

S A F E M O T H E R H O O D

Care in Normal Birth: a practical guide



DEPARTMENT OF
REPRODUCTIVE HEALTH & RESEARCH
WORLD HEALTH ORGANIZATION
GENEVA

P r a c t i c a l G u i d e

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Report of a Technical Working Group



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1. INTRODUCTION

1.1 Preamble

Despite considerable debate and research over many years the concept of "normality" in labour and delivery is not standardised or universal. Recent decades have seen a rapid expansion in the development and use of a range of practices designed to start, augment, accelerate, regulate or monitor the physiological process of labour, with the aim of improving outcomes for mothers and babies, and sometimes of rationalising work patterns in institutional birth. In developed countries where such activity has become generalised questions are increasingly raised as to the value or desirability of such high levels of intervention. In the mean time, developing countries are seeking to make safe, affordable delivery care accessible to all women. The uncritical adoption of a range of unhelpful, untimely, inappropriate and/or unnecessary interventions, all too frequently poorly evaluated, is a risk run by many who try to improve the maternity services. After establishing a working definition of "normal birth" this report identifies the commonest practices used throughout labour and attempts to establish some norms of good practice for the conduct of non-complicated labour and delivery.

The report addresses issues of care in normal birth irrespective of the setting or level of care. Its recommendations on those interventions which are or should be used to support the processes of normal birth are neither country nor region specific. Enormous variations exist worldwide as to the place and level of care, the sophistication of services available and the status of the caregiver for normal birth. This report aims simply to examine the evidence for or against some of the commonest practices and to establish recommendations, based on the soundest available evidence, for their place in normal birth care. In 1985 a meeting of the World Health Organization (WHO) European region, the regional office of the Americas, together with the Pan American Health Organization in Fortaleza, Brazil, made a number of recommendations based on a similar range of practices (WHO 1985). Despite this, and despite the rapidly increased emphasis on the use of evidence-based medicine, many of these practices remain common, without due consideration of their value to women or their newborns. This is the first time that a meeting involving childbirth experts from each of the WHO regions worldwide has had the opportunity to clarify, in the light of current knowledge, what they consider to be the place of such practices in normal birth care.

After debating the evidence, the working group classified its recommendations on practices related to normal birth into four categories:

- A. *Practices which are demonstrably useful and should be encouraged***
- B. *Practices which are clearly harmful or ineffective and should be eliminated***
- C. *Practices for which insufficient evidence exists to support a clear recommendation and which should be used with caution while further research clarifies the issue***
- D. *Practices which are frequently used inappropriately.***

1.2 Background

The first issue to be clarified is the sense in which the expression "normal birth" is used throughout this paper (see 1.4 below). It is vital to be specific on this if misinterpretation is to be avoided. A frequently cited statement concludes that "childbirth can only be declared normal in retrospect". This widespread notion led obstetricians in many countries to conclude that care during normal childbirth should be similar to the care in complicated deliveries. This concept has several disadvantages: it has the potential to turn a normal physiological event into a medical procedure; it interferes with the freedom of women to experience the birth of their children in their own way, in the place of their own choice; it leads to unnecessary interventions; and, because of the need for economies of scale, its application requires a concentration of large numbers of labouring women in technically well-equipped hospitals with the concomitant costs.

With the global phenomenon of increasing urbanisation many more women are delivering in obstetric facilities, whether they are having normal or complicated births. There is a temptation to treat all births routinely with the same high level of intervention required by those who experience complications. This, unfortunately, has a wide range of negative effects, some of them with serious implications. They range from the sheer cost of time, training and equipment demanded by many of the methods used, to the fact that many women may be deterred from seeking the care they need because they are concerned about the high level of intervention. Women and their babies can be harmed by unnecessary practices. Staff in referral facilities can become dysfunctional if their capacity to care for very sick women who need all their attention and expertise is swamped by the sheer number of normal births which present themselves. In their turn, such normal births are frequently managed with "standardised protocols" which only find their justification in the care of women with childbirth complications.

This report is not a plea for any particular setting for birth, for it recognises the reality of a range of appropriate places, from home to tertiary referral centre, depending on availability and need. It simply aims to identify what constitutes sound care for normal birth, wherever that birth takes place. The point of departure for the safe achievement of any birth, the assessment of risk, requires a special study of its own, but a brief introduction to the concept is needed here before the components of care in labour are discussed.

1.3 Risk Approach in Maternity Care

An assessment of need and of what might be called "birthing potential" is the foundation of good decision making for birth, the beginning of all good care. What is known as the "risk approach" has dominated decisions about birth, its place, its type and the caregiver for decades now (Enkin 1994). The problem with many such systems is that they have resulted in a disproportionately high number of women being categorised as "at risk", with a concomitant risk of having a high level of intervention in the birth. A further problem is that, despite scrupulous categorisation, the risk approach fails signally to identify many of the women who will in fact need care for complications in childbirth. By the same token, many women identified as "high risk" go on to have perfectly normal, uneventful births. Nonetheless, some form of initial and ongoing evaluation of a woman's likelihood of giving birth normally is critical to preventing and/or identifying the onset of complications and the decisions which have to be made about providing appropriate care.

This report therefore starts with the question of the assessment of the woman embarking on labour. The assessment of risk factors starts during prenatal care. This can be attained in a relatively simple way by determining maternal age, height and parity, asking for complications in obstetric history such as previous stillbirth or caesarean section, and searching for

abnormalities in the present pregnancy, such as pre-eclampsia, multiple pregnancy, ante partum haemorrhage, abnormal lie or severe anaemia (De Groot et al 1993). The risk assessment can also differentiate more extensively between individual risk factors and levels of care (Nasah 1994). In the Netherlands a list of medical indications for specialist care has been devised, distinguishing between low, medium and high risk (Treffers 1993). In many countries and institutions where a distinction is made between low-risk and high-risk pregnancies, comparable lists are in use.

The effectiveness of a risk scoring system is measured by its ability to discriminate between women at high and low risk, that is by its sensitivity, specificity, positive and negative predictive value (Rooney 1992). Exact figures about the discriminatory performance of these risk scoring systems are difficult to obtain, but from the available reports we may conclude that a reasonable distinction between low and high risk pregnancies can be made in developed and developing countries (Van Alten et al 1989, De Groot et al 1993). Defining obstetric risk by demographic factors such as parity and maternal height has a low specificity and therefore results in many uncomplicated deliveries being labelled as high risk. The specificity of complications in the obstetric history or in the present pregnancy is much higher. However, even high quality antenatal care and risk assessment cannot be a substitute for adequate surveillance of mother and fetus during labour.

Risk assessment is not a once-only measure, but a procedure continuing throughout pregnancy and labour. At any moment early complications may become apparent and may induce the decision to refer the woman to a higher level of care.

During prenatal care a plan should be made, in the light of the assessment, which identifies where and by whom labour will be attended. This plan should be prepared with the pregnant woman, and made known to her husband/partner. In many countries it is also advisable that the plan is known to the family, because they ultimately take the important decisions. In societies where confidentiality is practised other rules prevail: the family can only be informed by the woman herself. The plan should be available when labour starts. At that moment a reevaluation of the risk status takes place, including a physical examination to assess maternal and fetal well-being, fetal lie and presentation and the presenting signs of labour. If no prenatal care has been provided, an assessment of risk should be made at the time of the first contact with the caregiver during labour. Low-risk labour starts between 37 and 42 completed weeks. If no risk factors are identified labour can be considered as low-risk.

1.4 Definition of Normal Birth

In defining normal birth two factors must be taken into consideration: the risk status of the pregnancy, and the course of labour and delivery. As already discussed, the predictive value of risk scoring is far from being 100% - a pregnant woman who is at low risk when labour starts may eventually have a complicated delivery. On the other hand, many high-risk pregnant women ultimately have an uncomplicated course of labour and delivery. In this report our primary target is the large group of low-risk pregnancies.

We define normal birth as: spontaneous in onset, low-risk at the start of labour and remaining so throughout labour and delivery. The infant is born spontaneously in the vertex position between 37 and 42 completed weeks of pregnancy. After birth mother and infant are in good condition.

However, as the labour and delivery of many high-risk pregnant women have a normal course, a number of the recommendations in this paper also apply to the care of these women.

According to this definition how many births can be considered normal? This will largely depend on regional and local risk assessment and referral rates. Studies on "alternative birthing care" in developed countries show an average referral rate during labour of 20%, while an equal number of women have been referred during pregnancy. In multiparous women the referral rates are much lower than in nulliparae (MacVicar et al 1993, Hundley et al 1994, Waldenström et al 1996). In these studies risk assessment usually is painstaking, which means that many women are referred who will eventually end up with a normal course of labour. In other settings the number of referrals might be lower. In Kenya it was found that 84.8% of all labours were uncomplicated (Mati et al 1983). Generally, between 70 and 80% of all pregnant women may be considered as low-risk at the start of labour.

1.5 Aim of the Care in Normal Birth, Tasks of the Caregiver

The aim of the care is to achieve a healthy mother and child with the least possible level of intervention that is compatible with safety. This approach implies that:

In normal birth there should be a valid reason to interfere with the natural process.

The tasks of the caregiver are fourfold:

- support of the woman, her partner and family during labour, at the moment of childbirth and in the period thereafter.
- observation of the labouring woman; monitoring of the fetal condition and of the condition of the infant after birth; assessment of risk factors; early detection of problems.
- performing minor interventions, if necessary, such as amniotomy and episiotomy; care of the infant after birth.
- referral to a higher level of care, if risk factors become apparent or complications develop that justify such referral.

This description assumes that referral to a higher level of care can be easily realized. In many countries that is not the case; special regulations are then necessary to enable primary

caregivers to perform life saving tasks. This implies additional training, and adaptation of legislation to support the caregiver in these tasks. It also implies agreement amongst caregivers regarding their responsibilities (Kwast 1992, Fathalla 1992).

1.6 The Caregiver in Normal Birth

The birth attendant should be able to fulfil the tasks of the caregiver, as formulated earlier. He or she should have a proper training and a range of midwifery skills appropriate to the level of service. At the least, these should permit the caregiver to assess risk factors, recognise the onset of complications, perform observations of the mother and monitor the condition of the fetus and the infant after birth. The birth attendant must be able to perform essential basic interventions and to take care of the infant after birth. He or she should be able to refer the woman or the baby to a higher level of care if complications arise which require interventions which are beyond the caregiver's competence. Last but not least, the birth attendant should have the patience and empathetic attitude needed to support the woman and her family. Where possible, the caregiver should aim at providing continuity of care during pregnancy, childbirth and post partum period, if not in person then by the way that care is organised. Various professionals can be considered to fulfil these tasks:

- The obstetrician-gynaecologist: these professionals are certainly able to deal with the technical aspects of the various tasks of the caregiver. Hopefully they also have the required empathetic attitude. Generally obstetricians have to devote their attention to high-risk women and the treatment of serious complications. They are normally responsible for obstetric surgery. By training and by professional attitude they may be inclined and indeed, are often required by the situation, to intervene more frequently than the midwife. In many countries, especially in the developing world, the number of obstetricians is limited and they are unequally distributed, with the majority practising in big cities. Their responsibilities for the management of major complications are unlikely to leave them much time to assist and support the woman and her family for the duration of normal labour and delivery.
- The general physician and the general practitioner: the theoretical and practical training in obstetrics of these professionals varies widely. Certainly there are well-trained practitioners who are able to fulfil the tasks of the caregiver in primary care obstetrics and thus in normal birth. However, for general practitioners obstetrics is usually only a small part of their training and daily duty, and therefore it is difficult to keep up the skill and to remain up-to-date. General physicians working in developing countries often devote much of their time to obstetrics and are thus quite experienced, but may have to give more attention to obstetric pathology than to normal childbirth.
- The midwife: the international definition of the midwife, according to WHO, ICM (International Confederation of Midwives) and FIGO (the International Federation of Obstetricians and Gynaecologists) is quite simple: if the education programme is recognized by the government that licenses the midwife to practice, that person is a midwife (Peters 1995). Generally he or she is a competent caregiver in obstetrics, especially trained in the care during normal birth. However, there are wide variations between countries with respect to training and tasks of midwives. In many industrialized countries midwives function in hospitals under supervision of obstetricians. Usually this means that the care in normal birth is part of the care in the whole obstetric department, and

thus subject to the same rules and arrangements, with little distinction between high-risk and low-risk pregnancies.

The effect of the International Definition of the Midwife is to acknowledge that different midwifery education programmes exist. These include the possibility of training as a midwife without any previous nursing qualification, or "direct entry" as it is widely known. This form of training exists in many countries, and is experiencing a new wave of popularity, both with governments and with aspiring midwives (Radford and Thompson 1987). Direct entry to a midwifery programme, with comprehensive training in obstetrics and related subjects such as paediatrics, family planning, epidemiology etc. has been acknowledged as both cost-effective and specifically focused on the needs of childbearing women and their newborn. More important than the type of preparation for practice offered by any government is the midwife's competence and ability to act decisively and independently. For these reasons it is vital to ensure that any programme of midwifery education safeguards and promotes the midwives' ability to conduct most births, to ascertain risk and, where local need dictates, to manage complications of childbirth as they arise (Kwast 1995b, Peters 1995, Treffers 1995). In many developing countries midwives function in the community and health centres as well as in hospitals, often with little or no supervisory support. Efforts are being made to promote an expanded role of midwives, including life-saving skills in several countries in many parts of the world (Kwast 1992, O'Heir 1996).

- Auxiliary personnel and trained TBAs (traditional birth attendants): in developing countries which have a shortage of well-trained health care personnel the care in villages and health centres is often committed to auxiliary personnel, such as auxiliary nurse/midwives, village midwives or trained TBAs (Ibrahim 1992, Alisjahbana 1995). Under certain circumstances this may prove inevitable. These persons have at least some training and frequently provide the backbone of maternity services at the periphery. The outcome of pregnancy and labour can be improved by making use of their services, especially if they are supervised by well-trained midwives (Kwast 1992). However, for the fulfilment of the complete set of tasks of the caregiver as described above their education is frequently insufficient, and their background may mean that their practice is conditioned by strong cultural and traditional norms which may impede the effectiveness of their training. Nonetheless, it should be acknowledged that it is precisely this close cultural identification which often makes many women prefer them as caregivers for birth, especially in rural settings (Okafor and Rizzuto 1994, Jaffre and Prual 1994).

From the above account, the midwife appears to be the most appropriate and cost effective type of health care provider to be assigned to the care of normal pregnancy and normal birth, including risk assessment and the recognition of complications. Among the recommendations accepted by the General Assembly of the XIII World Congress of FIGO (International Federation of Gynaecology and Obstetrics) in Singapore 1991 (FIGO 1992) are the following:

- To make it more accessible to women in greatest need, each function of maternity care should be carried out at the most peripheral level at which it is feasible and safe.

- To make the most efficient use of available human resources, each function of maternity care should be carried out by the least trained persons able to provide that care safely and effectively.
- In many countries, midwives and assistant nurse-midwives, located in small health centres, require a higher level of support if maternity care is to be effectively provided for and with the community.

These recommendations point to the midwife as the basic health care provider in obstetrics delivering care in small health centres, in villages and at home, and perhaps also in hospitals (WHO 1994). Midwives are the most appropriate primary health care provider to be assigned to the care of normal birth. However, in many developed and developing countries midwives are either absent or are present only in large hospitals where they may serve as assistants to the obstetricians.

In 1992 the House of Commons Health Committee report on maternity services was published in the United Kingdom. Among other things, it recommended that midwives should carry their own caseload and take full responsibility for the women in their care; midwives should also be given the opportunity to establish and run midwife-managed maternity units within and outside hospitals (House of Commons 1992). The report was followed by the Expert Maternity Group report "Changing Childbirth" (Department of Health 1993) with comparable recommendations. These documents are first steps towards increased professional independence for midwives in Britain. In a few European countries midwives are fully responsible for the care of normal pregnancy and childbirth, either at home or in hospital. But in many other European countries and in the USA almost all midwives (if present) practise in hospital under the supervision of the obstetrician.

In many developing countries the midwife is considered the key person in the provision of maternity care (Mati 1994, Chintu and Susu 1994). However, that is not the case in all: some face a shortage of midwives. Especially in Latin America, schools of midwifery have been closed down, on the assumption that physicians would cover the tasks. In some countries the number of midwives is declining, and those that are present are maldistributed: the majority work in hospitals in towns, and not in the rural areas where 80% of the population lives and consequently most of the problems lie (Kwast and Bentley 1991, Kwast 1995b). It is recommended that more midwives be trained, and that consideration be given to the location of the training schools so that they are easily accessible to women and men from rural areas who are thus more likely to stay in the community they come from. The training should be such that midwives can meet the needs of the communities they are going to serve. They should be able to identify complications which require referral, but if referral to a higher level of care is difficult they should be able to perform life saving interventions.

2. GENERAL ASPECTS OF CARE IN LABOUR

2.1 Assessing the Well-being of the Woman during Labour

Where the onset of labour is spontaneous women themselves usually initiate care, either by sending for their birth attendant or by making arrangements to be admitted to a health facility. The attendant's responsibility for assessing the most appropriate care at the outset of labour has already been addressed, and the importance of support throughout labour is discussed below. Wherever birth takes place the establishment of good rapport between the woman and her caregiver is vital, whether or not they have met previously. The quality of welcome extended to a woman who seeks institutional care may well determine the level of trust which she and her family feel able to put in her carers.

Throughout labour and delivery the woman's physical and emotional well-being should be regularly assessed. This implies measuring of temperature, pulse and blood pressure, checking fluid intake and urine output, assessing pain and need of support. This monitoring should be maintained until the conclusion of the birthing process.

The assessment of the woman's well-being also comprises attention to her privacy during labour, respecting her choice of companions and avoiding the presence of unnecessary persons in the labour room.

2.2 Routine Procedures

The preparation for birth on admission to a hospital or health centre often includes several "routine" procedures such as the measuring of temperature, pulse and blood pressure, and an enema, followed by shaving of all or some of the pubic hair.

The first three procedures, taking and recording temperature, pulse and blood pressure, can have implications for the final outcome of birth, and could therefore influence the management of labour. These routine procedures should not be dismissed, although they should be introduced and explained to the woman and her partner. Measuring the temperature every 4 hours, according to the WHO partograph, is important, because a rise in temperature may be a first sign of infection, and thus may lead to early treatment, especially in case of prolonged labour and ruptured membranes; this may prevent sepsis. Sometimes it may be a sign of dehydration. Taking the blood pressure at the same intervals, is an important check on maternal well-being. A sudden rise in blood pressure can indicate the need to expedite delivery or transfer the woman to a higher level of care.

Enemas are still widely used because they supposedly stimulate uterine contractions and because an empty bowel allows the head to descend. They are also believed to reduce contamination and thereby infection of mother and child. However, they are uncomfortable and carry a certain risk of damage to the bowel. Even though some women ask for an enema, many women find them an embarrassment. Two randomized controlled trials (Romney and Gordon 1981, Drayton and Rees 1984) found that, with use of an enema, the rate of faecal soiling is unaffected during the first stage of labour, but reduced during delivery. Without an enema soiling is mainly slight, and easier to remove than soiling after an enema. No effects on the duration of labour or on neonatal infection or perineal wound infection were detected.

Pubic shaving (Johnston and Sidall 1922, Kantor et al 1965) is presumed to reduce infection and facilitate suturing but there is no evidence to support this. Women experience

discomfort as the hair grows back and the risk of infection is not reduced. The routine use could even increase the risk of infection by the HIV and hepatitis virus, either to the care provider or the woman.

In conclusion, measuring temperature, pulse and blood pressure are observations rather than interventions and are part of ongoing assessment in labour. They have a clear place in care, since they can indicate the need to change the course of action in any particular birth. However, they are only feasible in some settings. The last two procedures, enemas and pubic shaving, have long been considered unnecessary and should not be done except at the woman's request. There is no documentation on the above mentioned routine procedures in the case of home birth, let alone research. Neither is there evidence that at home the need for them is different from the need in hospital.

2.3 Nutrition

Views on nutrition during childbirth differ widely across the world. In many developed countries, the fear of aspiration of gastric contents during general anaesthesia (Mendelson's syndrome) continues to justify the rule of no food and drink during labour. For most women in labour the withholding of food poses no problem, as they do not want to eat during labour anyway, although many desperately need to drink. In many developing countries traditional culturally-bound beliefs restrain the food and fluid intake of women in labour.

The fear that eating and drinking during labour will put women at risk of aspirating stomach contents during anaesthesia is real and serious. Keeping a restriction on the food and fluid intake during labour however, does not guarantee reduced stomach content (Crawford 1956, Taylor and Pryse-Davies 1966, Roberts and Shirley 1976, Tettambel 1983, Mckay and Mahan 1988). Several trials on methods to reduce stomach content or the acidity of the content, both by pharmacological means and by restriction of oral intake, have not been able to establish a 100% positive effect of any specific method. The range of pH values found was wide and therefore, a researcher concludes, routine administration of antacids during labour cannot be relied on to prevent Mendelson's syndrome, neither does it affect the volume of gastric contents.

The risk of aspiration is associated with the risk of general anaesthesia. As there is no guarantee against Mendelson's syndrome, the correct approach for normal childbirth should include an assessment of the risk of general anaesthesia. Once categorized, the low risk birth can be managed without administration of antacids.

Labour requires enormous amounts of energy. As the length of labour and delivery cannot be predicted, the sources of energy need to be replenished in order to ensure fetal and maternal well-being. Severe restriction of oral intake can lead to dehydration and ketosis. This is commonly treated by an intravenous infusion of glucose and fluid. The maternal effects of this treatment have been evaluated in a number of randomized trials (Lucas et al 1980, Rutter et al 1980, Tarnow-Mordi et al 1981, Lawrence et al 1982). The rise in mean serum glucose levels appears to be accompanied by a rise in maternal insulin levels (and a reduction in mean levels of 3-hydroxybutyrate). It also results in an increase in plasma glucose levels in the baby and it may result in a decrease in umbilical arterial blood pH. Hyperinsulinism can occur in the fetus when women receive more than 25 grammes of glucose intravenously during labour. This can result in neonatal hypoglycaemia and raised levels of blood lactate. The excessive use of salt-free intravenous solutions can lead to hyponatraemia in both mother and child.

The above mentioned complications, especially dehydration and ketosis, can be prevented by offering oral fluids during labour, and by offering light meals. Routine intravenous infusions interfere with the natural process and restrict women's freedom to move. Even the prophylactic routine insertion of an intravenous cannula invites unnecessary interventions.

In the home birth situation no specific treatment is given; no use of antacids, no restriction of food and fluid intake. Sometimes women are cautioned that eating and drinking during labour can make them nauseous, but as they are in their own home, there is no control over what they eat and drink. When women do decide to eat they tend to eat light foods that are easily digestible. Intuitively they leave heavy meals and beverages alone. It is safe to say that for the normal, low-risk birth in any setting there is no need for restriction of food. However, serious discussion is necessary to determine whether the effects of intervention in maternal nutrition during labour are not worse than the risks of Mendelson's syndrome. And many questions remain, such as: Is there any research on labour with a full stomach? Is there any difference between eating and drinking a little or not at all? Are there any data on the effects of food and fluid restriction during labour in the developing countries, where there are no means of substituting the loss of energy in prolonged labour?

In conclusion, nutrition is a subject of great importance and great variability at the same time. The correct approach seems to be not to interfere with the women's wish for food and drink during labour and delivery, because in normal childbirth there should be a valid reason to interfere with the natural process. However, there are so many die-hard fears and routines all over the world that each needs to be dealt with in a different way.

2.4 Place of Birth

Does the place of birth have an impact on the course of labour and delivery? This question has been abundantly researched in the past two decades (Campbell and Macfarlane, 1994). When in many developed countries labour went from a natural process to a controlled procedure, the place of birth changed from home to hospital. At the same time much of the human touch was taken out. Pain was alleviated pharmacologically and women were left alone for long periods of time as they were in a light sleep anyway; they were monitored closely from afar. This was the opposite end of the spectrum of those parts of the world where fewer than 20% of women have access to any type of formal birth facility. For them, home birth is not an option, it is virtually inevitable, for reasons ranging from the economic to the cultural, and including the geographical (Mbizvo et al 1993, Onwudiego 1993, Smith 1993). The call for a return to the natural process in many parts of the developed world opened up delivery rooms to fathers and to other family members, but the location stayed the same: the hospital. Some hospitals have made an effort by installing a home-like birth room and this was found to increase maternal satisfaction and reduce the rate of perineal trauma, as well as reducing the desire for a different setting for the next birth, but randomised trials found no effect on the use of epidural analgesia, forceps delivery and caesarean section (Klein et al 1984, Chapman et al 1986). These trials were primarily concerned with a more attractive labour ward setting without a fundamental change in care; apparently this is not enough to improve the quality of care and the obstetric outcome.

Other studies found that a woman with a low risk delivery giving birth to her first child in a teaching hospital could be attended by as many as 16 people during 6 hours of labour and still be left alone for most of the time (Hodnett and Osborn 1989b). Routine, though unfamiliar, procedures, the presence of strangers and being left alone during labour and/or delivery caused stress, and stress can interfere with the course of birth by prolonging it and setting off what has been described as a "cascade of intervention".

Home birth is a practice which is unevenly spread across the world. With the widespread institutionalisation of childbirth since the 1930s the option of a home birth in most developed countries disappeared, even where it was not banned. The system of obstetric care in the Netherlands, where still more than 30% of pregnant women deliver at home, is exceptional among developed countries (Van Alten et al 1989, Treffers et al 1990). On the other hand, in many developing countries, great distances between women and the health facilities restrict options and make home birth the only choice.

Although risk assessment may be appropriately performed by trained birth attendants their advice about the place of birth, made on the basis of such assessment, is not always followed. Many factors keep women away from higher level health facilities. These include the cost of a hospital delivery, unfamiliar practices, inappropriate staff attitudes, restrictions with regard to the attendance of family members at the birth and the frequent need to obtain permission from other (usually male) family members before seeking institutional care (Brieger et al 1994, Paolisso and Leslie 1995). Often, high and very high risk women do not feel ill or show signs of disease, so they give birth at home, attended by a family member, by a neighbour or by a TBA (Kwast 1995a).

However, a properly attended home birth does require a few essential preparations. The birth attendant must make sure that there is clean water at hand and that the room in which the birth takes place is warm. There is a need for careful handwashing. Warm cloths or towels must be ready to wrap around the baby to keep it warm. There must also be at least some form of clean delivery kit as recommended by WHO in order to create as clean a field as possible for birth and to give adequate treatment to the umbilical cord. Furthermore, transport facilities to a referral centre must be available if needed. In practical terms this means that community participation and revolving funds are necessary to enable transport to be arranged for emergencies in areas where transportation is a problem.

In some developed countries birth centres in and outside hospitals have been established where low-risk women can give birth in a home-like atmosphere, under primary care, usually attended by midwives. In most such centres electronic fetal monitoring and augmentation of labour are not used and there is a minimum use of analgesics. An extensive report about birth centre care in the USA described care in alternative birth centres in and outside hospitals (Rooks et al 1989). Experiments with midwife-managed care in hospitals in Britain, Australia and Sweden showed that women's satisfaction with such care was much higher than with standard care. The number of interventions was generally lower, especially obstetric analgesia, induction and augmentation of labour. The obstetric outcome did not significantly differ from consultant-led care, though in some trials perinatal mortality tended to be slightly higher in the midwife-led models of care (Flint et al 1989, MacVicar et al 1993, Waldenström and Nilsson 1993, Hundley et al 1994, Rowley et al 1995, Waldenström et al 1996).

In a number of developed countries dissatisfaction with hospital care led small groups of women and caregivers to the practice of home birth in an alternative setting, often more or less in confrontation with the official system of care. Statistical data about these home births are scarce. In an Australian study data were collected which suggested that the selection of low-risk pregnancies was only moderately successful. In planned home deliveries the number of transfers to hospital and the rate of obstetric interventions was low. Perinatal mortality and neonatal morbidity figures were also relatively low, but data about preventable factors were not provided (Bastian and Lancaster 1992).

The Netherlands is a developed country with an official home birth system. The incidence of home deliveries differs considerably between regions, and even between large cities. A study of perinatal mortality showed no correlation between regional hospitalisation at delivery and regional perinatal mortality (Treffers and Laan 1986). A study conducted in the province of Gelderland, compared the "obstetric result" of home births and hospital births. The results suggested that for primiparous women with a low-risk pregnancy a home birth was as safe as a hospital birth. For low-risk multiparous women the result of a home birth was significantly better than the result of a hospital birth (Wiegers et al 1996). There was no evidence that this system of care for pregnant women can be improved by increasing medicalization of birth (Buitendijk 1993).

In Nepal the decentralization approach of maternity care has been adapted to the special needs of urban areas in a developing country, where a hospital's capacity to deliver the specialist obstetric services needed by women with childbirth complications was being swamped by the sheer numbers of low-risk women experiencing normal birth - a common scenario in many countries. The development of a "low-technology" birthing unit in the vicinity of the main hospital not only took the pressure off the specialist unit but made it much easier to deliver appropriate care to women in normal labour. A similar, larger-scale project took place in Lusaka, Zambia, where a University teaching hospital, serving as a specialist referral centre for the entire country, was overcrowded by large numbers of low-risk pregnant women. The extension of the capacity of the peripheral delivery centres and the opening of new centres for low-risk births reduced the number of deliveries in the hospital from around 22,000 to around 12,000, and at the same time the total number of births in the dozen satellite clinics rose from just over 2000 in 1982 to 15,298 in 1988. The care of high-risk women in the hospital was improved by the reduction in numbers of low-risk women, while in the peripheral units time was available to ensure that the low-risk women received the care and attention they needed (Nasah and Tyndall 1994).

So where then should a woman give birth? It is safe to say that a woman should give birth in a place she feels is safe, and at the most peripheral level at which appropriate care is feasible and safe (FIGO 1992). For a low-risk pregnant woman this can be at home, at a small maternity clinic or birth centre in town or perhaps at the maternity unit of a larger hospital. However, it must be a place where all the attention and care are focused on her needs and safety, as close to home and her own culture as possible. If birth does take place at home or in a small peripheral birth centre, contingency plans for access to a properly-staffed referral centre should form part of the antenatal preparations.

2.5 Support in Childbirth

Reports and randomized controlled trials on support in labour by one single person, a "doula", midwife or a nurse, showed that continuous empathetic and physical support during labour resulted in many benefits, including shorter labour, significantly less medication and epidural analgesia, fewer Apgar scores of <7 and fewer operative deliveries (Klaus et al 1986, Hodnett and Osborn 1989, Hemminki et al 1990, Hofmeyr et al 1991).

This report identifies a doula as a female caregiver, who has had a basic training in labour and delivery and who is familiar with a wide variety of care procedures. She provides emotional support consisting of praise, reassurance, measures to improve the comfort of the mother, physical contact such as rubbing the mother's back and holding her hands, explanation of what is going on during labour and delivery and a constant friendly presence. Such tasks can also be fulfilled by a nurse or midwife, but they often need to perform technical/medical procedures that can distract their attention from the mother. However, the constant comforting

support of a female caregiver significantly reduced the anxiety and the feeling of having had a difficult birth in mothers 24 hours postpartum. It also had a positive effect on the number of mothers who were still breast-feeding 6 weeks postpartum.

A woman in labour should be accompanied by the people she trusts and feels comfortable with; her partner, best friend, doula or midwife. In some developing countries this could also include the TBA. Generally these will be people she has become acquainted with during the course of her pregnancy. Professional birth attendants need to be familiar with both the supportive and the medical tasks they have and be able to perform both with competence and sensitivity. One of the supportive tasks of the caregiver is to give women as much information and explanation as they desire and need. Women's privacy in the birthing setting should be respected. A labouring woman needs her own room, where the number of attendants should be limited to the essential minimum.

However, in actual practice conditions often differ considerably from the ideal situation described above. In developed countries women in labour often feel isolated in labour rooms of large hospitals, surrounded by technical equipment and without friendly support of caregivers. In developing countries some large hospitals are so overcrowded with low-risk deliveries that personal support and privacy are impossible. Home deliveries in developing countries are often attended by untrained or insufficiently trained caregivers. Under these circumstances support of the labouring woman is deficient or even absent, for a significant number of women deliver with no attendant at all.

The implications of the above statements for the location of birth and the provision of support can be far reaching, because they suggest that caregivers in childbirth should work on a much smaller scale. Skilled care in childbirth should be provided at or near to the place where women live, rather than bringing all women to a large obstetric unit. Large units that perform 50 to 60 deliveries a day would need to restructure their services to be able to cater to women's specific needs. Caregivers would need to reorganise work schedules in order to meet women's need for continuity of care and support. This also has cost implications and thus becomes a political issue. Both developing and developed countries need to address and resolve these issues in their own specific ways.

In conclusion, normal birth, provided it is low-risk, only needs close observation by a trained and skilled birth attendant in order to detect early signs of complications. It needs no intervention but encouragement, support and a little tender loving care. General guidelines can be given as to what needs to be in place to protect and sustain normal birth. However, each country willing to invest in these services needs to adapt these guidelines to its own specific situation and the needs of the women as well as to ensure that the basics are in place in order to adequately serve women at low, medium and high risk and those who develop complications.

2.6 Labour Pain

Almost all women experience pain during labour, but the responses of individual women to labour pain are widely different. According to clinical experience, abnormal labour, prolonged or complicated by dystocia, induced or accelerated by oxytocics, or terminated by instrumental delivery, seems to be more painful than "normal labour". Nevertheless, even completely normal labour is painful too.

2.6.1 Non-pharmacological methods of pain relief

An important task of the birth attendant is to help women cope with labour pain. This may be achieved by pharmacological pain relief, but more fundamental and more important is the non-pharmacological approach, starting during prenatal care by providing reassuring information to the pregnant woman and her partner, and if need be to her family. Empathetic support, before and during labour, from caregivers and companions, can reduce the need for pharmacological pain relief and thus improve the childbirth experience (see 2.5).

Apart from support during labour (the most important factor) there are several other methods to alleviate labour pain. The first is the opportunity to assume any position the woman wishes, in or out of bed, during the course of labour. This means that she should not be restricted to bed, and certainly not to the supine position, but that she should have the freedom to adopt upright postures such as sitting, standing, or walking, without interference by caregivers, especially during the first stage of labour (see 3.2).

There are several non-invasive, non-pharmacological methods of pain relief that can be used during labour. Many women find relief of pain by the use of a shower or a bath. Touch and massage by a companion are often felt to be helpful. The same holds true for methods that help women cope with pain by attention-focusing techniques like patterned breathing, verbal coaching and relaxation, drawing a woman's attention away from her pain. These methods are sometimes applied in combination with other strategies, including a range of psychosomatic approaches to support a woman in labour such as hypnosis, music and biofeedback. The practices are experienced as useful by many women, they are harmless and can be recommended.

Specific non-pharmacological methods for relief of pain in women in normal labour include methods that activate peripheral sensory receptors (Simkin 1989). Among the newest of these is transcutaneous electrical nerve stimulation (TENS). The self-administered nature of this technique has contributed to its success among many women, but its availability is limited to high-resource areas of the world, and its effectiveness has not been demonstrated in randomized trials (Erkolla et al 1980, Nesheim 1981, Bundsen et al 1982, Harrison et al 1986, Hughes et al 1986, Thomas et al 1988). Other techniques are the use of superficial heat and cold, acupuncture, immersion in water, herbs and aromatherapy with fragrant oils. For most of these techniques randomized trials to establish their effectiveness are not available yet. These practices should undergo the same process of critical review as is required for pharmacological intervention. The same holds true for a semi-pharmacological method as intradermal injections of sterile water at four spots in the lower back area (Enkin et al 1995).

In conclusion, all cultures have their own ways of attending and coaching pregnant women, some of them explain their customs in a magic way, others try to give a more logical explanation for the system they apply. A common feature of many of these methods is the intense attention paid to the woman during pregnancy and childbirth; perhaps this is the reason why so many pregnant women find them comforting and helpful. The reports that women find them comforting are mainly observational, but nevertheless a number of these methods are harmless, and their use by women who experience relief of pain by them may be justified. Training in counselling and inter-personal communication skills is vital for all who care for childbearing women (Kwast 1995a).

2.6.2 Pharmacological pain relief in labour

Pharmacological methods of pain relief have gained ample application, especially in the developed countries. The effects of several techniques have been investigated by clinical trials; the benefits of pain relief became obvious, but the possible adverse effects on mother or infant have received less attention.

Systemic agents

A number of drugs have been and are being used for pain relief: opioid alkaloids, of which by far the most popular is pethidine, followed by phenothiazine derivatives (promethazine), benzodiazepines (diazepam) and others. In some countries inhalation analgesia for normal labour has decreased in recent years (it has been replaced by epidural analgesia); the most commonly used agent is nitrous oxide combined with 50 percent oxygen. All these agents can provide reasonable pain relief, but at the cost of unwanted side-effects (Dickersin 1989). Maternal side-effects of pethidine are orthostatic hypotension, nausea, vomiting, and dizziness. All of the systemic drugs used for pain relief cross the placenta and all except nitrous oxide are known to cause respiratory depression in the baby and neonatal behavioural abnormalities, including reluctance to breast-feed. Diazepam can cause neonatal respiratory depression, hypotonia, lethargy and hypothermia (Dalen et al 1969, Catchlove and Kafer 1971, Flowers et al 1969, McCarthy et al 1973, McAllister 1980).

Epidural analgesia

Of the different techniques of regional analgesia (epidural, caudal, paracervical, spinal) epidural analgesia is the method most widely used in normal labour. Its effects have been investigated in a number of trials, all of which compare epidural analgesia with other techniques of pain control (Robinson et al 1980, Philipsen and Jensen 1989, 1990, Swanstrom and Bratteby 1981, Thorp et al 1993). It provides better and more lasting pain relief than systemic agents. The adoption of epidural analgesia in obstetric care is resource-intensive and calls for several important facilities: labour and delivery should take place in a well-equipped hospital, the technical apparatus should be sufficient, an anaesthetist should be available at all times and constant skilled supervision of the mother is called for.

With epidural analgesia there is a tendency for the first stage of labour to be somewhat longer, and for oxytocin to be used more frequently. In several reports and trials the number of vaginal operative deliveries was increased, especially if the analgesic effect was maintained into the second stage of labour, thereby suppressing the bearing-down reflex. In a recent American trial the number of caesarean sections was increased when epidural analgesia was used, especially when the epidural was started before 5 cm dilatation (Thorp et al 1993). There is a paucity of data from randomized trials on possible effects of epidural analgesia on either mother or baby in the long term. No randomised trial compared epidural analgesia to "no pain control" or a non-pharmacological method, all comparisons are between different methods of epidural analgesia, or different methods of pharmacological pain relief. The main effect measured in the trials was the degree of pain relief, but in none of the trials of epidural analgesia was maternal satisfaction with childbirth measured. An observational study (Morgan et al 1982) suggests that there is no direct relation between pain relief and satisfaction. In a trial of birth centre care in Sweden the use of epidural analgesia and other methods of pharmacological pain relief was significantly lower in the birth centre group compared with standard care; nevertheless the attitude towards labour pain when asked two months after the birth was not different between the groups. Apparently many of the women regarded pain in labour in a positive light, as a feeling of achievement, which illustrates the different character of pain in childbirth compared

to pain related to illness (Waldenström and Nilsson 1994). In a study of new mothers, support by caregivers had a positive effect on women's total birth experience, while pain relief did not explain any of the variations in women's responses (Waldenstrom et al 1996).

There is little doubt that epidural analgesia is useful in complicated labour and delivery. However, if epidural analgesia is administered to a low-risk pregnant woman, it is questionable whether the resulting procedure can still be called "normal labour". Naturally, the answer depends on the definition of normality, but epidural analgesia is one of the most striking examples of the medicalization of normal birth, transforming a physiological event into a medical procedure. The acceptance of this transformation is largely determined by cultural factors. For instance, in Britain and the USA a large number of low-risk pregnant women deliver under epidural analgesia, while in the vast majority of developing countries very many deliveries take place at home, without any pharmacological pain control. This is not merely a contrast between developing and developed countries: in the Netherlands more than 30% of all pregnant women give birth at home without any pharmacological pain control, and even if they deliver in hospital only a minority of low-risk women receive pain relieving medication (Senden et al 1988).

In conclusion, in the care surrounding normal birth, non-pharmacological methods of pain relief, such as paying personal attention to the labouring woman, are of utmost importance. Methods requiring a large number of technical facilities like epidural analgesia, are only applicable in well-equipped, well-staffed hospitals. In many countries these technical facilities are not generally available, especially for normal childbirth. However, the demand for these methods is in large measure culturally determined, the quality of care in normal delivery is not dependent on the availability of these technical facilities. They are no part of essential care during childbirth. Pharmacological methods should never replace personal attention to the labouring woman and tender loving care.

2.7 Monitoring the Fetus during Labour

Monitoring fetal well-being is part of essential care during labour. The occurrence of fetal distress, usually through hypoxia, can never be fully excluded, even though a labour may meet the criteria for "normal" that is: it starts at term, after an uneventful pregnancy without factors indicating an increased risk of complications. The risk of fetal distress is somewhat higher during the second stage of labour and in the case of prolonged labour.

2.7.1 Assessment of amniotic fluid

The passage of meconium may reflect fetal distress and is associated with intrapartum stillbirth and neonatal morbidity or death (Matthews and Martin 1974, Gregory et al 1974, Fujikura and Kliensky 1975, Meis et al 1978, MacDonald et al 1985). Where services permit, the passage of meconium during labour is considered an indication for referral of the labouring woman by the primary caregiver. Thick meconium recognized after rupture of the membranes carries the worst prognosis; undiluted meconium also reflects reduced amniotic fluid volume, which is a risk factor in itself. The absence of amniotic fluid at the time of rupturing the membranes should also be considered a risk factor. Slight staining of the amniotic fluid probably reflects a far less serious risk, but this has not been fully investigated.

2.7.2 Monitoring the fetal heart rate

The relation between fetal well-being and fetal heart rate has been investigated in numerous studies. It is clear that fetal distress may express itself in abnormalities of the heart rate: bradycardia (<120/min), tachycardia (>160/min), reduced variability or decelerations. There are two methods of monitoring the heart rate: intermittent auscultation and continuous electronic surveillance.

Intermittent auscultation can be done by using a monaural (Pinard's) stethoscope, as it has been since the beginning of this century, or by a simple hand-held ultrasound Doppler apparatus. When the stethoscope is used the woman usually lies on her back or on her side, though it is possible to hear the heart sounds even with the woman sitting or standing. The Doppler apparatus is applicable in various positions. The auscultation is usually performed once every 15-30 minutes during the first stage of labour, and following every contraction during the second stage. If necessary, the fetal heart rate is compared to the maternal heart rate. Intermittent auscultation with monaural stethoscope is the only available option for the vast majority of caregivers at the periphery, whether at the health centre or in the home. An advantage of intermittent auscultation is its sheer simplicity - a clear example of appropriate technology, with an implement (the monaural stethoscope) which is both cheap to produce (it can even be improvised quite easily) and uncomplicated to use, and which leaves the woman free to move about at will. This means that, with appropriate training, the caregiver can monitor the fetal heart anywhere and is not confined to hospitals with sophisticated technical equipment, such as electronic monitors. Surveillance of the labouring woman and the fetus can be done by a midwife at home, or in a small maternity unit.

Electronic fetal heart rate monitoring is used during pregnancy in the surveillance of high-risk pregnancies, and also during labour. Its use is normally limited to institutional births. The monitoring is most commonly achieved by an external Doppler ultrasound transducer, or by an internal (vaginal) electrode attached to the fetal scalp, after rupture of the membranes. Although the information on fetal heart rate is more accurate in the latter method than with auscultation, the interpretation is difficult; the tracings are often interpreted differently by different care-givers, and even by the same people at different times (Cohen et al 1982, Van Geijn 1987, Nielsen et al 1987). The sensitivity of the method with respect to the detection of fetal distress is high, but the specificity is low (Grant 1989). This means that the method results in a high rate of false positive signals, and a concomitant high number of (unnecessary) interventions, especially if used in a group of low-risk pregnant women (Curzen et al 1984, Borthen et al 1989). In high-risk pregnancies and in high-risk cases during labour the method has proven to be useful and may, in addition, offer reassurance to the woman, although its use inevitably limits the woman's capacity to move about as she wishes.

Among the drawbacks associated with the application of electronic monitoring is a tendency in some caregivers, and even partners and family, to focus on the apparatus instead of on the woman. In some technically well-equipped hospitals the monitoring is even centralized, enabling the attendant to look at the monitor in a central office without being obliged to enter the labour room.

2.7.3 Fetal scalp blood examination

A microtechnique of sampling blood from the fetal scalp in order to confirm fetal hypoxia has been in use since the early 1960s. The acid-base status of the blood is examined, especially the pH. There are some doubts about the representativeness of a blood sample from a chronically oedematous part of the skin and about the reproducibility, but nevertheless the

method has proven its value in clinical use, in combination with fetal heart rate monitoring. The method is resource-intensive, expensive, invasive, time-consuming, cumbersome, and uncomfortable for the woman. As with the fetal scalp electrode, its use can occasionally result in trauma, infection and possibly pain for the fetus. Finally, it requires continuous availability of laboratory facilities and skilled personnel. Its use is therefore generally limited to larger hospital departments serving many high-risk cases. Its role in the surveillance of low-risk labour is limited: only for diagnostic purposes after the detection of fetal heart rate abnormalities (Grant 1989).

2.7.4 Comparison of auscultation and electronic fetal monitoring

These two methods of fetal surveillance have been compared in a number of trials (Haverkamp et al 1976, 1979, Kelso et al 1978, MacDonald et al 1985, Wood et al 1981, Neldam et al 1986). Caesarean section rate and operative vaginal delivery rate were both higher in all the electronically monitored groups. If scalp pH estimations were not available, the increase in caesarean section rates was even higher. There is little evidence that the increased number of interventions in the electronically monitored groups led to substantive benefits for the infants. Perinatal deaths and low Apgar scores were not reduced in the groups with electronic monitoring. Only one measure of neonatal outcome was improved by electronic monitoring, in the largest trial: neonatal seizures (MacDonald et al 1985). A further analysis of this trial suggested that the excess risk of neonatal seizures in the auscultation group was mainly limited to labours that were induced or augmented with oxytocin. The follow-up data of the infants with seizures showed an equal incidence of major neurological disabilities in the groups monitored electronically and by auscultation.

These data have important consequences for fetal surveillance during normal labour. The substantial increase of interventions if labour is monitored electronically is in agreement with the low specificity of the method in low-risk cases, and does not seem to lead to substantive benefits for the infant. The only exception is the occurrence of neonatal seizures. However, these occurred primarily in infants born after the use of oxytocin infusions, and one may rightly ask if labour induced or augmented by oxytocin is to be considered as "normal labour". In countries with sophisticated facilities and a high proportion of institutional births labour which is induced or augmented by oxytocin or prostaglandin is considered high-risk, and such labours only take place under the responsibility of the obstetrician; fetal surveillance will then be by electronic monitoring. In a large follow-up study of midwifery care with intermittent auscultation in normal births but electronic monitoring after referral for oxytocin augmentation, the number of neonatal seizures was very low (Van Alten et al 1989, Treffers et al 1990).

Intermittent electronic monitoring is a variation of continuous electronic monitoring. This method is used during a period of half an hour at the start of labour, and subsequently at regular intervals for a period of about twenty minutes. In a randomized trial Herbst and Ingemarsson (1994) compared the method with continuous monitoring: the results in both groups were equally good. Although in this trial the intervention rate was low in both groups, it is to be expected that the method, if widely adopted in normal labour, would have the same disadvantages as continuous monitoring, though they would perhaps be less obvious. These include restriction of movement during the application and low specificity with concomitant interventions. Moreover, its routine use could lead to mistrust of intermittent auscultation, if there is any suggestion that auscultation might be less reliable than electronic monitoring. Of course, routine use of intermittent electronic fetal monitoring must be distinguished from recourse to electronic monitoring (where it is available) where auscultation indicates the possibility of fetal distress; such practice leads to closer attention to deviations from normality in auscultation.

In conclusion, the method of choice for the monitoring of the fetus during normal labour is intermittent auscultation. In many countries it is the only method available for the large majority of women. But also in industrialized countries, where electronic equipment is more easily accessible, auscultation is the method of choice in normal labour. Individualized care of the labouring woman is essential, and this may be achieved more smoothly by the personal contact required by regular auscultation. Only in women with increased risk, such as labours which are induced or augmented, complicated by meconium-stained amniotic fluid or by any other risk factor, does electronic monitoring seem to be advantageous. In the majority of labours without increased risk, electronic monitoring increases the number of interventions with no clear benefit for the fetus and with a degree of additional discomfort for the women.

2.8 Cleanliness

Wherever labour and delivery are managed, cleanliness is a first and foremost requirement. There is no need for the form of sterility commonly used in an operating theatre, but nails must be short as well as clean and hands must be carefully washed with soap and water. Attention should be paid to the personal hygiene of birthing women and birth attendants as well as to the cleanliness of the environment and all materials used during birth. In some countries masks and sterile gowns are used traditionally to protect labouring woman from infection. For that purpose they are useless (Crowther et al 1989). However, in regions with a high prevalence of HIV and hepatitis B and C virus protective clothing is useful to protect the caregiver from contact with contaminated blood and other materials (WHO 1995).

WHO has established the contents of a clean delivery kit and its correct, effective use (WHO 1994a). The programmes already in place to advocate the positive effect of the use of the "three cleans" (hands, perineal area, umbilical area) need to be maintained or expanded. The contents of the clean delivery kit may vary from country to country, but they must fit the specific needs of the women giving birth and be easily obtainable at every street corner and in all remote regions of a country. These simple but effective kits can even be assembled at home and include a new, sterile razor blade for the umbilical cord. The clean delivery kit itself and its contents should indeed be clean and need not be sterilized. The disposable materials in the kit should not be reused.

Instruments destined to be reused should be decontaminated appropriately according to guidelines provided by WHO (1995). Equipment which comes into contact with intact skin can be washed thoroughly, instruments which come into contact with mucous membranes or non-intact skin should be sterilized, boiled or chemically disinfected, and instruments which penetrate the skin should be sterilized. These methods serve to prevent the contamination of women and caregivers.

Some measures should be taken during all deliveries, to prevent possible infection of the woman and/or the birth attendant. These measures include the avoidance of direct contact with blood and other body fluids, by the use of gloves during vaginal examination, during delivery of the infant, and in handling the placenta. It is important to reduce the potential for infection by keeping invasive techniques such as episiotomy to the strict minimum and taking additional care with the use and disposal of sharp instruments (for instance during suturing) (ICN 1996).

3. CARE DURING THE FIRST STAGE OF LABOUR

3.1 Assessing the Start of Labour

Assessing the start of labour is one of the most important aspects of the management of labour. Signs of the start of labour are:

- painful contractions with a certain regularity
- effacement and/or dilatation of the cervix
- leakage of amniotic fluid
- bloody discharge

Rupture of the membranes is a clear sign that something irreversible has occurred. The other symptoms are less obvious: contractions may be felt long before labour actually starts, and cervical dilatation may be present weeks before the end of pregnancy, and may progress slowly to the time of labour (Crowther 1989). Notwithstanding these difficulties the birth attendant should be able to distinguish between false labour and the beginning of labour; usually a vaginal examination is necessary to detect alterations of the cervix. The establishment of the onset of labour is, inevitably, the basis for identifying prolonged labour requiring action. If the diagnosis "start of labour" is made erroneously, the result may be unnecessary interventions, such as amniotomy or oxytocin infusions. The diagnosis "prolonged latent phase" is usually better substituted by "false labour", because actually labour has not yet started. Sometimes the distinction between "start of labour" and "false labour" can only be made after a short period of observation. In the WHO multicentre trial of the partograph (WHO 1994b) only 1.3% of the women were reported to have a prolonged latent phase. The cause of this small percentage can be twofold: at the introduction of the partograph in the hospitals a discussion of labour management took place which may have affected the way the latent phase is perceived. Also, active intervention in the latent phase is postponed by 8 hours in the partograph.

Spontaneous prelabour rupture of the membranes (PROM) at term provokes a lively discussion about the risk of vaginal examination (Schutte et al 1983), induction of labour and prophylactic antibiotics. In a recent randomized study on induction after 12 hours versus expectant management during 48 hours, in the induction group the need for pain medication was significantly greater and there were more interventions, while mild neonatal infection occurred in 1.6% in the induction group versus 3.2% in the group with expectant management. No routine prophylactic antibiotics were used and vaginal examination was only performed if labour had started (Ottervanger et al 1996). A conservative approach, which is supported by the existing evidence, would indicate a policy which requires observation without vaginal examination and without antibiotics, during the first 48 hours after PROM. If labour has not commenced spontaneously during that period (in about 20% of the women), consideration could be given to oxytocin induction. However, these results are obtained in populations of women from developed countries in good health, and in hospitals where it was possible to maintain high standards of hygiene at all times. In different populations a more active management may be advisable, with the use of antibiotics and earlier induction of labour. Given that in the developing world puerperal sepsis is often the third or fourth cause of maternal mortality all efforts should be made to prevent it, whatever its source.

3.2 Position and Movement during the First Stage of Labour

Several studies show that, during the first stage of labour, the supine position affects the blood flow in the uterus. The heavy uterus can cause aortocaval compression and the reduced blood flow can compromise the condition of the fetus. The supine position is also found to reduce the intensity of the contractions (Flynn et al 1978, McManus and Calder 1978, Williams et al 1980, Chen et al 1987), and thus interferes with the progress of labour. Standing and lying on the side are associated with greater intensity and greater efficiency of the contractions (their ability to accomplish cervical dilatation).

Despite the continued prevalence of the supine position many options are open to women in labour. However, various constraints frequently limit those options, from the design of the delivery-suite bed to delivery protocols or the presence of routine intravenous lines or monitoring equipment. Where such constraints are kept to a minimum women can stand, walk, sit upright or on hands and knees, take a shower or a bath to relax or adopt each position alternately as they choose. Trials that have compared these positions to the supine have found that, on average, labour was experienced as less painful (there was less need for analgesia) and augmentation was used less frequently in the non-supine positions (Chan 1963, Flynn et al 1978, McManus and Calder 1978, Diaz et al 1980, Williams et al 1980, Hemminki 1983, Melzack 1991). One trial (Flynn et al 1978) found a significantly lower incidence of fetal heart rate abnormalities in the upright position, but other trials detected no significant differences in neonatal outcomes.

In conclusion, there is no evidence to support the encouragement of the supine position during the first stage of labour. The only exception is where the membranes have ruptured in the presence of a non-engaged fetal head. If and when the membranes are ruptured and the birth attendant has established a sufficient engagement of the fetal head, women should be free and encouraged to choose the position they prefer during labour. They will often change positions, as no position is comfortable for a long period of time.

3.3 Vaginal Examination

This is one of the essential diagnostic actions in the assessment of the start and the progress of labour. It should only be conducted by trained birth attendants, with clean hands, covered by sterile gloves. The number of vaginal examinations should be limited to the strictly necessary; during the first stage of labour usually once every 4 hours is enough, as prescribed in the manual for the use of the partograph (WHO 1993). If labour passes off smoothly, experienced birth attendants can sometimes limit the number of examinations to one. Ideally, that would be the one examination necessary to establish active labour, i.e. to confirm the fact that there is dilatation of the cervix (the most objective criterion of active labour). Another practice in the management of labour is to only perform a vaginal examination when there is an indication for the need, for example when the intensity and frequency of the contractions decrease or at signs of heavy show or the urge to push, or before the administration of analgesia.

Something can be said for each of the above-mentioned approaches, but considering our theorem: "In normal childbirth there should be a valid reason to interfere with the natural process" maybe the latter two policies outweigh the former. Yet many questions remain, as there is no clear evidence to support any specific policy. Perhaps more strict guidelines are necessary in those countries where birth attendants have a limited training and are isolated, with great distances to the referral centres. These guidelines would then be country-specific.

In institutions where caregivers are trained a vaginal examination by a student sometimes will have to be repeated and checked by the supervisor. This may only be done after the woman has consented. Under no circumstances should women be compelled to undergo repeated or frequent vaginal examinations by a number of caregivers or students.

In the past rectal examination has been advised to avoid contamination of the vagina. This practice is not recommended. Studies comparing vaginal and rectal examinations showed a similar incidence of puerperal infection whether rectal or vaginal examinations were employed during labour (Crowther et al 1989). Women's preference for vaginal over rectal examinations was clearly demonstrated in a randomized clinical trial (Murphy et al 1986).

3.4 Monitoring the Progress of Labour

The assessment of the progress of labour is made by observation of the woman; her appearance, behaviour, contractions, and the descent of the presenting part. The most accurate measure is dilatation of the cervix. Deviation from an arbitrarily defined normal rate of dilatation should be an indication for review of the labour management plans. In the partograph method of WHO (WHO 1993) the alert line is passed if the dilatation is slower than 1 cm per hour; if the woman is in a health centre this is reason to refer her to a hospital. The action line is passed if delay in progress continues for four more hours. Then a critical assessment of the cause of delay should be made, and a decision taken about the appropriate management. Although these strict rules are not followed in all countries, they form valuable guidelines, especially in those situations where distances to a referral centre are great, and birth attendants are isolated. Research about the effect of the use of the partograph showed that over a fifth of the graphs of primigravidae crossed the alert line, and 10-11% crossed the action line (Philpott and Castle 1972, WHO 1994b). In Latin America a different partograph is in use, differentiating between nulliparous and multiparous women, intact and ruptured membranes, and upright or lying position (Schwarcz et al 1987-1995).

The relationship between prolonged labour and adverse maternal and fetal outcome is the reason why it is so important to monitor the progress of labour accurately. The extent to which that relationship is causal is by no means certain. Slow progress should be a reason for evaluation rather than for intervention. Cephalopelvic disproportion must be considered when progress is slow. Intrapartum X-ray pelvimetry has not proven to be useful. The available trials of X-ray pelvimetry show an increase of interventions like caesarean section, but no benefits in terms of reduced neonatal morbidity (Parsons and Spellacy 1985). X-ray pelvimetry during pregnancy and labour increases the incidence of leukaemia in infancy, and should be abolished (Stewart et al 1956, MacMahon 1962). In experienced hands manual pelvimetry may be useful. If the membranes are still intact during labour slow progress is usually not caused by disproportion. Expectant management would then be an option (Albers et al 1996). As no solid research evidence is available about expectant management versus active management in case of slow progress without signs of disproportion, no definite conclusions can be drawn. When the membranes are ruptured slow progress is more likely to be the consequence of mechanical problems. The management in cases of abnormal labour is beyond the scope of this report.

3.5 Prevention of Prolonged Labour

Several measures have been proposed to prevent delay in the progress of labour; sometimes these actions are taken long before the action line or even the alert line of the partograph are reached. The most active interventions are early amniotomy and early oxytocin infusion, or a combination of the two. Early amniotomy interferes with the physiological timing of fetal membranes' rupture. Under normal conditions, the membranes remain intact until full

dilatation in 75% of the cases (Schwarcz et al 1995). Amniotomy before full dilatation is frequently practised as a method to expedite labour.

3.5.1 Early amniotomy

This intervention has been recommended as a routine procedure 1 hour after admission in labour (O'Driscoll et al 1973). In a controlled study a considerable increase of type I decelerations of the fetal heart rate was found after early amniotomy (Schwarcz et al 1973). Several randomized trials suggest that amniotomy early in labour leads to a reduction, on average, of between 60 and 120 minutes in the duration of labour, without effects on the use of analgesia and rates of operative delivery. The trials provide no evidence that early amniotomy has a favourable or unfavourable effect on the condition of the neonate (Fraser et al 1991, 1993, Barrett et al 1992). It is not possible to conclude that early amniotomy has a clear advantage over expectant management, or the reverse. Therefore, in normal labour there should be a valid reason to interfere with the spontaneous timing of the rupture of the membranes.

3.5.2 Intravenous infusion of oxytocin

This is frequently used to expedite labour after either spontaneous or artificial rupture of the membranes. The combination with early amniotomy is often called "active management of labour", and as such it was first advocated in Ireland (O'Driscoll et al 1973, O'Driscoll and Meagher 1986). In more or less modified form the technique has been widely adopted across the world. According to the original protocols for the active management of labour, after early amniotomy hourly vaginal examinations are performed, and oxytocin is administered if the rate of cervical dilatation is less than 1 cm per hour. The practice has been investigated in a number of randomized trials (Read et al 1981, Hemminki et al 1985, Bidgood and Steer 1987, Cohen et al 1987, Lopez-Zeno et al 1992). Of the three trials providing data on the length of labour after oxytocin augmentation compared to control groups, only one showed a shorter mean duration with oxytocin. In one trial the women in the control group were encouraged to get out of bed and walk around, stand or sit as they wished. In this control group the mean duration of labour was slightly shorter than in the augmented group. Neither Apgar scores nor the incidence of admission to a special care nursery were different between oxytocin augmentation and control groups (Hemminki et al 1985). This study reported on the women's views on the procedure. The majority said the augmentation procedure was unpleasant. More than 80% felt that augmentation had increased their pain. Half of the women in the control group who were ambulant said that this mobility had decreased their pain while 24% felt no difference.

In conclusion, it is not clear from the available data that liberal use of oxytocin augmentation ("active management of labour") is of benefit to women and babies. Of course this does not mean that oxytocin is useless in the therapy of prolonged labour. However, there is no evidence that the prevention of prolonged labour by the liberal use of oxytocin in normal labour is beneficial. It is fair to ask whether labour augmented by oxytocin infusion can still be considered normal. In many places oxytocin infusions are only administered in hospital under the responsibility of the obstetrician. This is a reasonable precaution, given the unpredictable nature of artificially managed labour. As a general rule oxytocin should only ever be used to augment labour in facilities where there is immediate access to caesarean section should the need arise. The need for augmentation is considered an indication for referral to obstetric services with surgical facilities. Where available, subsequent fetal surveillance is not by intermittent auscultation but by electronic monitoring. The experience in Dublin during the randomized trial of intrapartum fetal heart rate monitoring also points in this direction: in the group monitored with auscultation the number of neonatal seizures was increased, but the majority of these infants were born from mothers who had augmentation with oxytocin during

labour (MacDonald et al 1985). See also 2.7 Oxytocin augmentation is a major intervention and should only be implemented on a valid indication. The same holds true for the more modern variation of augmentation with prostaglandins, and for the induction of labour with these substances.

3.5.3 Intramuscular oxytocin administration

Use of any intramuscular oxytocic before the birth of the infant is generally regarded as dangerous, because the dosage cannot be adapted to the level of uterine activity. Hyperstimulation may result and is harmful to the fetus. An increase in the incidence of ruptured uterus, with corresponding grave sequelae, has also been linked to this practice (Kone 1993, Zheng 1994). Nevertheless intramuscular oxytocin administration is still practised, sometimes at the request of pregnant women or her family expecting a more rapid delivery. In some developing countries the drug can be bought on the market. This harmful practice should be abandoned. The same holds true for the administration of other oxytocics, like prostaglandins, at any time before delivery in such a way that their effect cannot be controlled.

4. CARE DURING THE SECOND STAGE OF LABOUR

4.1 Physiological Background

During the second stage of labour the oxygenation of the fetus is gradually reduced because the fetus is being expelled from the uterine cavity, with resulting retraction of the uterus and decrease in placental circulation. Moreover, strong contractions and strenuous pushing may further reduce the uteroplacental circulation. The decrease in oxygenation is accompanied by acidosis. There are however large individual differences in the rate and seriousness of this process, and therefore the caregiver should carefully monitor the condition of the fetus.

4.2 The Onset of the Second Stage

The beginning of the second stage is marked by the following symptoms:

- the woman feels the urge to bear down, because the amniotic sac or the presenting part protrudes through the dilated cervix and presses against the rectum;
- often the membranes rupture spontaneously;
- usually there is full dilatation of the cervix, but sometimes the woman feels the urge to push at an earlier stage of dilatation. If a rim of cervix is left it will be pushed aside by the presenting part.

From the above-mentioned it becomes clear that often the onset of the second stage is not exactly known. A woman may feel the urge to bear down before complete dilatation or she may not yet feel it at the moment complete dilatation is diagnosed. If complete dilatation is diagnosed by vaginal examination, it remains uncertain how long this condition has been present before.

In some hospitals it is customary to transport the woman from the labour room to a specific "delivery room" at the onset of the second stage. The delivery room is usually equipped with large bright lamps, instruments and a delivery bed fitted lithotomy poles and stirrups or

metal gutters. Although such a setting is more convenient for the caregiver if an operative delivery is contemplated, for the woman any unnecessary transportation is unpleasant. In normal labour there is no need to move the woman to a different room at the onset of the second stage. Labour and delivery can very well be attended to in the same room.

4.3 The Onset of Pushing during the Second Stage

Caregivers often decide on the onset of the second stage by encouraging the woman to push, either when full dilatation has been diagnosed, or sometimes even earlier. The physiological approach is to wait until the woman feels the urge to bear down herself. At full dilatation sometimes the urge is not yet present, and by waiting ten or twenty minutes the expulsion phase may start spontaneously. There are no controlled trials about early versus late pushing in normal labour, but some trials have been done with epidural analgesia. Because the bearing down reflex is suppressed it is easy to delay the pushing efforts until the vertex is visible in the introitus. This procedure has been compared with pushing as soon as full dilatation was diagnosed (McQueen and Mylrea 1977, Maresh et al 1983, Buxton et al 1988). Delayed pushing did not show any hazardous effect on fetal or neonatal outcome. In the early pushing group significantly more forceps deliveries occurred. Although the results were obtained in women receiving epidural analgesia they are in accordance with clinical experience of midwives who delay pushing until the spontaneous bearing down reflex appears. This practice is easier for the woman and tends to shorten the bearing down phase.

At or before the onset of pushing it is sometimes advised to routinely empty the bladder by catheterisation. This practice is unnecessary and might cause infection of the urinary tract. During the second stage, when the fetal head is firmly engaged, catheterisation may be very difficult and even traumatic. It is advisable to encourage the woman to urinate spontaneously during the first stage of labour; in normal labour this practice will usually suffice.

4.4 The Procedure of Pushing during the Second Stage

The practice of encouraging sustained, directed (Valsalva) bearing down efforts during the second stage of labour is widely advocated in many delivery wards. The alternative is supporting the women's spontaneous pattern of expulsive efforts (exhalatory bearing down efforts). These two practices have been compared in several trials (Barnett and Humenick 1982, Knauth and Haloburdo 1986, Parnell et al 1993, Thomson 1993). The spontaneous pushing resulted in three to five relatively brief (4-6 seconds) bearing-down efforts with each contraction, compared with the 10-30 second duration of sustained bearing-down efforts, accompanied by breath holding. The latter method results in somewhat shorter second stages of labour, but may cause respiratory-induced alterations in heart rate and stroke volume. If the woman is lying flat on her back, it may be associated with compression of the aorta and reduced blood flow to the uterus. In the published trials mean umbilical artery pH was lower in the groups with sustained bearing down, and Apgar scores tended to be depressed. The available evidence is limited, but the pattern emerges that sustained and early bearing-down efforts result in a modest decrease in the duration of the second stage, but this does not appear to confer any benefit; it seems to compromise maternal-fetal gas exchange. The shorter spontaneous pushing efforts seem to be superior (Sleep et al 1989).

In many countries the practice of fundal pressure during the second stage of labour is common. It is meant to expedite the delivery, is sometimes performed shortly before delivery, sometimes from the beginning of the second stage. Apart from the issue of increased maternal discomfort, there is suspicion that the practice may be harmful for the uterus, the perineum and

the fetus, but no research data are available. The impression is that the method is at least used too often, with no evidence of its usefulness.

4.5 Duration of the Second Stage

In 1930 De Snoo determined the duration of the second stage of labour in 628 primiparous women with the fetus in vertex presentation. He found a mean duration of 1¼ hour, with a median value of 1 hour. These values were strongly influenced by the occurrence of some very long periods (10-14 hours). Since then the mean duration of the second stage has been largely determined by artificial termination of labour after the maximum period allowed by the caregiver. In primiparous women the mean duration of the second stage is now often reported at about 45 minutes. The association of a prolonged second stage with fetal hypoxia and acidosis was an incentive to curtail the second stage of labour even in the absence of overt maternal or fetal problems. This policy has been examined in controlled trials (Wood et al 1973, Katz et al 1982, Yancey et al 1991). The termination of labour after an uncomplicated second stage led to significantly higher umbilical artery pH values, without any other evidence that this policy had a beneficial effect on the baby. The maternal trauma and occasional fetal trauma resulting from the increased surgical interference that the policy involves can hardly be justified. If maternal and fetal conditions are good and if there is progress of labour, there is no reason to rigidly adhere to a stipulated duration of the second stage, of for instance 1 hour.

Several follow-up studies have been published about the neonatal condition after a second stage of various duration. In the Wormerveer study (Van Alten et al 1989, Knuist et al 1989) a cohort of 148 neonates was examined using determination of umbilical artery pH and neurological score (Prechtl) in the second week of life. The second stage of labour varied from <60 min (66% of nulliparous women) to 159 min. No correlation was found between the duration of the second stage and the neonatal condition. Recently a follow-up study has been published of 6759 firstborn infants in cephalic presentation weighing >2500 g; the second stage of labour lasted >3 hours in 11%. No relation was found between second-stage duration and low 5-minute Apgar score, neonatal seizures or admission to the neonatal intensive care unit (Menticoglou et al 1995).

In conclusion, decisions about curtailing the second stage of labour should be based on surveillance of the maternal and fetal condition, and on the progress of labour. If there are signs of fetal distress or if the presenting part fails to descend there is good reason to terminate labour, but if the mother's condition is satisfactory, the fetus is in good condition, and there is evidence of progress in the descent of the fetal head, there are no grounds for intervention. However, after a second stage of >2 hours in nulliparous women and >1 hour in multiparae the chance of spontaneous delivery within a reasonable time decreases, and termination should be contemplated.

All over the world, in developed and developing countries, during the last decades the number of operative deliveries has increased sharply. The causes are not known exactly, but apart from the earlier mentioned rigid adherence to a stipulated duration of the second stage, the incidence of operative deliveries may be influenced by the fear of malpractice suits, by convenience and by financial gain. Research among obstetricians and residents in the Netherlands showed that the tendency to more frequent interventions was counteracted by the presence of midwives in a hospital (Pel et al 1995). Apparently labour attendance by professionals who are not qualified to interfere, but who act towards the preservation of normality can prevent unnecessary interventions. The world-wide epidemic of operative deliveries needs more attention, because unnecessary interventions are harmful to women and infants.

4.6 Maternal Position during the Second Stage

A number of trials (Stewart et al 1983, Liddell and Fisher 1985, Chen et al 1987, Johnstone et al 1987, Gardosi et al 1989ab, Stewart and Spiby 1989, Crowley et al 1991, Allahbadia and Vaidya 1992, Bhardwaj et al 1995) suggest that an upright (vertical) position or a lateral tilt during the second stage of labour show greater advantages than a dorsal position. The upright position gives less discomfort and difficulty in bearing down, less labour pain, less perineal/vaginal trauma and wound infections. In one trial a shorter duration of the second stage was observed in the upright position. With regard to the fetal outcome, in some trials there were fewer Apgar scores below 7 in the upright position.

A vertical or upright position, with or without the use of a birthing chair, can give more labial tears, the results suggest an increase in third degree tears though the numbers available for analysis are very small. An increased percentage of postpartum haemorrhage has been found in women adopting the vertical position. The cause is not yet established; possibly in the upright position the measurement of blood loss is more accurate, but the difference could also be due to increased pressure on the pelvic and vulvar veins (Liddell and Fisher 1985, Gardosi et al 1989, Crowley et al 1991,). In one trial the haemoglobin was lower on the fourth day after birth, though the difference was not significant.

The position of the mother during the second stage of labour affects the condition of the fetus as it does in the first stage. Research shows less frequent abnormal heart rate patterns in upright positions and on average a higher umbilical arterial pH. A few trials asked the women which position they preferred and found greater enthusiasm for the upright postures, producing less pain and less backache. The lithotomy position with the legs in stirrups was experienced as less comfortable and more painful and restricted in movement. Women who had given birth in that position would prefer the option of an upright position in the future (Stewart and Spiby 1989, Waldenström and Gottvall 1991).

Much of the positive effect of the vertical position depends on the capacities of the birth attendant and his or her experience with any position other than the supine. A certain amount of knowledge of the advantages and the willingness to attend to women in various positions can make a vast difference to labour.

In conclusion, for both the first and the second stage, this means that women can adopt any position they like, while preferably avoiding long periods lying supine. They should be encouraged to experiment with what feels most comfortable and should be supported in their choice. Birth attendants need training in coaching and performing births in other positions than the supine in order to not be an inhibiting factor in the choice of position.

4.7 Care of the Perineum

Perineal damage is one of the traumas most frequently suffered by women during delivery, even during labour and delivery that are considered normal. There are several techniques and practices aimed at reducing the damage, or modifying it to manageable proportions.

4.7.1 "Guarding the perineum" during delivery

Many textbooks describe the practice of guarding the perineum during delivery of the fetal head: the fingers of one hand (usually the right) support the perineum, while the second hand applies pressure to the fetal head to control the speed of crowning, thus trying to prevent

or reduce damage to the perineal tissues. It is possible that by this manoeuvre a perineal tear may be prevented, but it is also conceivable that the pressure on the fetal head impedes the extension movement of the head and diverts it from the pubic arch to the perineum, thus increasing the chance of perineal damage. Because there have been no formal evaluations of this strategy or of the opposite: not touching the perineum or the head during this phase of delivery, it is impossible to decide which strategy is preferable. The practice of guarding the perineum by the hands of the accoucheur can be applied more easily if the woman is in the supine position. If she is in the upright position the attendant can support the perineum blindly, or is compelled to follow the "no touch" strategy.

Another technique aiming at reducing the risk of trauma to the perineum, is massaging the perineum during the last part of the second stage of labour, thus attempting to stretch the tissues. The technique has never been properly evaluated, but there may be doubts about the benefit of the sustained rubbing of tissues that are already highly vascularized and oedematous.

Other manoeuvres about which insufficient evidence exists with respect to their effectiveness are the various methods to deliver the shoulders and the abdomen of the infant after the birth of the head. It is not clear if these manoeuvres are always necessary and if they are appropriate. Research data about this subject are not available. However, the National Perinatal Epidemiology Unit at Oxford is currently conducting a randomised controlled trial of "Care of the Perineum at Delivery - Hands On Or Poised", the so-called "HOOP" study, which should provide data on the effect of different approaches to delivery of the fetal head and shoulders on the perineum (McCandlish 1996).

4.7.2 Perineal tear and episiotomy

Perineal tears occur frequently, especially in primiparous women. First-degree tears sometimes do not even need to be sutured, second-degree tears usually can be sutured easily under local analgesia, and as a rule heal without complications. Third-degree tears can have more serious consequences and should, where at all possible, be sutured by an obstetrician in a well-equipped hospital, in order to prevent faecal incontinence and/or faecal fistulas.

Episiotomies are often made, but the incidence is diverse. In the USA they are carried out on between 50 and 90% of women giving birth to their first child, thus making the episiotomy the most commonly performed surgical procedure in that country (Thacker and Banta 1983, Cunningham et al 1989, Woolley 1995). In many centres "blanket" policies, such as a requirement for all primiparous women to have an episiotomy, are in place. In the Netherlands midwives attain an overall frequency of 24.5% episiotomies, 23.3% of which are mediolateral and 1.2% midline episiotomies (Pel and Heres 1995). Midline episiotomies are more easily sutured and have the advantage of leaving less scar-tissue, whilst mediolateral episiotomies more effectively avoid the anal sphincter and the rectum. Good reasons for performing an episiotomy during a thusfar normal delivery can be: signs of fetal distress; insufficient progress of delivery; threatened third-degree tear (including third-degree tear in a previous delivery).

All three indications are valid, although the prediction of a third-degree tear is very difficult. The incidence of third-degree tears is about 0.4%, and the diagnosis "threatened third-degree tear" should therefore only be made occasionally, otherwise the diagnosis is meaningless.

In the literature several reasons, besides the above-mentioned, are given for a liberal use of episiotomy. These include the arguments that it substitutes a straight, neat surgical incision for a ragged laceration, it is easier to repair and heals better than a tear (Cunningham et al 1989);

that liberal use of episiotomy prevents serious perineal trauma; that episiotomies prevent trauma to the fetal head; and that episiotomies prevent trauma to the muscles of the pelvic floor, and thus prevent urinary stress incontinence.

The evidence to support these postulated benefits of a liberal use of episiotomy has been investigated in several randomized trials (Sleep et al 1984, 1987, Harrison et al 1984, House et al 1986, Argentine episiotomy trial 1993). The data from these trials do not give evidence to support this policy. Liberal use of episiotomy is associated with higher rates of perineal trauma, and lower rates of women with an intact perineum. The groups of women with liberal and restricted use of episiotomy experienced a comparable amount of perineal pain assessed at 10 days and 3 months post partum. There is no evidence of a protective effect of episiotomy on the fetal condition. In a follow-up study up to three years postpartum no influence of a liberal use of episiotomies on urinary incontinence was found. In an observational study of 56,471 deliveries attended by midwives the incidence of third-degree tears was 0.4% if no episiotomy was made, and the same with a mediolateral episiotomy; the incidence with a midline episiotomy was 1.2% (Pel and Heres 1995).

The caregiver who makes the episiotomy should be able to suture tears and episiotomies appropriately. He or she should be trained accordingly. An episiotomy should be made and sutured under local anaesthesia, with proper precautions for the prevention of HIV and hepatitis infection (see 2.8).

In conclusion, there is no reliable evidence that liberal or routine use of episiotomy has a beneficial effect, but there is clear evidence that it may cause harm. In a thusfar normal delivery there may at times be a valid indication for an episiotomy, but a restricted use of this intervention is recommended. The percentage of episiotomies attained in the English trial (10%) without harm to the mother or the infant (Sleep et al 1984) would be a good goal to pursue.

5. CARE DURING THE THIRD STAGE OF LABOUR

5.1 Background

In this stage of labour placental separation and expulsion take place; for the mother the main risks are haemorrhage during or after separation of the placenta, and retention of the placenta. Postpartum haemorrhage is one of the main causes of maternal mortality; the large majority of these cases occur in developing countries (Kwast 1991). The incidence of postpartum haemorrhage and retention of the placenta is increased if predisposing factors are present, such as multiple pregnancy or polyhydramnios, and complicated labour: augmentation of labour, obstructed labour, or vaginal operative delivery (Gilbert et al 1987). Postpartum haemorrhage and placental retention also occur more frequently if these complications were present in the obstetric history of the woman (Doran et al 1955, Hall et al 1987, WHO 1989). To a certain extent therefore it is possible to select during pregnancy and in the course of labour those women with an increased risk of complications in the third stage. But even in low-risk pregnancies and after an uneventful first and second stage of labour serious haemorrhage and/or placental retention may sometimes occur. The management of the third stage may influence the incidence of these complications, and the amount of blood lost. Several measures aiming at the prevention of complications have been proposed, have been tested in randomized trials and are discussed below.

5.2 Prophylactic use of Oxytocics

Oxytocics may be given prophylactically at various moments during the third stage. Most often they are administered intramuscularly immediately with the delivery of the anterior shoulder, or after delivery of the infant. The drugs usually given, and investigated in trials, are oxytocin and ergot derivatives like ergometrine, or a combination of the two, syntometrine (Daley 1951, McGinty 1956, Friedman 1957, Newton et al 1961, Howard et al 1964, Hacker and Biggs 1979, Rooney et al 1985, Prendiville et al 1988, Thornton et al 1988, Begley 1990). Both oxytocin and ergot derivatives decrease the estimated postpartum blood loss, but the effect of ergot seems to be somewhat less than the effect of oxytocin. The effect on retention of the placenta is not yet quite clear, although there are some data suggesting that routine oxytocics may increase the risk of retained placenta.

Complications of oxytocics are nausea, vomiting, headache and hypertension postpartum. These complications occur more often with ergot derivatives. Moreover, rare but serious maternal morbidity has been associated with oxytocics, especially with ergometrine: cardiac arrest and intracerebral haemorrhage, myocardial infarction, postpartum eclampsia and pulmonary oedema. Because these events are so rare, randomized trials cannot give useful information about the extent to which they may be attributed to oxytocics. The available evidence suggests that oxytocin is a better choice than ergot derivatives. Moreover, in tropical countries oxytocin is more stable than ergometrine or methylergometrine (Hogerzeil et al 1992, 1994).

Because in many developing countries the administration of oral tablets would be much easier, and the tablets would be more stable than injections under tropical conditions, a randomized study was undertaken to investigate the influence of oral tablets of ergometrine immediately after birth. The outcome was disappointing: compared with a placebo the medication had little demonstrable effect on blood loss after childbirth (De Groot et al 1996).

5.3 Controlled Cord Traction

Controlled cord traction involves traction on the cord, combined with counterpressure upwards on the uterine body by a hand placed immediately above the symphysis pubis. In two controlled trials this procedure has been compared with less active approaches, sometimes entailing fundal pressure (Bonham 1963, Kemp 1971). In the controlled traction groups a lower mean blood loss and shorter third stages were found, but the trials do not provide sufficient data to warrant definite conclusions about the occurrence of postpartum haemorrhage and manual removal of the placenta. In one trial patient discomfort was less if controlled traction was used. However, in 3% the cord was ruptured during controlled cord traction. A rare but serious complication associated with controlled cord traction is inversion of the uterus. Although the association might be with a wrong application of the method, the occurrence of inversion of the uterus still is a matter of concern. The above mentioned trials have apparently gathered data on women in a supine position. The impression of midwives attending deliveries with the woman in the upright position during the second and third stage is that the third stage is shorter and placental separation is easier, although the loss of blood is more than in the supine position. However, apart from blood loss, these aspects have not been investigated in randomized trials. Presumably controlled cord traction as described in the textbooks would be more difficult to perform in the upright position.

5.4 Active Versus Expectant Management of the Third Stage

The combined effects of oxytocics and controlled cord traction are sometimes summarized by the term "active management of the third stage", as opposed to expectant or physiological management. Sometimes early clamping of the cord is included too, especially because in controlled cord traction early clamping is mandatory. However, because the main effects of this procedure relate to the newborn we shall deal with that aspect separately.

In the literature active management of the third stage compares favourably with expectant management, mainly because postpartum haemorrhage occurs less often and haemoglobin levels postpartum are higher (Prendiville et al 1988, Harding et al 1989, Begley 1990, Thigalathan et al 1993). The results with respect to the frequency of blood transfusion and manual removal of the placenta are not identical in the two largest trials, in Bristol and Dublin (Prendiville et al 1988, Begley 1990). In both trials active management resulted in more nausea, vomiting and hypertension, probably caused by the use of ergometrine.

Some remarks on these findings may be justified. Postpartum haemorrhage is defined by WHO as blood loss ≥ 500 ml (WHO 1990). The diagnosis is made by a clinical estimate of blood loss; such an assessment of the amount of blood often causes a significant underestimation. Apparently the definition is influenced by the fact that in large parts of the world 500 ml of blood loss (or even less) is a real threat to the life of many women, mainly because of the high prevalence of severe anaemia. Nevertheless, if meticulously measured, the mean blood loss at vaginal delivery is around 500 ml, and about 5% of women delivering vaginally lose more than 1000 ml of blood (Pritchard et al 1962, Newton 1966, De Leeuw et al 1968, Letsky 1991). In the Bristol trial (Prendiville et al 1988) 18% of the group of women with a physiological management of the third stage had blood loss ≥ 500 ml, and only 3% lost > 1000 ml.

In a healthy population (as is the case in most developed countries) postpartum blood loss up to 1000 ml may be considered as physiological, and does not necessitate treatment other than oxytocics. However, in many developing countries other standards may be applied. The 500 ml limit as defined by WHO should be considered an alert line; the action line is then reached when vital functions of the woman are endangered. In healthy women this usually only occurs after blood loss >1000 ml. This distinction is crucial in the light of efforts to minimise unnecessary blood transfusion and its associated risks, including HIV infection.

Definite conclusions about the value of active management of the third stage in healthy low-risk populations cannot yet be drawn. The term "active management" is used for a combination of various interventions with different effects and side-effects. All trials of expectant versus active management were carried out in centres where active management was the normal practice. A trial is needed in a setting where both expectant and active management are normal procedures. The occurrence of serious but rare complications (cardiac complications, eclampsia, inversion of the uterus, etc.) cannot be studied in randomized trials, but might nevertheless be of major importance if and when active management is recommended for large populations. Serious doubts are justified about the routine prophylactic use of ergometrine or a combination of oxytocin and ergometrine, and also about controlled cord traction as a routine procedure.

In conclusion, oxytocin administration immediately after delivery of the anterior shoulder, or after delivery of the infant, seems advantageous, especially in women with increased risk of postpartum haemorrhage or in women endangered by even a small amount of blood loss, for instance women with severe anaemia. Doubts remain about the combination with

controlled cord traction, and about the routine application in healthy low-risk women. Recommendation of such a policy would imply that the benefits of this management would offset and even exceed the risks, including potentially rare but serious risks that might become manifest in the future. In our opinion it is too early to recommend this form of active management of the third stage for all normal low-risk deliveries, although we note the earlier recommendations made by WHO (1990, 1994c). If for various reasons active management is employed, a number of questions remain unresolved, particularly regarding the optimal timing of prophylactic oxytocin injections.

5.5 Timing of Cord Clamping

The umbilical cord can be clamped immediately after birth or at a later moment, and this may have effects on the mother and the infant (Prendiville and Elbourne 1989). The effects on the mother have been studied in some trials (Dunn et al 1966, Botha 1968, Nelson et al 1980). There was no evidence of a significant effect of the timing of cord clamping on the incidence of postpartum haemorrhage or on feto-maternal transfusion. The effects on the newborn have been studied by observational studies and randomized trials.

There are a number of observations on the effects of the timing of cord clamping on the neonate (Buckels and Usher 1965, Spears et al 1966, Yao et al 1971, Nelson et al 1980). If after birth the infant is placed at the level of the vulva or below that level for three minutes before clamping the cord, this results in a shift of about 80 ml of blood from the placenta to the infant (Yao et al 1971, 1974, Dunn 1985). The erythrocytes in this volume of blood will soon be destroyed by haemolysis, but this provides about 50 mg of iron to the infant's reserve and reduces the frequency of iron-deficiency anaemia later in infancy (Michaelsen et al 1995, Pisacane 1996). Theoretically this transfusion of blood from the placenta to the infant might cause hypervolaemia, polycythemia and hyperviscosity, and also hyperbilirubinaemia. These effects have been studied in a number of trials (Prendiville and Elbourne 1989). Babies born after early cord clamping have lower haemoglobin values and haematocrits. With respect to neonatal respiratory disturbances there were no significant differences between the two management practices. Neonatal bilirubin levels were lower after early cord clamping, but no clinically relevant differences between the two practices were noticed, and no differences in neonatal morbidity.

Late clamping (or not clamping at all) is the physiological way of treating the cord, and early clamping is an intervention that needs justification. The "transfusion" of blood from the placenta to the infant, if the cord is clamped late, is physiological, and adverse effects of this transfusion are improbable, at least in normal cases. After an abnormal pregnancy or labour, for instance in rhesus sensitization or preterm birth, late clamping may cause complications, but in normal birth there should be a valid reason to interfere with the natural procedure.

If controlled cord traction after oxytocin administration is practised, as is the case in many obstetric departments worldwide, early or relatively early clamping of the cord is mandatory. However, where late clamping is taught and practised, i.e. after the pulsations of the cord have ceased, usually after about 3-4 minutes, adverse effects have not been recorded. In addition, recent research supports late clamping, because it may prevent iron deficiency anaemia in childhood, which might be of special importance in developing countries (Michaelsen et al 1995, Pisacane 1996). Although at present there is insufficient evidence on which to decide between early and late clamping, this issue clearly deserves more attention.

5.6 Immediate Care of the Newborn

Directly after birth there should be attention to the condition of the newborn. Such attention is an integral part of care in normal birth, and the World Health Organization stresses the importance of a unified approach to care of the mother and the baby (WHO 1994c). Immediate care involves ensuring that the airway is clear, taking measures to maintain body temperature, clamping and cutting the cord and putting the baby to the breast as early as possible. Each of these elements has been the object of considerable research and debate, but the present Technical Working Group for Normal Birth has the advantage of being able to refer to the work and recommendations of the Technical Working Group on Essential Care of the Newborn (WHO 1996). In the present report only a few aspects of the immediate care of the newborn will be briefly mentioned.

- Immediately after the birth the baby has to be dried with warm towels or cloths, while being placed on the mother's abdomen or in her arms. The baby's condition is assessed and the existence of a clear airway is ensured (if necessary) simultaneously. Maintaining the body temperature of the baby is important; newborn babies exposed to cold delivery rooms may experience marked drops in body temperature, and concurrent metabolic problems. A fall in infant temperature can be reduced by skin-to-skin contact between baby and mother.
- Early skin-to skin contact between mother and baby is important for several other reasons. Psychologically it stimulates mother and baby to get acquainted with each other. After birth babies are colonized by bacteria; it is advantageous that they come into contact with their mothers' skin bacteria, and that they are not colonized by bacteria from caregivers or from a hospital. All these advantages are difficult to prove, but nevertheless they seem plausible. Early suckling/breast-feeding should be encouraged, within the first hour after birth (WHO/UNICEF 1989). The influence of nipple stimulation by the baby on uterine contractions and postpartum blood loss should be investigated. One randomized study has been performed (Bullough et al 1989), but only with traditional birth attendants. The influence of early suckling on blood loss could not be established. However, a study with professional birth attendants is needed.
- Cutting the cord should take place with sterile instruments, either disposable, for instance from the clean delivery kit, or thoroughly decontaminated by sterilization. This is of utmost importance for the prevention of infections.

5.7 Care of the Mother Immediately after Delivery of the Placenta

The placenta should be examined carefully to detect abnormalities (infarcts, haematomas, abnormal insertion of the umbilical cord), but above all to ensure that it is complete. If there is a suspicion that part of the placenta is missing, preparations should be made to explore the uterine cavity. If part of the membranes are missing exploration of the uterus is not necessary.

In some countries it is customary for birth attendants routinely to explore the uterine cavity after every delivery, "uterine revision". There is not the slightest evidence that such policy is useful; on the contrary, it can cause infection or mechanical trauma or even shock. The same holds true for another practice, the "lavage of the uterus", the rinsing out or douching of the uterine cavity after delivery.

The mother should be observed carefully during the first hour postpartum. The most important observations include the amount of blood lost, and uterine fundal height: if the uterus contracts insufficiently blood may accumulate in the uterine cavity. If the blood loss is abnormal and the uterus is contracting poorly, gentle abdominal massage of the uterus can be helpful. It is essential to ensure that uterine contraction is not inhibited by the presence of a full bladder. Abnormal blood loss, estimated more than 500 ml, should be treated with oxytocics: ergometrine or oxytocin intramuscularly. The condition of the mother is also important: blood pressure, pulse and temperature, and general well-being should be assessed.

6. CLASSIFICATION OF PRACTICES IN NORMAL BIRTH

This chapter classifies the practices common in the conduct of normal childbirth into four categories, dependent on their usefulness, effectiveness and harmfulness. The classification reflects the views of the Technical Working Group on Normal Birth. Arguments for this classification are not given here; the reader is referred to the preceding chapters, which are the outcome of the reflection and debates of the Working Group, based on the best currently available evidence (numbers of chapters between brackets).

CATEGORY A:

6.1 Practices which are Demonstrably Useful and Should be Encouraged

1. A personal plan determining where and by whom birth will be attended, made with the woman during pregnancy and made known to her husband/partner and, if applicable, to the family (1.3).
2. Risk assessment of pregnancy during prenatal care, reevaluated at each contact with the health system and at the time of the first contact with the caregiver during labour, and throughout labour (1.3).
3. Monitoring the woman's physical and emotional well-being throughout labour and delivery, and at the conclusion of the birth process (2.1).
4. Offering oral fluids during labour and delivery (2.3).
5. Respecting women's informed choice of place of birth (2.4).
6. Providing care in labour and delivery at the most peripheral level where birth is feasible and safe and where the woman feels safe and confident (2.4, 2.5).
7. Respecting the right of women to privacy in the birthing place (2.5).
8. Empathic support by caregivers during labour and birth (2.5).
9. Respecting women's choice of companions during labour and birth (2.5).
10. Giving women as much information and explanation as they desire (2.5).
11. Non-invasive, non-pharmacological methods of pain relief during labour, such as massage and relaxation techniques (2.6).

12. Fetal monitoring with intermittent auscultation (2.7).
13. Single use of disposable materials and appropriate decontamination of reusable materials throughout labour and delivery (2.8).
14. Use of gloves in vaginal examination, during delivery of the baby and in handling the placenta (2.8).
15. Freedom in position and movement throughout labour (3.2).
16. Encouragement of non-supine position in labour (3.2, 4.6).
17. Careful monitoring of the progress of labour, for instance by the use of the WHO partograph (3.4).
18. Prophylactic oxytocin in the third stage of labour in women with a risk of postpartum haemorrhage, or endangered by even a small amount of blood loss (5.2, 5.4).
19. Sterility in the cutting of the cord (5.6).
20. Prevention of hypothermia of the baby (5.6).
21. Early skin-to-skin contact between mother and child and support of the initiation of breast-feeding within 1 hour postpartum in accordance with the WHO guidelines on breast-feeding (5.6).
22. Routine examination of the placenta and the membranes (5.7).

CATEGORY B:

6.2 Practices which are Clearly Harmful or Ineffective and Should be Eliminated

1. Routine use of enema (2.2).
2. Routine use of pubic shaving (2.2).
3. Routine intravenous infusion in labour (2.3).
4. Routine prophylactic insertion of intravenous cannula (2.3).
5. Routine use of the supine position during labour (3.2, 4.6).
6. Rectal examination (3.3).
7. Use of X-ray pelvimetry (3.4).
8. Administration of oxytocics at any time before delivery in such a way that their effect cannot be controlled (3.5).
9. Routine use of lithotomy position with or without stirrups during labour (4.6).

10. Sustained, directed bearing down efforts (Valsalva manoeuvre) during the second stage of labour (4.4).
11. Massaging and stretching the perineum during the second stage of labour (4.7).
12. Use of oral tablets of ergometrine in the third stage of labour to prevent or control haemorrhage (5.2, 5.4).
13. Routine use of parenteral ergometrine in the third stage of labour (5.2).
14. Routine lavage of the uterus after delivery (5.7).
15. Routine revision (manual exploration) of the uterus after delivery (5.7).

CATEGORY C:

6.3 Practices for which Insufficient Evidence Exists to Support a Clear Recommendation and which Should be Used with Caution while Further Research Clarifies the Issue

1. Non-pharmacological methods of pain relief during labour, such as herbs, immersion in water and nerve stimulation (2.6).
2. Routine early amniotomy in the first stage of labour (3.5).
3. Fundal pressure during labour (4.4).
4. Manoeuvres related to protecting the perineum and the management of the fetal head at the moment of birth (4.7).
5. Active manipulation of the fetus at the moment of birth (4.7).
6. Routine oxytocin, controlled cord traction, or combination of the two during the third stage of labour (5.2, 5.3, 5.4).
7. Early clamping of the umbilical cord (5.5).
8. Nipple stimulation to increase uterine contractions during the third stage of labour (5.6).

CATEGORY D:

6.4 Practices which are Frequently Used Inappropriately

1. Restriction of food and fluids during labour (2.3).
2. Pain control by systemic agents (2.6).
3. Pain control by epidural analgesia (2.6).
4. Electronic fetal monitoring (2.7).

5. Wearing masks and sterile gowns during labour attendance (2.8).
6. Repeated or frequent vaginal examinations especially by more than one caregiver (3.3).
7. Oxytocin augmentation (3.5).
8. Routinely moving the labouring woman to a different room at the onset of the second stage (4.2).
9. Bladder catheterization (4.3).
10. Encouraging the woman to push when full dilatation or nearly full dilatation of the cervix has been diagnosed, before the woman feels the urge to bear down herself (4.3).
11. Rigid adherence to a stipulated duration of the second stage of labour, such as 1 hour, if maternal and fetal conditions are good and if there is progress of labour (4.5).
12. Operative delivery (4.5).
13. Liberal or routine use of episiotomy (4.7).
14. Manual exploration of the uterus after delivery (5.7).

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**THE COCHRANE PREGNANCY and CHILDBIRTH DATABASE (issue 1995-1)
CCPC reviews used in this report:**

Elbourne DR

- Prophylactic oxytocics in third stage of labour. Review 02974
- Prophylactic syntometrine vs oxytocin in third stage of labour. Review 02999
- Prophylactic oxytocin vs ergot derivatives in third stage of labour. Review 03000
- Prophylactic syntometrine vs ergot derivatives in third stage of labour. Review 03001
- Early umbilical cord clamping in third stage of labour. Review 3818
- Cord traction vs fundal pressure in third stage of labour. Review 03004
- Active vs conservative third stage management. Review 05352
- Active vs conservative third stage management-low risk women. Review 05353

Fraser WD

- Amniotomy to shorten spontaneous labour. Review 04134
- Early amniotomy and early oxytocin for delay in labour compared to routine care. Review 06949

Grant AM

- EFM vs intermittent auscultation in labour. Review 03884
- EFM and scalp sampling vs intermittent auscultation in labour. Review 03297
- EFM alone vs intermittent auscultation labour. Review 03298
- Fetal blood sampling as adjunct to heart rate monitoring. Review 07018
- Liberal vs restricted use of EFM in labour (low risk labours). Review 03886
- Liberal vs restricted use of EFM in labour (all labours) Review 03885

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- Birth room vs conventional delivery setting. Review 05735
- Continuity of caregivers during pregnancy and childbirth. Review 07672

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- Systematic narcotics for analgesia in labour. Review 03398
- Diazepam in labour. Review 03401
- Methoxyflurane vs nitrous oxide/oxygen for analgesia in labour. Review 03400
- Epidural vs non-epidural analgesia in labour. Review 03399

Nikodem C

- Upright vs recumbent position during first stage of labour. Review 03334
- Upright vs recumbent position for second stage of labour. Review 03335
- Birth chair vs recumbent position for second stage of labour. Review 04735
- Lateral tilt vs dorsal position for second stage of labour. Review 03402
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Renfrew MJ

- Routine perineal shaving on admission in labour. Review 03876
- Liberal use of episiotomy for spontaneous vaginal delivery. Review 03695

Renfrew MJ, Hay-Smith J

- Routine enema on admission in labour. Review 03877

Sinclair JC

- Intubation and suction in vigorous meconium-stained babies. Review 05946

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