



World Health  
Organization

REGIONAL OFFICE FOR Europe

Improving the quality of maternal  
and perinatal health care

# Conducting a maternal near-miss case review cycle at hospital level

Manual with practical tools



**Improving the quality of maternal  
and perinatal health care**

# **Conducting a maternal near-miss case review cycle at hospital level**

**Manual with practical tools**

# Abstract

This manual explains how effectively implement the individual near-miss case review (NMCR) cycle. It is designed for hospital staff involved in maternal and newborn health care, programme managers and policy-makers who are responsible for the quality of perinatal health care at ministries of health or in facilities supporting improvement of maternal and perinatal health. The NMCR cycle is defined as a continuous quality improvement process that seeks to improve patient care and outcomes by the review of the care provided to maternal near-miss cases (defined as women who survived severe complications during pregnancy, childbirth or within 42 days of termination of pregnancy). In the NMCR cycle, maternal near-miss cases are selected, typically on a monthly basis, among case managed at hospital level, and the hospital staff involved in the case management systematically evaluates the care provided against evidence-based guidelines, local protocols and standards of care. The aim is not to solve the single near-miss case under review, but rather to use the case to critically discuss local case management, procedures and attitudes, and to identify areas that can be further improved. The emphasis of the NMCR cycle is on identifying areas amenable of improvement, and finding and implementing solutions to the problems identified, with a bottom-up approach so that to ensure local ownership of the process, together with facilitating team-building dynamics. The ultimate primary purpose of the NMCR is to reduce preventable maternal and perinatal morbidity and mortality.

## Keywords

NEAR-MISS CASE

MATERNITY HOSPITAL

MATERNAL AND PERINATAL CARE

QUALITY OF CARE

OBSTETRIC COMPLICATIONS

Address requests about publications of the WHO Regional Office for Europe to:

Publications  
WHO Regional Office for Europe  
United Nations City, Marmorvej 51  
DK-2100 Copenhagen Ø, Denmark

Alternatively, complete an online request form for documentation, health information, or for permission to quote or translate, on the Regional Office website (<http://www.euro.who.int/pubrequest>).

## © World Health Organization 2016

All rights reserved. The Regional Office for Europe of the World Health Organization welcomes requests for permission to reproduce or translate its publications, in part or in full.

The designations employed and the presentation of the material in this publication do not imply the expression of any opinion whatsoever on the part of the World Health Organization concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Dotted lines on maps represent approximate border lines for which there may not yet be full agreement.

The mention of specific companies or of certain manufacturers' products does not imply that they are endorsed or recommended by the World Health Organization in preference to others of a similar nature that are not mentioned. Errors and omissions excepted, the names of proprietary products are distinguished by initial capital letters.

All reasonable precautions have been taken by the World Health Organization to verify the information contained in this publication. However, the published material is being distributed without warranty of any kind, either express or implied. The responsibility for the interpretation and use of the material lies with the reader. In no event shall the World Health Organization be liable for damages arising from its use. The views expressed by authors, editors, or expert groups do not necessarily represent the decisions or the stated policy of the World Health Organization.

The responsibility for the content of this report lies with the authors, and the content does not represent the views of the European Commission; nor is the Commission responsible for any use that may be made of the information contained herein.

# Contents

|  |            |
|--|------------|
| <b>Acknowledgements</b> .....  | <b>v</b>   |
| <b>Abbreviations</b> .....   | <b>vi</b>  |
| <b>Executive summary</b> .....   | <b>vii</b> |
| <b>1. Introduction</b> .....   | <b>1</b>   |
| 1.1 WHO vision of quality of care for maternal and newborn health .....                                | 1          |
| 1.2 Maternal and newborn health in the WHO European Region .....                                       | 2          |
| 1.3 The WHO “Beyond the numbers” approach and guiding principles .....                                 | 3          |
| 1.4 Purpose of this manual and readership .....  | 4          |
| 1.5 The maternal near-miss case review cycle .....   | 5          |
| 1.6 Possible challenges and key elements for successful implementation .....                           | 7          |
| <b>2. Introducing the near-miss case review cycle in a country</b> .....                               | <b>9</b>   |
| 2.1 Starting at national level .....   | 9          |
| 2.1.1 Sequence of activities .....   | 9          |
| 2.1.2 Prerequisites .....  | 10         |
| 2.1.3 Preparatory phase .....  | 12         |
| 2.2 Pilot implementation .....   | 17         |
| 2.2.1 Quality assessment.....  | 17         |
| 2.2.2 Dissemination of results .....   | 18         |
| 2.3 Scaling-up .....   | 18         |
| 2.3.1 Plan .....   | 18         |
| 2.3.2 Activities .....   | 19         |
| 2.3.3 Quality assurance .....  | 19         |
| 2.4 Role of overseeing authorities .....   | 20         |
| 2.4.1 National level .....   | 20         |
| 2.4.2 International level.....   | 20         |
| <b>3. Near-miss case review at hospital level</b> .....  | <b>21</b>  |
| 3.1 General preparation for each session.....  | 21         |
| 3.1.1 Frequency of meetings .....  | 21         |
| 3.1.2 Roles and responsibilities of facilitators and coordinators .....                                | 21         |
| 3.1.3 Case identification and selection .....  | 21         |
| 3.1.4 Inviting participants .....  | 21         |
| 3.1.5 Setting ground rules and code of conduct .....   | 22         |
| 3.1.6 Material required.....   | 22         |
| 3.1.7 Collecting the perspectives of women and family members .....                                    | 23         |
| 3.2 Steps in the session.....  | 24         |
| 3.3 Actions after each NMCR session .....  | 27         |
| <b>4. Ensuring the quality of the near-miss case review cycle</b> .....                                | <b>29</b>  |
| 4.1 Reasons for ensuring quality .....   | 29         |
| 4.2 Capitalizing on previous experience .....  | 29         |
| 4.3 Key elements in successful implementation, possible challenges and solutions .....                 | 30         |
| 4.4 Assessing and improving the quality of the NMCR cycle .....  | 32         |
| 4.4.1 Quality assessment.....  | 32         |
| 4.4.2 Checklist for assessing the quality of the near-miss care review cycle in hospitals ..           | 33         |
| <b>5. References</b> .....   | <b>37</b>  |
| <b>Annex 1. Regional and national activities organized and supported<br/>by WHO and partners</b> ..... | <b>44</b>  |
| <b>Annex 2. Examples of activities during country implementation (Uzbekistan)</b> .....                | <b>46</b>  |
| <b>Annex 3. Inclusion criteria for NM cases</b> .....  | <b>48</b>  |

|  |           |
|--|-----------|
| <b>Annex 4. Glossary.....</b>  | <b>50</b> |
| <b>Annex 5. Examples of operational definitions .....</b>  | <b>52</b> |
| <b>Annex 6. Examples of standards of care.....</b>   | <b>54</b> |
| <b>Annex 7. Principles for interviewing .....</b>  | <b>56</b> |
| <b>Annex 8. “Door to door” analysis.....</b>   | <b>58</b> |
| <b>Annex 9. Factors that can influence the quality of care .....</b>   | <b>59</b> |
| <b>Annex 10. Templates for documenting a near-miss case review .....</b>   | <b>61</b> |
| <b>Annex 11. Example of a review of a near-miss case of eclampsia.....</b>   | <b>64</b> |
| <b>Annex 12. Suggestions for reporting .....</b>   | <b>69</b> |
| <b>Annex 13. Types of report for dissemination of results .....</b>  | <b>70</b> |
| <b>Annex 14. Examples of basic monitoring indicators.....</b>  | <b>71</b> |
| <b>Annex 15. Template for synthetic reporting on the implementation<br/>of the NMCR approach at country level .....</b>                    | <b>73</b> |
| <b>Annex 16. Checklist to assess the quality of the NMCR cycle at hospital<br/>level and matrix to develop local recommendations .....</b> | <b>77</b> |
| <b>Annex 17. Matrix for a national action plan after a quality assessment .....</b>  | <b>82</b> |

# Acknowledgements

This manual was prepared at the WHO Collaborating Centre for Maternal and Child Health at the Institute for Maternal and Child Health, Istituto di Ricovero e Cura a Carattere Scientifico Burlo Garofolo, Trieste, Italy. The primary authors of this updated version are Marzia Lazzarini and Alberta Bacci. Major contributions were also made by Veronique Filippi, London School of Hygiene and Tropical Medicine, and Stelian Hodoroagea, Department of Obstetrics and Gynaecology, State Medical and Pharmaceutical University N. Testemitanu, Chisinau, Republic of Moldova.

The authors would like to thank the following external reviewers for providing relevant contributions (in alphabetical order): Shohida Babadjanova, Mavjuda Babamuradova, Larisa Boderscova, Vincent de Brouwere, Adriana Gomez Luz, Henrik Khachatryan, Tamar Khomasuridze, Hemantha Senanayake and Joao Paulo Souza.

We thank WHO country offices and development partners who have assisted the introduction of the NMCR cycle at country level and who have made available a number of reports. Unpublished reports and documents are footnoted in the document. Readers are welcomed to communicate with the WHO Regional Office for Europe and/or the WHO Collaborating Centre for Maternal and Child Health in Trieste, Italy for further information.

Language revision was assured by Alessandra Knowles.

# Abbreviations

|        |   |
|--------|---|
| BTN    | Beyond the numbers                        |
| CARK   | Central Asian Republics and Kazakhstan    |
| CME    | Continuous Medical Education              |
| CIS    | Commonwealth Independent States           |
| CS     | Caesarean Section                         |
| EU     | European Union                            |
| EBM    | Evidenced Based Medicine                  |
| EPC    | Effective Perinatal Care                  |
| ICU    | Intensive Care Unit                       |
| MM     | Maternal Mortality                        |
| MMR    | Maternal Mortality Ratio                  |
| MOH    | Ministry of Health                        |
| NM     | Near Miss                                 |
| NMCR   | Near Miss Case Review                     |
| PDAS   | Plan-do-study-act                         |
| PPH    | Postpartum Hemorrhage                     |
| QoC    | Quality of Care                           |
| QI     | Quality Improvement                       |
| WHO    | World Health Organization                 |
| WHO CO | World Health Organization Country Office  |
| WHO RO | World Health Organization Regional Office |

# Executive summary

In 2004, WHO published a manual, “Beyond the numbers”, which presented various approaches for generating information on the underlying avoidable causes of maternal mortality and severe morbidity. Since its launch, considerable experience has been gained in using the approaches proposed. Commitment by ministries of health, health service providers and professional associations, with the technical guidance of WHO and coordinated support from United Nations organizations and development partners, have contributed to successful activities in many countries.

This manual focuses on one of the “Beyond the numbers” approaches: reviews of individual cases of maternal “near-misses” in facilities. It is based on previous manuals and definitions, the literature and lessons from the field over time in the WHO European Region and in other regions of the world. Specifically, it describes introduction of the near-miss case review (NMCR) approach in countries (chapter 2), NMCRs in hospitals (chapter 3) and assuring the quality of the NMCR cycle (chapter 4).

The manual is designed for hospital staff involved in maternal and newborn health care, programme managers and policy-makers who are responsible for the quality of perinatal health care at ministries of health or in facilities and United Nations and development partners that support maternal and perinatal health care.

NMCR is a means for continuous improvement of the quality of maternal and newborn care and outcomes, involving systematic reviews of care against explicit criteria and subsequent changes. Its purpose is to reduce preventable maternal and perinatal morbidity and mortality. In the NMCR cycle, individual near-miss cases are selected, and the hospital staff involved in managing the case systematically evaluate the care provided against evidence-based guidelines, local protocols and standards of care. Both good and substandard practices are identified. Actions to improve the quality of care are agreed upon, and their implementation is monitored. NMCRs should be conducted cyclically in order to improve the quality of care provided.

Chapter 2 of this manual describes, step-by-step, implementation of the NMCR cycle in facilities in a country. National guidelines on key obstetric complications should be available before starting the cycle. The main steps in NMCR are establishing a legal framework, appointing coordinators, preparing a national action plan, preparing or adapting a national manual with operational definitions and reference standards, building capacity and setting accountability mechanisms (quality assurance). Introduction into a country usually starts with a pilot programme in three or four large or medium-sized maternity hospitals and is scaled-up subsequently only if the pilot programme is successful.

Chapter 3 of the manual describes in detail the organization and conduct of an NMCR session in a hospital, including the roles and responsibilities of the people involved and the necessary materials. The steps for reviewing near-miss cases are listed, with tools and templates.

It is crucial to assure the quality of the NMCR cycle, so as not to waste resources, and chapter 4 provides examples based on long experience of common challenges and possible solutions for successful implementation. It also provides practical tools for improving the quality of the review cycle both in facilities and at country level. The quality of the NMCR cycle should be evaluated in the pilot phase before scale-up and at regular intervals subsequently.



# 1. Introduction

## 1.1 WHO vision of quality of care for maternal and newborn health

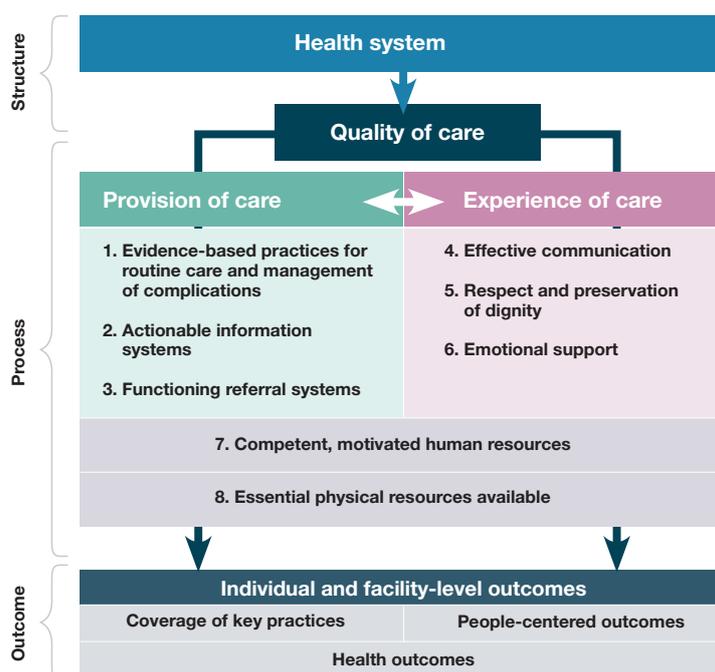
As we move beyond 2015, WHO envisions a world in which “every pregnant woman and newborn receives quality care throughout pregnancy, childbirth and the postnatal period” (1). The quality of care is recognized as a crucial aspect in WHO global strategies for ending preventable maternal mortality (2, 3) and in the “Every newborn action plan” (4). Ensuring adequate quality of care is a primary objective of Health 2020, the European strategic framework that sets the policy directions for the 53 Member States in the WHO European Region (5). Adequate quality of care is recognized as essential for the health and well-being of the population and also as a basic human right (6, 7). Additional emphasis has been given to quality of care in the context of the recent global economic crisis, as efficient use of available resources is a component of quality of care (6, 8). In WHO’s vision, the quality of care is defined as “the extent to which health care services provided to individuals and patient populations improve desired health outcomes” (1). Quality of care is a multi-dimensional concept: high-quality health care should be safe, effective, timely, efficient, equitable and people-centred (Box 1).

### Box 1. Dimensions of quality of care (1, 8, 9)

- **Safe:** health care that minimizes risks and harm to service users, including avoiding preventable injuries and reducing medical errors
- **Effective:** services based on scientific knowledge and evidence-based guidelines
- **Timely:** shorter delays in providing and receiving health care
- **Efficient:** delivery of health care in a manner that maximizes resource use and avoids wastage
- **Equitable:** delivery of health care that does not differ in quality because of personal characteristics such as gender, race, ethnicity, geographical location or socioeconomic status
- **People-centred:** care that takes into account the preferences and aspirations of individual service users and the culture of their communities.

WHO has conceptualized a “quality of care framework for maternal and newborn health” (Fig. 1) (1), in which the quality of care for pregnant women and newborns in facilities requires competent, motivated human resources and essential physical resources. The process of care is composed of two complementary domains: the “provision of care” and the “experience of care”. The provision of care requires evidence-based practices for routine

Fig. 1. WHO framework for the quality of maternal and newborn health care (1)



and emergency care, actionable information systems in which record-keeping enables review of the care provided and functioning referral systems between different levels of care (1). For the experience of care, effective communication, respect, preservation of dignity and emotional support should be ensured (1). Continuity of care across all services, units and levels of the health system is also fundamental (1, 10).

Evidence suggests that coverage with essential interventions does not ensure adequate health outcomes if consideration is not given to the quality of care (10–14). Substandard quality of care can be harmful to mothers and newborns, besides representing a cost for patients, the health system and the community, and can act as a disincentive for accessing health services (1, 11, 13). Differences in the quality of care by social status, gender or ethnicity contribute to inequity in health outcomes (1–5). In facilities, poor quality of care is a major contributor to avoidable maternal and neonatal mortality and morbidity, particularly in countries where care is given mainly in hospitals (11–13). The benefits of good-quality care include better health outcomes, cost savings, greater satisfaction of patients and staff and a lower risk for litigation.

A number of strategies have been proposed to improve the quality of maternal and newborn care in the past few years. In the past few years, including the development of standards for improving quality of maternal and newborn care in health facilities (1). In the WHO vision, quality improvement should achieve the standards for both “provision of care” and “experience of care” (1).

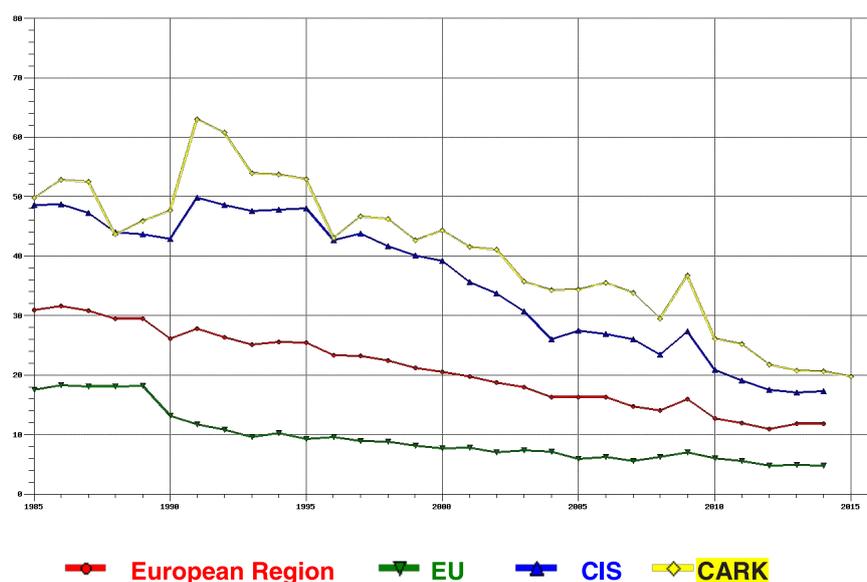
This manual focuses on one of the possible interventions to improve the quality of care in hospitals: the individual near-miss maternal case review (NMCR) cycle.

## 1.2 Maternal and newborn health in the WHO European Region

Between 1990 and 2015, the global maternal mortality ratio decreased by 44% (15), although the decrease differed substantially among regions. The largest decrease during that period was observed in eastern Asia (72%). Developing regions accounted for approximately 99% of all maternal deaths in 2015; sub-Saharan Africa alone accounted for roughly 66%, followed by southern Asia (15).

The WHO European Region comprises 53 Member States, which differ widely in political and socio-economic status and in national health system organization and health outcomes. The Region contains some of the richest countries in the world, with high development profiles and very low maternal and neonatal mortality, and some of the poorest. Considerable reductions in both maternal and perinatal mortality have been achieved in the Region in the past 20 years (Figs 2 and 3), but with large differences between and within countries (16, 17). In 2013, the average ratio reported by Member States in the Region was 11.8 maternal deaths per 100 000 live births (17).

**Fig. 2. Trends in maternal mortality ratio (MMR) over time by European sub-region**

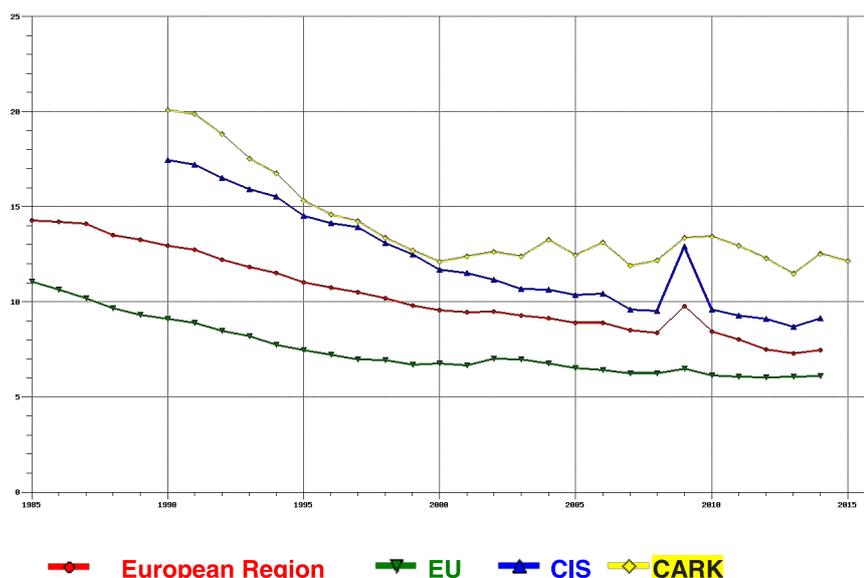


Source: WHO Health-for-all database

EU, European Union; CIS, Commonwealth of Independent States; CARK, Central Asian republics and Kazakhstan

Data for the central Asian republics and Kazakhstan are reported up to 2012; subsequently, data from the Central Asian Republics Health Information Network (CARINFONET) were used.

**Fig. 3. Trends in perinatal mortality over time by European sub-region**



Source: WHO Health-for-all database

EU, European Union; CIS, Commonwealth of Independent States; CARK, Central Asian republics and Kazakhstan

Data for the central Asian republics and Kazakhstan are reported up to 2012; subsequently, data from the Central Asian Republics Health Information Network (CARINFONET) were used.

Significant differences between official statistics and United Nations estimates suggest common under-reporting of both maternal and perinatal deaths, even in the most developed countries in western Europe (18–20).

### 1.3 The WHO “Beyond the numbers” approach and guiding principles

In 2004, WHO published a manual *Beyond the numbers: reviewing maternal deaths and complications for making pregnancy safer* (21). The manual describes various approaches for generating information on the underlying avoidable causes of maternal deaths and severe obstetric complications. The approaches go beyond counting deaths to understanding why maternal deaths occur and how they can be averted (Box 2). All the approaches are action-oriented, with practical recommendations for improving the quality of care.

#### Box 2. General principles of “Beyond the numbers”

- Knowing the of maternal deaths severe complications is not enough; we understand why women and all underlying factors that led to death.
- Each maternal death or life-threatening complication can practical ways of addressing the problem.
- Learning lessons and to act the findings of these approaches for improving quality of care.
- The purpose of the approaches is to save lives and not to apportion blame.
- Confidential, non-threatening environment

A fundamental aspect of all the approaches described in “Beyond the numbers” is the importance of a confidential, non-threatening environment in which to report and analyse the factors leading to death or severe obstetric complications in individual women. When confidentiality is assured, reporting is more open, leading to a more complete picture of the sequence of events. Participants, including health care staff and family members, should be assured that the sole purpose of case reviews is to save lives and not to apportion blame (21).

Since the launch of the initiative in Nairobi, Kenya, in 2004, considerable experience has been gained in various regions. The commitments of ministries of health, health care professionals and professional associations, with the technical guidance of WHO and coordinated support by United Nations organizations and development partners, have contributed to successful implementation in several countries.

In the WHO European Region, two “Beyond the numbers” approaches were identified by countries and supported by WHO and development partners: “Confidential enquiries into maternal deaths” at national level and individual “Near-miss case reviews” at hospitals. These two approaches are complementary for improving the quality of care and for reducing deaths and complications (Table 1). Advocacy, capacity-building and activities started by WHO now involve a number of other United Nations agencies, such as the Population Fund (UNFPA) and the Children’s Fund (UNICEF) and development partners.

**Table 1. Main characteristics of confidential enquiries into maternal deaths and individual near-miss case reviews**

|                  | Confidential enquiries into maternal deaths   | Individual near-miss case reviews  |
|------------------|---|--|
| What             | Enquire into maternal deaths  | Review cases of “near misses”  |
| Where            | National level<br>Information on clinical cases forwarded to national level   | Local activity at hospital level<br>Information on clinical cases remains at local level   |
| Who              | Expert national team  | Local hospital team  |
| How              | Comprehensive enquiry into all cases<br>Quantitative and qualitative data<br>Focus on professionals’ perspective  | Selected review of most informative cases<br>Predominantly qualitative data<br>Systematically includes women’s (and families’) perspectives  |
| Why              | Primary objective:<br>To improve quality and organization of care at national level (recommendations for policy-makers, university and professional associations, managers, health professionals and the community) | Primary objective:<br>To improve quality and organization of care at local level<br><br>Secondary objectives:<br>Learning opportunity for local hospital teams<br>Share lessons learnt with other hospital teams<br>Provide recommendations to ministry of health (e.g. to update national guidelines) |
| Expected results | No blame, accusation, disciplinary action or prosecution, but improve the quality of care and provide support and learning opportunities  |  |

This manual focuses on one of these approaches: NMCRs at facility level. It draws on lessons learnt from the “Beyond the numbers” manual (21), on other manuals and definitions (22–24), on a review of the literature and on direct field experience accumulated in the European Region (25–33)<sup>1–6</sup> and other regions (34–61).

## 1.4 Purpose of this manual and readership

This manual complements and extends guidance provided by WHO (21, 22), focusing on:

- introducing the NMCR approach in a country (chapter 2),
- organizing an NMCR session in a hospital (chapter 3)
- assuring the quality of the NMCR cycle (chapter 4).

<sup>1</sup> Lazzarini M et al. Impact of the facility based maternal near-miss case reviews in improving the quality of maternal and newborn care in low and middle income countries: systematic review (submitted for publication);

<sup>2</sup> Lazzarini M et al. Facilitators and barriers of successful implementation of the facility based maternal near-miss case reviews in low and middle income countries: qualitative systematic review (submitted for publication);

<sup>3</sup> Bacci A. Experience of implementation of facility level near miss individual case reviews in the European Region (personal communication) Stronger clinical governance for better maternal health outcomes: Beyond the numbers workshop for the south Caucasus and the Turkey Cluster, organized by UNFPA, Tbilisi, 23–25 June 2015;

<sup>4</sup> Bacci A. Summary and recommendations (personal communication) Stronger clinical governance for better maternal health outcomes: Beyond the numbers workshop for the south Caucasus and the Turkey cluster, organized by UNFPA. Tbilisi, 23–25 June 2015;

<sup>5</sup> Hodoroagea S. Introduction into near-miss case review (personal communication). National workshop Beyond the numbers, Kiev, 22–25 April 2008;

<sup>6</sup> Hodoroagea S. Near miss case reviews: main requisites (personal communication) Stronger clinical governance for better maternal health outcomes: Beyond the numbers workshop for the south Caucasus and the Turkey cluster, organized by UNFPA, Tbilisi, 23–25 June 2015.

This manual is intended for hospital staff involved in maternal and newborn health care, for programme managers and policy-makers who are responsible for the quality of perinatal health care at ministries of health or in facilities and for United Nations agencies and development partners that support maternal and newborn health care. Ministries of health, United Nations agencies and development partners will be particularly interested in chapters 2 and 4, and hospital staff are the main target readership of chapters 3 and 4.

## 1.5 The maternal near-miss case review cycle

The general definition of a woman who experiences a maternal near-miss case is: “a woman who nearly died but survived a complication that occurred during pregnancy, childbirth or within 42 days (6 weeks) of termination of pregnancy” (22). Examples of the operational definitions used to identify near-miss cases on the basis of information in clinical records are given in Annex 5.

A variety of approaches have been used in the past to audit clinical obstetrics in order to improve the quality of care, with varying terminology (Box 3).

### Box 3. Terminology used for auditing near-miss cases

In 2002, the National Institute for Clinical Excellence (NICE) provided the following definition of “clinical audit” (623), which was adopted by others (63–66): “Clinical audit is a quality improvement process that seeks to improve patient care and outcomes through systematic review of care against explicit criteria and the implementation of change. Aspects of the structure, processes, and outcomes of care are selected and systematically evaluated against explicit criteria. Where indicated, changes are implemented at an individual, team, or service level and further monitoring is used to confirm improvement in healthcare delivery.” In “Beyond the numbers”, the expressions “clinical audit” and “criterion-based clinical audits” are used to identify structured approaches, in which clinical cases are evaluated against predefined criteria (21). Another characteristic of the clinical audit, according to the “Beyond the numbers” definition, is that it can, or in some instances should, include all clinical cases that match a given case definition over a certain period; this process is referred to as “quantitative”. The expression “case review” identifies a more informal, qualitative method of clinical audit, which is limited to a selected number of cases. Both approaches have been defined as “cyclical” (21), although they have not always been effectively conducted as such in the field.

Experience with criterion-based audits has increased considerably in low- and middle-income countries over the past few years (67–70). Since “Beyond the numbers”, others have defined “criterion-based audits” as “objective, systematic, and critical analysis of the quality of health care against a set of criteria (standards) of best practice” (68), with the following features: based on a predefined list of selected criteria; information usually collected from records and logbooks (not by internal discussion or interviews with service users); audit most often performed by external auditors; and audits based on a defined sample of cases, so that inclusion of all cases is not always necessary (67–70). In the WHO European Region, the term “facility-based individual near-miss case review” has been used extensively for an audit method based on internal discussion among a team of local professionals in charge of hospital care of selected near-miss cases and comparison with predefined standards (usually, national clinical guidelines, local protocols and standards of care) (25–33).<sup>1-4</sup> The NMCR approach, as implemented in the WHO European Region, involves regular (e.g. monthly) staff meetings to discuss the management of individual near-miss cases, depends on interaction and ownership and is predominantly a qualitative approach. Because of the long-standing use of this definition, we decided to maintain the term “near-miss case reviews” (NMCRs) in this manual.

<sup>1</sup> Bacci A. Experience of implementation of facility level near miss individual case reviews in the European Region (personal communication) Stronger clinical governance for better maternal health outcomes: Beyond the numbers workshop for the south Caucasus and the Turkey Cluster, organized by UNFPA, Tbilisi, 23–25 June 2015;

<sup>2</sup> Bacci A. Summary and recommendations (personal communication) Stronger clinical governance for better maternal health outcomes: Beyond the numbers workshop for the south Caucasus and the Turkey cluster, organized by UNFPA, Tbilisi, 23–25 June 2015;

<sup>3</sup> Hodorogea S. Introduction into near-miss case review (personal communication). National workshop Beyond the numbers, Kiev, 22–25 April 2008;

<sup>4</sup> Hodorogea S. Near miss case reviews: main requisites (personal communication) Stronger clinical governance for better maternal health outcomes: Beyond the numbers workshop for the south Caucasus and the Turkey cluster, organized by UNFPA, Tbilisi, 23–25 June 2015.

This manual describes the NMCR as a type of “clinical audit” (62) of maternal near-miss cases and is defined as “A continuous process to improve the quality of patient care and outcomes in facilities by systematic review of care against explicit criteria and implementation of changes”.

### **Main characteristics**

- cyclical;
- hospital-based;
- multidisciplinary: obstetricians, midwives, neonatologists, laboratory and pharmacy staff, managers and other relevant staff;
- bottom-up, participatory;
- strengthens local ownership of the process;
- based on the ground rules of respect, confidentiality and avoidance of blame and punishment;
- standard-based: the care provided is compared with evidence-based guidelines, local protocols and standards of care;
- focuses not only on clinical management but also on organization, communication and support system factors;
- includes the woman's view, providing information on the "experience of care" as well as complementary information on "provision of care";
- recognizes good practices;
- identifies substandard care and underlying reasons;
- solves problems, with agreed solutions;
- action-oriented: solutions are implemented and monitored;
- low cost: does not require many resources.

Several arguments support introduction of the NMCR method. First, discussion of near-miss cases is much more likely to allow staff to consider both the positive (i.e. factors that may have contributed to the woman's survival) and the negative aspects of the care provided (i.e. factors that may have contributed to complications) than discussion of maternal deaths. A discussion of cases of women who have survived life-threatening complications may be easier for health providers than a discussion of deaths, less prone to assignment of blame and therefore more effective in encouraging active participation, which is essential for quality improvement. Secondly, because the woman has survived, her views can be included in the analysis, and her experience of care can provide useful information and insights, including the extent to which her rights were respected (e.g. effective communication, emotional support, respect and preservation of dignity). Thirdly, near-miss cases are more common than maternal deaths and therefore allow a more comprehensive understanding of the quality of care provided. The prevalence of near-miss cases in a single facility depends on factors such as the local epidemiology, specific case definitions, case mix and quality of care. The available surveillance data indicate that the prevalence of near-miss cases is generally 7.5 cases (range, 3–15) per 1000 hospital deliveries (22, 24). In many settings, holding regular meetings (e.g. monthly) to discuss near-miss cases is feasible and important for monitoring progress in the quality of care, while there may be too few maternal deaths for regular discussions.

Other advantages of the NMCR are the general benefits of internal clinical reviews in a facility. The process encourages a sense of ownership, active engagement and preparedness for emergency cases among the hospital staff directly involved in providing care (21, 27, 33). Staff at a facility are in a better position than external auditors to propose, agree and implement solutions. When staff are approached with an assurance of respect for confidentiality, they may be willing to reveal and address shortcomings in quality of care that are not reported in medical records (21, 25–27, 35).<sup>1</sup> The NMCR cycle helps to promote use of evidence-based clinical and organizational guidelines and evidence-based medicine and may reveal a need to prepare new national guidelines and local protocols (25–27).<sup>1,2</sup> It fosters a problem-solving attitude and encourages dialogue, exchanges of views and team-building among professionals, such as those in obstetrics and neonatal care units, who may not have many occasions to meet and discuss cases (25–28, 35).<sup>3</sup> The process can also ensure an active role of mid-level staff, such as midwives and nurses (27–30) and improve the quality of medical records (25). An additional advantage is that organizing and running frequent meetings require only modest extra resources (25, 36).

In the NMCR approach, a case is selected for review by the staff involved in care provision, usually every month but less frequently in smaller facilities where near-misses are rare events. The aim is not to resolve single near-miss cases, as the patient has usually already been discharged, but to use the case to discuss routine case

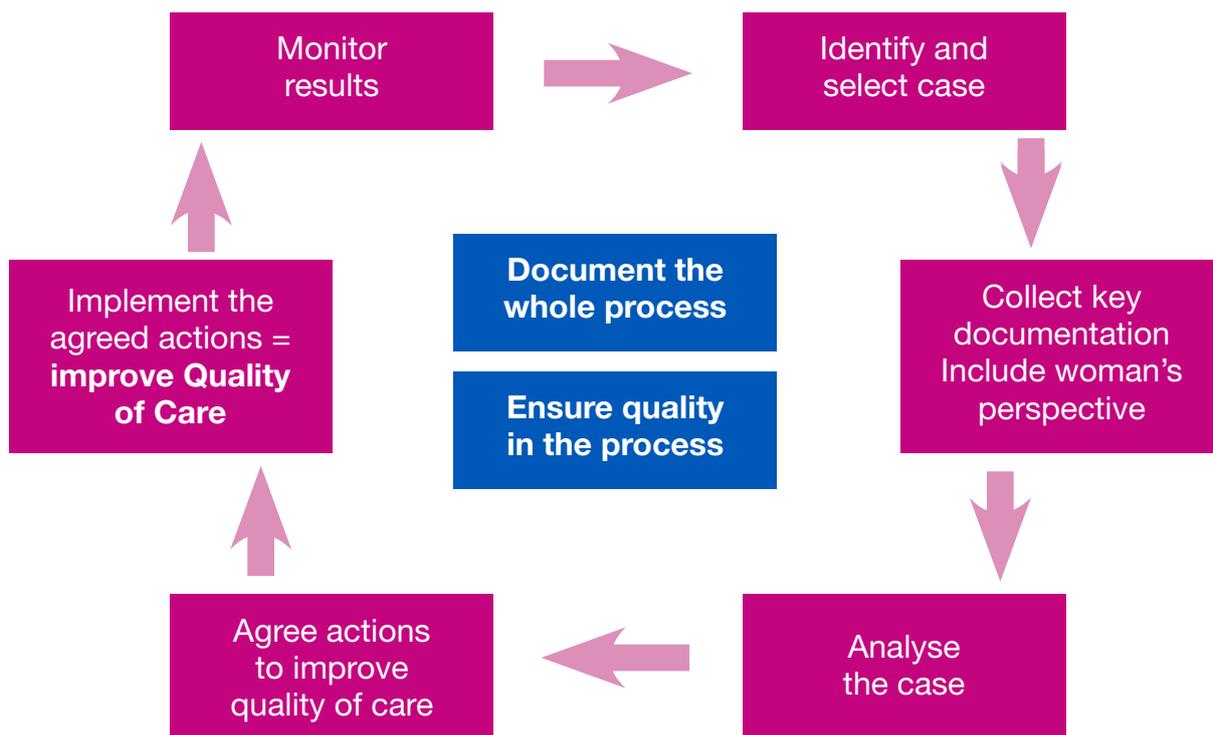
<sup>1</sup> Lazerini M et al. Impact of the facility based maternal near-miss case reviews in improving the quality of maternal and newborn care in low and middle income countries: systematic review (submitted for publication).

<sup>2</sup> Facilitators and barriers of successful implementation of the facility based maternal near-miss case reviews in low and middle income countries: qualitative systematic review (submitted for publication).

management, procedures and attitudes. The objective of the NMCR is not simply descriptive (counting near-miss cases, calculating incidence rates or establishing relative risks) but to identify areas for improving the quality of care and to find solutions to the problems identified.

The NMCR cycle is action-oriented. The aim is to improve actual practice on the basis of the findings of the review. A case is analysed to determine all the aspects of care (case management, hospital support systems, organization of care, including team work and communication, individual behaviour) that might have contributed to the outcomes, to identify deficiencies in the quality of care provided and their underlying factors and to agree on actions to improve the quality of care. After each session, the cycle should be completed by implementation of the agreed actions and monitoring the results (Fig. 4), as expected in the plan–do–study–act cycle (70).

**Fig. 4. Steps in the near-miss case review cycle**



All the steps in the process are crucial and should be performed continuously in order to make substantial changes in the quality of care, because a review without feedback and without implementation of remedial action is not effective. The circularity of the process is fundamental, and this should be clear to all those involved.

In this manual, we describe NMCRs conducted in facilities by hospital staff and not by external auditors. The assumption, beyond the NMCR cycle, is that active involvement, a team approach, ownership by local clinical staff (doctors, nurses and midwives) and support by local managers are required for a real, long-lasting impact on quality of care. One aim of the process is active involvement of hospital staff in improving the quality of care by engaging them in discussing real cases treated in the hospital. Country experience has showed that NMCRs can also improve the role and recognition of mid-level staff, such as midwives, nurses and technicians (25, 30, 31). It has been reported that involving women and their relatives through interviews (i.e. asking their views and opinions) empowers service users (49).

This guide should be used in conjunction with evidence-based clinical guidelines, such as the WHO guidelines (71), training courses such as the effective perinatal care package (72) and tools for quality assessment (73, 74).

## 1.6 Possible challenges and key elements for successful implementation

Country experience has shown that implementation of the NMCR approach may require a radical change in mentality. For example, in some countries, especially in the Commonwealth Independent States (CIS) countries, other systems of Maternal Mortality audits were already in place. These were often characterised by the

following features: focus on maternal death, conduct by national auditors, a “top-down”, non-participatory approach, lack of involvement of midwives and other mid-level staff, no consideration of the views of the women or their family members, unclear standards of care, blurred review criteria based on subjective opinions, blame and punishment of single individuals and no constructive action to improve the quality of care at facility and health system levels.

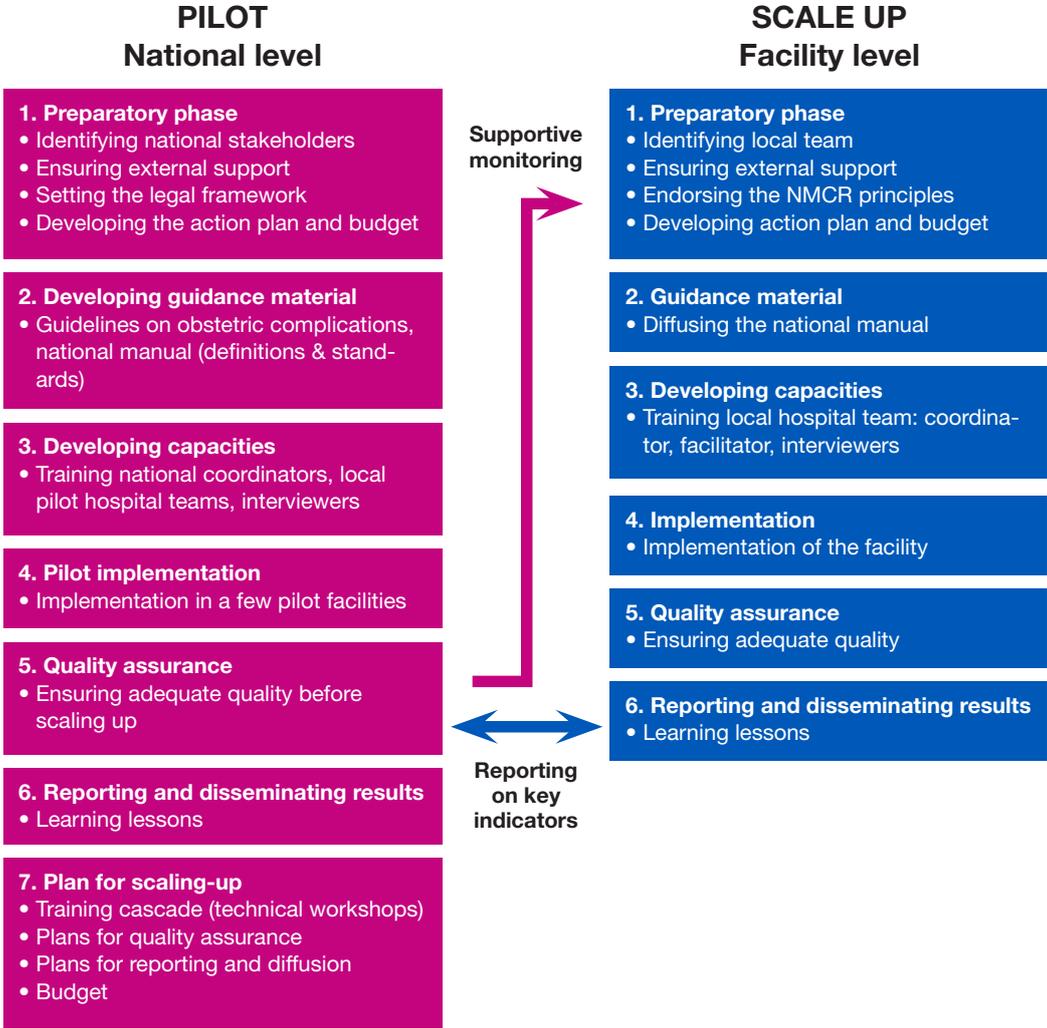
More information on frequent challenges in implementing the NMCR cycle and practical advice on overcoming those challenges is given in chapter 4.

# 2. Introducing the near-miss case review cycle in a country

This chapter describes introduction of the NMCR approach in a country. The process usually begins at the request of the ministry of health, supported by United Nations agencies and development partners. Alternatively, it may be requested by professional associations, such as societies of health professionals or academic institutions or by one motivated hospital rather than nationally. Experience of implementation in countries in the WHO European Region (Annex 1) indicates that most countries followed the steps outlined in this manual.

When started as part of a national programme, the NMCR cycle should first be pilot-tested in three or four large or medium-sized hospitals and be scaled-up only after successful testing and discussion of the lessons learnt. The main steps at both national and facility level are depicted in Fig. 5.

**Fig. 5. Main phases in national implementation of the NMCR cycle**



## 2.1 Starting at national level

### 2.1.1 Sequence of activities

In most cases, a first national workshop is preceded by an international workshop, usually involving countries in the same WHO region or sub-region, with similar characteristic. The objective is to encourage dialogue and sharing of experiences.

Implementation at country level starts with an introductory workshop to provide information on “Beyond the numbers” and NMCR, encourage commitment by policy-makers and other relevant stakeholders, build national ownership, start preparation of a national action plan and, if necessary, a regulatory framework. A decision to implement the NMCR cycle, alone or with other “Beyond the numbers” approaches, is usually taken during this workshop.

The introductory workshop is followed by one or more technical workshops to build technical capacity in effective use of the new approach and action plans for NMCR implementation in each pilot facility.

Table 2 lists the main aspects of each step of implementation. An example of a list of activities, usually supported by United Nations agencies and development partners, in the NMCR approach at national level is given in Annex 2.

## **2.1.2 Prerequisites**

### *2.1.2.1 Updated national guidelines on obstetric complications*

Before starting the NMCR cycle, updated national guidelines on the main obstetric complications – severe hypertension, eclampsia, post-partum haemorrhage, severe infection and sepsis – should be available and adequately disseminated. This is a prerequisite for the NMCR cycle, as national guidelines are required as references for case reviews and as standards of care.

When minimal set of national guidelines on the main obstetric complications are not available, they should be developed/adapted or updated. WHO or other United Nations agencies can provide support and technical expertise. The most efficient and currently the most widely used way of setting national guidelines is to adapt high-quality international guidelines to the local context; this is quicker, requires less effort and usually results in a better product than establishing guidelines de novo (75). Evidence-based guidelines can be retrieved on the WHO website (71) and from other trustworthy sources, such as the Reproductive Health Library (76), the National Institute for Health and Care Excellence (NICE) (77) and the Royal College of Obstetricians and Gynaecologists (78). The criteria for adapting international recommendations for local use depend on the local epidemiology, the availability of resources and patients’ preferences (75). Guideline development is, however, not enough to ensure their uptake: they must be adequately disseminated in facilities.

The concept of evidence-based medicine, although now widely disseminated, may still be relatively unfamiliar to some health professionals. Workshops, courses and other approaches are usually required to raise their awareness of the value of evidence-based medicine and bring about a real change in practice (Annex 1). The WHO effective perinatal care package includes a module on the principles of evidence-based medicine, and the package of 30 modules gives evidenced-based recommendations for the care of women and newborns (72). Training with this package should be considered before starting the NMCR cycle.

As it may take some time to update all the necessary guidelines, discussion of near-miss cases might cover only selected diseases. For example, if national guidelines are available only on post-partum haemorrhage, the NMCR could start with those cases.

As several guidelines may be relevant to the management of near-miss cases, the discussions might indicate that national guidelines on e.g. other clinical conditions, internal protocols on case referral or organization of care should be prepared or updated.

### *2.1.2.2 National engagement and external support*

Appropriate stakeholders in the country should be identified. These usually include the ministry of health, the WHO country office, other United Nations agencies and development partners, academic institutions and societies of health professionals. The involvement of patients’ associations and consumer groups can contribute to the process.

Learning from the experience of other countries to avoid mistakes will save resources. External technical support can be provided by international experts with long experience in the field. Such external support should be sustained over time, as maintaining the capacity to review near-miss cases and assessing and reinforcing the quality of the process can take several years.

**Table 2. Typical sequence of activities for national implementation of the NMCR cycle**

| International introductory workshop (3–4 days)   |  |
|--|--|
| <p><b>Participants</b></p> <p>Representatives of ministries of health of each country, key national health care planners and managers</p> <p>Representatives of leading academic institutions and professional associations working in maternal and newborn health and improvement of quality of care, who can make decisions and changes</p> <p>United Nations agencies, development partners international donors</p> <p>International experts</p>   | <p><b>Objectives</b></p> <p>Introduce the principles of “Beyond the numbers” and NMCR</p> <p>Encourage dialogue and sharing of experience among countries</p> <p>Encourage commitment of policy-makers</p> <p>Build a sense of ownership at national level</p> <p>Start preparing country-specific action plans for engagement of national stakeholders, a national introductory workshop and a regulatory framework</p>   |
| Prerequisites for implementation at national level   |  |
| <ul style="list-style-type: none"> <li>● National clinical guidelines on the main obstetric complications, updated according to international standards (71), a good level of understanding of the principles of effective perinatal care and use of evidenced-based practices, and, if necessary, training with the WHO effective perinatal care package before introduction of NMCR (72)</li> <li>● Engagement of driving forces at national, regional and district levels</li> <li>● Adequate, sustained external technical support</li> </ul>  |  |
| National introductory workshop (3–4 days)  |  |
| <p><b>Participants</b></p> <p>Representatives of the ministry of health, key national health care planners and managers, relevant regional and district representatives of the pilot-testing areas</p> <p>Representatives of leading academic institutions and professional associations, health professionals (obstetricians, midwives, neonatologists, family practitioners, anaesthesiologists, social workers and psychologists) working in maternal and newborn health and improving quality of care, who can make decisions and changes</p> <p>United Nations agencies, development partners, donors at country level</p> <p>International experts</p> <p>Representative of users’ associations in the area of maternal and newborn health and improving quality of care should also be considered</p> | <p><b>Objectives</b></p> <p>Introduce the principles of “Beyond the numbers” and NMCR, with examples from other countries</p> <p>Plan for official institutionalization and, if necessary, a national regulatory framework</p> <p>Draft a national action plan, including:</p> <ul style="list-style-type: none"> <li>● a technical workshop;</li> <li>● initial selection of facilities for pilot-testing (with sufficient number of births and near-miss cases) and coordinators;</li> <li>● setting up the national working group (national coordinator and team) and their roles and responsibilities;</li> <li>● preparation of guidance material;</li> <li>● presentation of a general definition of a near-miss case, inclusion criteria and glossary (Annexes 3 and 4);</li> <li>● drafting operational definitions of near-miss cases (Annex 5);</li> <li>● monitoring, quality assurance and accountability mechanisms;</li> <li>● diffusion of results;</li> <li>● budget.</li> </ul> |
| Prerequisites for implementation at facility level   |  |
| <ul style="list-style-type: none"> <li>● Guidance manual and related material are translated and printed.</li> <li>● Pilot facilities have been identified.</li> <li>● There is adequate, sustained external technical support.</li> </ul>   |  |

**Table 2. Typical sequence of activities for national implementation of the NMCR cycle** *Continued*

| Technical workshops in pilot facilities (3–4 days)  |   |
|---|---|
| <p><b>Participants</b></p> <p>Hospital teams: four or five people involved in clinical care from each facility (obstetricians, midwives, neonatologists, interviewer, anaesthesiologists) and managers interested in improving the quality of care and in a position to make changes in the facility</p> <p>International experts</p> <p>Representatives of United Nations agencies, development partners and donors at country level</p> | <p><b>Objectives</b></p> <p>To develop technical capacity for practical implementation of NMCRs in a facility, including:</p> <ul style="list-style-type: none"> <li>● presentation of “Beyond the numbers” principles, NMCR method, general near-miss case definition, inclusion criteria and glossary (Annexes 3 and 4);</li> <li>● finalization of operational definitions of near-miss cases (Annex 5);</li> <li>● preparation of standards of care (Annex 6);</li> <li>● development of capacity in hospital teams and coordinators in e.g. facilitating NMCR sessions, interviewing women, respecting confidentiality and reporting (Annexes 7–13);</li> <li>● discussion of monitoring indicators (Annexes 14 and 15); and</li> <li>● understanding the principles of assessing and improving the quality of NMCR (Annex 16).</li> </ul> <p>To finalize a plan for pilot-testing, including:</p> <ul style="list-style-type: none"> <li>● a plan for official institutionalization and, if necessary, a regulatory framework at facility level;</li> <li>● identification of facility coordinator(s);</li> <li>● plan for implementation at each facility;</li> <li>● plans for quality assurance;</li> <li>● plan for diffusing results at facility level;</li> <li>● plan for diffusing results at national level;</li> <li>● budget.</li> </ul> |

### 2.1.3 Preparatory phase

A good preparatory phase is essential for successful implementation. The following steps are introduced during the international and national workshops and are finalized during the technical workshops before the start of the implementation:

- setting the legal framework;
- preparing a national action plan;
- preparing national guidance material, including operational definitions and standards;
- developing capacity and defining roles and responsibilities;
- preparing specific action plans for facilities.

#### 2.1.3.1 Setting the legal framework

Formal institutionalization of the NMCR cycle and, if necessary, a national or local regulatory framework are usually discussed during the national workshop and finalized during the technical workshop.

The principles of the NMCR cycle (see Box 4) should be formally endorsed and supported by the local health authorities. This step is crucial for successful implementation of the approach, as, if people do not give such formal endorsement, they may be reluctant to participate in NMCR sessions. Health authorities and managers should agree on implementation of the principles, and local managers should be engaged to support the NMCR cycle, complying with the fundamental principles (i.e. confidentiality, no blame, no punishment). This is essential, both as a prerequisite for the NMCR and for improving quality in facilities. In line with these fundamental principles, all staff should be assured that the primary purpose of NMCR is to learn from near-miss cases and save lives in the future and not to identify guilty people, blame single individuals or institutions or punish individuals or groups. Con-

#### Box 4. Fundamental principles of the NMCR cycle

| <b>Its aims are:</b>   | <b>Its aims are not:</b>  |
|--|---|
| Critical, open analysis of near-miss cases to reveal details of case management and provide a true picture of what really happened   | Identify guilty people, provide a basis for litigation, blame single individuals or institutions or punish individuals or groups                    |
| Create the conditions for agreement and participatory implementation of strategies to improve the quality of care.   | Discipline health providers or review their qualifications (in a case review, the identities of the patients or practitioners need not be revealed) |
| Find and implement solutions within the facility; e.g. improve training, update internal protocols, strengthen team work, improve internal communication                                   | Merely collect epidemiological data for health authorities  |
| Report shortcomings that require action at a higher level of the health system (e.g. pre-service training or updating national guidelines) to the ministry of health or health authorities | Compile reports to indicate that the quality of care is ideal and that all standards are met  |
| A no-blame, no-punishment attitude and respect for confidentiality are essential.  | Focus solely on corrective action by the ministry of health   |
|  | Conduct the cycle in such a way as to attribute blame or lack of assurance of confidentiality will inhibit staff from cooperating.                  |

Confidentiality must be assured during case discussions to ensure the necessary openness in describing events and to obtain a more complete, detailed picture of the sequence of events (21, 25, 27, 34).<sup>1</sup>

A constructive, open-minded, “no blame, no punishment” attitude may not be easy to achieve in practice, and continuous external support on this aspect has been found to be essential in many parts of the WHO European Region. The accountability of all health workers should be encouraged by means other than punishment, such as adequate training and better information and communication with the community.

As a principle, a NMCR must never be used as the basis for litigation, sanctions or blame by management. Information on grave misconduct should not be acquired during NMCR sessions but should be managed by other approaches. If gross negligence or malpractice is revealed in NMCR sessions, which cannot be explained by health system failure, notification to health managers and/or the relevant authorities may be considered (21).

In some cases, the NMCR cycle may indicate revision of national legislation on the rights and responsibilities of service providers and service users.

##### 2.1.3.2 Preparing the national action plan

The elements of a national action plan include:

- plans for a technical workshop;
- initial selection of facilities for pilot-testing;
- identification of local coordinators;
- establishment of a working group (national coordinator and team) with defined roles and responsibilities;
- plans for preparing guidance material (national manual, operational definitions and standards);
- plans for monitoring, quality assurance and accountability;
- plans for disseminating results; and
- a budget.

The pilot-testing plan should include evaluation of the quality of NMCR implementation. Ensuring the quality of the cycle in pilot facilities is crucial before extension to more facilities, in order to avoid wasting resources. If the quality of the NMCR cycle is substandard, more time should be taken to improve it before scaling it up.

<sup>1</sup> Lazzarini M et al. Facilitators and barriers of successful implementation of the facility based maternal near-miss case reviews in low and middle income countries: qualitative systematic review (submitted for publication).

### 2.1.3.3 Preparing guidance material

Guidance material includes: a national manual, a list of relevant clinical guidelines, operational definitions of near-miss cases, a list of standards and documents on the basic rights of women and newborns in hospital.

A national manual should be translated into the local language (if necessary) and made widely available (printed in an adequate numbers of copies). It is recommended that annexes be included, providing a list of relevant clinical guidelines, operational definitions of near-miss cases, standards of care and some reference documents on the basic rights of women and newborns in hospital. When provided as annexes, they can readily be revised on the basis of updated clinical guidelines, usually every 2–5 years.

As the terminology in this area is divergent and confusing (terms such as “guidelines”, “protocols” and “standards” are often used interchangeably), standard definitions have been adopted for this manual to ensure consistency and clarity, in line with WHO capacity-building and implementation activities in countries (Box 5).

#### **Box 5. Guidelines, protocols and standards: terminology**

**Evidence-based clinical guidelines:** systematically developed, evidence-based guidance to assist in health care decision-making for a specific clinical condition (79). Clinical guidelines consist of recommendations on clinical care, supported by the best evidence in the clinical literature (80).

**Clinical protocols:** documents used at local (institution, department or clinic) health care level to implement national clinical guidelines in specific settings in order to improve the quality of care and reduce inequalities in the provision of care. They are drawn from the national clinical guidelines and reflect local circumstances and variations due to different types of clinical care at different levels (81, 82).

**Standards of care:** the criteria against which to measure practice during case analysis. Clinical standards are specific, measurable targets that reflect the care that a health service and a prudent health care professional should provide in order for the care to be effective and safe for the patient (79). WHO describes standards as recommendations for minimum (essential) care for all mothers and newborns and for those who require special care (1). Standards should be based on the latest evidence-based guidelines and be realistic in the context of local circumstances and available resources.

National evidenced-based clinical guidelines should be ready before the technical workshops (prerequisite). Preparation of national guidelines is not the subject of this manual, but a number of guidance documents are available (75, 80, 82, 83).

Operational definitions of near-miss cases are drafted during the national workshop on the basis of suggestions (Annex 5), field-tested to determine their practicability for identifying near-miss cases and discussed and finalized during the technical workshop. The operational definitions of near-miss cases (Annex 5) might have to be adapted to the national context, as some may assume the availability of certain equipment or supplies, such as laboratory tests. On the basis of the local epidemiology, other locally relevant, life-threatening conditions could be added to the list, with their operational definitions.<sup>1</sup> It is strongly recommended that the same operational definitions for near-miss cases be used in all facilities in a country to ensure comparable results.

Standards of care are usually drafted during the technical workshop; revisions may be required after the first quality assessment. As it may be difficult and time-consuming to make a comprehensive list of standards against which to measure each step in case management, it is advisable to focus on key standards and to use reference material (Box 6, Annex 6).

The case discussion should include both “provision of care” and “experience of care” (Fig. 1). The latter includes the perspectives of those who use health care services, which can be collected at interviews. To establish a standard against which to evaluate the “experience of care”, it is strongly recommended that reference documents on the basic rights of women and newborns in hospital be included in the guidance material.

<sup>1</sup> Lazzarini M et al. Impact of the facility based maternal near-miss case reviews in improving the quality of maternal and newborn care in low and middle income countries: systematic review (submitted for publication)

## Box 6. Reference documents for operational definitions, standards and patients' rights

### *Operational definitions:*

- See examples in Annex 5.

### *Standards:*

- See examples in Annex 6
- Standards for improving quality of newborn care in health facilities (1)
- WHO standards for maternal and newborn health (84)
- European Board and College of Obstetrics and Gynaecology Standards of Care for Women's Health in Europe. Obstetric and Neonatal Services 2014 (79)
- Other sources include manuals (22), guidelines (71), effective perinatal care training package (72), experience from other countries and expert consensus.

### *Rights of women and newborns in hospital:*

- Prevention and elimination of disrespect and abuse during childbirth (6)
- Respectful maternity care: the universal rights of childbearing women (85)
- International Mother–Baby Childbirth Initiative. Ten steps to optimal mother–baby maternity services (86)
- Report of the Office of the United Nations High Commissioner for Human Rights on preventable maternal mortality and morbidity and human rights. United Nations Human Rights Council (87)
- Charter on Sexual and Reproductive Rights. International Planned Parenthood Federation (88)
- Report of the United Nations High Commissioner for Human Rights. Technical guidance on the application of a human rights-based approach to the implementation of policies and programmes to reduce preventable maternal morbidity and mortality (89)
- See also references 90–95.

### 2.1.3.4 Building technical capacity and defining roles and responsibilities

Capacity-building and definition of roles and responsibilities are usually done during technical workshops, under the supervision of external experts. The person responsible for this aspect nationally is the national coordinator, who is usually a single person; however, the number of national coordinators will depend on the size of the country. In some cases, there may be regional coordinators. In each facility, a hospital coordinator, the referent for the process should be identified. The national or regional coordinator(s) should ideally have the following characteristics: sufficient clinical experience in maternal and/or neonatal health care, knowledge of the principles of evidence-based health care, good knowledge of national and international standards (71) and of effective perinatal care (72), good understanding of the NMCR cycle, be accountable and have leadership qualities, be able to work in a team and, if possible, have experience in training and health system governance.

Hospital coordinators should be chosen among local staff, with characteristics similar to those of the national coordinator. The coordinator need not be the director of the hospital, the deputy-director or the chief of the maternity department; the role can be taken by an expert obstetrician or a midwife. The roles and responsibilities of coordinators are listed in Box 7.

Other local roles to be assigned, with proper training, include those of the facilitator and the interviewer. The ideal candidate facilitator may be identified during the technical workshop or later, in the hospital team. The ideal facilitator will have the following characteristics:

- capacity to support participation, stimulate open case discussions and respect the opinions of other staff;
- experience in working within a team and sufficient clinical experience in maternal or neonatal health care;
- knowledge of the principles of evidence-based health care;
- knowledge of national and international standards (71) and effective perinatal care (72); and,
- if possible, experience in staff training.

The coordinator is often the facilitator of an NMCR session. As staff become more experienced, the role of the facilitator is often taken by others in order to ensure the sustainability of the process.

It is important to identify suitable professionals and train them in interviewing, as experience has shown that only trained interviewers can obtain realistic opinions from women and their relatives. Interviews can empower pa-

## Box 7. Roles and responsibilities of coordinators

|                                     |  |
|-------------------------------------|--|
| National or regional coordinator(s) | <ul style="list-style-type: none"><li>● Participate in technical workshops with international experts.</li><li>● Participate in NMCR sessions in their facilities.</li><li>● Support NMCR implementation in facilities.</li><li>● Participate in national quality assurance of NMCR with international experts and subsequently ensure quality (also by facility visits) at national level.</li><li>● Coordinate NMCR quality assurance at their facilities.</li><li>● Coordinate regional and national reports (Annex 12).</li><li>● Oversee monitoring, in collaboration with health authorities (Annexes 14 and 15).</li><li>● Coordinate dissemination of findings at regional and national levels, discuss achievement and constraints, and decide how to overcome constraints.</li><li>● Oversee and coordinate plans for scaling-up.</li><li>● Organize and conduct cascade training.</li></ul>   |
| Hospital coordinator                | <ul style="list-style-type: none"><li>● Participate in the technical workshop.</li><li>● Oversee organization and regular running of NMCR sessions.</li><li>● Coordinate and participate in NMCR sessions in the hospital.</li><li>● Appoint a facilitator for each NMCR session.</li><li>● Coordinate record-keeping, and ensure that all information is kept in a secure place.</li><li>● Inform managers about recommendations from each session.</li><li>● Oversee implementation of recommendations.</li><li>● Ensure that recommendations for the regional and national levels are forwarded.</li><li>● Coordinate facility reporting (Annex 12) and monitoring (Annexes 14 and 15).</li><li>● Ensure respect for confidentiality in the reports.</li><li>● Coordinate NMCR quality assurance in the hospital.</li><li>● Coordinate dissemination of findings in the facility and locally, discuss achievements and constraints, and decide how to overcome constraints.</li><li>● Ensure capacity-building for professionals in case of transfer of roles due to staff turn-over.</li></ul> |

tients by giving them space for discussion and contestation (49). The choice of interviewers depends on the setting and workforce; they may include psychologists, social scientists, anthropologists, social workers, nurses, midwives and other staff, who preferably did not directly provide care in the near-miss case under discussion. The most important qualities of the interviewer are: understanding the purpose of the interview (i.e. to collect women's views), conveying to women that their views will be taken seriously and being motivated to obtain useful information. Interviewing techniques are gained in one or more technical workshops. Some of the basic principles of interviewing are listed in Annex 7.

The capacity of local coordinators, facilitators and interviewers should be built in workshops, which should include practical exercises (e.g. effectively facilitating a meeting, ensuring active participation of all staff, making recommendations, reporting and using templates for case reporting (Annex 10)). Reinforcement should be ensured by supportive supervision and regular quality assessments. Both the coordination and facilitation of a meeting may be challenging, and typical difficulties and possible solutions should be discussed during the technical workshops and during quality assurance activities.

Changes of duty station or role or transfer of personnel in key NMCR roles may jeopardize the quality and continuity of the NMCR cycle (see also chapter 3). Therefore, the availability of staff in the mid- and long-term should be taken into account in selecting coordinators, facilitators and interviewers. Rotation of two or three staff in the roles of facilitator and interviewer will establish a larger pool of skilled professionals and help to ensure continuity.

If professionals involved in the NMCR are to change duty stations, their capacity must be properly transferred in a timely way.

#### 2.1.3.5 Facility action plans

Action plans are prepared at each facility during the technical workshops, including:

- a plan for official institutionalization and a facility regulatory framework, if necessary;
- capacity-building and dissemination of guidance material;
- plans for monitoring and quality assurance;
- plans for dissemination of results; and
- a budget.

## 2.2 Pilot implementation

As indicated earlier, three to four large or medium-sized maternity hospitals are usually selected for pilot-testing. The criteria for selecting facilities include the presence of dedicated managers and clinical staff who wish to improve the quality of care and who have knowledge and experience in perinatal care (trained with the WHO effective perinatal care package (72)) and sufficient numbers of births and of near-miss cases. The geographical distribution of facilities will depend on the country; however, it may be useful, if feasible and appropriate, to choose facilities that are located in different regions, to ensure lessons for different contexts and so that scaling-up can benefit from experience in each region.

It is advisable to pilot-test the process in no more than four facilities, to allow adequate development of expertise. If there are too many facilities, it may be difficult to organize quality assessment and supervisory visits by international and national experts. In addition, if the quality of NMCR is evaluated as poor in the pilot phase, mistakes are easier to correct if there are only a few facilities.

All staff in the pilot facilities should be adequately informed. It is advisable to present the principles, aims and methods of the NMCR formally, including reference guidelines, standards and the ground rules of good conduct to all hospital staff. Staff should agree on the latter (see also chapter 3).

The pilot phase typically lasts 6–8 months. The capacity and confidence of staff in running individual NMCRs will increase with time. An NMCR session is usually organized every 4–6 weeks, depending on factors such as the size of the hospital, the number of near-miss cases and the number of staff, their experience and their workload. The frequency of review sessions and the number of cases reviewed should be high enough to convey the concept of “routine practice” (not just occasional meetings), while avoiding staff overload.

One near-miss case is discussed at each session to ensure effective, efficient use of staff time and involvement of the staff who managed the case in the review. For additional information, see chapter 3.

Evaluation of the quality of the NMCR cycle should be planned from the beginning and performed at the end of a 6-month pilot phase. Thus, a sufficient number (at least five or six) of near-miss cases should have been reviewed at each hospital.

### 2.2.1 Quality assessment

This phase is discussed in detail in chapter 4. The objectives are both to assess and improve the quality of the process and to build the capacity of the national team. The phase also includes an assessment of feedback. Assessments are usually conducted by two international experts with long experience in individual NMCR cycles, with the national coordinators.

After assessment at each pilot hospital, a national 1–2-day workshop should be organized, at which the findings of the evaluation and recommendations are discussed and plans are made to improve the quality of the process. If the quality of NMCR at the pilot facility is not appropriate, time should be allowed for acting on the feedback and for gaining experience and confidence before scaling-up. Examples from other countries and expected achievements could be discussed, clear roles and responsibilities should be assigned, and timelines agreed.

If additional time for pilot-testing is allowed, a further in-depth quality assessment should be conducted at the end of the period to identify any other aspects that require action before national scale-up. If the evaluation indicates that additional input is needed, a workshop could be conducted on interviewing women or on revising national guidelines in line with international recommendations.

### **2.2.2 Dissemination of results**

The results obtained in the pilot phase should be disseminated as summary briefs and presentations to policy-makers, administrators and development partners (Annexes 12 and 13). This information is valuable for advocacy, and its dissemination can support policy actions and mobilize professional and civil society to improve the quality of care for pregnant women. Publication of good-quality data can attract further funding to improve maternal and perinatal health services.

The information must reach the right audience, i.e. those who can act on it. The recipients should be identified in the planning stage, and the information should be written in such a way that all stakeholders can access it.

## **2.3 Scaling-up**

### **2.3.1 Plan**

Scaling-up to other facilities should be planned. The first step is to select the facilities. Preferably, five or six new facilities will be chosen, to ensure effective quality assurance. The quality assessment will have identified well-performing hospital staff and coordinators, and a pilot hospital that was found to conduct good-quality reviews could coach one or two nearby facilities. In large countries, NMCR can be introduced in maternity hospitals in selected regions.

A workshop should be considered for the staff of the new facilities to receive “lessons learnt” from the staff of a pilot facility. Usually, coordinators and members of the teams that participated in the pilot phase train the new teams in a series of introductory and technical workshops. It is suggested that a “critical mass” of four or five people be trained in each facility.

The requirement for a regulatory framework at national or sub-national level will be evaluated case by case in each country.

It is essential that results be presented and discussed at facility level, with reporting of recommendations and results from hospitals to national coordinators. The purpose of reporting is not merely to comply with formal requirements but to share experience, in line with the principles of continuous quality improvement. The findings from quality assurance activities should be presented to all interested parties and discussed, for example during workshops. Activities to improve the quality of NMCR should be discussed and agreed. Lessons learnt can also be discussed at international workshops.

A suitable budget must be allocated for activities, with assured funds. Typical expenses include the costs of preparing and printing training materials, training, quality assurance, networking (e.g. exchange visits) and dissemination of results (e.g. reports and workshops).

Plans for ensuring the sustainability of NMCR should be drawn up at the beginning of implementation and revised after the pilot phase. Medium- to long-term technical and financial support and professional recognition are necessary to sustain the cycle. As better quality of care is likely to reduce the numbers of maternal deaths, stillbirths and early neonatal deaths significantly, NMCR should be regarded as giving a triple return on the investment.<sup>1</sup>

---

<sup>1</sup> Lazzarini M et al. Impact of the facility based maternal near-miss case reviews in improving the quality of maternal and newborn care in low and middle income countries: systematic review (submitted for publication)

### **2.3.2 Activities**

Scaling-up and dissemination of individual NMCRs to other maternity hospitals are also conducted in a step-wise approach based on lessons learnt during the pilot phase.

- Regulatory framework: If it is required, a regulatory framework should be made available in each facility.
- Local action plan: The local team that participated in capacity-building should prepare an action plan, in consultation with the hospital manager or director. It is suggested that the plan be presented officially to all staff at the hospital who are involved in maternal and newborn health care.
- Guidance material: Material prepared during the pilot phase, revised if necessary, should be distributed.
- Training: A series of technical workshops should be organized for each “new” hospital team, consisting of four or five people involved in clinical care and case management (obstetricians, midwives, neonatologists, interviewers, anaesthesiologists and managers) who are committed to improving the quality of care, are trained in effective perinatal care and are in a position to make changes at facility level. Two or three trainers (national and local coordinators, facilitators and interviewers) should build technical capacity among local staff, using a similar programme, presentations, exercises and methods as in the initial technical workshop
- Quality assurance: See chapter 2.3.3.
- Reporting and impact evaluation: The model chosen can vary but often includes written reports, workshops and seminars.
- Budget: The expenses at facility level are usually minimal. Implementation of the recommendations of NMCRs may imply some cost, although efforts should be made to make changes with existing resources.

### **2.3.3 Quality assurance**

Some mechanism for accountability must be introduced during scaling-up. Adequate quality in conducting the NMCR cycle will avoid wastage of resources. If the process is not correctly implemented, it may even have negative effects, such as undermining the staff's confidence in their work.

Local coordinators are expected to build their capacity gradually through practical experience in the NMCR cycle, although some supportive supervision should be provided to local coordinators to ensure consistency in application of the principles and methods of the NMCR cycle. We suggest that an international expert be involved in planning this aspect and for a quality assessment after 1 or 2 years of scaling-up, as the quality of sessions tends to diminish at each subsequent wave (30). Ensuring the quality of the NMCR cycle in hospitals is further described in chapter 4.

Other mechanisms for quality assurance include supportive supervision (including monitoring), coaching, mentoring and networking, such as identifying local leaders and exchange visits among facilities for direct observation of NMCR sessions.

To date, there is little documented experience of effective monitoring of the NMCR cycle, although interesting examples are provided in references 33 and 34. Ideally, monitoring indicators should include NMCR process indicators, such as the number and types of cases reviewed, the number and types of recommendations and the percentage of recommendations implemented; process of care indicators, such as coverage of women with pre-eclampsia who received essential interventions, such as magnesium sulfate (22); and health outcome indicators, such as the number of near-miss cases in the hospital. Use solely of the prevalence of near-misses or the maternal mortality ratio to measure the success of the NMCR cycle is inappropriate, especially in hospitals with low mortality and morbidity rates, as large numbers of deliveries might be required to see an effect. Annex 14 gives examples of monitoring indicators.

Institutions can be motivated to improve the quality of care and promote social participation in a continuous manner by identifying locally relevant process and outcome indicators, establishing targets and making the information publicly available in a transparent way (7).

## 2.4 Role of overseeing authorities

### 2.4.1 National level

After the process and final results of the NMCR cycle in facilities have been reported to national coordinators, quality assurance mechanisms should be in place, such as effective monitoring and provision of feedback from the coordinators to the facilities. Local authorities should support a high-quality NMCR cycle and therefore commit themselves to monitoring and providing technical feedback as necessary.

In some countries, insufficient attention was given to monitoring and evaluation by national authorities, which significantly reduced the impact of NMCRs. It is suggested that good systems of monitoring and evaluation be in place at both national and supra-national level to assess impact, when possible. Useful activities include national reviews of the quality of the NMCR cycle, with diffusion of reports, concrete, specific feedback from national coordinators to facilities and planning of activities to improve the quality of the process if it is rated as substandard. Feedback should be given only on the quality of the process; authorities should not acquire information on the near-miss cases or discuss them directly.

### 2.4.2 International level

Implementation of the NMCR cycle, particularly at national level, is not a fast process (Annexes 1 and 2). It requires effective collaboration and sustained support from development partners, United Nations agencies in particular, especially in countries with limited resources. In several countries, NMCR implementation could not move beyond the pilot phase because of lack of monitoring, quality assessment, impact evaluation and support from national authorities and donors (25, 26).

Besides being a waste of resources, this can concretely hamper the quality improvement process. Even at national level, we suggest that a good system for monitoring and impact evaluation be in place, based on the philosophy and principles of the plan–do–study–act cycle (70). Useful activities to do this include inter-country reviews of the quality of the NMCR cycle, with direct quality assessment conducted regularly by international experts and national coordinators and supported by WHO or United Nations staff, development partners or project managers. The reports should be shared among the WHO country office, the WHO Regional Office, partners, the ministry of health and local coordinators.

The WHO Regional Office for Europe organized reviews of maternal NMCRs in 2010 and 2014 (25, 26) to share information on the status of implementation, achievements and challenges among countries and development partners. The reviews were based on information provided by each country and on quality assessments by international experts and helped disseminate lessons learnt about practical steps and time frames. Each country delegation prepared plans for future steps and support requirements. This kind of activity helps to share experience and illustrate achievements, challenges and solutions and ultimately contributes to real changes in the quality of care. Suggestions for assuring quality in the NMCR cycle in hospitals are given in chapter 4.

The annexes to this manual describe the following tools for monitoring and improving the quality of implementation of NMCRs:

- Annex 15: a template for synthetic reporting on implementation of the NMCR approach, which should be compiled before a field mission for quality assessment in selected facilities. The template can also be used for regular monitoring.
- Annex 16: a checklist for assessing the quality of the NMCR cycle in hospitals and a matrix for local action plans, to be used to assess and improve the quality of the cycle in selected maternity hospitals. If conducted in an adequate sample of hospitals, the assessment can provide information on the quality of the NMCR cycle nationally and as a basis for national recommendations.
- Annex 17: a matrix for a national action plan after the quality assessment, usually completed during a national workshop at which the findings from the two previous evaluations are discussed.

# 3. Near-miss case review at hospital level

## 3.1 General preparation for each session

### 3.1.1 Frequency of meetings

Usually, one near-miss case is discussed at each session, to ensure that the staff involved in management of the case participate in the review. Meetings are organized every 4–6 weeks, depending on the size of the hospital, the numbers of near-miss cases and staff workload. Sessions should be held frequently enough to be perceived by staff as “routine practice” and not just occasional, while avoiding time overload. Meetings should also be held regularly in order to build and maintain capacity in conducting them, including finding solutions and agreeing on actions, and to allow time for implementing the actions, so that the process results in real changes in the quality of care.

### 3.1.2 Roles and responsibilities of facilitators and coordinators

The local coordinator appoints a facilitator. At the beginning of the cycle, the coordinator may also act as facilitator; the role may be taken by other staff as they become more experienced. The role can be performed effectively by a midwife, a nurse or a doctor who is trained or experienced in conducting the meetings. Larger facilities may have more than one experienced facilitator. In all cases, the coordinator and the facilitator work as a team, particularly in organizing sessions and summarizing the results at the end of sessions.

The main role of the facilitator during a session is to invite contributions and to ensure that all staff participate actively, the ground rules are respected and all the steps in conducting a case review are followed (see chapter 3.2). When guiding the session, the facilitator should not question staff directly, lecture them or appear to know everything but should manage the team dynamics effectively. Some “soft skills” are therefore required to facilitate a NMCR session, such as the capacity to recognize and manage the dynamics to the benefit of the session. These skills are usually acquired during training and practice.

The facilitator, in agreement with the coordinator, identifies the interviewer, the person who will present the case and the note-taker. While the interviewer is usually trained, the other two roles are often attributed on rotation. The facilitator should contact the interviewer and case presenter before the session to ensure that the interviews and the case summary are ready. The facilitator also identifies a list of participants for each session, i.e. those who participated in managing the case. The roles and responsibilities of participants in NMCR sessions are listed in Table 3.

### 3.1.3 Case identification and selection

Cases should be identified according to the national operational definitions of a near-miss case (Annex 5). When the NMCR cycle is routine, any clinical staff member who is familiar with the near-miss case definition can identify cases among recent patients. Cases are selected for NMCR sessions on the basis of the following criteria:

- They are informative in the context of quality improvement and not just those that went well.
- They include various conditions (e.g. eclampsia, post-partum haemorrhage, sepsis).
- They were managed by different teams or departments.

### 3.1.4 Inviting participants

The participants who should be invited to each session are the staff who managed the case being reviewed: obstetrician gynaecologists, midwives, neonatologists, nurses, anaesthesiologists, laboratory staff, radiologists and auxiliary staff (e.g. transport staff). Involving the staff who cared for the woman is the basis of an individual NMCR.

The participation of professionals who were not involved in managing the near-miss case under review should be avoided or minimized to encourage disclosure and open discussion of problems by those who managed them

**Table 3. Roles and responsibilities of key participants in NMCR**

| Role               | Before the session  | During the session  | After the session  |
|--------------------|---|---|--|
| Coordinator        | <ul style="list-style-type: none"> <li>Select the case.</li> <li>Identify participants.</li> <li>Fix the date for case discussion.</li> </ul>   | <ul style="list-style-type: none"> <li>Oversee the process.</li> </ul>                                  | <ul style="list-style-type: none"> <li>Store documentation in a secure place</li> <li>Ensure confidentiality.</li> </ul>   |
| Facilitator        | <ul style="list-style-type: none"> <li>Organize interview.</li> <li>Identify who will prepare and present the case summary.</li> <li>Ensure that all material is ready (see section 3.1.6) before the meeting.</li> </ul> | <ul style="list-style-type: none"> <li>Facilitate the session.</li> </ul>                               | <ul style="list-style-type: none"> <li>Disseminate final recommendations to all interested staff and the manager.</li> <li>Follow-up implementation.</li> <li>Oversee implementation of agreed solutions.</li> </ul> |
| Interviewer        | <ul style="list-style-type: none"> <li>Contact the woman and her relatives.</li> <li>Conduct the interview. Prepare a summary of the interview for presentation.</li> </ul>   | <ul style="list-style-type: none"> <li>Present the interview.</li> </ul>                                | <ul style="list-style-type: none"> <li>Respect confidentiality.</li> <li>Implement agreed solutions.</li> </ul>  |
| Case presenter     | <ul style="list-style-type: none"> <li>Prepare the case summary.</li> </ul>   | <ul style="list-style-type: none"> <li>Present the case summary.</li> </ul>                             | <ul style="list-style-type: none"> <li>Respect confidentiality.</li> <li>Implement agreed solutions.</li> </ul>  |
| Note-taker         | <ul style="list-style-type: none"> <li>Become acquainted with the templates for documenting the session.</li> </ul>   | <ul style="list-style-type: none"> <li>Complete the template (Annex 10) from the discussion.</li> </ul> | <ul style="list-style-type: none"> <li>Respect confidentiality.</li> <li>Implement agreed solutions.</li> </ul>  |
| Other participants | <ul style="list-style-type: none"> <li>Note the day of the NMCR session to ensure their presence.</li> </ul>  | <ul style="list-style-type: none"> <li>Participate actively in the session.</li> </ul>                  | <ul style="list-style-type: none"> <li>Respect confidentiality.</li> <li>Implement agreed solutions.</li> </ul>  |

and to avoid judgement or blame by “external” entities. This approach ensures the principle of a participatory, bottom-up approach, synthesized in the phrase, “the review is about us, not for judging the others”.<sup>1</sup>

The manager has a key role in supporting the implementation. The participation of a senior hospital manager in an NMCR session may be considered, as it may be useful for effective implementation of solutions; however, it might represent an obstacle to the full participation and involvement of other staff members or to full disclosure of details and opinions. If a manager attends an NMCR session, he or she should respect the principles of “no blame, no punishment” and of confidentiality.

### 3.1.5 Setting ground rules and code of conduct

The participants should agree on the essential ground rules of good conduct in case discussion. Box 8 gives an example of ground rules adapted from statements used in both the European and the African regions. The statement could be read aloud at the beginning of each meeting, because the participants may be different at each session, especially in large facilities, and depending on the case presented.

### 3.1.6 Material required

All the material for a case discussion should be ready before the start of the session to avoid wasting time (Box 9).

Each meeting should start with a report on follow-up of recommendations from the previous meeting. Therefore, the completed template (Annex 10) from the previous meeting should be available. It is advisable to make avail-

<sup>1</sup> Lazzarini M et al. Impact of the facility based maternal near-miss case reviews in improving the quality of maternal and newborn care in low and middle income countries: systematic review (submitted for publication).

able copies of the relevant national clinical guidelines and local protocols, and a textbook of obstetric medicine or relevant WHO manuals or training packages. The characteristics of the cases to be discussed determine the material required, which might include scientific papers.

Templates for documenting an NMCR session are provided in Annex 10, and Annex 11 gives a practical example of a completed template.

### **3.1.7 Collecting the perspectives of women and family members**

The interviewer should be fully informed about the woman whose case has been selected for review and have collected her views and experience of care. The interview methods used should be those discussed during technical workshops, including the principles described below. Further suggestions for interviewing are provided in Annex 7.

The woman or the other person selected for the interview should be fully informed of the scope of the interview and be asked to give consent to be interviewed. The principles of autonomy (voluntary participation in the interview; the right to end the interview at any time) and privacy (non-disclosure of the identity of the person interviewed in any official report) should always be respected.

### **Box 8. Sample statement of ground rules and code of conduct**

**We, the staff of this maternity hospital, agree to respect the following rules of good conduct during meetings to review near-miss cases in our facility:**

1. Arrive at the meeting on time.
2. Participate actively in discussions.
3. Respect confidentiality, and avoid disseminating confidential details outside the meeting.
4. Agree not to hide useful information or falsify information that could enhance understanding of the case under review.
5. Respect everyone's ideas and their ways of expressing them.
6. Accept discussion and disagreement without resorting to aggressive behaviour.
7. Accept that one's own actions can be questioned.
8. Avoid blaming single individuals; the objective of the meeting is to improve the quality of care in our hospital.
9. Remember that "the review is about us"; it is not about "judging others".
10. Our final aim is to improve the quality of care in our hospital, for the benefit of our community.

### **Box 9. Material required for each case discussion**

#### **General:**

National guidance manual (with operational definitions, standards of care)

Logbook for recording information

Flipcharts, pens, papers (projector, if available)

#### **For follow-up:**

Folders from previous case discussions, with templates for following-up agreed recommendations

#### **For new cases:**

Medical records

Summary of the case interview with the woman or her family

Blank template for case analysis and recommendations (Annex 10)

#### **As reference:**

Copies of any reference material (national guidelines, local protocols)

Textbooks and other relevant material, such as the effective perinatal care training package (72), journal articles and other material requested for the case discussion

The interview should be collected in a quiet place, possibly after hospital discharge, so that the woman feels free to discuss the care she received. When appropriate, relatives or close friends might be interviewed to provide complementary information.

The interviewer should collect the woman's views and perceptions, not merely formal feedback. Understanding the "real" experience of care is essential for determining what really happened and for improving health care practice (Fig. 1).

The interviewer should obtain a description of the management of the case and collect information on the mechanisms in place to protect the basic rights of women in hospital (e.g. equity in access to care, information on and participation in care, privacy). Information on accessibility, affordability and acceptability is also collected.

The main points of the interview should be summarized accurately (e.g. the actual words of the woman) and prepared for presentation at the NMCR session. The names of health care providers and patients are not recorded in templates, and all information, including that obtained by interview, is treated confidentially.

### **3.2 Steps in the session**

The 12 steps that comprise an NMCR session are detailed below. The discussion, from case presentation to agreeing on actions for quality improvement, should not take too long. Experience has shown that 60–90 min are sufficient for all the steps. Clear timelines will avoid keeping staff away from their clinical duties and will increase participation. The time dedicated to follow-up should be no longer than 10 min; that for summarizing and reconstructing the case, including the interview, should be no longer than 15 min; and the remaining time should be used for case analysis and agreement on recommendations.

Following the 12 steps closely will help prevent negative dynamics, i.e. will avoid "personalities" and influential people taking over the meeting, introducing circular arguments in the discussion or using power and influence to hinder reconstruction of the case and its analysis. The facilitator should use the stepwise approach to minimize such negative dynamics.

Templates for documenting an NMCR session are provided in Annex 10, and a practical example of completed templates is given in Annex 11.

#### **Step 1. Following-up on the previous NMCR session**

The meeting should start with a follow-up of the recommendations of the previous meeting or meetings. This step ensures that the NMCR cycle is completed, and it should never be omitted. The logbook is useful for rapid revision of previous recommendations, allocation of roles and responsibilities, the timelines and the extent of implementation.

During this phase, the team involved in the review should check whether all recommendations have been implemented and, if not, determine why. They should also agree on further activities, allocation of responsibilities and timelines (so as to avoid postponing action indefinitely).

#### **Step 2. Presenting the case summary**

As an introduction to each case discussion, a staff member (usually designated by the facilitator and preferably someone who was not the main person responsible for the case) should present a written case summary (on paper, a flipchart or slides) based on a review of the woman's medical records and other relevant documents.

The case summary should be concise (ideally no longer than 5–7 min). Skills in case synthesis should be strengthened to avoid too long a presentation at the expense of the case discussion. Nevertheless, all the key elements of the case should be presented.

#### **Step 3. Reconstructing the case management "door to door"**

After presentation of the short case summary, time should be allowed for each staff member involved in managing the case to provide additional information. This should include reconstruction of the sequence of events and

the care provided, including any problems, from when the woman arrived at the hospital (“entry door”) to when she was discharged (“exit door”), known as the “door-to-door” approach.

This step is crucial for a proper discussion, as many aspects of care (e.g. details of management, delays, team dynamics, personal behaviour, communication) are not reported in medical records. Annexes 8 and 9 list elements that might be considered for a comprehensive case analysis. This step may also be an occasion for discussing the completeness and accuracy of the medical chart.

#### **Step 4. Presenting the perspectives of the woman and family members**

The interviewer should have prepared an informative summary of the experience of the woman (and/or family members) of the quality of care. The main content of the interview and its findings should be properly presented (e.g. including the actual words used). Inclusion of information on the experience of care (effective information, emotional support, respect and preservation of dignity) is essential for understanding what really happened and for improving the overall quality of care (Fig. 1).

#### **Steps 5–7. Analysing the case**

The case should be analysed by a structured approach to ensure a critical analysis of the management in terms of appropriateness of care, timeliness and respect of rights from arrival at the hospital to discharge. The case analysis is based on standards, and guidelines, protocols and standards should be mentioned in the template. The sequence of steps is shown in Box 10.

#### **Box 10. Case analysis**

##### **Step 5. What went well and why**

It is important to acknowledge good aspects of care and to praise staff. This enhances staff commitment, ownership, teamwork and willingness to participate in NMCR sessions. It also reinforces good practices in the management of similar cases.

##### **Step 6. What did not go well**

In this phase, it is important to focus on the aspects of care that contributed most to the negative aspects of the near-miss case.

##### **Step 7. Why, but why?**

Participants should identify the reasons for elements of care that did not go well. This step can be repeated until all the reasons have been discussed.

A number of factors in each element of care may have contributed to the negative outcome, in various categories (Annex 9):

- personnel
- drugs
- equipment
- protocols
- organization and administration
- respect for human rights

Some elements of care may have several underlying factors in different categories. For example, magnesium sulfate was not administered in a case of severe pre-eclampsia because of:

- equipment and supplies: magnesium sulfate is not regularly available because the stock is not routinely monitored (local recommendation) or due to a failure in the distribution system (national recommendation);
- guidelines: there is no specific local protocol (local recommendation) or national guideline (national recommendation); or
- organization: nurses are not sure about how to administer it (local recommendation) or are not allowed to do so (national recommendation).

During case analysis, the facilitator should avoid addressing staff members directly, such as by using the word “you” in, for example “What did you do?” “Why didn’t you do this or that?”. The facilitator should encourage participatory discussion on what was done properly and what could be improved. By comparing management of the case with guidelines and standards, participants will recognize the importance of providing care according to clinical guidelines, local protocols and standards of care, and their understanding of and capacity to use these documents will improve.

The aim of the case analysis should be to analyse not only the case management but also the degree to which the basic rights of the woman were respected in hospital (for standards, see references 1 and 85–94).

**Step 8. Preparing recommendations and actions for improving the quality of care**

After the analysis of “what did not go well” and of the reasons, recommendations should be prepared to address the main problems. The facilitator should involve all participants in preparing the recommendations and avoid proposing solutions him- or herself.

Recommendations should be SMART (96), i.e. specific, measurable, achievable, realistic and time-bound (Box 11). Preparing SMART recommendations may not be easy but will improve with practice and expert supervision.

The recommendations should cite actions to be undertaken in the hospital in which the review is done and should identify *what* to do, *who* will do it and by *when*. The template for the case review includes spaces for recommendations, identifying the people in charge and timelines (Annex 10).

Recommendations should be specific; vague, nonspecific recommendations should be avoided, as they are difficult to implement, follow up and monitor (Box 11). Recommendations should be measurable (e.g. adoption of a checklist) and achievable with local resources (e.g. adoption of a checklist within the resources and implementation capacity of the hospital). Recommendations should be realistic and neither too ambitious nor too complex. The timeline for implementing recommendations should be explicit; otherwise, they are nothing but wishful thinking.

**Box 11. Example of vague and SMART recommendations**

|  |  |
|--|--|
| <p>Case:</p> <ul style="list-style-type: none"> <li>● Severe postpartum haemorrhage after caesarean section in intensive care unit</li> </ul> <p>What did not go well:</p> <ul style="list-style-type: none"> <li>● Delay in diagnosis</li> </ul> <p>Why?</p> <ul style="list-style-type: none"> <li>● Because the tonus of the uterus and volume of blood loss were not monitored</li> </ul> <p>But why?</p> <ul style="list-style-type: none"> <li>● The doctor was busy.</li> <li>● Nurses are not trained in checking blood loss.</li> <li>● There is no written protocol for monitoring women after a caesarean section.</li> </ul> |  |
| <p>Practical recommendations</p>   |  |
| <p>Vague (to be avoided)</p> <ul style="list-style-type: none"> <li>● Strengthen monitoring of patients.</li> <li>● Increase understanding of staff about case management.</li> <li>● Respect protocols and standards.</li> <li>● Improve staff curriculum, and increase staff.</li> <li>● Educate and inform the population.</li> <li>● Improve safe motherhood programmes.</li> </ul>  | <p>SMART</p> <ul style="list-style-type: none"> <li>● Prepare a checklist for monitoring women after caesarean section, within the next month.</li> <li>● Provide short refresher training for all staff, especially nurses and midwives, in monitoring uterine contraction and blood loss, within 2 months</li> <li>● Ensure that staff training includes provision of appropriate information to women.</li> </ul> |

Recommendations should also, as far as possible, be evidence-based (or, if this is not possible, at least experience-based). For example, lack of knowledge or of practical skills should be remedied by training (by courses of proven effectiveness); lack of guidelines should be remedied by adopting high-quality, evidence-based guidelines (e.g. from the WHO website), while “creative solutions based on no previous experience” should be considered the last choice.

Recommendations should also include the user’s view, with due consideration to the issues of women’s rights in hospital: effective communication, emotional support, respect and preservation of dignity.

It is expected that three to four main recommendations can be agreed upon during each session. It is natural to wish to make as many recommendations as possible, but experience shows that only a few, focused, important recommendations are more likely to be followed up and their implementation assessed and regularly reviewed.<sup>1</sup> Although each recommendation may appear to be only a small step forward, the sum of the recommendations made in an NMCR cycle will make a difference. It is important to ensure the regularity of the process and the “action” part of the cycle. If a regular review meeting is organized each month, 10–12 cases will be discussed in 1 year, and about 30 recommendations will be made and, most importantly, will have to be implemented. It should be clear from the beginning that the efficiency of the process will be measured in terms of “how many recommendations are translated into action” rather than “how many cases are discussed”.

It can be tempting to focus on factors external to hospital, such as a delay in the woman reaching the hospital. The final objective of the case review, however, is to improve the quality of care in the facility. Recommendations should therefore refer to events and actions that occurred in the hospital and identify causes at the hospital, so that solutions to the causes can be agreed on and implemented. Mention of aspects that are beyond the control of the facility, without the participation of the staff involved, will not lead to specific recommendations or improve the quality of care.

Some recommendations may go beyond the role of the facility, such as developing or updating a national guideline. This type of recommendations should be forwarded to national level and should not prevent the identification of factors to be addressed at the facility.

## **Step 9. Documenting the case review session**

Experience has shown that standard, structured forms should be used to document an NMCR session in order to improve the efficiency, usefulness and timeliness of discussions and subsequent use of the data. Templates for documenting the NMCR session are provided in Annex 10.

Confidentiality should be maintained. All the data necessary for the case summary should be extracted from health facility records and presented without patient or staff identification. The names of the woman whose case is being discussed and of health professionals should be mentioned in the template; however, it is the responsibility of the local coordinator to ensure that all materials are securely stored when not in use.

Basic information on the cases discussed should be kept in a logbook, in order to facilitate follow-up and synthesis of results. Such information includes the type of near-miss case, the date of case discussion, a list of the recommendations agreed, the people in charge, timelines and whether the recommendations were implemented.

A practical example of a review of a near-miss case of eclampsia is given in Annex 11.

## **3.3 Actions after each NMCR session**

### **Step 10. Translating recommendations into action**

The actions taken justify the previous work. They may include interventions in:

- case management (according to evidence-based guidelines);
- the organization of care (e.g. protocols for case referral);

<sup>1</sup> Lazzarini M et al. Facilitators and barriers of successful implementation of the facility based maternal near-miss case reviews in low and middle income countries: qualitative systematic review (submitted for publication).

- the hospital support systems (e.g. equipment, supplies, laboratory); and
- the area of rights: effective communication, emotional support, respect and preservation of dignity.

Managers and local health authorities are expected to support implementation of recommendations actively. As many recommendations and solutions directly concern the organization of care, changes will be difficult to implement and maintain without the involvement of and continuous monitoring by facility managers.

### **Step 11. Checking that recommendations have been implemented**

The process is cyclical and continuous. Field experience shows that regular follow-up at each review session is essential to ensure that the recommendations are SMART and that the proportion implemented is high. This is the responsibility of the local coordinator, who can work with the local manager and the facilitator(s).

### **Step 12. Documenting the whole NMCR cycle**

After each review session, all those in a position to ensure implementation of the recommendations or otherwise involved in the process should be properly informed. The recommendations should be shared not only with the head of the facility but with the entire staff, for example at a morning conference. This is important, as the recommendations are designed not only for the participants in the event but also to improve the practices of all the personnel in the hospital.

Published reports should describe ways to improve the system and avoid focusing on individual errors that were made in case management. It is suggested that a report be prepared every 6–12 months and presented to the staff of the facility and that another report be prepared for regional and national authorities every 12 months, with recommendations to be forwarded to a higher level. For more details, see Annex 12.

# 4. Ensuring the quality of the near-miss case review cycle

## 4.1 Reasons for ensuring quality

Ensuring adequate quality in the implementation of the NMCR cycle is essential. The implementation of the NMCR cycle is a complex intervention, and can be a new experience in many settings. It includes changing behaviour, it requires honesty and openness in challenging routine practices and attitudes, it implies analysing cases of near miss in depth, identifying real reasons for shortcomings, and taking decisions for action.

The NMCR cycle should be conducted according to set principles and methods; otherwise, it may be counter-productive. A NMCR that is not conducted according to the established principles and methods may hinder team work, destroy the confidence of individuals or even cause long-term damage. For example, if audits are performed to identify “guilty” professionals and lead to punishment of staff, they will increase concealment of information and under-reporting or reporting of “fake data”, such as labelling all practices as “matching the standards”.

## 4.2 Capitalizing on previous experience

In the European Region, many countries have chosen to introduce, pilot-test and disseminate the NMCR approach in a number of maternity hospitals following the steps outlined in chapter 2. Initial commitment from ministries of health and key stakeholders and the existence of updated clinical guidelines were essential prerequisites; however, the speed of implementation, final coverage and the quality of implementation varied widely.

When there was sustained commitment from the ministry of health and stakeholders, supported by United Nations and development partners, and regular technical advice from experts, the cycle resulted in major changes, such as progressive national scaling-up and high-quality individual NMCR cycles. When this combination of elements was missing, the results were modest, especially with regard to follow-up after the first pilot study, the quality assessment and implementation of recommendations (25–28).

Other challenges in the WHO European Region include a historical lack of involvement of mid-level staff – midwives in particular, little or no attention to factors related to the women themselves, their families or their communities, and organizational difficulties, such as delays in communication or referral. A further common problem was lack of understanding of the importance of evidence-based clinical guidelines (25–28).

In some cases, the NMCR cycle proceeds smoothly, respecting all the principles and methods, for a certain time and then suddenly reverts to the old systems of interrogation, blaming and punishment.<sup>1,2</sup> One of the core tasks of WHO and partners in some countries has been to promote creation of an environment in which true problems are openly discussed. This has been associated with positive outcomes (25–28).<sup>3</sup>

Some individual NMCR cycles were maintained in a single maternity hospital, by respecting the principles and method, resulting in effective development and implementation of relevant recommendations for improving the quality of care.<sup>4</sup> There has, however, been little documentation of the process, the challenges, the achievements and the outputs (25, 26).

<sup>1</sup> Bacci A. Experience of implementation of facility level near miss individual case reviews in the European Region (personal communication) Stronger clinical governance for better maternal health outcomes: Beyond the numbers workshop for the south Caucasus and the Turkey Cluster, organized by UNFPA, Tbilisi, 23–25 June 2015;

<sup>2</sup> Bacci A. Summary and recommendations (personal communication) Stronger clinical governance for better maternal health outcomes: Beyond the numbers workshop for the south Caucasus and the Turkey cluster, organized by UNFPA. Tbilisi, 23–25 June 2015

<sup>3</sup> Lazzarini M et al. Impact of the facility based maternal near-miss case reviews in improving the quality of maternal and newborn care in low and middle income countries: systematic review (submitted for publication).

<sup>4</sup> Bacci A, Hodorogea S. WHO mission to review and re-launch implementation of Beyond the numbers (BTN) in Armenia, 23–27 February 2015, available from the WHO Country Office Armenia.

### 4.3 Key elements in successful implementation, possible challenges and solutions

Several aspects should be taken into account for successful implementation of the NMCR cycle. Field experience indicates that the key elements in most settings are similar (25–60):<sup>1-5</sup>

- **Sustained external support:** technical support from international experts is essential to ensure a real shift in behaviour and an NMCR cycle of adequate quality.
- **Legal framework and managerial commitment:** ground rules should be formalized; support from local managers and decision-makers is essential.
- **Key people:** national and local coordinators should have the capacity and commitment for successful implementation.
- **Effective training:** training a team in each facility creates the necessary critical mass.
- **Local ownership:** a participatory, bottom-up approach should be used from the beginning, and recommendations should be made by hospital staff themselves, on the basis of real cases.
- **Inclusion of women's views:** real information on the “experience of care” of those who use health services is essential for improving the quality of care.
- **Completeness:** the cycle should be completed at all steps; importantly, each session should start with follow-up of the actions agreed during the previous session.
- **Simplicity:** when staff are already overloaded with clinical work, a discussion of too many cases may be detrimental. It is better to review a realistic number of near-miss cases in order to make good recommendations and implement them effectively.
- **Regularity:** meetings should be held regularly in order to make a real difference in the quality of care. If key people (e.g. the local coordinator) are unable to continue their roles, they should be appropriately handed over.
- **Focus:** to make a difference, the “real problem” should be identified, analysed openly and subject to SMART recommendations.
- **Learn from lessons:** appropriate dissemination of results and a capacity to learn lessons are fundamental.
- **Monitoring:** regular reporting at national level and provision of feedback are essential, also to ensure accountability in the whole process. Without monitoring, implementation may end quickly.

Clearly, a number of challenges can hamper successful implementation of the NMCR cycle. Some of the common challenges and possible solutions are presented in Table 4.

The process of change is gradual and varies by country. “Learning by doing” is an effective way of gaining trust about changes. In some settings, the methods described in this manual will contrast with years of professional practice and will imply a dramatic change in attitude.

Particular care should be given to providing adequate training, coaching and external supportive supervision. The benefits for the community of the NMCR approach, with examples of successful implementation in similar settings, should be communicated to avoid using local difficulties as an excuse for not moving the process forward.

<sup>1</sup> Lazzarini M et al. Facilitators and barriers of successful implementation of the facility based maternal near-miss case reviews in low and middle income countries: qualitative systematic review (submitted for publication);

<sup>2</sup> Bacci A. Experience of implementation of facility level near miss individual case reviews in the European Region (personal communication) Stronger clinical governance for better maternal health outcomes: Beyond the numbers workshop for the south Caucasus and the Turkey Cluster, organized by UNFPA, Tbilisi, 23–25 June 2015;

<sup>3</sup> Bacci A. Summary and recommendations (personal communication) Stronger clinical governance for better maternal health outcomes: Beyond the numbers workshop for the south Caucasus and the Turkey cluster, organized by UNFPA, Tbilisi, 23–25 June 2015;

<sup>4</sup> Hodorocea S. Introduction into near-miss case review (personal communication). National workshop Beyond the Numbers, Kiev, 22–25 April 2008;

<sup>5</sup> Hodorocea S. Near miss case reviews: main requisites (personal communication) Stronger clinical governance for better maternal health outcomes: Beyond the numbers workshop for the south Caucasus and the Turkey cluster, organized by UNFPA, Tbilisi, 23–25 June 2015.

**Table 4. Common challenges and possible solutions for successful implementation of an NMCR cycle in a facility**

| Common challenges   | Solutions  |
|---|--|
| <b>General organization of the NMCR</b>   |  |
| <ul style="list-style-type: none"> <li>● Weak local leader or coordinator</li> <li>● Lack of commitment from managers or staff</li> <li>● Lack of commitment from regional or national managers and authorities</li> <br/> <li>● Difficulties in conducting regular meetings because of staff work overload</li> <li>● Poor participation of local staff</li> <br/> <li>● Insufficient methodological skills</li> <br/> <li>● Staff shortage and high turnover</li> </ul> | <ul style="list-style-type: none"> <li>● The NMCR process and principles should be endorsed by local, regional and national health authorities.</li> <li>● Strengthen ownership by maternity staff.</li> <li>● Maintain continuous supervision and external support; revise basic principles.</li> <li>● Disseminate good results and examples.</li> <br/> <li>● Strengthen staff information, the facilitator's role and support from the local manager.</li> <li>● Discuss the importance of these activities with the manager, aim at what is feasible, suggest that staff be allowed "protected time" for submission of reports of activities.</li> <br/> <li>● Strengthen training and supervision.</li> <li>● Regularly assess and improve quality; share experience with hospital representatives.</li> <li>● Support exchange visits.</li> <li>● Ensure independent external quality assessment and reinforcement by international experts.</li> <br/> <li>● Ensure hand-over of key skills and roles in case of staff migration.</li> <li>● Rotate staff in key roles.</li> <li>● Introduce policies to reduce staff shortages and turnover.</li> </ul> |
| <b>Identification and selection of cases</b>  |  |
| <ul style="list-style-type: none"> <li>● Only "good cases" (i.e. cases with good management)</li> <li>● Not all staff involved in management of the case are invited.</li> </ul>  | <ul style="list-style-type: none"> <li>● Strengthen training, external support and supervision in selecting cases and participants.</li> </ul>   |
| <b>Inclusion of the woman's perspective</b>   |  |
| <ul style="list-style-type: none"> <li>● Not included</li> <li>● No aim or non-achievement of a description of the "real" experience of care</li> <li>● Not considered in the case analysis or in making recommendations</li> </ul>   | <ul style="list-style-type: none"> <li>● Strengthen training, external support and supervision in including the perspective of service users.</li> </ul>   |
| <b>Presentation and analysis the case</b>   |  |
| <ul style="list-style-type: none"> <li>● Fear of revealing real information</li> <li>● Breaches of confidentiality</li> <li>● Blaming</li> <li>● Focus on external factors rather than on internal, solvable factors in the facility</li> <li>● Poor participation of midwives</li> <li>● Lack of "critical analysis"</li> <li>● Poor knowledge of reference standards</li> <li>● Chaotic discussion of the case</li> </ul>   | <ul style="list-style-type: none"> <li>● Ensure endorsement of principles beyond the NMCR by local authorities.</li> <li>● Repeat the ground rules (Box 9) at each session.</li> <li>● Strengthen the facilitator's role and capacity.</li> <li>● Strengthen training, external support and supervision (including mentoring by "champions" and partnerships among facilities).</li> </ul>   |

**Table 4. Common challenges and possible solutions for successful implementation of an NMCR cycle in a facility** *Continued*

| <b>Presentation and analysis the case</b>  |   |
|--|---|
| <p>Typical of senior staff and managers:</p> <ul style="list-style-type: none"> <li>● Bossy attitude: lecturing others, examining others, silencing others, interrupting the flow of the session, making judgements based on personal opinion</li> <li>● Reference to old orders or regulations</li> <li>● Concealment of key details</li> </ul> | <ul style="list-style-type: none"> <li>● Independent external quality assessment performed by international experts to support and empower the local coordinator, as it is sometimes difficult for him or her and the session facilitator to stand up to interventions from managers or senior staff</li> <li>● The manager might delegate authority to the coordinator and support the organization and implementation of recommendations, rather than participating directly in NMCR sessions.</li> <li>● Demonstrate how to achieve better communication.</li> </ul> |
| <b>Agree on SMART recommendations to improve the quality of care.</b>  |   |
| <ul style="list-style-type: none"> <li>● Difficulty in developing or agreeing on SMART recommendations</li> <li>● Tendency to focus on recommendations for external actors (e.g. national level)</li> </ul>  | <ul style="list-style-type: none"> <li>● Strengthen training, external support and supervision in making SMART recommendations.</li> <li>● Strengthen the commitment of managers to support appropriate recommendations.</li> <li>● Ensure exchange visits among key staff of facilities for direct observation of sessions.</li> </ul>   |
| <b>Translating recommendations into action</b>   |   |
| <ul style="list-style-type: none"> <li>● No implementation of agreed actions</li> <li>● Implementation of other actions</li> <li>● Punishment</li> </ul>   | <ul style="list-style-type: none"> <li>● Strengthen training, external support and supervision in translating recommendations into action.</li> <li>● Improve documentation.</li> <li>● Ensure independent external quality assessment and reinforcement by international experts.</li> <li>● Ensure exchange visits among key staff of facilities for direct observation of sessions.</li> </ul>   |
| <b>Documenting the process</b>   |   |
| <ul style="list-style-type: none"> <li>● Lack of clear, complete documentation</li> <li>● Lack of confidentiality</li> <li>● Omissions</li> </ul>  | <ul style="list-style-type: none"> <li>● Strengthen training, external support and supervision in use of the templates for session documentation.</li> <li>● Strengthen the commitment of managers to support use of the templates.</li> <li>● Ensure independent external quality assessment and reinforcement by international experts.</li> </ul>  |
| <b>Monitoring results</b>  |   |
| <ul style="list-style-type: none"> <li>● Lack of effective monitoring</li> </ul>   | <ul style="list-style-type: none"> <li>● Ensure that meetings are held regularly, starting with a follow-up to the previous meeting.</li> <li>● Strengthen training in monitoring and external support and supervision.</li> <li>● Ensure independent external quality assessment and reinforcement by international experts.</li> </ul>  |

## 4.4 Assessing and improving the quality of the NMCR cycle

### 4.4.1 Quality assessment

It is important to ensure adequate quality in implementation of the NMCR cycle, both in hospitals and at national level. Regular quality assessments should be conducted, with the aim of making recommendations at both hospital and national level to improve the quality of the NMCR cycle.

Quality should be assessed both during the pilot phase to ensure that the NMCR cycle is of adequate quality before scaling up and after the pilot phase, at regular intervals, such as every year during the first years of implementation and then every 2 years.

The tools for assessing the quality of implementation of the NMCR cycle at country level are reported below.

- A template for synthetic reporting on national implementation of the NMCR approach (Annex 15), ideally before a field mission in selected facilities; can also be used for regular monitoring;
- A checklist for assessing the quality of the NMCR cycle in a hospital and a matrix to prepare local recommendations (Annex 16). If used for an adequate sample of maternity hospitals, the checklist can provide information on the quality of the NMCR cycle and form a basis for making recommendations at national level; and
- A matrix for designing a national action plan after quality assessment (Annex 17), usually during a national workshop at which the findings from the two previous evaluations are presented and discussed.

In the pilot phase and until the capacity and skills of the national team are fully developed, all quality assessments should be conducted under the supervision of international experts in order to build adequate experience among national experts in the delicate role of assessor.

How to conduct a quality assessment in a hospital level is described in detail below. This is the core of the quality assessment, since it is based on direct evaluation of what is actually going on in the field.

#### **4.4.2 Checklist for assessing the quality of the near-miss care review cycle in hospitals**

##### *4.4.2.1 Team*

An assessment is usually conducted by a team of two to four people, including one or two experienced international external experts, with national coordinators or other staff involved in NMCR. The members of the assessment team should be professionally competent and recognized as such, to ensure that peer-to-peer exchange is maintained during the assessment.

The international assessors should have experience in assessing the quality of the NMCR cycle and in use of the checklist (Annex 16); such experience is mandatory for the team leader. Experience in implementing WHO recommendations and other evidence-based practices and in maternal and neonatal health care is also essential (71, 72). Experience in similar quality improvement processes (73, 74) and in health system governance would be an asset.

Members of the national team of assessors should have good, long-term experience in participating and coordinating NMCR cycles, knowledge of the principles of evidence-based health care, sufficient clinical experience in maternal or neonatal health care (72) and, if possible, experience in staff training and in health system governance. Assessors are usually not staff members and do not have management responsibility in the hospitals they assess.

If the assessment is organized by the WHO country office, it is recommended that a representative from the office participate at least in some of the assessment visits, to provide support and to fully understand the approach and its implications. Similarly, if the evaluation is organized by another United Nations agency, body or project, participation of a representative will ensure better understanding of the findings and actions to be implemented and acquaintance with the professionals involved.

##### *4.4.2.2 Dedicated tool*

A checklist for the assessment is provided in Annex 16. It comprises 50 items to be evaluated, divided into groups. The reference for all the items in the checklist is this manual.

The checklist should be used by experienced assessors as a guide for a professional expert review of the quality of NMCRs in hospitals. Thus, a quality review it is not simply the job of a clerk.

The checklist includes a summary table of the main strengths and weaknesses, a space for comments and a matrix for highlighting areas that require improvement, agreed actions, responsible people and timelines.

#### *4.4.2.3 Preparing for the assessment visit*

Preliminary information on the objectives and methods of the assessment should be sent to the local health authorities before the management of the facility or facilities to be assessed is contacted. The criteria for selecting the hospitals to be visited should be discussed and agreed upon, particularly for ensuring representativeness for national assessments.

A detailed timetable of visits should be drawn up, usually by health authorities, development partners or project managers and the national NMCR coordinating team, in close collaboration with the assessment team leader. The average time required to evaluate a facility is usually half to one full day. The timetable should include travel time and take account of local working hours and holidays.

Before a visit, the NMCR coordinator and the head of the hospital to be visited should be informed about the purpose of the assessment, its supportive, action-oriented approach and the proposed timetable. One copy of the checklist (Annex 16) should be made available for each assessor, one for the hospital coordinator and one for the hospital manager.

A half-day workshop should be organized to train national coordinators, during which each assessor is instructed in the structure and use of the checklist and given guidance on key items, if necessary. Common understanding of the scoring system should be established, with examples. Adequate time for discussion among national and international assessment team members should be ensured before the start of the hospital assessment and after it, to clear up any doubts about the assessment methods. New assessors will learn by making observations in collaboration with experienced assessors, until they have acquired the appropriate skills and practice and an attitude of confidential, supportive peer-to-peer observation and feedback.

If one or more interpreters are needed, they should receive a copy of the checklist before the start of the assessment so that they can become familiar with the technical terms.

#### *4.4.2.4 Presenting the aim, objectives and methods of the assessment*

Visits begin with a briefing for participants and the coordinator on the objectives and methods for the evaluation and for feedback. The assessment of the facility should be placed in the context of ongoing national activities to assist hospitals in improving the quality of NMCR, by identifying issues that need to be improved and actions that should be taken at local and at higher administrative level.

The participatory, no-blame (for either individuals or work areas), supportive, confidential approach of the assessment should be emphasized. The facilitator should explain that some staff members may be interviewed about hospital routines and practices related to the NMCR cycle and that the assessors will have to examine documents such as templates, summary documentation and logbooks of previous sessions; the relevant documents should be made available. The facilitator should emphasize that the results of the assessment will be reported anonymously, without the names of the hospitals or individuals or details of case management.

#### *4.4.2.5 Assessment visit*

The assessment comprises field visits to pilot facilities (1 day each) and includes the following activities:

- direct observation of a review (1-2 hours) of a near-miss case;
- discussion with the participants on their perception of the quality of the case review;
- feedback and recommendations from the assessors to participants on the quality of the NMCR session;
- a meeting of local coordinators, the facilitator and staff involved in the NMCR cycle to discuss their perceptions of the quality of the cycle, achievements and challenges; joint review of documents from previous cases (at least 5, if possible 10), including interviews with women and follow-up of recommendations; and additional information from regional/national coordinator(s);
- feedback and recommendations to the local coordinators and staff.

Assessors are expected to review the quality of the NMCR cycle and not the quality of case management. The assessment is based on direct observation of an NMCR session and review of related documents, which, with the checklist, allow comprehensive assessment of the quality of the NMCR cycle.

The assessment starts with a brief introduction of participants and assessors, to clarify the roles and forms of participation. Observation of an NMCR session should not be intrusive; the assessors should be respectful and silent and avoid making comments until the session is declared finished by the facilitator. They should observe the people involved and the exchanges, situations and actions and check the duration of the case description and that of the case analysis. They should take notes in order to fill in the checklist.

Capacity-building and a participatory approach are key features of an assessment. After observing an NMCR session, local staff may raise issues or questions on how to improve the NMCR cycle, and the assessors should be prepared to respond. If certain issues (e.g. specific problems in near-miss cases) cannot be evaluated by direct observation, techniques such as practical exercises and case scenarios can be used. An example might be “What would you do if you experience a bossy attitude or a participant who is afraid to reveal what went wrong?”

An adequate number of completed templates and summary documents from previous NMCR sessions (at least 5, if possible 10) should be assessed to evaluate the discussion of near-miss cases, including interviews with women and follow-up of recommendations.

An assessment usually results in identification of staff members who are driving forces in the NMCR cycle and quality improvement. The visit is considered to be complete when sufficient information has been collected for adequate assessment of the quality of the NMCR cycle and for feedback and recommendations. Assessors should take time to finalize their copy of the checklist on the hospital visited, including scores, strengths, weaknesses, comments and recommendations, as soon as possible after the visit.

#### 4.4.2.6 Scoring

Each assessor should attribute scores. A team discussion can help to understand the points of view of other assessors and to discuss differences in scoring. Each item on the checklist should be scored as follows:

- 0 = totally inappropriate quality
- 1 = major problems
- 2 = some deficiencies
- 3 = appropriate quality.

Groups of items should be scored with a summary score as the arithmetic mean of the scores of each item in the group.

#### 4.4.2.7 Providing feedback at local level

The team should prepare a joint, detailed synthesis to the staff of the facility, listing the main strengths and weaknesses. The team leader usually delivers the feedback, with contributions from the other team members. The report should cite priorities, with details of actual findings as illustration. When providing feedback, assessors should remember that the aim is to motivate the participants to change and to show them that improvement is possible. The general attitude should be supportive, describing what is being done appropriately and potential improvements, emphasizing that identification of individual responsibility is not the objective of the assessment,

The matrix of recommendations for improving the quality of the NMCR cycle at hospital level on the checklist (Annex 16) should be filled in by the assessors and the local coordinators, clearly showing the priorities for improvement, agreed action, the people responsible and the timeline. Any requirement for further technical support should be clearly identified. Plans for follow-up or supportive supervision should be described if follow-up is included in the programme. Actions at a higher level (district, regional or national) should be identified.

Shortly after the assessment, a copy of the completed checklist, the summary table and plans for improving the quality of the NMCR cycle should be given to the coordinator. These documents represent the basis for changes and should be used for follow-up and supervision and as a comparison for subsequent assessments.

#### 4.4.2.8 *Providing feedback regionally or nationally and preparing a national action plan*

Once all the assessment visits have been completed, the assessors will discuss the main findings, identify strengths and weaknesses and prepare presentations for a 1–2-day workshop with the ministry of health, other stakeholders and representatives of the maternity hospitals involved in NMCRs. The participants should include national and local NMCR coordinators, representatives of the ministry of health and of other health authorities, hospital managers, relevant national and international partners, including members of academia and scientific and professional societies, other stakeholders and all the assessors. If there are service user associations in the country, representatives should be invited.

The meeting should start with presentations by a representative of each hospital of achievements and challenges with the NMCR cycle. The findings of the assessment will then be presented, maintaining the anonymity of the facilities and emphasizing that the purpose is to identify systemic issues. Tables and figures may be used to summarize the findings of the assessment, and each hospital could be identified by a number or a letter.

Each facility team then presents the steps planned for improving the NMCR process. The assessor team will facilitate identification of action needed at national level (Annex 17), taking into account the information in Annex 15 and that collected by direct assessment in hospitals (Annex 16). Timelines and national responsibilities should be specified, with steps to be taken, such as national workshops to improve capacity in defined areas or an updated national plan of action, and the role of partners. The meeting should include a follow-up plan and discussion of mechanisms to ensure sustainability and to maintain and expand national capacity in NMCR quality assessment and improvement.

The team leader should coordinate preparation of a report, including recommendations, to the ministry of health or local authorities and to the United Nations and other partners. The final report should include a summary of the findings, without compromising confidentiality, strengths and weaknesses and recommendations for improvement. The recommendations will form the basis for defining and planning future steps. If the quality of the NMCR cycle is found to be substandard, time should be allowed for implementing the recommendations before a second evaluation is carried out. The experience and human resources of maternity hospitals that performed well could be used to support those in which the quality is substandard. A second assessment should be planned after further NMCR cycles (12–24 months), with the same team of assessors, to evaluate progress.

## 5. References

1. Standards for improving quality of maternal and newborn care in health facilities. Geneva: World Health Organization, 2016. ([http://www.who.int/maternal\\_child\\_adolescent/documents/improving-maternal-newborn-care-quality/en/](http://www.who.int/maternal_child_adolescent/documents/improving-maternal-newborn-care-quality/en/))
2. Strategies towards ending preventable maternal mortality. Geneva: World Health Organization; 2015 ([http://who.int/reproductivehealth/topics/maternal\\_perinatal/epmm/en/](http://who.int/reproductivehealth/topics/maternal_perinatal/epmm/en/) [http://apps.who.int/iris/bitstream/10665/134588/1/WHO\\_RHR\\_14.23\\_eng.pdf?ua=1&ua=1](http://apps.who.int/iris/bitstream/10665/134588/1/WHO_RHR_14.23_eng.pdf?ua=1&ua=1), accessed 8 February 2016).
3. Targets and strategies for ending preventable maternal mortality. Consensus statement. Geneva: World Health Organization; 2014 ([http://www.who.int/reproductivehealth/publications/maternal\\_perinatal\\_health/consensus-statement/en/](http://www.who.int/reproductivehealth/publications/maternal_perinatal_health/consensus-statement/en/), accessed 8 February 2016).
4. Every newborn: an action plan to end preventable deaths: executive summary. Geneva: World Health Organization; 2014 ([http://www.everynewborn.org/Documents/Every\\_Newborn\\_Action\\_Plan-EXECUTIVE\\_SUMMARY-ENGLISH\\_updated\\_July2014.pdf](http://www.everynewborn.org/Documents/Every_Newborn_Action_Plan-EXECUTIVE_SUMMARY-ENGLISH_updated_July2014.pdf), accessed 8 February 2016).
5. Health 2020: the European policy for health and well-being. Copenhagen: World Health Organization Regional Office for Europe; 2013 (<http://www.euro.who.int/en/health-topics/health-policy/health-2020-the-european-policy-for-health-and-well-being/publications/2013/health-2020-a-european-policy-framework-and-strategy-for-the-21st-century>, accessed 12 February 2016).
6. The prevention and elimination of disrespect and abuse during facility-based childbirth. Geneva: World Health Organization; 2014 ([http://apps.who.int/iris/bitstream/10665/134588/1/WHO\\_RHR\\_14.23\\_eng.pdf?ua=1&ua=1](http://apps.who.int/iris/bitstream/10665/134588/1/WHO_RHR_14.23_eng.pdf?ua=1&ua=1), accessed 8 February 2016).
7. The second report of the independent expert review group (iERG) on information and accountability for women's and children's health. Geneva: World Health Organization; 2013 ([http://www.who.int/reproductive-health/publications/maternal\\_perinatal\\_health/consensus-statement/en/](http://www.who.int/reproductive-health/publications/maternal_perinatal_health/consensus-statement/en/) [http://apps.who.int/iris/bitstream/10665/85757/1/9789241505949\\_eng.pdf?ua=1](http://apps.who.int/iris/bitstream/10665/85757/1/9789241505949_eng.pdf?ua=1), accessed 8 February 2016).
8. Committee on Quality of Health Care in America. Crossing the quality chasm: a new health system for the 21st century. Washington DC: Institute of Medicine; 2001.
9. Quality of care: a process for making strategic choices in health systems. Geneva: World Health Organization; 2006.
10. Tamburlini G, Siupsinskas G, Bacci A. Maternal and Neonatal Care Quality Assessment Working Group. Quality of maternal and neonatal care in Albania, Turkmenistan and Kazakhstan: a systematic, standard-based, participatory assessment. *PLoS One*. 2011;6:e28763.
11. Tamburlini G, Yadgarova K, Kamilov A, Bacci A, Maternal and Neonatal Care Quality Improvement Working Group. Improving the quality of maternal and neonatal care: the role of standard based participatory assessments. *PLoS One*. 2013;8:e78282.
12. van den Broek NR, Graham WJ. Quality of care for maternal and newborn health: the neglected agenda. *BJOG*. 2009;116(S1):18–21.
13. Souza JP, Gülmezoglu AM, Vogel J, Carroli G, Lumbiganon P, Qureshi Z, et al. Moving beyond essential interventions for reduction of maternal mortality (the WHO multi-country survey on maternal and newborn health): a cross-sectional study. *Lancet*. 2013;381:1747–55.
14. Legido-Quigley H, McKee M, Nolte E, Glinos IA. Assuring the quality of health care in the European Union. A case for action. Copenhagen: World Health Organization Regional Office for Europe; 2008 (Observatory

Series No. 12) ([http://www.euro.who.int/\\_\\_data/assets/pdf\\_file/0007/98233/E91397.pdf](http://www.euro.who.int/__data/assets/pdf_file/0007/98233/E91397.pdf), accessed 8 February 2016).

15. Trends in maternal mortality: 1990 to 2015. Estimates by WHO, UNICEF, UNFPA, the World Bank and the United Nations Population Division. Geneva: World Health Organization; 2014 (<http://www.who.int/reproductivehealth/publications/monitoring/maternal-mortality-2015/en/>, accessed 8 February 2016).
16. The European health report 2015. Targets and beyond – reaching new frontiers in evidence. Copenhagen: World Health Organization Regional Office for Europe; 2013. (<http://www.euro.who.int/en/data-and-evidence/european-health-report/european-health-report-2015/european-health-report-2015-the.-targets-and-beyond-reaching-new-frontiers-in-evidence>, accessed 8 February 2016).
17. WHO Health for all database. Copenhagen: World Health Organization Regional Office for Europe (<http://data.euro.who.int/hfad/>, accessed 8 February 2016).
18. Donati S, Senatore S, Ronconi A, Regional Maternal Mortality Working Group. Maternal mortality in Italy: a record-linkage study. *BJOG*. 2011;118:872–9.
19. Deneux-Tharoux C, Berg C, Bouvier-Colle MH, Gissler M, Harper M, Nannini A, et al. Underreporting of pregnancy-related mortality in the United States and Europe. *Obstet Gynecol*. 2005;106:684–92. Erratum in: *Obstet Gynecol*. 2006;107:209.
20. Salanave B, Bouvier-Colle MH, Varnoux N, Alexander S, Macfarlane A. Classification differences and maternal mortality: a European study. MOMS Group. Mothers' Mortality and Severe morbidity. *Int J Epidemiol*. 1999;28:64–9.
21. Beyond the numbers: reviewing maternal deaths and complications to make pregnancy safer. Geneva: World Health Organization; 2014 (<http://whqlibdoc.who.int/publications/2004/9241591838.pdf?ua=1>, accessed 8 February 2016).
22. Evaluating the quality of care for severe pregnancy complications. The WHO near-miss approach for maternal health. Geneva: World Health Organization; 2011 (<http://www.who.int/reproductivehealth/publications/monitoring/9789241502221/en/>, accessed 8 February 2016).
23. Tunçalp O, Hindin MJ, Souza JP, Chou D, Say L. The prevalence of maternal near miss: a systematic review. *BJOG*. 2012;119:653–6.
24. Tunçalp Ö, Souza JP. Maternal near-miss audits to improve quality of care. *BJOG*. 2014;121(Suppl.4):102–4.
25. Multi-country review meeting on maternal mortality and morbidity audit “Beyond the numbers”, Report of a WHO meeting, Charvak, Uzbekistan 14–17 June 2010. Copenhagen: World Health Organization Regional Office for Europe; 2010 (<http://www.euro.who.int/en/health-topics/Life-stages/maternal-and-newborn-health/publications/2010/multi-country-review-meeting-on-maternal-mortality-and-morbidity-audit-beyond-the-numbers,-report-of-a-who-meeting,-charvak,-uzbekistan-1417-june-2010>, accessed 8 February 2016).
26. The impact of implementation of “Beyond the numbers” approach in improving maternal and perinatal health. 29–30 April 2014, Bishkek, Kyrgyzstan. Copenhagen: World Health Organization Regional Office for Europe; 2014 (<http://www.euro.who.int/en/media-centre/events/events/2014/04/the-impact-of-implementation-of-beyond-the-numbers-approach-in-improving-maternal-and-perinatal-health>, accessed 8 February 2016).
27. Bacci A, Lewis G, Baltag V, Betrán AP. The introduction of confidential enquiries into maternal deaths and near-miss case reviews in the WHO European Region. *Reprod Health Matters*. 2007;15:145–52.
28. Bacci A. Implementing “Beyond the numbers” across the WHO European Region: steps adopted, challenges, successes and current status. *Entre Nous* 2010;70:6–7 ([http://www.euro.who.int/\\_\\_data/assets/pdf\\_file/0013/123016/en70.pdf](http://www.euro.who.int/__data/assets/pdf_file/0013/123016/en70.pdf), accessed 8 February 2016).

29. Yadgarova K, Fazilova F. Implementation of near miss case reviews in Uzbekistan: the role of prikazes. *Entre Nous* 2010;70:26–7 ([http://www.euro.who.int/\\_\\_data/assets/pdf\\_file/0013/123016/en70.pdf](http://www.euro.who.int/__data/assets/pdf_file/0013/123016/en70.pdf), accessed 8 February 2016).
30. Hodorocea S. Piloting near miss case reviews in Kazakhstan: improving quality of maternal care. *Entre Nous* 2010;70:28–9 ([http://www.euro.who.int/\\_\\_data/assets/pdf\\_file/0013/123016/en70.pdf](http://www.euro.who.int/__data/assets/pdf_file/0013/123016/en70.pdf), accessed 8 February 2016).
31. Sukhanberdiyev K, Ayazbekov A, Issina A, Abuova G, Hodorocea S, Bacci A. Initial experience of near miss case review: improving the management of haemorrhage. *Entre Nous* 2011;74:18–9 ([http://www.euro.who.int/\\_\\_data/assets/pdf\\_file/0008/146978/313914\\_Entre\\_Nous\\_74\\_low.pdf](http://www.euro.who.int/__data/assets/pdf_file/0008/146978/313914_Entre_Nous_74_low.pdf), accessed 8 February 2016).
32. Making pregnancy safer in Uzbekistan. Maternal mortality and morbidity audit activities report 2002–2008. Copenhagen: World Health Organization Regional Office for Europe; ([http://www.euro.who.int/\\_\\_data/assets/pdf\\_file/0004/98797/MPS\\_UZB.pdf](http://www.euro.who.int/__data/assets/pdf_file/0004/98797/MPS_UZB.pdf), accessed 8 February 2016).
33. Baltag V, Filippi V, Bacci A. Putting theory into practice: the introduction of obstetric near-miss case reviews in the Republic of Moldova. *Int J Qual Health Care*. 2012;24:182–8.
34. Filippi V, Brugha R, Browne E, Gohou V, Bacci A, De Brouwere V, et al. Obstetric audit in resource-poor settings: lessons from a multi-country project auditing “near miss” obstetrical emergencies. *Health Policy Plann*. 2004;19:57–66.
35. Bakker W, van den Akker T, Mwangomba B, Khukulu R, van Elteren M, van Roosmalen J. Health workers’ perceptions of obstetric critical incident audit in Thyolo District, Malawi. *Trop Med Int Health*. 2011;16:1243–50.
36. Belizán M, Bergh AM, Cilliers C, Pattinson RC, Voce A, Synergy Group. Stages of change: a qualitative study on the implementation of a perinatal audit programme in South Africa. *BMC Health Serv Res*. 2011;11:243.
37. Borchert M, Goufodji S, Alihonou E, Delvaux T, Saizonou J, Kanhonou L, et al. Can hospital audit teams identify case management problems, analyse their causes, identify and implement improvements? A cross-sectional process evaluation of obstetric near-miss case reviews in Benin. *BMC Pregnancy Childbirth*. 2012;12:109.
38. Richard F, Ouédraogo C, Zongo V, Ouattara F, Zongo S, Gruénais ME, et al. The difficulty of questioning clinical practice: experience of facility-based case reviews in Ouagadougou, Burkina Faso. *BJOG*. 2009;116:38–44.
39. Van Hamersveld KT, den Bakker E, Nyamtema AS, van den Akker T, Mfinanga EH, van Elteren M, et al. Barriers to conducting effective obstetric audit in Ifakara: a qualitative assessment in an under-resourced setting in Tanzania. *Trop Med Int Health*. 2012;17:652–7.
40. Hutchinson C, Lange I, Kanhonou L, Filippi V, Borchert M. Exploring the sustainability of obstetric near-miss case reviews: a qualitative study in the South of Benin. *Midwifery*. 2010;26:537–43.
41. Lewis G. Emerging lessons from the FIGO Logic initiative on maternal death and near-miss reviews. *Int J Gynaecol Obstet*. 2014;127(Suppl.1):S17–20.
42. Browne JL, van Nievelt SW, Srofenyoh EK, Grobbee DE, Klipstein-Grobusch K. Criteria-based audit of quality of care to women with severe pre-eclampsia and eclampsia in a referral hospital in Accra, Ghana. *PLoS One* 2015;10:e0125749.
43. Kidanto HL, Wangwe P, Kilewo CD, Nystrom L, Lindmark G. Improved quality of management of eclampsia patients through criteria based audit at Muhimbili National Hospital, Dar es Salaam, Tanzania. Bridging the quality gap. *BMC Pregnancy Childbirth*. 2012;12:134.

44. van den Akker T, Mwangomba B, Irlam J, van Roosmalen J. Using audits to reduce the incidence of uterine rupture in a Malawian district hospital. *Int J Gynaecol Obstet.* 2009;107:289–94.
45. van den Akker T, van Rhenen J, Mwangomba B, Lommerse K, Vinkhumbo S, van Roosmalen J. Reduction of severe acute maternal morbidity and maternal mortality in Thyolo District, Malawi: the impact of obstetric audit. *PLoS One.* 2011;6:e20776.
46. Kongnyuy EJ, Leigh B, van den Broek N. Effect of audit and feedback on the availability, utilisation and quality of emergency obstetric care in three districts in Malawi. *Women Birth.* 2008;21:149–55.
47. Kongnyuy EJ, Mlava G, van den Broek N. Criteria-based audit to improve a district referral system in Malawi: a pilot study. *BMC Health Serv Res.* 2008;8:190.
48. Weeks AD, Alia G, Ononge S, Otolorin EO, Mirembe FM. A criteria-based audit of the management of severe pre-eclampsia in Kampala, Uganda. *Int J Gynaecol Obstet.* 2005;91:292–7; discussion 283–4.
49. Béhague DP, Kanhonou LG, Filippi V, Lègonou S, Ronsmans C. Pierre Bourdieu and transformative agency: a study of how patients in Benin negotiate blame and accountability in the context of severe obstetric events. *Sociol Health Illn.* 2008;30:489–510.
50. Wagaarachchi PT, Graham WJ, Penney GC, McCaw-Binns A, Yeboah Antwi K, Hall MH. Holding up a mirror: changing obstetric practice through criterion-based clinical audit in developing countries. *Int J Gynaecol Obstet.* 2001;74(2):119–30;discussion 131.
51. Luz AG, Osis MJ, Ribeiro M, Cecatti JG, Amaral E. Impact of a nationwide study for surveillance of maternal near-miss on the quality of care provided by participating centers: a quantitative and qualitative approach. *BMC Pregnancy Childbirth.* 2014;14:122.
52. Luz AG, Osis MJ, Ribeiro M, Cecatti JG, Amaral E. Perspectives of professionals participating in the Brazilian Network for the Surveillance of Severe Maternal Morbidity regarding the implementation of routine surveillance: a qualitative study. *Reprod Health.* 2014;11:29.
53. Lewis G. Emerging lessons from the FIGO Logic initiative on maternal death and near-miss reviews. *Int J Gynaecol Obstet.* 2014;127(Suppl.1):S17–20.
54. Bailey PE, Binh HT, Bang HT. Promoting accountability in obstetric care: use of criteria-based audit in Viet Nam. *Global Public Health.* 2010;5:62–74.
55. Bhattacharyya S, Srivastava A, Knight M. Developing a framework to review near-miss maternal morbidity in India: a structured review and key stakeholder analysis. *BMC Health Serv Res.* 2014;14:553.
56. Müffler N, Trabelssi M, De Brouwere V. Scaling up clinical audits of obstetric cases in Morocco. *Trop Med Int Health* 2007;12:1248–57.
57. Saizonou J, De Brouwere V, Vangeenderhuysen C, Dramaix-Wilmet M, Buekens P, Dujardin B. Audit de la qualité de prise en charge des « échappées belles » (near miss) dans les maternités de référence du Sud Bénin [Quality audit of the management of near-misses in reference maternities in south Benin]. *Cah Santé* 2006;16:33–42.
58. Sahel A, De Brouwere V, Lardi M, Van Lerberghe W, Ronsmans C, Filippi V. Des catastrophes obstétricales évitées de justesse: les near miss dans les hôpitaux marocains [Near-miss obstetric emergencies in Moroccan hospitals]. *Cah Santé* 2001;11:229–35.
59. Dumont A, Fournier P, Abrahamowicz M, Traoré M, Haddad S, Fraser WD et al. Quality of care, risk management, and technology in obstetrics to reduce hospital-based maternal mortality in Senegal and Mali (QUAR-ITE): a cluster-randomised trial. *Lancet.* 2013;382:146–57.

60. Amaral E, Souza JP, Surita F, Luz AG, Sousa MH, Cecatti JG, et al. A population-based surveillance study on severe acute maternal morbidity (near-miss) and adverse perinatal outcomes in Campinas, Brazil: the Vigimoma Project. *BMC Pregnancy Childbirth*. 2011;22:9.
61. Maternal near-miss. A valuable concept for improving safe motherhood in low income countries (Briefing paper 7). London: Department for International Development; 2010 ([http://r4d.dfid.gov.uk/PDF/Outputs/Maternal\\_RPC/nearmiss.pdf](http://r4d.dfid.gov.uk/PDF/Outputs/Maternal_RPC/nearmiss.pdf), accessed 8 February 2016).
62. National Institute for Clinical Excellence (NICE). Principles for best practice in clinical audit. Abingdon, Berks: Radcliffe Medical Press; 2002 ([http://www.uhbristol.nhs.uk/files/nhs-ubht/best\\_practice\\_clinical\\_audit.pdf](http://www.uhbristol.nhs.uk/files/nhs-ubht/best_practice_clinical_audit.pdf), accessed 8 February 2016).
63. Burnett AC, Winyard G. Clinical audit at the heart of clinical effectiveness. *J Qual Clin Pract* 1998;18:3–19.
64. Criterion-based audit manual. New York, NY: Averting Maternal Death and Disability, Columbia University; 2003 (<http://cpmcnet.columbia.edu/dept/sph/popfam/amdd/resources.html>).
65. Graham WJ, Wagaarachchi P, Penney G, McCaw-Binns A, Antwi KY, Hall MH. Criteria for clinical audit of the quality of hospital-based obstetric care in developing countries. *Bull World Health Organ* 2000;78:614–20.
66. Graham WJ. Criterion-based clinical audit in obstetrics: bridging the quality gap? *Best Pract Res Clin Obstet Gynaecol*. 2009;23:375–88.
67. Kongnyuy EJ, Uthman OA. Use of criterion-based clinical audit to improve the quality of obstetric care: a systematic review. *Acta Obstet Gynecol Scand*. 2009;88:873–81.
68. Pirkle CM, Dumont A, Zunzunegui MV. Criterion-based clinical audit to assess quality of obstetrical care in low- and middle-income countries: a systematic review. *Int J Qual Health Care*. 2011;23:456–63.
69. Pirkle CM, Dumont A, Traore M, Zunzunegui MV. Validity and reliability of criterion based clinical audit to assess obstetrical quality of care in West Africa. *BMC Pregnancy Childbirth*. 2012;12:118.
70. Taylor MJ, McNicholas C, Nicolay C, Darzi A, Bell D, Reed JE. Systematic review of the application of the plan–do–study–act method to improve quality in healthcare. *BMJ Qual Saf*. 2014;23:290–8.
71. Sexual and reproductive health. Clinical guidelines. Geneva: World Health Organization (<http://www.who.int/reproductivehealth/publications/clinical/en/>, accessed 8 February 2016).
72. WHO effective perinatal care training package, 2nd edition. Copenhagen: World Health Organization Regional Office for Europe; 2015 (<http://www.euro.who.int/en/health-topics/Life-stages/maternal-and-newborn-health/activities-and-tools/effective-perinatal-care-epc-training-package>, accessed 8 February 2016).
73. Hospital care for mothers and newborn babies: quality assessment and improvement tool. Copenhagen: World Health Organization Regional Office for Europe; 2014 (<http://www.euro.who.int/en/health-topics/Life-stages/maternal-and-newborn-health/publications/2014/hospital-care-for-mothers-and-newborn-babies-quality-assessment-and-improvement-tool>, accessed 8 February 2016).
74. Assessment tool for the quality of outpatient antepartum and postpartum care for women and newborns. Copenhagen: World Health Organization Regional Office for Europe; 2013 ([http://www.euro.who.int/\\_\\_data/assets/pdf\\_file/0006/191697/assessment-tool-for-the-quality-of-outpatient-antepartum-and-postpartum-care-for-women-and-newborns.pdf](http://www.euro.who.int/__data/assets/pdf_file/0006/191697/assessment-tool-for-the-quality-of-outpatient-antepartum-and-postpartum-care-for-women-and-newborns.pdf), accessed 8 February 2016).
75. Introducing WHO's sexual and reproductive health guidelines and tools into national programmes: principles and process of adaptation and implementation. Geneva: World Health Organization; 2007.
76. WHO Reproductive Health Library. Geneva: World Health Organization (<http://apps.who.int/rhl/en/>, accessed 8 February 2016).

77. National Institute for Health and Care Excellence (NICE). London (<http://www.nice.org.uk/Guidance>, accessed 8 February 2016).
78. Royal College of Obstetricians and Gynaecologists. London (<http://www.rcog.org.uk/> <https://www.rcog.org.uk/en/guidelines-research-services/>, accessed 8 February 2016).
79. Standards of care for women's health in Europe. Obstetric and neonatal services. Brussels: European Board and College of Obstetrics and Gynaecology; 2014 (<http://www.ebcog.eu/doc/obstetric.pdf>, accessed 8 February 2016).
80. WHO handbook for guideline development. Geneva: World Health Organization; 2010 ([http://www.euro.who.int/hiv/topics/mtct/grc\\_handbook\\_mar2010\\_1.pdf](http://www.euro.who.int/hiv/topics/mtct/grc_handbook_mar2010_1.pdf), accessed 8 February 2016).
81. South Eastern Europe Health Network. Health development action for south-eastern Europe. Strengthening national capacities for improving maternal and neonatal health in south-eastern Europe. Workshop on clinical guidelines development. SEE improving maternal and neonatal health project. Copenhagen: World Health Organization Regional Office for Europe; 2007 ([http://www.euro.who.int/\\_\\_data/assets/pdf\\_file/0011/99686/Workshop\\_Guidelines\\_Split\\_report\\_FINAL.pdf?ua=1](http://www.euro.who.int/__data/assets/pdf_file/0011/99686/Workshop_Guidelines_Split_report_FINAL.pdf?ua=1), accessed 20 February 2016).
82. Development and implementation of clinical guidelines for sexual and reproductive health. Programme guidance for countries in eastern Europe and central Asia. United Nations Population Fund Regional Office for Eastern Europe and Central Asia, 2012 ([http://eeca.unfpa.org/sites/default/files/pub-pdf/Clinical%20Guidelines%20Programme%20Guidance%20FINAL\\_0.pdf](http://eeca.unfpa.org/sites/default/files/pub-pdf/Clinical%20Guidelines%20Programme%20Guidance%20FINAL_0.pdf), accessed 20 February 2016).
83. Bacci A, Wyn Huis D, Baltag V, Lazarus JV. Introducing evidence based medicine and guidelines for maternal and newborn health in the Republic of Moldova. *Cent Eur J Publ Health* 2005;13:200–1.
84. Standards for maternal and newborn health. Group 1: General standards of care for healthy pregnancy and childbirth. Geneva: World Health Organization; 2007 ([http://www.who.int/maternal\\_child\\_adolescent/documents/a91272/en/](http://www.who.int/maternal_child_adolescent/documents/a91272/en/), accessed 20 January 2016).
85. Respectful maternity care: the universal rights of childbearing women. Washington DC: White Ribbon Alliance; 2011 ([http://whiteribbonalliance.org/wp-content/uploads/2013/10/Final\\_RMC\\_Charter.pdf](http://whiteribbonalliance.org/wp-content/uploads/2013/10/Final_RMC_Charter.pdf), accessed 20 January 2016).
86. International MotherBaby Childbirth Initiative. Ten steps to optimal MotherBaby maternity services. Ponte Vedra Beach, FL: International MotherBaby Childbirth Organization (<http://www.imbci.org/>, accessed 20 January 2016).
87. Report of the Office of the United Nations High Commissioner for Human Rights on preventable maternal mortality and morbidity and human rights. New York, NY: United Nations Human Rights Council; 2010 (A/HRC/14/39) (<http://www.refworld.org/docid/4c0615622.html>, accessed 20 January 2016).
88. Charter on Sexual and Reproductive Rights. London: International Planned Parenthood Federation; 1996 (<http://www.shfpa.org.au/sites/shfpa.drupalgardens.com/files/201303/IPPF%20Charter.pdf>, accessed 20 January 2016).
89. Report of the United Nations High Commissioner for Human Rights. Technical guidance on the application of a human rights-based approach to the implementation of policies and programmes to reduce preventable maternal morbidity and mortality. New York, NY: United Nations Human Rights Council; 2012 ([http://www2.ohchr.org/english/issues/women/docs/A.HRC.21.22\\_en.pdf](http://www2.ohchr.org/english/issues/women/docs/A.HRC.21.22_en.pdf), accessed 20 January 2016).
90. Responding to intimate partner violence and sexual violence against women. Geneva: World Health Organization; 2013 (<http://www.who.int/reproductivehealth/publications/violence/9789241548595/en/index.html>, accessed 20 January 2016).

91. Convention on the Rights of the Child. Committee of the Rights of the Child. Fifty-first Session, 25 May–12 June 2009 (General comment No. 12). New York, NY: United Nations; 2009 (<http://www.coe.int/t/dg3/children/participation/CRC-C-GC-12.pdf>, accessed 20 January 2016).
92. Active Citizenship Network. European Charter of Patient's Rights. Rome: European Commission; 2002 ([http://ec.europa.eu/health/ph\\_overview/co\\_operation/mobility/docs/health\\_services\\_co108\\_en.pdf](http://ec.europa.eu/health/ph_overview/co_operation/mobility/docs/health_services_co108_en.pdf), accessed 20 January 2016).
93. Patients' rights. Geneva: World Health Organization (<http://www.who.int/genomics/public/patientrights/en/>, accessed 20 January 2016).
94. Reproductive, maternal, newborn and child health and human rights: a toolbox for examining laws, regulations and policies. Geneva: World Health Organization; 2014 ([http://apps.who.int/iris/bitstream/10665/126383/1/9789241507424\\_eng.pdf?ua=1&ua=1](http://apps.who.int/iris/bitstream/10665/126383/1/9789241507424_eng.pdf?ua=1&ua=1), accessed 20 January 2016).
95. Global strategy for women's, children's and adolescents' health, 2016–2030. Geneva: World Health Organization; 2015 (<http://www.who.int/pmnch/activities/jointactionplan/en/index.html>, accessed 20 January 2016).
96. Doran GT. There's a S.M.A.R.T. way to write management's goals and objectives. *Manage Rev* 1981;70:35–6.
97. Scottish confidential audit of severe maternal morbidity: reducing avoidable harm. 10th annual report. Edinburgh: Healthcare Improvement Scotland; 2014 ([http://www.healthcareimprovementscotland.org/our\\_work/reproductive,\\_maternal\\_child/programme\\_resources/scasmm.aspx](http://www.healthcareimprovementscotland.org/our_work/reproductive,_maternal_child/programme_resources/scasmm.aspx), accessed 20 January 2016).

## Annex 1. Regional and national activities organized and supported by WHO and partners (1, 2)

### Regional workshops:

- WHO: two regional “Beyond the numbers” workshops (2004, 2005), with a total of 12 countries involved
- UNFPA: three “Beyond the numbers” sub-regional workshops: 2014, in the Former Yugoslav Republic of Macedonia; 2015, in Bosnia Herzegovina and in Georgia; a total of 9 countries involved

### National workshops:

- “Beyond the numbers” workshops: Republic of Moldova, Uzbekistan (2005); Kyrgyzstan, Tajikistan (2006); Armenia, Kazakhstan, Romania (2007); Ukraine (2011); Latvia (2012); United Nations Interim Administration Mission in Kosovo<sup>1</sup> (2013); Georgia (2015)
- Technical workshops on facility-based individual near-miss case reviews: Republic of Moldova (2005); Uzbekistan (2007); Kazakhstan, Kyrgyzstan, Tajikistan (2008); Armenia, Romania, Russian Federation (2009); United Nations Interim Administration Mission in Kosovo<sup>1</sup>, Latvia, Ukraine (2013); Turkmenistan (2014); Azerbaijan, Georgia (2015)

### Country activities

- Armenia: pilot project since 2009, quality assessment in 2015, technical workshop planned for 2016 to ensure capacity and quality before scaling up
- Georgia: pilot project since 2015 in six maternity hospitals, quality assessment and reinforcement planned for 2016
- Kazakhstan: pilot project since 2008, scale-up after quality assessment and reinforcement in 2010, quality assessments in 2014 and 2015
- Kyrgyzstan: pilot project since 2007, plans for scaling up after quality assessment in 2014 and capacity-building in 2015
- Latvia: pilot project since 2013, scale-up after quality assessment and reinforcement in 2013
- Republic of Moldova: pilot project since 2006, scale-up after quality assessment and reinforcement in 2008 and 2015
- Romania, United Nations Interim Administration Mission in Kosovo<sup>1</sup>: pilot projects
- Russian Federation: pilot project, report issued for 2014
- Tajikistan: pilot project since 2007, quality assessment and reinforcement in 2010, plans for scale-up after quality assessment in 2014
- Turkmenistan: pilot project since 2014 in three maternity hospitals
- Ukraine: pilot project since 2013
- Uzbekistan: pilot project since 2007, scale-up after quality assessment and reinforcement in 2009, 2012 and 2015 (all maternity hospitals)

### Multi-country “Beyond the numbers” reviews:

- 2010 (in Charvak, Uzbekistan), 14 countries involved
- 2014 (in Bishkek, Kyrgyzstan), 10 countries involved

<sup>1</sup> In accordance with Security Council resolution 1244 (1999)

## References

1. Multi-country review meeting on maternal mortality and morbidity audit “Beyond the numbers”, Report of a WHO meeting, Charvak, Uzbekistan 14–17 June 2010. Copenhagen: World Health Organization Regional Office for Europe; 2010 (<http://www.euro.who.int/en/health-topics/Life-stages/maternal-and-newborn-health/publications/2010/multi-country-review-meeting-on-maternal-mortality-and-morbidity-audit-beyond-the-numbers,-report-of-a-who-meeting,-charvak,-uzbekistan-1417-june-2010>, accessed 8 February 2016)
2. The impact of implementation of “Beyond the numbers” approach in improving maternal and perinatal health. 29–30 April 2014, Bishkek, Kyrgyzstan. Copenhagen: World Health Organization Regional Office for Europe; 2014 (<http://www.euro.who.int/en/media-centre/events/events/2014/04/the-impact-of-implementation-of-beyond-the-numbers-approach-in-improving-maternal-and-perinatal-health>, accessed 8 February 2016).

## Annex 2. Examples of activities during country implementation (Uzbekistan) (1, 2)

### Activities organized by WHO

- Workshop on evidence-based mother and newborn care, Uzbekistan (10–14 November 2003)
- First WHO European regional workshop on “Beyond the numbers”, Kyrgyzstan (May–June 2004)
- Development of guidelines for emergency obstetric and pregnancy-induced hypertension, Uzbekistan (18–21 January 2005)
- Workshop on “Beyond the numbers”, Uzbekistan (28 February–4 March 2005)
- Technical workshop on “Beyond the numbers”: near-miss case review, Uzbekistan (12–15 June 2007)
- Pilot-testing near-miss case reviews: international consultancy, Uzbekistan (4–10 November 2007)
- Near-miss case reviews in pilot sites: follow-up, Uzbekistan (22–23 and 29–30 January 2008)
- Near-miss case reviews: workshop on interviews with women, Uzbekistan (17–18 April 2008)
- “Beyond the numbers” review and scaling up, Uzbekistan (12–23 May 2008)
- “Beyond the numbers”. WHO European Region review, Charvak, Uzbekistan (14–17 June 2010)
- Impact of implementation of “Beyond the numbers” approach in improving maternal and perinatal health. WHO European Region review, Bishkek, Kyrgyzstan (29–30 April 2014)
- Assessment and reinforcement of the quality of the NMCR in Uzbekistan (16–21 November 2015)

### Activities organized in Uzbekistan by national institutions and experts

- Order of the Ministry of Health No. 428 on pilot-testing of NMCR in maternity hospitals (2007)
- Pilot-testing of NMCR in four hospitals (2007)
- Follow-up and monitoring (2007–2008)
- Quality assessment and plans for scaling-up, with international and national experts (2009)
- Scaling-up, including pilot-testing in 18 new hospitals (started in 2009)
- Two waves (2009–2013 and 2014–2015) of workshops conducted by national experts to train staff of maternity hospitals and prepare for scaling up
- Training in 90% of maternity hospitals (by 2015)
- The Ministry of Health approved the NMCR method, including the revised operational definitions of near-miss cases and updated standards of care, templates for reporting and methods for interviewing women (translated into Uzbek) (2015)

### Challenges

- Insufficient support from local administrations
- Absence of local leaders to introduce NMCR audits in some institutions
- Irregular NMCR meetings
- Non-compliance with the method; limited role of midwives
- Insufficient knowledge of standards for managing severe obstetric complications
- Lack of control over implementation of recommendations of NMCR audits

### Main achievements

- Local guidance material, including standards, fully developed
- Local staff informed about purpose, principles and method
- Interviewers selected and trained
- Principles and methods of the NMCR cycle endorsed by local prikazes (local health authority orders)
- 22 institutions implementing an NMCR cycle by the end of 2012, training in 90% of maternity hospitals by 2015
- regular, monthly NMCR meetings organized in most facilities
- NMCR supported by the local administration in most facilities
- method respected in the vast majority of facilities
- effective solutions and recommendations to improve local practices and organization of care developed and implemented
- The quality assessment visit by international and national experts in 2015 showed good quality of NMCR sessions in all six maternity hospitals visited.

## References

1. Multi-country review meeting on maternal mortality and morbidity audit “Beyond the numbers”, Report of a WHO meeting, Charvak, Uzbekistan 14–17 June 2010. Copenhagen: World Health Organization Regional Office for Europe; 2010 (<http://www.euro.who.int/en/health-topics/Life-stages/maternal-and-newborn-health/publications/2010/multi-country-review-meeting-on-maternal-mortality-and-morbidity-audit-beyond-the-numbers,-report-of-a-who-meeting,-charvak,-uzbekistan-1417-june-2010>, accessed 8 February 2016).
2. Making pregnancy safer in Uzbekistan. Maternal mortality and morbidity audit activities report 2002–2008. Copenhagen: World Health Organization Regional Office for Europe; ([http://www.euro.who.int/\\_\\_data/assets/pdf\\_file/0004/98797/MPS\\_UZB.pdf](http://www.euro.who.int/__data/assets/pdf_file/0004/98797/MPS_UZB.pdf), accessed 8 February 2016).

## Annex 3. Inclusion criteria for NM cases (1)

Women who are pregnant, in labour, or who delivered or aborted up to 42 days ago

- arriving at the facility with **any of the listed conditions** or
- developing **any of the listed conditions** during their stay at the health-care facility \*

### Severe maternal complications

- Severe postpartum haemorrhage
- Severe pre-eclampsia
- Eclampsia
- Sepsis or severe systemic infection
- Ruptured uterus
- Severe complications of abortion

### Critical interventions or intensive care unit use

- Admission to intensive care unit
- Interventional radiology
- Laparotomy (includes hysterectomy, excludes caesarean section)
- Use of blood products

### Life-threatening conditions (near-miss criteria)

- Cardiovascular dysfunction
  - Shock, cardiac arrest (absence of pulse/ heart beat and loss of consciousness), use of continuous vasoactive drugs, cardiopulmonary resuscitation, severe hypoperfusion lactate > 5 mmol/l or > 45 mg/dl), severe acidosis (pH < 7.1)
- Respiratory dysfunction
  - Acute cyanosis, gasping, severe tachypnea (respiratory rate > 40 breaths per minute), severe bradypnea (respiratory rate < 6 breaths per minute), intubation and ventilation not related to anaesthesia, severe hypoxemia (O<sub>2</sub> saturation < 90% for ≥ 60 minutes or PAO<sub>2</sub>/FiO<sub>2</sub> < 200)
- Renal dysfunction
  - Oliguria non-responsive to fluids or diuretics, dialysis for acute renal failure, severe acute azotemia (creatinine ≥ 300 µmol/ml or ≥ 3.5 mg/dl)
- Coagulation/haematological dysfunction
  - Failure to form clots, massive transfusion of blood or red cells (≥ 5 units), severe acute thrombocytopenia (<50 000 platelets/ml)
- Hepatic dysfunction
  - Jaundice in the presence of pre-eclampsia, severe acute hyperbilirubinemia (bilirubin > 100 µmol/l or > 6.0 mg/dl)
- Neurological dysfunction
  - Prolonged unconsciousness (lasting ≥ 12 hours)/coma (including metabolic coma), stroke, uncontrollable fits/status epilepticus, total paralysis
- Uterine dysfunction
  - Uterine haemorrhage or infection leading to hysterectomy

### Note:

\* The NM definition is not restricted by gestational age at which complications occurred (i.e. women with abortions or ectopic pregnancies and presenting with any of the inclusion criteria are eligible).

### Exclusion criteria:

Women who develop these conditions independently of pregnancy (i.e. not during pregnancy or 42 days after termination of pregnancy)

**Reference**

1. Evaluating the quality of care for severe pregnancy complications. The WHO near-miss approach for maternal health. Geneva: World Health Organization; 2011 (<http://www.who.int/reproductivehealth/publications/monitoring/9789241502221/en/>, accessed 8 February 2016).

## Annex 4. Glossary (1)

**Acute severe azotemia:** creatinine  $\geq 300$   $\mu\text{mol/l}$  or  $\geq 3.5$   $\text{mg/dl}$ .

**Cardiac arrest:** Sudden absence of pulse and loss of consciousness.

**Cardiopulmonary resuscitation:** A set of emergency procedures including chest compressions and lung ventilation administered to cardiac arrest victims.

**Failure to form clots:** The clinical inability to form clots/disseminated intravascular coagulation. Clinically, absence of clotting from the IV site or suture after 7–10 minutes. It can be assessed by the bedside clotting test (failure of a clot to form after 7 minutes or a soft clot that breaks down easily suggest coagulopathy) or other laboratory tests (acute thrombocytopenia ( $< 50\,000$  platelets), low fibrinogen ( $< 100$   $\text{mg/dl}$ ), prolonged prothrombin time ( $> 6\text{s}$ , INR  $> 5$ ), or elevated D-dimer ( $> 1000$   $\text{ng/dl}$ )). The bedside clotting test is a clinical test to assess the clotting status (Instructions: (1) Take 2 ml of venous blood into a small, dry, clean, plain glass test-tube (approximately 10 mm  $\times$  75 mm); (2) Hold the tube in your closed fist to keep it warm ( $+37^\circ\text{C}$ ); (3) After 4 minutes, tip the tube slowly to see if a clot is forming. Then tip it again every minute until the blood clots and the tube can be turned upside down; (4) Failure of a clot to form after 7 minutes or a soft clot that breaks down easily suggests coagulopathy).

**Gasping:** A terminal respiratory pattern. The breath is convulsively and audibly caught.

**Hysterectomy:** In the maternal near-miss context, surgical removal of the uterus following infection or haemorrhage.

**Life-threatening condition:** A severe health condition usually associated with organ dysfunction. In the maternal near-miss context, a condition that can only result in a near-miss case or in a maternal death.

**Massive transfusion:** Transfusion of a considerable amount of blood or red cells, i.e. transfusion of  $\geq 5$  units of blood or red blood cells.

**Maternal near-miss:** A woman who nearly died but survived a complication that occurred during pregnancy, childbirth or postpartum up to 42 days

**Metabolic coma:** loss of consciousness and presence of glucose plus ketoacids in urine.

**Oliguria non-responsive to fluids or diuretics:** A urinary output  $< 30$   $\text{ml/h}$  for 4 hours or  $< 400$   $\text{ml/24h}$  non-responsive to fluids or diuretics.

**Prolonged unconsciousness:** Any loss of consciousness lasting more than 12 hours, involving complete or almost complete lack of responsiveness to external stimuli. A state compatible with Coma Glasgow Scale  $< 10$ .

**Severe acidosis:** blood pH  $< 7.1$ .

**Severe acute hyperbilirubinemia:** Bilirubin  $> 100$   $\text{mmol/l}$  or  $> 6.0$   $\text{mg/dl}$ .

**Severe acute thrombocytopenia:** Acute reduction in the number of platelets in the blood to  $< 50\,000$  platelets/ml.

**Severe bradypnea:** Respiratory rate less than six breaths per minute.

**Severe hypoperfusion:** Lactate  $>5$   $\text{mmol/l}$  or 45  $\text{mg/dl}$ .

**Severe hypoxemia:** Oxygen saturation  $< 90\%$  for  $\geq 60$  minutes or  $\text{PaO}_2/\text{FiO}_2 < 200$ . The  $\text{PaO}_2/\text{FiO}_2$  index is the relation between the arterial oxygen saturation ( $\text{PaO}_2$ ) and the fraction of inspired oxygen ( $\text{FiO}_2$ ). Arterial oxygen saturation is determined by performing an arterial blood gasometry. The inspired oxygen fraction may vary according to patient need and should be recorded at the moment of blood collection for the gasometry. It can be precise (for instance during mechanical ventilation, 0.21–1.00) or estimated (without oxygen supplementation, 0.21; oxygen nasal catheter, 0.25; facial oxygen mask, 0.25–1.0).

**Severe tachypnea:** Respiratory rate over 40 breaths per minute.

**Shock:** A persistent systolic blood pressure  $<80$   $\text{mmHg}$  or a persistent systolic blood pressure  $< 90$   $\text{mmHg}$  with a pulse rate at least 120 bpm.

**Total paralysis:** The complete or partial paralysis of both sides of the body. Usually, an extreme neuromuscular global weakness associated with critical illness. This conditions is also known as critical illness poly-neuromyopathy

**Uncontrollable fit:** Refractory, persistent convulsions. Status epilepticus

### Reference

1. Evaluating the quality of care for severe pregnancy complications. The WHO near-miss approach for maternal health. Geneva: World Health Organization; 2011 (<http://www.who.int/reproductivehealth/publications/monitoring/9789241502221/en/>, accessed 8 February 2016).

## Annex 5. Examples of operational definitions

### FROM THE WHO MANUAL (2011) (1)

#### Severe postpartum haemorrhage

- Genital bleeding after delivery, with at least one of the following:
  - perceived abnormal bleeding (1000 ml or more) OR
  - any bleeding with hypotension or blood transfusion.

#### Severe pre-eclampsia

- Persistent systolic blood pressure of 160 mmHg or more OR a diastolic blood pressure of 110 mmHg; proteinuria of 5 g or more in 24 hours; oliguria of < 400 ml in 24 hours; and HELLP syndrome or pulmonary oedema. Excludes eclampsia.

#### Eclampsia

- Generalized fits in a patient without previous history of epilepsy. Includes coma in pre-eclampsia.

#### Severe systemic infection or sepsis

- Presence of fever (body temperature > 38 C), a confirmed or suspected infection (e.g. chorioamnionitis, septic abortion, endometritis, pneumonia), AND at least one of the following:
  - heart rate > 90, respiratory rate > 20, leukopenia (white blood cells < 4000), leukocytosis (white blood cells > 12 000).

#### Uterine rupture

- Rupture of the uterus during labour confirmed by laparotomy.

### OTHER DEFINITIONS

#### Major obstetric haemorrhage (2)

- Estimated blood loss > or = 2500 ml OR
- Transfused 5 or more units of blood OR
- Received treatment for coagulopathy (fresh frozen plasma, cryoprecipitate, platelets) (includes ectopic pregnancy meeting these criteria)

#### Pre eclampsia (3)

- Pregnant women with diastolic hypertension over 110, and systolic over 160, plus one or more of the following:
  - headache;
  - epigastralgia;
  - visual impairment (frontal vision);
  - oliguria (reduction of diuresis less than 30 ml hour).

Operational definitions can be adapted nationally. The threshold above which an adverse obstetric event becomes life-threatening depends on the woman's general health, the context and the services available.

It is important that the definitions used in any review are appropriate to local circumstances; this will ensure local improvements to maternal care. A good operational definition should be easily understood and used by all the staff concerned, and the data should be easy to extract from registers and case notes.

## References

1. Evaluating the quality of care for severe pregnancy complications. The WHO near-miss approach for maternal health. Geneva: World Health Organization; 2011 (<http://www.who.int/reproductivehealth/publications/monitoring/9789241502221/en/>, accessed 8 February 2016).
2. Scottish confidential audit of severe maternal morbidity: reducing avoidable harm. 10th annual report. Edinburgh: Healthcare Improvement Scotland; 2014 ([http://www.healthcareimprovementscotland.org/our\\_work/reproductive,\\_maternal\\_child/programme\\_resources/scasmm.aspx](http://www.healthcareimprovementscotland.org/our_work/reproductive,_maternal_child/programme_resources/scasmm.aspx), accessed 20 January 2016).
3. Making pregnancy safer in Uzbekistan. Maternal mortality and morbidity audit activities report 2002–2008. Copenhagen: World Health Organization Regional Office for Europe; ([http://www.euro.who.int/\\_\\_data/assets/pdf\\_file/0004/98797/MPS\\_UZB.pdf](http://www.euro.who.int/__data/assets/pdf_file/0004/98797/MPS_UZB.pdf), accessed 8 February 2016).

## Annex 6. Examples of standards of care

| <b>From the WHO Manual (2011) (1)</b>              |  |
|--|--|
| <b>Condition</b>                                   | <b>Standard</b>  |
| Prevention of postpartum haemorrhage               | All women should receive 10 IU of oxytocin just after delivery for the prevention of postpartum haemorrhage.   |
| Treatment of postpartum haemorrhage                | All women with postpartum haemorrhage should receive oxytocin  |
| Eclampsia  | All women with eclampsia should receive magnesium sulfate  |
| Prevention of severe systemic infections or sepsis | All women who have a caesarean section should receive prophylactic antibiotics   |
| Treatment of severe infections and sepsis          | All women with severe systemic infections or sepsis should receive intravenous antibiotics   |
| Fetal lung maturation                              | All women delivering a live preterm fetus should receive corticosteroids for fetal lung maturation   |
| <b>Other experiences</b>                           |  |
| Severe preeclampsia/eclampsia (2)                  | <ol style="list-style-type: none"> <li>1. Senior doctor/consultant on duty has to be involved in the management of patients with severe preeclampsia/eclampsia.</li> <li>2. All pregnant women with high arterial pressure at the admission to the hospital must be tested for: proteinuria, hourly diuresis, coagulation time, transaminase level.</li> <li>3. Antihypertensive therapy must be prescribed when BP is more than 160-170/105-110 mm Hg.</li> <li>4. Magnesium sulfate is the drug of choice for treatment/prevention of convulsions (initial dose – 15-20 ml of 25-percent substance, supportive dose – 1-2 g/hr).</li> <li>5. When prescribed, the magnesium therapy is carried out during the whole period of labour and at least 24 hours during the postnatal period.</li> <li>6. During the magnesium therapy, knee-jerk reflex, diuresis and breathing must be monitored.</li> <li>7. 10-percent calcium gluconate must be available for cases of magnesium overdose.</li> <li>8. During the post-operation/postnatal period the fluid intake should not exceed 80 ml per hour (with the exception of cases of blood loss replacement therapy in haemorrhage).</li> <li>9. Pregnancy should be terminated within 24 hours after the diagnosis of severe preeclampsia/eclampsia is made.</li> <li>10. Endotracheal anaesthesia is contraindicated when AP is above 170/110 mm Hg.</li> <li>11. Epidural anaesthesia should be considered as the method of choice of anaesthesia for Caesarean section.</li> </ol> |

**From the WHO Manual (2011) (1)**

| <b>Condition</b>                        | <b>Standard</b>  |
|---|--|
| Treatment of postpartum haemorrhage (3) | <ol style="list-style-type: none"><li>1. An emergency care team of two obstetricians/gynaecologists, an anaesthesiologist, a nurse anaesthesiologist, a midwife, etc., should be available no later than 10 minutes after diagnosis.</li><li>2. For any form of obstetrical bleeding, regardless of BP and pulse parameters, venous access (I/v line) should be set up within five minutes.</li><li>3. In case of bleeding, the level of haemoglobin or haematocrit, the blood group and Rh-factor should be analysed for compatibility and blood coagulation.</li><li>4. BP, pulse and diuresis parameters, taken every 15 min, are the guiding criteria for blood volume replacement therapy.</li><li>5. In case of non-stop bleeding, after transfusion of three litres of liquids (crystalloids, colloids), transfusion of erythrocytes iso-group or blood of I (O), Rh negative should be initiated.</li><li>6. In case of the heavy form of uterus atony, a minimum dose of 20 UA oxytocin should be used.</li><li>7. If, in addition to hemodynamic instability, non-stop bleeding has reached a volume of 1500 ml laparotomy should be performed. It is important that laparotomy takes place no later than 30 minutes after decision.</li><li>8. During laparotomy (in case of atonic haemorrhage), before hysterectomy, the following steps to stop bleeding are to be taken: injection of Enzaprost intrauterus, sewing together of uterine artery/removal of uterus blood vessels. Repeated examination of maternal [generative] passages is to be carried out if bleeding continues after injections of high doses of uterotonics.</li><li>9. Before laparotomy, uterine bleeding should be controlled/decreased through bimanual compression of uterus or compression of an aorta abdominalis.</li><li>10. For women with prepartum bleeding, vaginal examination should be carried out only after placental presentation is excluded through ultrasound examination, or if there are preconditions for urgent interruption of pregnancy (delivery room should be prepared).</li></ol> |

**References**

1. Evaluating the quality of care for severe pregnancy complications. The WHO near-miss approach for maternal health. Geneva: World Health Organization; 2011 (<http://www.who.int/reproductivehealth/publications/monitoring/9789241502221/en/>, accessed 8 February 2016).
2. Standards of care for women's health in Europe. Obstetric and neonatal services. Brussels: European Board and College of Obstetrics and Gynaecology; 2014 (<http://www.ebcog.eu/doc/obstetric.pdf>, accessed 8 February 2016).
3. Making pregnancy safer in Uzbekistan. Maternal mortality and morbidity audit activities report 2002–2008. Copenhagen: World Health Organization Regional Office for Europe; ([http://www.euro.who.int/\\_\\_data/assets/pdf\\_file/0004/98797/MPS\\_UZB.pdf](http://www.euro.who.int/__data/assets/pdf_file/0004/98797/MPS_UZB.pdf), accessed 8 February 2016).

## Annex 7. Principles for interviewing

### Background principles

- The woman (or other person selected for interview) should be fully informed and have given consent before the interview. The principles of autonomy (participation in the interview is voluntary; the interviewee has the right to end the interview at any time) and privacy (non-disclosure of the name of the interviewee in any official report) should be respected.
- The interview should be conducted in a quiet place, if possible after discharge, to avoid intimidating the woman from discussing the care she received, and should follow the general rules and method for interviewing. When appropriate, relatives or close friends might also be interviewed to provide complementary information.
- The aim of the interview should be to collect informative, real facts and women's real perceptions and views, not just formal, superficial feedback.
- The aim of the questions posed should be to obtain a description of the management provided to the woman and also to determine whether the basic rights of the woman in hospital were respected (e.g. equity in access to care, effective communication, emotional support, respect and preservation of dignity).
- Interviewers should be skilled or trained to obtain information in a sensitive manner, without biasing the responses of the interviewee and to help respondents to recall facts, details and dates.
- They should learn not to upset respondents and to respond to questions or requests for information.
- Interviewers must ensure that the information they receive is confidential and that the woman's privacy is respected.
- It is crucial that interviewers remain neutral and do not impose their personal opinions or beliefs on the interviewees.
- Structured interview questions should be short, clear and in the local language with local terms. They should be phrased in a neutral way that does not suggest a "correct" answer; otherwise, the answer may be what the respondent thinks the interviewer wants, rather than what is true.
- Sensitive questions should be asked towards the end of an interview, once the interviewer has established a rapport with the respondent.
- The main content of the interview should be properly summarized and presented appropriately during the NMCR session (e.g. with relevant quotations).

## **Guide for interviewing women after childbirth**

### **1. Condition of the woman up to pregnancy**

Please give me some information about yourself:

Name, education, employment, where you live

Number of previous children

Any health problem or medical treatment before pregnancy, the kind and the outcome

### **2. Pregnancy**

Was your pregnancy planned or unplanned)?

What services did you receive during the pregnancy?

How did the pregnancy evolve? Did you have any illnesses? If yes, where and how were they treated?

### **3. Hospitalization**

When were you hospitalized? For what reason?

Who took you to the hospital? How and at what time of day?

Who was the first person you met in the maternity hospital? What service did she or he provide?

What happened in the hospital? Who provided which services and what kind of services?

How did your labour evolve? Who took care of you and how? Was any member of your family with you?

How did the birth proceed? What care was provided at childbirth?

Which members of your family were present at childbirth, and why?

What happened after the birth?

What do you think are the reasons for the course of events?

When were you discharged? What information did you receive?

### **4. Level of satisfaction with the health service and recommendations for other women, families and medical personnel**

Please give me your recommendations and wishes for improving the quality of the services in medical facilities that provide care during pregnancy and childbirth.

What is your view of the quality of care received? (Obtain details with different questions):

- physical infrastructure (e.g. rooms, services for personal hygiene);
- availability of staff, equipment and medicines;
- attitude of the maternity staff, information and communication, emotional support, respect for dignity and privacy, partnership in labour.

## Annex 8. “Door to door” analysis

### Key steps to be considered

The list of steps below should be familiar to the coordinator and the facilitator, to ensure accurate case reconstruction, from what happened between admission and discharge. The list should not be discussed item by item during an NMCR session, as this would waste time.

|  |   |
|--|---|
| <b>1. Admission</b>                              | <ul style="list-style-type: none"> <li>● When the woman arrived at the hospital, did her case fit your definition of a near-miss obstetrical emergency?</li> <li>● If not, did it later become a near miss, and when? Was there a delay before the woman was first seen by a staff member?</li> </ul>   |
| <b>2. Diagnosis</b>                              | <ul style="list-style-type: none"> <li>● Was the initial assessment of her condition technically adequate?</li> <li>● Was her medical condition (and complications) correctly diagnosed?</li> <li>● Was there any delay in making the diagnosis?</li> <li>● Was there any delay in communication among members of staff (e.g. between midwife and doctor on duty)?</li> <li>● Were all the necessary investigations (e.g. laboratory tests, X-ray) ordered?</li> <li>● Were all the necessary investigations carried out?</li> <li>● Were all the investigations necessary?</li> <li>● Was there any delay in carrying out and reporting investigations?</li> </ul>   |
| <b>3. Treatment</b>                              | <ul style="list-style-type: none"> <li>● Was the initial treatment adequate (e.g. setting up an intravenous line and ensuring that sufficient intravenous fluids were given to stabilize the woman’s condition)?</li> <li>● Was the subsequent treatment adequate (e.g. surgical intervention, drugs to manage complications or infection, blood transfusions)?</li> <li>● Was each element of patient management adequate and appropriate?</li> <li>● Was the treatment based on a treatment protocol?</li> <li>● Was the treatment given in accordance with the treatment protocol?</li> <li>● Was each of the problems identified dealt with properly?</li> <li>● Was there any delay in ordering the necessary treatments, e.g. because of a delay in key staff seeing the patient or in recognizing the need for treatment?</li> <li>● Was there any delay in giving the necessary treatment? For a major treatment, such as a caesarean section, break this down into stages: informing theatre staff, informing other essential staff, getting patient to the theatre, patient preparation, anaesthesia, operation.</li> </ul> |
| <b>4. Monitoring and further treatment</b>       | <ul style="list-style-type: none"> <li>● Was the correct follow-up treatment prescribed? Was it based on guidelines? Was it carried out as prescribed?</li> <li>● Was adequate monitoring ordered? Was it based on guidelines? Was it carried out as prescribed?</li> </ul>   |
| <b>5. Discharge</b>                              | <ul style="list-style-type: none"> <li>● Was the discharge diagnosis correct?</li> <li>● Was the timing of discharge appropriate?</li> <li>● Was adequate follow-up management after discharge clearly described? Was the follow-up management carried out as prescribed?</li> </ul>  |
| <b>6. Information available in medical files</b> | <ul style="list-style-type: none"> <li>● Was the information in the files adequate? Please list any specific information that should have been recorded but was not.</li> <li>● Was the information in the files complete? Please list any specific information that was missing.</li> </ul>  |
| <b>7. Other</b>                                  | <ul style="list-style-type: none"> <li>● Elements of care that are not be grouped under the above headings can be listed here.</li> </ul>   |

## Annex 9. Factors that can influence the quality of care

The list below should be familiar to the coordinator and the facilitator to ensure discussion of all relevant aspects but should not be discussed item by item during NMCR sessions.

|   |  |
|---|--|
| <p><b>1. Personnel</b></p>                | <ul style="list-style-type: none"> <li>● Qualifications: was the person who took a certain action qualified to do so?</li> <li>● Skills: was the person qualified but lacked the competence or skill to carry out certain tasks?</li> <li>● Availability:             <ul style="list-style-type: none"> <li>– permanent (e.g. the hospital does not have an anaesthetist or laboratory technician)</li> <li>– temporary (e.g. there is an anaesthetist, but he or she was on holiday)</li> <li>– staff roster (e.g. key staff were not on duty and therefore not available, or no member of – staff was designated to be on call)</li> <li>– staff residence (e.g. on-duty staff live far from the hospital and were unable to arrive in time)</li> </ul> </li> <li>● Supervision of junior hospital staff</li> <li>● Communication (between staff and between staff and patients)</li> <li>● Staff attitudes</li> </ul> <p>These factors apply to all hospital personnel involved in the chain of care, whatever their position. For example, a major delay in key activities may be due to a combination of smaller delays involving different staff at different stages of the care process. It is important to record the category of staff to which each problem applies, e.g. insufficient skill in handling certain complications or delays in responding.</p> |
| <p><b>2. Equipment</b></p>                | <ul style="list-style-type: none"> <li>● Availability             <ul style="list-style-type: none"> <li>– permanent (e.g. there is no vacuum extractor in the delivery room)</li> <li>– temporary (e.g. on that day, the sphygmomanometer could not be found; surgical operating instruments were not autoclaved or prepared for use after a previous operation; stocks of suture material or laboratory reagents were not monitored, and supplies were not ordered in time)</li> </ul> </li> <li>● Accessibility (e.g. the vacuum extractor is locked up)</li> <li>● Maintenance: not functioning or broken</li> <li>● Correct use</li> </ul> <p>Consider all types of equipment necessary for optimum case management of each near-miss case; specify any that was not functioning and when, and explore the reasons.</p>   |
| <p><b>3. Drugs</b></p>                    | <ul style="list-style-type: none"> <li>● Availability             <ul style="list-style-type: none"> <li>– always available in the hospital, operating theatre, emergency room, delivery room; personnel, e.g. pharmacy staff, on call and available to provide drugs;</li> <li>– temporarily unavailable (out of stock or locked up; the latter will also apply to 1)</li> </ul> </li> </ul> <p>Specify which drugs were not available, the time and why.</p> <ul style="list-style-type: none"> <li>● Accessibility (e.g. drug cannot be given by a midwife)</li> <li>● Expired or other reason</li> <li>● Correct use</li> </ul>  |
| <p><b>4. Guidelines and protocols</b></p> | <ul style="list-style-type: none"> <li>● Availability: guidelines and protocols not prepared or not obtained from higher levels to guide the elements of care</li> <li>● Accessibility: guidelines and protocols exist but are not prominently displayed in the relevant areas of the hospital (e.g. delivery room, operating theatre)</li> <li>● Correct use: guidelines and protocols are available but were not followed. This may also relate to training and supervision.</li> </ul>  |

|                                |   |
|--------------------------------|---|
| <b>5. Organization of care</b> | <ul style="list-style-type: none"> <li>● Organizational and management weaknesses (and strengths) may contribute to many of the above factors. For example, organization of care among different departments, internal protocols.</li> </ul> <p>Consider organizational management factors in each of the hospital departments that contribute to care.</p>   |
| <b>6. Respect for rights</b>   | <p>Avoidance of disrespect and abuse:</p> <ul style="list-style-type: none"> <li>● Access to care: economic (user fees), cultural and geographical accessibility</li> <li>● Information and communication: was the patient adequately informed? Were the patient's requests listened to?</li> <li>● Participation in care and collaboration: was the patient or her family able to participate actively in care? (e.g. partnership in labour, active support to the woman and collaboration in her care)</li> </ul> |



**Template B. Summary of underlying reasons and recommendations**

| Missed opportunity | Why? | But why? | But why? | But why? | Recommendation |
|--------------------|------|----------|----------|----------|----------------|
|                    |      |          |          |          |                |
|                    |      |          |          |          |                |
|                    |      |          |          |          |                |

A number of factors in each element of care may have contributed to a positive or negative outcome.

This form includes three “why” columns to encourage analysis in appropriate depth, a column for entering the recommendation and one line per case management problem.

**Template C. Follow-up of implementation of recommendations and action taken**

| Recommendation | Action(s) | Responsible(s) | Deadline | Implemented?<br>If not, why?<br>Next deadline |
|----------------|-----------|----------------|----------|---|
|                |           |                |          |   |
|                |           |                |          |   |
|                |           |                |          |   |
|                |           |                |          |   |

This form provides spaces for recording recommendations, the specific action(s) necessary to implement the recommendation, the responsible person(s) and the timelines. The last column should indicate whether action has been taken. If not, the reason should be recorded, with a new deadline.

## Annex 11. Example of a review of a near-miss case of eclampsia

### Case summary (from clinical records and logbooks)

N.Z., 22 years old, at 37 weeks' gestation, was admitted to the maternity hospital on 9 November at 12:40 with irregular contractions and generalized oedema. Blood pressure, 155/110 mm Hg; pulse, 86/min  
Proteinuria, 1.65 g/L

Fetus in longitudinal lie, cephalic presentation; fetal head level, 4/5; fetal heart rate, 146 beats/min

**Diagnosis at admission:** Primigesta, primipara, 37 weeks of gestation, severe pre-eclampsia

Nifedipine 10 mg was administered orally, and a loading dose of 20 mL 25% MgSO<sub>4</sub> was administered intravenously.

The patient was transferred to the department of pathology of pregnancy.

A continuous infusion of 100 mL of 25% MgSO<sub>4</sub> in 400 mL of saline solution was initiated at a rate of six or seven drops/min. After approximately 30 min, the patient's conditions had stabilized: blood pressure 140/90 mm Hg, no clinical signs or symptoms, normal fetal heart rate.

The clinical management plan was to monitor blood pressure, pulse and fetal heart rate continuously. In view of the stable condition of the patient and the ripened cervix (Bishop score, 8 points), it was decided to induce vaginal birth by amniotomy on the following day, 10 November.

On the day of admission, 9 November, at 22:45, the patient had eclamptic convulsions.

The midwife called the obstetrician and the anaesthesiologist immediately.

**Diagnosis:** Primipara, 37 weeks' gestation, eclampsia

The emergency team cleaned the airways, placed the woman in a lateral position, started oxygen therapy and administered 10 mL (2.5 g) of 25% MgSO<sub>4</sub> and 10 mg diazepam intravenously.

The patient was transferred to the intensive care unit, with continuous intravenous MgSO<sub>4</sub> infusion. Interruption of pregnancy was indicated.

At 23:50, an emergency caesarean section was performed, and a live boy was born (2654 g, 49 cm, Apgar score 7–8). Surgery was carried out with no technical difficulty. Postoperatively, MgSO<sub>4</sub> administration was continued for 24 h.

The patient was discharged from hospital in a satisfactory condition on 15 November with the child. At discharge, her blood pressure was 130/90 mm Hg.

## Interview

During the interview, N.Z. said that on 9 November at approximately half past five in the afternoon in the maternity ward, she experienced severe headache and vomited. She informed the midwife about her symptoms, and the midwife explained that many women vomit when the cervix dilates and reassured her, saying that everything was OK. The midwife did not inform the doctor about these symptoms. N.Z. also said: "When the drip (infusion) was placed, I felt quite uncomfortable. I went to the bathroom several times, and each time the midwife had to stop the infusion and re-start it, placing a new needle. Then I said to the midwife, 'It hurts every time you insert a needle. Can I rest and lie down without the drip? I do not want to have a needle re-inserted for this infusion every time.' I had very painful contractions....The midwife agreed and removed the infusion system."

At about 22:00, N.Z. reported having a severe headache. She does not remember what happened afterwards. When she regained consciousness, her baby boy was lying beside her, and she was told that he was delivered by caesarean section. She said, "I was told that I had convulsions, which is considered a very severe complication of pregnancy, and that I could have died. But the doctors saved my life and that of my child. I am grateful to them for their help. I think that if I had come to the hospital earlier, this complication would not have happened. Maybe I thought I could give birth to my baby by myself; now I know that I must be more careful next time. The most important thing is that my baby is with me, he is alive and healthy; this is the most important thing for me."

## Case reconstruction by the staff involved in its management\*

During the case reconstruction, from admission to discharge, the staff revealed that the patient experienced life-threatening symptoms (vomiting and severe headache) in the pathology department, but the doctor was not informed or called.

MgSO<sub>4</sub> was not given continuously but was interrupted periodically and was discontinued at approximately 18:00. The woman thus received MgSO<sub>4</sub> for only 5 of the 9 h she spent in the pathology department. The midwife said that the patient refused re-insertion of the needle and the intravenous system.

## Case analysis by all participants\*

### Elements of care that went well

During the episode of eclampsia, the patient received the appropriate care and treatment, and the baby was promptly delivered by caesarean section. The patient was discharged in satisfactory condition with a healthy baby.

### Missed opportunities

The main elements that required improvement were infusion of MgSO<sub>4</sub> intermittently and then discontinued and that the doctor was not informed about the patient's symptoms. The "Why? But why?" analysis indicated that the midwives in the pathology department are not trained and do not know how to insert an intravenous catheter. They removed and re-inserted the needle every time the patient had to get out of the bed. This was both uncomfortable and stressful. Infusing MgSO<sub>4</sub> continuously without an infusion pump is complicated, as it is difficult and inefficient to count six or seven drops/min with a drip infusion system: it runs either too fast or too slow. Infusion pumps are not available in the pathology department and are used only in the intensive care unit. There are thus not enough infusion pumps in the facility to cover the needs.

\* **Note:** Case reconstruction and analysis are usually not documented in order to facilitate the discussion of sensitive details.

### Template A. Elements of care that went well and missed opportunities

|   |                        |                |
|---|------------------------|----------------|
| Type of near-miss event: eclampsia  | NMCR session number: 8 | Date: 02/12/15 |
| <b>Elements of care that went well</b>  |                        |                |
| <ol style="list-style-type: none"> <li>1. During the episode of eclampsia, the patient received the appropriate care and treatment.</li> <li>2. Her infant was promptly delivered by caesarean section.</li> <li>3. The patient was discharged in satisfactory condition with the healthy child.</li> </ol> |                        |                |
| <b>Elements of care that did not go well and missed opportunities</b>   |                        |                |
| <ol style="list-style-type: none"> <li>1. MgSO<sub>4</sub> infusion was provided intermittently and then discontinued.</li> <li>2. The doctor was not informed about the symptoms of impending eclampsia.</li> </ol>  |                        |                |

### Template B. Summary of underlying reasons and recommendations

| Missed opportunity   | Why?   | But why?  | But why?  | But why?   | Recommendations   |
|--|--|---|---|--|---|
| Administration of MgSO4 was interrupted  | Infusion was stopped at the patient's request  | Each time the woman got out of bed to go to the toilet, the infusion was stopped and was then re-started by reinsertion of a needle. Eventually, the woman refused to have the needle reinserted again. | An intravenous catheter for continuous administration of MgSO4 was not used.  | Midwives in the pathology department are not trained to insert intravenous catheters for continuous administration of medicines. | 1. Ensure that key staff have the knowledge and skill to insert a catheter.   |
| Administration of MgSO4 was not continuous or regular.   | It is difficult to maintain infusion of six or seven drops/min continuously with an infusion drip. | Without an infusion pump, the speed of infusion changes with the patient's movements and is either too fast or too slow.  | The drip was used because there are no infusion pumps in the pathology department. The number of infusion pumps in the facility is insufficient. (Infusion pumps are available in the intensive care unit). |  | 2. Administer MgSO4 intravenously only with an infusion pump.   |
| The doctor on duty was not informed about the symptoms (severe headache, vomiting) of a woman with severe pre-eclampsia. | The midwife was not familiar with the symptoms of impending eclampsia.                             | Some staff members do not know or remember how to recognize the symptoms of severe pre-eclampsia.   | Training in the management of severe pre-eclampsia was organized, but no reminders or visual aids were displayed in the ward or department.   |  | 3. Prepare or adapt and distribute visual reminders of the symptoms of severe pre-eclampsia and when a doctor should be called. |

### Template C. Follow-up of implementation of recommendations and actions

| Recommendation  | Action(s)  | Person(s) responsible   | Deadline      | Done? If not, why? Next deadline |
|---|--|---|---------------|----------------------------------|
| 1. Ensure that key staff have the knowledge and skill to insert a catheter.   | Train midwives in the pathology department in inserting intravenous catheters (two practice sessions).   | D.M. Head nurse in the intensive care unit<br>S.S. Midwife in No. 2 delivery ward | 21 November   | Yes                              |
| 2. Administer MgSO <sub>4</sub> intravenously only with an infusion pump.   | Move one infusion pump temporarily from the intensive care unit to the pathology department.   | S.B.V. Head nurse   | 26 November   | Yes                              |
|   | Train midwives in the pathology department in the use of infusion pumps (two sessions)   | L.K. Midwife trainer  | 2 December    | Postponed to 16 January          |
|   | Submit a written request to the administration for procurement of six additional infusion pumps.   | I.P.S. Director of the perinatal centre   | Within 1 week | Yes                              |
| 3. Prepare or adapt and distribute visual reminders of the symptoms of severe pre-eclampsia and when a doctor should be called. | Prepare a reminder (on A4 paper) about threatening symptoms of severe pre-eclampsia, indicating that midwives should inform a doctor if a woman has such symptoms. | V.K. Midwife  | 16 December   | Yes                              |
|   | Place copies of the reminder on the work tables of midwives and doctors in the pathology and admission departments and in the delivery wards.                      | Head midwives of the pathology and admission departments                          | 21 December   | Yes                              |

## Annex 12. Suggestions for reporting

| Type of report  | What to report  | To whom   |
|---|---|---|
| Each near-miss case   | <ul style="list-style-type: none"> <li>● Case summary</li> <li>● Interview with the woman</li> <li>● All completed case analysis templates (including “Why, but why” and recommendations)</li> </ul>  | <ul style="list-style-type: none"> <li>● Create a folder, and store it in a secure place in the facility.</li> <li>● Consider using a logbook for key information (case number, date, type, recommendation, notes).</li> </ul>  |
| Internal report for the facility (every 6–12 months)            | <ul style="list-style-type: none"> <li>● Number of sessions</li> <li>● Types of near-miss cases</li> <li>● Staff who participated</li> <li>● Number and types of recommendations agreed</li> <li>● Number and types of recommendations implemented</li> <li>● Other achievements (e.g. health outcomes)</li> <li>● Constraints</li> </ul> | <ul style="list-style-type: none"> <li>● All the hospital staff at all levels involved in the care of mothers and newborns</li> </ul>   |
| External report to regional or national level (every 12 months) | <ul style="list-style-type: none"> <li>● Number of facilities</li> <li>● Number of sessions</li> <li>● Action taken</li> <li>● Achievements (specific, measurable)</li> <li>● Recommendations that require action at regional or national level (e.g. preparing or updating national guidelines)</li> </ul>                               | <ul style="list-style-type: none"> <li>● Professional societies, local, regional and/or national health care planners, policy-makers and politicians</li> <li>● Ministry of health</li> <li>● Health care professionals in all disciplines, including obstetricians, midwives, anaesthetists and pathologists, at local and national levels</li> <li>● Leaders in other health care systems, such as social security and the private sector</li> <li>● Health promotion and education experts</li> <li>● Public health or community health departments</li> <li>● Academic institutions</li> <li>● National or local advocacy groups</li> <li>● The media</li> <li>● Representatives of faith or cultural institutions or other opinion formers who could facilitate beneficial changes in local practice and organization of care</li> </ul> |
| External report at international level (every 1–2 years)        | <ul style="list-style-type: none"> <li>● Number of sessions</li> <li>● Action taken</li> <li>● Achievements (specific, measurable)</li> <li>● Recommendations that require action at national level (e.g. preparing or updating national guidelines)</li> </ul>   | <ul style="list-style-type: none"> <li>● WHO and other United Nations agencies</li> <li>● Development partners</li> </ul>   |

## Annex 13. Types of report for dissemination of results

### **Facility level**

- Internal reports
- Reports from internal workshops
- PowerPoint presentations
- Posters
- Other (see list below)

### **Sub-national or national level**

- Reports from national and sub-national workshops
- PowerPoint presentations
- Scientific articles
- Proceedings of conferences, meetings and congresses
- Posters
- Web sites
- Newsletters and bulletins
- Fact sheets
- Press releases
- Other media
- Other

### Notes for effective reporting:

- Long, expensive, detailed reports are of no use if they cannot be widely disseminated.
- A short executive summary at the beginning of a report facilitates dissemination of the main results.
- Content can be highlighted in boxes and with images.
- If appropriate, an introduction by the ministry of health or the leaders of health care professional organizations could be added.

## Annex 14. Examples of basic monitoring indicators (1,2)

Monitoring indicators for NMCR have not been fully determined/validated. The following is a list with examples of possible indicators, that should be adapted, or further refined, for use at local level. Proposed core indicators are highlighted with the symbol “▶”.

| NMCR Facility reporting form   |   |
|--|---|
| Facility name:<br>Monitoring period (typically 6–12 months):   |   |
| Indicator  | Proposed targets                                    |
| <p><b>Process</b></p> <p>▶ Number of NMCR sessions in the given period</p> <p>At least two midwives participated in each session</p> <p>Proportion of NMCR sessions in which the interview with the woman (or her relatives) was included</p>  | <p>12 in 1 year*</p> <p>Yes</p> <p>At least 85%</p> |
| <p><b>Description of cases</b></p> <p>Type of NM cases (by disease category)</p>   | <p>Target as for expert evaluation**</p>            |
| <p><b>Areas for improvement identified</b></p> <p>Number identified, by type</p> <ol style="list-style-type: none"> <li>Personnel</li> <li>Drugs</li> <li>Equipment</li> <li>Protocols</li> <li>Organization and administration</li> <li>Rights of women: effective communication, emotional support, respect and dignity</li> </ol> | <p>Target as for expert evaluation**</p>            |

**NMCR Facility reporting form**

**Facility name:**

**Monitoring period (typically 6–12 months):**

**Development of recommendations**

▶ Number of recommendations relevant to the facility developed

At least 2 for every NMCR session

Number of recommendations relevant to the facility developed by type

Target as for expert evaluation\*\*

- a. Personnel
- b. Drugs
- c. Equipment
- d. Protocols
- e. Organization and administration
- f. Rights of women: effective communication, emotional support, respect and dignity

Proportion of developed recommendations concerning the national/regional level

Maximum 10% of recommendations

Number of developed recommendations concerning the national/regional level, by type

Target as for expert evaluation\*

- a. Personnel
- b. Drugs
- c. Equipment
- d. Protocols
- e. Organization and administration
- f. Rights of women: effective communication, emotional support, respect and dignity

**Implementation of recommendations**

▶ Proportion of recommendations fully implemented

At least 70%

▶ Proportion of recommendations partially implemented

At least 80%

Proportion of recommendations fully and partially implemented by type

|                                 | Total | Fully | Partially |
|---------------------------------|-------|-------|-----------|
| Personnel                       |       |       |           |
| Drugs                           |       |       |           |
| Equipments                      |       |       |           |
| Protocols                       |       |       |           |
| Organisation and administration |       |       |           |
| Rights of women                 |       |       |           |

Target as for expert evaluation\*

\* The target number may differ depending on the size of the maternity and the occurrence of NM cases  
 \*\* Expert(s) evaluation: For these indicators the achievement of the target should be evaluated by external experts since a common pre-defined target cannot be applied to all settings.

**References**

1. Baltag V, Filippi V, Bacci A. Putting theory into practice: the introduction of obstetric near-miss case reviews in the Republic of Moldova. *Int J Qual Health Care.* 2012;24:182–8.
2. Filippi V, Brughla R, Browne E, Gohou V, Bacci A, De Brouwere V, et al. Obstetric audit in resource-poor settings: lessons from a multi-country project auditing “near miss” obstetrical emergencies. *Health Policy Plann.* 2004;19:57–66.

## Annex 15. Template for synthetic reporting on the implementation of the NMCR approach at country level

| NMCR Synthetic Report Form – Implementation at country level |                    |                   |                 |
|--|--------------------|-------------------|-----------------|
| Country  | <i>Add country</i> | Year of reporting | <i>Add year</i> |

### Part 1. Activities

| Fundamental Steps  | Yes/<br>No | Date (link to date<br>of workshop, if<br>necessary) | Supporting<br>partners |
|--|------------|---|------------------------|
| 1. Key clinical guidelines revised & endorsed  |            |   |                        |
| 2. NMCR concept introduced   |            |   |                        |
| 3. National support secured  |            |   |                        |
| 4. Technical support from external expert(s) secured   |            |   |                        |
| 5. NMCR National working group established   |            |   |                        |
| 6. Regulatory framework established  |            |   |                        |
| 7. National action plan for the pilot phase developed  |            |   |                        |
| 8. Operational definition and standards developed  |            |   |                        |
| 9. Guidance material prepared and distributed  |            |   |                        |
| 10. Coordinators trained   |            |   |                        |
| 11. Interviewers trained   |            |   |                        |
| 12. Pilot implementation started (# of maternities)  |            |   |                        |
| 13. 1st International experts' quality assessment on the pilot phase, and recommendations      |            |   |                        |
| 14. Action plan after 1st quality assessment   |            |   |                        |
| 15. Actions to improve quality of the process taken (provide details- expand as needed)        |            |   |                        |
| 16. 2nd International experts' quality assessment on the pilot phase, and recommendations      |            |   |                        |
| 17. Action plan after 1st quality assessment   |            |   |                        |
| 18. Decision to scale up taken   |            |   |                        |
| 19. National action plan for scaling up phase developed  |            |   |                        |
| 20. Scaling up started   |            |   |                        |
| 21. Cascade training completed   |            |   |                        |
| 22. 1st International experts' quality assessment on the scaling up phase, and recommendations |            |   |                        |
| 23. Action plan after the 1st quality assessment   |            |   |                        |

|  |                |  |                            |
|--|----------------|--|----------------------------|
| 24. Actions to improve quality of the process taken (provide details- expand as needed)                            |                |  |                            |
| 25. 2nd International experts' quality assessment on the scaling up phase, review of progress, and recommendations |                |  |                            |
| 26. Action plan after 2nd quality assessment   |                |  |                            |
| 27. Actions to improve quality of the process taken (provide details)  |                |  |                            |
| 28. Dissemination of information on the NMCR (provide details)   |                |  |                            |
| 29. Other (specify)  |                |  |                            |
| 30. Other (specify)  |                |  |                            |
| <b>Main workshops</b>  | <b>Yes/ No</b> | <b>Date (link to date of workshop, if necessary)</b> | <b>Supporting partners</b> |
| 1. Inter-country regional workshop   |                |  |                            |
| 2. National workshop   |                |  |                            |
| 3. First technical workshop(s)   |                |  |                            |
| 4. Additional technical workshop(s)  |                |  |                            |
| • 2nd  |                |  |                            |
| • 3rd  |                |  |                            |
| • Others   |                |  |                            |
| 5. 1st External quality assessment of the pilot phase - restitution workshop                                       |                |  |                            |
| 6. 1st Quality assessment restitution workshop   |                |  |                            |
| 7. 2nd External quality assessment of the pilot phase - restitution workshop                                       |                |  |                            |
| 8. 2nd Quality assessment restitution workshop   |                |  |                            |
| 9. Dissemination of information workshops (provide details)  |                |  |                            |
| 10. 1st External quality assessment of the scale up phase – restitution workshop                                   |                |  |                            |
| 11. 1st Quality assessment restitution workshop  |                |  |                            |
| 12. 2nd External quality assessment of the scale up phase – restitution workshop                                   |                |  |                            |
| 13. 2nd Quality assessment restitution workshop  |                |  |                            |
| 14. Dissemination of information workshops (provide details)   |                |  |                            |
| 15. Others (specify)   |                |  |                            |

## Part 2. Results

|  |                   |   |
|--|-------------------|---|
| <b>Number of maternities implementing NMCR</b>   | <i>Add number</i> | <i>Add total number of maternity hospitals in the country</i> |
| <b>Number of total staff trained</b>   |                   |   |
| <b>Number of total recommendations developed</b>   | <i>Add number</i> |   |
| <b>Measured impacts on process outcomes (e.g. number of obstetric hysterectomies)*</b>       |                   |   |
| <b>Measured impacts on health outcomes (maternal and perinatal morbidity and mortality)*</b> |                   |   |

\* Data on process and health outcomes need to be interpreted based on different factors (local epidemiology, case mix, coverage area etc)

## Part 3. Dissemination of results

|  | Yes/No | Date (link to date of workshop, if needed) |
|--|--------|--|
| <b>National report</b>   |        |  |
| <b>Other publications</b> <ul style="list-style-type: none"> <li>● Newsletters and bulletins</li> <li>● Fact sheets</li> <li>● Press releases or Other Media</li> <li>● Scientific articles</li> <li>● Web-site</li> <li>● Others</li> </ul> |        | <i>Please include full citation</i>        |

**Part 4. Challenges**

| List main challenges encountered | Add possible solution |
|----------------------------------|-----------------------|
| 1.                               |                       |
| 2.                               |                       |
| 3.                               |                       |
| 4.                               |                       |
| 5.                               |                       |
| 6.                               |                       |
| 7.                               |                       |
| 8.                               |                       |
| 9.                               |                       |
| 10.                              |                       |

**Part 5. Additional information**

## Annex 16. Checklist to assess the quality of the NMCR cycle at hospital level and matrix to develop local recommendations

| <b>Checklist to assess the quality of the NMCR cycle at hospital level and matrix to develop local recommendations</b>  |
|---|
| Facility name _____ Date _____  |
| <p><b>Instructions</b></p> <p>Sources of information:</p> <ul style="list-style-type: none"> <li>● Direct observation and evaluation of a NMCR session</li> <li>● Discussion with participants</li> <li>● Discussion with coordinators and managers               <ul style="list-style-type: none"> <li>– Documents from the NMCR sessions: Records/notes of the sessions: templates, cases summaries, summary of the interviews with women and other care-takers (family, documents in support of the recommendations and their implementation, other related documentation (photo etc.)</li> </ul> </li> <li>● Other related documents:</li> </ul> <p>National documents</p> <ul style="list-style-type: none"> <li>– National policies, and guidance documents</li> <li>– National clinical guidelines</li> <li>– National documents related to quality assurance, monitoring and supervision</li> <li>– National summary reports on NMCR implementation</li> </ul> <p>Local documents</p> <ul style="list-style-type: none"> <li>– Regional/local policies, and guidance documents</li> <li>– Local clinical protocols and standards for care provision</li> <li>– Local documents related to quality assurance, monitoring and supervision</li> <li>– Local summary reports</li> </ul> <p>Methods of scoring:</p> <p>1) Score each single item as follows: Score 0= totally inappropriate; Score 1= major problems; Score 2= some deficiencies; Score 3= appropriate.</p> <p>2) In the blue row calculate the mean of the scores for each key item in the group. This is the score for that group of items.</p> |

|   | <b>Score</b> | <b>Comments</b> |
|---|--------------|-----------------|
| <b>INTERNAL ORGANISATION/PREPARATION</b>  |              |                 |
| 1. A local written procedure to implement the NMCR cycle exists   |              |                 |
| 2. Support from management is adequate  |              |                 |
| 3. Regular meetings are held  |              |                 |
| 4. Each meeting has adequate duration   |              |                 |
| 5. All key staff involved in the NM case is invited to the session  |              |                 |
| 6. Very limited (and justified) participation of people who were not involved in the management of the NM case reviewed |              |                 |
| 7. All material need is prepared before the session   |              |                 |

|   | Score | Comments |
|---|-------|----------|
| <b>CASE IDENTIFICATION AND SELECTION</b>  |       |          |
| 8. The agreed NM definition is used (same definition in all the country)  |       |          |
| 9. The NM cases are correctly identified  |       |          |
| 10. A NM case is appropriately selected for review among those identified   |       |          |
| <b>GROUND RULES</b>   |       |          |
| 11. Ground rules for the NMCR are respected, especially confidentiality, respect of other people's opinion and refrain from blaming single individuals  |       |          |
| <b>NMCR SESSION: CASE PRESENTATION</b>  |       |          |
| 12. The case is appropriately summarised and presented by one participant (paper copies; flip charts; slides)   |       |          |
| 13. A "door to door" reconstruction, with all relevant details, is provided by all staff involved in care provision   |       |          |
| 14. The clinical records of the patient, whose case is reviewed, are available during the meeting, if additional information is needed  |       |          |
| <b>NMCR SESSION: INCLUSION OF USERS VIEWS</b>   |       |          |
| 15. The opinions of the woman (i.e. informative contents on real facts, and her perceptions and views), and if appropriate of relatives and/or friends, is collected (interview), for each NM case reviewed |       |          |
| 16. The interview(s) is/are appropriately summarised and presented  |       |          |
| 17. The key findings from the interview (i.e. same definition as above) are appropriately taken into consideration in the case analysis   |       |          |
| 18. The key findings (i.e. same definition as above) from the interview are appropriately taken into consideration for the prioritisation and development of solution                                       |       |          |
| <b>NMCR SESSION: CASE ANALYSIS</b>  |       |          |
| 19. The case-analysis is performed following a structured analytical approach   |       |          |
| 20. The case management is analysed from admission to discharge: a "door to door" approach is used  |       |          |
| 21. The case is reviewed comparing actual management versus evidence (clinical guidelines, protocols and standards)   |       |          |
| 22. The positive aspects of care provision ("what we did good") are identified and documented   |       |          |
| 23. The staff is praised for the positive aspects of care provision   |       |          |
| 24. The critical aspects of care ("what did not go well") are appropriately identified, focusing on the most important issues ("getting to the real point")   |       |          |
| 25. The real underlying reasons for substandard care ("why but why?") are identified, discussed and documented  |       |          |
| 26. The facilitator ensures that ground rules are respected, all steps of the session are completed, notes are taken  |       |          |

|   | Score | Comments |
|---|-------|----------|
| 27. Staff of all types and roles (including midwives and nurses) actively and openly participate in the case analysis                                   |       |          |
| 28. The results of the case-analysis are documented (using the templates)   |       |          |
| <b>NMCR SESSION: DEVELOPMENT OF RECOMMENDATIONS</b>   |       |          |
| 29. A list of SPECIFIC recommendations linked to the NM case is always developed, including responsible people and timelines                            |       |          |
| 30. The recommendations target the main problem (s) and the main underlying factors   |       |          |
| 31. Most of the recommendations refer to actions to be carried forward at the hospital performing the review  |       |          |
| 32. The recommendations use as reference clinical guidelines, protocols and standards   |       |          |
| 33. The recommendations are SMART (specific, measurable, achievable, realistic, time-bound)   |       |          |
| 34. The recommendations give due consideration to women's rights in hospital: effective communication, emotional support, respect and dignity           |       |          |
| 35. The recommendations include an adequate division of tasks among hospital staff  |       |          |
| 36. Recommendations that need action at regional/national level are effectively identified  |       |          |
| 37. The facilitator ensures that ground rules are respected, all steps of the session are completed, notes are taken                                    |       |          |
| 38. Staff of all types and roles (including midwives and nurses) participate actively and openly  |       |          |
| 39. The recommendations are documented (using the templates)  |       |          |
| <b>IMPLEMENTATION OF RECCOMENDATIONS</b>  |       |          |
| 40. The agreed recommendations are implemented (at least 75%)   |       |          |
| 41. Managers/local health authorities actively support implementation of recommendations  |       |          |
| 42. The implementation of recommendations is documented (using the template)  |       |          |
| <b>NMCR SESSION: FOLLOW UP</b>  |       |          |
| 43. The NMCR session starts with a follow up of the previous session, checking that recommendations have been implemented                               |       |          |
| 44. In case the agreed actions were not taken, reasons are discussed, and a new recommendation is developed, including responsible people and timelines |       |          |

|  | Score | Comments |
|--|-------|----------|
| <b>DOCUMENTATIONS ON THE NMCR CYCLE AND EFFECTIVE DIFFUSION OF RESULTS - AT FACILITY LEVEL</b>   |       |          |
| 45. A folder is kept for each NM case containing all key documentation, including the follow up phase (see manual); cases are recorded in a register/log book  |       |          |
| 46. At hospital level, an appropriate summary of relevant information regarding the NMCR cycle is regularly disseminated and discussed, without compromising confidentiality, among staff, managers, and health authorities (see manual) |       |          |
| 47. Effective communication of key information is provided by hospital coordinators to national coordinator(s)   |       |          |
| <b>ENSURING QUALITY IN THE NMCR CYCLE</b>  |       |          |
| 48. Collaboration of the local team with the national/regional coordinator has been effective  |       |          |
| 49. Periodical evaluations of the quality of the NMCR has been planned   |       |          |
| 50. Previous recommendations from quality assessment has been taken into consideration and translated into actions   |       |          |

## Summary table

|   |
|---|
| <p><b>Main strengths:</b></p> <ol style="list-style-type: none"> <li>1.</li> <li>2.</li> <li>3.</li> <li>4.</li> </ol>  |
| <p><b>Main weaknesses:</b></p> <ol style="list-style-type: none"> <li>1.</li> <li>2.</li> <li>3.</li> <li>4.</li> </ol> |
| <p><b>Comments:</b></p> <ol style="list-style-type: none"> <li>1.</li> <li>2.</li> <li>3.</li> <li>4.</li> </ol>        |

**Matrix for recommendations for improving the quality of the NMCR cycle in a hospital (extend as necessary)**

| Priorities for improvement | Action agreed | Person responsible | Timeline |
|----------------------------|---------------|--------------------|----------|
|                            |               |                    |          |
|                            |               |                    |          |
|                            |               |                    |          |
|                            |               |                    |          |
|                            |               |                    |          |
|                            |               |                    |          |

Annex 17 . Matrix for a national action plan after a quality assessment

| Identified priority | Action(s) agreed | Person or organization responsible | Partners | Timelines |
|---------------------|------------------|------------------------------------|----------|-----------|
|                     |                  |                                    |          |           |
|                     |                  |                                    |          |           |
|                     |                  |                                    |          |           |
|                     |                  |                                    |          |           |
|                     |                  |                                    |          |           |

## **The WHO Regional Office for Europe**

The World Health Organization (WHO) is a specialized agency of the United Nations created in 1948 with the primary responsibility for international health matters and public health. The WHO Regional Office for Europe is one of six regional offices throughout the world, each with its own programme geared to the particular health conditions of the countries it serves.

### **Member States**

Albania  
Andorra  
Armenia  
Austria  
Azerbaijan  
Belarus  
Belgium  
Bosnia and Herzegovina  
Bulgaria  
Croatia  
Cyprus  
Czech Republic  
Denmark  
Estonia  
Finland  
France  
Georgia  
Germany  
Greece  
Hungary  
Iceland  
Ireland  
Israel  
Italy  
Kazakhstan  
Kyrgyzstan  
Latvia  
Lithuania  
Luxembourg  
Malta  
Monaco  
Montenegro  
Netherlands  
Norway  
Poland  
Portugal  
Republic of Moldova  
Romania  
Russian Federation  
San Marino  
Serbia  
Slovakia  
Slovenia  
Spain  
Sweden  
Switzerland  
Tajikistan  
The former Yugoslav  
Republic of Macedonia  
Turkey  
Turkmenistan  
Ukraine  
United Kingdom  
Uzbekistan

### **World Health Organization Regional Office for Europe**

UN City, Marmorvej 51, DK-2100 Copenhagen Ø, Denmark

Tel.: +45 45 33 70 00 Fax: +45 45 33 70 01 Email: [euwhocontact@who.int](mailto:euwhocontact@who.int)

Website: [www.euro.who.int](http://www.euro.who.int)