

Strategies for reducing maternal mortality in developing countries: what can we learn from the history of the industrialized West?

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Summary

Ten years of Safe Motherhood Initiative notwithstanding, many developing countries still experience maternal mortality levels similar to those of industrialized countries in the early 20th century. This paper analyses the conditions under which the industrialized world has reduced maternal mortality over the last 100 years. Preconditions appear to have been early awareness of the magnitude of the problem, recognition that most maternal deaths are avoidable, and mobilization of professionals and the community. Still, there were considerable differences in the timing and speed of reduction of maternal mortality between countries, related to the way professionalization of delivery care was determined: firstly, by the willingness of the decision-makers to take up their responsibility; secondly, by making modern obstetrical care available to the population (particularly by encouragement or dissuasion of midwifery care); and thirdly, by the extent to which professionals were held accountable for addressing maternal health in an effective way. Reduction of maternal mortality in developing countries today is hindered by limited awareness of the magnitude and manageability of the problem, and ill-informed professionalization strategies focusing on antenatal care and training of traditional birth attendants. These strategies have by and large been ineffective and diverted attention from development of professional first-line midwifery and second-line hospital delivery care.

keywords history, maternal mortality, U.S.A., Sweden, England & Wales, Safe Motherhood, antenatal care, traditional birth attendants, developing countries

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Introduction

In the 1980s maternal mortality in developing countries became a major issue in health services research and international aid (Rochat 1981). In 1987 this sudden interest in a heretofore 'neglected tragedy' (Rosenfield & Maine 1985) led major development agencies to launch a worldwide 'Safe Motherhood Initiative' – which translates rather curiously as 'Initiative pour une Maternité sans Risque'. After a decade of intensive programmes on reproductive health, however, maternal mortality ratios in developing countries remain similar to those of industrialized countries in the early 20th century.

High levels of maternal mortality are associated with poverty, but the relationship is not straightforward. In countries where GNP per capita was below US\$ 1000 in 1993, estimates of maternal mortality ratios ranged from 22 to

1600 per 100 000 live births (Figure 1). For example, at that time, maternal mortality ratios were estimated at 160, 1200 and 1300 in Vietnam, Uganda and Burundi, respectively, despite very similar GNPs per capita (US\$ 170–180) in these three countries. Even if estimates of maternal mortality, like those of GNP, have to be taken with caution, clearly, economic development is not a sufficient condition to mitigate the risk of childbirth.

Reproductive health programmes have largely relied on the transfer, to developing countries, of the techniques that were instrumental in reducing maternal mortality in industrialized countries. These toolboxes and knowledge bases provide effective means to tackle increasingly trivial issues such as obstructed labour, ruptured uterus or puerperal sepsis. They have had but little influence on maternal mortality ratios. There have been repeated (Ronsmans 1995), if rather ritualistic, calls for fostering the political will to address the

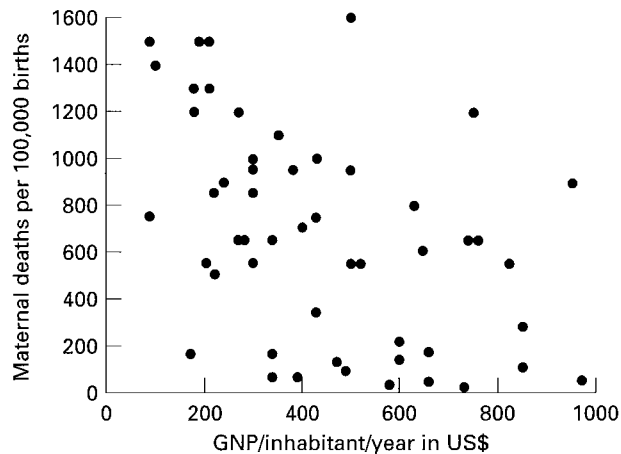


Figure 1 Distribution of maternal mortality ratios according to the GNP/inhabitant/year in countries with a GNP/inhabitant under 1000 US\$. Sources: GNP/inhabitant in 1993: World Bank (1995); Estimation of maternal mortality ratios in the 1990s: Stanton *et al.* (1995).

problem of maternal health in developing countries. This has often been done without a clear view of the concrete content of the political and social strategies that are the necessary complements of an adequate knowledge base (Richmond & Kotelchuck 1985; Atwood *et al.* 1997).

There have been important differences in performance among industrialized countries, as there are between the successful approaches of the past and those practised in many developing countries today. This paper looks at the political and social strategies that have made the dramatic reduction of maternal mortality ratios in industrialized countries possible during the past century – and at those that explain the failures in developing countries today. It focuses on some of the key changes that were advocated and implemented in different settings, and considers their practical consequences for maternal health policies today.

Patterns of maternal mortality reduction in industrialized countries

Around 1870, maternal mortality ratios in most of what now is the industrialized world were above 600 per 100 000. For some of the countries – such as Sweden, USA, England and Wales – detailed time series are available. These show different patterns of reduction. Swedish ratios started dropping as early as 1870, to stabilize at 250–300 per 100 000 around the turn of the century; at that moment England and Wales still were at levels of 400–450 and the United States of 600–800, and they stayed there for another four decades (Figure 2). This period of stagnation was followed by fast reduction, between 1937 and the end of the sixties, which

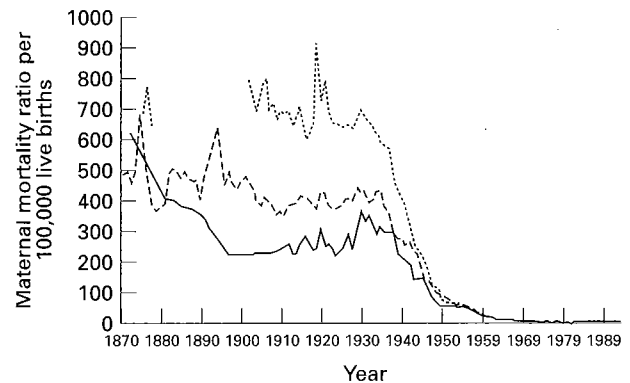


Figure 2 Evolution of maternal mortality in Sweden, U.S.A. and England & Wales from 1870 to 1993. ----- England and Wales; — Sweden; USA Sources: Howard (1921), Högberg *et al.* (1986), Högberg & Wall (1986); Loudon (1992a), WHO & UNICEF (1996).

brought all these countries to the current low level of around 10 per 100 000. How can the differences be explained?

Sweden

In the first half of the 18th century, Sweden was a poor country with a very scattered population. Early recognition of the magnitude of maternal mortality was made possible because from 1749 onwards Sweden had a General Register for the systematic collection of individual health data, building on the pre-existing parish registration of births and deaths. As early as 1751 the Swedish Health Commission (Sundhetskommissionen) directed attention towards 'avoidable maternal mortality' with the observation that at least 400 women of 651 dying in childbirth could have been saved if only there had been enough midwives (Högberg *et al.* 1986).

Public health authorities consequently developed a policy of training enough midwives to make sure that qualified personnel would attend all home births. Training large numbers of midwives was a slow and stepwise process. Results were obtained only because there was strong political will to tackle the problem of maternal mortality. In 1861 'professional' (i.e. certified) midwives attended 40% of births. By 1900 the proportion had risen to 78%, with a corresponding reduction in the number of deliveries carried out by traditional birth attendants (60% in 1861, 18% in 1900). Midwives were supervised by the local public health doctor, who could be called upon in case of serious complication and who was held accountable for official reports. Only between 2% and 5% of births took place in hospital.

This organizational development went along with the prompt introduction of modern techniques. Certified

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midwives were allowed to use forceps and hooks for craniotomy as early as 1829. But the major decline in maternal mortality occurred after implementation of the systematic use of aseptic techniques. These had been introduced in hospitals in the late 1870s, and by 1881 all certified midwives had been instructed to apply this new technology. The early adoption of this original combination of professional assistance to home deliveries and use of effective techniques enabled Sweden to achieve the lowest maternal mortality ratios in Europe (228 maternal deaths per 100 000 live births) by the beginning of the 20th century (Högberg *et al.* 1986).

The Swedish success was partially a result of scientific and technical advances, and partially of social changes empowered by a strong political will. Ultimately, the causal chain accounting for the reduction involved three factors: political commitment, availability of effective techniques, and assistance to most deliveries provided by trained health professionals able to 'culturally' integrate such a technology. The potential value of this recipe was further confirmed by late adopters of the same policy – i.e. the Netherlands, Denmark and Norway – who succeeded in achieving maternal mortality ratios under 300 per 100 000 by 1920 (Loudon 1992b).

England and Wales

In England and Wales maternal mortality ratios were computed routinely from the end of the first half of the 19th century: the first report of the Registrar-General's Office was published in 1838 (Loudon 1992a). Between 1850 and 1900 maternal mortality ratios decreased from 600 per 100 000 to 450–500 per 100 000, remaining well above what 'less-developed' Sweden had achieved by that time. They remained between 400 and 450 well into the 1930s.

Awareness of the problem came later than in Sweden. In 1928, a special committee appointed to the Ministry of Health put forward the concept of 'primary avoidable factor' among the causes of maternal mortality, 77 years later than in Sweden. The commission recommended a strictly confidential investigation into every maternal death. In 1932, the Ministry sent a mission to Denmark, the Netherlands and Sweden to find out how these countries managed to achieve their low maternal mortality ratios (Oakley 1984). Awareness of the problem by the population played an important role in putting maternal mortality on the agenda in the 1930s: the 1938 'Mothers' Charter' Conference in Great Britain, for example, was attended by women from over 60 local associations (Oakley 1984).

Professionalization of obstetric care in England and Wales was a slow process. Most birth attendants were untrained until the end of the 19th century. This contributed to a

stereotypic image of 'ignorant midwives' (Pelling *et al.* 1993) cultivated by the general practitioners who were in direct competition for the clientele. The Midwives Act of 1902 aimed at replacing untrained traditional birth attendants by trained and certified midwives. It made training for midwives mandatory and regulated the profession (a policy that had started about a century earlier in Sweden). Results consequently came later. In 1908, of a total of 27234 enrolled midwives, 43% were *bona fides* (untrained traditional birth attendants), 36% were certified and only 21% were graduated from the Central Midwives Board (Loudon 1992a). In Sweden 80% were trained by 1900. The general practitioners were not better skilled in obstetrics, and used and abused chloroform anaesthesia and forceps till the 1930s. Some of the gains of better midwifery care were probably offset by iatrogenesis due to misguided over-intervention by general practitioners. In 1929, the Royal College of Obstetricians and Gynaecologists was founded with the aim to organize the speciality of obstetrics. In parallel, the number of trained midwives increased, albeit in a patchy way, since this was very much dependent on the willingness of the local authorities 'who spent as little as possible on maternal and child health'.

By 1935 maternal mortality ratios began to fall, mainly as a result of steady decline in puerperal infections (Baird 1960; Loudon 1988). During and after the Second World War the capacity to handle major emergencies in a hospital environment further decreased levels, down to 85 in 1950. It was not until 1949 that confidential enquiries into maternal deaths drew attention to other causes of maternal mortality (Llewellyn-Jones 1974) that could be avoided by effective methods of prophylaxis and treatment. With the development of that new knowledge, and under strong pressure from the public, both obstetric specialists and primary caregivers became aware of their potential in reducing maternal mortality (Klein & Clahr 1958) and managed to assess needs for improvements, e.g. control of bleeding, safe anaesthesia, effective emergency obstetric services. These enquiries played the part of a medical audit (Crombie *et al.* 1993), and the resulting awareness among caregivers largely contributed to the decline: from 87 to 25 per 100 000 between 1950 and 1965 (Llewellyn-Jones 1974).

The United States

In the United States reliable vital statistics became available in the 1920s, much later than in Sweden or England (Pearl 1921). In most large cities, however, maternal mortality had been followed up since the beginning of the century, and found to compare unfavourably with ratios in European countries (Howard 1921). In 1918, the maternal mortality ratio in the US was 885 per 100 000 live-births, as high as in Sweden a century before and twice the Swedish ratio for the mid-19th

century. Official recognition of the need for maternal health programmes came in 1920 with the establishment of the National Maternal Welfare Committee. Its aim was

‘to encourage the analysis of maternal deaths in every state, county and community and to try, if possible, to prevent maternal deaths by education of the laity, the hospital members, the community and also the medical profession’ (Llewellyn-Jones 1974).

Increasing public interest in the problem of maternal mortality was first given concrete expression by the introduction of regulatory mechanisms promoting maternal welfare (Sheppard-Turner Act, between 1922 and 1929; Social Security Act 1935) (Schmidt & Valadian 1969). At that time US obstetricians thought that it would be possible to reduce maternal mortality ratios by proper identification of the behavioural causes of maternal deaths – whether related to the behaviour of the mother or her family, the midwife, or the physician – and intensive promotion of behavioural changes. It was not until 1933, however, that the first report called for by the Public Health Relations Committee of the New York Academy of Medicine was published. It showed that 66% of maternal deaths could have been prevented ‘if the care of the woman had been proper in all respects’ (Porges 1985). Even worse, perhaps, the enquiry revealed that 61% of 1343 avoidable deaths could be attributed to the doctors (abuse of anaesthetics, unjustified instrumental deliveries – particularly caesarean sections –, etc.), while the behaviour of the midwives and women was held to be responsible for only 2% and 37% of these deaths, respectively. A number of similar investigations into maternal deaths, however, did not alter the American authorities’ views on the necessity, for the sake of reducing maternal mortality, of having all women delivered in hospital by obstetricians rather than at home by midwives. Yet in 1925 a pioneer, Mary Breckinridge, had demonstrated that a network of trained and permanently available midwives could provide a service of high quality: in the rural area of Kentucky where she worked, the maternal mortality ratio was 68 per 100 000, whereas in the town of Leamington, where a doctor carried out deliveries, it exceeded 800 per 100 000 (Loudon 1988). Even more than in England and Wales, the medical lobby managed to hinder the development of professional midwifery outside the hospitals.

Despite public health concern and efforts to promote hospital delivery, it was not until the late 1930s that a declining trend appeared: through reduction of puerperal infection, more effective ways of controlling obstetric emergencies, and less iatrogenesis. The trend accelerated during World War II with the Emergency Maternity and Infant Care Programme. This comprehensive programme for spouses of army personnel defined standards for staffing, infrastructure, services and charges in all areas that qualified

for state subsidies. It had an immediate effect on the quality and accessibility of care provided to pregnant women and their children (Schmidt & Valadian 1969).

Key steps

The schematic representation of trends in maternal mortality by Loudon (1992a) (Figure 3) suggests two main phases in the reduction in mortality ratios. The first phase was characterized by the recognition of both the magnitude – revealed by the vital statistics which became available in the 19th century – and the manageability of the problem; and by the development and accessibility of effective midwifery techniques (e.g. asepsis for the prevention of puerperal infections), that were culturally mastered by their users. This meant professionalization of midwifery care: the countries that managed to do this on a large scale, such as Sweden, the Netherlands, or Denmark, obtained reductions of maternal mortality to the equivalent of the 25th centile of the poorest countries today.

The key to success was early recognition of the magnitude of maternal mortality, both in absolute terms and in comparison with other countries, followed by identification

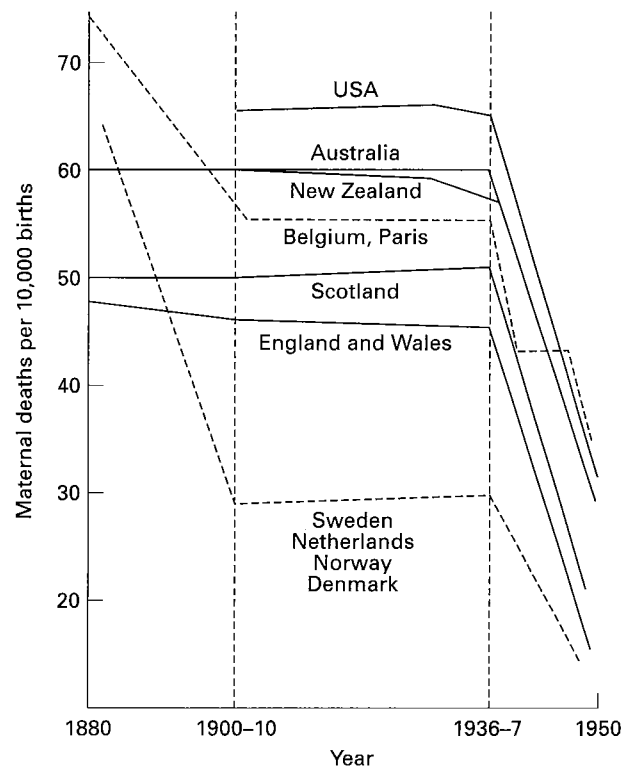


Figure 3 Schematic representation of the trends in maternal mortality in various countries 1899–1950. Source: Loudon (1992a), reproduced with the authorization of Clarendon Press, Oxford.

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of the factors affecting its distribution and what could be done to alleviate it. Problem identification was an essential factor in raising decision-makers' awareness, and in balancing political and professional perspectives with community expectations. It led to the identification of priorities and was a precondition for professionalization of obstetric care. The speed of implementation was a function of the willingness of the decision-makers to enforce such policies; of the strategy they adopted for making practices and procedures of modern obstetric care available to the population (promotion of midwives in Sweden, hospital delivery in the USA); and of the extent to which professionals (midwives and doctors) were held accountable for providing quality care (Figure 4). What is sometimes less appreciated – and is of some relevance to the situation of developing countries today – is that during the period when mortality ratios were falling in the western world, the debate on maternal mortality was not a matter for doctors and public health administrators alone. In various European countries, from the early 20th century to the late 1930s, committees concerned with improving maternal mortality were formed and associations with the same object – sometimes medical, sometimes lay – were founded. Legislation was introduced and funds were made available.

Further reduction – the second phase, which followed the plateau of 1900–37 – was made possible by the improvement

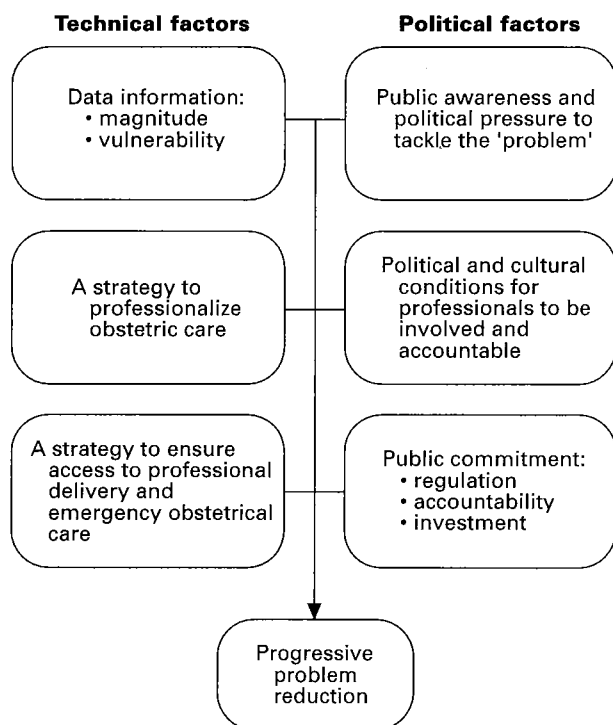


Figure 4 Technical and political factors influencing the reduction of maternal mortality in western countries.

of techniques (antibiotics, caesareans, transfusions) in a context in which they were mastered and were available to the great majority of women, whether confined in hospital or at home. There was a culture of quality of care sustained by a system of control, which in turn was fed with information derived from studies of maternal deaths. Technological developments and increased accessibility of hospital care allowed the countries that already had reduced their maternal mortality considerably to reach today's low levels; it permitted those that lagged behind to catch up. What then differentiated the countries of northern Europe (Denmark, Sweden, the Netherlands, Norway) from other European countries and from the United States was the low proportion of instrumental deliveries and the high proportion of births assisted by well-trained midwives. The combination of circumstances and conditions that allowed for early reduction in some countries and paved the way for the technological developments of the 1940s has not been present in many developing countries.

Maternal mortality in developing countries

Professionals in developing countries have known technologies such as the use of antibiotics, blood transfusion and lower-segment caesarean section since they were developed. This progress in knowledge and technical know-how, however, has had but little impact. Partly this is due to a failure to mobilize resources adequately, partly to ill-informed choices of strategies for the introduction of new technologies. Resource and strategy questions, however, are compounded by a series of misconceptions about the nature and extent of the problems women face – among health and development professionals as much as among certain populations.

Blind spots

Vital statistics in developing countries were – and still are – very much incomplete. In 1977 only 66 countries of 162 provided (incomplete) data on maternal mortality: in Africa 5 of 52, in Asia 13 of 43 and in Latin America 19 of 31 (Rochat 1981). The only information on maternal mortality in developing countries came from hospital studies or statistics (Kwast 1988), without a denominator to put them in a population perspective. The little that was known gave a bleak picture. In the early 1950s, the few statistics available in developing countries (mainly in Asia and Latin America) showed mortality rates of the order of 300–400 per 100 000 (Rosa 1981), 3–4 times higher than the levels of industrialized countries at that time. In the late 1960s the rates in industrialized countries were of the order of 30 per 100 000, and in those developing countries (e.g. Thailand) where

figures were available, of the order of 300 per 100 000: 10 times higher. In relative terms, the gap increased (Rao 1981; Rosa 1981). It was only in 1985 – although these figures were already available in the late 1970s – that the scientific world became aware of the fact that maternal mortality in developing countries was 20–100 times higher (Rosenfield 1992), and that the (cumulative) risk of dying during pregnancy was 55–400 times higher there than in the industrialized world (WHO 1986). Moreover, these figures were probably over-optimistic, since no information was available for those countries with the most serious problems.

One thing is certain: maternal mortality was not a matter of public concern, in spite of the fact that it was broadly at the level which had given rise to major political pressure in Sweden in the 19th century and in Britain in the early 20th. Various factors may have contributed to this. Firstly, there is what Graham calls the ‘measurement trap’ (Graham & Campbell 1992). Infants under one appear to run a much greater risk of dying than mothers when mortality quotients or rates are measured; for the maternal mortality rates relate to only one pregnancy at a time and not to the total number of pregnancies a mother may have in the course of her life. Health care providers in the hospitals of developing countries do not expect large numbers of maternal deaths. They will not see them since most of the women who die do so at home, not in the hospital. The lack of visibility is quite convenient in a context where women’s lives are valued poorly, high fertility is culturally rewarded and health professionals have little in common with their client populations. Furthermore, funding and planning agencies may have realized at an early stage that it was easier to have an impact on the mortality of children than on that of mothers; for child mortality visibly and rapidly responds to a range of vertical programmes (Walsh & Warren 1980), even though the effect of such programmes may not necessarily be long-lasting (Kasongo Project Team 1981).

If the scientific world and the planners have been slow to appreciate this reality, the same can be said of the health professionals. In developing countries there have been no pressure groups of health professionals comparable to those which were active in Britain and the United States in the early 20th century. Among specialists in the large hospitals in the capitals, quality of care is no key feature of the medical culture, and it is rare for quality standards to be promoted or monitored. Practitioners in the district hospitals have many priorities, and the lack of resources rapidly leads to a degree of fatalism. The relative rarity of the number of deaths (Rosenfield 1989) makes maternal mortality an underestimated problem, particularly since most of the deaths occur outside of hospital.

In sharp contrast to the selective blindness of the medical establishment, many populations perceive maternal deaths as

a priority problem. It is true that the annual number of maternal deaths in a particular district may be relatively ‘low’: maternal mortality is not a readily visible problem. But the death of a mother is usually perceived as a traumatic event, even in societies where women have low status. Often, maternal death is considered more dramatic than the death of a child – not only because it threatens the survival of the mother’s children (WHO 1952; Türmen & AbouZahr 1994), but also because the death of an adult is an event of greater social weight. This concern finds expression in the numerous taboos surrounding pregnancy, and often in very concrete form, in requests to the health services to build a village maternity centre as a matter of priority. It is usually only the inaccessibility of the emergency obstetric services, or their unacceptability (Sundari 1992; Jaffré & Prual 1994) that prevents the community from using them – which in turn contributes to concealing the extent of the problem to health professionals and policy makers.

All this results in a gap between the concerns of the population and the priorities of professionals and decision-makers: a gap in the appreciation of the extent of the problem (the subjective feeling of the population that deliveries are dangerous *vs.* the failure by the professionals and decision-makers to appreciate the extent of maternal deaths) and a gap in the understanding of the determinants and circumstances of maternal deaths (a matter of access for the population, a technical problem for the professionals). Failure to appreciate the nature of the problem led decision-makers to develop ill-informed strategies which, even where they were actually implemented, did not achieve the expected results.

New magic bullets

What strategies have been promoted to reduce maternal morbidity and mortality? The package of measures introduced has remained substantially unchanged since the early 1950s, when it was defined by the first WHO expert committee: antenatal clinics and education of the mothers (WHO 1952). In the late 1960s, when contraceptives were more widely used, family planning was added on a systematic basis. It must be realised that these measures were mainly directed towards improving the survival prospects of infants. The decentralization of maternity care was seen as the spearhead in a move to improve the coverage of care designed to promote the survival of children. But in most maternity care programmes in developing countries, antenatal clinics and family planning remained unchallenged as the basic elements to promote maternal welfare. Later, in the 1970s, the training and promotion of traditional birth attendants formed the second strategic axis in the action against maternal mortality.

Antenatal clinics and the risk approach

The postulate was that it was possible to anticipate complications of pregnancy and to identify at-risk deliveries by means of good antenatal clinics (Tucker *et al.* 1994). It was thought possible to identify these problems with a satisfactory degree of sensitivity and specificity. Throughout the 1970s and 80s the scientific world concentrated on the improvement of the antenatal clinic as the ideal solution to the problems of maternal mortality. The at-risk approach was developed, and challenged only sporadically until the late 1980s. In 1980, in a study of antenatal clinics in Aberdeen, Hall *et al.* (1980) showed that the productivity of the routine antenatal clinic in relation to the prediction and identification of obstetric problems was extremely low. The conceptual error here is inherent in the approach, which considers only two elements: the proportion of problems in the population considered to be at risk and the 'relative risk', which is the ratio of the incidence of problems among women at risk to the incidence of problems among women identified as not being at risk (Alisjabana 1990; Phuapradit *et al.* 1990). A risk factor was recognized when it presented a statistically significant relative risk, but without taking into account a Bayesian analysis in terms of predictive value and output.

The Kasongo study – one of the first gathering information on the prevalence of risks in a group of women and data in terms of sensitivity and specificity – showed that women at risk were only a small proportion (29%) of all women with obstructed labour (Kasongo Project Team 1984). Maine used this study to argue that most of the complications threatening the mother's life could not be identified at the antenatal clinic (Maine *et al.* 1991). The current consensus is that even in developing countries where the prevalence of risk is higher, antenatal screening has low predictive value because of its low sensitivity (30%) and its relatively low specificity (around 90%) (Chng *et al.* 1980; Hall *et al.* 1980; Koblinsky *et al.* 1994; Walsh *et al.* 1994; Acharya 1995; Rohde 1995; Yuster 1995; Dujardin *et al.* 1996; McDonagh 1996).

The antenatal clinic, thus reduced to an instrument for the prediction of risk, omits a number of other roles played by the clinic – education, information, treatment of existing problems (i.e. urinary infection, malaria, anaemia) and prevention of potential problems (i.e. malaria). In a wider perspective of maternal health than detection of maternal mortality risks the availability of a clinic concerned principally with pregnancy and associated psycho-affective and health problems may be considered an important service for the local population. At hospital level individual information on the progress of a pregnancy may be important in decision-making (socio-economic and family context, treatment followed, episodes of illness, etc.). Nor should we disregard the effect of a doctor/patient

relationship in motivating a woman to go to the hospital in the event of a problem which she has been informed might be serious (Van Lerberghe & Pangu 1988).

But in terms of reduction of maternal mortality there is no point in providing an antenatal clinic unless arrangements are possible and implemented to refer women for care in case of emergency. When a serious problem is present, a pregnant woman should have access to an appropriately equipped health service, and accessibility to a source of obstetric care must evidently be geographical, but also financial, cultural and psychosocial. In many developing countries hospitals are under-used by the population of the immediate area, even in urban areas. In an urban district of Bamako, for example, maternal mortality rates exceeded 325 per 100 000 and caesarean rates were less than 1% (Etard *et al.* 1996). Antenatal care without obstetric care cannot achieve all that much.

Training traditional birth attendants

In parallel with the promotion of antenatal clinics – essentially a strategy based on a traditional view of professional preventive care – efforts have also been made to improve obstetric services through training of traditional birth attendants (TBA). The basic observation which long served to justify the decision to train traditional birth attendants was that there were not enough professional health personnel to provide maternity care, not at present nor in the immediately foreseeable future. Moreover, there were not enough beds or staff at hospital level to absorb the workload that would be created if all women had access to hospital for their confinement (Dissevelt 1978). The TBAs did, however, exist and performed deliveries (mostly in rural areas), they were accessible and culturally acceptable and they influenced the decision of mothers to go to the health services. Admittedly, their technical competence was inadequate. The solution was to train them in modern methods of delivery.

This analysis was not new. In some countries training of TBAs began many years ago: in 1921 in Sudan, in the early 1950s in India, Thailand and the Philippines (Bayoumi 1976; Mangay-Maglacas 1990). In the 70s, however, the idea of training TBAs emerged as a dominant strategy. In 1970, an interregional seminar in Malaysia organized by the WHO recommended a wide-ranging international study of the characteristics of personnel concerned with maternal health, including TBAs, in order to improve the quality of the data available for planning maternal health programmes (de Lourdes Verdese & Turnbull 1975). The study recommended the preparation of a guide which should give the countries concerned guidance on the development of strategies leading to the training and utilization of TBAs. In the late 70s, mobilization of the community was at the core of the primary

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health care strategy, and the training of TBAs seemed entirely in accordance with empowerment of the community (Araujo & Oliveira 1982). Tens of thousands of TBAs were trained, principally in Asia and Latin America, but also in Africa (Chen 1981). With the advent of the at-risk approach it was even hoped that these TBAs could conduct antenatal clinics (Estrada 1983; Favin *et al.* 1984; Viegas *et al.* 1987) and might even be integrated into the health system as health personnel (Awan 1987; Hyppolito 1987).

While the WHO continued to encourage the training of TBAs through the mid-80s (WHO 1986), some authors began to express their doubts on the effectiveness of this strategy. The first evaluations mainly concerned the training programmes, but also questioned the potential of the strategy as such. Namboze (1985), while still recommending that they should be trained, expressed his scepticism: 'such women are unlikely to change their ways even if they are trained; by training them you are creating a substandard cadre which will never pass an examination; and you are likely to increase the time of delay in the village before antenatal care is sought, particularly in the case of the high-risk mother.' Ross examined the impact of the training of TBAs on neonatal tetanus, but wondered whether vaccination was not a more efficient strategy than the training of TBAs (Ross 1986). Gradually it has emerged that the training of TBAs has had little impact on maternal mortality, and that the most effective measures were those which make it possible to reach a well-equipped hospital (Greenwood *et al.* 1990; Maine *et al.* 1991; Fauveau & Chakraborty 1994; Koblinsky *et al.* 1994; Türmen & AbouZahr 1994).

How then could health authorities be so wrong in choosing a strategy that, *a posteriori*, was clearly doomed from the outset? The promoters of TBAs made a correct observation, and their first reflex was legitimate. A number of elements, however, had been under-estimated. Firstly, the function, the knowledge and the experience of traditional birth attendants are very variable between one region and another, even within the same country. In some regions the traditional birth attendant is an experienced woman who has had (and survived) numerous pregnancies and who carries out several dozen deliveries a year. Her experience and inherited traditional knowledge will have taught her certain obstetric procedures and the effect of certain herbs. Elsewhere she will be a woman in the village or in the family whose sole role during the few deliveries at which she has been present is to reassure the woman by holding her in her arms. In such regions, where there are hundreds or even thousands of TBAs who 'do' only a few deliveries a year, it is an illusion to suppose that a course of training, even when given added status by the gift of a case of instruments and a few pharmaceutical products, can have any effect on maternal mortality. It is not therefore technically valid to frame a general strategy for the training of TBAs without taking account of these variations.

The advocates of the training of TBAs have reacted sharply against criticism of the strategy: in their view the fault lies not in the strategy but in the lack of supervision and support which has reduced its effectiveness (Mangay-Maglacas 1990; Sai & Measham 1992). The supervision of TBAs is a major problem indeed. Since the importance of supervision is inversely proportional to the level of training, TBAs have a much greater need of being supervised than obstetric specialists or professional midwives. And in a situation in which health professionals have neither the time nor the resources to supervise other professional staff at the peripheral level, one may well wonder how this problem is ever to be solved. A strategy that calls for so much supervision input is not sustainable.

The second reason is qualitative: we do not know what TBAs ought to be taught. In order to change their behaviour it would be necessary to have a very clear understanding of what they are doing wrong. This has seldom been proposed (Williams *et al.* 1985). And even if it were, what then? Traditional knowledge is a single whole. Altering one of its components may 'destabilize' the TBA and detach her from this traditional body of knowledge. The social role of a TBA, like that of a traditional healer, is profoundly rooted in the local culture. The role is not confined to the care to be provided for a particular pathology: it is all-embracing, and reinterprets the patient's suffering in its cultural context (Singleton 1994). Some authors hope that the TBAs will at least help to persuade women with complications to go to hospital (Estrada 1983; Caffish 1987; Viegas *et al.* 1987). Others, however, observe that TBAs tend to delay or even deliberately discourage women from going to hospital (Lawson & Stewart 1967; Okafor & Rizzuto 1994).

The decision-makers have not appreciated the immense cultural gap between modern methods of care and the activities of TBAs. When Sweden, Denmark, the Netherlands and Britain decided to train midwives, in the late 19th and early 20th century, it was a matter of training of young and better educated women, not of recycling traditional birth attendants. With the progressive increase in the numbers of trained midwives, traditional birth attendants disappeared, as the population recognized the competence of the professionals, leaving little room for the training of new TBAs by the old ones. The TBA strategy is now increasingly seen as a dead end. It will have taken more than 20 years to realize this, and the money spent on the training of TBAs would perhaps, in the end, have been better used to train professional midwives.

Mobilization and accountability

The obstetric techniques which make it possible to save the mother's life (lower segment caesareans, blood transfusion, antibiotics, control of pre-eclampsia, oxytocin) are widely

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known in the developing countries. Two elements, however, that proved essential in industrialized countries are absent in developing countries: recognition of the magnitude of unmet needs and the mobilization both of professionals and of the community.

Awareness of maternal mortality rates, and the causes of maternal deaths, has been a determining factor in the active development of strategies for combating maternal mortality in the western countries. In the developing countries it is illusory to imagine that the systematic recording of the number and causes of maternal deaths can be routinely carried out within the foreseeable future (Graham & Campbell 1992; Graham *et al.* 1996). It is not possible therefore to count on this indicator for political mobilization and involvement of planners or health professionals. The considerable efforts of the last decade to obtain mortality ratios through surveys remain inadequate, since they are not routinely provided and do not allow planners to take decisions: they do not localize the problem and do not identify the actions to which it would be vulnerable.

There are, however, output and process indicators which might very well serve the purpose of mobilization. They were developed in parallel by Columbia University (Maine *et al.* 1992) and by the Institut National d'Administration Sanitaire (INAS) in Morocco (De Brouwere *et al.* 1996a,b) (Table 1). The indicators suggested by Maine have proven their value in India (Nirupam & Yuster 1995), it was possible for researchers – if not for the decision-makers – to identify problem districts. INAS mapped 'unmet obstetric need' by plotting the difference between observed and expected rates of major obstetric interventions for absolute maternal indications (MOI/AMI). The mapping and analysis of intervention rates on a geographical basis then made it possible to identify priority districts. This served as a starting point for district teams to identify local solutions (Belghiti

et al. 1998), and for decision-makers to put maternal health on the policy agenda (De Brouwere & Van Lerberghe 1998). The ease with which they can be calculated and their level of precision permit intradistrict analysis and annual monitoring (Van Damme *et al.* 1998).

These alternative indicators do not measure maternal mortality, but have the advantage of showing what can be done and of monitoring the effects of interventions to improve the situation. As such their potential for stimulating local and national awareness of the problem and for guiding intervention strategies is inherently greater than that of maternal mortality. Linking the estimates of deficits in MOI/AMI to specific interventions is much more straightforward than is the case for aggregate maternal mortality figures, and forces health care providers – who are necessarily involved in estimating such deficits – into awareness of the importance of the problem, and of what could be done about it.

Ten years ago, the Nairobi conference organized by the WHO, UNICEF, UNFPA and the World Bank launched the 'Safe Motherhood Initiative'. One of its objectives was to reduce maternal mortality by 50% by the year 2000. Far from diminishing, the figures increase, partly because more information becomes available, partly because little has changed. The task indeed is considerable, and not amenable to a simple crash programme. It is necessary, of course, to improve women's access to emergency obstetric care, and perhaps it may be necessary to progressively abandon uninformed strategies in favour of more durable ones such as the training of qualified staff, their distribution throughout the country and the provision of operating surgical units in district hospitals. This requires considerable resources, restructuring and re-engineering of the overall health care system.

Such restructuring is unlikely to happen without pressure

Table 1 Process and output indicators

Coverage indicators suggested by Maine, and endorsed by UNICEF/WHO

Number of health formations providing essential obstetric care (EOC) (expected: 4 basic EOC units and 1 comprehensive EOC unit per 20 000 expected births)

Geographical distribution of beds in formations providing EOC units (expected: maximum of 3 hs to reach a basic EOC unit and 12 hs for comprehensive EOC units)

Percentage of births in these units to all expected births (expected: at least 15%)

Proportion of women with complications reaching one of these formations (expected: 15%)

Percentage of caesareans (expected: minimum 5%, maximum 15%)

Performance indicators suggested by Maine

Specific lethality rate for women with obstetric complication, in hospital (expected: under 1%)

Indicators of unmet obstetric needs suggested by the Institut National d'Administration Sanitaire (Morocco)

Mapping of shortfalls of observed *vs.* expected number of major obstetric interventions for absolute maternal indication (ranges used: 1–2%)

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from the different stakeholders, and, in the first place, from the population: pressure on decision-makers to provide the resources, at least for accessible emergency care at district level; pressure on health authorities to professionalise obstetric care, to set and enforce standards; pressure on health care providers to account for the quality of care provided.

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