

# Maternal near-miss case reviews: the UK approach

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The UK has a well-established programme of Confidential Enquiries into Maternal Deaths and a national system for research into near-miss maternal morbidities, the UK Obstetric Surveillance System. The addition of a programme of near-miss case reviews, the Confidential Enquiries into Maternal Morbidity, permits a complete examination of the incidence, risk factors, care and outcomes of the severest complications in pregnancy, and enables the lessons learnt to improve future care to be identified

more quickly. This in turn allows for more rapid inclusion of recommendations into national guidance and hence the potential of better health for both women and babies.

**Keywords** Case reviews, confidential enquiry, near miss, severe maternal morbidity.

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## Introduction

The UK is uniquely positioned in having not only a world-renowned Confidential Enquiry into Maternal Death (CEMD),<sup>1</sup> which has operated continually since 1952, but also a national system to conduct research into rare and severe pregnancy complications, the UK Obstetric Surveillance System (UKOSS).<sup>2</sup> The CEMD, now run by MBRRACE-UK and described in a linked paper,<sup>1</sup> is an essential part of the patient safety and risk management structure within UK maternity services, and has had important positive impacts on maternal deaths from specific causes,<sup>3</sup> notably thromboembolic disease, and among specific vulnerable groups, such as Black African women. Participation in MBRRACE-UK is mandatory in England. UKOSS is a well-established data collection system that operates throughout obstetric units in the UK, and allows for research and audit covering a changing series of uncommon pregnancy complications, including specifically 'near-miss' maternal morbidities.<sup>2</sup> Participation in UKOSS is not mandatory, but is undertaken as part of hospitals' commitment to ongoing improvement in quality evidence-based care. By collecting tailored information on specific near-miss morbidities, UKOSS can be used to address a wide range of research questions that cannot be answered through studies using routine hospital data, as

well as audit care against national guidelines. UKOSS studies can generate information on disease incidence or prevalence, risk and prognostic factors, variations in management as well as maternal and perinatal outcomes.<sup>4</sup> UKOSS therefore complements and extends the utility of surveillance of maternal deaths, providing denominator data and allowing for calculation of case fatality rates and examining risk factors associated with mortality.<sup>5</sup>

UKOSS identifies near-miss cases through a routine monthly mailing to nominated reporting midwives, obstetricians and anaesthetists in all consultant obstetrician-led maternity units in the UK. Clinical staff are asked to indicate on their reporting card whether there have been any women with specific severe morbidities admitted to their unit over the previous month. Notably, they are also asked to return their report card indicating if there have been no cases, in this way participation rates can be monitored, and an average of 93% of cards are returned each month. The majority of cards are returned within a month of mailing, which represents a maximum of two months from the occurrence of the case. It is important to confirm when there have been no cases through this negative surveillance method, as near-miss morbidities are rare, and a few missed cases may impact on incidence estimates. When a clinician reports a near-miss case, they are then sent a data collection form collecting anonymous information on the

woman's demographic and clinical characteristics, management and outcomes. For some studies, data are also collected on comparison women, providing information representative of the population of women giving birth as a whole, and so allowing for quantification of risk associated with maternal demographic and other characteristics.

The conditions studied through UKOSS change over time, according to the key questions and challenges identified from within UK maternity services. No attempt is made to define severe maternal morbidity as an entity, or to conduct ongoing surveillance of an unchanging list of conditions. This topic-based approach to study of near-miss conditions allows for new studies to be introduced when there are specific clinical questions to be addressed, prevents data collection fatigue, and minimises the data collection burden on reporting clinicians. Examples of near-miss conditions studied through UKOSS include uterine rupture,<sup>6</sup> eclampsia,<sup>7</sup> pulmonary embolism<sup>8</sup> and placenta accreta,<sup>9</sup> and the system was used to introduce a rapid study of pregnant women admitted to hospital with influenza A H1N1 during the 2009 pandemic.<sup>10</sup>

### The added value of near-miss case reviews to confidential enquiries into maternal deaths

The two UK systems described above allow for surveillance studies of both maternal deaths and near-miss events, and for confidential case reviews of maternal deaths. Confidential case reviews, more commonly known as confidential enquiries, enable detailed examination of the quality of care of individual cases against national guidelines or accepted best practice by a multidisciplinary group of independent experts.<sup>11</sup> In the UK, where maternal deaths are uncommon, it is increasingly recognised that the events surrounding individual maternal deaths may be unique. Near-miss maternal morbidities are more common, and therefore confidential enquiries into maternal morbidity may generate more generalisable messages to improve care, and allow for a more rapid review and reporting cycle. Additionally, the care of women who survive can be compared with that of those who die.<sup>5</sup> It is clear that near-miss complications can have very long-lasting impacts, both mental and physical, on women and their partners, and near-miss case reviews have the potential to allow for the development of recommendations to prevent both short-term and long-term additional morbidity. Because the women concerned survive, near-miss case reviews can also be seen as less threatening by the staff involved, and, perhaps most importantly, allow for the perspectives of women and their partners on their care to be taken into account.

### The UK Confidential Enquiries into Maternal Morbidities

The topic-based approach to study of near-miss conditions through UKOSS has also been adopted for the UK Confidential Enquiries into Maternal Morbidities (CEMM). A different near-miss condition is chosen each year for the CEMM, on the basis of an open call for topic proposals.<sup>1</sup> Individual clinicians, members of the public, voluntary organisations or professional groups can make suggestions about which near-miss condition should be investigated on a UK-wide basis. The final topic is chosen by an Independent Advisory Group on the basis of its importance in terms of the burden of morbidity, the availability of national standards against which to assess care and so the potential for an impact on improved care and improved patient outcome, and the practicality of identifying cases. For many, but not necessarily all, CEMM topics, cases can be identified through a UKOSS study, so giving the added advantage of a full description of the epidemiology and management of all women with the condition, alongside detailed confidential enquiries on a sample of cases.

After a suitable topic has been chosen, the methodology used by the CEMM is, with the addition of a Topic Expert Group, identical to that of the CEMD. A representative sample of near-miss cases is selected. Anonymous copies of a full set of the woman's case records are obtained from the hospital caring for her, along with statements from the midwives and doctors involved in each near-miss case, giving their perspectives on the woman's care and the lessons learnt. In addition, copies of any internal reviews conducted by the hospital concerned are also obtained. The care provided to the woman, as documented in these records, is then assessed by a multidisciplinary group of independent experts, including midwives, obstetricians, anaesthetists, pathologists, general practitioners, psychiatrists, intensive care specialists, emergency medicine specialists, obstetric physicians and physicians from other specialties such as cardiology, neurology and infectious diseases, as appropriate. Care is assessed against relevant national guidance from organisations including the National Institute for Health and Care Excellence, the Royal College of Obstetricians and Gynaecologists, the Royal College of Midwives, the Obstetric Anaesthetists Association and the Association of Anaesthetists of Great Britain and Ireland. Assessment of full sets of case notes as well as records of any in-hospital investigation gives added value over a simple audit against a set of standards, as all aspects of care can be examined in full, including comparison with accepted best practice where no standards exist. In addition, confidential enquiry using this approach allows for system-level issues to be

identified, which need to be addressed by high-level policy actions and are unlikely to be identified by simple audits. Lessons learnt to improve future care are drawn together in an annual report together with the lessons from the CEMD.

## Maternal sepsis—a case study

The topic chosen for the MBRRACE-UK CEMM in 2013 is maternal sepsis, based on its identification as a leading cause of maternal death in the UK, and one of very few causes of maternal death that appears to be increasing in frequency. A UKOSS case-control study of maternal sepsis was carried out between 2011 and 2012,<sup>12</sup> which identified 365 women with severe maternal sepsis, an estimated 5 per 10 000 women delivering. Of these women, 18% had septic shock and survived. A stratified random sample of the women with septic shock who survived has been selected, and data are currently being collected in order that the care of these women may be examined against key standards. The key standards of care against which cases are assessed<sup>13–15</sup> have been identified by the Topic Expert Group; the role of the Topic Expert Group additionally is to advise MBRRACE-UK on appropriate evidence-based actions to address the lessons learnt from the confidential case reviews once complete, and to peer review the resulting report and recommendations. Specifically members of the Topic Expert Group do not conduct the confidential case reviews, but provide an additional cadre of expertise to ensure that both messages for care and messages for future research are drawn from the CEMM findings. The contrasting questions addressed by the UKOSS study and by the CEMM are outlined in Box 1.

**Box 1.** A comparison of questions addressed by a UKOSS study of severe maternal sepsis and MBRRACE-UK confidential case reviews of cases of maternal septic shock

UKOSS study: all women in the UK with severe sepsis

- What is the incidence of severe maternal sepsis in the UK?
- What are the risk factors for severe maternal sepsis?
- What are the main causative organisms?
- How is severe maternal sepsis managed in the UK?
- What are the outcomes for mother and infant?
- Are there any factors that are associated with poor outcomes?

MBRRACE-UK CEMM: a sample of women with septic shock

- Are women cared for according to current guidelines?
- Are there any differences in care for women who die and women who survive?
- Are there any system failures which might be addressed to improve care for women with sepsis?
- Are there any lessons to be learned to improve future care and hence future outcomes for women with severe sepsis?

All maternal deaths from sepsis will also be subject to Confidential Enquiry, and so at the completion of this work we will have a comprehensive picture of the epidemiology, management and outcomes of severe maternal sepsis in the UK. A key advantage of the Confidential Enquiry into sepsis morbidity cases is a detailed examination of care across the whole patient pathway, and a comparison of this with the care of women who die. This will enable identification of public health, hospital and system problems in addition to problematic individual clinical care. The CEMM, coupled with the quantitative information on the burden of disease and population risk factors from the UKOSS study, will therefore provide additional messages to enable changes in high-level health policy and improvement in both hospital and primary-care services.

## The added value of near-miss case reviews to UKOSS studies of severe maternal morbidity

The added value of assessing cases in a confidential enquiry alongside the UKOSS case-control study is that with the UKOSS quantitative data we can estimate the incidence of sepsis, describe the pathogenesis and management, identify risk factors, and quantify the outcomes. As a qualitative narrative approach the confidential enquiry adds clinical context from real-life situations, enabling us to understand not just the 'what' but also the 'why'. Individual care is assessed against accepted standards and although not generating new evidence to change practice, this process helps us to identify when current practice is not evidence-based, or when evidence to guide practice is lacking. The 'stories' generated from confidential enquiries are uniquely persuasive in changing practice and the vignette element of the CEMD report is retained for this reason. Combining the information from the UKOSS sepsis study, an essentially quantitative approach, with the qualitative information from the confidential enquiries will provide powerful evidence on which to base recommendations for future improvements in care.

## Conclusion and future directions

The UK has a well-established programme of CEMD and a national system for research into near-miss maternal morbidities. The addition of a programme of near-miss case reviews, the CEMM, permits a complete examination of the incidence, risk factors, care and outcomes of the severest complications in pregnancy, and enables the lessons learnt to improve future care to be identified more

quickly. This in turn allows for more rapid inclusion of recommendations into national guidance and hence the potential of better health for both women and babies. Alongside sepsis, psychiatric disorders and cardiac disease have also been identified as leading causes of maternal death in the UK. Further confidential enquiries into severe maternal morbidities are planned to address these key areas, focusing on postpartum psychosis and pregnant women with replacement heart valves. There is clear added value to be obtained through the integration of quantitative, qualitative and confidential enquiry methods to investigate maternal deaths and near-miss events and promote continuing quality improvement in maternity care.

### Disclosure of interests

The authors declare that no competing interests exist.

### Contribution to authorship

Author contributions are as follows: MK, GL, CDA and JJK contributed to conception and design; MK and CDA contributed to acquisition, analysis and interpretation of data; MK, GL, CDA and JJK drafted the article or revised it critically for important intellectual content; and MK, GL, CDA and JJK gave final approval of the version to be published.

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