms through which these interventions could be delivered in low- and middle-income countries would be useful to advocate for action and to guide action. Alongside this, it was agreed that it would be useful to list gaps and areas of weakness in the evidence.

##### Action point

- Publish the existing evidence base, and identify gaps in the evidence base.

#### 3.3 Raise the profile of preconception care and engage key stakeholders to support action and research in this area

##### Conclusion

It was agreed that it is important to inform and engage key stakeholders at the global, regional and country level to support action and research in preconception care at all levels.

##### Action points

- Develop an advocacy document, translate it as necessary, and disseminate it widely.
- Prepare a paper on preconception care for publication in the *Bulletin of the World Health Organization*.
- Keep the departments in WHO and the Partnership for Maternal, Newborn and Child Health that participated in the meeting engaged in follow-up work.
- Reach out to key players outside WHO to bring them on board. This includes selected bilateral agencies such as USAID and the Department for International Development; multilateral agencies such as UNICEF and UNFPA; funds such as the GAVI Alliance; development banks such as the World Bank; foundations such as the Bill & Melinda Gates Foundation, the Packard Foundation and the Macarthur Foundation; international nongovernmental organizations such as the International Planned Parenthood Federation and Family Care International; and groups such as the Preparing for Life Initiative.

### 3. CONCLUSIONS AND AGREEMENTS ON ACTION POINTS

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- Engage individuals and organizations working on different aspects of maternal and child health who may not always communicate with each other, such as those working on childhood mortality reduction, maternal mortality reduction or family planning, and individuals and organizations affiliated with various departments within WHO, including mental health and substance dependence, reproductive health and research, environmental health and nutrition.
- Raise the profile of preconception care by participating in events such as the meetings of the professional associations of gynaecologists and obstetricians (e.g. International Federation of Gynecology and Obstetrics), paediatricians (e.g. International Paediatric Association) and midwives (e.g. International Confederation of Midwives); by contributing to consultative processes such as the International Conference on Population Development (ICPD) and the corresponding +20-year review process; and by making use of networks such as the WHO expert panel on genetics.

#### 3.4 Document case studies

##### Conclusion

It was agreed that it would be useful to put together a set of case studies using a common analytical framework to showcase what is being done and to inspire others to act.

##### Action points

- Develop a common analytical framework.
- Document a set of case studies to showcase what is being done, such as in the Netherlands, Italy, the Philippines, Sri Lanka and India.

#### 3.5 Gather and disseminate tools

##### Conclusion

It was agreed that it would be useful to gather the tools that have been used to support policy development, to guide implementation and monitoring of activities, and to build the capacity of health workers and others on preconception care, and to make these tools widely available.

It was also agreed that it would be useful for WHO to develop guidelines on preconception care.

##### Action points

- Identify available training tools that could be used or drawn from.
- Prepare an annotated list of tools.
- Consider preparing guidelines on preconception care.

#### 3.6 Define indicators for preconception care

##### Conclusion

As we define the content of preconception care and its delivery, we must develop indicators to track its delivery, just as we are doing for prenatal care and delivery care. Methods need to be developed for collecting information and creating databases for preconception care analyses.

### 3. CONCLUSIONS AND AGREEMENTS ON ACTION POINTS

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	<p><b>Action point</b></p> <ul style="list-style-type: none"><li>• Develop indicators that could be used nationally and globally to track the delivery of preconception care.</li></ul>
<b>3.7 Build capacity to plan, implement and monitor preconception care</b>	<p><b>Conclusion</b></p> <p>It was agreed that it would be important to build the capacity of public health programme managers and health workers (e.g. doctors, midwives, nurses) in preconception care. It is also important to consider including such capacity-building in pre-service training.</p> <p><b>Action point</b></p> <ul style="list-style-type: none"><li>• Identify opportunities to incorporate in-service and pre-service training on preconception care within existing capacity-building efforts, including through distance education.</li></ul>
<b>3.8 Stimulate and support country action</b>	<p><b>Conclusion</b></p> <p>It was agreed that it would be useful to work with the WHO regional offices and the regional offices of other United Nations (UN) and other agencies to sensitize regional and country level staff and to support country-level work.</p> <p><b>Action point</b></p> <ul style="list-style-type: none"><li>• Develop a plan for sensitization and to support countries.</li></ul>
<b>3.9 Support demonstration projects</b>	<p><b>Conclusion</b></p> <p>It was agreed that it would be useful to carry out demonstration projects and to carefully document key elements such as the targeted groups in the population, the health outcomes aimed for, the interventions delivered and how they are delivered, as well as the results achieved. Such projects would strengthen the evidence base on the feasibility and value of such initiatives.</p> <p><b>Action point</b></p> <ul style="list-style-type: none"><li>• Carry out demonstration projects on preconception care to strengthen the evidence for work in this area.</li></ul>





# Annexes

## ANNEX 1: SYNTHESSES OF GROUP WORK ASSIGNMENTS

### Synthesis of group work 1

Meeting participants were divided into the following groups:

HAI (SHARK)	DELFIN (DOLPHIN)	SJØLØVE (SEA LION)	GULLFISK (GOLDFISH)
Josaphat Byamugisha	Andrew Mbewe	Coceka Mnyani	Olga Agbodjan-Prince
Coleen Boyle	Faysal El-Kak	Mary-Elizabeth Reeve	Christopher Howson
Fariyal Fikree	Semiha Denktas	Anwar Al-Thaher	Anna Rajab
Patricia Aguilar-Martinez	Irmgard Nippert	Martina Ens-Dokkum	Leo ten Kate
Pierpaolo Mastroiacovo	Pauline Verloove	Cor Oosterwijk	Ysbrand Poortman
Valentina Baltag	Nethanjalie Mapitigama	Eric Steegers	Peter Weber
Suneeta Mittal	Atif Rahman	Vijay Kumar	Rukshana Haider
Sohni Dean	Nanbert Zhong	Arvind Mathur	Sanjeev Thomas
Kate Teela	Neena Raina	Carmencita Padilla	Emmalita Mañalac
Ramez Mahaini	Arnold Christianson	Catherine Lane	Priya Matzen
	Amina Farag		

The groups were asked to consider the following five questions:

#### 1. What are the potential benefits of preconception care? How could these be optimized?

There are both short-term and long-term benefits. There will be benefits to people who are married or in a stable relationship and to people who are not in such a relationship.

Health benefits include the following:

- improved maternal, perinatal and neonatal health, which will help to achieve the MDGs;
- reduction in pregnancies that are too early, pregnancies that are too close, unplanned pregnancies and abortions;
- reduction in maternal and neonatal mortality and morbidity, fewer stillbirths, fewer preterm births, fewer low-birth-weight babies and more healthy babies;
- improved maternal nutrition, such as tackling obesity and related issues, undernutrition and micronutrient deficiencies;
- improved fertility;
- increased awareness of the importance of, and greater attention to, men's health;
- opportunities to improve mental health through counselling and community support groups;
- improved health in later life through detection and treatment of chronic conditions;
- multigenerational benefits.

Other benefits include the following:

- economic benefits to the family and the community;

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- social benefits, such as empowerment of women and better communication and more shared decision-making by couples (e.g. in relation to birth defects).

It is important that we generate data that demonstrate the impact of preconception care on improved maternal and neonatal health, both for general advocacy and for work in a specific country, region and population groups.

### 2. What are the potential risks of preconception care? How could these be minimized?

There is a risk of medicalizing reproduction and of intruding into the privacy of women and couples. There is also a risk that women and couples will be stigmatized and blamed or will blame themselves for adverse reproductive outcomes (e.g. those who have genetic conditions, those who are overweight, those who smoke). To minimize these risks, preconception programmes should be implemented with care, and communication about preconception should be done with care.

Health policy-makers may perceive preconception as an optional extra and may not give it their support. To minimize this risk, they must be well informed.

If the right delivery mechanisms are not used, we will not get the desired results. To minimize this risk, we must use channels that have the best chances of uptake and target the groups likely to be most receptive, such as adolescent health programmes and vertical programmes (e.g. vaccination, nutrition). We must also work outside the health sector, such as by using the media, religious institutions and other community-based organizations, if we want to achieve changes in, for example, family behaviour.

There is a risk that systems and workers already under pressure may be overwhelmed. These risks must be considered carefully in the planning process.

There is a risk that men may be left out. To minimize this risk, we must focus on the health of couples and involve men in preconception programmes.

There is a risk that by including issues such as mental health and environmental health, the focus on key interventions such as folic acid supplementation may be diluted.

### 3. What should the contents of a global package of interventions on preconception care for preventing maternal and childhood mortality and morbidity include? How could the package be delivered?

It may be useful to think of a universal package. In addition, it would be useful to add a complementary package with locally relevant interventions.

It is important that the package can feasibly be delivered. It may be useful to propose a basic or minimum package for all countries to use along with an extended package for countries that have the means to include it.

Any generic package must be tailored to the needs of a country and specific target groups within countries.

The universal package should contain the following:

#### *Basic package:*

- family planning (more than just contraception);
- nutrition and micronutrients (including food and micronutrient supplementation, food fortification, nutrition education);

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- tobacco cessation (including exposure to second-hand smoke);
- reducing harmful environmental exposures (e.g. indoor air pollution);
- improving sexual health and behaviour (screening, counselling, treatment).

*Expanded package (basic package plus the following issues):*

- mental health problems;
- intimate partner and sexual violence;
- alcohol and drug use;
- non-population-specific genetic diseases (e.g. Down syndrome).

The local package should contain the following:

- region-specific genetic diseases.

These interventions would need to be delivered through:

- health education and promotion;
- vaccination;
- nutritional supplementation and food fortification;
- family planning (to delay first pregnancy and to space subsequent pregnancies);
- screening, counselling and clinical interventions for infections, genetic conditions, and chronic conditions such as diabetes and epilepsy.

In delivering preconception care, we must make sure that we:

- use both existing and innovative mechanisms;
- try to integrate preconception care into ongoing programmes such as family planning programmes;
- present preconception care as part of the continuum rather than on its own – it should be layered on top of maternal and newborn care;
- include activities on preconception in community-level activities in addition to clinic-level activities if we are to reach more people and to build positive attitudes and personal responsibility;
- use every opportunity of a woman contacting a health facility to provide preconception messages and interventions;
- work both within and outside the health sector and use a variety of settings, the mass media and popular technologies such as electronic and mobile technology;
- identify and build on the preconception activities that are under way in several countries.

Importantly, we must make sure that we do not overburden community health workers, who already have a lot to do.

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To move ahead in each country, we must:

- do a needs assessment;
- pilot and evaluate programmes before scaling up;
- build capacity;
- advocate for action, using messages tailored to the situation;
- support policy and strategy development.

### 4. Which segments in a population should be targeted with preconception care?

We must reach out to all segments of the population, including couples planning a pregnancy and couples not planning a pregnancy. We must devote special attention to adolescents, both males and females. We must consider starting our work with girls, children and adolescents.

The following groups with special needs need to be addressed:

- women and couples who have had previous poor outcomes;
- Those in difficult social situations – e.g. poor people, poor immigrants (but this must be done without stigmatizing them);
- people with known chronic medical disorders;
- people living with HIV;
- women who have been subjected to female genital mutilation;
- people with known genetic conditions;
- underweight and overweight women.

Communication must be directed at political leaders, health professionals, influential family members and the community at large.

Assessments must be done to identify needs and then focus on the people with the most needs.

### 5. What are the pros and cons of using the terms 'preconception care' and 'pre-pregnancy care'?

It was agreed that a definition needs to be consistent, simple, clear and understandable for the public, policy-makers and other stakeholders. It was also agreed that there is a need for a conceptual framework in which to embed such a definition. The terms 'preconception care' or 'pre-pregnancy care' have social, religious and cultural implications. The majority felt that 'preconception care' was the preferred term, as this could also embrace unmarried and adolescent people.

It was however agreed that, at a local level, the package could be named according to the interventions and target population addressed, e.g. 'adolescent health', 'environmental health', 'occupational health'. If the target populations include partners/spouses and siblings, a term such as 'family health' could be appropriate.

## ANNEX 1: SYNTHESSES OF GROUP WORK ASSIGNMENTS

### Synthesis of group work 2

Meeting participants were divided into the following regional groups:

AFRICAN REGION	EUROPEAN REGION	SOUTH-EAST ASIAN REGION	WESTERN PACIFIC REGION	EASTERN MEDITERRANEAN REGION
Josaphat Byamugisha	Patricia Aguilar-Martinez	Rukshana Haider	Carmencita Padilla	Anwar Al-Thaher
Arnold Christianson	Martina Ens-Dokkum	Vijay Kumar	Nanbert Zhong	Fariyal Fikree
Coceka Mnyani	Pierpaolo Mastroiacovo	Nethanjalie Mapitigama	Emmalita Mañalac	Amina Farag
Olga Agbodjan-Prince	Irmgard Nippert	Sanjeev Thomas	Eric Steegers	Anna Rajab
Catherine Lane	Ysbrand Poortman	Mary-Elizabeth Reeve	Kate Teela	Atif Rahman
Andrew Mbewe	Pauline Verloove	Priya Matzen	Cor Oosterwijk	Sohni Dean
Semiha Denktas	Peter Weber	Arvind Mathur		Christopher Howson
	Valentina Baltag	Neena Raina		Ramez Mahaini
		Coleen Boyle		Leo ten Kate
		Suneeta Mittal		Faysal El-Kak

The groups were asked to consider the following six questions:

**1. What are the potential benefits of preconception care? How could these be optimized?**

The African region group commented that such a programme would be a window of opportunity for the promotion of health and also a vehicle for intersectoral collaboration. It stated that preconception care could provide an arena to discuss issues other than HIV. It further stated that preconception care could empower women and therefore contribute to MDG 3.

The Western Pacific region group stated that preconception care would go well with the continuum of care.

**2. What are the potential risks of preconception care? How could these be minimized?**

In particular, the African region group noted there is a risk of:

- blaming women for things that go wrong;
- forgetting or sidelining men's health;
- invading the privacy of women and men;
- diluting the effects of other programmes;
- medicalizing health and reproduction.

**3. What should the contents of a global package of interventions on preconception care for preventing maternal and childhood mortality and morbidity include? How could the package be delivered?**

The African region group did not list specific interventions to be included in the package. It did, however, list the following issues to be considered when delivering preconception care services:

- Preconception care needs to be communicated in a clear and simple way to professionals, policy-makers, faith-based organizations, and other individuals and organizations who uphold customs and traditions.
- Preconception care interventions need to be seen as part of the continuum of care.

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- When promoting preconception care, change agents in communities need to be targeted.
- Preconception care could be marketed using mobile and electronic health technologies such as social media.
- Education and schools could be used as an entry point for the delivery of interventions.

The Eastern Mediterranean region group noted that the following issues should be included in a package of interventions:

- diabetes screening and, where possible, screening for other conditions;
- micronutrient deficiencies (iodine, iron, folic acid, vitamins A and D);
- genetic counselling;
- family planning;
- psychosocial distress, common mental disorders and lifestyle counselling;
- violence prevention;
- premarital testing and counselling.

Regarding delivery mechanisms, the Eastern Mediterranean region group stated it was important to target opinion leaders such as religious leaders, school teachers and service providers to mobilize and reach target groups.

The South-East Asia region group stated that preconception care should be positioned into existing programmes that deal with the continuum of care. It further noted that intersectoral collaboration would be important, with the health sector taking the lead and being a role model for other sectors. It suggested that a checklist for change, based on evidence-based data and information, was critical. The group suggested that initially it was important to focus on ‘low-hanging fruit’ interventions, such as:

- prevention and treatment of folic acid deficiency;
- prevention and management of anaemia;
- weight control;
- diabetes prevention and management;
- prevention of unsafe abortion;
- sex selection;
- delaying pregnancies among adolescents;
- substance abuse (e.g. alcohol, tobacco).

Reduction of neonatal mortality should be a priority, and it should be noted that birth defects are a major problem in the region. This calls for interventions such as vaccination against rubella, folic acid supplementation, preventing alcohol use and reducing environmental exposure.

The South-East Asia region group also made the following points:

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- Delivery channels need to be strong, and there should be an emphasis on a channel that involves families and communities.
- The empowerment of women needs to be emphasized.
- Appropriate packaging of interventions is critical to their successful acceptability and delivery, taking into account more country- and context-specific interventions, given the differences between countries, within countries and even within communities.

The Western Pacific region group mentioned that interventions to be included in a package have already been identified at the regional level. These include nutritional interventions, interventions on healthy lifestyle and contraception.

### 4. Which segments in a population should be targeted with preconception care?

The African region group noted that the target population should include adolescents, couples, families, the workforce and communities. It noted that faith-based organizations could play an important role in delivering services. It also mentioned that people with certain diseases, such as diabetes and sickle-cell disease, should be targeted specifically.

The Eastern Mediterranean region group stated that the general population, including people with special needs, should be targeted.

The Western Pacific region group emphasized that preconception should target both adolescent boys and girls.

### 5. What are the pros and cons of using the terms 'preconception care' and 'pre-pregnancy care'?

The African region group noted that the definition should reflect the target populations for the interventions.

The Eastern Mediterranean region group stated that the term 'preconception care' could be controversial. It suggested alternatives such as 'education for life' and 'education for health'.

The South-East Asia region group emphasized that one term may not be acceptable in all the countries in the region, but they suggested the term 'happy, healthy family life' to include all the members in the family.

The Western Pacific region group stated that 'preconception care' may be an appropriate term, but with a need for it to be defined more clearly.

### 6. Are there any specific regional considerations on the five previous questions?

The African region group noted that human resource constraints and lack of finances are critical issues for the region. Weak health-care systems are a challenge when implementing new interventions, and the HIV epidemic requires a lot of attention. Another consideration was the lack of male involvement in health issues regarding the couple, the family and the child.

The Eastern Mediterranean region group stated that the region is very diverse in terms of political and socioeconomic indicators. Traditions of forced and arranged marriages and adolescent marriages require special attention. Other factors that need special attention are educational challenges such as the illiteracy rate, especially among women; demographic changes such as in the total fertility rate, family size and variable age of first marriage; and discrimination and violence against women. The group noted that it would be culturally necessary for the promotion of a preconception care package



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to refrain from discussing or alluding to premarital sex, fertility control or sexual health.

The European region group noted that preconception care in Europe varies within and between countries. There are low- and middle-income pockets in many countries, and minority communities need somewhat different attention compared with the majority community. The group emphasized that the relative wealth in the region requires different interventions from those required in many low- and middle-income countries. Lifestyle change has led to obesity problems among various segments of the population in the region. Another special consideration for preconception care is the significant shift in the reproductive age to older women, and inadequate intake of vitamins A, D, E and folate seen in the majority of people, including women of reproductive age.

The Western Pacific region group highlighted that the region is very diverse, with low-, middle- and high-income countries with varied needs and concerns related to preconception care. It stated that each country has cultural and ethnic differences, which may dictate the menu of interventions that should go into the preconception care package.

### Suggestions for next steps

The African region group noted that the process of implementing preconception care should happen slowly. It stated various considerations and needs for implementing preconception care interventions:

- The interventions need to be packaged in a logical manner, and a monitoring and evaluation plan must be in place.
- The interventions should be integrated into existing programmes.
- The young adolescent period (age 10–14 years) could be a good entry point.
- The most prevalent and emerging problems need to be identified.
- There is a need for capacity building, including among health-care workers.
- Needs-assessment tools are required.
- There is a need for research in the field.

The European region group stated there is a need to get more evidence on preconception care to:

- generate awareness through increased and improved communication;
- engage politicians;
- establish education programmes, e.g. in schools.

The South-East Asia region group emphasized a need to organize a regional consultation and suggested that linkages should be made with ongoing efforts to focus increasingly on birth defects.

The Western Pacific region group stated it would appreciate guidelines on preconception care for adaptation at both the regional and the country level. It noted there is a need for an inventory of preconception care-related

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activities already being implemented in the countries in the region, and there is a need for a regional meeting on preconception care for which technical and financial assistance from WHO headquarters is needed.

### Presentation of the 'ears' group

A working group of participants was identified at the start of the meeting to function as the 'ears' of the participants and to report to the group on the discussions that they heard. The working group comprised the following participants:

- Carmencita Padilla
- Josephat Byamugisha
- Atif Rahman
- Jane Ferguson
- Christopher Howson (chair)

### Working premise of the meeting

- There is much to do and much that can be done.
- Not all issues will be resolved in the 2-day meeting.
- We must begin with small steps.

### Starting point

Objectives include the following:

- Place preconception care as part of an overall strategy to improve women's health and to prevent maternal and child mortality and morbidity.
- Develop consensus on a package of promotive, preventive and curative interventions to be delivered.
- Identify mechanisms of delivering the package through existing public health programmes.
- Prepare an agenda of action in the context of planned parenthood and wanted pregnancies.

The following terms are currently used:

- *preconception care* – any preventive, promotive or curative health-care intervention provided to women of childbearing age in the period before pregnancy (proximal – within 2 years or distal) and between consecutive pregnancies to improve health-related outcomes for women, newborns and adolescents;
- *periconception care* – care 3 months before or after conception;
- *interconception care* – care between pregnancies.

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### Definitions

We need definitions that are consistent, simple, clear and understandable – and thus ‘sellable’ – to various stakeholders, including policy-makers and the general public. We also need a conceptual framework in which to embed these definitions.

- Should we use the term ‘preconception care’ or ‘pre-pregnancy care’, or should we use other terms? (Both ‘preconception’ and ‘pre-pregnancy’ have social, religious and cultural implications.)
- If the target populations include partners/spouses and siblings, should we use the term ‘family health’?
- If we acknowledge the importance of peer-to-peer messaging, the use of social media and the conveyance of the message that preconception health improves health across the lifespan, including adult health, should we use the term ‘community health’?
- Should we simply use a term according to the intervention and target population addressed, such as ‘adolescent health’, ‘environmental health’ or ‘occupational health’?

Each region may need to develop a working terminology best suited to its own needs.

### Importance of preconception care

*Preconception care:*

- extends the maternal, neonatal and child health continuum of care and thus contributes to MDGs 4 and 5;
- empowers women and thus contributes to MDG 3;
- offers a window of opportunity to introduce a positive agenda (better outcomes for the baby and strengthening families and community health);
- offers a wedge or a space for other interventions (e.g. prevention of use of and exposure to tobacco);
- promotes intersectoral collaboration (within the health sector and between the health sector and other sectors).

### Risks of preconception care

Risks of preconception care include the following:

- blaming women (stigmatization, undermining women’s autonomy);
- forgetting men’s health;
- intruding on the privacy of women;
- diluting effects of certain interventions if stretched too far and neglecting existing maternal, neonatal and child health interventions that work;
- medicalizing issues that are better dealt with by experts or stakeholders in other domains (e.g. sociocultural, religious).

## ANNEX 1: SYNTHESSES OF GROUP WORK ASSIGNMENTS

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### Target populations

Target populations include the following:

- adolescents;
- couples-to-be and couples, including the spouse/partner;
- families, including siblings and extended family;
- the workforce, both women and men;
- communities.

### Factors to consider

The following groups should be considered:

- people who require special medical attention, such as people with diabetes, epilepsy, sickle-cell disease or thalassaemia;
- people at risk of maternal and child health problems, such as adolescents (given the high number of births in low- and middle-income countries and the relatively lower availability of interventions and programmes serving them), and people experiencing psychosocial risk factors.

### Preconception interventions

The package of interventions is likely to vary according to the specific epidemiological situation of the population, the resources available (human, technical, financial) and cultural considerations.

The package can be drawn from interventions identified as effective in the Aga Khan University review:

- tobacco use prevention and cessation programmes;
- nutrition programmes;
- vaccine programmes;
- fertility and infertility programmes;
- female genital mutilation programmes;
- HIV testing and counselling programmes;
- mental health programmes;
- substance use programmes;
- intimate partner and sexual violence programmes;
- premarital counselling programmes;
- genetic counselling programmes;
- maternal and child health programmes;
- adolescent-friendly services;
- occupational health programmes.

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Wherever feasible, we should:

- package preconception interventions according to the target group and the mode of delivery;
- package and market preconception interventions to attract adequate attention;
- integrate preconception care into existing programmes according to the country's needs and priorities.

Delivery channels and mechanisms for preconception care (which should take into account inequalities of all types, not only economic) could include the following:

- primary care;
- community-based organizations and programmes such as faith-based organizations;
- existing ministry of health programmes;
- the educational system;
- social welfare programmes;
- workplace programmes.

*Key point* – Delivery mechanisms should not stigmatize or undermine the role of women and families as key decision-makers or groups at risk.

### **Marketing preconception care**

We need to think about how to 'market' preconception care to policy-makers, donors, the media, target populations and other stakeholders (especially those that do not know they are stakeholders) and emphasize important aspects of preconception care, such as the following:

- Preconception care strengthens health across the lifespan from birth through adulthood.
- Preconception care strengthens individuals, families and communities (huge value-added).
- Strengthening preconception health strengthens other programmes, including programmes in other sectors, such as education.

Marketing can be done using a variety of methods:

- Preconception care may make use of mobile and electronic social media e.g. SMS, Facebook, YouTube, Twitter to convey health messages and information.
- Preconception care may make use of mass media (e.g. television, radio, popular magazines) to reach a majority of people.

## ANNEX 1: SYNTHESSES OF GROUP WORK ASSIGNMENTS

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- Preconception care may better target the true change agents, particularly at the community level (emphasize community sources and leaders wherever possible).

Economic analyses are essential to the success of preconception care programmes.

There is a rich body of experience to learn from. These experiences should be identified and recorded. Examples include programmes:

- tailored to specific target groups (Dutch experience) linked to existing programmes (e.g. folic acid supplementation integrated with messages about the importance of preconception health in Bangladesh);
- taking advantage of routine visits (e.g. counselling of married couples in Sri Lanka);
- using the community to convey preconception messages (e.g. youth counsellors in the Philippines);
- embedding programmes in community entities where the messengers are trusted (e.g. faith-based organizations).

We should begin where “the fruit is luscious” (Aga Khan University’s analysis) and “low” (where intervention is needed and feasible).

Possible action steps (assuming first-step interventions or packages of interventions are identified and agreed upon) include the following:

- Develop and implement needs-assessment tools and methods for application at the national, regional and local level (ideally include economic analyses).
- Use results to influence policy development.
- Develop capacity to implement programmes.
- Develop marketing strategies for multiple stakeholders (tailor messages carefully to specific audiences).
- Conduct research, such as programme outcome evaluation and economic analysis, both regional and national (e.g. fortification versus interventions targeted to specific populations).
- Encourage publications to broaden evidence base (programme case studies, best practices), and offer support for this.

6 February – Day 1  
(Chaired by Arnold  
Christianson)

### Opening session

- Welcoming remarks by E. Mason (Director, WHO Department of Maternal, Newborn, Child and Adolescent Health).
- Introductory comments by F. Donnay (Bill & Melinda Gates Foundation) and Y. Poortman (Preparing for Life Initiative).
- Introductions and declarations of interests by participants (all participants were required to state whether they had a conflict of interest in the subjects being discussed at the meeting).

### Overview of meeting objectives, anticipated outputs and agenda

- V. Chandra-Mouli (WHO Department of Maternal, Newborn, Child and Adolescent Health) presented the objectives of the meeting, the anticipated outputs and an overview of the agenda.<sup>7</sup>

### Presentation of the rationale and place of preconception care

- Z. Bhutta (Aga Khan University) presented the rationale and place of preconception care as part of an overall approach to improving the health of populations and reducing maternal and childhood mortality and morbidity.
- Discussion.

### Panel presentation on experiences in delivering preconception care

- Panel presentation by one participant from each of the six WHO regions on experiences in delivering preconception care.
- Discussion.

### Evidence base on preconception care

- C. Christiansen (WHO Department of Maternal, Newborn, Child and Adolescent Health) gave an introduction to the process used to develop the menu of effective interventions.
- C. Boyle (Centers for Disease Control and Prevention), E. Steegers (Erasmus University Medical Centre) and Z. Bhutta gave brief presentations on the reviews on preconception care that they have led or been associated with.
- Presentations by WHO departments, followed by questions and comments on:
  - the nature and scope of health problems, problem behaviours and risk factors that contribute to maternal and childhood mortality and morbidity;

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<sup>7</sup> The objectives of the meeting were:

- to develop a shared understanding of the place of preconception care as part of an overall strategy to prevent maternal and childhood mortality and morbidity;
- to develop consensus on a package of promotive, preventive and curative health interventions to be delivered in the context of preconception care (in both the pre-pregnancy and interpregnancy periods); and on mechanisms of delivering the package through existing public health programmes in low- and middle-income countries to prevent maternal and childhood mortality and morbidity;
- to develop an agenda for action.

The anticipated outputs of the meeting were:

- a brief report outlining the discussions held, and the conclusions and recommendations of the meeting;
- a time-bound agenda for moving the agenda forward, in line with the conclusions and recommendations of the meeting.

## ANNEX 2: ANNOTATED AGENDA AND PROCEEDINGS OF THE MEETING

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- effective interventions to address these problems;
- existing mechanisms through which such interventions could be delivered.
- Presentations by representatives from the various departments on:
  - nutritional problems;
  - vaccine-preventable infections;
  - tobacco use;
  - environmental health;
  - congenital conditions, including genetic disorders;
  - pregnancies that are too early or are in rapid succession;
  - female genital mutilation;
  - STIs and reproductive tract infections, including HIV;
  - mental health problems;
  - use of alcohol and illicit drugs;
  - intimate partner and sexual violence.

### **Presentation on a preconception care package and its delivery**

- Z. Bhutta gave a presentation on a proposed package of effective and feasible promotive, preventive and curative interventions for preconception care to prevent maternal and childhood morbidity and mortality, and mechanisms for delivering this package in low- and middle-income countries.
- Discussion.

### **Recap of Day 1 and introduction to Day 2**

#### **Reception hosted by Preparing for Life Initiative**

7 February - Day 2  
(Chaired by Rukshana Haider)

### **Recap of Day 1 and introduction to Day 2**

#### **Group work session 1**

- Group work on the following five questions:
  1. What are the potential benefits of preconception care? How could these be optimized?
  2. What are the potential risks of preconception care? How could these be minimized?
  3. What should the contents of a global package of interventions on preconception care for preventing maternal and childhood mortality and morbidity include? How could the package be delivered?
  4. Which segments in a population should be targeted with preconception care?
  5. What are the pros and cons of using the terms 'preconception care' and 'pre-pregnancy care'?



## **ANNEX 2: ANNOTATED AGENDA AND PROCEEDINGS OF THE MEETING**

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- Feedback in plenary, question by question. After each, there was a plenary discussion.

### **Group work session 2**

- The five regional groups discussed the same five questions as in group work session 1, paying particular attention to regional considerations.
- Feedback in plenary, leading to a plenary discussion.

### **Exercise in plenary on next steps**

- Each participant wrote on a card one thing they believed would be an important next step in moving the preconception care agenda.
- The cards were clustered and organized and reviewed in plenary.
- Discussion on next steps.

### **Presentation by the 'ears' group**

- The 'ears' group consisted of five members identified at the start of the meeting to function as the 'ears' of the participants and to report to the group on the discussions that they heard.
- Discussion.

### **Review of conclusions and recommendations**

- Recap of conclusions and recommendations.

### **Closing session**

- Closing remarks by E. Mason, F. Donnay and Y. Poortman.

## ANNEX 2: ANNOTATED AGENDA AND PROCEEDINGS OF THE MEETING

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### Participants

#### *African region*

Josaphat Byamugisha, Department of Obstetrics and Gynaecology, Makerere University College of Health Sciences School of Medicine, Uganda

Arnold Christianson, Division of Human Genetics, National Health

Laboratory Service and University of the Witwatersrand, South Africa

Coceka Mnyani, Anova Health Institute, South Africa

#### *American region*

Coleen A. Boyle, National Center on Birth Defects and Developmental Disabilities, Centers for Disease Control and Prevention, United States of America

Fariyal F. Fikree, Evidence to Action, Pathfinder International and PATH, United States

#### *Eastern Mediterranean region*

Anwar Al-Thaher, United Nations Relief and Works Agency for Palestine Refugees in the Near East, Jordan

Faysal H. El-Kak, Faculty of Health Sciences, American University of Beirut, Lebanon

Amina Farag, Department of Pesticide Chemistry and Technology, Alexandria University, Egypt

Anna Rajab, Genetics Unit, Ministry of Health, Oman

#### *European region*

Patricia Aguilar-Martinez, Laboratoire d'hématologie, Hôpital Saint Eloi, France

Semiha Denktas, Erasmus Centre for Migration, Ethnicity and Health, the Netherlands

Martina Ens-Dokkum, Leiden University Medical Centre, the Netherlands

Leo P ten Kate, Department of Clinical Genetics, VU University Medical Center, The Netherlands

Alastair Kent, Genetic Alliance UK, United Kingdom of Great Britain and Northern Ireland

Pierpaolo Mastroiacovo, Centre of the International Clearinghouse for Birth Defects Surveillance and Research, Italy

Irmgard Nippert, Institut für Humangenetik, Wesfälische Wilhelms- Universität Münster, Germany

Cor Oosterwijk, Dutch Genetic Alliance, Belgium

Ysbrand Poortman, Preparing for Life Initiative, the Netherlands

Eric A. Steegers, Division of Obstetrics and Prenatal Medicine, Erasmus University Medical Center, the Netherlands

Pauline Verloove, Leiden University, the Netherlands

Peter Weber, DSM Nutritional Products Ltd, Switzerland

#### *South-East Asian region*

Rukhsana Haider, Training and Assistance for Health and Nutrition Foundation, Bangladesh

Vijay Kumar, Survival for Women and Children Foundation, India

Nethanjali Mapitigama, Gender and Women's Health, Family Health Bureau, Sri Lanka

Suneeta Mittal, Department of Obstetrics and Gynaecology; All India Institute of Medical Sciences, India

Atif Rahman, University of Liverpool, United Kingdom of Great Britain and Northern Ireland; Human Development Research Foundation, Pakistan

Sanjeev V. Thomas, Sree Chitra Tirunal Institute for Medical Sciences and Technology, India

#### *Western Pacific region*

Carmencita D. Padilla, Newborn Screening Reference Center, University of the Philippines Manila, the Philippines

Nanbert Zhong, Peking University Center of Medical Genetics; China

#### *Other organizations*

Dr Zulfiqar Bhutta, Division of Women and Child Health, Aga Khan University, Pakistan

Sohni Dean, Department of Pediatrics, Aga Khan University Hospital, Pakistan

## ANNEX 2: ANNOTATED AGENDA AND PROCEEDINGS OF THE MEETING

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France Donnay, Maternal, Newborn and Child Health, Bill & Melinda Gates Foundation, United States of America

Kate Teela, Maternal, Newborn and Child Health, Bill & Melinda Gates Foundation, United States of America

Mary-Elizabeth Reeve, March of Dimes Foundation, United States of America

Christopher Howson, March of Dimes Foundation, United States of America

Renée Van de Weerd, Maternal, Newborn and Child Health, UNICEF, United States of America

Catherine Lane, USAID, United States of America

Priya Matzen, Novo Nordisk A/S, Denmark

Carole Presern, Partnership for Maternal, Newborn and Child Health, Switzerland

Juana Willumsen, Independent Technical Writer, France

### *WHO African Region*

Olga Agbodjan-Prince, Child and Adolescent Health, Inter-country Support Team, West Africa

Andrew Mbewe, Child and Adolescent Health, WHO Country Office, Nigeria

### *WHO Eastern Mediterranean Region*

Ramez Mahaini, Women's and Reproductive Health, WHO Regional Office for the Eastern Mediterranean, Egypt

### *WHO European Region*

Valentina Baltag, Adolescent Health and Development, WHO Regional Office for Europe, Denmark

### *WHO South-East Asia Region*

Arvind Mathur, Making Pregnancy Safer, WHO Regional Office for South-East Asia, India

Neena Raina, Child and Adolescent Health, WHO Regional Office for South-East Asia, India

### *WHO Western Pacific Region*

Emmalita M. Mañalac, Maternal, Child Health and Nutrition, WHO Regional Office for the Western Pacific, the Philippines

*WHO headquarters – Maternal, Newborn, Child and Adolescent Health Department (Secretariat)*

Elizabeth Mason, Director

Samira Aboubaker

Paul Bloem

Krishna Bose

Venkatraman Chandra-Mouli

Charlotte Sigurdson Christiansen

Bernadette Daelmans, Coordinator

Jane Ferguson

Nicole Edith Grillon, Assistant

Matthews Mathai, Coordinator

Luwam Ogbaselassie (intern)

Severin von Xylander

*WHO headquarters – collaborating departments*

Avni Amin, Gender, Women and Health

Lubna Bhatti, Tobacco Free Initiative

Nicolas Clark, Mental Health and Substance Use

Tarun Dua, Mental Health and Substance Use

Philippe Duclos, Immunization, Vaccine and Biologicals

Ruth Etzel, Public Health and Environment

Gottfried Otto Hirnshall, Director, HIV/AIDS

Berit Sabine Kieselbach, Violence and Injury Protection

Michael T. Mbizvo, Director, Reproductive Health and Research

Mario Meriardi, Reproductive Health and Research

Hanna Tait Neufeld, Nutrition for Health and Development

Chiara Servili, Mental Health and Substance Use

Nathan Shaffer, HIV/AIDS

Sheryl Vanderpoel, Reproductive Health and Research

Mohammed Taghi Yasamy, Mental Health and Substance Use

## ANNEX 3: HEALTH PROBLEMS, PROBLEM BEHAVIOURS AND RISK FACTORS THAT CAN BE ADDRESSED IN PRE-PREGNANCY/INTERPREGNANCY, AND RELATED INTERVENTIONS

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This annex contains matrices on the following three questions:

1. Why were these health problems/problem behaviours/risk factors chosen?
2. Are there effective interventions to identify and address the health problems/problem behaviours/risk factors before pregnancy occurs?
3. Are there effective mechanisms to deliver these interventions in low- and middle-income countries?

The analytical framework for the matrices was developed by a working group consisting of Z. Bhutta (Aga Khan University), F. Donnay and K. Teela (Bill & Melinda Gates Foundation), C. Howson and M.-E. Reeve (March of Dimes Foundation), Y. Poortman and A. Christianson (Preparing for Life Initiative) and E. Mason, C. Christiansen and V. Chandra-Mouli (WHO Department of Maternal, Newborn, Child and Adolescent Health).

The matrices were prepared by or in conjunction with staff from nine different WHO departments, which are acknowledged in the individual sections. Grateful thanks are given to all for their work against a tight timeframe.

C. Christiansen and V. Chandra-Mouli worked with S. Dean (Aga Khan University) and J. Willumsen (independent technical writer) to put together the matrices in advance of the meeting. Following the meeting, C. Christiansen and V. Chandra-Mouli worked with all the above-mentioned WHO departments to revise and finalize the matrices. E. Mason guided the work throughout the process.

### Defining the concepts and terms used in the matrices

In this part of the report, preconception care is defined as the provision of biomedical, behavioural and social health interventions to women and couples before conception (both before a pregnancy and between subsequent pregnancies). The health problems/problem behaviours/risk factors included contribute to maternal or childhood morbidity or mortality and are of promotive, preventive and curative character. The interventions can be delivered within the health-care system (at the community, primary or referral level) or at the community level (e.g. in schools or community programmes) and are targeted mainly at low- and middle-income countries.

## ANNEX 3: HEALTH PROBLEMS, PROBLEM BEHAVIOURS AND RISK FACTORS

### Nutritional conditions

(Developed in conjunction with the Department of Nutrition for Health and Development)

#### 1. Why were these health problems/problem behaviours/risk factors chosen?

Folic acid insufficiency before conception and during the first trimester is associated with a higher prevalence of neural tube defects. Adequate folic acid supplementation before pregnancy and during early pregnancy can help to reduce the risk of a neural tube defect-affected pregnancy.<sup>8</sup>

All women of reproductive age are at risk of iron deficiency. It is estimated that 30% of women globally are anaemic, with at least half of these cases arising from iron deficiency. Anaemia and iron deficiency are associated with lower physical capacity in adults and poor cognitive and physical development in children.<sup>9</sup>

Maternal undernutrition and iron-deficiency anaemia increase the risk of maternal death, accounting for at least 20% of maternal mortality. Maternal and child undernutrition is the underlying cause of 3.5 million deaths annually, 35% of the disease burden in children younger than 5 years, and 11% of total global disability-adjusted life-years. Maternal undernutrition (body mass index (BMI) <18.5 kg/m<sup>2</sup>) ranges from 10% to 19% in most developing countries.<sup>10</sup> Low BMI, often combined with short stature (<145 cm), is particularly common among women in lower-income countries, where many families live in circumstances of chronic food insecurity. Maternal low BMI can result in poor fetal development. Short stature can also put the mother and child at risk of complications during pregnancy and delivery. Infants also tend to be born with lower birth weights, which can increase the newborn risk of mortality. These children are more likely to develop noncommunicable diseases such as type 2 diabetes and cardiovascular disease in later life.<sup>11</sup>

Globally it is estimated that 35% of adult women are overweight. Women who are overweight (BMI ≥25 kg/m<sup>2</sup>) or obese (BMI >30 kg/m<sup>2</sup>) before pregnancy are at greater risk of developing hypertensive disorders during pregnancy such as eclampsia or pre-eclampsia. They are also at greater risk of developing gestational diabetes mellitus or may have pre-existing type 2 diabetes before conception. Overweight and obesity may increase the risk of stillbirth, difficult delivery, haemorrhage and birth defects. Infants of overweight women tend to be born larger and may be at increased risk of developing obesity and type 2 diabetes as children and adolescents.<sup>12</sup> Obesity is associated with an elevated risk of type 2 diabetes, infertility, gallbladder disease, limitations in mobility, osteoarthritis, sleep apnoea, respiratory impairment, social stigmatization and a variety of cancers (e.g. breast, uterine, colon). Overweight status, including weight retained from a previous pregnancy, may also predict subsequent obesity.<sup>13</sup>

Adding to maternal micronutrient stores both before conception and during the postpartum period is essential to satisfy the increased nutrient requirements during the lactation period and to add to nutrient reserves

<sup>8</sup> *Prevention of neural tube defects: standards for maternal and neonatal care*. Geneva, World Health Organization, 2006.

<sup>9</sup> *Progress in nutrition: sixth report on the world nutrition situation*. Geneva, United Nations Standing Committee on Nutrition Secretariat, 2010.

<sup>10</sup> Black RE et al. Maternal and child undernutrition: global and regional exposures and health consequences. *Lancet*, 2008, 371:243-260.

<sup>11</sup> *Low birthweight: country, regional and global estimates*. New York, United Nations Children's Fund and World Health Organization, 2004.

<sup>12</sup> *Global status report on noncommunicable diseases*. Geneva, World Health Organization, 2010.

<sup>13</sup> *Progress in nutrition: sixth report on the world nutrition situation*. Geneva, United Nations Standing Committee on Nutrition Secretariat, 2010.

## ANNEX 3: HEALTH PROBLEMS, PROBLEM BEHAVIOURS AND RISK FACTORS

leading up to the pregnancy. In addition to iron and folic acid, several other potential micronutrient deficiencies can negatively affect the health of the mother and fetus if not targeted during the preconception period and between pregnancies. For example, iodine is essential for the healthy brain development of the fetus and young child, and calcium supplementation improves calcium intake and reduces the risk of the woman developing hypertensive disorders during pregnancy.

**Table A3.1** Nutrition-related health problems, problem behaviours and risk factors that contribute to maternal and childhood mortality and morbidity

Health problems/problem behaviours/risk factors	Contribution to maternal mortality and morbidity	Contribution to childhood mortality and morbidity
Folic acid insufficiency		Neural tube defects, other birth defects
Iron-deficiency anaemia	Maternal morbidities and mortality	Child mortality, low birth weight, preterm birth, low child cognition (intelligence quotient)
Maternal underweight, often combined with low stature	Complications during pregnancy and delivery, nutrient deficiencies (potentially resulting in obstetric complications)	Preterm birth, low birth weight, stillbirth, type 2 diabetes and cardiovascular disease in later life
Maternal overweight and obesity	Pre-existing type 2 diabetes, hypertensive disease of pregnancy, gestational diabetes, hypertensive and thromboembolic disorders, postpartum haemorrhage and anaemia, caesarean delivery, induction of labour, instrumental delivery, shoulder dystocia	Birth defects, neural tube defects, preterm delivery, stillbirth, macrosomia
Untreated diabetes mellitus (type 2 and gestational)	Type 2 diabetes, spontaneous abortion, worsening of existing microvascular complications, urinary tract and other infections, preterm labour, obstetric trauma, caesarean section, hypertension, pre-eclampsia, gestational diabetes mellitus, obstetric trauma, caesarean section, pre-eclampsia	Birth defects, stillbirth, macrosomia with shoulder dystocia/nerve palsy if delivered vaginally, hypoglycaemia after birth, type 2 diabetes in later life
Iodine		Abortion, stillbirth, mental retardation, cretinism, increased neonatal/infant mortality, goitre, hypothyroidism
Calcium	Maternal eclampsia, pre-eclampsia	

**2. Are there effective interventions to identify and address the health problems/problem behaviours/risk factors before pregnancy occurs?**

See Table A3.2.

**3. Are there effective mechanisms to deliver these interventions in low- and middle-income countries?**

See Table A3.2.

## ANNEX 3: HEALTH PROBLEMS, PROBLEM BEHAVIOURS AND RISK FACTORS

**Table A3.2** Evidence-based interventions to address nutrition related health problems, problem behaviours and risk factors, and mechanisms of delivering them

Health problems/problem behaviours/risk factors that could be addressed through promotional, preventive and curative health interventions in pre-pregnancy/interpregnancy	Evidence-based preventive and curative health interventions that could be delivered in pre-pregnancy/interpregnancy	Existing delivery mechanisms that could be used to deliver interventions at scale in low- and middle-income countries
Consequences of folic acid insufficiency	Iron and folic acid supplementation (e.g. food fortification, administration of tablets, use of micronutrient powders containing folic acid); information; education	Primary care facilities; community settings (such as fortification by food producers and at home; mass media ;
Consequences of anaemia and iron deficiency	Iron and folic acid supplementation (e.g. food fortification, use of micronutrient powders containing iron); screening for anaemia; information; education	Primary care facilities; community settings (such as food fortification at home); mass media
Underweight	Nutrition education (counselling about risks to own health and future pregnancies); nutritional monitoring; provision of energy- and nutrient-dense supplementary foods	Primary care facilities; community settings; mass media; dietary diversity programmes; linkage to community and societal level initiatives to improve food security
Overweight and obesity	Nutrition education (counselling about risks to own health and future pregnancies); nutritional monitoring; nutrition counselling (lower caloric intake, increase physical activity, structured weight-loss programme, continued breastfeeding); community-based prevention programmes (e.g. increasing opportunities to physical exercise and to healthy foods)	Primary care facilities; community settings; mass media
Diabetes mellitus	Information and education; community-wide or national screening among populations at high risk; blood glucose monitoring, management of diabetes (glycaemic control before, during and after pregnancy); exercise; nutritional counselling (screening for pre-existing type 2 diabetes and every 1-3 years after gestational diabetes)	Primary care facilities; community settings; mass media
Iodine deficiency	Salt iodization	Iodization by salt producers

## ANNEX 3: HEALTH PROBLEMS, PROBLEM BEHAVIOURS AND RISK FACTORS

### Vaccine-preventable diseases

(Developed in conjunction with the Department of Immunization, Vaccines and Biologicals)

#### 1. Why were these health problems/problem behaviours/risk factors chosen?

In 1996, an estimated 22 000 babies in Africa, 46 000 babies in South-East Asia and almost 13 000 babies in the Western Pacific were born with congenital rubella syndrome. Very few countries in these regions had introduced rubella-containing vaccine by 2008, and therefore the current burden of congenital rubella syndrome in these settings is thought to be similar to that estimated for 1996.<sup>14</sup>

WHO estimates that in 2008 (the latest year for which estimates are available), 59 000 newborns died from neonatal tetanus, a 92% reduction from the situation in the late 1980s.<sup>15,16</sup> By the end of 2011, 36 countries still had not eliminated maternal and neonatal tetanus in all districts.<sup>17</sup>

Worldwide, 2 billion people have been infected with hepatitis B virus and 360 million have chronic hepatitis B, resulting in 600 000 deaths annually. Women with chronic hepatitis B virus infection are at high risk of developing liver disease, including cirrhosis and hepatocellular carcinoma. The risk of maternal-to-child transmission ranges from 10% if the woman is hepatitis B virus surface antigen- (HBsAg-) positive to 90% if she is both HBsAg- and hepatitis 'e' antigen (HBeAg)-positive.<sup>18</sup> Most perinatal transmissions take place at birth or in infancy or early childhood, but intrauterine transmission is also possible. About 90% of infants infected during the first year of life develop chronic infections. About 25% of adults who were chronically infected during childhood die from liver cancer or cirrhosis.<sup>19</sup>

A vaccine against hepatitis B has been available since 1982. Hepatitis B vaccine is 95% effective in preventing hepatitis B virus infection and its chronic consequences, and it is the first vaccine against a major human cancer. The vaccine can be given as either three or four separate doses<sup>20</sup> as part of existing routine immunization schedules. All infants should receive their first dose of hepatitis B vaccine as soon as possible after birth (i.e. within 24 hours).<sup>21</sup>

**Table A3.3** Vaccine-preventable disease-related health problems, problem behaviours and risk factors that contribute to maternal and childhood mortality and morbidity

Health problems/problem behaviours/risk factors	Contribution to maternal mortality and morbidity	Contribution to childhood mortality and morbidity
Rubella	Spontaneous or therapeutic abortion	Stillbirth, congenital rubella syndrome
Tetanus	Maternal infection, death	Neonatal infection, death
Hepatitis B	Chronic liver disease, premature death	Neonatal hepatitis B infection

<sup>14</sup> World Health Organization. Rubella vaccines: WHO position paper. *Weekly Epidemiological Record*, 2011, 86:301-316.

<sup>15</sup> Ibid.

<sup>16</sup> In the 1980s, it was estimated that there were 30 000 maternal tetanus deaths annually. These estimates have not been updated, but it is assumed that the reduction has been similar to that of neonatal deaths (i.e. 92%).

<sup>17</sup> World Health Organization. Tetanus vaccine: WHO position paper. *Weekly Epidemiological Record*, 2006, 81:198-208.

<sup>18</sup> HBsAg may be detected in serum 30-60 days following infection and may persist for widely variable periods of time. An important proportion (7-40%) of individuals who are HBsAg-positive may also carry HBeAg, which is associated with high infectivity. Unless vaccinated at birth, the majority of children born to mothers who are HBeAg-positive become chronically infected.

<sup>19</sup> World Health Organization. Hepatitis B vaccine: WHO position paper. *Weekly Epidemiological Record*, 2009, 84:405-420.

<sup>20</sup> Four doses can be given for programmatic reasons if a combination vaccine is being used.

<sup>21</sup> Hepatitis B vaccine: WHO position paper. *Weekly Epidemiological Record*, 2009, 84:405-420.



## ANNEX 3: HEALTH PROBLEMS, PROBLEM BEHAVIOURS AND RISK FACTORS

2. Are there effective interventions to identify and address the health problems, problem behaviours or risk factors before pregnancy occurs?

See Table A3.4.

3. Are there effective mechanisms to deliver these interventions in low- and middle-income countries?

Among vaccine-preventable infectious diseases, rubella, tetanus and hepatitis B may increase newborn morbidity and mortality if infection occurs during pregnancy. WHO recommends routine childhood immunization against these diseases. Although governments generally provide the vaccines free of cost in developing countries, there are still barriers that prevent some children from receiving them. Consequently, some women are at risk from these vaccine-preventable diseases during the preconception period. WHO advocates that health-care providers check the vaccination status of adolescent girls and women, and that those who have not been fully vaccinated have their course of immunization completed. For rubella, it is recommended that women avoid pregnancy for at least 1 month after vaccination. Preconception screening provides the opportunity to increase immunization coverage to prevent transmission of infectious diseases and to improve maternal and newborn outcomes.

**Table A3.4** Evidence-based interventions to address vaccine-preventable disease-related health problems, problem behaviours and risk factors, and mechanisms of delivering them

Health problems/problem behaviours/risk factors that could be addressed through promotional, preventive and curative health interventions in pre-pregnancy/interpregnancy	Evidence-based preventive and curative health interventions that could be delivered in pre-pregnancy/interpregnancy	Existing delivery mechanisms that could be used to deliver interventions at scale in low- and middle-income countries
Rubella	Rubella-containing vaccine (monovalent rubella [R] or measles-rubella [MR] or measles-mumps-rubella [MMR]) for women who have not been vaccinated previously	National immunization programme
Tetanus	Tetanus- and diphtheria-containing (Td) vaccine for women who were not fully immunized in childhood or previous pregnancies	National immunization programme
Hepatitis B	Hepatitis B vaccination	National immunization programme

## ANNEX 3: HEALTH PROBLEMS, PROBLEM BEHAVIOURS AND RISK FACTORS

### Genetic conditions

(Developed in conjunction with the Preparing for Life Initiative)

#### 1. Why were these health problems, problem behaviours or risk factors chosen?

Genetic conditions are a group of congenital disorders (birth defects) that can be categorized as conditions that occur in specific areas or groups of people (sometimes improperly called ‘ethnicity-based genetic conditions’); conditions in which there is a family history, including consanguinity and disorders in one or both parents; and conditions identified in previous pregnancies. This classification is based mainly on the way the disorder can be identified at the personal or population level. This separation is sometimes artificial, however, and there can be overlaps between two or more categories. The disorders given in Table A3.5 are examples of the main conditions that have to be considered, but this list is not exhaustive. Each country and world region has to define its own list of disorders for which a specific effort has to be made.<sup>22</sup>

Genetic disorders can be caused by single-gene defects, chromosome disorders and multi-gene defects (e.g. diabetes; this is not included in this section, as it is covered in other matrices).

Haemoglobin disorders are among the most prevalent genetic diseases worldwide. It is estimated that each year over 300 000 babies with severe forms of these diseases are born worldwide, the majority in low- and middle-income countries. Approximately 5% of the world’s population are healthy carriers of a gene for sickle-cell disease or thalassaemia. The percentage of people who are carriers of the gene is as high as 25% in some regions.<sup>23,24,25,26</sup>

**Table A3.5 Genetic condition-related health problems, problem behaviours and risk factors that contribute to maternal and childhood mortality and morbidity**

Health problems/problem behaviour/risk factors	Contribution to maternal mortality and morbidity	Contribution to childhood mortality and morbidity
Single-gene disorders, e.g. sickle-cell disease, thalassaemia, glucose-6-phosphate dehydrogenase deficiency, bleeding disorders (particularly haemophilia), phenylketonuria, occulocutaneous albinism (sub-Saharan Africa), cystic fibrosis, Tay-Sachs disease, inborn errors of metabolism, X-linked mental retardation, genetic blindness or deafness	Depending on the disorder, these may contribute to some of the following: recurrent miscarriage, pregnancy complications (e.g. pre-eclampsia, maternal death), intellectual or physical disability	Depending on the disorder, these may contribute to some of the following: intrauterine death, hydrops fetalis (in alpha-thalassaemias and other red cell disorders), fetal growth retardation, preterm birth, complications of delivery (e.g. early death, respiratory distress, haemorrhage, anoxia), neonatal complications/manifestations (e.g. anaemia, haemolysis, convulsions, respiratory distress, cardiac failure)
Chromosome disorders, e.g. Down syndrome, disorders due to translocations	Recurrent miscarriage, preterm labour, premature rupture of membranes	Intrauterine death, fetal growth retardation, preterm birth, complications of delivery, neonatal complications/manifestations

<sup>22</sup> *Community genetics services: report of a WHO consultation on community genetics in low- and middle-income countries*. Geneva, World Health Organization, 2011 ([http://whqlibdoc.who.int/publications/2011/9789241501149\\_eng.pdf](http://whqlibdoc.who.int/publications/2011/9789241501149_eng.pdf)).

<sup>23</sup> *Sickle-cell disease and other haemoglobin disorders*. Fact sheet 308. Geneva, World Health Organization, 2011.

<sup>24</sup> *Management of births defects and haemoglobin disorders: report of a joint WHO-March of Dimes meeting*. Geneva, World Health Organization, 2006.

<sup>25</sup> *World Health Assembly resolution on sickle cell anaemia*. WHA59.20. Geneva, World Health Organization, 2006.

<sup>26</sup> *Executive Board resolution on thalassaemia and other haemoglobinopathies*. EB118.R1. Geneva, World Health Organization, 2006.

## ANNEX 3: HEALTH PROBLEMS, PROBLEM BEHAVIOURS AND RISK FACTORS

2. Are there effective interventions to identify and address the health problems, problem behaviours or risk factors before pregnancy occurs?

A minimum package of interventions to be used for the prevention and control of genetic diseases at the country level has been listed in a WHO expert consultation on community genetics.<sup>27</sup> Some of these interventions go beyond the scope of preconception care, such as training of health professionals in the basic concepts of genetics and their application to prevent and control genetic diseases. In Table A3.6, only preconception care interventions and their mechanisms are included.

3. Are there effective mechanisms to deliver these interventions in low- and middle-income countries?

**Table A3.6** Evidence-based interventions to address genetic condition-related health problems, problem behaviours and risk factors, and mechanisms of delivering them

Health problems/problem behaviours/risk factors that could be addressed through promotional, preventive and curative health interventions in pre-pregnancy/interpregnancy	Evidence-based preventive and curative health interventions that could be delivered in pre-pregnancy/interpregnancy	Existing delivery mechanisms that could be used to deliver interventions at scale in low- and middle-income countries
Various forms of genetic conditions listed in Table A3.5	Taking a thorough family history, including asking about age of parents, ethnicity, consanguinity and past medical and obstetric history; establish precise diagnosis of genetic disease; family planning needs and options; genetic counselling, carrier screening and testing; appropriate treatment; community-based education; community-wide or national screening among populations at high risk; population-wide screening	Primary care facilities; community genetic services; referral facilities/specialized services

<sup>27</sup> *Community genetics services: report of a WHO consultation on community genetics in low- and middle-income countries*. Geneva, World Health Organization, 2011 ([http://whqlibdoc.who.int/publications/2011/9789241501149\\_eng.pdf](http://whqlibdoc.who.int/publications/2011/9789241501149_eng.pdf)).

## ANNEX 3: HEALTH PROBLEMS, PROBLEM BEHAVIOURS AND RISK FACTORS

### Environmental health

(Developed in conjunction with the Department of Public Health and Environment)

#### 1. Why were these health problems, problem behaviours or risk factors chosen?

Some 3 billion people worldwide are exposed to indoor air pollution from the use of solid biomass fuels. Women and children are most at risk, since they spend most of their time in the home. Indoor air pollution may lead to chronic obstructive pulmonary disease and lung cancer. It may also be a risk factor for primary or reactivation tuberculosis. In many countries, the use of biomass as a fuel for cooking is problematic in other ways, since women are usually responsible for collecting the cow dung, wood or coal to be used. It also increases the risk of women and children being burnt.<sup>28</sup>

**Table A3.7** Environmental health-related health problems, problem behaviours and risk factors that contribute to maternal and childhood mortality and morbidity

Health problems/problem behaviours/risk factors	Contribution to maternal mortality and morbidity	Contribution to childhood mortality and morbidity
Ionizing radiation	First-trimester miscarriage	Fetal growth restriction, impaired brain function, microcephaly, childhood cancers
Pesticides	Early spontaneous abortion	Childhood cancers
Lead or mercury pollution	Miscarriage, early spontaneous abortion, stillbirth, anaemia	Central nervous system damage, fetal growth restriction, preterm births
Indoor air pollution	Stillbirth, chronic obstructive pulmonary disease, lung cancer (from coal use)	Pneumonia, fetal growth restriction

#### 2. Are there effective interventions to identify and address the health problems, problem behaviours or risk factors before pregnancy occurs?

See Table A3.8.

#### 3. Are there effective mechanisms to deliver these interventions in low- and middle-income countries?

See Table A3.8.

<sup>28</sup> Smith KR et al. Indoor air pollution from household use of solid fuels. In: Ezzati M, ed. *Comparative quantification of health risks: global and regional burden of disease attributable to selected major risk factors*. Geneva, World Health Organization, 2004.

## ANNEX 3: HEALTH PROBLEMS, PROBLEM BEHAVIOURS AND RISK FACTORS

**Table A3.8** Evidence-based interventions to address environmental health-related health problems, problem behaviours and risk factors, and mechanisms of delivering them

Health problems/problem behaviours/risk factors that could be addressed through promotional, preventive and curative health interventions in pre-pregnancy/interpregnancy	Evidence-based preventive and curative health interventions that could be delivered in pre-pregnancy/interpregnancy	Existing delivery mechanisms that could be used to deliver interventions at scale in low- and middle-income countries
Consequences of exposure to ionizing radiation	Anticipatory guidance and protection from unnecessary radiation exposure in occupational, environmental and medical settings	Primary care facilities
Consequences of exposure to pesticides	Anticipatory guidance and avoidance of unnecessary pesticide use; alternatives to pesticides	Primary care facilities
Consequences of exposure to lead and mercury pollution	Anticipatory guidance and protection from lead exposure (including workplaces); local fish advisories to alert pregnant women and women of childbearing age about levels of methyl mercury in fish	Primary care facilities
Consequences of exposure to indoor air pollution	Anticipatory guidance and use of improved stoves; use of cleaner liquid/gaseous fuels	Primary care facilities; linkage to organizations that provide subsidies or microfinance

## ANNEX 3: HEALTH PROBLEMS, PROBLEM BEHAVIOURS AND RISK FACTORS

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### Infertility/subfertility

(Developed in conjunction with the Department of Reproductive Health and Research)

#### 1. Why were these health problems, problem behaviours or risk factors chosen?

Pre-pregnancy counselling, recommendation and guidance documents often neglect to recognize that many women, men and couples who want to have a child have difficulties becoming pregnant.

#### *High global health burden of childlessness*

Based on the Demographic Health Survey (1994–2000), WHO has estimated that 186 million women (a proxy for couples, as estimates for men are not available) in developing countries experience childlessness despite 5 years of attempting for pregnancy or a live birth.<sup>29</sup> This statistically translates into one in every four couples of reproductive age in developing countries presenting with an unfulfilled desire for a wanted pregnancy. Therefore, although one couple may have eight children and an unmet need for contraception, the neighbouring couple may be struggling to have just one child.

#### *Maternal morbidity*

Inability to have a successful healthy birth (infertility/subfertility) can be defined as either a disease of the reproductive tract (no reproductive success after 1 year of actively attempting for a pregnancy) or a disability that results in an impairment of function. Estimates generated for the First WHO/World Bank Report on Disability depict 35 million women with primary or secondary infertility (maternal morbidity) as a result of either maternal sepsis or infection due to unsafe abortions.<sup>30</sup> The burden related to maternal morbidity has been found predominantly in developing and transitional countries and represents the fifth largest global burden of all disabilities evaluated within women of reproductive age.

#### *Social barriers to care*

Social barriers to care contribute to maternal and infant mortality and morbidity. Infertility is a highly stigmatized disease or disability, and the fear of diagnosis inhibits individuals from seeking care and thus opportunities to decrease maternal or infant morbidity or mortality. Infertile women and men are highly ostracized; for example, in developing and transitional countries, women diagnosed with infertility have been abandoned by their husbands, have been victims of intimate partner and family violence, may not be buried on fertile agricultural ground, and risk complete alienation from their community and social functions due to inaccurate fear of these women conferring infertility to other family or community members. Often due to lack of access to public health care, traditional means of self-cure (e.g. unprotected sex with multiple partners to achieve the goal of a wanted pregnancy) can result in the spread of HIV and other STIs, with the potential to contribute further to the disease burden of infertility, HIV and STIs. Couples living with HIV in developing countries have been found to

<sup>29</sup> Demographic health survey. Geneva, World Health Organization.

<sup>30</sup> World report on disability. Geneva, World Health Organization and World Bank, 2011.

have higher rates of infertility (inability to become pregnant despite a desire for a healthy child outcome) or subfertility (e.g. higher rates of spontaneous miscarriage).

In addition, in both developing and developed countries, as population transitions occur, the level of women's education is increasing and women are having children later in life. This is a welcome trend in many countries, but extended childbearing delays can result in difficulties for women to become pregnant and skew populations towards an ageing population. Counselling and fertility awareness are key components of pre-pregnancy planning globally, but they require adaptations dependent upon need, including populations experiencing large rural-to-urban transitions.

### *Need for counselling in women and men*

Misinformation about infertility has led to it being inappropriately linked as a permanent result of contraceptive use, as a 'fate' rather than a diagnosable and treatable condition, or as a result of vaccination (e.g. there was a decreased uptake of the polio vaccine due to fear of subsequent infertility). High rates of clinically significant symptoms of depression and anxiety, suicidal tendencies and a strong conceptualization of grief affect people with infertility. Intimate partner violence and sexual violence have been associated with infertility. Fertility-awareness messaging for decision-making, counselling, and infertility/subfertility diagnosis, care and treatment specifically target the pre-pregnancy period also sometimes defined as, and includes the periconception period (three months prior), which includes a 1-year timeframe before an intended pregnancy occurs (and also includes follow-up to ascertain a healthy maternal and child outcome).

### *Barriers to access and challenges*

Interventions and care for people with infertility have been mostly sidelined to the area of private medicine, with 'infertility' often described as a 'rich person's disease'. Often, poor reproductive medicine or infertility practice results when couples access infertility care outside their own country or clinics in their own country that do not adhere to global and (if available) national best-practice evidence-based guidelines. These interventions pose risks to the safety and health of the mother and the potential newborn child. This occurs despite the fact that interventions and modified gentler approaches to infertility care are currently being strongly recommended by professional societies as best practice. (WHO evidence-based guidelines with recommendations for infertility/subfertility care and fertility awareness are in development.)

## ANNEX 3: HEALTH PROBLEMS, PROBLEM BEHAVIOURS AND RISK FACTORS

**Table A3.9** Infertility/subfertility-related health problems, problem behaviours and risk factors that contribute to maternal and childhood mortality and morbidity

Health problems/problem behaviours/ risk factors	Contribution to maternal mortality and morbidity	Contribution to childhood mortality and morbidity
M overweight and obesity, maternal underweight	Difficulty becoming pregnant or maintaining pregnancy; complications during pregnancy/ delivery (see similar link to nutritional conditions on obesity and underweight contributions); polycystic ovarian syndrome	Preterm birth, stillbirth
Lack of HIV/STI screening and interventions before/after diagnosis and attempting infertility interventions	Pelvic inflammatory disease, tubal adhesions and tubal blockage (resulting in infertility); horizontal transmission of HIV/STIs	Congenital disease linked to STIs (see link to HIV/STI contribution); vertical transmission of HIV/STIs
Lack of interventions to address embryo implantation, inadequate development of endometrium, and assessment (including maternal aging (>40/45 years of age))	Repeat miscarriage, repeat spontaneous abortion, preterm delivery	Spontaneous abortion, stillbirth, birth defects (due to ageing of gametes)
Unsafe practices, Lack of (or lack of adherence to) guidelines on fertility interventions (e.g. modified ovarian stimulation)	Ovarian hyperstimulation syndrome, multiple births	Preterm birth, stillbirth
Unsafe practices, Lack of (or lack of adherence to) guidelines on fertility interventions (e.g. multiple embryo transfer)	Multiple births	Preterm birth, stillbirth
High stigmatization associated with infertility	Depression, suicidal tendencies, violence	

**2. Are there effective interventions to identify and address the health problems, problem behaviours or risk factors before pregnancy occurs?**

See Table A3.10.

**3. Are there effective mechanisms to deliver these interventions in low- and middle-income countries?**

See Table A3.10.



## ANNEX 3: HEALTH PROBLEMS, PROBLEM BEHAVIOURS AND RISK FACTORS

**Table A3.10** Evidence-based interventions to address infertility/subfertility-related health problems, problem behaviours and risk factors, and mechanisms of delivering them

Health problems/personal behaviours/risk factors that could be addressed through promotional, preventive and curative health interventions in pre-pregnancy/interpregnancy	Evidence-based preventive and curative health interventions that could be delivered in pre-pregnancy/interpregnancy	Existing delivery mechanisms that could be used to deliver interventions at scale in low- and middle-income countries
Consequences of misunderstanding contraceptives by the woman, her family and the community (thus decreased uptake of contraceptive use)	Anticipatory guidance from health care providers to create awareness and understanding of fertility and infertility (e.g. temporary state of subfertility/infertility during contraceptive use and following discontinuation of long-acting contraceptives)	Primary care facilities (general or specific clinics e.g. family planning clinics); community settings
Consequences of misunderstanding biological causes of infertility/subfertility (e.g. mental health disorders, depression, broader chronic diseases)	Anticipatory guidance from health care providers to improve understanding of preventable and unpreventable causes of infertility/subfertility; guidance on actions that individuals and couples could take to address preventable causes of infertility/subfertility (improving nutrition, improving mental health, immunization, avoiding alcohol abuse); counselling for individuals/couples diagnosed with unpreventable causes of infertility/sub-fertility	Primary care facilities (general or specific clinics e.g. family planning clinics)
Consequences of unprotected sex to achieve pregnancy, especially in populations at high risk of HIV/STIs	Screening and diagnosis of couples following 6-12 months and following 12 months of attempting pregnancy, using an algorithm involving minimal intervention at the primary level; and screening diagnosis and management at the tertiary level; diagnosis and management of underlying causes of infertility/sub-fertility, including past STI/RTI; need for specific guidance directed towards populations at high risk	Primary care facilities; referral facilities/specialized services
Consequences of misunderstanding social causes of infertility/subfertility	Defusing stigmatization of infertility and assumption of fate by introducing evidence-based educational tools to understand causes and care solutions of infertility; expand beyond misunderstanding that prevention will solve most underlying diseases/disabilities and infertility; introduce tools for national-level discussions to address ethics and legal/social implications of introducing infertility diagnosis/care; advocacy targeting communities, civil society, governments, policy makers and funding agencies	Community settings; mass media

## ANNEX 3: HEALTH PROBLEMS, PROBLEM BEHAVIOURS AND RISK FACTORS

### Female genital mutilation

(Developed in conjunction with the Department of Reproductive Health and Research)

#### 1. Why were these health problems, problem behaviours or risk factors chosen?

In practising societies, female genital mutilation is promoted as a form of identity and continuity, religious perception, sexual control of women, and conformity to sociocultural norms in practising societies.

Female genital mutilation is a form of violence against girls and women. It is a practice that is condoned and perpetuated by certain societies, despite it being a violation of key human rights. Regardless of their pregnancy status, women with female genital mutilation are at increased risk of several health complications, including genital morbidities such as cysts, menstrual and urinal problems, and infections that can affect sexuality and future fertility.

In the societies in which it is practised, female genital mutilation is generally performed on girls between 0 and 15 years of age. Occasionally it is interlinked with the marriage ceremony and in fewer contexts with delivery.

**Table A3.11** Female genital mutilation-related health problems, problem behaviours and risk factors that contribute to maternal and childhood mortality and morbidity

Health problems/problem behaviours/risk factors	Contribution to maternal mortality and morbidity	Contribution to childhood mortality and morbidity
Female genital mutilation	Infections, infertility, delivery complications	Morbidity and mortality as a result of delivery complications

#### 2. Are there effective interventions to identify and address the health problems, problem behaviours or risk factors before pregnancy occurs?

See Table A3.12.

#### 3. Are there effective mechanisms to deliver these interventions in low- and middle-income countries?

See Table A3.12.

## ANNEX 3: HEALTH PROBLEMS, PROBLEM BEHAVIOURS AND RISK FACTORS

**Table A3.12** Evidence-based interventions to address female genital mutilation-related health problems, problem behaviours and risk factors, and mechanisms of delivering them

Health problems/problem behaviour/risk factors that could be addressed through promotional, preventive and curative health interventions in pre-pregnancy/interpregnancy	Evidence-based preventive and curative health interventions that could be delivered in pre-pregnancy/interpregnancy	Existing delivery mechanisms that could be used to deliver interventions at scale in low- and middle-income countries
Female genital mutilation risk in adolescence or later	In areas where FGM is a risk at the age of adolescence and later, discuss and discourage the practice with the girl and her parents and/or partner; screen women and girls for female genital mutilation to detect complications that may cause inability to have sexual intercourse, infertility or birth complications; counsel to discourage continuation of female genital mutilation in next generation; treat infections and other conditions that can cause infertility	Primary care facilities; referral facilities if surgery necessary
Female genital mutilation	Inform women and couples about complications of female genital mutilation and about access to treatment	Primary care facilities
	Carry out defibulation of infibulated ('sealed') girls and women before pregnancy or early in pregnancy to reduce some of the risks during childbirth; remove cysts and treat complications	Primary care facilities ; referral facilities if surgery necessary

## ANNEX 3: HEALTH PROBLEMS, PROBLEM BEHAVIOURS AND RISK FACTORS

### Too early, unwanted and rapid successive pregnancies

(Developed in conjunction with the Department of Reproductive Health and Research)

#### 1. Why were these health problems, problem behaviours or risk factors chosen?

Childbirth at an early age is associated with greater health risks for the mother. In low- and middle-income countries, complications of pregnancy and childbirth are the leading cause of death in young women aged 15–19 years. The adverse effects of adolescent childbearing also extend to the health of the infants. Perinatal deaths are 50% higher among babies born to mothers under 20 years of age than among those born to mothers aged 20–29 years. Babies of adolescent mothers are also more likely to be low birth weight, with the risk of long-term effects.<sup>31</sup>

Unintended pregnancies may end in abortions, which are often unsafe. There were an estimated 3 million unsafe abortions in women aged 15–19 years in 2008.<sup>32</sup>

**Table A3.13** Too-early, unwanted and rapid successive pregnancy-related health problems, problem behaviours and risk factors that contribute to maternal and childhood mortality and morbidity

Health problems/problem behaviours/risk factors	Contribution to maternal mortality and morbidity	Contribution to childhood mortality and morbidity
Pregnancy too early	Complications in pregnancy, death	Perinatal death, low birth weight
Unintended pregnancy	Morbidity related to complications of unsafe abortion (may lead to death), psychosocial consequences	Less attention to care of self and unborn child during pregnancy, with adverse effects on infant and child health
Short birth intervals (<24 months)	Complications during pregnancy (e.g. preterm labour), increased likelihood of depression	Prematurity, fetal death, low birth weight, small size for gestational age (associated with birth intervals of <6-18 months), increased risk of neonatal and postneonatal (1 month-1 year) death

#### 2. Are there effective interventions to identify and address the health problems, problem behaviours or risk factors before pregnancy occurs?

See Table A3.14.

#### 3. Are there effective mechanisms to deliver these interventions in low- and middle-income countries?

See Table A3.14.

<sup>31</sup> Patton GC et al. Global patterns of mortality in young people: a systematic analysis of population data. *Lancet*, 2009, 374:881-892.

<sup>32</sup> Patton GC, Coffey C, Sawyer SM et al. Global patterns of mortality in young people: a systematic analysis of population data. *Lancet*, 2009, 374:881-892.

## ANNEX 3: HEALTH PROBLEMS, PROBLEM BEHAVIOURS AND RISK FACTORS

**Table A3.14** Evidence-based interventions to address too-early, unwanted and rapid successive pregnancy-related health problems, problem behaviours and risk factors, and mechanisms of delivering them

Health problems/problem behaviours/risk factors that could be addressed through promotional, preventive and curative health interventions in pre-pregnancy/interpregnancy	Evidence-based preventive and curative health interventions that could be delivered in pre-pregnancy/interpregnancy	Existing delivery mechanisms that could be used to deliver interventions at scale in low- and middle-income countries
Girls married early	Keeping girls in school, influencing cultural norms that support early marriage through community mobilization	Community settings; mass media
Lack of understanding of (and lack of support for) need to prevent pregnancy before age 20 years	Visible, high-level support for pregnancy-prevention programmes; educating girls and boys about sexuality; building community support for preventing early pregnancy	Community settings such as school and community programmes; mass media
Low use of modern contraceptives	Educating adolescents about sexuality, sexual and reproductive health and contraceptive use; building community support for contraceptive provision to adolescents; enabling adolescents to obtain contraceptive services	Community settings such as school and community programmes; mass media; adolescent-friendly health facilities
Girls coerced into having sex	Empowering girls to resist coerced sex; changing social norms that condone coerced sex; engaging men and boys to critically assess norms and practices regarding gender-based violence and coerced sex	Community programmes (including programmes with small groups); mass media
Short birth intervals (<24 months)	Educating women and couples about dangers to the baby and mother of short birth intervals; provision of contraception	Primary care facilities; community settings

## ANNEX 3: HEALTH PROBLEMS, PROBLEM BEHAVIOURS AND RISK FACTORS

### Sexually transmitted infections

(Developed in conjunction with the Department of Reproductive Health and Research)

#### 1. Why were these health problems, problem behaviours or risk factors chosen?

Untreated STIs can have critical implications for reproductive, maternal and newborn health. For example, 10–40% of women with untreated chlamydial infection may develop pelvic inflammatory disease associated with salpingitis or tubal scarring. Post-infection tubal damage has been implicated in up to 30–40% of cases of female infertility in some settings. Furthermore, women who have had pelvic inflammatory disease are 6–10 times more likely to develop an ectopic pregnancy than those who have not, and 40–50% of ectopic pregnancies can be attributed to previous pelvic inflammatory disease. Ectopic pregnancies can result in mortality if they are missed, particularly in the context of weak health systems.

Infection with certain types of the human papillomavirus can lead to the development of genital cancers, particularly cervical cancer in women.

Untreated STIs are associated with congenital and perinatal infections in neonates, particularly in regions where rates of infection remain high. In pregnant women with untreated early syphilis, 25% of pregnancies result in stillbirth and 14% of pregnancies result in neonatal death – an overall perinatal mortality of about 40%. Up to 35% of pregnancies among women with untreated gonococcal infection result in low birth weight and premature deliveries, and up to 10% result in perinatal deaths. In the absence of prophylaxis, 30–50% of infants born to mothers with untreated gonorrhoea and up to 30% of infants born to mothers with untreated chlamydia develop a serious eye infection (ophthalmia neonatorum), which can lead to blindness if not treated early.<sup>33</sup>

Prevention and early management of STIs are the keys to reducing morbidity and mortality.<sup>34</sup>

**Table A3.15 Sexually transmitted infection-related health problems, problem behaviours and risk factors that contribute to maternal and childhood mortality and morbidity**

Health problems/problem behaviours/risk factors	Contribution to maternal mortality and morbidity	Contribution to childhood mortality and morbidity
Gonorrhoea	Preterm delivery, chronic pelvic pain, pelvic inflammatory disease (not specific to pregnancy and childbearing), infertility, ectopic pregnancy, spontaneous abortion, postpartum endometritis, prelabour rupture of membranes (specific to pregnancy and childbearing)	Preterm delivery, neonatal conjunctivitis, low birth weight
Chlamydia	Pelvic inflammatory disease, chronic pelvic pain (not specific to pregnancy and childbearing), infertility, ectopic pregnancy	Preterm delivery, low birth weight, neonatal conjunctivitis, pneumonia, otitis
Syphilis	Neurological, cardiovascular and other systemic complications resulting from tertiary syphilis (not specific to pregnancy and childbearing), spontaneous abortion, fetal loss, postpartum endometritis, prelabour rupture of membranes (specific to pregnancy and childbearing)	Preterm delivery, congenital infection abnormalities, stillbirth, low birth weight, enhanced mother-to-child transmission of HIV in mothers living with both HIV and syphilis

Continues...

<sup>33</sup> *Sexually transmitted infections*. Fact sheet 110. Geneva, World Health Organization, 2011 (<http://www.who.int/mediacentre/factsheets/fs110/en/index.html>).

<sup>34</sup> *Sexually transmitted and other reproductive tract infections: a guide to essential practice*. Geneva, World Health Organization, 2005.

## ANNEX 3: HEALTH PROBLEMS, PROBLEM BEHAVIOURS AND RISK FACTORS

...Continued

Health problems/problem behaviours/risk factors	Contribution to maternal mortality and morbidity	Contribution to childhood mortality and morbidity
Genital herpes	Aseptic meningitis, transverse myelitis (not specific to pregnancy and childbearing), dissemination of infection (especially third trimester), spontaneous abortion (specific to pregnancy and childbearing)	Preterm delivery, neonatal herpes, encephalitis, dissemination of infection, skin/eye/mouth infection, enhanced mother-to-child transmission of HIV
Hepatitis B	Chronic hepatitis, cirrhosis, liver cancer (not specific to pregnancy and childbearing)	Perinatal hepatitis B
Trichomonas	Chronic inflammation of mucosa, leading to enhanced risk of HIV transmission to women	Preterm delivery, low birth weight

2. Are there effective interventions to identify and address the health problems, problem behaviours or risk factors before pregnancy occurs?

See Table A3.16.

3. Are there effective mechanisms to deliver these interventions in low- and middle-income countries?

See Table A3.16.

**Table A3.16** Evidence-based interventions to address sexually transmitted infection-related health problems, problem behaviours and risk factors, and mechanisms of delivering them

Health problems/problem behaviours/risk factors that could be addressed through promotional, preventive and curative health interventions in pre-pregnancy/interpregnancy	Evidence-based preventive and curative health interventions that could be delivered in pre-pregnancy/interpregnancy	Existing delivery mechanisms that could be used to deliver interventions at scale in low- and middle-income countries
Lack of comprehensive knowledge and understanding about sexuality, reproduction and sexual/reproductive health and adverse health outcomes (including poor infant health outcomes)	Age-appropriate comprehensive sexual health education and services (including production of information and materials in local languages)	Delivered in schools such as schools (including by parents at home)
Lack of awareness of risk of acquisition of HIV and other STIs	Information and education	Community settings
Unsafe sex	Safer sex promotion (individual-, group- and community-level behavioural interventions); condom promotion for dual protection against STIs and unwanted pregnancies; increased access to condoms	Community settings
Lack of awareness of infections/symptomless infections	Screening	Primary care facilities; mobile health camps
Lack of treatment/services for already acquired STIs	Accessible and affordable treatment (individual or mass) and other relevant health services for people in need	Primary care facilities; mobile health camps
Social, economic and cultural barriers	Structural interventions	Community settings

\* For all these interventions, the right balance must be found between reaching groups at risk and the general population.

## ANNEX 3: HEALTH PROBLEMS, PROBLEM BEHAVIOURS AND RISK FACTORS

### Human immunodeficiency virus

(Developed in conjunction with the HIV Department)

#### 1. Why were these health problems, problem behaviours or risk factors chosen?

HIV is one of the world's leading infectious killers, claiming more than 25 million lives over the past three decades. In 2012, there are approximately 34 million people living with HIV worldwide. HIV can be suppressed by combination antiretroviral therapy consisting of three or more antiretroviral drugs. Antiretroviral therapy does not cure HIV infection but controls viral replication within the person's body, allowing the immune system to strengthen and regain the power to fight off infections. With antiretroviral therapy, people living with HIV can have healthy and productive lives.

The transmission of HIV from a woman living with HIV to her child during pregnancy, labour, delivery or breastfeeding is called vertical transmission or mother-to-child transmission. In the absence of any interventions, transmission rates are 15–45%. Mother-to-child transmission can be almost fully prevented if both the mother and the child are provided with antiretroviral therapy or antiretroviral drug prophylaxis throughout the stages when infection could occur.<sup>35</sup>

Prevention of mother-to-child transmission (PMTCT) programmes are scaling up in most countries around the world, based on provider-initiated HIV testing and counselling in antenatal care and labour and delivery, in order to identify women living with HIV and provide them with antiretroviral therapy, within the context of providing essential maternal and child health services.<sup>36,37,38</sup> The Global Plan Towards the Elimination of New HIV Infections Among Children by 2015 and Keeping Their Mothers Alive was launched in June 2011, with the goal of reducing new infant infections by 90%, and including specific targets for HIV and the health mothers and children.<sup>39</sup> There is currently a well-documented package of interventions for PMTCT and to improve the health of mothers living with HIV, based on providing highly effective lifelong antiretroviral therapy to eligible women (CD4 count <350) or effective shorter-term prophylaxis during the pregnancy and breastfeeding period for women who do not yet require lifelong treatment.<sup>40,41</sup>

<sup>35</sup> HIV/AIDS. Fact sheet 360. Geneva, World Health Organization, 2012 (<http://www.who.int/mediacentre/factsheets/fs360/en/index.html>).

<sup>36</sup> *Guidance on the global scale-up of the prevention of mother-to-child transmission of HIV*. Geneva, World Health Organization and United Nations Children's Fund, 2007 ([http://www.who.int/hiv/pub/mtct/pmtct\\_scaleup2007/en/index.html](http://www.who.int/hiv/pub/mtct/pmtct_scaleup2007/en/index.html)).

<sup>37</sup> *Antiretroviral drugs for treating pregnant women and preventing HIV infections in infants: recommendations for a public health approach (2010 version)*. Geneva, World Health Organization, 2010. (<http://www.who.int/hiv/pub/mtct/antiretroviral2010/en/index.html>).

<sup>38</sup> *Guidance on provider-initiated HIV testing and counselling in health facilities*. Geneva, World Health Organization, 2007 (<http://www.who.int/hiv/pub/vct/pitc/en/index.html>).

<sup>39</sup> *Countdown to zero: global plan towards the elimination of new HIV infections among children by 2015 and keeping their mothers alive*. Geneva, Joint United Nations Programme on HIV/AIDS, 2011 ([http://www.unaids.org/en/media/unaids/contentassets/documents/unaidspublication/2011/20110609\\_JC2137\\_Global-Plan-Elimination-HIV-Children\\_en.pdf](http://www.unaids.org/en/media/unaids/contentassets/documents/unaidspublication/2011/20110609_JC2137_Global-Plan-Elimination-HIV-Children_en.pdf)).

<sup>40</sup> *Guidance on the global scale-up of the prevention of mother-to-child transmission of HIV*. Geneva, World Health Organization and United Nations Children's Fund, 2007 ([http://www.who.int/hiv/pub/mtct/pmtct\\_scaleup2007/en/index.html](http://www.who.int/hiv/pub/mtct/pmtct_scaleup2007/en/index.html)).

<sup>41</sup> *Antiretroviral drugs for treating pregnant women and preventing HIV infections in infants: recommendations for a public health approach (2010 version)*. Geneva, World Health Organization, 2010. (<http://www.who.int/hiv/pub/mtct/antiretroviral2010/en/index.html>).



## ANNEX 3: HEALTH PROBLEMS, PROBLEM BEHAVIOURS AND RISK FACTORS

The well-established four-prong approach to PMTCT emphasizes prevention of new infections and provision of essential care and treatment to people living with HIV:<sup>42,43,44</sup>

- preventing new HIV infections in women;
- preventing unwanted pregnancies in women living with HIV;
- preventing mother-to-child transmission in women living with HIV;
- maximizing HIV treatment and care postpartum.

**Table A3.17** HIV-related health problems, problem behaviours and risk factors that contribute to maternal and childhood mortality and morbidity

Health problems/problem behaviours/risk factors	Contribution to maternal mortality and morbidity	Contribution to childhood mortality and morbidity
HIV infection in adolescents, women and their sexual partners/spouses	Untreated HIV infection can contribute to increased maternal mortality and morbidity (related to childbirth) and progresses to HIV-related premature illnesses and death	Untreated HIV infection progresses to HIV-related illnesses and death in the mother, which leads to orphanhood (major risk factor for poor child health and social outcome); untreated HIV infection in the mother leads to a high risk (up to 35%) of transmission of HIV from the mother to the newborn child, resulting in chronic and fatal illness in the child

### 2. Are there effective interventions to identify and address the health problems, problem behaviours or risk factors before pregnancy occurs?

To provide comprehensive preconception care services in relation to HIV, the incidence and prevalence of HIV in adolescent girls and women, and in pregnant adolescent girls and women, should be monitored. Related indicators include age at sexual debut, numbers of partners and safe/unsafe sex.

### 3. Are there effective mechanisms to deliver these interventions in low- and middle-income countries?

<sup>42</sup> *Guidance on the global scale-up of the prevention of mother-to-child transmission of HIV*. Geneva, World Health Organization and United Nations Children's Fund, 2007 ([http://www.who.int/hiv/pub/mtct/pmtct\\_scaleup2007/en/index.html](http://www.who.int/hiv/pub/mtct/pmtct_scaleup2007/en/index.html)).

<sup>43</sup> *Antiretroviral drugs for treating pregnant women and preventing HIV infections in infants: recommendations for a public health approach (2010 version)*. Geneva, World Health Organization, 2010. (<http://www.who.int/hiv/pub/mtct/antiretroviral2010/en/index.html>).

<sup>44</sup> *Preventing HIV and unintended pregnancies: strategic framework 2011-2015*. New York, United Nations Population Fund, 2012 (<http://www.unfpa.org/public/home/publications/pid/10575>).

## ANNEX 3: HEALTH PROBLEMS, PROBLEM BEHAVIOURS AND RISK FACTORS

**Table A3.18** Evidence-based interventions to address HIV-related health problems, problem behaviours and risk factors, and mechanisms of delivering them

Health problems/problem behaviours/risk factors that could be addressed through promotional, preventive and curative health interventions in pre-pregnancy/interpregnancy	Evidence-based preventive and curative health interventions that could be delivered in pre-pregnancy/interpregnancy	Existing delivery mechanisms that could be used to deliver interventions at scale in low- and middle-income countries
HIV infection in adolescent girls and women	Education and behaviour change to increase HIV awareness and reduce unsafe sexual behaviours; delay sexual debut; promote risk reduction, especially safe sex and dual method birth control (with condoms) and STI control; increase awareness of HIV, HIV status and risk through provider-initiated HIV counselling and testing, including male partner testing; new approaches of antiretroviral therapy for prevention and potentially pre-exposure prophylaxis; maximize access to antiretroviral therapy for people living with HIV in need of treatment; male circumcision (decreases acquisition of infection in men, secondarily decreasing onward horizontal transmission to female partners)	Primary care facilities; community settings; family planning programmes, male circumcision programmes; mass media
Risk of transmitting HIV from mother to child	Preventing unintended pregnancies in general and specifically in women living with HIV; family planning/interventions to avoid unwanted pregnancies; provide effective PMTCT prophylaxis for women not eligible for or not on antiretroviral therapy; ensure linkages to future HIV care and treatment	Primary care facilities; referral facilities/specialized services; PMTCT programmes
Risk of transmitting HIV from mother to child	Provision of antiretroviral therapy for women living with HIV who need treatment; assure supply of antiretroviral medicines; lifelong treatment for eligible women living with HIV	Primary care facilities; referral facilities/specialized services; antiretroviral treatment programmes
Risk of transmitting HIV from mother to child	Retesting for HIV during pregnancy or breastfeeding to detect seroconversion (new infections)	HIV retesting programmes in high-incidence settings <sup>1</sup>
Poor health in women living with HIV	Retaining in HIV care and treatment programmes; determining eligibility for lifelong antiretroviral therapy; providing antiretroviral therapy if/when eligible; providing HIV basic care package; ensuring appropriate family planning	Primary care facilities; referral facilities/specialized services; linkage between maternal and child health and HIV treatment/care programmes

<sup>45</sup> The preconception care interventions related to PMTCT are only parts of a full PMTCT scheme, which also includes interventions to maximize the health of a child exposed to or living with HIV.

## ANNEX 3: HEALTH PROBLEMS, PROBLEM BEHAVIOURS AND RISK FACTORS

### Interpersonal violence

(Developed in conjunction with the Department of Violence and Injuries Prevention and the Department of Reproductive Health and Research)

#### 1. Why were these health problems, personal behaviours or risk factors chosen?

Intimate partner violence refers to behaviour in an intimate relationship that causes physical, sexual or psychological harm, including physical aggression, sexual coercion, psychological abuse and controlling behaviours. Sexual violence is defined as any sexual act, attempt to obtain a sexual act, unwanted sexual comments or advances or otherwise directed against a person's sexuality using coercion, by any person, regardless of their relationship to the person, in any setting, including but not limited to home and work. It includes rape, defined as the physically forced or otherwise coerced penetration of the vulva or anus with a penis, other body part or object.<sup>46</sup>

Intimate partner violence is widespread. A WHO multi-country study found that 15–71% of women aged 15–49 years reported experiencing physical and/or sexual violence by an intimate partner at some point in their life.

Intimate partner violence and sexual violence directed at women result in a range of health consequences to the women's physical, mental, sexual and reproductive health. Such violence also has negative consequences on the health and well-being of the women's children. Growing up in a family where intimate partner violence happens and being maltreated as a child are associated with violence perpetration later in life, thus contributing to an intergenerational transmission of violence.

Intimate partner violence occurring during pregnancy is usually a continuation of ongoing violence, although for some women violence can begin during pregnancy.

**Table A3.19** Interpersonal violence-related health problems, problem behaviours and risk factors that contribute to maternal and childhood mortality and morbidity

Health problems/problem behaviours/risk factors	Contribution to maternal mortality and morbidity	Contribution to childhood mortality and morbidity
Consequences of intimate partner violence and sexual violence	Unintended pregnancy, gynaecological problems, abortion, STIs/HIV, depression, post-traumatic stress disorder, emotional distress, suicide attempts, sleep difficulties, eating disorders	Increased childhood mortality; behavioural and emotional disturbances (may be associated with perpetration or experience of violence later in life); morbidity (e.g. diarrhoeal disease, malnutrition)
Consequences of intimate partner violence and sexual violence during pregnancy	Miscarriage	Low birth weight, stillbirth, preterm delivery

#### 2. Are there effective interventions to identify and address the health problems, problem behaviours or risk factors before pregnancy occurs?

See Table A3.20.

<sup>46</sup> Violence against women. Fact sheet 239. Geneva, World Health Organization, 2011 (<http://www.who.int/mediacentre/factsheets/fs239/en/index.html>).

## ANNEX 3: HEALTH PROBLEMS, PROBLEM BEHAVIOURS AND RISK FACTORS

### 3. Are there effective mechanisms to deliver these interventions in low- and middle-income countries?

See Table A3.20.

**Table A3.20** Evidence-based interventions to address interpersonal violence-related health problems, problem behaviours and risk factors, and mechanisms of delivering them

Health problems/problem behaviours/risk factors that could be addressed through promotional, preventive and curative health interventions in pre-pregnancy/interpregnancy	Evidence-based preventive and curative health interventions that could be delivered in pre-pregnancy/interpregnancy	Existing delivery mechanisms that could be used to deliver interventions at scale in low- and middle-income countries
Intimate partner violence in young people	Health promotion aimed at preventing dating violence	Community settings such as school; sexual health programmes
Intimate partner violence and sexual violence	Changing harmful gender norms (including those that perpetuate or tolerate violence against women) through comprehensive sexuality education that addresses gender equality, human rights, sexuality and sexual relations; community mobilization	Community settings such as schools; mass media
Intimate partner violence and sexual violence	Combining and linking economic empowerment and gender equality or life-skills training for women and adolescent girls through community mobilization	Linkage to programmes involved in economic development; microfinance; microcredit and behaviour change communication;
Intimate partner violence and sexual violence	Reducing harmful use of alcohol/ interventions for problem drinkers through: (i) screening and counselling of people who are problem drinkers, and treatment for people who have alcohol use disorders; (ii) changing individual and social norms	Primary care facilities; community settings mass media
Intimate partner violence and sexual violence	Provision of health-care services and psychosocial support to survivors of violence; recognizing signs of violence against women; providing medical (including psychosocial) care and referral services where appropriate (including post-rape care)	Primary care facilities; referral services / specialized services

\* These programmes should, as far as possible, be integrated into other health (e.g. HIV) and social (e.g. literacy) programmes.

## ANNEX 3: HEALTH PROBLEMS, PROBLEM BEHAVIOURS AND RISK FACTORS

### Mental health

(Developed in conjunction with the Department of Mental Health and Substance Abuse)

#### 1. Why were these health problems, personal behaviours or risk factors chosen?

There is evidence indicating that common mental disorders, in particular depressive and anxiety disorders, in pregnant women and up to 1 year after childbirth pose a serious public health concern because of their adverse effects on infant development, breastfeeding, infant nutritional status and child growth.<sup>47</sup>

The evidence is somewhat inconsistent, however: several studies have documented that a high correlation of antenatal depression may be associated with miscarriage, antepartum haemorrhage, operative delivery, preterm birth and low birth weight.<sup>48,49</sup>

Bipolar disorder has been associated with placental abnormalities and antepartum haemorrhage. Women with bipolar disorder have a high risk of alcohol and substance use disorders, which could affect fetal outcomes. In addition, pre-pregnancy psychiatric disorders, including bipolar disorder, significantly increase the risk of postpartum psychotic events. Management of bipolar disorder in women of childbearing age may be especially challenging because of the potential fetal teratogenic risks of medications.

Women with epilepsy are at increased risk of having babies with birth defects. It is difficult to clarify the relative contribution of increased seizure frequency during pregnancy, socioeconomic factors associated with the disease, and the teratogenic effects of antiepileptic drugs. Several lines of evidence support the latter having a major contribution.

**Table A3.21** Mental health-related health problems, problem behaviours and risk factors that contribute to maternal and childhood mortality and morbidity

Health problems/problem behaviours/risk factors	Contribution to maternal mortality and morbidity	Contribution to childhood mortality and morbidity
Perinatal depression, including antenatal and postpartum depression	Complications during pregnancy	Preterm birth; underweight and stunting; reduced breastfeeding; increased episodes of diarrhoea; lower compliance with immunization schedules; delayed psychosocial development
Bipolar disorder	Complications during pregnancy; postpartum bipolar event; high risk of alcohol or substance use during pregnancy and postpartum period	
Psychosis	Postpartum psychosis	
Epilepsy	Perinatal complications	Neurodevelopmental impairments
Use of psychotropic drugs (e.g. for epilepsy or mood disorders)		Birth defects

<sup>47</sup> Surkan PJ et al. Maternal depression and early childhood growth in developing countries: systematic review and meta-analysis. *Bulletin of the World Health Organization*, 2011, 89:608-615.

<sup>48</sup> Ibid.

<sup>49</sup> Bhutta ZA et al. *A systematic review of preconception risks and interventions*. Karachi, Aga Khan University, 2011.

## ANNEX 3: HEALTH PROBLEMS, PROBLEM BEHAVIOURS AND RISK FACTORS

2. Are there effective interventions to identify and address the health problems, problem behaviours or risk factors before pregnancy occurs?

See Table A3.22.

3. Are there effective mechanisms to deliver these interventions in low- and middle-income countries?

See Table A3.22.

**Table A3.22** Evidence-based interventions to address mental health-related health problems, problem behaviours and risk factors, and mechanisms of delivering them

Health problems/problem behaviours/risk factors that could be addressed through promotional, preventive and curative health interventions in pre-pregnancy/interpregnancy	Evidence-based preventive and curative health interventions that could be delivered in pre-pregnancy/interpregnancy	Existing delivery mechanisms that could be used to deliver interventions at scale in low- and middle-income countries
Depression, psychoses, bipolar disorder, epilepsy	Provision of counselling on required changes in clinical management before and during pregnancy; risks for relapse during pregnancy; impact of disorders and medications on maternal outcomes and child health/development	Primary care facilities; referral facilities/ specialized services
Depression	Individual level: educational and psychosocial counselling for promotion of mental health and psychosocial well-being (e.g. enhancement of coping and socioemotional skills, parental training, reduction of psychosocial distress); assess psychosocial problems, noting past and ongoing social and relationship issues, living and financial circumstances, and any other ongoing stressful life events	Primary care facilities; community settings
Depression	Population and community levels: strengthen community networks and promote women's empowerment; improve access to education for women of childbearing age; reduce economic insecurity of women of childbearing age	Community settings (such as schools)
Depression	Management of depression in women planning pregnancy: psychoeducation; address current psychosocial stressors; assess suicide risk; reactivate social networks; if available, consider interpersonal therapy, behavioural activation therapy or cognitive-behavioural therapy; if available, consider adjunctive treatments (e.g. structured physical activity programmes, relaxation training, problem-solving treatment); if drug treatment required, consider tricyclic antidepressants or fluoxetine; consult specialist if possible	Primary care facilities; referral facilities/ specialized services
Psychosis	Women of childbearing age: avoid routine use of depot antipsychotics; treat women planning a pregnancy with low-dose oral haloperidol or chlorpromazine; explain risk of adverse consequences for mother and baby, including obstetric complications and psychotic relapse (particularly if medication is changed or stopped); consult specialist if possible	Primary care facilities; referral facilities/ specialized services
Bipolar disorder	Women of childbearing age: avoid starting treatment with mood stabilizer; consider low-dose haloperidol (with caution); consult specialist if possible	Primary care facilities; referral facilities/ specialized services
Epilepsy	Women of childbearing age: avoid valproic acid; advise folate (5 mg/day) in all women taking antiepileptic drugs; if planning a pregnancy, avoid polypharmacy <sup>50</sup>	Primary care facilities; referral facilities/ specialized services

<sup>50</sup> *Management of epilepsy in women of child bearing age*. Geneva, World Health Organization Mental Health Gap Action Programme, 2012 ([http://www.who.int/mental\\_health/mhgap/evidence/epilepsy/mh\\_evidence\\_prof\\_epilpesy\\_q1\\_childbearingage\\_2010\\_en.pdf](http://www.who.int/mental_health/mhgap/evidence/epilepsy/mh_evidence_prof_epilpesy_q1_childbearingage_2010_en.pdf)).

## ANNEX 3: HEALTH PROBLEMS, PROBLEM BEHAVIOURS AND RISK FACTORS

### Psychoactive substance use

(Developed in conjunction with the Department of Mental Health and Substance Abuse)

#### 1. Why were these health problems, problem behaviours or risk factors chosen?

Use of alcohol and other psychoactive substances in the preconception period often continues during pregnancy and may impact negatively on the development of the fetus. Alcohol consumption during pregnancy can result in fetal alcohol spectrum disorder, an umbrella term used to describe a range of neurodevelopmental conditions of various severities, including fetal alcohol syndrome, which is often associated with lifelong disability. The prevalence of fetal alcohol syndrome is usually reported at 0.5–2 per 1000 live births, but in some communities it can be as high as 2–7 per 1000 live births. Because the damage may already be done by the time the woman suspects she is pregnant, the optimal time to intervene is before conception. Continued prenatal exposure to alcohol and drugs can result in neonatal withdrawal syndrome in the newborn.

**Table A3.23** Psychoactive substance use-related health problems, problem behaviours and risk factors that contribute to maternal and childhood mortality and morbidity

Health problems/problem behaviours/risk factors	Contribution to maternal mortality and morbidity	Contribution to childhood mortality and morbidity
Alcohol use before conception	Unwanted pregnancy; risk of STIs/HIV; alcohol-related health conditions (e.g. liver disease, injuries, depression); increased risk of interpersonal, social, legal and financial problems (e.g. violence, domestic abuse)	Fetal alcohol spectrum disorders, ranging from severe neurodevelopmental disorder to behavioural problems and mild intellectual disability; miscarriage; prematurity
Drug use before conception	Unwanted pregnancy; increased risk of STIs/HIV; drug-related health conditions (e.g. hepatitis C, depression); increased risk of interpersonal, social, legal and financial problems (e.g. violence, domestic abuse)	HIV transmission from mother to child; impaired preparedness in mother for pregnancy, delivery and childcare; child neglect

#### 2. Are there effective interventions to identify and address the health problems, problem behaviours or risk factors before pregnancy occurs?

See Table A3.24.

#### 3. Are there effective mechanisms to deliver these interventions in low- and middle-income countries?

See Table A3.24.

## ANNEX 3: HEALTH PROBLEMS, PROBLEM BEHAVIOURS AND RISK FACTORS

**Table A3.24** Evidence-based interventions to address psychoactive substance use-related health problems, problem behaviours and risk factors, and mechanisms of delivering them

Health problems/problem behaviours/risk factors that could be addressed through promotional, preventive and curative health interventions in pre-pregnancy/interpregnancy	Evidence-based preventive and curative health interventions that could be delivered in pre-pregnancy/interpregnancy	Existing delivery mechanisms that could be used to deliver interventions at scale in low- and middle-income countries
Hazardous and harmful alcohol and drug use	Screening of substance use (e.g. use WHO ASSIST or AUDIT tools); brief interventions <sup>51</sup> and referral for treatment (linked to WHO ASSIST or AUDIT tools); treatment of substance use disorders, including pharmacological and psychological interventions; <sup>52</sup> family planning assistance for families with substance use disorders, including postpartum and between pregnancies; prevention programmes to reduce substance use in adolescents <sup>53</sup>	Primary care facilities; referral facilities/specialized services; community settings (such as schools and community centres)

<sup>51</sup> Short structured intervention lasting 3-15 minutes.

<sup>52</sup> *Intervention guide for mental neurological and substance use disorders in non-specialized health settings*. Geneva, World Health Organization Mental Health Gap Action Programme, 2011.

<sup>53</sup> *Guide to implementing family skills training programmes for drug abuse prevention*. Vienna, United Nations Office on Drugs and Crime, 2009.



## ANNEX 3: HEALTH PROBLEMS, PROBLEM BEHAVIOURS AND RISK FACTORS

### Tobacco use

(Developed in conjunction with the Tobacco Free Initiative)

#### 1. Why were these health problems, problem behaviours or risk factors chosen?

Regardless of their pregnancy status, women who smoke tobacco are at increased risk for a wide range of cancers (lung, cervical, pancreatic, bladder, kidney), cardiovascular disease and pulmonary disease.<sup>54</sup> Cigarette smoke contains several thousand components and toxins that adversely affect all stages of reproductive function, including folliculogenesis, steroidogenesis, embryo transport, endometrial receptivity, endometrial angiogenesis, uterine blood flow and uterine myometrium.<sup>55,56</sup> These effects of cigarette smoke are dose-dependent, translating into increased severity of the adverse health outcomes for long-term smokers. Individual sensitivity, dose, time and type of exposure also play a role in the impact of smoke constituents on human fertility. A meta-analysis review of 12 studies found a higher risk of infertility in women smokers compared with non-smokers.<sup>57</sup>

More than half of pregnant women who smoked before getting pregnant continued to smoke during the early part of their pregnancy.<sup>58</sup> Because only 20% of women who smoke successfully control tobacco dependence during pregnancy,<sup>59</sup> and prenatal smoking cessation interventions have a modest effect on quit rates,<sup>60</sup> cessation of smoking is recommended before pregnancy, when the woman has more treatment options and more time to attempt a quit attempt.

Globally, 22% of the world's adult population aged 15 years and over are current tobacco smokers, including 36% of men and 8% of the women.<sup>61</sup> Although the prevalence of tobacco use is lower among women in comparison to men, globally more than a third of women are exposed to second-hand smoke,<sup>62</sup> and this exposure continues during pregnancy.<sup>63</sup> Second-hand smoke exposure during pregnancy leads to intrauterine growth retardation and low birth weight, and parental smoking around infants causes respiratory illnesses such as asthma, bronchitis, ear infections and sudden infant death syndrome.<sup>64</sup>

In the United States, smoking during pregnancy results in the deaths of approximately 800 infants annually.<sup>65</sup> Estimates indicate that eliminating

<sup>54</sup> *The health consequences of smoking: a report of the Surgeon General*. Washington, DC, United States Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, and Office on Smoking and Health, 2004.

<sup>55</sup> Dechanet C et al. Effects of cigarette smoking on reproduction. *Human Reproduction Update*, 2011, 17:76-95.

<sup>56</sup> *The biology and behavioral basis for smoking-attributable disease: a report of the Surgeon General*. Rockville, MD, Public Health Service, Office of the Surgeon General, 2010.

<sup>57</sup> Augood C et al. Smoking and female infertility: a systematic review and meta-analysis. *Human Reproduction*, 1998, 13:1532-1539.

<sup>58</sup> Anderka M et al. Patterns of tobacco exposure before and during pregnancy. *Acta Obstetrica et Gynecologica Scandinavica*, 2010, 89:505-514.

<sup>59</sup> Johnson K et al. Recommendations to improve preconception health and health care - United States: a report of the CDC/ATSDR Preconception Care Work Group and the Select Panel on Preconception Care. *Morbidity and Mortality Weekly Report*, 2006, 55:1-23.

<sup>60</sup> Lumley J et al. Interventions for promoting smoking cessation during pregnancy. *Cochrane Database of Systematic Reviews*, 2009, (3):CD001055.

<sup>61</sup> *WHO report on the global tobacco epidemic, 2011: warning about the dangers of tobacco*. Geneva, World Health Organization, 2011 ([http://www.who.int/tobacco/global\\_report/2011/en/index.html](http://www.who.int/tobacco/global_report/2011/en/index.html)).

<sup>62</sup> Öberg M et al. *Global estimate of the burden of disease from second-hand smoke*. Geneva, World Health Organization, 2010 ([http://whqlibdoc.who.int/publications/2010/9789241564076\\_eng.pdf](http://whqlibdoc.who.int/publications/2010/9789241564076_eng.pdf)).

<sup>63</sup> Bloch M et al. Tobacco use and secondhand smoke exposure during pregnancy: an investigative survey of women in 9 developing nations. *American Journal of Public Health*, 2008, 98:1833-1840.

<sup>64</sup> *The health consequences of involuntary exposure to tobacco smoke: a report of the Surgeon General*. Atlanta, GA, Department of Health and Human Services, Centers for Disease Control and Prevention, Coordinating Center for Health Promotion, National Center for Chronic Disease Prevention and Health Promotion, and Office on Smoking and Health, 2006.

<sup>65</sup> Centers for Disease Control and Prevention. Smoking-attributable mortality, years of potential life lost, and productivity losses - United States, 2000-2004. *Morbidity and Mortality Weekly Report*, 2008, 57:1226-1228.

## ANNEX 3: HEALTH PROBLEMS, PROBLEM BEHAVIOURS AND RISK FACTORS

smoking during pregnancy could reduce 5–8% of very preterm and moderately preterm births and 3–4% of late preterm births, and could reduce the proportion of low-birth-weight singleton births by 13–19%.<sup>66</sup> This could also potentially avoid 5–7% of preterm-related deaths and 23–34% of cases of sudden infant death syndrome.

**Table A3.25** Tobacco use-related health problems, problem behaviours and risk factors that contribute to maternal and childhood mortality and morbidity

Health problems/problem behaviours/risk factors	Contribution to maternal mortality and morbidity	Contribution to childhood mortality and morbidity
Smoking in preconception period	Infertility, conception delay	
Smoking in preconception period and pregnancy	Spontaneous abortion, ectopic pregnancy, placenta praevia, placental abruption, premature rupture of membranes	Preterm birth, low birth weight, birth defects (including oral cleft, limb-reduction defects, clubfoot, defects of eyes and gastrointestinal system, especially gastroschisis and abdominal hernias), sudden infant death syndrome
Use of smokeless tobacco in preconception period and pregnancy		Stillbirth, preterm birth, low birth weight
Exposure to second-hand smoke during preconception period and pregnancy		Lower birth weight, birth defects

### 2. Are there effective interventions to identify and address the health problems, problem behaviours or risk factors before pregnancy occurs?

The WHO Framework Convention on Tobacco Control and its guidelines, developed in response to the globalization of the tobacco epidemic, provide the foundation and guidance for countries to implement and manage tobacco control.<sup>67</sup> The Framework sets the baseline for reducing demand for and supply of tobacco, which in turn would protect people from harm from tobacco at all stages of life.

The interventions suggested in the next section are in line with the recommendations of the Framework and suggest specific health interventions that could be delivered in the pre-pregnancy and interpregnancy periods through existing delivery mechanisms.

### 3. Are there effective mechanisms to deliver these interventions in low- and middle-income countries?

See Table A3.26.

<sup>66</sup> Dietz PM et al. Infant morbidity and mortality attributable to prenatal smoking in the U.S. *American Journal of Preventive Medicine*, 2010, 39:45-52.

<sup>67</sup> See <http://www.who.int/fctc/en/>.

## ANNEX 3: HEALTH PROBLEMS, PROBLEM BEHAVIOURS AND RISK FACTORS

**Table A3.26** Evidence-based interventions to address tobacco use-related health problems, problem behaviours and risk factors, and mechanisms of delivering them

Health problems/problem behaviours/risk factors that could be addressed through promotional, preventive and curative health interventions in pre-pregnancy/interpregnancy	Evidence-based preventive and curative health interventions that could be delivered in pre-pregnancy/interpregnancy	Existing delivery mechanisms that could be used to deliver interventions at scale in low- and middle-income countries
Tobacco use (smoking and smokeless) by women	Screening of women and girls for tobacco use (smoking and smokeless tobacco) at all clinical visits using '5 As' (ask, advise, assess, assist, arrange); brief tobacco cessation advice; pharmacotherapy (including nicotine replacement therapy, if available); referral to intensive behavioural counselling services	Primary care facilities; referral facilities/specialized services
Exposure to second-hand smoke	Screening for smoking tobacco use at all clinical visits (men and women); all non-smokers (men and women) screened and advised about harm from other people's smoking; all smokers (men and women) screened and advised about harms of smoking to themselves and to others around them; brief advice on dangers of second-hand smoke and harmful effects on pregnant women and unborn children; brief tobacco cessation advice for husbands/partners who smoke; pharmacotherapy (including nicotine replacement therapy, if available, for husbands/partners who smoke); referral to intensive behavioural counselling services	Primary care facilities; community settings

For further information and publications, please contact:

**Department of Maternal, Newborn, Child and Adolescent Health (MCA)**

World Health Organization

20 Avenue Appia

1211 Geneva 27

Switzerland

Tel.: +41 22 791 3281

Fax: +41 22 791 4853

E-mail: [mncah@who.int](mailto:mncah@who.int)

Web site: [http://www.who.int/maternal\\_child\\_adolescent/en/](http://www.who.int/maternal_child_adolescent/en/)



### **REDUCTION OF MATERNAL AND CHILDHOOD MORTALITY**

and morbidity requires the provision of a continuum of care that spans pregnancy, childbirth, infancy, childhood and adolescence. Interventions before pregnancy occur can increase the health and well-being of adolescents, adult women and men, and improve subsequent pregnancy and child health outcomes.

This report reflects the proceedings from a meeting to develop a global consensus on preconception care to reduce maternal and childhood mortality and morbidity. It furthermore provides a 'menu of interventions' which lists the health problems, problem behaviours and risk factors that contribute to maternal and childhood mortality and morbidity in thirteen domains, evidence-based interventions to address them and mechanisms of delivering them.

The document is a result of an extensive cooperative effort led by the Maternal, Newborn, Child and Adolescent Health Department (MCA) in conjunction with nine different WHO departments and partners.

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