The publication of Why Mothers Die 2000–2002\(^1\) marks the 50th birthday of what has been the longest running and most successful medical audit in history. The first Report on Confidential Enquiries into Maternal Deaths covered maternal deaths in England and Wales for the years 1952–1954,\(^2\) although the system on which it was based had first been established in 1928 in response to concerns about the high rate of maternal mortality at the time. Since then it has grown and developed. In 1985–1987 the report was extended to cover all four countries in the UK,\(^3\) and the current report was produced for the first time under the auspices of the Confidential Enquiry into Maternal and Child Health (CEMACH), an independent body primarily funded by the National Institute of Clinical Excellence (NICE). During the evolution of the report, the range of professions represented by advisors and assessors has been steadily expanded; an anaesthetist first joined in 1955–1957, a midwife was first appointed as a central assessor in 1994–1996 and an intensive care specialist in 1997–1999. The striking decrease in maternal deaths that has occurred during the five decades that the report has been in existence is a remarkable achievement and all who have been involved with it should be commended.

The report has always been published as a monograph and consequently its main target audience has been health care professionals in the UK. This has been criticized as a potential limitation of its international impact. It is a welcome development now to see wider dissemination of its findings in peer-reviewed international journals.\(^4\) \(^5\) In keeping with this philosophy, this issue of the British Journal of Anaesthesia has reprinted for the second time the anaesthesia chapter from the current report,\(^6\) and for the first time the intensive care chapter.\(^7\) The full report is also available on the internet (www.cemach.org.uk).

Much of the strength of the report lies in its disciplined approach. By rigorously collecting and confidentially analysing maternal mortality data every 3 years, a continuity has been achieved that is unrivalled in any other country. With the publication of each report, data from the triennium can be compared with those from previous years. Progress is monitored and effectiveness of recommendations is evaluated: the audit loop is closed. A simple example that demonstrates how the report can change practice can be seen in the way that oxytocin is given. In the report from the 1997–1999 triennium that was published in 2001,\(^8\) two deaths were reported in which rapid injection of 10 IU oxytocin was implicated as a contributory factor. The report emphasized the profound haemodynamic changes that large doses of oxytocin can cause and pointed out prevailing recommendations that the drug should be given slowly in a dose of not more than 5 IU. A subsequent survey of obstetric anaesthetists in the UK, published in 2003,\(^9\) showed that 84% of respondents had changed their practice, almost all of whom gave the report as the main reason for change. On a more dramatic scale, improvements in anaesthetic training and supervision, the introduction of antacid prophylaxis and the move toward regional anaesthesia have together led to a marked reduction in anaesthesia-related deaths. Anaesthesia for Caesarean section in the UK is now 30 times safer than it was in the 1960s. There is no better example of a major effect that the report has had on changing practice and improving patient care.

What are the important findings in the current report? A number of general points deserve to be highlighted. The leading cause of direct death (those resulting from conditions or complications unique to pregnancy) was again thrombosis and thromboembolism. This was followed by haemorrhage and hypertensive disease. Of some concern is the increase in deaths from haemorrhage compared with recent triennia. Similar to the previous report, indirect deaths (those resulting from pre-existing maternal disease aggravated by pregnancy) outnumbered direct deaths. This may be a reflection of a changing society in which more women with complex coexisting medical disorders are now choosing to become or stay pregnant and underlines the importance of multidisciplinary care and advance planning that has been emphasized in recent reports. Psychiatric disease features prominently in the causes of indirect death. When data from the Enquiries were linked with data from the Office for National Statistics, it emerged that suicide, often by violent means, was the leading cause of maternal death. Cardiac disease was the second most frequent indirect cause of maternal death. Of note, deaths from cardiac disease outnumbered deaths from the leading direct cause,
thromboembolism. The decrease in importance of rheumatic heart disease as a cause of maternal death has been impressive; it was responsible for no deaths in the current report compared with 8% of cardiac deaths in the first three reports (1952–1960).

An important feature of this report is a detailed analysis of related factors that contributed to death. This wider health focus reveals gross social inequalities. Factors that predisposed women to dying included being unemployed, single, poor or a member of a minority ethnic group. The most disadvantaged women were 20 times more likely to die than those from higher socio-economic groups. Women from non-white ethnic groups were three times more likely to die than white women. Mortality rates among refugees and asylum seekers were particularly high. One-third of women who died were obese. More than half of the women who died had some aspect of substandard clinical care. These inequities mirror similar observations in the USA. Finding an answer to these problems will be a challenge far greater than that of simply improving clinical care.

The anaesthesia-related deaths in the current report are cause for concern. There were six direct deaths plus one late death (for which the primary event occurred in the previous triennium) due to anaesthesia compared with three in 1997–1999. All deaths were associated with general anaesthesia. Additionally, in a further 20 deaths substandard anaesthesia care was implicated. Although the number of deaths has increased slightly from the previous triennium, this is less important than the circumstances under which the deaths occurred. Oesophageal intubation was the cause of three maternal deaths. Each of these cases involved an SHO-grade trainee without immediate senior back-up, and in two cases capnography was not used in direct inexperience and inadequate training as the underlying cause of this problem. A decrease in trainees’ practical exposure to general anaesthesia because of the widespread adoption of regional anaesthesia in obstetrics has been a hot topic for several years. This may be so. But the problem is surely more complex. Review of the records of the anaesthetic deaths revealed failures of anaesthesia services to meet declared standards of the relevant Departments of Health and professional bodies. This is indicative of a deeper systematic problem that goes beyond simple training issues. The current report should be an impetus for all departments to examine not only their training programmes but also their policies for supervision and implementation of guidelines. This should also extend to subspecialties other than obstetrics; analysis of the ASA closed claims database showed that the frequency of claims for oesophageal intubation was greater in non-obstetric files than in obstetric files.

One death involved an inadequately supervised anaesthetist who was new to the country and hospital and who had undergone no assessment of competence. With the demographic changes occurring in the European Union and the arrival of overseas-trained doctors with varying levels of skill and experience, this is a further issue that should be addressed with some urgency.

Other recommendations for anaesthesia services follow a recurring theme. They include recommendations for dedicated obstetric anaesthesia services, use of invasive monitoring and early consultant involvement. One important recommendation in the current report, which elaborates on comments in the previous report, is for early referral and involvement of specialists in intensive care. This is to assist with resuscitation and postoperative care, but also as part of multidisciplinary team planning for patients with serious comorbidity, including severe pre-eclampsia. Approximately one in three of all maternal deaths had some involvement with intensive care. Early institution of intensive care without waiting for admission to the intensive care unit (ICU), consultant-to-consultant referral to facilitate ICU admission and the use of outreach staff were recommended. Of course, implementation of these recommendations will depend on the resources of individual units. In this respect, the results of the report may be a powerful tool for guiding administrators in their prioritization of resources.

How much of the marked decrease in maternal mortality in the past 50 years can be directly attributed to the report itself? This is difficult to estimate with certainty because undoubtedly much of the credit must go to general medical advances and concomitant improvements in standards of care and standards of living that occurred independent of the report. For example, a downward trend in deaths from puerperal sepsis, largely as a result of the introduction of sulphonamides and penicillin, was already established by the time the first report was published. Similarly, haemorrhage was a major cause of death in 1952–1954, but numbers were already much lower than in preceding decades, probably because of improving access to blood transfusion. Deaths from abortion were prominent in the early reports but decreased after the legalization of therapeutic abortion in 1967 and the availability of contraception under the NHS that occurred at the same time. Nonetheless, the publication of each triennial report was probably a powerful stimulus to maintain the drive for improvement and to enhance the implementation of each new advance.

What is the relevance of the report outside the UK? Those who live in wealthy countries like the UK take heed of the
recommendations of each report. But this must be tempered by the fact that, from a global perspective, maternal mortality is almost completely a problem of the developing world. Estimates from the World Health Organization (WHO), United Nations Children’s Fund (UNICEF) and United Nations Population Fund (UNFPA) show that over half a million mothers die each year.\textsuperscript{13} Almost all these women, and their families, are from the developing world. As you read this, somewhere a mother in a poor country is probably dying from an avoidable cause. In the developing world, the majority of maternal deaths are from direct causes, particularly haemorrhage, puerperal sepsis, abortion, pre-eclampsia/eclampsia and obstructed labour.\textsuperscript{4} Of the indirect causes, a major feature is the prominence of infectious diseases, in particular malaria, tuberculosis and, especially in Africa, HIV/AIDS. The world’s maternal deaths are roughly evenly divided between Africa and Asia. In Afghanistan, Angola, Malawi, Niger and Sierra Leone the estimated lifetime risk of a woman dying from pregnancy is between 1 in 6 and 1 in 7.\textsuperscript{14} In stark contrast, maternal deaths in developed countries make up less than 1\% of the world’s total.

Is the report of any benefit in this context? Perhaps. Although the appallingly high global maternal mortality rate is largely a consequence of economic underprivilege in developing countries, the data from the UK may still be of use as a model for directing aid and available resources and for monitoring change. Examination of the patterns of death in the developing world shows similarities to those in the UK in the early part of last century. In 1928, the maternal mortality ratio (MMR) in the UK was 400 per 100 000 births which is similar to the global value today.\textsuperscript{15} Of course it is impossible to completely extrapolate the UK experience to the developing world—after all, half a century ago the UK was rich—but nonetheless even with limited resources small changes in practice can make large differences. The report should be at least of some encouragement to those facing the enormous problems in the developing world. Several countries around the world have adapted the UK model and are producing their own Confidential Enquiries.\textsuperscript{16} One hopes that they may achieve the same pattern of improvement as the UK.

Finally, we must consider that, because maternal deaths are now rare in developed countries, the report focuses on only a small subset of outcomes. For example, in obstetric anaesthesia it is well recognized that although general anaesthesia is associated with the greatest risk of maternal mortality, the alternative, regional anaesthesia, is associated with significant risk of morbidity. Although the use of regional anaesthesia may decrease the risk of maternal mortality, the ASA closed claims project database shows that the choice of anaesthesia does not affect the likelihood of malpractice litigation.\textsuperscript{17} Should the report be extended to include morbidity? Although the last two reports have included a chapter on ‘near misses’ and severe maternal morbidity based on Scottish experience of auditing these outcomes, this has yet to become a major focus. Perhaps this is something to consider over the next 50 years.

The Report on Confidential Enquiries into Maternal Deaths has been a remarkable success. It has saved the lives of countless mothers over the past 50 years. Happy birthday. And many more happy returns.

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