

Tackling Unmet Need for Major Obstetric Interventions

*Concepts, General Principles
and International Network*

The background of the cover features a light blue gradient. A dark blue triangle is positioned on the left side, pointing towards the right. Overlaid on this are several thick, white, curved lines that sweep across the page from the bottom left towards the top right, creating a sense of movement and depth.

Tackling Unmet Need for Major Obstetric Interventions

Part 1
Concepts, General Principles
and International Network

Strengthening Essential Obstetric Care, basic and comprehensive, is the key strategy to obtain rapid improvements in safe motherhood. Essential Obstetric Care encompasses a wide range of interventions. These include a set of major surgical and technical interventions that may be required to treat a number of conditions that directly threaten the life of the mother during labour.

For a number of these interventions, the “major obstetric interventions for absolute maternal indications¹” it is possible to map under-utilisation: the unmet need for this type of care.

In countries with high levels of maternal mortality policy makers and health care providers are often unaware of the extent of the unmet need for essential obstetric care – and of the often very real possibilities to improve things. Mapping unmet need for these “major obstetric interventions for absolute maternal indications” does not measure all the unmet need for basic or comprehensive essential obstetric care. It can however be useful to trigger the interest of a wide range of actors, lay and professional, in improving maternal health policies and services.

The UON network brings together ministries of health, development organisations, scientific institutions and practitioners who want to map unmet need for “major obstetric interventions for absolute maternal indications” as a starting point – not just to improve maternal health but also the overall functioning of their health care system. The UON-network provides technical support for national teams involved in this kind of work, as well as opportunities to learn from each other.

¹ *List of Major Obstetric Interventions* : caesarean section, laparotomy for uterine breach, hysterectomy, internal version, symphysiotomy, craniotomy. *List of Absolute Maternal Indications* : severe antepartum haemorrhage (placenta praevia and abruptio placentae), severe postpartum haemorrhage, foeto-pelvic dystocia, malpresentation (transverse lie and brow presentation).



UON Network – Unmet Need for Major Obstetric Interventions

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1. INTRODUCTION

Maternal mortality ratios* are generally used to measure the ability of different health systems to respond to obstetric needs. These ratios can show very considerable differences between one context and another: in Scandinavia, for example, with excellent health services and access to them, the maternal mortality ratio is of the order of 6 maternal deaths per 100,000 live births¹, while in Africa and certain Asian countries the ratio may be anything up to a hundred or three hundred times higher². There are also marked disparities between different regions within the same country.

One of the priorities of the worldwide campaign for the reduction of maternal mortality was to identify countries whose ability to handle obstetric emergencies was poor. Accordingly the World Health Organisation, UNICEF and other international organisations launched, and still maintain, surveys designed to establish maternal mortality ratios in each country. The diffusion of this information has revealed the scale of the problem of maternal mortality throughout the world and the need to mobilise the necessary funds for programmes aimed at reducing maternal mortality and directing resources to the countries whose needs in this area are greatest.

The measurement of maternal mortality ratios, however, is a difficult task in developing countries, since reliable information is seldom available. Estimates of maternal mortality ratios are then based on the measurement of these ratios in samples of the population. The information obtained usually gives an idea of the scale of the problem either within a region or country (with a wide margin of error) or over a period of ten years or so; but it is rarely sufficiently precise to make it possible to take concrete decisions at local level or to mobilise the providers of care to deal with problems which are amenable to solution at their hands.

Moreover the data is used in the narrow circles of those responsible for programmes for the reduction of maternal mortality, although the causes of these problems are also to be found at the level of general health services such as emergency services, surgical services or the services responsible for the supply of medicaments and equipment. The problems found in these services relate, for example, to the initial training of health personnel, the geographical distribution of infrastructures or national choices in terms of health resources. These factors must be considered in the overall development of health services, whether for the reduction of maternal mortality or for other measures for dealing with priority health problems. It is therefore useful to develop an indicator which could:

- stimulate awareness among decision-makers and health professionals of matters relevant in each context;
- identify what is capable of being dealt with within a given socio-economic context;
- locate needs and identify investment priorities;
- evaluate failures of the health system in meeting identified needs; and
- monitor the impact of safe motherhood programmes.

2. OBSTETRIC NEEDS

Need is defined here in terms of health problems which necessitate health care. For the population served the scale of need for health care varies in function of such determinants as the environment, the technology available, the way of life and the "health culture". For health professionals need is defined as an estimate based on a professional judgment of the number of personnel available, their competence and the services required to offer an optimum standard of health care.

For example, cephalo-pelvic disproportion is a complication of pregnancy which is usually fatal. For the obstetrician it corresponds to an incontestable need. A caesarean – when the infant is alive – is the intervention which makes it possible to respond to this need by saving the life of mother and child.

In the field of maternal health a maternal death is evidence that the need has not been met. However, the definition of an obstetric need – and its identification in practice – is less precise and more difficult to pin down.

Conceptual definition

From a medical point of view pregnancy can be the direct cause of a number of problems which threaten the life of the mother and/or the foetus. It may also be an aggravating factor in me-

* In this paper the term maternal mortality ratio, rather than maternal mortality rate, is used to define the relationship of the number of maternal deaths to the number of live births.

dical problems, either pre-existing (diabetes, cardiopathy, etc.) or occurring during pregnancy (infectious hepatitis, malaria), which, when they lead to the death of a pregnant woman, are considered as indirect causes of maternal death. “Natural” (in the sense of non-iatrogenic) complications directly caused by pregnancy may occur very soon (an extra-uterine pregnancy, an incomplete abortion) or later, during the perinatal period.

Possible complications during this period are an ante- or post-partum haemorrhage, acute or chronic; a dynamic or cephalo-pelvic disproportion linked with the foetus (presentation, excessive volume either generalised or localised, for example hydrocephaly), the pelvis (congenital anomaly or growth anomaly) or the soft tissues (tumours, malformations); eclampsia; an infection; or an embolism. Some women (and/or their child) with one of these direct obstetric complications will die of it. Direct causes, together with anaemias, are responsible for 75% to 80% of all maternal deaths reported in developing countries³. Others will suffer the consequences in the form, for example, of chronic anaemia, a vesico-vaginal fistula or secondary sterility.

All this – the sum total of the incidences of these problems – corresponds to the concept of “need” as defined above: these are situations in which care should be provided in order to obviate or treat the problems which occur. In other words, the concept of “obstetric need” is here constructed on the basis of an epidemiological approach which “integrates” (in the mathematical sense of the term) the sum total of the pathologies which may lead to the suffering and/or the death of mother and child.

Usefulness and limits of the conceptual definition

However, if this definition is to be useful in the planning of care the need must be expressed in terms of health problems which necessitate an intervention by health care services. This makes it possible to identify the women who have had recourse to health care (use of services) and whose needs have been met by an intervention (appropriate offer of services). The women who require obstetric care and have not received it constitute what we call “unmet obstetric need”.

Consideration of the sum of obstetric problems provides an exhaustive image of the need, but this raises two types of problem: prioritisation in planning and the quality of the information on the basis of which it is possible to evaluate the extent to which obstetric needs are met.

Prioritisation

Considering the sum of all the pathologies which have serious consequences for the child and those which are serious for the mother does not really help the planner to establish an order of priority in the action to be taken to meet the obstetric needs. One could start from the principle that the survival of the mother is the priority, even if perinatal deaths are much more frequent than maternal deaths. This is mainly a value judgment – and therefore a judgment which can be questioned. The priority of saving the mother is guided by the observation that a maternal death involves not only the death of the child the mother was carrying but also, in a significant proportion of cases, the death of the previous child⁴. In addition to the social suffering caused by the death of a wife, the mother’s death is often a heavy blow to the family’s domestic economy. It is on these “reasons” that the postulate suggested is based.

Quality of information

If we restrict the need for care to the indications for which an obstetric intervention is indispensable for the survival of the mother we still have to consider two essential criteria of the quality of the information available – its reliability and its validity.

The reliability of the information depends on the ability of health professionals to notify the same problems in the same way. This is what is known as reproducibility. To take a concrete example: faced with a placenta praevia, will, first, the same health professional (intra-observer reproducibility) and then the general body of health professionals among themselves (interobserver reproducibility) notify the problem in the same way? Or will the problem be reported in one medical record as ante-partum haemorrhage, in another as haemorrhage (unspecified) or third-degree placenta praevia?

The validity of the information depends in the first place on the ability of health professionals to recognise the pathology: that is, to make a correct diagnosis. For example, the identification

by electronic monitoring of foetal distress necessitating an emergency caesarean has had no effect on the Apgar scores, on the need to admit these neonates to intensive care, on the ratio of neonatal infections, on intra-partum mortality or on the overall perception of the labour by the parturients⁵. Electronic monitoring produces false positives of foetal distress for which caesareans are then performed, with the invalid notification of "foetal distress". But even if other criteria as well as electronic monitoring are used this diagnosis is still poorly reproducible (interobserver 30%, intraobserver 25%)⁶.

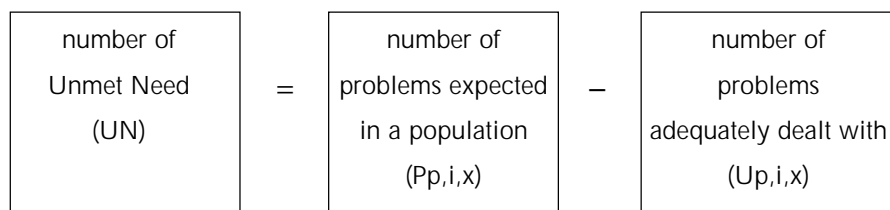
In developing countries the problem usually presents itself in different terms, since the technical level may be poor: caesareans are sometimes performed for a dystocia for which attentive and encouraging surveillance, or a trial of labour might have solved the problem⁷. In such cases the diagnosis of foeto-pelvic disproportion is a false positive.

3. AN INDICATOR OF UNMET OBSTETRIC NEED

In this paper the concept of unmet need refers to the idea of a difference between what is considered a need by the professionals in terms of health problems to be resolved by a major obstetric intervention and what is in fact met by the services offered: that is, problems for which a major obstetric intervention has been performed.

However the determination of unmet need means on the one hand that the total need for a given population over a given period of time – that is, the frequency of the problem in the population concerned -- is known, and on the other that the quantity of need that has been met – that is, the utilisation of services for the particular problem – is also known. The unmet need is then obtained by the deduction of the actual utilisation of services from the estimated total need (Figure 1).

FIGURE 1. CONCEPT OF UNMET NEED



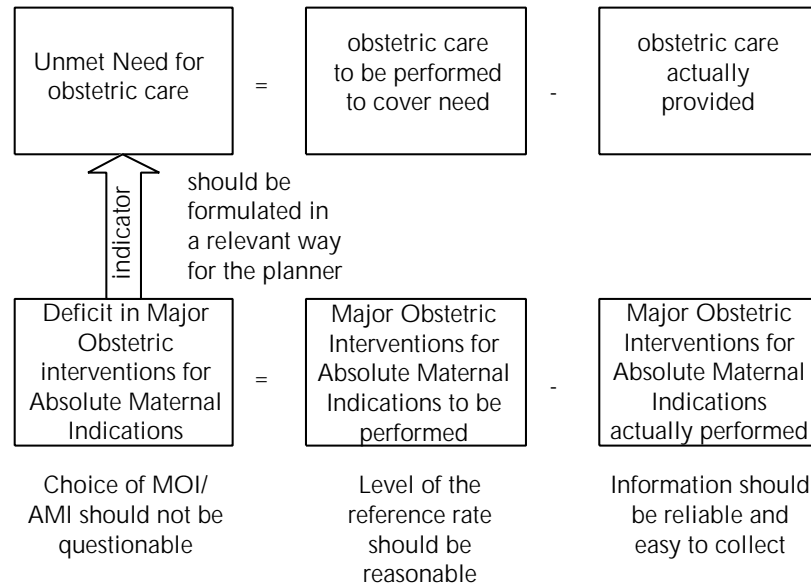
where $P_{p,i,x}$ represents the incidence of x obstetric problems (or which there is a need for care) during a period of time i , and $U_{p,i,x}$ represents the incidence of adequate utilisation of services by women belonging to the population p for an obstetric problem x (necessitating care) during a period of time i .

The definition of obstetric need must, if it is to be of use in the planning of care, be expressed in terms of health problems which necessitate an intervention by the health care system. Even if priority must be given to interventions which can save the life of the mother this need cannot be measured merely as such. The concept is still a loose one: what is thought necessary to supply in the way of care will be the resultant of a judgment which involves technical and epidemiological elements, but also cultural elements and professional habits, whether well-founded or not (for example, "Once a caesarean section, always a caesarean"). Among indications for intervention some are more essential to the survival of the mother (and the child) than others. These will be called "absolute maternal indications"; and it is on this basis that the indicator of obstetric need will be constructed. That does not mean that the need for care is limited to these indications: it is considered, however, that to cover these indications is important and a priority in itself, and that action undertaken to make it possible to cover them will improve the total care given in childbirth.

The indicator should reflect the volume of the obstetric need that is met in order to estimate the need that remains to be met and to direct the action required to achieve this. This presents a number of problems. It is necessary, if the indicator is confined to major obstetric interventions for absolute maternal indications, to select these in such a way as to leave least room for discussion and in a way that is most relevant to the planning of the minimum interventions required. It must also be possible to estimate a standard level of what is expected or desirable as the frequency of intervention for these indications; and it must be possible to obtain, easily and reliably, information

on what has already been done. Finally it must be possible to present the information in an intelligible and concrete fashion for the decision-makers and those working on the ground: the interpretation of the information must lead to action, and not merely to noting the gravity of the situation (Figure 2).

FIGURE 2. AN INDICATOR OF UNMET NEED FOR MAJOR OBSTETRIC INTERVENTIONS



4. THE SELECTION OF INTERVENTIONS AND INDICATIONS

If it is desired to give priority to what is important for the survival of the mother and avoid major problems in terms of reproducibility and validity, the pathologies contained in the indicator must be confined to those for which a major obstetric intervention is absolutely necessary: that is to say, obstetric problems for which, if a major surgical intervention is not performed, there is a very high probability that the parturient will die. The indications must, however, be based, in a given context, on reliable data*. These indications are brought together under the label "absolute maternal indications" (AMI):

- severe ante-partum haemorrhages caused by a placenta praevia or a retro-placental haematoma (still called premature detachment of a normally inserted placenta);
- incoercible post-partum haemorrhages;
- major foeto-pelvic disproportions (due to a narrow pelvis or a hydrocephaly);
- transverse positions (shoulders neglected);
- face presentations.

This group of indications corresponds to what were classed as "obligatory indications" in a study carried out in Senegal⁸. These obligatory indications were (i) foeto-pelvic disproportion, (ii) placenta praevia, (iii) abnormal presentation and (iv) uterine rupture. The authors did not specify what they called an abnormal presentation, nor how they differentiated between a cephalo-pelvic disproportion and a prolonged labour. This classification of indications (for caesareans), say the authors, is similar to other classifications⁹ which bring in the concept of obligatory indications, for reasons of prudence and necessity.

In Morocco abnormal presentations (face and transverse) were specified and validated as being absolute by a group of Moroccan obstetricians¹⁰. This last point is important, because the terms used and the elements on which doctors base their diagnosis of a condition, a pathology, depend principally on the way in which they have been taught.

Differences of culture and of medical training set limits to the external validity of international comparisons of intervention ratios on the basis of particular indications. For example, the notion of cephalo-pelvic disproportion is understood differently according to the context: in the

* This is one of the reasons why in Morocco, a posteriori, interventions other than major interventions have not been included in the analysis. For example, the decisions for minor interventions were not standardised, the indications were difficult to interpret, and in addition this would have almost doubled the number of centres from which information would had to be collected.

United States in the 1980s there were six times as many indications for a caesarean for cephalo-pelvic disproportion than in Ireland for groups of women who showed the same characteristics (nulliparity, known risk factors, age of mother and birth weight of child) and had been delivered in comparable hospitals¹¹. This difference was not due to a different epidemiology; there was undoubtedly a subjective “cultural” factor in the notification of the diagnosis. No distinction was made between foeto-pelvic disproportion and ineffective uterine contractions; but the distinction has its consequences, for it is almost always recommended to perform a caesarean in a case of disproportion, while this is seldom recommended in the case of ineffective uterine contractions. Making this distinction involves taking the risk of a trial of labour, which seems to be “culturally” acceptable in Ireland¹² and Nigeria¹³, sometimes in France¹⁴, but to a lesser extent in the United States.

The other limit to external validity is connected with epidemiological differences (incidence of problems) between different countries, or even between different regions in the same country. For example at Karawa (Zaire), in an area where goitre was endemic, 20% of the women admitted to an obstetric department for obstructed labour suffered from cretinism, while among those without obstructed labour only 1% suffered from cretinism¹⁵. Other epidemiological variations have been observed for which it has not always been possible to suggest an explanation: for example it has been noted that the incidence of pre-eclampsia is apparently higher among black and Indian women than among white women, even when account is taken of parity, age and standard of living¹⁶, or variations in foeto-pelvic disproportions at Zaria in Nigeria¹⁷.

Once the indications have been selected it is necessary to identify all possible interventions for meeting the need, which is confined in our indicator to absolute maternal indications. The major obstetric interventions performed for absolute maternal indications as defined above comprise:

- caesareans (for severe ante-partum haemorrhages, major cephalo-pelvic disproportions where the child is alive, transverse and frontal presentations);
- laparotomies (for suture of a uterine breach in a reparable rupture);
- hysterectomies (in a major uterine rupture or an incoercible post-partum haemorrhage);
- internal versions (in a case of transverse position);
- craniotomies or embryotomies (in cases of dystocia when the child is dead);
- a symphysiotomy which is carried out to avoid a caesarean in a case of cephalo-pelvic disproportion.

These interventions were selected not only because they are designed to save the mother's life (for the indications mentioned above) but also because they can be performed only in hospital. This last point is particularly important, since it enables the collection of data to be restricted to maternity institutions with an operating suite.

This indicator of the coverage of obstetric need thus includes all major obstetric interventions for absolute maternal indications as defined above. It has the advantage of being less “manipulable” than the simple caesarean ratio; for the danger would be that, noting a low caesarean ratio, health professionals might increase the sensitiveness of their decision to intervene – in which case the caesarean ratio would increase, but not necessarily to the benefit of women with an absolute need of it.

There are, of course, other indications which in a high proportion of cases necessitate a major intervention to avoid a maternal death. This may be so in the case of a transfusion for an acute post-partum haemorrhage or a caesarean in a case of eclampsia. But for these other indications it is even more difficult to achieve satisfactory reproducibility, and there is still no experience in this field. It is, however, entirely acceptable that other indications should be added to the pool of indications defined above in a particular country in order to take account of specific regional needs. The indicator serves mainly to give some idea of the extent to which maternal obstetric need is being met; it is not intended to give an idea of the extent to which the total need is being met. This would not in any case be feasible, on the one hand because obstetricians have not reached a consensus on what is an absolute need: the boundaries of the term are ill-defined and have not so far been standardised. Moreover the ratio of complications may vary in different environments.

As for equity in access to obstetric care, it is the spatial analysis of intervention ratios for specific indications that makes it possible to measure it, and thus to measure the degree of equity in meeting maternal needs.

5. DEFICITS IN MAJOR OBSTETRIC INTERVENTIONS FOR ABSOLUTE MATERNAL INDICATIONS

The measurement of deficits is a matter of subtracting from the estimated number of women who need a major obstetric intervention for absolute maternal indications, the number who have actually had an intervention for such indications. This deficit may be expressed in absolute figures or in ratios (the number of women who have not had access to an obstetric intervention which they needed divided by the number of women who have given birth during the same period – which is reduced to an approximation: the deficit divided by the number of births expected). These deficits can then be measured, presented and analysed by geographical area.

The concept of Reference Ratio

The estimated number of women who need an obstetric intervention is required to enable the deficit in interventions to be quantified. It is necessary therefore, to put a figure on the incidences expected or the "reference" incidences. This reference ratio is calculated for a population group which has few barriers to access to hospital obstetric care (that is, for which the need is, in principle, met); and, by comparison, it can be used to measure deficits in other populations which have less good access to such care, in a cultural and epidemiological environment which a priori is not significantly different. The determination of a reference ratio is to some extent an arbitrary choice; but this choice must nevertheless be validated in order to make it credible to the health workers concerned.

There are a number of possible approaches to the comparison of data for different areas: comparison with (i) the incidence of the indications considered where these have been measured and published, (ii) the observation of intervention ratios which at some period in our history have made it possible to monitor maternal mortality, or (iii) the observation of maternal mortality ratios in environments where there are no interventions.

In Gambia a maternal mortality ratio of 2200/100.000 was observed during a period when there was no possibility of access to any source of obstetric care¹⁸. In the United States, in a religious sect whose members refuse to accept surgical treatment but otherwise are well nourished and live in conditions of hygiene and comfort similar to those of their fellow-Americans, the ratio was 872 maternal deaths per 100,000 live births in 1982¹⁹. These extreme situations show that it would need an intervention ratio of at least the order of 1--2 % to eliminate maternal mortality.

Epidemiological information on the frequency of maternal indications as defined above in a given population is not really available. The ratios suggested in the literature relate mainly to caesarean sections (the other interventions are deemed to fall out of consideration when a caesarean is performed in time). These publications mention ratios of the order of 5% to avoid death or a grave complication for the mother or child²⁰. The contribution made by the literature, however, is only moderately helpful, since the ratios for obstetric interventions, and specifically the ratios for caesareans, are very variable between one place and another²¹. Most of the publications are concerned with hospital populations and take account only of women who have given birth in hospital. There has been much debate about the representativeness of maternal mortality ratios based on hospital studies²². It appears, however, that in developing countries where the proportion of births in a supervised environment is low many women whose pregnancy is high-risk do not reach hospital and that many of them die outside hospital²³. The proportion of deaths at home (or on the way to hospital) to the total number of varies from one environment to another: around 25% in Jamaica²⁴, 47% in a country area in China²⁵, 50% at Giza in Egypt²⁶ and in south-eastern India²⁷, 80% at Matlab²⁸ and 100% in a country area in Gambia²⁹.

There are few studies in which it is possible to establish ratios to the total number of births. This is particularly the case in developing countries in which a majority of women give birth outside hospital. Moreover comparisons of indications for caesareans are difficult, because on the one hand all indications are mentioned (and not only the principal indication which led to the caesarean) and also because no attempt is usually made to study differences in the incidence of complications³⁰. It is still rarer to find publications in which the authors make a distinction between obstetric interventions designed to save the mother's life and others which put great emphasis on foetal indications³¹.

When the limited amount of relevant and usable data is analysed it appears that most problems of maternal health – at least those related to childbirth – can be solved with caesarean ratios well below 5%. At Enga in Papua New Guinea, with a caesarean ratio of 1.8% (for all indications, including indications specific to the child) the maternal mortality ratio was 180/100,000³². More

recently, at Harare in Zimbabwe, a randomised clinical trial aimed at demonstrating that it was possible to rationalise the offer of antenatal care followed 15,994 pregnant women over a period of two years. The maternal mortality ratio was 71 and the ratio for urgent caesareans was 2.7%³³.

It does not appear, however, that there is any univocal relationship between ratios of obstetric interventions for absolute maternal indications and maternal mortality, since the aggravation of a birth problem may be due to a number of factors (the mother's general condition, severe anaemia, osteomalacia, time of application for care).

Even if there is no measurement of the absolute frequency of major obstetric interventions for absolute maternal indications, it is nevertheless possible to take as a reference point the ratios of interventions in a situation where the frequency of interventions is sufficient to prevent the majority of maternal deaths without any overuse of interventions: in other words, a situation in which the decisions on interventions are sufficiently sensitive to avoid a death but also sufficiently specific to avoid iatrogenesis.

One of the few well documented studies which meet these criteria comes from a survey carried out in England and Wales in 1958³⁴. Francome and Savage³⁵ used this data to construct a table setting out the incidence of specific indications and the expected proportions of births by caesarean (Table 1). The figures for the indications were collected at a time when the total ratio for caesareans was 2.7%, induction of labour or the use of oxytocine were rare and the population was fairly homogeneous. The figures presented relate to the first caesareans performed on women carrying a single foetus. The expected proportions of caesareans also include absolute indications for the child.

On the basis of this table a standard ratio for the need for interventions might be of the order of 2% (with a minimum of 1.9%, consisting of 1% for foeto-pelvic disproportions, 0.5% for antepartum haemorrhages and 0.4% for transverse and frontal presentations, and a maximum of 2.9%, with 1.5%, 1% and 0.4% respectively for the same indications).

TABLE 1. INCIDENCE OF DEFINED INDICATIONS FOR CAESAREAN SECTION IN SINGLETON PREGNANCIES

CONDITION	INCIDENCE %	EXPECTED % OF DELIVERIES BY CS
Breech	2.6	1.0-1.5
Shoulder	0.2	0.2
Face and brow	0.4 + 0.1 = 0.5	0.2
POP and DTA	3.4 + 0.3 = 3.7	0.5
<i>Total malpresentations and malpositions</i>	<i>7.0</i>	<i>1.9-2.4</i>
Placenta praevia	0.5	0.3-0.4
Abruptio placentae	0.4	0.1-0.2
Unspecified APH	2.2	0.1-0.2
<i>Total Antepartum Haemorrhages</i>	<i>3.1</i>	<i>0.5-1.0</i>
Severe PET/eclampsia	1.0-1.5	0.5-1.0
Diabetes	1.0	0.1-0.2
Other diseases	1.0	0.1-0.2
<i>Total maternal disease</i>	<i>3.0-3.5</i>	<i>0.7-1.4</i>
Cord prolapse	0.1-0.3	0.1
Feto-pelvic disproportion	?1.0	1.0-1.5
Fetal distress	1.0-2.5?	0.7-2.0
<i>Total fetal reasons</i>	<i>?2.3-3.8?</i>	<i>1.8-3.6</i>
TOTAL DEFINED REASONS FOR PRIMARY CAESAREAN SECTION		5.0-8.4

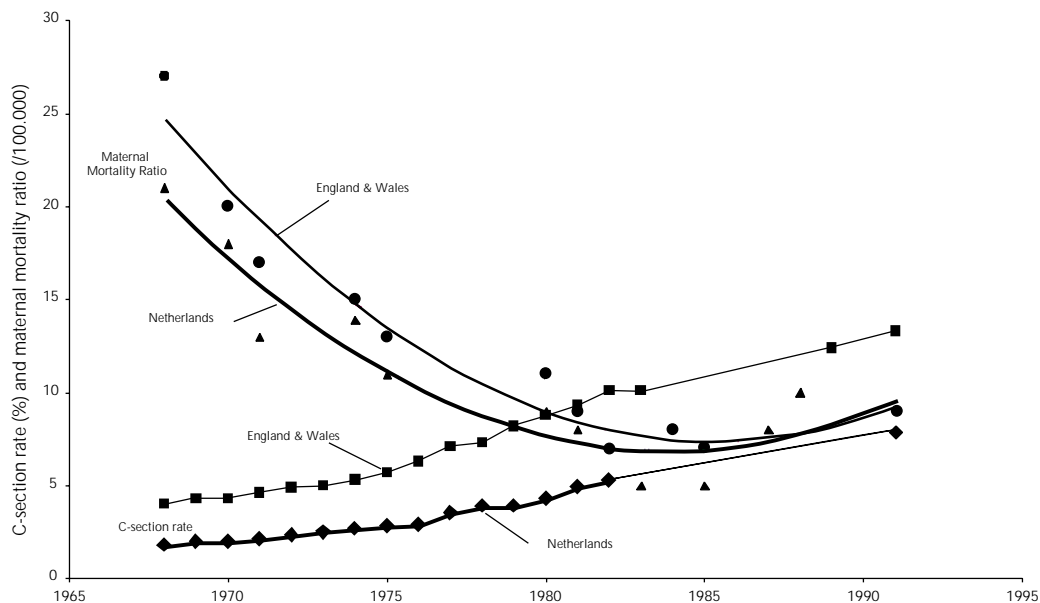
Source: Francome and Savage, 1993

Historical validation

Historical data estimated on the basis of a variety of sources shows that in the English county of Somerset, maternal mortality was around 2350 per 100,000 live births in the 16th century and around 1590 in the 17th and 18th centuries³⁶, at a time when obstetric techniques were not really effective. This gives some idea of the level of natural maternal mortality in childbirth. The figures reported by John Graunt (1620--74) point to a mortality ratio for women dying in childbirth of the order of 1%³⁷. A study of maternal mortality in European ruling families between 1600 and 1850 suggested a ratio of 2000 maternal deaths per 100,000 live births³⁸. In Sweden, where deaths have been systematically recorded since 1749, maternal mortality ratios ranged round 900/100,000 between 1750 and 1800³⁹. Shorter⁴⁰ summarises our knowledge of maternal mortality in European history: "Before 1800 between 1% and 1.5% of births led to the mother's death, the average of the studies consulted being 1.3%. The rate of mortality in childbirth, considered over the long term, seldom exceeded 2% (although this seems to have been the case in the London district of Aldgate in the 16th century and in New England in the colonial period). It was also seldom below 0.5%, even though that was sometimes the case in certain German villages".

More recently, between 1938 and 1947, the caesarean ratio at Aberdeen in Scotland was 1% and the mortality "attributable to a long and difficult labour" was 370 per 100,000 births⁴¹. In the following period 1948--54 the caesarean ratio increased to 2.4% and maternal mortality fell to 180/100,000⁴². In 1968 the caesarean ratio in the Netherlands was 1.8% (for all indications together, with maternal mortality of the order of 20/100,000⁴³. In subsequent years the increase in caesarean ratios reached the limit of decreasing returns, at least for maternal mortality (Figure 3).

FIGURE 3. MATERNAL MORTALITY AND CAESAREAN RATIOS IN THE NETHERLANDS AND ENGLAND AND WALES (1968—91)



Local validation

Another approach is to use the ratios for major obstetric interventions for absolute maternal indications, measured in an urban environment* with an efficient maternity hospital, as the standard ratio. The hypothesis (which it would be well to verify, for example by a study of the deaths of women of reproductive age from the town) is that in an urban setting with an efficient maternity hospital there is a guarantee of access to emergency obstetric care and that women in the town will go to it if they have a problem. The advantage of this practical approach is twofold: those responsible for providing care will have less resistance to accepting the standard ratio, since it has been constructed by their own people and has not been imported from outside and takes account of local epidemiological variations, in so far as women in the town have the same epidemiological characteristics as women in the country (which was not the case at the beginning of the century in England⁴⁴).

* Or, more exactly, in an area near the hospital where there is no difficulty about access.

In Morocco the median urban ratio of obstetric interventions for absolute maternal indications was used. This standard ratio is of the order of 1%. It corresponds to the ratio observed for women living in an urban setting in Kasongo (Democratic Republic of Congo: 1.1% for the period 1976--84), Mali (Bamako 1.2%, Kolondieba 1.3%) and Guinea-Bissau (Gabu 1%). This ratio underestimates the scale of the need, but has the major advantage of representing a minimum which local health professionals cannot dispute. This would not be the case with the values proposed for "obligatory, necessary or absolute" caesarean ratios, which vary between 1.5%⁴⁶ and 1.8%⁴⁷, 3%⁴⁸, 5%⁴⁹ or even 10%⁵⁰. The variation in these recommendations shows how differently the idea of need can be expressed and how necessary it is, therefore, to specify exactly what is being measured, while bearing in mind that this is merely a working hypothesis and not an "absolute and universal" norm.

Such working hypotheses transform a measurement which is in principle easy and reproducible (major obstetric interventions for absolute maternal indications) into an indicator of deficits in obstetric care which remain to be met. The selection of the indications and interventions which make up the indicator of unmet need for major obstetric interventions depends partly on the priorities which have been adopted (the mother's life) and partly on the quality of the information to be collected (reproducibility and validity). These are the criteria which were determinant in the development of the indicator in Morocco.

Calculation of the indicator

The number of major obstetric interventions carried out for absolute maternal indications in a given period is obtained (retrospectively, or prospectively if the data is found to be imprecise) from the records and reports of activities of the hospital or hospitals in the geographical area concerned. In order to maintain the quality of the indicator (precision, reliability) the number of major obstetric interventions (MOI) taken into account, together with the absolute maternal indications (AMI), subtracting all cases where a major intervention was carried out for a non-absolute indication, must be specified. The calculation and the analysis will be done for a given population -- which implies a defined geographical area. The place of origin of the patients must therefore be specified in the records and reports used in gathering data in order to ensure that the calculations as a whole cover the same population (the same denominator).

The indicator of unmet need for major obstetric interventions for a given population in a given period is calculated as follows:

$$\text{Unmet obstetric need} = (\text{BE} \times \text{RR}) - (\text{number of MOI/AMI}),$$

BE = number of births expected in the period under study,

RR = reference ratio of MOI for AMI, and

number of MOI/AMI = number of major obstetric interventions for absolute maternal indications carried out in the same population during the same period

6. WIDER INVOLVEMENT OF HEALTH WORKERS

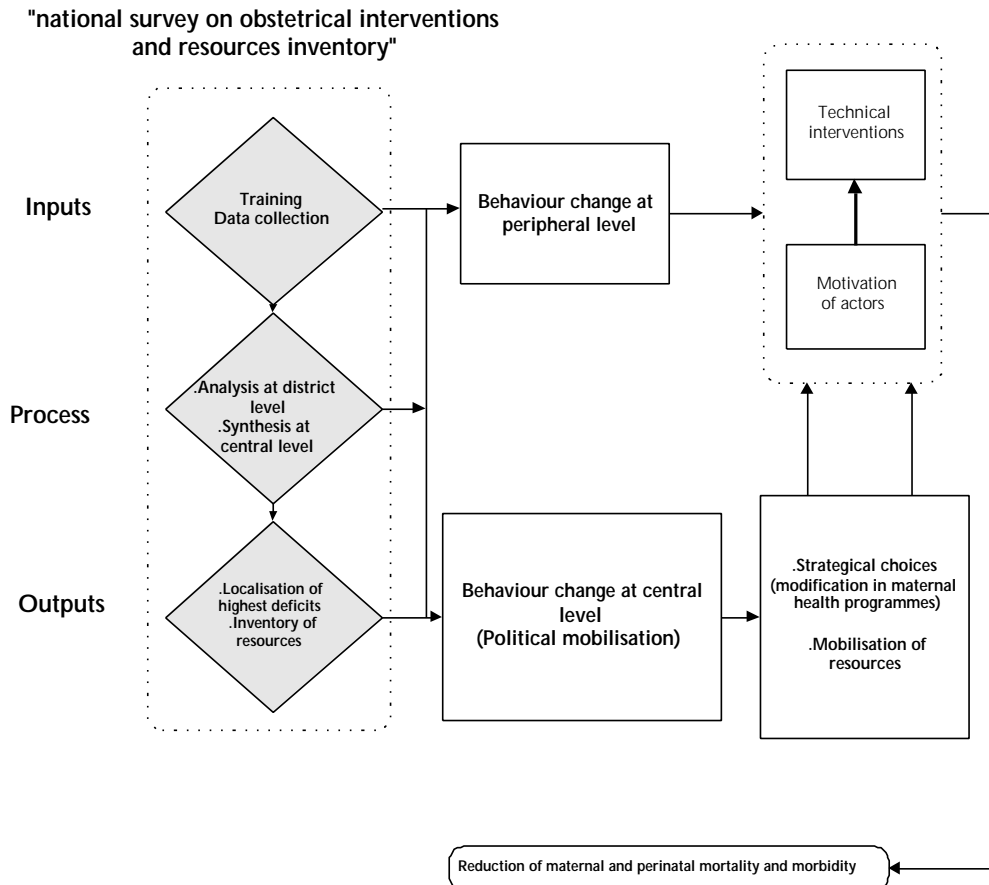
In order to carry out a study of unmet need for major obstetric interventions and then use the results as a basis for active operational measures of health planning and changes in health strategies or health policy it is essential that all levels of the health system should be involved in the research and that tasks should be assigned from the very beginning of the process. The *raison d'être* of this wider involvement of all concerned lies in the dynamic of change induced by the revelation of deficits and their causal analysis rather than in the study as such, since the collection of data should be as simple as possible, capable of being carried out by local teams and based on information already available in the hospital service.

Essential obstetric care, in the sense of care which is vital for the mother's life, calls for an effective health system (hospitals, primary-level health services, arrangements for referral); and the essential elements in the effort to reduce maternal mortality are in fact those which are required for the development of health services in general. In most cases considerable changes in health systems will be called for, and accordingly the involvement of decision-makers in the process of study and analysis is of crucial importance.

Another reason for involving a wide range of those concerned in the study is that tackling the problems will frequently call for political and strategic measures and not merely increased resources; or, where additional resources are required, a more effective distribution of existing

resources can often offer an entirely acceptable solution. Historical studies of maternal mortality⁵¹ have shown how important political choices have been in reducing maternal mortality, for example in Sweden, well before the advent of modern obstetric techniques. Among such measures have been the provision of information on mortality, the professionalisation of obstetric services (training of midwives) and social measures ensuring access to the health structures concerned.

FIGURE 4. EXPECTED IMPACT OF THE STUDY ON OBSTETRIC INTERVENTIONS



Source: De Brouwere and Van Lerberghe. 1998

In Figure 4 the study is presented as a system in which there are inputs (training of provincial teams and collection of data), a process (the analysis of data) and outputs (the location of the most serious deficits and an inventory of resources). The impact expected from this type of study on the reduction of maternal mortality is not direct. It is expected that health workers at the peripheral level, by estimating the extent of the deficits and analysing their causes, will become aware of the scale of the problem and potential means of tackling it, for example by setting up a dialogue with the population served, improving the quality of hospital care or establishing a system of referral and evacuation. These interventions are only possible if health workers on the periphery are motivated (hence the crucial importance of their involvement in the collection and analysis of data) and the central level gives them the necessary support. At the central level the mapping of unmet need, the distribution of the available resources and the analysis of bottlenecks should form a powerful stimulus (and an objective basis) for adapting strategies and allotting resources.

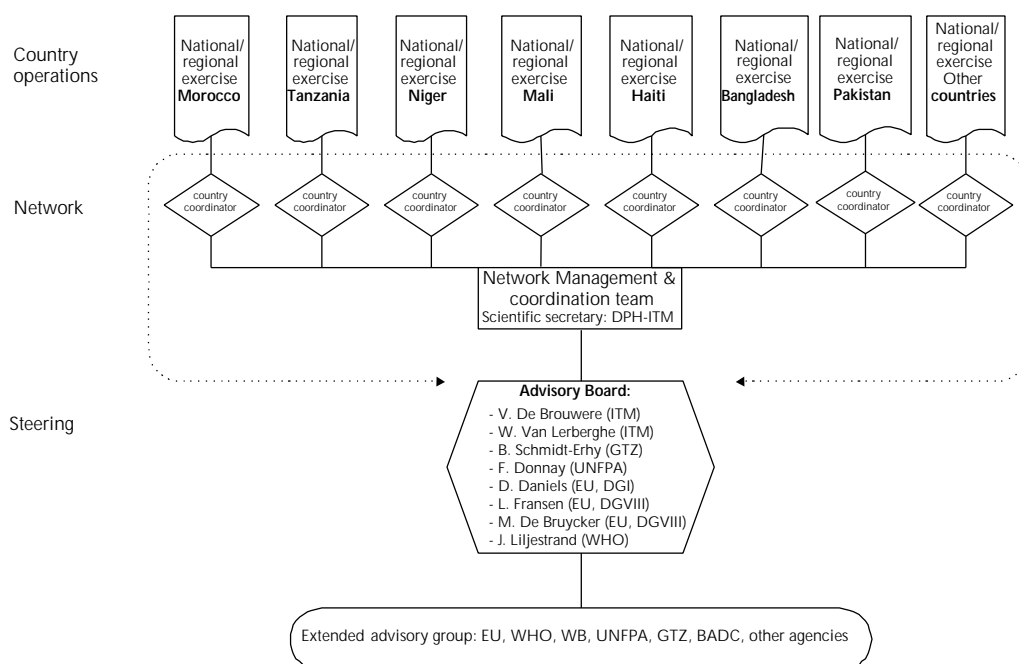
7. INTERNATIONAL UON NETWORK, UNMET NEED FOR MAJOR OBSTETRIC INTERVENTIONS

The method of analysis and planning based on a calculation of unmet need for major obstetric interventions and the impact of the process on policies and strategies of health development are

the subject of a project financed by the European Union (DG 8) in the form of a network (Figure 5) consisting of –

- national teams in certain developing countries;
- a co-ordinating and management team based in the Department of Public Health of the Institute of Tropical Medicine in Antwerp; and
- an international advisory committee composed of representatives of the organisations most closely involved in the development of this initiative: UNICEF, GTZ, European Union (DG 8), WHO, the World Bank, UNFPA.

FIGURE 5. ORGANISATION OF THE NETWORK ON UNMET NEED FOR MAJOR OBSTETRIC INTERVENTIONS



Justification of the network

The measurement of unmet need for major obstetric interventions makes it possible to provide data on the situation of obstetric services in particular geographical areas. These measurements can be used for the planning and follow-up of the development of health services and provide a very concrete starting-point for dialogues on health policy and strategies at local, regional or national level. From an operational point of view, unmet need for major obstetric interventions are expressed in terms of the number of women who should have had a surgical intervention; and it is thus possible to estimate the need for interventions in obstetric emergencies without the need to carry out extensive and costly studies in the population. Estimates made in this way are useful in comparing the availability of obstetric techniques in different geographical areas, identifying regions where the needs are greatest, and thus defining more effectively the expenditure required to ensure the development of services. Those responsible for health planning can also use unmet need for major obstetric interventions to follow up the improvement of health development and its impact on maternal mortality.

Unmet need for major obstetric interventions' can thus serve as a lever for interventions much more than as a measuring tool. The gathering of data and the analysis of unmet need for major obstetric interventions in any country can therefore –

- help to create a political awareness of the need to promote maternal health;
- readily provide the information necessary for planning and prioritising the development of services; and
- lead to action for the reduction of maternal mortality at local level by changing certain attitudes,

mobilising resources and more effectively adapting professional practices to the needs of patients.

The use of 'unmet obstetric need' as the point of entry for launching or revising a strategy for the reduction of maternal mortality can yield numerous benefits: for example –

- encourage community discussion and political pressures for the mobilisation of resources and the formulation of strategies for improving obstetric care;
- directly involve health professionals and communities in the improvement of obstetric care and, more generally, of the referral system; and
- make it possible to follow up trends in efforts to reduce maternal mortality.

Estimating the amount of 'unmet need for major obstetric interventions' is thus a starting-point for concrete interventions in terms of developing health policy and improving maternal health.

Questions for research connected with the network project:

- the validation of the methodology and the value of the indicator of unmet obstetric need in different contexts, so as to define in what circumstances and under what constraints this approach is effective;
- tests of additional modules complementing the approach;
- the influence of the information provided on maternal health policy.

Complementary modules

The basic modules for estimating unmet need for major obstetric interventions are already available. They have been tested on the national scale in Morocco by the National Institute of Health Administration (Institut National d'Administration Sanitaire, INAS) with the support of the Institute of Tropical Medicine in Antwerp. Experience in Morocco has shown that the indicator is useful, ethical, reliable, representative, comprehensible and easily calculable. It has also proved its effectiveness as an inducer of political and operational changes. The indicator needs wider validation before being used on a larger scale in countries where this approach would be useful. The validation of the methodology based on unmet need for major obstetric interventions in other contexts is now necessary in order to define the circumstances in which it is valid and the constraints and factual evidence which can be used in guiding its use on a large scale.

In parallel with this basic module other tools are being developed in order to permit a closer analysis of certain problems: for example the behaviour of obstetric personnel, their sense of responsibility, the tasks of midwives, referral and evacuation systems and the quality of obstetric care in hospitals. Some of these "complementary modules" have been successfully used in Morocco, but they too need further definition and further testing. New modules directed towards the impact of political and operational changes induced by a process of calculation and analysis of unmet need for major obstetric interventions.

The formation of a network makes it possible to carry out exercises in the gathering of data and analysis of unmet need for major obstetric interventions in different contexts and achieve a synthesis and detailed analysis in order to assess their reproducibility, feasibility and effective impact on health policies and strategies.

Terms of reference of the Unmet Need for Major Obstetric Interventions Network

The Unmet need for Major Obstetric Interventions Network project has the following terms of reference:

1. Aim:

The project will contribute to improving the ability to plan and develop health policies and health services in order to reduce maternal mortality.

2. General objective:

The project will produce a series of reliable tools enabling developing countries with high maternal mortality ratios to develop health policies which are adequate to their needs in terms of the planning and development of health services.

3. Expected products:

- A series of validated tools and technical guides, in French and English, focussing on the estimation of unmet need for major obstetric interventions, as well as scientific publications on the subject.
- A critical mass of at least seven national teams familiar with the tools, forming the Network on Unmet Need for Major Obstetric Interventions.
- At least seven case studies in various countries, with comparative analyses, including a critical analysis of the situation and the documentation of political changes.

Tackling Unmet Need for Major Obstetric Interventions

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