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GUIDEBOOK FOR MATERNAL AND NEONATAL HEALTH INDICATORS -PROCOSI-

TECHNICAL WORKING PAPER 4

June 1997

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Guidebook for
Maternal and Neonatal Health Indicators
- PROCOSI -

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I USING INDICATORS

A Introduction

This Guidebook provides material on indicators aimed at assessing maternal and neonatal health levels and the performance of programs implemented to affect those health levels Interventions (programs) to improve health states require information about their adequacy and performance as well as their impact Indicators are the basic tools used to measure progress and achievement of program goals "Monitoring progress is essentially a process of comparison of indicators, over time and across populations" (WHO, 1994 14 p 1)

PROCOSI

The indicators included in this Guidebook are a reflection of the current interests of the PROCOSI member groups in reproductive health

PROCOSI - Programa de Coordinacion en Supervivencia Infantil - Program to Coordinate Infant Survival - is a network of nongovernmental organizations (NGO) PROCOSI has as a major goal to improve reproductive health in the rural areas of Bolivia by 1997 To achieve this goal it has set itself three major sub-project goals for the areas where its members work (1) to reduce perinatal mortality by 30% (2) to reduce neonatal mortality by 30% and (3) to reduce neonatal tetanus by 80% (taken from the PROCOSI log frame of September 1994 - 1997)

PROCOSI has stated a current purpose to be to increase the coverage and quality of the reproductive health programs of its members The following sub-projects for member groups will include increasing the use of modern contraceptive methods reducing the incidence of neonatal tetanus increasing the coverage of two or more antenatal visits increasing the coverage of professional and humanized care in childbirth and adequate treatment of obstetric emergency, increasing coverage of cervical cytology testing to screen for cancer increasing the use of breast examination to screen for cancer and increasing diagnostic treatment and preventive activities for sexually transmitted diseases including acute immune deficiency syndrome (STD/AIDS)

Reproductive Health

In this Guidebook reproductive health includes the following topics

- Safe regulation of fertility primarily family planning but also infertility and fertility awareness,
- Maternal health and nutrition including preconception prenatal childbirth postpartum neonatal periods and breastfeeding,
- Protection from sexually-transmitted diseases including prevention referral and treatment of those diseases
- Other reproductive health issues such as freedom from harmful practices reproductive rights and sexuality/sexual behavior (MotherCare 1995)

Development of the Guidebook

The Guidebook benefits from the work of various groups The indicators included in this Guidebook were assembled from material produced at the PROCOSI Workshop held in La Paz, Bolivia, 26 to 28 April, 1995, and from material prepared by MotherCare (MotherCare, 1995) that included information written by various groups The Evaluation Project, Proyecto Evaluacion (Bertrand et al , 1995), MotherCare staff and consultants, USAID Reproductive Health Task Force, the World Health Organization (WHO, 1994 14), and UNICEF (Maine et al , 1992) Various committees and groups have involved themselves in developing indicators to measure activities and results of reproductive health programs for specific programmatic activities (MotherCare, 1995) A basic list of Safe Pregnancy Indicators recommended by these groups appear in Appendix D

The indicators given in this Guidebook are provided for your use and information In some cases the indicators are "experimental" in the sense that although they may have been used by researchers or individual programs, they have not been used for large scale programs or for enough time to know all the measurement issues that can occur

Each program will need to give priority to the indicators that are most useful to that program, and adapt the indicators as necessary to fit the objectives of the particular program, or the reality of the area in which the work is being done

The Guidebook is open, that is the format permits the addition of new indicators as program managers develop them Also any experiences that program managers have with indicators can be recorded in the Guidebook, to pass along to other members of the PROCOSI network

B Components of Indicators

Indicators have 5 parts to them

- **numerator** the events that occur among the population in the denominator
- **denominator** the group that is being studied
- **time period** during which the group studied is watched for the events to occur The time period should be the same for both the numerator and the denominator
- **geographic area or population** the indicator refers to where does the group under study come from The numerator and the denominator should come from the same place If information is collected from two different sources or sites, then this must be clear in the definitions of what is measured for the numerator and the denominator
- **mathematical "constant"** that makes it easier for us to understand the numbers Usually 100 1 000 10 000 or 100 000 are used For most people to understand what 0 335 is saying about a group of people is difficult The usual practice is to use a "constant" that makes the fraction refer to a group of people, for example to a group of 100 people That means multiplying the fraction by the constant (0 335 X 100) to give 33 5 events per 100 people or in more usual terms, 33 5% of the population had the event For fractions that are very small, for example in maternal mortality a fraction might be 0 0039 Here we use a bigger "constant", for example, 100,000, and multiplying (0 0039 X 100,000) tells us that 390 events occur per 100 000 people (this is the maternal mortality ratio for Bolivia 1992-1994 reported in SNIS, 1995 based on ENDSA 1994)

An example is

Indicator	% of all births occurring in Community A during 1994 who were attended by medically trained personnel
Numerator	# of births attended by medically trained persons
Denominator	# of all births
Time period	1994
Geographic area	Community A
Constant	100 makes a percent

C Proportions and Ratios

It is important to be aware of how the numerator and the denominator relate to one another since it will affect the interpretation of the data from the indicator

Traditionally for indicators in maternal and child health everything was called a "rate" But the term "rate" has a very special meaning and not all of the traditional indicators are truly rates Now we use other words besides "rate", such as proportion, percentage and ratio for many indicators

- A rate is a mathematical measure that means the events in the numerator arose out of the denominator, and that everyone in the denominator had a real chance of having the event It also means that every event counted in the numerator occurred to someone who was counted in the denominator With a rate, there is a concept of movement out of the denominator into the numerator (Examples follow)

- A proportion says there is a relation between the numerator and the denominator, but it does NOT have to mean that the special association of a "rate" is present The relation is usually expressed as a percent (%)

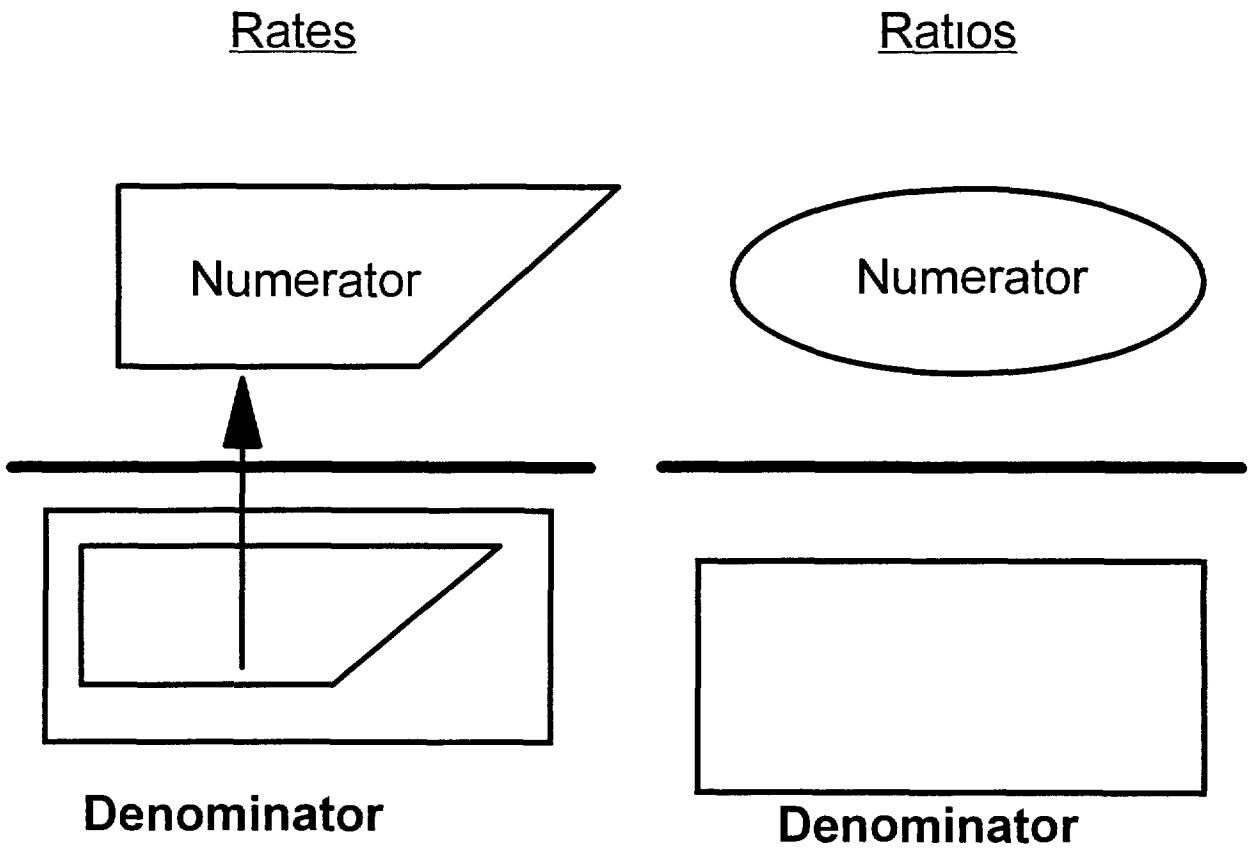
- A ratio does not require any similarity between the denominator and the numerator We also call indicators "ratios" when the denominator does not count all of the women who appear in the numerator or vice versa

A common example of "proportion" and "ratio" is a basket of fruit of different types there are 6 fruit in the basket 3 bananas 2 oranges 1 papaya The proportion of the basket of fruit that is oranges is 2/6 (2 divided by 6) or 0 333 of the basket of fruit is oranges, or using a "constant" of 100, (0 333 X 100) means that 33 3 of 100 fruit are oranges or 33 3% of the fruit in the basket are oranges Since an orange is a type of fruit there is a real relationship between the numerator (oranges) and the denominator (all fruit in the basket)

A ratio tells us the relation of bananas to oranges that is that there are 3/2 (3 divided by 2), or 1 5 bananas to every 1 orange Bananas are a different type of fruit than oranges, and so this is a ratio

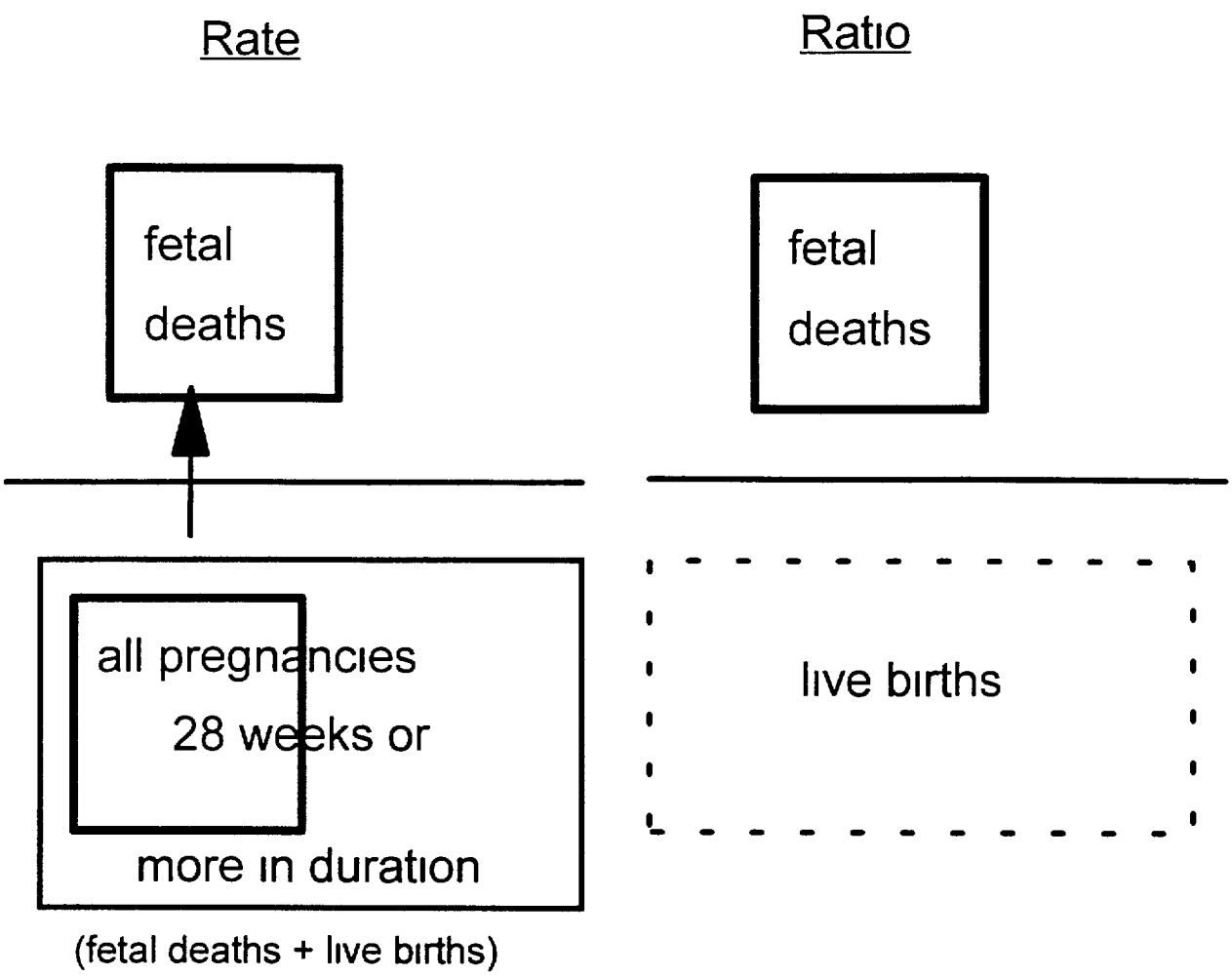
Figure 1 shows the relation of numerator and denominator For a rate, the denominator (the rectangle) includes all the people who could become part of the numerator (the circle), and if this relation exists you have a rate or a proportion For the ratio the denominator (the rectangle) does not contain all the people who can have the event so the numerator is a different shape that is not part of the denominator

Figure 1
Types of Indicators



Copyright BJS

Figure 2
Differences between a Rate and a Ratio:
Example Indicator



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An example of an indicator in practice that could be a rate or a ratio appears in Figure 2 and is explained below

- a rate

$$\frac{\text{number of fetal deaths in a community during a specified time period}}{\text{number of all pregnancies 28 weeks or more in duration (i e fetal deaths and live births) in the same community during the same time period}} \times 1000$$

This is a rate because the denominator counts all pregnancies that lasted 28 weeks or longer (fetal deaths [infants born dead in a pregnancy that is 28 weeks or longer in duration] plus those infants that are born alive) From this denominator the pregnancies that ended with the infant being born dead (called a fetal death or a stillbirth) are counted in the numerator It tells us how likely fetal death is among all "viable" pregnancies "Viable" means that staying alive is possible for the fetus outside the womb, that is that the fetus is not so immature that any possibility of surviving outside the womb is nil

- a ratio

$$\frac{\text{number of fetal deaths in a community during a specified time period}}{\text{number of live births in the same community during the same time period}} \times 1000$$

This is a ratio because the pregnancies that are counted in the denominator include only those that end with a live birth while the numerator includes those pregnancies that end with a fetal death The numerator is not included in the denominator This is a classic ratio

D Scientific Qualities of Indicators

Indicators are chosen depending on their scientific attributes as well as on which part of a program is to be measured The qualities recommended are

- Valid that the indicator does measure the events desired This is the most important quality Even if an indicator has all the other qualities, it should not be used if it has very little validity
- Reliable that the indicator measures the same thing in different settings and with various people making the measures It is repeatable, trustworthy
- Specific that the indicator measures only the events it is supposed to measure and not other things as well
- Sensitive that the indicator measures changes that occur, that is, that it is sensitive to changes in the events
- Feasible that the indicator can be measured It is best if generally accepted definitions exist for it and that standards have been developed and tested for it Many of the indicators in this Guidebook are new, and worldwide standards do not yet exist Another important consideration is whether you have the resources to collect the information needed for the indicator properly

(based on WHO 1995 14 p 4)

E Methods and Sources of Data

This section discusses methods and data sources in general In the section where each indicator is presented, specific methods and sources are listed for that indicator

The most common sources of information for indicators are the following

- civil registers vital statistics, and the census - usually these data exist in a published format, or more detailed information can be obtained from the agency that keeps the records
- clinical reports or medical histories
- logbooks/registries kept in the services or in the community
- people themselves either individually or in groups

The most commonly used methods for collecting information for indicators are the following

- abstracting information from existing sources
- asking questions of people in surveys, personal interviews
- rapid epidemiological surveys
- observation of work that is done (usually observing treatments or procedures done in facilities)
- for qualitative information conducting group interviews or carrying out in-depth open ended interviews

Every source and method has problems of measurement that should be accounted for when information is used based on that source or method In the following are some examples of measurement issues that are classic of selected sources or methods

- **vital records** reporting of events is late that is in some places live births are not registered until the child is 6 years old and ready to begin school, some proportion of events are not reported at all and the events that are not reported may be coming from a specific group of community members (an example is not registering births done at home, or more often not registered if residence is in rural areas)

- **medical or clinical records** events that actually occurred may not be recorded in them physicians may use different definitions to diagnose similar condition causing events to be over-reported in some facilities while under-reported in others, recording errors are common, records may be missing in some proportion of people who were served at the facility

- using **facility records** rather than a survey in the community the people who come to the facility may be different from the population in the surrounding community some people using the facility will be arriving from other communities, often facility records do not contain all the information one would like to have for example, the education of pregnant women is often not even mentioned in the medical history

- **community surveys** sample sizes that are required to have a stable indicator may be so large that the resources do not exist to do the survey, the manner in which a sample is selected may require assistance from technically prepared professional people, some events such as obstetric complications may be difficult to diagnose in the community or to obtain a standardized definition of the complication from the women interviewed, the survey may have to be repeated at least twice to obtain indicator data that can show a change has taken place Consultation with an expert is usually needed to obtain a good sample of the group to be studied

- **qualitative information** these methods can provide very rich data that tell a lot about what is happening in the community but the representativeness of the small group included in the survey may be questionable to use these methods properly consultation is probably needed with a technically prepared professional analysis and interpretation of this information takes time and skill

- **case review** and **confidential inquiry** both of these methods obtain a lot of information about single deliveries and either about the mother the infant or both Both methods can be used with either medical records (if they are complete enough) or with community members The decision depends on the goal of the data collection Most often the review and the inquiry are directed at cases of death or of selected complications

  The case review and a verbal autopsy have been used in Bolivia and in Bangladesh with families of maternal and peri/neonatal deaths The intent of the review was to find out about decision making about seeking medical care and about the process of recognizing serious complications (a process diagnosis) A verbal autopsy was carried out to define the cause of death This is especially helpful when a large proportion of deaths occur outside medical facilities

  A more detailed description along with questionnaires used are available from MotherCare (Harrison 1994 pp 26-29)

  The confidential inquiry looks into the medical treatment and management of the cases Originally the inquiry was developed to study maternal death, and more recently perinatal death There is special emphasis on framing cases so that individual medical professionals and cases cannot be identified The purpose of the inquiry is to improve the treatment and handling of complicated cases so that mistakes in decisions are identified and improved practice standards can be written (Godber, 1976) Data are collected and then reviewed by a panel who decide if complications and events of the case were "difficult to avoid" "possibly avoidable", or "probably avoidable" Cases that are classified as avoidable deaths receive attention to decide what the course of action should be in the future so that such outcomes do not reoccur

Program managers need to be aware of these issues when deciding on their intended sources of data

and methods One must weigh the pros and cons in one's situation to choose the best way to collect indicator data

F Interpreting Indicators

Indicators measure

- the **average rate or percentage of events in a population** For example, that out of 100 000 live births in Bolivia during 1992-1994 on average 75 infants died before reaching 12 months of age (reported in SNIS, 1995 based on ENDSA, 1994) For a single baby however the chance of living to 12 months is either 100% (they do live that long) or 0% (they die before they complete 12 months of life) The average rate is a probability (a risk or a chance) of events occurring for any particular infant based on characteristics of the total population of live births Indicators tell you about groups of people, and are not predictive of any one baby's real chance

- the **magnitude of an event in population**, that is, it answers the question of how many people in a group, on average, are affected by it

- the **frequency with which an event occurs**, that is, the event is a very common occurrence or not

- whether **changes have occurred** in events when you compare the indicator with something

Interpreting indicators considers the methods and sources used to collect the information used to measure the indicator

- **what is the source?** where does the information come from? A source would be medical records from the pregnant woman herself etc

- **to whom does the information refer?** that is which population or group of people did the information come from? for example, does it refer to everyone in the community, or to those who came to the health clinic during the month of December?

- **what method** was used to collect the information? a community survey abstracting medical records? observing a nurse perform a procedure? etc

- do the **definitions of the numerator and the denominator** fit what you need for your program?

- **what is the consistency of the data?** Were there enough numbers of events or people included that normal small fluctuations from time to time or from place to place, will not change the meaning of the indicator (See Appendix B for more on small numbers and the stability of indicators)

Interpreting an indicator is best done together with information from other indicators It is good to

have information from other indicators that give a different perspective on the event being studied Being able to compare information from other places and populations is very helpful All of this brings greater depth of understanding about what the problem is, where interventions can be introduced to do something about the problem, or what effect an intervention may have had

To make judgments about indicators a comparison figure is needed There must be some idea of what is expected, or what the goal is for the indicator Program managers might collect information about the indicator at different periods of time or from several locations, or in different populations or they might use national figures as a comparison, so that they can judge if the indicator for their population is higher or lower than the comparison indicator This issue is discussed more in the Section 2E on monitoring and evaluation

Using Imprecise Data

Imprecise data can be used and interpreted with proper caution Often the inaccuracies are known although the magnitude of inaccuracy cannot be precisely identified The important thing is not to interpret the actual number given by the indicator (rate percentage, or ratio) as a fact but to use it as a rough indicator This indicator can be interpreted by assessing the general pattern of the indicator in the context of changes over time comparing with the same indicator from other places and by assessing the size or frequency of the event within the context of patterns shown by other indicators

For example the maternal mortality ratio for Bolivia is known to be imprecise because not all live births are recorded in the vital statistics system (this is the denominator for the ratio), and not all the maternal deaths are reported (this is the numerator for the ratio) Especially events occurring at home are not registered and it is well accepted that a goodly percentage of births occur at home in the country If the system remains essentially the same in Bolivia over the years, we can compare the rate in 1992-94 of 390 deaths per 100 000 registered live births with other years We know that the maternal mortality ratio for Bolivia is not exactly 390 but it gives us a rough estimate, that says this ratio is not the highest in the world (Bangladesh reports rates of 800 maternal deaths per 100,000 live births) but Bolivia's ratio is much higher than countries with vast coverage by medical professionals Japan s 1992 ratio was 9 2 per 100 000 live births (United Nations 1995 p 399) so there is clearly a problem for Bolivia to prevent maternal deaths

Does the ratio of 390 seem reasonable given other indicators in Bolivia? The infant mortality rate in 1992-1994 was reportedly 75 infant deaths per 1 000 live births - again not the highest in the world but higher than Japan's rate of 5 per 1 000 live births For information the estimated infant mortality rates for selected countries reported for 1993 are Colombia = 37 0, Ecuador = 49 7 Mexico = 36 0 and Guatemala = 86 2 (United Nations 1995 p 376)

Levels of poverty lack of education lack of attendance at prenatal care and so on all point to the feasibility of having a maternal mortality ratio about where the reported one is We could speculate that the ratio is probably higher than that reported If some of the indicators that are known to

influence higher chances of maternal death were not supportive of the ratio of 390, then the ratio would be in great doubt, and might be considered too imprecise to use

G Planning for Using Indicators

A matrix has been developed as a tool to assist in planning and gathering information for the indicators chosen Figure 3 is a blank matrix that can be photocopied and used in your planning activities It is designed to cover the basic issues involved in collecting and using indicator data It can help you avoid duplication in data collections by laying out a careful plan which clearly lists what is needed for each indicator Often indicators use the same denominator or the same numerator By recognizing this you can make your data collection more efficient It also helps to decide early which type of comparisons you will make with your indicators, so that when the indicator data begins to arrive, you have the needed comparison data available for interpretation as well There are definitions in Figure 4 for each of the 8 columns of the planning matrix

Figure 5 contains an example of a plan to gather indicator data for a program with one objective to increase program coverage of all pregnancies in community AA One question the program managers will address with the program appears in column 1 - whether the new program increases the level of prenatal care use in the community? The indicator as stated in column 2 is the % of pregnant women with at least 2 visits for prenatal care The definition used for the indicator are given in columns 3 and 4 It has been decided to compare with a norm of 50% that has been set for the program This norm should not be chosen without some knowledge of current coverage levels, or it could be impossible to meet Indicator data will be collected twice as given in column 6, from women who have completed their pregnancies (column 7) using a community survey (column 8) The same community survey might collect information for other indicators which would make it a more efficient expense than collecting information for just one indicator

Similar information would be prepared for every indicator that you decide to use for your program

Figure 3

PLAN FOR THE USF OF INDICATORS

	1	2	3	4	5	6	7	8
	Objectives and questions of the program	Indicator	Define the		Compare with		Data collection	
			numerator	denominator		When?	Source of information	Methods for collecting the information
A	Objective A							
1	Question # 1							

Figure 4
Guide for the
PLAN FOR THE USE OF INDICATORS

1 Objective and questions of the program this refers to the main purpose of the program Often there is more than one question for each objective It is also possible to have more than one indicator to address a single objective

2 Indicator what is the indicator(s) to be used to address this question

3 & 4 Define the numerator and the denominator this refers to their exact definition including the site and the time period covered by the indicator

5 Compare with this refers to the decision about what to compare the indicator to in order to have an idea of its value (higher, lower, or the same as another population, for example) Several possible comparisons can be made, and a list appears in the section on evaluation and monitoring

6 Collection of data When to collect it at what point in the program will data for the indicator be collected? Before and after the program is implemented? Periodically during the time the program is running? etc

7 Source of the data from what source will the information be gathered for the indicator both the numerator and the denominator - the information source should be clearly listed for each

8 Data collection method this refers to the methods to be used for gathering the numerator and the denominator data The most common methods are surveys, abstraction of existing information using logbooks or registries and observation and recording

Figure 5

EXAMPLE PLAN FOR THE USE OF INDICATORS

1	2	3	4	5	6	7	8
Objectives and questions of the program	Indicator	Define the		Compare with		Data collection	
		numerator	denominator		When?	Source of information	Methods for collecting the information
A Objective A Increase the coverage of the program to all pregnant women in community AA							
1 Has the level of prenatal care increased in the community with the new program?	% of pregnant women in the community with a minimum of 2 prenatal visits	# with 2 or more prenatal visits	all of the pregnant women in the community targeted by the program	a goal of 50% after a year	baseline &	women who have completed their pregnancies	community survey

II FOCUS OF INDICATORS

A Introduction

For maternal and child health two broad categories of indicators exist

- those that relate to health status showing an impact on a health outcome or disease state, or death (examples are the maternal mortality ratio and perinatal mortality rates), and
- those that relate to the process of delivering health services, whether direct or intermediate measures (outputs) of health services (examples are attendance at antenatal care or having received a tetanus toxoid immunization)

The first set of indicators looks at the condition of the population group (what is the magnitude of the health problem) and the second group looks at the health care delivery system, either by itself (are there any facilities that can perform the emergency obstetrical care functions as recommended?) or how it interacts with people (do women with complications get adequate treatment? Are they satisfied with their care?)

The interaction of people and the health care delivery system has been studied for a long time Indicators recommended in this Guidebook are related to models (or diagrams) of the interaction between women and neonates and the health care delivery system, with a desire to capture markers for both population characteristics and the system characteristics involved in program success Indicators for health status are related to pregnancy and childbirth, and the model is discussed in Section 2 B Indicators and Biological Timing There are terms that have been applied to various characteristics describing the health care delivery system and these terms are presented in Section 2 C Health Services Systems and their Characteristics The place of indicators in the causal chain of events leading to contact with the system and with system performance are presented in Section 2 D Pathway to Survival Model Emphasis is placed on indicators that are action oriented and provide useful and meaningful information that can lead to decisions about program changes or to evaluate program changes Monitoring and Evaluation issues are discussed in Section 2E

The selection of indicators depends on the characteristics of the target population, the type of program that is given the interventions that are to be used and the way in which the information is to be used and interpreted

Practical aspects must be considered as well that is the feasibility of collecting the information for the indicator and the indicator's responsiveness to the program changes being made (how quickly the indicator will show that a change is occurring)

Usually programs wish to show an impact or effect on the health status of a population group (or a group being served at a clinic) and that is an important measure of health programs (that is, that death and disease rates decrease or that they are prevented altogether) but it is often not practical to measure health status directly in the time period of the program experiment, or the size of the

population group being served may be too small to be able to see a statistically valid change

However for some practices in maternal and child health, studies in other parts of the world have shown a strong association between a practice and a change in health status, so that now, we can use a "process measure", that is, that the practice was implemented and carried out properly -- and that becomes a "surrogate" (or "stand in") measure for the health impact measure Also, some conditions, such as severe obstetric complications require medical treatment for the health impact to be realized and so treatment at health facilities can be used as surrogate measures for maternal mortality

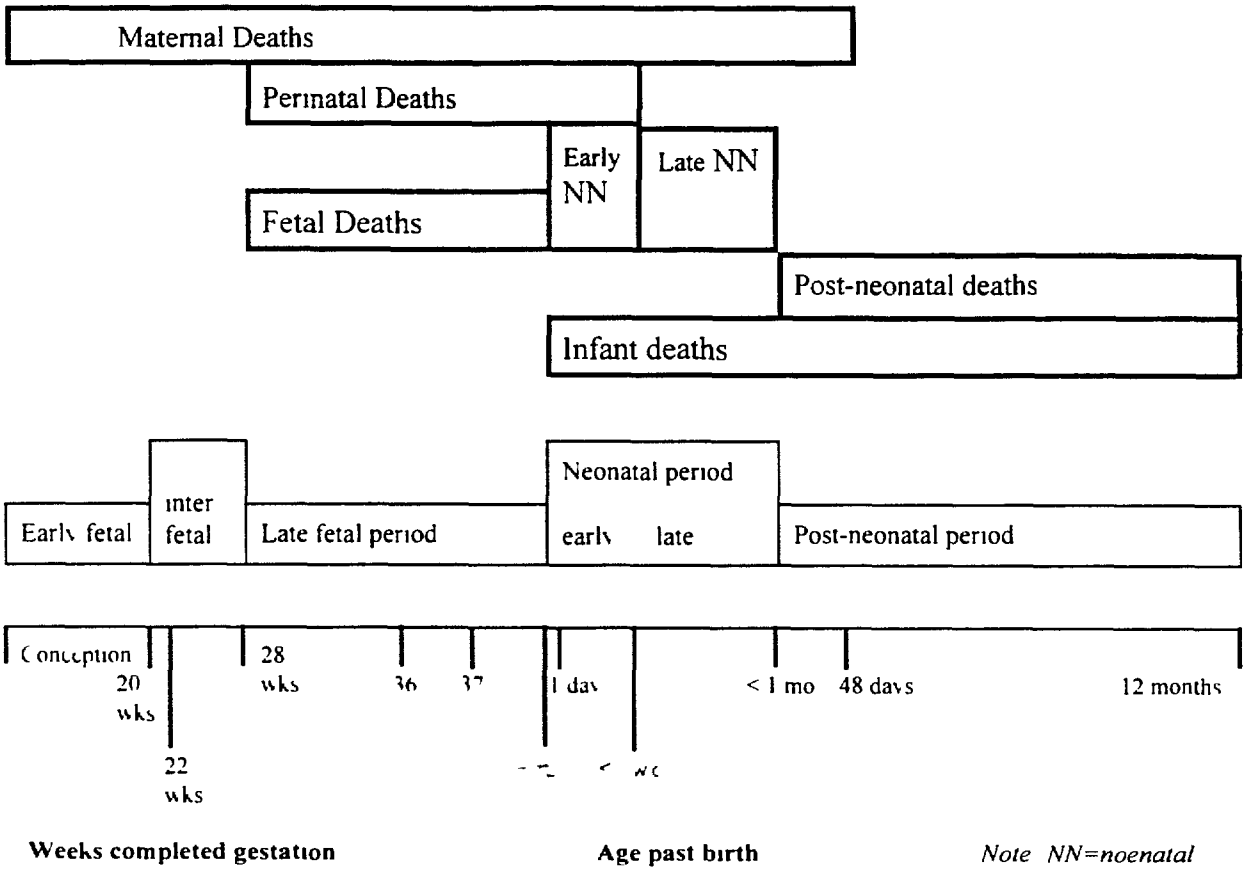
When choosing indicators for a program think about what the program hopes to accomplish with the program changes that are to be implemented You will want to have measures showing that the program changes were made and some indication that there was an effect of the changes For example with the introduction of emergency obstetric care at a facility in the community one would want to measure that the new services actually were introduced and functioned when a case of postpartum hemorrhage arrived at the facility If the intervention is effective one would expect that the proportion of postpartum hemorrhage cases that are incorrectly managed at the facility would decrease or that there would be an increase in early referral of women with excessive blood loss

B Indicators and Biological Timing

In maternal and neonatal health the majority of the health outcome (or health effect) indicators are associated with the time during pregnancy or the postpartum period (see Figure 6) The majority of words used to name an indicator also tells the time when the events occurred In choosing indicators program staff need to think about what time period their programs are targeting and choose appropriate indicators to capture that

Figure 6

Biological Timing and Health Outcome Indicators in Maternal and Neonatal Health



In the Figure the horizontal line represents the time from conception of a pregnancy to birth, and then to 12 months after the birth The time periods used in this Guidebook to define the indicator and the terms for these periods are shown

For the indicators addressed in this Guidebook, the most important periods for the infant are from 28 weeks of gestation (that is, weeks after conception) when the late fetal period begins, through the first week after birth, that is, the early neonatal period Maternal deaths are counted from the beginning of pregnancy up to 48 days after the birth or the end of the pregnancy Perinatal mortality rates include the time from 28 weeks of gestation up to the first week after the birth, so this rate is a combination of the fetal death rate and the early neonatal death rate

The time periods used for these indicators indicate periods of changing biology, and so the indicators are associated with times when the physical organism is undergoing great change and is at high risk of complications (e g , the late fetal period) or when interventions and activities outside the infant or the mother can put one or both at high risk of mortality (e g , delivery practices that can introduce infection to the mother or the infant)

C Health Services Systems and their Characteristics

Health services systems are complex organizations with multiple levels or sophistication of services Health planners and researchers use models (diagrams) of the systems as ways to categorize many complex things into a few groups so that we can work with, or think about the relationships with the system The models help us plan indicators that measure activities or events, and help us understand the relationships within the system

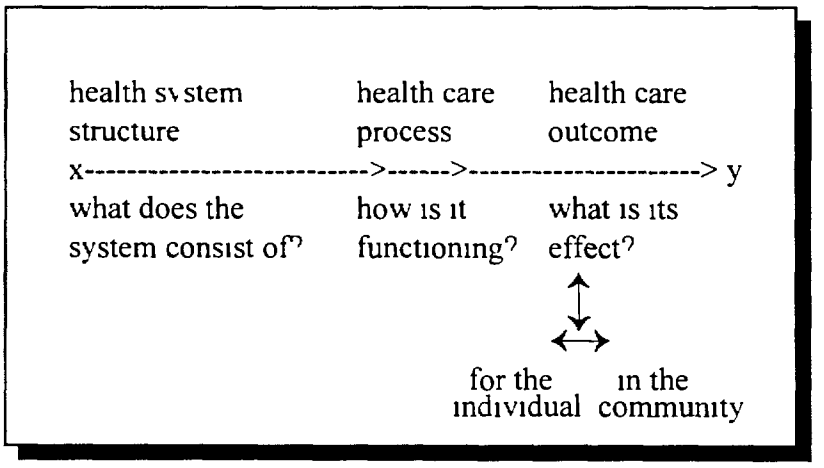
The most simple model of the characteristics of health services systems was originally described and used by Donabedian in the 1970's to evaluate quality of care (Donabedian, 1978) (see Figure 7 below) and consists of three basic and broad characteristics These three characteristics permit us to describe many different health care delivery systems and look at how those systems function

- the structure of the system How the system is organized and what it contains for example availability, organization equipment, politics, and so on
- the process by which services are delivered How the services function, the kind and amount or care that is provided and what their quality is, their access characteristics, and so on
- the outcome or effect or impact that the services have on the health state of the individual or the community For the individual whether the person gets better because of contact with the services For the community whether the rates of disease or death change or the rates of preventive states improve e g immunization levels increase

The objective of investigations into the health service system asks how are services performing? Usually we arrange the system into the following three characteristics and address three basic questions

Figure 7

Simplified Model of Health Service System Characteristics



The health services system interacts with the community and so more detailed models have been developed that include factors outside the health care delivery system itself, and the role that those factors play The model by Aday et al (1993) in Figure 8 shows more associations and characteristics, and includes the role of health policy and the community It also includes an idea of measures to evaluate the health care delivery system in a broader societal way, by looking at equity efficiency, and effectiveness, plus the ultimate outcome measure of improved quality of life These concepts are discussed below

Factors of the health service system are again descriptions of its structure availability, organization, financial support - that describe what exists The **population characteristics** are important as they influence what the community expects from the system and how the community will act toward the system characteristics such as the community's attitude and knowledge about the target health conditions and about the system the level of need or health problems in the community and their epidemiological characteristics, and factors that facilitate the decision to use services which include cultural traits and practices

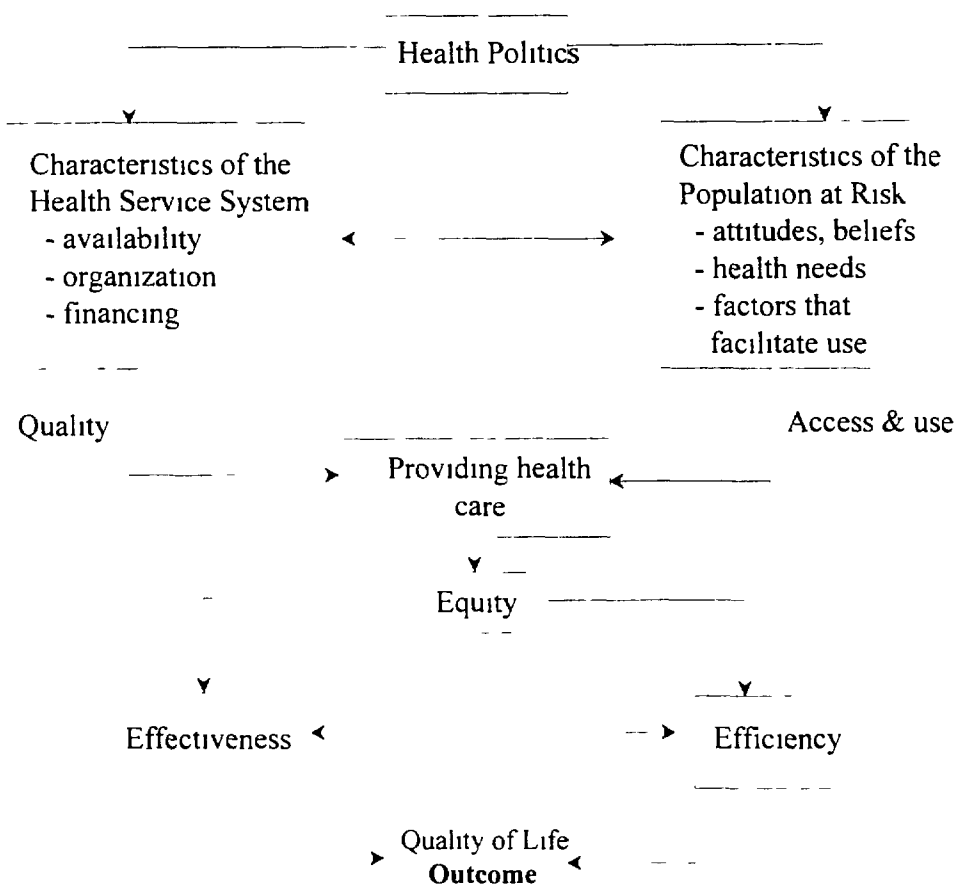
In the act of providing services and care to the people who have contact with the services an important characteristic to measure is the **quality of the care** For the population they must decide to **use services** and to have **access to the services** in order to have contact with the quality of care

- **access** has two aspects -a service aspect and a community aspect Access is prevented by barriers that exist in the services such as hours when the services are not open capacity availability of enough appointment times, cost of a visit, location of services culture of the professionals, attitude of service providers, and so on, other barriers exist for the community personally, for example, lack of transportation to get to the services, or money to pay for the services their attitudes toward the services, their beliefs, and so on

- **quality of care** measures how well providers do their job (and, of course, this can be affected by some of the structure characteristics - having equipment, for example), and includes providing care adequate to the need giving appropriate treatment for the health problems and performing procedures according to protocol It also includes the attitude of providers toward patients and the cultural sensitivity with which services are provided

Figure 8

Model of Characteristics of Health Service Systems



Modified from Aday et al 1993

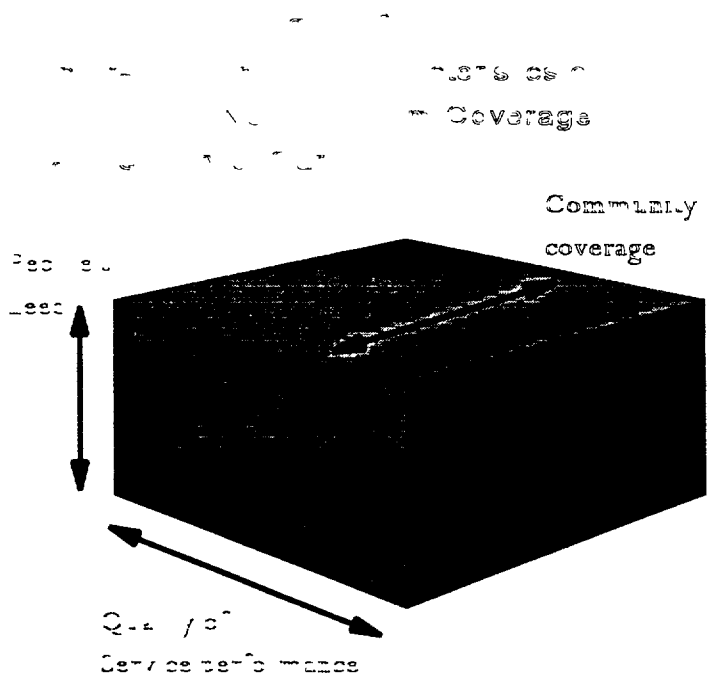
An important community measure is the

- **equity** with which services are delivered that is that there is a balance in the distribution of the services the cost of the services and the effect of the services among all the groups in the population
- **effectiveness** answers the question "what difference has the program made?" It measures the change in health states due to a service or care that has been given by the system Program managers must decide if the focus is on the individuals who seek care or on the community as a whole If the emphasis is on those who seek care (users) then indicators will address questions about the effects of clinical practice If the emphasis is on the community then measures must account for both those who use the services and those who do NOT use

the services and also look at the overall effect of the services on the community level of health Other issues to include will be the coverage and acceptability of services

- **efficiency** means that the performance is the best possible at the most reasonable cost for the effect achieved It answers the question "was the amount of difference achieved done at the most reasonable cost in resources?"
- **quality of life** is basically measured by indicators of preventive services delivered, or by decreasing in rates of morbidity and mortality True quality of life measures will eventually go beyond just illness and death and will include measures of well-being, functionality general health states- physical, mental, emotional and spiritual, but public health measures are not fully developed to indicate these conditions

There is interaction between the health problems that exist in the community the quality of care provided and coverage of that care in the community (see Figure 9) which affects the final effect that services can have in a community Concentrating only on facility indicators leads to a lack of depth in the evaluation of services Greater community coverage of need with high quality services is what ultimately has an impact on rates of disease and death at the community level An example, is that if services provide quality care for specified severe obstetric complications but only a few women have contact with these services then community coverage is low, and the overall impact will be low



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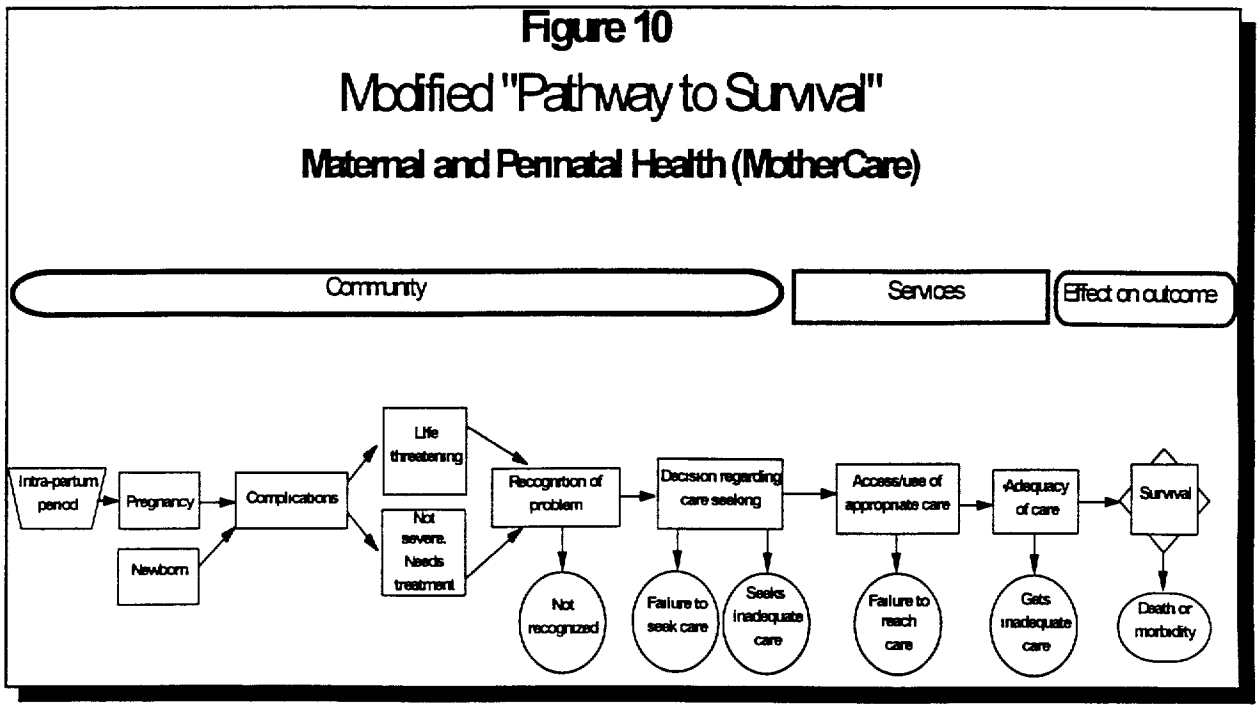
D Pathway to Survival Model

Specific to maternal and neonatal health MotherCare has developed a model of the chain of events that lead from a life-threatening illness to survival (Pathway to Survival, MotherCare, 1994) The Pathway model is modified for the purposes of this Guidebook to include the intra-partum period, early pregnancy, and the early newborn period (see Figure 10) These parts are added to accommodate preventive (e g , prenatal care newborn care) and screening activities that are desirable for women and newborns (e g , for cervical pathology or for infant feeding problems)

The Pathway model (Figure 10) shows that in the community some women or newborns will develop complications When the pregnant woman or the newborn develop a complication whether life-threatening or not they are usually at home and the family must recognize these complications If complications are not recognized as requiring medical treatment then medical services are not sought The risk of death is high for untreated life-threatening complications Even if the complication is recognized, the family must decide whether to seek care of not, and which type of care to seek Both failure to seek any care or to seek inadequate care can result in death for a life-threatening complication A family may decide to seek care, but must still negotiate the barriers to care - that is the family may lack access to care and fail to reach care even after making the effort to use services If access to services exists for the family, and they use appropriate services, the adequacy or quality of care must be such that the life-threatening complication is given proper treatment If care is inadequate death may still be the result When the Pathway is successfully traveled survival -hopefully without long term morbidity- is the result

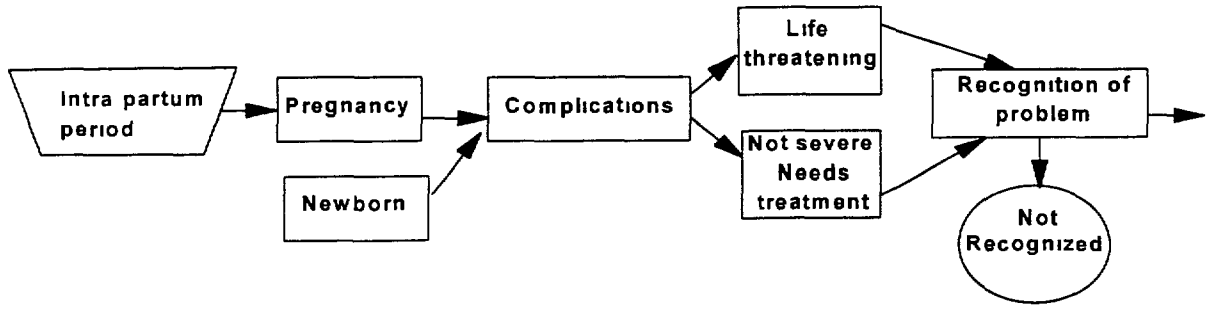
The Pathway model serves as a worksheet for choosing areas of programmatic work choosing indicators along the Pathway and interpreting indicator information in light of the entire Pathway Using the Pathway helps to maintain focus and also to maintain awareness of the other parts of the system that can be influencing your results Examples of using the Pathway are given in Figure 11 and Figure 12



Figures 11a and 11b show the association between characteristics of a health care delivery system (from Figures 7 and 8) and the Pathway model The characteristics are removed from the abstract concept of the service system and shown in relation to the Pathway that women or newborns follow The services and the community are in contact in meeting the **needs for preventive care and screening for conditions** that require treatment In pregnancy and the early neonatal period there are preventive service needed by all pregnant women and newborns (prenatal care or well-child care) There are also needs for screening services that detect problems and then require further diagnostic work and treatment

The interaction of the community and the system becomes critical when a life-threatening complication develops In recognizing the problem and taking decisions to seek care the **characteristics of the community and its individual members** play a large role These characteristics interact with **service characteristics** especially in forming opinions and expectation of any outcome from contact with the services When women try to use services the whole area of **access** barriers created by the system begins to influence the success of women to arrive in care Once women **use a service** the characteristics of the services become dominant including all of the factors that play a role in creating **adequate or high quality care** Various states of survival are possible - women may recover completely from the complication or they may be left with residual morbidity

Figure 11a Modified Pathway and Characteristics of the Health Care System



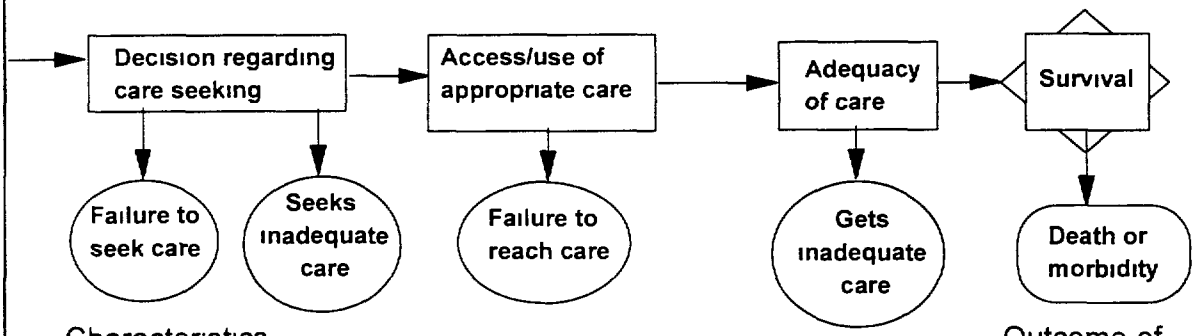
Needs

-family planning
-screening for sexually transmitted disease
-cervical cytology screening (Pap test)
-treatment
-prenatal care
-newborn care
-screen for emerging complications

Characteristics of the community

-epidemiologic profile
-beliefs attitudes & knowledge about illness & complications
-socio-economic factors
-demographic factors

Figure 11b Modified Pathway and Characteristics of the Health Care System



Characteristics of the community

all that affects decisions to seek care

Service Characteristics

availability
all service factors that could affect the decision to seek care

Access & Use of Care

access barriers of the services
access barriers of the community

Service Characteristics

-structure
-health policies
-process of care

Quality

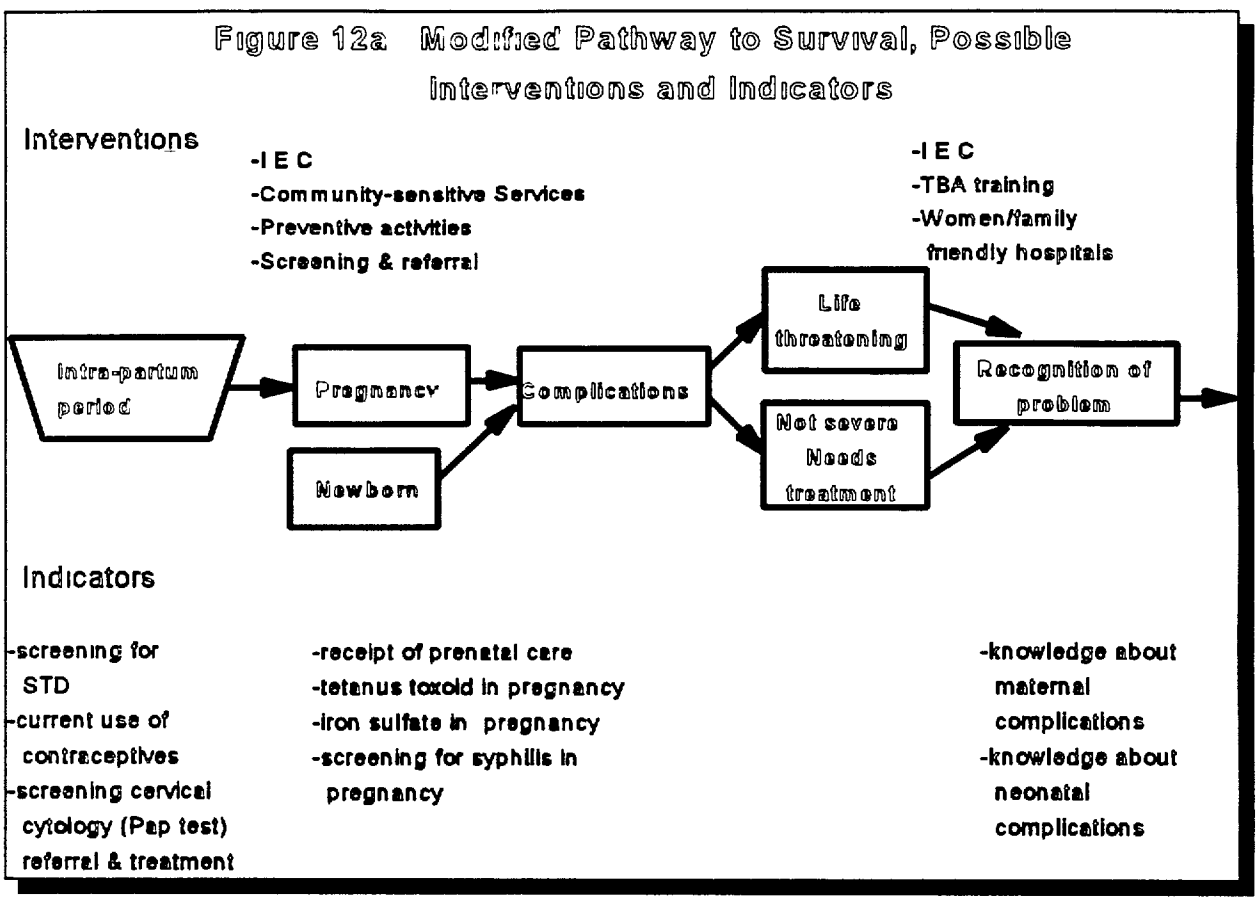
actual quality
-reasons for inadequacy

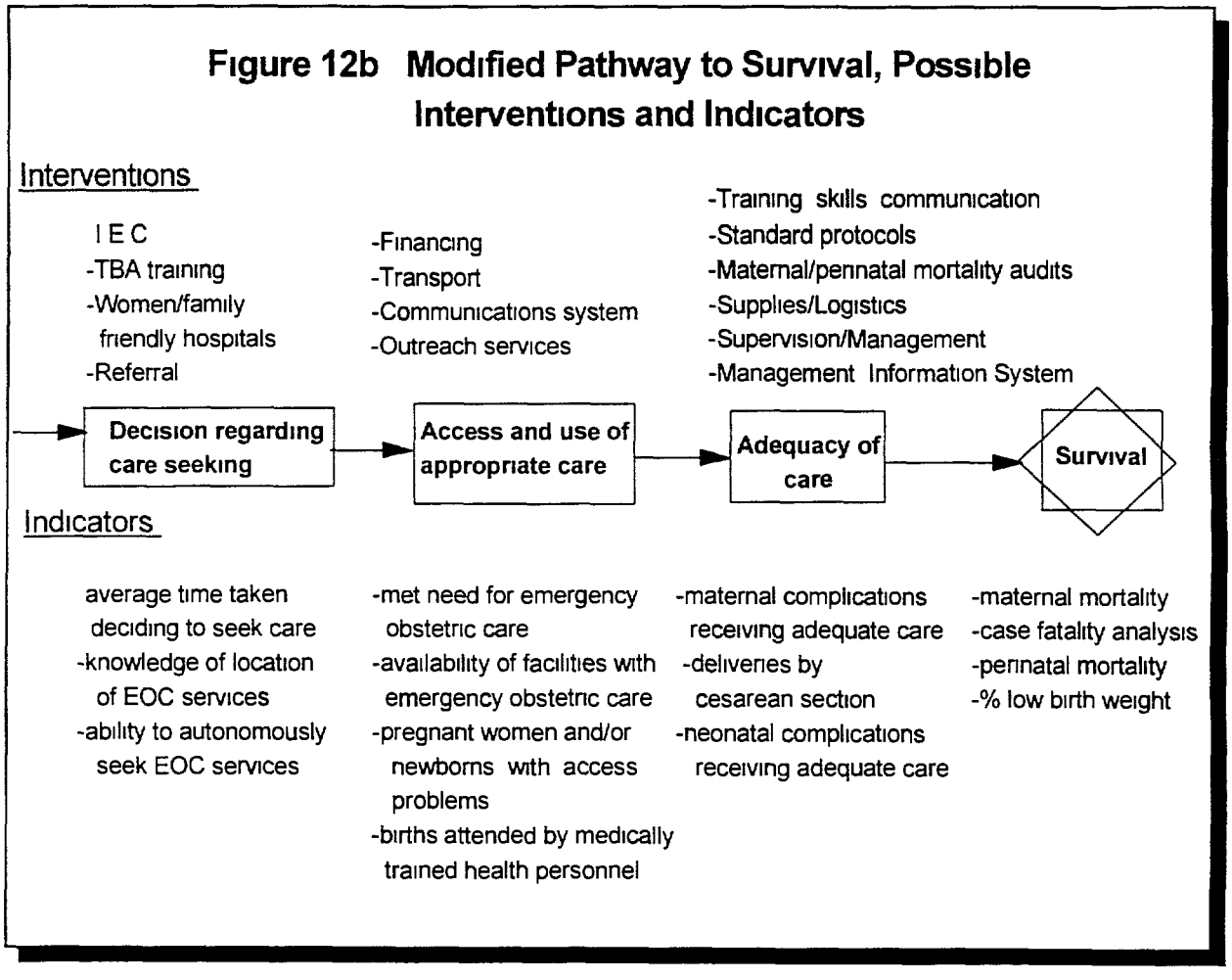
Outcome of service contact

-improved
-longterm morbidity
-death

To assist in deciding about interventions and indicators for the elements along the Pathway Figures 12a and 12b are provided Here the Pathway model contains basic interventions and basic indicators Many variations are possible Program managers will need to think carefully about where the indicators they choose fit along the Pathway Since the components of the model are all associated with one another, it is best to measure several aspects, and not to concentrate on only one aspect, for example, measuring aspects of the quality of care rather than collecting data only related to mortality outcomes

There are blank copies of the full scale Pathway model (Figure 10a and 10b) and enlarged pages of Figure 12a and 12b in Appendix E for your use





Footnotes to Figure 12

IEC = information education and communication programs
STD = sexually transmitted diseases
EmOC = emergency obstetric care
TBA = traditional birth attendant

Figure content based on work by Koblinsky M at MotherCare 1994

E Monitoring and Evaluation

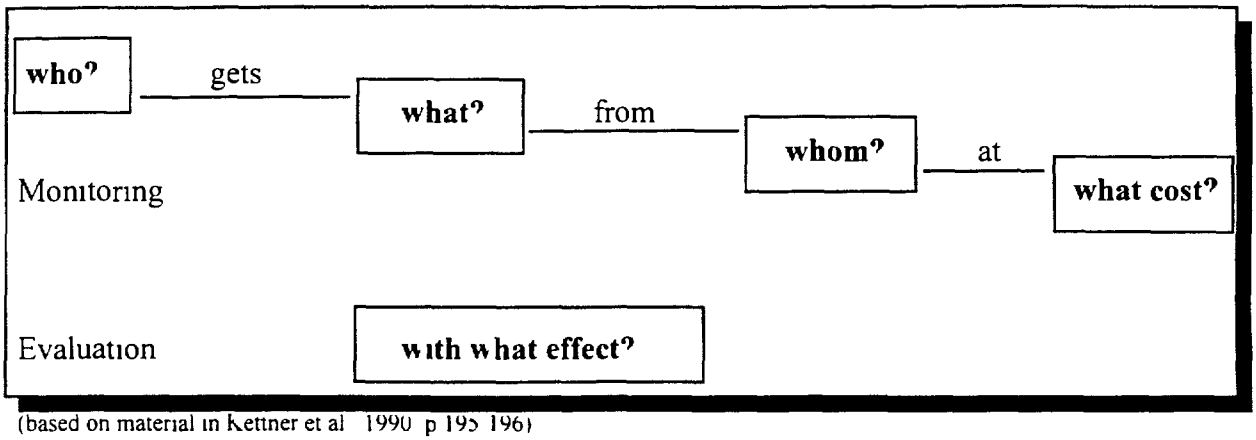
Monitoring and evaluation look at what services are being provided how they are being provided and what effect they have Current practice is to use the word "monitoring" to refer to the **process** of providing services and to use the word "evaluation" when referring to the **effect** of the services usually on mortality or morbidity The whole idea of monitoring and evaluation is to look at changes that occur and decide if the changes have been caused by the program or something that was done in the services Judgment is usually based on comparisons, for example, in comparing two or more services or programs

The basic idea in evaluating the effect of health policy or of health programs is to ask has there been a change due to the program? To truly answer this question, there are actually three questions that must be addressed

Major questions	Examples
▸ What do you want to accomplish with the service? [objectives and goal]	- improve reproductive health in rural areas of Bolivia - increase the coverage and quality of services - reduce perinatal mortality by 30% by 1997
▸ How are you going to do what you want to do? (what services) and how will you know you did it? [monitoring] [process evaluation]	- measure the process, train personnel, give immunizations, get new facilities, better quality care, add EmOC functions
▸ How will you know if you accomplished your objectives? [outcome evaluation]	- measures outcomes Mortality went down more women had prenatal visits fewer severe obstetric complications

Monitoring

Monitoring is concerned with the services being delivered and asking a set of questions about the care given



(based on material in Kettner et al 1990 p 195 196)

Monitoring means tracking that the right person gets the right service from the right provider "Right" refers to the concordance between the treatment and the needs of the health problem Further information is collected about the cost since part of the idea is to provide adequate care for a reasonable cost (which may not be the lowest cost but it is the least expensive necessary treatment to maintain the lowest rates of illness in the community)

Monitoring serves as an "early warning system" and should not be just a collecting of data The information needs to be looked at thought about and action taken when needed A monitoring system provides information to program managers during program operation for purposes of modifying program operations as needed Therefore the information is evaluated and judged against standards and goals and changes are made if services are not at the level of adequacy needed (WHO 1994 2 pg 44)

An example of monitoring in a maternal health program the indicators selected and results found appear in Figure 13 To judge whether the services are being performed satisfactorily the monitoring indicators need to be tracked and compared to something in this case, probably the most common comparison is comparing the monitoring indicators within the service from time to time, for example from month to month The effect might be measured only twice before the program begins and again after a year but the monitoring indicators should be measured more frequently In the example we would expect that the percentage of women with PPH who die in the group with poor care will be higher than in the group with good care

Figure 13

Example of Monitoring a Maternal Health Condition

Monitoring		Example		
Who?	which patients?	Women with post-partum hemorrhage (PPH)		
What?	service offered	Poor wait for 3 hours to get care	Good rapid attention	Indicator % of women with PPH who are treated immediately
Who?	provider	without training	trained	% of women with PPH treated by trained personnel
What cost?			Cost per patient	
Evaluation				
What effect?		Poor Death	Good Survival	Indicator Compare women with PPH poor care % who died good care % who died

Activities in Evaluation and Monitoring

In designing a program and then carrying out monitoring and evaluation activities the following steps are taken

- analyze the problem This means the health state of the target population and any services problems that are detected or known to exist
- devise the objectives of the program and the evaluation of it
- describe and standardize the programmatic activities and the data collection activities to be carried out
- decide how the intervention will be done, what will be done, by whom and how

- measure the quantity of change that occurs Monitoring and epidemiologic surveillance are useful here
- identify how much of the change is associated with the program intervention
- determine the cost of the program interventions and the cost associated with the amount of change realized in the program

The most difficult part of evaluating a program for an effect (whether solely a service change or also relating it to a health outcome change) is being able to "prove" that the program made the difference and, as importantly how much of the change the program actually accounts for Very rarely is the entire change in the rates of a health outcome due solely to programmatic changes, since many other things go on in communities that can affect the status of health More directly attributable to the intervention are programmatic changes such as improved provider attitudes towards patients or improved skills in life saving techniques and so on

The difficulty in attributing an effect to a program change has resulted in very specialized study designs being developed for evaluative purposes The key factor in all the designs for monitoring and evaluation is

Having something to compare your findings to

There are various types of comparisons that can be made for monitoring and evaluation Having a comparison allows you to judge your findings against something The complexity is higher for evaluating a program effect on health status

For monitoring several types of comparisons are acceptable Figure 14 gives the most commonly used and adequate types of comparisons for monitoring and an example of each

Figure 14
Monitoring Service Activities and Capacity

Type of comparison minimally adequate	Example in a service
♦ based on investigations or theory	women with post-partum hemorrhage respond best to treatment with xxxx
♦ norm or external standard	every pregnant woman would have at least 1 prenatal visit to a medically trained professional
♦ various programs used the same common indicator	compare the % of pregnant women with 2 doses of TT between my program and the program of Agency AA
♦ measures over time	what % of pregnant women in the community had 1 prenatal visit before the program began and after the first year of operation?

Comparisons for evaluating a health effect are more difficult and usually require two groups of people although it is possible to use one group with very careful measures at different points in time A stronger design (also a very common one) is a combination of non-equivalent comparison groups and measures over time at least one measure before the program begins and another after a year or longer Figure 15 lists the most adequate comparisons and an example of each

The choice of a comparison depends on the circumstances of the services being monitored and the health outcome being evaluated There are other types of comparative designs that can be used (for example case comparison designs called case control studies by some) These designs require technical assistance from an epidemiologist to implement properly Some rapid assessment methods can also be applied to evaluation and monitoring

Figure 15
Evaluation of a Health Effect

Type of comparison minimally adequate	Example
♦ different programs that use a common indicator	The new methods used in clinic AA reduce the % of pregnant women with anemia to a lower frequency than the methods used in clinic BB
♦ non-equivalent comparison group	Compare the rate of tetanus in newborns whose births are attended by trained personnel in area AA with the rate of tetanus in area BB where the personnel are not trained Areas AA and BB have similar demographic profiles
♦ Measures over time	Measure the % of anemia every month and we found a large decrease in the percentage - it began to decrease after the program began

III THE INDICATORS

A Indicators - Information Given about Each One

For each indicator described in this section specific information is addressed to explain the use of the indicator how to measure it, and to discuss some aspects of interpreting the indicator once you have data These are the aspects addressed

- NAME OF INDICATOR and the formula, time, place, constant
- Definition of Numerator
- Definition of Denominator
- Example of Calculation - if needed, If the calculation is to simply divide the numerator by the denominator, then no further information is given
- What is Measured (see the Model) - the characteristic of the health care delivery system that is "indicated" is named The Model used here is the Modified Pathway to Survival Model (Figure 11a and 11b) on which the characteristics and how they fit into the Pathway to Survival are shown
- Reported Range - data for Bolivia are given if available Usually the range most frequently reported around the world is given, if it is known Some of these indicators have not been used long enough or in enough places to have a believable range For some indicators reliable data are not available from developing countries and occasionally the indicators used in developed countries are different from those presented here In both cases ranges from around the world are not given There are data for Bolivia for various indicators in the Appendix C

- Advantages -
- Disadvantages -
- Interpretation -

These three items discuss aspects of the choice and use of the indicator, such as the indicator's association with an outcome/disease/process, its feasibility of collection and use its responsiveness to changes in the program and its interpretation in light of how the indicator is collected who is NOT included who is included, and its relation to other pieces of data that may or may not be collected

An important consideration of the feasibility of an indicator for your use is the number of

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cases likely to occur in the population to be included over the time period included, the issue of "stable rates" or "small numbers" This topic is addressed in Appendix B in more detail Generally if you have tens of numbers of cases you may not need a statistically calculated indicator You might be able to use a case review or audit as a better method If you have hundreds of cases or more, then indicators requiring mathematical calculation are possible

Source and methods used for collection of indicator data are taken into account when deciding the advantages or disadvantages of an indicator, and when interpreting the findings of the indicator The sources and methods will greatly affect the answer given by the indicator

- Population or Facility Based - the indicator tells you about a group of people who use a facility (facility based) or about the population outside facilities (population based) People who come to a specific facility or clinic or hospital can have different patterns of characteristics from the people who do not use that facility, or who live in the geographic area surrounding the facility The decision to use a "facility based" indicator or a "population based" indicator depends on the goals of the project and what you want to measure with the indicator

  Various levels of facilities may be part of the health care system under assessment, for example, health posts health clinics local hospitals, and the university hospital Program managers decide which facilities should have data collected from them - but for most maternity care systems it is best to look at all levels of facilities

- Frequency of Collection - how often the indicator is measured over the life of a program or service

- Methods and Sources of Information - this section suggests sources and methods of data but individual programs may have other available sources or methods than those given Each program needs to decide what they have, what they need in addition and what is feasible for them to do

- Other Issues - such as other complimentary indicators that can be used in addition to the one discussed also modifications to the proposed indicator that have been used before

Receipt of Prenatal Care

The following indicator is recommended

- a percentage

$$\frac{\text{number of women attended at least once during pregnancy by medically trained personnel for reasons related to pregnancy in a geographic area during a specific time period}}{\text{number of pregnant women in the same geographic area and time period}} \times 100$$

Definition of Numerator

There should be agreement about what "reasons related to pregnancy" means It can include coming to check up on her pregnancy "to see if it is all right", or a more specific issue The care that can be counted should be part of norms and standards of prenatal care for the area under study

Medically trained personnel include physicians, whether specialized or not, and persons with midwifery skills who can diagnose and manage obstetrical complications Some type of modern medical training is part of the definition Traditional birth attendants who have extensive training (six months to one year) within the modern health care sector and who work in some capacity within the sector might be included (WHO 1994 p 33)

The information will probably be collected in an interview with the mother (unless home based maternal cards are in use or some other form of pregnancy registry), therefore, the type of personnel acceptable in this indicator must be understood by the interviewers and made clear to the mother

Definition of Denominator

A count of identified pregnant women in the community Some pregnant women will be missed, since some will not know they are/were pregnant or do not wish to tell you

It would be best to have a number of recently completed pregnancies to use as the denominator so that every woman has had about the same amount of time over which to use services To include the most recently completed pregnancy during the five years prior to the survey is the recommended method (WHO 1994 p 11)

For currently pregnant women one would have to know about how long they have been pregnant as they may not have gone yet but may plan to go later in pregnancy

What is Measured (see the Model)

- a maternal health practice indicator
- coverage - there is need for every pregnant woman to have a prenatal check up and this measures the percentage who have at least one visit For women to actually arrive at services implies other conditions existed for the woman that is there were services available some degree of accessibility, and some perceived importance to using the services None of these latter characteristics are measured directly by this indicator
- a surrogate impact indicator for preventive care A better indicator for impact would be the percentage who have healthy pregnancies

Reported Range

The range is from 0% to 100% with the highest frequency among countries between 30% and 80% of live births (WHO 1993 7) In Bolivia in 1993 it was estimated to be 61 3%, however, the percentage is based on the number of new prenatal consults and an estimated number of pregnancies (reported in SNIS 1995)

Also from Bolivia other studies provide different percentages 52 5% of births (assume these are live births) had mothers who received care from a physician, nurse, auxiliary nurse or health worker (ENDSA 1994) and in 1993 45% of births had a visit with a professional person (ENDSA 1993)

Advantages

- there are regional references with which to compare
- related to improved maternal health
- related to decreased perinatal mortality
- clearly associated with program changes if there is adequate information provided to the general community so they know the services that exist and what is needed to access them
- useful for program planning and management

Disadvantages

- does not tell about quality of care that is the frequency and content of care
- probably requires a community survey unless the visits to clinics and the source population are clearly related
- use the number of prenatal consults must have a count of the number of women using services

Interpretation

This is the most basic level of indicator for prenatal care The indicator shows the percentage of pregnant women coming for some type of care because of their pregnancy, which makes it specific to pregnancy Current standards of maternity care require prenatal care as part of an acceptable package The indicator is useful to program management

The indicator directly relates the women in need of care -those who have been (or are currently) pregnant- to their use of prenatal services

Prenatal care has a disputed association with maternal death, especially when women are not seen in the last 1-2 months prior to labor and delivery so that complications can be detected and treated Complications that develop when labor begins cannot be detected with prenatal care Prenatal care allows health professionals to assist the mother and her family to plan for what to do when labor occurs

Prenatal care is more closely associated with maternal health But having only one visit is probably inadequate to accomplish much if there are any difficulties during the pregnancy More visits are usually required to successfully resolve any complications that occur

Prenatal care can have a positive effect on perinatal mortality and morbidity Both maternal health levels and proper care of complications affect perinatal status

The idea for having visits with medically trained personnel is to detect coverage by personnel with the skills needed to treat severe complications in pregnancy Which makes the form of the indicator suggested here more closely associated with medical care than with preventive care

When pregnant women come for prenatal care they are screened for developing complications as part of the usual prenatal care package Providing this most basic type of service implies that there are resources available for treating complications that are detected during routine prenatal care, or for referring women to services where their complication can be diagnosed and treated

Population or Facility Based

- population based

Frequency of Collection

- yearly if program changes are being made
- can be collected periodically thereafter (every 3-5 years) to monitor the system

Methods and Sources of Information

- Source both from survey information
  - for the denominator population based registers (especially usable if the accuracy of information has been verified by cross-checks with other

sources of information)

- Method probability sample of women completing a pregnancy during the preceding years (one, two, and five years have been used in various programs) Information is collected about only the most recent pregnancy

Using health service data does not provide useful information about the coverage of services to all those in need of them in the population A community survey is the recommended method unless the relation between the services and the community if very close, and a count of pregnancies in the community is accurate, then local clinic data or local registries can be used

Other Issues

Other ways to measure prenatal care use

- the numerator and denominator can relate to only live births, and the information might come from vital statistics Fetal deaths could also be included if vital statistics systems have high coverage of these events
- only those women arriving at a health facility can be included and the timing of their first prenatal visit used for the numerator
- a less satisfactory indicator is obtained in the following way the estimated number of pregnancies in a population can be used for the denominator (see below for the calculation of this) and the numerator could come from the services in the same population and a count of the pregnant women coming for their first prenatal visit This is a ratio It is a less specific indicator which is harder to interpret because the expected number of pregnancies is disputable The denominator of pregnancies can be estimated from the number of live births, increased to account for about 15% of pregnancies that do not result in a live birth (WHO, 1994 14 p 12) Calculation (# of live births X 0 15) + # of live births
- the numerator can be specific to a recommended number of prenatal visits that should be made by every pregnant woman for example, in some countries 4 prenatal visits are recommended This would give information on whether norms are met
- the numerator can specify that "at least one visit be made during the last month (or last trimester) of pregnancy"
- the numerator can specify "a visit with any type of trained health personnel", this would allow visits to traditional birth attendants to be counted, or other health personnel for example community health workers

- a percentage

$$\frac{\text{number of pregnant women in the community during a specified time period who have received at least two doses of tetanus toxoid prior to 36 weeks of pregnancy}}{\text{number of pregnant women in the same community during the same time period}} \times 100$$

Definition of Numerator

For women who have not previously received tetanus toxoid, they need to receive their second dose before the last month of pregnancy before 36 weeks of gestation, to allow 2-4 weeks for immunity to reach the fetus This requires some knowledge of the length of pregnancy Ideally, the manner for estimating gestational age should be specified

Women who have received 3 doses of tetanus toxoid within the past 5 years should be counted as they are protected in the current pregnancy

See the "Other Issues" section below for more options

Definition of Denominator

A count of identified pregnant women in the community who have carried their pregnancy to at least 36 weeks of gestation or into the last month of pregnancy It is better not to include women with different lengths of pregnancy as this inflates the denominator and can underestimate the percentage of women who will have gotten two doses of tetanus toxoid by the time they deliver but have not had enough time yet

What is Measured (see the Model)

- community coverage by preventive care
- quality of preventive care

Reported Range

- 100% is the ideal but a more realistic goal should be set In Bolivia it is reported that 20% of women had at least one dose of tetanus toxoid during pregnancy (from

ENDSA, 1993, as stated in Plan Vida, 1994)

Advantages

- the mother being immunized against tetanus has a direct association with a decreased risk of the newborn to contract neonatal tetanus, hence, linked to decreased neonatal mortality
- easy to interpret
- useful
- specific measure of the care provided
- indicates coverage for an excepted part of quality maternity care

Disadvantages

- does not directly measure the rate of neonatal tetanus
- does not provide information about the reasons for low coverage
- requires a community survey

Interpretation

This indicator tells us the % of pregnant women who are immunized adequately enough to prevent neonatal tetanus in their newborn It tells us about provision of accepted preventive services There should be a clear relation between increasing community level rates of proper tetanus immunization and a declining neonatal tetanus death rate

Population or Facility Based

- population based

Frequency of Collection

- yearly if there is a program aimed at changing the levels of coverage With a program the data collection should be timed to its needs, and could be done more frequently
- will probably require two data collection times at minimum to see a change
- can be collected periodically thereafter (every 3-5 years) to monitor the system

Methods and Sources of Information

Numerator

- clinical records
- register for services provided, but must be able to track individual women and the number of doses they receive Do not count the total number of doses given and

divide by the number of pregnant women -- that calculation gives an average number of doses given, and does not tell us about coverage of women

- community survey

Denominator

- community survey
- population based registers (especially usable if the accuracy of information has been verified by cross-checks with other sources of information)

Other Issues

Modifications can be made to the indicator

- a service indicator can be created the denominator is women coming to services for prenatal care and the numerator counts the number of them who are appropriately immunized against tetanus
- the denominator could be the expected number of pregnancies in the community calculated from the number of live births, increased to account for about 15% of pregnancies that do not result in a live birth (WHO, 1994 14, p 12) Calculation (# of live births X 0 15) + # of live births
- denominator can also have the number of live births only, but this is an underestimate of all pregnancies However if the numerator is a count of all women with a live birth who receive tetanus toxoid then that is an adequate indicator

A population oriented indicator would be

- a percentage

$$\frac{\text{number of women in the fertile ages in the community during a specified time period who have at least two doses of tetanus toxoid within the last 5 years}}{\text{number of women in the fertile ages in the community during the same specified time period}} \times 100$$

Be sure to specify the ages included in "fertile years" whether 15-49 years of age, or 15-44 years etc Use the same age group for both the numerator and the denominator

- There is evidence that immunity peaks at about 2 weeks after receiving a TT immunization and then declines One dose of TT confers protection to as little as 50% of adults (Benenson 1990 p 432) Having two doses successfully immunizes nearly all of the group but a third dose 6 to 12 months later is needed to provide long term protection

Iron Sulfate Tablets during Pregnancy

Coverage of Iron Sulfate in the Community

- a percentage

$$\frac{\text{number of pregnant women in the community during a defined time period who received iron sulfate tablets according to practice norms}}{\text{number of pregnant women in the same community during the same time period}} \times 100$$

Definition of Numerator

The practice norms guide the definition of the numerator

Definition of Denominator

A count of identified pregnant women in the community Some pregnant women will be missed since some will not know they are/were pregnant or do not wish to tell you

It would be best to have a number of recently completed pregnancies to use as the denominator so that every woman has had about the same amount of time over which to use services To include the most recently completed pregnancy during the five years prior to the survey is the recommended method (WHO 1994 p 11) For some practices five years may be too long, and then a one or two year period can be used

For currently pregnant women the difficulty is that they have been pregnant different lengths of time and therefore have had different lengths of time to get the tablets It is better to use completed pregnancies for this indicator

What is Measured (see the Model)

- community coverage of care
- quality is indirectly measured -- that iron is given according to norms To be a more direct measure of quality the denominator would have to be "all those who receive iron tablets"
- It assumes that all pregnant women need iron sulfate tablets, and measures the % of that need which is met

- This measure is especially good if the organization of services includes community outreach, and provision of iron sulfate to women at home, and not just to those who arrive at a clinic

Reported Range

- 100% coverage is the ideal, but a more realistic goal should be set

Advantages

- gives a population based estimate of coverage
- indicates that services were provided

Disadvantages

- does not indicate if women are taking the iron tablets, only that they received them
- does not indicate whether the iron tablets relieve anemia in the pregnant women
- does not indicate the reasons for low coverage
- does not indicate the quality of the iron tablets
- requires a community survey

Interpretation

Since this indicator assumes that all women require iron tablets, the denominator is mixed between those pregnant women who are clinically anemic and require supplementation to improve their iron levels and those who are not for whom the iron tablets may be a wasted resource

The indicator only says that the care was given according to norms, but tells nothing about the further quality of care - that enough education and explanation was done so that women knew and understood why and how to take the iron it tells us nothing about compliance - that they took the iron and it tells us nothing about the impact on levels of anemia There is a good correlation between taking the tablets properly and changes in level of hemoglobin

Over 50% of pregnant women in lesser developed countries are anemic (United Nations Global Population Estimates 1990 UN Population Division New York, 1991 as stated on pg 285 of MotherCare 1995) Iron deficiency probably causes over half of the anemia the rest coming from deficiencies of other nutrients, or from non-nutrient factors including infection or genetically related anemia Iron deficiency anemia is not detected until iron deficiency is severe therefore, the reported iron deficiency anemia rate will underestimate the level of iron deficiency in the population

Population or Facility Based

- population based

Frequency of Collection

- yearly, if there is a program aimed at changing the levels of coverage With a program, the data collection should be timed to its needs, and could be done more frequently

- will probably require two data collection times at minimum to see a change

- can be collected periodically thereafter (every 3-5 years) to monitor the system

Methods and Sources of Information

- Source both from survey information, or population based registers (especially usable if the accuracy of information has been verified by cross-checks with other sources of information)
- Method probability sample of women completing a pregnancy during the preceding years (one two and five years have been used in various programs) Information is collected about only the most recent pregnancy

Other Issues

Another set of indicators would suggest whether women are compliant with the iron sulfate therapy recommended to them

- a percentage

$$\frac{\text{number of recently delivered women in the community during a defined time period who report taking the iron sulfate tablets according to practice norms}}{\text{number of recently delivered women in the same community during the same time period who were given iron tablets to take}} \times 100$$

This indicator suffers from an inability to verify what the women say they actually do It is best for such an indicator to interview women soon after they complete their pregnancies as their memories of what they did will dim with time

A more useful way to use this indicator is to find out WHY women are not taking the tablets as they should Once the reasons for non-compliance are known health workers can alter practice to make it easier for women to comply A second indicator is also recommended that addresses pregnant women already coming to health services It indicates coverage among service users only

Coverage of Iron Sulfate in the Services

- a percentage

$$\frac{\text{number of pregnant women in selected services during a defined time period who received iron sulfate tablets according to practice norms}}{\text{number of pregnant women in the same services during the same time period}} \times 100$$

Definition of Numerator

The practice norms guide the definition of the numerator Count a woman only one time that is, she may have received iron tablets more than once, but she should only be counted once for the numerator

Definition of Denominator

A count of identified pregnant women in the services A women should only be counted once, so those who make more than one visit must be identified Some services count "New users" so that a woman is only counted once and at her first prenatal visit to the service

What is Measured (see the Model)

- quality of care -- if the accepted norm is that all pregnant women receive iron sulfate tablets The indicator tells us that at least the norm of giving tablets is met
- This measure is especially good if the organization of services means that only women who come to the services for a visit can receive iron tablets

Reported Range

- 100% is the ideal but a more realistic goal should be set

Advantages

- indicates that services were provided
- indicates quality - the % of pregnant women for whom the norms are met
- many existing record systems can already capture the data
- a measure specific to a program goal

Disadvantages

- does not indicate if women are taking the iron tablets, only that they received them
- does not indicate whether the iron tablets relieve anemia in the pregnant women
- does not indicate the reasons for not giving tablets to women
- does not indicate the quality of the iron tablets
- only indicates a one time receipt of tablets, and if the norms require giving iron tablets monthly or so it does not measure that

Interpretation

This indicator assumes that all women require iron tablets The denominator is mixed between those pregnant women who are clinically anemic and require supplementation to restore their iron levels, and those who are not

The indicator only says that the care was given according to norms, but tells nothing about the further quality of care - that enough education and explanation was done so that women knew and understood why and how to take the iron it tells us nothing about compliance - that they took the iron and it tells us nothing about the impact on levels of anemia

There is a good correlation between taking the tablets properly and changes in level of hemoglobin

Over 50% of pregnant women in lesser developed countries are anemic (United Nations, Global Population Estimates 1990, UN Population Division, New York, 1991, as stated on pg 285 of MotherCare 1995) Iron deficiency probably causes over half of the anemia, the rest coming from deficiencies of other nutrients or from non-nutrient factors including infection, or genetically related anemia Iron deficiency anemia is not detected until iron deficiency is severe, therefore, the reported iron deficiency anemia rate will underestimate the level of iron deficiency in the population

Population or Facility Based

- facility based

Frequency of Collection

- monthly if there is a program aimed at changing the levels of coverage With a program the data collection should be timed to its needs, and could be done more frequently This indicator can serve a monitoring role, to mark whether services continue to be offered according to norms
- will probably require two data collection times at minimum to see a change

Methods and Sources of Information

- Source both from clinic data
  - clinical history
  - cardex register or other local log
  - pharmacy reports
  - SNIS

- Method a count of women coming the first time for prenatal care can be made using a log book or registry There can also be a log book or registry that regularly records whether the iron tablets were given to women This would be easier than using the clinical history, since in many countries the clinical history is not well maintained

Met Need for Emergency Obstetric Care (EmOC)

This refers to "Life-saving" obstetric care The following indicator is recommended

Emergency Care of Obstetric Hemorrhage

- a percentage

$$\frac{\text{number of pregnant women with obstetric hemorrhage arriving at an EmOC service during a specified time period who were treated within 2 hours of arriving in the service}}{\text{number of pregnant women with obstetric hemorrhage arriving at a EmOC service during a specified time period}} \times 100$$

Definition of Numerator

This indicator requires a standardized definition of obstetric hemorrhage This includes the amount of blood loss required and the way to measure it

The timing of when the hemorrhage occurs must also be specified, that is, in the use of the indicator what is to be counted? -antepartum hemorrhage? postpartum hemorrhage? or both? Also the amount of time postpartum during which to count hemorrhage must be specified

EmOC service - Emergency Obstetric Care - is a service that has the required equipment and skills available to provide life-saving treatment See Appendix A for the full explanation of this type of service

Antepartum hemorrhage - decide if you will include pregnancies of < 28 weeks duration and if abortion hemorrhage is to be counted

Postpartum hemorrhage
- vaginal delivery required (to exclude c-section hemorrhage),
- pregnancy duration >28 weeks (to exclude abortion hemorrhage),

Blood loss An example of definitions that have been used - if assessed in a health facility, >= 500 cc of blood loss If assessed by interview then blood loss is estimated- for example "the woman's clothes were soaked and the woman was unable to sit up" If the women went to a health facility

before arriving at the indicator service ask whether intravenous fluids were given, whether the placenta had to be removed or whether the cord was pulled followed by heavy bleeding Hemorrhage is an emergency and requires prompt action to save the mother's life and perhaps that of the fetus In some uses of this indicator 2 hours may be too long Professionals decide the appropriate time for treatment for the indicator and the services available The indicator may include women already in the facility who develop obstetric hemorrhage

Definition of Denominator

The number of pregnant women with obstetric hemorrhage arriving at the same EmOC service during the same time period

EmOC (emergency obstetric care) includes the basic set of emergency obstetric care [parenteral antibiotics oxytocics, and sedatives manual removal of the placenta, removal of retained products of conception and assisted (vaginal) delivery, plus facilities that can provide the basic EmOC plus obstetric surgery and blood transfusion (called "comprehensive" EmOC)

What is Measured (see the Model)

- quality of care in the service
- incompletely measured
  - access in that some women with obstetric hemorrhage do not make it to the services and are excluded from the indicator
  - utilization the decision on the part of some women and their families to go for care is also indicated, but incompletely as the women who do not go for care are excluded from the indicator

Reported Range

Ideally nearly 100% of women with obstetric hemorrhage would be treated appropriately This indicator is new so findings from services around the world are not available to provide a range WHO estimates that as much as 10% of pregnancies may have obstetric hemorrhage in some countries (Maine D in MotherCare 1995)

Advantages

- can measure program change directly and quickly
- numerator can be feasibly collected
- evidence shows that prompt and proper provision of services to women with life-threatening obstetric complications can decrease maternal mortality and morbidity

Disadvantages

- limited to services by level of care
- the number of cases of obstetric hemorrhage for a stable indicator may be difficult to achieve in a year, but that depends on the total number of deliveries done in a year at the service
- tracking treatment and the time since entry might be difficult for some services, for this reason case review processes are encouraged

Interpretation

This indicator can be made more specific by adding a further measure of quality to it by specifying that the treatment must be according to a specified protocol, or that certain outcomes were achieved (for example that the mother did not die) The protocol for treatment must also be specified and the appropriate application of it must be tracked

More indicators related to "Emergency Care of Obstetric Hemorrhage" are given under the section called "Other Issues"

Population or Facility Based

- facility based

Frequency of Collection

- annually at least

Methods and Sources of Information

Denominator once a woman is defined as being a case of obstetric hemorrhage (according to the standardized definition used) she is counted for this indicator Probably the easiest is to follow all pregnancies in the service (or a sample of them) to find out which ones have an obstetric hemorrhage

Numerator The women who are identified for the denominator must be followed up to find out when treatment occurred after admission

Possible sources of information are

- hospital registers
- labor ward register with complications recorded
- operating theater register
- case records and medical audit/case review process
- requires protocols of care to be developed

- protocols should be in accord with services level of care capability
- registration of time of admission
- registration of the time of treatment with details on the condition of the woman and her management

Other Issues

Some researchers may prefer to measure an outcome of treatment as a indicator of quality and effect Instead of using "treatment within two hours" some specific health state could be used for example the percentage of women who were "successfully treated"

$$\frac{\text{number of pregnant women with obstetric hemorrhage arriving at an EmOC service during a specified time period who were "successfully treated"}}{\text{number of pregnant women with obstetric hemorrhage arriving at a EmOC service during the same specified time period}} \times 100$$

"Successfully treated" needs to be clearly defined Some examples are survived or survived without entering shock Other indicators related to this one are given below

A more specific modification of the preceding indicator would be

Emergency Care of Serious Obstetric Complications

- a percentage

$$\frac{\text{number of pregnant women with severe obstetric complications arriving at a EmOC service during a specified time period who were treated within 2 hours of arriving in the service}}{\text{number of pregnant women with severe obstetric the same specified time period}} \times 100$$

Definition of Numerator

Seriously complicated obstetric cases refers to those complications in pregnancy that are potentially life-threatening and that require the level of treatment called "emergency obstetrical care The serious complications usually include hemorrhage (antepartum and postpartum) prolonged/obstructed labor postpartum sepsis complications of abortion, pre-eclampsia/eclampsia

ectopic pregnancy, and ruptured uterus

The list of complications included for your indicator must be specified If a woman has more than one complication, some life-threatening and some not, she is counted If a woman has more than one life threatening complication, she is counted only once, since we are counting women and not the number of complications

EmOC = emergency obstetric care that is, facilities that have this capability See Appendix A for details

Definition of Denominator

The number of pregnant women with severe obstetric complications arriving at the same EmOC service during the same time period

Another recommended indicator is

Met General Need for Emergency Obstetric Care (EmOC)

- a ratio

$$\frac{\text{number of seriously complicated obstetric cases in EmOC facilities in a geographic area over a defined period of time}}{\text{number of seriously complicated obstetric cases in a geographic area over a defined period of time}} \times 100$$

- The indicator is a ratio because the women in the numerator may not all be the same women in the denominator Two different sources and methods might be used to calculate the data in the numerator and the data in the denominator

Definition of Numerator

"Seriously complicated obstetric cases" refers to those complications in pregnancy that are potentially life-threatening and that require the level of treatment called "emergency obstetrical care" as in the previous indicator

In this indicator both women who come to the facility with the complication and those who are already in the facility and develop the complication are included

Definition of Denominator

The number of seriously complicated pregnancies in the communities that feed the services should be counted This is the most direct estimate of the population-in-need of EmOC care However, the diagnosis of the complications is often made with an interview, and this can be a difficult thing to do well One must be sure to accurately reflect the service area from which the users of the EmOC facilities come It is important to do so, or the indicator will not have much meaning

Another more indirect method is to use the estimated number of births in the geographic area that is relevant to the facility users and multiply it by 15%, which is the estimated percentage of pregnancies with serious obstetric complications (MotherCare, 1995 January edition)

Example of Calculation of the Denominator

1 estimated number of births in the geographic area that is relevant to the facility users = 130 000

2 the estimated percentage of pregnancies with serious obstetric complications = 15%

3 130 000 x 0 15 = 19 500 women with serious obstetric complications

What is Measured (see the Model)

Several aspects of the system are being measured simultaneously

- coverage the proportion of need for services that is being met Directly indicated
- incompletely indicated
  - access in that the services exist and some women are successful in getting to them We do not find out how many wanted to go for care, or tried to go and were not successful

Reported Range

The estimate for serious obstetric complications is 15% of all births in a population (MotherCare, 1995) This estimate has been agreed upon and is used by most agencies It is assumed by many people in the field to be an underestimate

Advantages

- responds quickly to changes in availability, quality and utilization of services
- numerator can be feasibly collected
- evidence shows that prompt and proper provision of services to women with life-threatening obstetric complications can decrease maternal mortality and morbidity

Disadvantages

- collection of the denominator is problematic
  - counting the number of complications in the population is costly and could result in identifying more complications than would be diagnosed as serious in a formal service (differences in diagnostic decisions)
  - on the other hand, using 15% to estimate the number of serious complications in a community could greatly underestimate the real need for services
- best interpretation of this indicator requires others to complement it
- does not point out where changes are needed
- numerator and denominator are collected using different methods

Interpretation

This indicator most directly tells you the level of coverage that exists that is the amount of need for EmOC that is provided But it does not tell you where the problems are if the % of existing cases covered is low You will not know from this indicator alone if the problem is in the recognition of a serious complication, in the decision to not utilize existing services for some reason, or if there are problems getting to the existing services (access)

If the denominator is estimated using the number of births and the 15% estimation of seriously complicated pregnancies the indicator could come out higher than 100% It is likely that in many developing countries the percentage of women with seriously complicated pregnancies is higher than 15% This would lead to the indicator have a value greater than 100%

Population or Facility Based

- population based for the denominator
- facility based for the numerator

Frequency of Collection

- annually at least

Methods and Sources of Information

Numerator

- facility records
  - individual patient records While usable, they are not good for finding the list of women with these complications
  - patient register with serious complications recorded, a maternity logbook This is the most feasible source, and encourages regular monitoring activities
- gynecology ward, surgical ward

- morgue

Denominator

- demographic surveys
- census if newborns are counted
- vital registration of births

Other Issues

The above indicator could be improved by directly relating the denominator to the numerator that is

- a percentage

$$\frac{\text{the number of community ascertained cases of serious obstetric complications}^{@}\text{ who arrive at a EmOC facility over a time period}}{\text{the number of cases of serious obstetric complications}^{@}\text{ identified in a community area over the same time period}} \times 100$$

Other useful pieces of information

- to know where the various obstetric complications are occurring
- a percentage

$$\frac{\text{the number of community ascertained cases of serious obstetric complications}^{@}\text{ at each place of delivery during a specified time period}}{\text{the number of cases of serious obstetric complications}^{@}\text{ identified in a community area over the same time period}} \times 100$$

to know who is delivering the cases with various obstetric complications

- a percentage

$$\frac{\text{the number of community ascertained cases of serious obstetric complications}^{@}\text{ at attended by each type of birth attendant during a specified time period}}{\text{the number of cases of serious obstetric complications}^{@}\text{ identified in a community area over the same time period}} \times 100$$

A further refinement is to use an indicator of decision making

- **the average amount of time taken by women (or their families) with serious obstetric complications to decide to go to a EmOC service in a community during a time period =**

$$\frac{\text{the total number of minutes taken by women (or their families) identified below to decide to go to a EmOC service in a community during a time period}}{\text{the number of women with serious obstetric complications}^{@}\text{ identified in the same community over the same time period}} \times 100$$

[@] These indicators can be made more specific by including only cases of selected specific complications such as obstetric hemorrhage This would be especially good if the indicator Emergency care of obstetric hemorrhage were also measured

Knowledge about Complications

This issue is addressed for both maternal complications and for newborn complications The two will be presented together since much of the same information applies to both

Knowledge about Maternal Complications

- a percentage

$$\frac{\text{number of adults in the community during a time period who are knowledgeable about maternal complications of pregnancy and childbirth}}{\text{number of adults in the same community during the same time period}} \times 100$$

Knowledge about Newborn Complications

- a percentage

$$\frac{\text{number of adults in the community during a time period who are knowledgeable about newborn complications}}{\text{number of adults in the same community during the same time period}} \times 100$$

Definition of Numerator

A definition of what "knowledgeable" means must be written A list of complications is needed that is associated with a planned program or with changes in the services to be delivered The list consists of the signs of the major complications associated with mortality and morbidity The scoring of the answers to the indicator usually means that a higher score suggests more knowledge If a program has a set of educational items targeted at specific complications then questions are included that indicate knowledge of those items

See "Other Issues" for this indicator for suggested forms of the indicator

Definition of Denominator

A cross-section of adults of all ages is used The age range that is acceptable should be specified usually the lower age is 15 years This can vary depending on the community expectations of assuming adult responsibility

What is Measured (see the Model)

- knowledge levels of a community Without knowledge of danger signs as an indicator of community awareness, there can be no recognition of them, and no action taken because of them

Reported Range

- There are no norms Each community is different It would be interesting for the PROCOSI members to decide on a set of questions that all gather data about, to see what the range is for the communities served

Advantages

- can measure results of education programs
- tries to measure what people think is important
- gives a community level measure of knowledge, not just those who use services who would be expected to have higher levels of knowledge

Disadvantages

- does not measure practice
- no population norm is available for judging how good the indicator is, so there have to be two data collection activities
- measures all adults to find out what the major care givers know (probably the women) need a large enough sample so that women can be analyzed separately
- requires community survey to collect

Interpretation

This indicator provides information about the knowledge level in the community of complications that require medical review and treatment Knowledge about serious complications is necessary in the community for appropriate use of services to occur Eventually increased knowledge should help decrease the rates of pregnancy-related and newborn morbidity and mortality, by increasing the percentage of women and newborns receiving early diagnosis and treatment of their serious conditions

The list of acceptable complications is based on what is known about the most common causes of mortality and morbidity, but it also depends on the complications the services are planning to target for improvement

Population or Facility Based

- population based as recommended

Frequency of Collection

- yearly if there is a program aimed at changing the levels of knowledge With a program the data collection should be timed to its needs, and could be done more frequently
- will probably require two data collection times at minimum to see a change
- can be collected periodically thereafter (every 3-5 years) to detect long term changes in the level of knowledge due to migration

Methods and Sources of Information

Denominator

- probability sample of the general population
  - train people in rapid epidemiologic assessment techniques
  - training in interpreting the confidence limits of rapid assessments
- a population based register of all adults (especially usable if the accuracy of information has been verified by cross-checks with other sources of information)

Numerator

Collecting knowledge data requires help from people with some training in social science data collection techniques Several methods are used to collect this kind of data

- asking people to list what they think are danger signs
- giving people a list of acceptable danger signs and a few that are not danger signs and asking people asking people a list of signs and asking them how closely related to death the signs are (a lot sort of related can't decide sort of not related not related at all) or some variation on this type of words One can also use a line and ask people to mark how closely related they are

a lot ———————————————————————— not at all

This type of response is easier to collect but harder to code for an answer

Other Issues

Related indicators could be

- The information can be made more specific by including that adults be able to identify four of seven warning signs of maternal complications of pregnancy and childbirth antenatal vaginal bleeding, high fever, abdominal pain, swelling of hands and face, active labor for > 12 hours placenta retained for more than one hour and seizures For newborns it would be identifying three of four warning signs of neonatal problems after birth "blue baby", high or low temperature, inability to suck extreme irritability or lethargy These indicators would be most useful if they were keyed to an education and information program
- including data collection on the knowledge, perceptions and practices of mothers regarding their pregnancy complications, or newborn complications
- including only mothers in the study not all adults
- collect the same data from women coming to health facilities

Availability of EmOC Facilities

- the number of facilities providing emergency obstetric care in a geographic area during a specified time period per 500,000 population

Definition of Numerator

Emergency obstetric care (EmOC) can exist at two levels of the health care system health centers may provide the basic set of EmOC functions with district hospitals providing the comprehensive set of EmOC functions

The basic set of EmOC functions include parenteral antibiotics, oxytocics, and sedatives, manual removal of the placenta, removal of retained products of conception, and assisted (vaginal) delivery The comprehensive set of EmOC functions include the basic EmOC plus obstetric surgery and blood transfusion

Only facilities that are functioning and that have provided at least one of the emergency services within the six months prior to the time period of the indicator are included (WHO 1994 14 p 14-15)

Definition of Denominator

The total population of the area is used not just women of childbearing age, or of pregnant women The choice of this denominator is in keeping with other planning indicators typically used by health planners

What is Measured (see the Model)

- availability of facilities with services

Reported Range

Not available

Advantages

- standard indicator for health planning
- responsive to program change

Disadvantages

- does not give the distribution of facilities in the geographical area Mapping the

facilities would be useful
- no standards for small population sizes

Interpretation

Since the denominator refers to the general population and not to the specific population at risk of needing such services, that is, pregnant women, the crude birth rate would be useful to include when reviewing this indicator, as variations in crude birth rates can be substantial, and the services should be more common where the birth rate is higher

Population or Facility Based

- population based

Frequency of Collection

- annually or at least every two years

Methods and Sources of Information

Numerator
- count the services with the EmOC functions
- review of records to be sure services have been provided within the six months prior to collecting data for the indicator

Denominator
- population census

Other Issues

- Mapping the location of services with and without EmOC would be useful

Measures of Access to Care

There are many indicators of access because there are many components to "having access to care" In this section access to care measures whether people have what it takes to obtain health care that exists If no health services exist that is a lack of availability of services which is addressed by other indicators Here we address access The following indicator is recommended

Knowledge of the Location of EmOC Services

- a percentage

$$\frac{\text{number of adults in the community during a specified period of time with knowledge of the location of emergency obstetric care services}}{\text{number of adults in the same community during the same time period}} \times 100$$

Definition of Numerator

EmOC Emergency obstetric care services include the basic set of EmOC functions parenteral antibiotics oxytocics, and sedatives manual removal of the placenta, removal of retained products of conception and assisted (vaginal) delivery and the comprehensive set of EmOC functions which are the basic EmOC plus obstetric surgery and blood transfusion

Knowledge of the location of EmOC services means the adults can tell you which facilities have these services The list of acceptable services is known both for basic EmOC and for comprehensive EmOC The question needs to be very specific to what you want to know so decisions are needed before the questions are made See the Methods section for this indicator for more information

Definition of Denominator

A cross-section of adults of all ages is used The age range that is acceptable should be specified usually the lower age is 15 years This can vary depending on the community expectations of assuming adult responsibility

What is Measured (see the Model)

- access - through an indicator of knowledge Knowledge of services that exist is a necessary component of successful access

Reported Range

- There are no norms Each community is different It would be interesting for the PROCOSI members to decide on a set of questions that all gather data about to see what the range is for the communities served

Advantages

- can directly measure results of education programs
- tries to measure what people know about availability of services, an important step in using the services
- gives a community level measure of knowledge

Disadvantages

- does not measure practice
- no population norm is available for judging how good the indicator is so there have to be two data collection activities
- measures all adults, to find out what the major care givers know (probably the women) need a large enough sample so that women can be analyzed separately
- requires community survey to collect

Interpretation

This indicator provides information on community awareness of the location of EmOC services which is an important step in the utilization of such services Finding out the community level of knowledge before preparing educational campaigns is useful, and the making the same measure after the program has operated gives an evaluation of the success of the program

The indicator does not measure whether people actually act on their knowledge of the services that is if an obstetric complication arises is it recognized and is the pregnant woman taken to the services It does not tell you what other problems exist that may keep people from using services (even when they know about them) for example distances that must be traveled, difficulty obtaining transport cultural issues autonomy of decision making and action, and so on However, this indicator is meant to serve as a general marker for access Other access indicators are listed in "Other Issues" for this indicator

The hope is that having some knowledge of the location of services decreases inappropriate pregnancy-related care seeking behavior by increasing the likelihood that appropriate services are sought (MotherCare, 1995 [January version] p 133)

Population or Facility Based

- population based

Frequency of Collection

- yearly, if there is a program aimed at changing the levels of knowledge With a program, the data collection should be timed to its needs, and could be done more frequently
- will probably require two data collection times at minimum to see a change
- can be collected periodically thereafter (every 3-5 years) to detect long term changes in the level of knowledge due to migration

Methods and Sources of Information

Numerator

Options for creating the question(s) to be used in the survey include

- the list of acceptable facilities should be made from which to judge the correctness of the response however it is better to ask an open question and code the response later as "correct" or not,
- give a facility for only comprehensive EmOC services or include facilities with just the basic set (depends on what is available in the area),
- list as many facilities as possible or give only one - one would seem sufficient to the purpose,
- relate the question to any life-threatening (to mother or baby) obstetric complication or just to a single type,
- just name the facility or require they know where it is physically located
- The question (MotherCare 1995 [January version], p 133) used by some groups to get this information only asks for the location of comprehensive services for one type of obstetric complication The question "If you or a woman you know were in labor for three days and could not deliver the baby where would you/she be able to go for an operation for delivery
- The amount of knowledge about the services is decided before the questions to obtain this information are written
- If there is a program of education and information, then the questions should reflect what is given
- focal group discussions can also be used to obtain information about access to services

Denominator

- probability sample of the general population
- a population based register of all adults specially usable if the accuracy of

information has been verified by cross-checks with other sources of information)

Other Issues

- The indicator can be made very specific to childbearing age women by using all the women of childbearing age as the population from whom the knowledge data are collected The usefulness of this information depends on the social/cultural decision making process about going for services The culturally appropriate adults should be included if this indicator is to function properly

- Other indicators of access many of the following indicators contain information that can be gathered using qualitative methods rather than the quantitative methods suggested here In some cases the qualitative methods would give you a richer amount of information about the questions addressed The purpose of this Guidebook is to offer various indicators that are obtained with some type of quantitative measure, that is, counts of people with specific characteristics Other books exist that present the qualitative approaches to gathering and using data about these issues (Harrison, 1994)

Pregnant Women with Access Problems

$$\frac{\text{number of women who completed a pregnancy with in the past xx months/years living the community during a specified time period with problems of access to EmOC}}{\text{number of women who completed a pregnancy with in the past xx months/years in the same community during the same time period}} \times 100$$

Newborns with Access Problems

$$\frac{\text{number of newborns now more than one week old whose mothers live the community during a specified time period with problems of access to medical services}}{\text{number of newborns now more than one week old whose mothers live in the same community during the same time period}} \times 100$$

- a percentage
  - "Problems of access" - these could be clearly specified or a very general question can be asked about whether the women who completed a pregnancy during the past xx months/years had any trouble getting health care for that pregnancy
  - The major problem with this indicator is that it is too general -- this is also its major strength, but the likelihood of getting useful information is low It is better to ask one specific question like the recommended one, than to be too general
  - One method to obtain this information in a useful way is to ask a series of two questions (one question has not proven to be sufficient) as given below These are open questions and require careful coding of the answers to be useful

1 "During your most recent pregnancy what were the main problems you had in getting (example prenatal care services)?"Allow the woman to tell all the barriers she experienced Write all the problems down After the first one re-ask "anything else?" and after the third one ask "what else?"

2 "What would you like to see happen to make (example prenatal care services better for you and your family?" The answers are handled the same way as in question (1) These two questions need to be analyzed together, as people often answer "none" to the first question and then give a several suggestions for improvements These two questions give a estimate of the number of people with access problems, and a list of access problems that is freely generated by the population (Based on the Cameron Country Primary Health Care Review Committee Manual of Procedures January 1991 University of Texas School of Public Health Houston Texas USA)
  - Such information can also be obtained through carefully conducted focus group discussions
  - Other possibilities for indicating access are
    - women/newborns who are within one hour travel from a EmOC facility Mode of travel must be specified

Ability to Autonomously Seek Essential Obstetric Care

- a percentage

$$\frac{\text{number of all childbearing age women in a community during a specified time period who are able to autonomously seek essential obstetric services}}{\text{number of all childbearing age women in the same community during the same time period}} \times 100$$

  - For nulliparous women if you were pregnant and needed to seek essential care during pregnancy or childbirth is there anyone whose approval you would have to

obtain before seeking care? YES or NO, and then is YES whose approval would vou have to seek? your husband, another woman in your family (mother-in-law sister etc), another person (traditional birth attendant, priest or traditional healer midwife etc), another person not listed ___who?___

- For previously pregnant women during your most recently completed pregnancv did you need to seek essential care for a problem you had in your pregnancy" YES or NO, if YES, ask whose approval they had to seek, if NO as the following if you had needed to seek essential care during pregnancy or childbirth, is there anyone whose approval you would have to obtain before seeking care? YES or NO If YES to needing to seek approval, then whose approval would you have to seek? your husband another woman in your family (mother-in-law, sister, etc), another person (traditional birth attendant, priest or traditional healer, midwife etc), another person not listed ___who?___

- These questions can also be addressed in a focal group discussion

Births Attended by Medically Trained Health Personnel

- a percentage

$$\frac{\text{number of births occurring in a geographic area over a specified time period that are attended by medically trained health personnel}}{\text{number of all births occurring in the same geographic area over the same time period}} \times 100$$

Definition of Numerator

Medically trained health personnel excludes all traditional birth attendants, whether trained or untrained and refers to personnel who have received training in modern medical "essential obstetric functions" appropriate to the level of the health system where the personnel work An exact definition is needed of what "medically trained" means

The births/deliveries whether they result in a stillbirth (fetal death), a live birth, an abortion an ectopic or molar pregnancy attended by medically trained health personnel are included

Definition of Denominator

All births/deliveries whether they result in a stillbirth (fetal death), a live birth, an abortion, an ectopic or molar pregnancy are counted

This denominator may be difficult to obtain An estimated number of pregnancies can be calculated from the number of live births increased to account for about 15% of pregnancies that do not result in a live birth (WHO 1994 14 p 12) Calculation (# of live births X 0 15) + # of live births

What is Measured (see the Model)

- coverage

Reported Range

- 100% coverage is not required because many pregnancies are not in need of medically trained personnel to deliver them Based on estimates that at least 40% of pregnancies develop some kind of complication and that 15% of pregnancies develop a life threatening obstetric complication a minimum of 15% coverage would be expected In reality it may need to be higher
- 2% to 96% of deliveries are attended by a trained birth attendant, defined as a

physician, person trained as a midwife (probably a nurse), and trained traditional birth attendants (WHO, 1993 7)

- In Bolivia an estimated 50% of births are attended by a health professional (PAHO 1993, as stated in the Plan Vida, 1994)

Advantages

- useful to program managers
- gives an indication of action being taken to help prevent maternal mortality
- easy to interpret

Disadvantages

- is not specific to those in need of medically trained personnel care so it is possible that some who are attended by medically trained personnel do not need that level of care, while some with complications go unattended
- does not measure quality or adequacy of the care provided
- is not an impact measure

Interpretation

With this indicator we are NOT suggesting that all deliveries be done in a facility The indicator IS addressing the coverage of deliveries by personnel who know life-saving obstetric skills The indicator would be much more specific to this task if the denominator contained only those deliveries that would truly need such care such as those with complications Such a specific denominator is difficult to obtain But most programs will find it useful to collect information about all of the attendant types for the pregnancies included and to calculate a percentage per type of attendant With this further information a much clearer interpretation can be made of the pattern of attendants at deliveries

Population or Facility Based

- population based

Frequency of Collection

- yearly, if there is a program aimed at changing the levels of coverage With a program the data collection should be timed to its needs
- will probably require two data collection times at minimum to see a change
- can be collected periodically thereafter (every 3-5 years) to monitor the system

Methods and Sources of Information

- service registers or log books
- community registers
- SNIS

The most specific measure is with a population survey to identify all deliveries and then find out who the attendant was This method can collect information on all types of attendants
The indicator can also be constructed from two sets of data one that provides the numerator data (from health service data), and a second that provides denominator data (community survey or registry of live births) Such an indicator will probably not give data on deliveries by non-medically trained health personnel especially the attendant for out of service deliveries

Other Issues

- The indicator can be modified to show the percentage of all live births that are attended by medically trained health personnel
- Including trained traditional birth attendants and/or trained family members in the indicator might be useful to program managers, or to give even more information the following indicator might be the most useful
- Knowing the distribution of deliveries by all types of birth attendants provides useful information The percentage of all deliveries that were done by each type of attendant is calculated
- To complement the previous indicator the percentage of all deliveries that occur in each setting (hospital, maternity clinic, or home) is also useful

Deliveries by Cesarean Section

- a percentage

$$\frac{\text{number of live births in selected services during a specified time period delivered by cesarean section}}{\text{number of live births in the same geographic area during the same time period}} \times 100$$

Definition of Numerator

A cesarean section requires surgery on the mother to remove the infant from the uterus through an abdominal incision of the mother It is considered a major surgical procedure

Only live births are used here however in circumstances where data are available both stillbirths (fetal deaths) and live births can be used The important point is to use the same type of group in both the numerator and denominator

Definition of Denominator

A count of all live births in the same geographic area from which the service clients come It is important that the cesarean section cases in the numerator have come from the live births in the denominator Where data are available both stillbirths (fetal deaths) and live births can be used The same group must be used for the numerator and denominator

What is Measured (see the Model)

- coverage -- although it is an indirect measure since the denominator is not specific to those who definitely need a cesarean section Cesarean section is a well studied procedure and there are data on the usual percentage of live births that would truly need a cesarean section (see the section on "Interpretation" that follows)
- can be seen as a quality of care marker since maternity care programs require the capacity to perform cesarean section for those women whose complications need this treatment

Reported Range

- 5% is the minimum level currently used as acceptable based on data from various countries over several years of use of this indicator

- 15% is the currently used maximum level In places with higher rates the procedure has been found to be overused that is, performed for non-essential reasons

Advantages

- measures capacity to resolve obstetric complications
- very specific to the complications it is meant to treat, in those complications if a cesarean section is not done, higher maternal and fetal mortality will occur
- facilities performing cesarean sections can be easily identified
- responds well to changes in the system to increase the availability of cesarean section, and efforts to improve access and acceptability of the facility and the procedure for the community

Disadvantages

- a small number of cases is possible in some levels of care
- does not measure quality of care provided, that is, how well the procedure was performed
- does not measure the outcome of the procedure, such a mortality and morbidity

Interpretation

Cesarean section is one of the emergency obstetrical care (EmOC) functions and is a life saving procedure -- either for the mother or for the fetus It may be performed as an emergency procedure or as a planned procedure where there is fore knowledge of a condition that will not permit a vaginal birth (diagnosed cephalo-pelvic disproportion for example) Its proper use results in decreased maternal and perinatal mortality and morbidity for the complications it is meant to treat

Cesarean section occurs at the end of pregnancy and at the end of a chain of events that includes problem recognition decision making to use services availability of personnel trained in the procedure equipment and supplies for it referral practices, and successful arrival at services Therefore lower or higher than expected cesarean section rates must be investigated further to explain the reasons for them

The indicator shows the percentage of all live births that received a cesarean section This measure has been used for enough years that there are expectation about what is acceptable (see the section on "Reported Ranges") It includes all live births as the denominator, not just to those with complications -- hence the indicator takes into account both the rate of complications for which cesarean section is an appropriate treatment and the practice patterns of performing the procedure

Rates will probably increase after service changes are made When rates decrease it can be reflecting improved maternal health decreased complication rates improved management of complications in pregnancy or decreased availability or access to services Again, further investigation is needed

This indicator serves as a monitoring devise for program managers It is a sensitive indicator, but further investigation will be needed to decide whether there are problems and what to do about them

Population or Facility Based

- population based - in that the denominator and the numerator should represent information for more than one facility, unless only one facility in a geographic are is capable performing cesarean section Facilities want to know what their cesarean section rate is This is fine but those rates do not represent the entire community rate because they are heavily dependent on referral practices, access issues, and women's opinions of a particular facility The cesarean section rates vary greatly by facility for these reasons

Frequency of Collection

- yearly, if there is a program aimed at changing the availability of the procedure With a program, the data collection should be timed to its needs
- will probably require two data collection times at minimum to see a change
- can be collected periodically thereafter (every 3-5 years) to monitor the system

Methods and Sources of Information

Numerator

- operating room logs or delivery logs
- referral card and return referral
- clinical history
- Partogram
- community surveys

Denominator

- vital registration
- community surveys
- population based registry of live births

The most direct measure of this indicator is to count all live births and how they were delivered Such data would require a registry or a community survey

Perinatal Mortality

Perinatal Mortality Rate per 1000 Births

- a rate

$$\frac{\text{number of fetal deaths and early neonatal deaths in a community during a specified time period}}{\text{number of fetal deaths and live births in the same community during the same time period}} \times 1000$$

Definition of Numerator

- fetal deaths are infants born dead in a pregnancy that is 28 weeks or longer in duration
- early neonatal deaths are infants who were born alive that died during the first 7 days of life

Definition of Denominator

- fetal deaths are infants born dead in a pregnancy that is 28 weeks or longer in duration
- live births include all infants that show signs of life at birth in a pregnancy that is 28 weeks or longer in duration

What is Measured (see the Model)

- impact

Reported Range

- A study of all hospital births (nearly 100% coverage of all local births) in Pelotas, Brazil, found a perinatal mortality rate of 33 7 deaths per 1,000 total births (Barros et al 1987)
- Figures available using only registered live births as a denominator from 1975 in the Philippines 27 5 deaths from 28 weeks gestation to 6 completed days of life per 1000 live births and in 1971 in Japan 20 5

Advantages

- provides an indication of program effects on mortality
- widely used so can compare with other areas
- avoids the problem of defining a live birth

Disadvantages

- difficult to be sure of gestational age except in later pregnancy
- need a large number of births for stable rates
- fetal deaths may be greatly under-reported among home births
- may miss early neonatal deaths among home births

Interpretation

Perinatal mortality is used to remove the problem of deciding if the infant is a live birth Infants who die shortly after birth often are recorded as a fetal death This practice makes the neonatal mortality rate lower than it should be

Perinatal mortality rates provide a measure of risk to the baby's life from causes that occur during pregnancy or during labor and delivery or during the first few hours after birth Changes in prenatal intrapartum or neonatal care should be reflected in the perinatal mortality rate However, the risk of death also depends on the mother's health and nutritional status, and on the baby's environment The perinatal mortality rate gives an indication of the situation but more investigation is needed to find out the reason for the rate

When a program begins the perinatal mortality rate can increase as more cases are reported than would previously have been

The perinatal mortality rate has two components (fetal deaths and neonatal deaths) that have different patterns of causes When working with this rate it is a good idea to look at the components separately as well for better understanding of the quality of the information It is a common problem that the fetal death rate is greatly under-reported especially where many deliveries occur at home because the fetal deaths are not reported nor registered More information about this is given below when each component is discussed separately

Population or Facility Based

- population based
- a facility based rate can be calculated for a particular facility's use

Frequency of Collection

- yearly

Methods and Sources of Information

- vital registration Must be used with caution, and depends on the percentage of all deliveries that occur in hospitals, since there is very little reporting of fetal deaths that occur at home
- community registers that capture every pregnancy and its outcome
- community survey
- hospital records for the deaths
- information from birth attendants

Other Issues

- These rates can be calculated for facilities, but should not be interpreted as giving a picture of the community rate Each facility has a distinct type of population with varying referral patterns to it, and varying community utilization patterns
- The same information gathered for the perinatal mortality rate can be used in other ways

Fetal Death Rate per 1000 Births

- a rate

$$\frac{\text{number of fetal deaths in a community during a specified time period}}{\text{number of fetal deaths and live births in the same community during the same time period}} \times 1000$$

Early Neonatal Death Rate per 1000 Live Births

- a rate

$$\frac{\text{number of early neonatal deaths in a community during a specified time period}}{\text{number of live births in the same community during the same time period}} \times 1000$$

Interpretation

The expected pattern between these two rates is that the fetal death rate will be higher than the early neonatal death rate Death rates are always higher for more vulnerable groups, and the younger a baby is the higher its chance to die is, therefore, death rates are higher for fetal deaths, lower for early neonatal deaths, and lower still for late neonatal deaths (dying at 8-28 days of life)

Sometimes the data do not show the expected pattern because the reporting for fetal deaths is often very incomplete, resulting in an underreport of the fetal death rate Or there could be an true problem occurring that needs more investigation to describe and to solve

In the following example the problem lies with incomplete reporting fetal deaths in the Philippines

	Philippines *1975*	Japan *1971*
Fetal mortality ratio per 1,000 live births	10 7	14 1
Early neonatal death rate per 1,000 live births	16 8	6 3

Comparing the Philippines with a country like Japan shows that the fetal mortality ratio is lower in the less developed country than in Japan (an unexpected thing) while the early neonatal death rate is nearly three times higher in the Philippines (which is expected) The biological expectation is for the fetal mortality ratio to be higher than the early neonatal death rate Therefore the suspicion is that there is under-reporting of fetal deaths in the Philippines but not in Japan Japan has a sophisticated system of reporting and the pattern of fetal and early neonatal death in Japan is the same as seen in other industrialized countries

The early neonatal death rate may respond more quickly to interventions than the fetal death rate Interventions are often targeted at newborn care (for example, neonatal resuscitation) which will have no impact on fetal deaths, unless many live births that die early have been classified as fetal deaths As maternal conditions and emergency obstetric care is available and used, there will be a lowering of the fetal death rate

The difficulty in separating the two rates from the perinatal mortality rate is the confusion over reporting a live birth The example above shows that where fetal deaths are not well reported the expected pattern between fetal deaths and early neonatal deaths is not seen (The expected pattern is that the fetal death rate is higher than the early neonatal mortality rate) In the comparison of the Philippines and Japan the two perinatal mortality rate is affected by the lower than expected fetal

death rate and cannot be used very confidently

Reported Range

fetal death rate per 1000 births

- 16 5 in Pelotas, Brazil, 1987 and fetal deaths accounted for nearly 50% of the perinatal mortality (Barros et al , 1987)
- fetal death ratio, denominator is 1000 live births (United Nations, 1995 p 361)
- 3 5 in Japan, 1992
- 10 5 in Venezuela 1990
- 10 2 in Cuba, 1990

early neonatal death rate per 1000 live births

- 17 5 in Pelotas, Brazil (Barros et al , 1987)

Ratio of Fetal to Neonatal Deaths

- a ratio

$$\frac{\text{number of fetal deaths}}{\text{number of early neonatal deaths}}$$

Interpretation

The ratio tells us how many fetal deaths there are for every 1 early neonatal death A ratio of 1 0 says that the numbers of fetal deaths and early neonatal deaths is equal

Fetal deaths (stillbirths) reflect the maternal health and nutritional status people to and during pregnancy environmental condition and prenatal care Early neonatal deaths reflect maternal health delivery care or early newborn care (tetanus neonatorum would be here)

It is expected that there will be more fetal deaths than early neonatal deaths

Reported Range

In many countries fetal deaths could be 50% of all perinatal mortality Where programs lower the early neonatal death rate the ratio becomes more like 2 fetal deaths for every 1 early neonatal death (such as in Japan in 1971 as displayed in the above table)

Other Measures

- % of perinatal deaths from hospitals, maternity clinics, and from home the percentage is calculated based on all fetal and early neonatal deaths that are collected, and the percentage that occurred in each place is calculated and examined This indicator tells us where the majority of deaths are occurring As a program operates the percentage would be expected to shift to more deaths in the hospitals, as more of the complicated pregnancies go there, and newborns with complications are brought or born there

- Among the fetal deaths (stillbirths) comparison can be made between macerated and fresh fetal deaths, that is, between fetal deaths that have been dead for 24 or more hours (macerated), or that have died within the past 24 hours (fresh) Macerated fetal deaths are expected to be common in situations where there is a high incidence of syphilis, chorioamnitis, prolonged labor of 24 hours or more, antepartum hemorrhage, hypertensive disease of pregnancy, and poor prenatal care If there are more fresh than macerated fetal deaths it means that deaths are due to poor management of the Pathway to Survival surrounding labor and delivery by the family and by the birth attendant Many of these deaths can be prevented

Low Birth Weight

- a percentage

$$\frac{\text{number of live births in a community during a specified time period who weighed} < 2500 \text{ g at birth}}{\text{number of live births in the same community during the same time period}} \times 100$$

Definition of Numerator

- live births who weigh less than 2500 g are counted as low birth weight infants Some type of weighing scale is needed to obtain the birth weight using this measure

Definition of Denominator

- live births include all infants that show signs of life at birth in a pregnancy that is 28 weeks or longer in duration

What is Measured (see the Model)

- impact - birth weight is an outcome by itself

Reported Range

The range of low birth weight varies world wide from 3% to 25% of live births (WHO, 1992 2) In Pelotas Brazil the figure was 8 8% (Barros et al 1987)

In Bolivia 13% of births are of low birth weight (PAHO, 1993 as stated in Plan Vida, 1994)

Advantages

- indicates the frequency of infants at high risk of mortality and morbidity
- larger numbers occur than do deaths
- responds to program changes directed at increasing the birth weight of infants who are mature

Disadvantages

- does not measure mortality

- requires measurement of birth weight so there will sub-registration where deliveries occur at home
- if a large proportion of births are not weighed this indicator cannot be used

Interpretation

Low birth weight is a good indicator of neonatal health It is both an outcome of previous care to the mother, and a predictor of infant mortality and morbidity Infants with low birth weight are at higher risk of mortality and morbidity than infants weighing 2500 g or more

There are larger numbers of low birth weight infants than deaths, and so smaller sample sizes are needed to use this indicator than mortality

Analysis of data around the world indicates an association between this indicator and improved maternal health and nutrition, especially when a large portion of low birth weight is made up of infants who are mature at birth (term gestational age) but of low weight (< 2500 g)

This indicator has been used worldwide as a marker for maternal and infant health, hence, data for comparisons exist

Population or Facility Based

- population based
- a facility can monitor its low birth weight rate, but this should not be used a measure of the community rate, especially where many births occur outside the home

Frequency of Collection

- yearly, if there is a program aimed at improving maternal conditions With a program, the data collection should be timed to its needs
- will probably require two data collection times at minimum to see a change
- can be collected periodically thereafter (every 3-5 years) to monitor the system

Methods and Sources of Information

Numerator

- some type of scale is needed to classify the newborn as low birth weight or not There are small cloth scales that do not indicate the actual weight, and show only that the newborn is "in the red" (below 2500 g) or not (2500 g or more) These must be culturally adapted for use in areas where births occur at home or with traditional midwives
- registries
- SNIS

- hospital records or log books of births with weight recorded

Denominator

- community survey
- vital statistics
- registries

Other Issues

- In facilities or communities where birth weight information is available, the analysis of the birth weights is most useful if they are reclassified into three groups <1500 g (the majority of whom will also be premature infants), 1500-2499 g (around 50% of these births will be premature infants), and those weighing 2500 g or more In Pelotas Brazil 42% of all low birth weight babies were premature (Barros et al 1987)

  The reason for separating the weight groups is because we can do little currently to prevent premature births but we can prevent low weight births in mature infants A rough guide to this condition (often called intrauterine growth retardation-IUGR) is weighing between 1500 g and 2400 g, since 50-65% of that group will be low weight but mature babies These babies are still at higher risk of mortality and morbidity than normal weight babies at term The % of births that are 1500-2499 g can be used as an indicator of the effect on the newborn for programs that target improvements in maternal health and nutrition during the pregnancy, and as a prevention for neonatal morbidity and mortality

  For information purposes in Pelotas Brazil, 1987
  = 7 5% of newborns weighed 1500-2499 g and 1 3% weighed <1500 g
  = 3 2% of newborns were low birth weight and pre-term (<37 weeks)
  = 3 9% of newborns were low birth weight and term (IUGR)
  = 2 9% of newborns were not low birth weight but pre-term

- mortality by birth weight group (low weight vs normal weight) can be used to monitor progress of programs aimed at lowering the death rate among low birth weight infants

Neonatal Complications

Newborns with Complications Receiving Treatment

- a percentage

$$\frac{\text{number of newborns with serious complications arriving at services during a specified time period who receive treatment within 2 hours of their arrival}}{\text{number of newborns with serious complications arriving at the same services during the same time period}} \times 100$$

Definition of Numerator

Newborn means 0-7 days of age

Serious complications generally means they are life threatening conditions The list of complications included for your indicator must be specified Both newborns who come to the facility with the complication and those who are already in the facility and develop the complication are included

For example, your list of complications might include those with pneumonia, malnutrition, premature baby low birth weight baby small for age baby, anoxic baby, tetanus, "blue baby," babies with high or low temperature inability to suck extreme irritability or lethargy, seizures

A definition of what will be counted as "treatment" needs to be specified, and timing of arrival and first treatment recorded

The Appendix A on Neonatal special care (NSC) gives information on newborn care recommended by the World Health Organization for newborns who had a difficult birth or whose mother had a complicated pregnancy and/or labor and delivery

Definition of Denominator

All the newborns arriving in the services with the specified complications are counted These must be the newborns from which the numerator comes or it will be difficult to properly interpret the indicator

What is Measured (see the Model)

- quality of care - at least from the point of view of prompt attention It does not

measure whether the right thing was done for a particular diagnosis -- this information would be necessary to adequately measure quality of care
- a process indicator, and can be used for monitoring changes in service delivery
- incompletely indicated are the other characteristics of recognition of a problem, decision making to use a service, referral patterns, and access issues These all play a role in getting the newborn to the service, but are not measured with this indicator

Reported Range

Ideally nearly 100% of newborns with a serious complication would be treated appropriately This indicator is new, so findings from services around the world are not available to provide a range

Advantages

- collected in services where the diagnosis of complications can be more complete
- can measure changes in service provision quickly and directly

Disadvantages

- does not measure the unmet need in the community, that is, the newborns with complications who are not brought to the services
- tracking treatment and the time since entry might be difficult for some services for this reason case review processes are encouraged
- only measures how quickly care is given does not measure the adequacy of care
- requires personnel with diagnostic skills to identify the cases
- special logs or records might need to be created to gather the data for the indicator

Interpretation

This indicator is a measure of the promptness of treatment It is a first step in a program of improved quality of care It serves as a relatively easily obtained marker for care of newborns, whose conditions can deteriorate rapidly and suddenly Thus they do need quick attention at least to correctly diagnose their condition

A further separation of the conditions into diagnostic groups would give more information about where differences may be in speed of treatment which would make investigation of reasons for delays more efficient

Population or Facility Based

- facility based

Frequency of Collection

- yearly, if there is a program aimed at improving maternal and infant conditions With a program, the data collection should be timed to its needs
- will probably require two data collection times at minimum to see a change
- can be collected periodically thereafter (every 3-5 years) to monitor the system

Methods and Sources of Information

- clinical records
- registry the diagnostic definitions must be agreed upon before gathering the data for the indicator
- admission logs so that time of admission is available

Other Issues

Some investigators might wish to include an indicator of the outcome effects of treatments used for example the percentage of newborns who were "successfully treated"

$$\frac{\text{number of newborns with serious complications arriving at an EmOC service during a specified time period who were "successfully treated"}}{\text{number of newborns with serious complications arriving at an EmOC service during the same specified time period}} \times 100$$

"Successfully treated" needs to be clearly defined Some examples are survived, or survived without residual effects etc

Other indicators can be used to complement the recommended one

Newborns with Asphyxia Receiving Treatment

- a percentage

$$\frac{\text{number of newborns with asphyxia at services during a specified time period who receive treatment within 1 hour of diagnosis}}{\text{number of newborns with asphyxia at the same services during the same time period}} \times 100$$

- Newborn means 0-7 days of age
- the definition of the signs and symptoms of asphyxia must be clearly defined and all services must use them
- only one condition must be tracked rather than all of them
- the number of cases occurring in services of this specific condition may be too small over a year to make a stable indicator

Neonatal Complications Arriving at Services

- a percentage

$$\frac{\text{number of newborns with serious complications in a community during a specified time period who arrive for care at selected services}}{\text{number of newborns with serious complications in a community during a specified time period}} \times 100$$

- Newborn means 0-7 days of age
- Serious complications generally means they are life threatening conditions The list of complications included for your indicator must be specified Only newborns who develop their complications outside of medical services are included in the numerator
- Both the numerator and the denominator will probably be collected from a community survey If this indicator is used, there will have to be a set of community recognized signs and symptoms, or complications that can be asked on interview
- Measures coverage While the method of collection poses some difficulties the information would be very useful in learning the amount of unmet need that exists in the community It would be even more informative is some information is collected about the reasons some infants were not taken to care -- an access measure

Maternal Mortality

Maternal Mortality Ratio

- a ratio

$$\frac{\text{number of maternal deaths in a geographic area over a specified time period}}{\text{number of live births occurring in the same geographic area and time period}} \times 100{,}000$$

Definition of Numerator

A maternal death is a death to a woman who is currently pregnant or who has been pregnant in the last 6 weeks The outcome of the pregnancy (live birth, still birth, miscarriage, induced abortion, ectopic or molar pregnancy) is not relevant The cause of death is relevant, it is a maternal death if it is caused directly by the pregnancy (including those deaths which result from treatment of complications) or if the pregnancy aggravates another condition Not usually included are "accidental and incidental deaths" such as a traffic accidents or deaths from conditions (such as most cancers) which are unaffected by the pregnancy "

Definition of Denominator

The number of live births occurring during the same time period in the same geographic area The newborn must show signs of life at birth to be counted

Example of Calculation (MotherCare, 1995 January edition p 16)

Number of maternal deaths = 37
Number of registered births = 15 500
Total population = 372,450
Crude birth rate = 41 3 births per 1000 population

1 $\frac{37}{15\,500} \times 100{,}000 = 238\ 7$ maternal deaths per 100,000 registered live births

2 If the total number of live births is not known but you do know the crude birth rate and the total population, the estimated number of live births can be calculated thus total population x crude birth rate (see calculation)

$$\text{therefore MMR} = \frac{37}{372{,}450 \times \frac{41\ 3}{(1000)}} \times 100{,}000 =$$

$$= \frac{37}{372{,}450 \times 0413} \times 100{,}000 =$$

$$= \frac{37}{15382\ 185} \times 100{,}000 =$$

= 240 5 maternal deaths per 100 000 live births (estimated)

What is Measured (see the Model)

- health impact
- obstetric risk
- the average chance of dying once pregnant in the population of women

It is ratio (not a rate) because the denominator of live births does not count all pregnancies for example women die during pregnancies that end in abortion or stillbirth (fetal death), but abortions and stillbirths are not counted in the denominator of all live births

Reported Range

The range is very wide -- from 2 to 1600 maternal deaths per 100,000 registered live births (WHO 1986 3) In the Bolivian altiplano the MM Ratio is reported as 929 deaths per 100,000 live births in 1994 (by DHS survey, using the sisterhood method) Other reports for Bolivia show 390 per 100 000 live births 600 per 100,000 live births in 1988 (from Plan Vida, 1994 p Anexo 1), and 480 per 100 000 live births (from Plan Vida 1994 p 16)

Ratios from other countries in Latin America are given for information Cuba = 41 8 per 100 000 LB in 1990 Mexico = 51 3 per 100 000 LB in 1992, Argentina = 52 0 per 100,000 LB in 1990, and Ecuador = 152 2 per 100,000 LB in 1990 [data from civil registries of unknown completeness] (United Nations, 1995 p 399)

The ratios will change with better reporting so this range is an estimate, to provide an idea of what has been reported

Advantages

- measures impact on health state

- internationally recognized
- most commonly used measure of maternal health status

Disadvantages

- large population required for good indicator and to have enough maternal deaths to have a "stable" ratio Consult Appendix B for more specifics on this issue
- high resource cost to collect
- difficult to collect data
- variable sensitivity to program changes, unless they are targeted very specifically

Interpretation

The MM Ratio is a general measure to use when measuring progress in maternity services alone that is, when family planning services are not included (see MM Rate if family planning services are to be evaluated)

The MM Ratio can measure progress over a long term Many services must be given in the system of health care for the population MM Ratio to show improvement For the ratio to change, complications must be recognized and treated appropriately, referral and transport must exist equipment and supplies must exist to treat life-threatening complications

If improvement/change occurs in only one of the steps in the health service system, the MM Ratio may not show any change If a change is directly targeted at a specific cause of death, for example, the MM Ratio for that cause could show a change, but the change in the overall MM Ratio might be small

Population or Facility Based

- population based is best The MM Ratio includes all maternal deaths and live births in the chosen geographic area
- facility based MM Ratio tells about a single facility or group of facilities, but it does not account for maternal deaths and live births in the catchment area of the facility, only those that occur in (or are known to) specific facilities Also, women who choose to come to a facility for example - a hospital may not be from the local community or they may already have complications that put them at high risk of death These characteristics can mean that the MM Ratio in a facility is higher than the population- based MM Ratio

Frequency of Collection

- not more than once a year In some cases 2 or 3 years might have to be covered to acquire enough maternal deaths to have a stable indicator (see Appendix B of the Guide book)

Methods and Sources of Information

Maternal deaths

Multiple sources are necessary to be certain all maternal deaths are counted Suggested sources are

- local registers
- civil registers
- hospital death reports
- morgue reports
- cemetery reports
- newspaper reports
- house-to-house surveys
- key informants
- village leaders
- sisterhood method

Live Births

- Suggested sources are
- locally registers
- civil registers
- vital statistics
- births in facilities
- house-to-house surveys
- key informants
- village leaders
- population census

Other Issues

If a survey is the method of choice to collect data about maternal deaths there is a choice between two methods to collect the information The characteristics of each are discussed below

A **general survey** usually means a house-to-house survey to find out if women in that household who have been pregnant died as a result of it Such a study was done in Addis Ababa, Ethiopia, used here as an example (MotherCare 1995 January edition p 16-17)

The **sisterhood method** is used to collect a count of deaths due to pregnancy among the sisters of all the adults living in a household Such a study was done in the Gambia (MotherCare 1995 January edition p 16-17)

General Survey Methods	Sisterhood Method
- need larger sample size since few pregnancies occur in a house in a year	- smaller sample size is needed since all adults in a household report about all their sisters
- usually covers 1-3 years before the study	- can cover 1-12 years before the study
- in Addis Ababa 9315 respondents were interviewed with 45 maternal deaths identified in the survey households	- problem of fixing the year of death if that is needed
	- in Gambia 2163 respondents were interviewed with 91 maternal deaths identified among all their sisters

Using the MM Ratio as a measure of program impact has an additional disadvantage, that relates both to the Stable Indicator (Appendix B) issue and to the amount of impact or decrease in the MM Ratio that is needed to be able to convince policy makers that the program has had a real impact on the MM Ratio

As an example We use levels of confidence around the MM Ratio to judge if the changes we see are real or are only due to natural variation (These are measures of statistics that say we are 95% confident that the changes were big enough and stable enough to have been caused by the program and not by normal year to year variation in the MM Ratio Since little in life is 100% certain, we cannot be 100% confident, as there is always a chance that we will judge wrong, but the chance is very small - only 5% - if we use 95% as out measure)

The data from Addis Ababa and the Gambia were used to calculate how much the MM Ratio would have to decrease over the time of the program to be able to say (with 95% confidence) that the program made a significant difference

- if there were a 50% decrease in the MM Ratio, the amount would be significant for the Gambia, but not Addis Ababa
- a 25% decrease in the MM Ratio would not be significant for the Gambia or Addis Ababa For this amount to be significant statistically one would need a much larger number of respondents in both methods (i e , larger sample sizes)

In this example, even though maternal mortality decreased it takes very large numbers of pregnant women to say that the decrease was more than expected In countries like the Gambia or Ethiopia where the MM ratio is high it is difficult to achieve a decrease of more the 50% in the MM ratio in one year which is what is needed to be 95% confident that the program made the decrease happen For this reason the maternal mortality ratio is difficult to use as a program impact indicator

Maternal Mortality Rate

- a rate

$$\frac{\text{number of maternal deaths in a geographic area over a specified time period}}{\text{number of women of reproductive age in the same geographic area over the same time period}} \times 100{,}000$$

Definition of Numerator

A maternal death is a death of woman who is currently pregnant or who has been pregnant in the last 42 days, (6 weeks) The outcome of the pregnancy (live birth, still birth, miscarriage induced abortion, ectopic or molar pregnancy) is not relevant The cause of death is relevant, it is a maternal death if it is caused directly by the pregnancy (including those deaths which result from treatment of complications) or if the pregnancy aggravates another condition Not usually included are "accidental and incidental deaths" such as traffic accidents or deaths from conditions (such as most cancers) which are unaffected by the pregnancy

Definition of Denominator

Women of reproductive age refers to women aged 15-44 years Other age groups have been used, for example 15-59, 10-44 or 10- 49 years The choice of age group depends on the reproductive habits of the population included

Example of Calculation

Number of maternal deaths = 37
Number of women of reproductive age = 74,490
in the population

1 $\frac{37}{74\,490}$ X 100 000 = 49 7 Maternal deaths per 100,000 Women of reproductive age

What is Measured (see the Model)

- health impact
- risk of dying, but includes the likelihood of both becoming pregnant and dying due to a pregnancy
- baseline or progress in reproductive health services that includes family planning programs as well as maternity services

It is called a rate because the majority of women of reproductive age in most communities are at risk

of becoming pregnant This indicator is a combination (mathematically) of the fertility rate and the maternal mortality ratio

Reported Range

This rate will always be a lower number than the MM Ratio because there are more women in the population than there are live births (the denominator for the rate and the ratio) For example, in Bolivia the MM Ratio is 480/100,00 live births The MM Rate is 62/100,000 women of reproductive age

Advantages

- measures impact on health state
- assess two major program components family planning and maternity services

Disadvantages

- large population required for good indicator and to have enough maternal deaths to have a "stable" rate
- higher resource cost to collect maternal deaths
- difficult to collect data on maternal deaths

Interpretation

The MM Rate is somewhat new and people must become more familiar with interpreting it Since it combines a measure of fertility (risk of pregnancy) and maternal mortality it can be difficult to judge An improvement in only one program component, family planning for example, but no change in the other, for example -maternity services, will be more difficult to detect with the MM Rate

Population or Facility Based

- population based

Frequency of Collection

- not more than once a year In some cases 2 or 3 years might have to be covered to acquire enough maternal deaths to have a stable indicator (see Appendix B of the Guide Book)

Methods and Sources of Information

Maternal deaths

Multiple sources are necessary to be certain all maternal deaths are counted Suggested sources are

- local registries
- civil registries
- hospital death reports
- morgue reports
- cemetery reports
- newspaper reports
- key informants
- village leaders
- sisterhood method

Women of reproductive age

- local registries
- population census
- house-to-house surveys

Other Issues

See the material on the Maternal Mortality Ratio for this

Maternal and Perinatal Deaths and Case Fatality

The number of deaths by itself, that is, without something to compare it to or relate it to can be misleading and is difficult to interpret The deaths can be used in several ways to gain insight into service system problems

- the place of delivery for all deaths Calculate the percentage of deaths occurring in each place of delivery (hospital, maternity clinic, district hospital, home, etc) This indicates where the majority of deaths occur, not by where they die, but by where the delivery took place
- obtain the cause of death The distribution of deaths by cause makes very useful data available By knowing the most frequent cause of death, information guides decision making about where to concentrate preventive activities, and provides a way to monitor the intervention This indicator is most useful if a particular cause is targeted The change in the percentage of all deaths associated with that cause would indicate the change is having an effect
- investigating the factors related to deaths from specific causes -medical and treatment factors but also community familiar, and personal factors- provides useful information in deciding about which would be the most effective preventive activities This indicator will help to establish priorities for action

Case Fatality Rate for Obstetric Complications

- a percentage of all complications

$$\frac{\text{number of deaths from specific obstetric complications in selected services during a specified time period}}{\text{number of women with specific obstetric complications in the same services during the same time period}} \times 100$$

Definition of Numerator

Deaths from all of the following complications are included

- hemorrhage ante-partum and post-partum
- prolonged/obstructed labor
- post-partum sepsis
- complications of abortion
- pre-eclampsia/eclampsia

- ectopic pregnancy
- ruptured uterus

Definition of Denominator

Women who are diagnosed as having one or more of the above complications are included in the denominator

Case Fatality Rate for Neonatal Complications

- a percentage of all complications

$$\frac{\text{number of deaths from specific neonatal complications in selected services during a specified time period}}{\text{number of neonates with specific complications in the same services during the same time period}} \times 100$$

Definition of Numerator

Deaths from all of the following complications are included

- pneumonia
- blue babies
- tetanus
- birth trauma
- anoxia or hypoxia
- prematurity
- low birth weight
- sepsis
- malnutrition
- diarrhea

Definition of Denominator

Live born infants who are between 0-7 days of age and who are diagnosed as having one or more of the above complications are included in the denominator

What is Measured (see the Model)

- impact at least within the facilities - measures the likelihood that a women with complications will die from those complications

- Some may wish to look at it as a quality of care measure, but this is not appropriate The highest quality care given to a complicated case that has been in trouble for a long time before arrival may not prevent a death All of the issues involved in problem recognition, decision making, access and utilization play a role as well

Reported Range

UNICEF Guidelines suggest that the minimum acceptable level is 1% for case fatality This indicator has not been used much internationally, so findings from services around the world are not available to provide a range

Advantages

- an impact indicator that should be responsive to changes made in the facility
- if data on complications is being collected, then this indicator is fairly easy to construct
- indicates where the highest priority problems lie

Disadvantages

- requires a large number of complicated cases to have a large enough number of deaths to have a stable rate
- does not indicate community impact unless the majority of complicated cases come to the facilities for care
- do not know the state of seriousness cases are in when they arrive at the facility

Interpretation

The case fatality rate responds to the quality of care, but is affected by the condition of women and newborns when they arrive at the facility If complicated cases have waited too long before coming to the facility even the highest quality care may not save them

If most complicated cases do not come to the facilities studied then the case fatality rate will not indicate the community picture very well

Population or Facility Based

- facility based

Frequency of Collection

- yearly if there is a program aimed at improving maternal conditions With a program, the data collection should be timed to its needs It is probably wise to

monitor the rate yearly
- will probably require two data collection times at minimum to see a change

Methods and Sources of Information

Numerator
- count of deaths in the facilities during the time period

Denominator
- count of complications in the facilities
- clinical histories
- registry or log book of complications
- Both the numerator and the denominator can come from a community survey but the sample size would have to be very large to collect enough deaths for a stable rate

Other Issues

Other types of case fatality measures can provide interesting information, for example
- comparing the outcomes among the babies of women with and without obstetric complications Outcomes can be live birth, still birth, low birth weight, etc Investigators need to be clear which obstetric complications are included
- comparing the outcomes for newborns with low birthweight and those who are not Outcomes can be death in the first week of life, or during the first month of life, or the first year of life Morbidity outcomes can also be used

- a percentage

Screening of Pregnant Women for Syphilis

$$\frac{\text{number of pregnant women coming to selected services during a specified time period who are screened (tested) for syphilis}}{\text{number of pregnant women coming to the same selected services during the same time period}} \times 100$$

Definition of Numerator

The women who are tested for syphilis is measures here, not who are positive for the infection A norm may exist that says by what gestational age in pregnancy (or during labor) a woman should be tested for syphilis and this should define the indicator population, that is, only women who have arrived at the required stage of pregnancy should be included in the numerator and the denominator

Definition of Denominator

All of the pregnant women who have arrived at the specified stage of pregnancy or passed it are included in the denominator

What is Measured (see the Model)

- coverage of a screening test
- can also be seen as a measure of quality, as there probably exist protocols of care that require a syphilis test by a certain stage of pregnancy

Reported Range

- The minimum could be 0% in areas where syphilis testing is not available In places where nearly all women deliver in hospitals 100% of those women are tested for syphilis

Advantages

- is specific to this element of preventive care and responds quickly to a change in the program

- is fairly easy to measure in services

Disadvantages

- does not account for the need of such testing in the population
- only measures one type of sexually transmitted disease
- tests are made outside of the protocol

Interpretation

The measure shows how frequently pregnant women are tested for syphilis, but does not tell you the percentage that are positive The goal of maternity services is to be sure that women are screened for conditions that can affect their health or the health of their newborn That is the reason for screening for syphilis Protocols should exist to direct when to screen and this indicator helps evaluate practice of preventive activities To further understand the magnitude of the health problem then among those screened the percentage positive would be useful

Screening for syphilis is done with the intention of treating the problem if it is detected Common practice guidelines suggest that no screening should be done unless there are possibilities for treating women who are found to be positive for the disease

Population or Facility Based

- facility based

Frequency of Collection

- yearly With a specific program, the data collection should be timed to its needs, and could be done more frequently
- will probably require two data collection times at minimum to see a change
- can be collected periodically thereafter (every 3-5 years) to detect long term changes

Methods and Sources of Information

- facility records
- registry or log book of tests done (need to be sure that women are not included more than once)

Other Issues

- If another sexually transmitted disease is more prevalent than syphilis, then that disease should be used instead

Other indicators are

- Percentage of pregnant women who are diagnosed as positive for an STD or HIV/AIDS during their pregnancy
- Percentage of childbearing age women who are positive for an STD or HIV/AIDS as found from urology, gynecologic surgery or dermatology services
- Percentage of childbearing age women (or could use pregnant women) positive for an STD or HIV/AIDS who are referred for counseling (or who are given counseling) for their condition
- Percentage of women treated for an STD or HIV/AIDS for whom the professional health worker follows the treatment protocol adequately

Current Use of Contraception

- a percentage

$$\frac{\text{number of reproductive women in the community during a specified time period who are currently using a modern method of contraception (or their partner is using one)}}{\text{number of reproductive age women in the same community during the same time period}} \times 100$$

Definition of Numerator

Reproductive age women ages 15 to 49 years old who are using now, currently, a modern method of contraception If they stopped, then they are not counted as users here If people are using more than one method, and any one of them qualify as "modern" then there is use of a method Count the person only once

Modern contraceptive methods include hysterectomy, vasectomy, contraceptive pill or injection, intrauterine device diaphragm, tubal ligation and condom

This is a prevalence measure, current status is the important thing However, one can decide to use a period of time, for example, during the preceding month or year, and ask if women have used a method during that period of time The period of time must be clearly stated in the indicator As it is written above the measure is of women who at the time they are asked the question, they (or their partner) are using a contraceptive method

Definition of Denominator

Reproductive age women ages 15 to 49 years old in a selected geographic area over the time period of the survey are included in the denominator

What is Measured (see the Model)

- prevalence of practice of prevention - coverage

Reported Range

In Bolivia 12 2% of women of childbearing age who are in a stable relationship use modern methods of contraception (ENDSA, 1993 as stated in Plan Vida, 1994)

- The range varies widely around the world the lowest would be 0% in areas where there are no modern contraceptives available but the percentage will not reach 100% as some women in the denominator would know they are not sexually active and do not need contraception

Advantages

- orients programs around family planning activities
- responds well to direct program change where introduction of contraceptives in done with appropriate social and cultural means and with accompanying education and information
- is used worldwide which gives various measures for comparison

Disadvantages

requires a community survey

- women may use other effective traditional means of contraception not included on the list of "modern" contraceptives which can underestimate the protected population
- no information on how well the method is practiced
- no information on reasons for nonuse

Interpretation

This indicator gives a broad idea of current contraceptive use among the total population of reproductive age women For it to be more specific the denominator would have to contain only women at risk of pregnancy, that is, those who are sexually active, not infertile, not pregnant or amenorrheic Using a denominator of all reproductive age women is easier to obtain or estimate than a denominator of only women at current risk of pregnancy

The indicator can underestimate the actual protection from pregnancy since other effective traditional means of contraception are not included on the list Knowledge of practices in the community would be helpful for better interpretation Also women who are currently pregnant would report not using a method but the reason for nonuse is appropriate

Other indicators are needed to understand the barriers to access or use of modern contraception, or how the current methods are actually used The indicator as given does provide a measure for program monitoring

Population or Facility Based

- population based

Frequency of Collection

- yearly, if there is a program aimed at changing the levels of knowledge With a program, the data collection should be timed to its needs, and could be done more frequently
- will probably require two data collection times at minimum to see a change
- can be collected periodically thereafter (every 3-5 years) to detect long term changes in the level of knowledge due to migration

Methods and Sources of Information

Numerator

- community survey is probably the most reliable way to capture this count, since women in Bolivia can purchase contraceptives without a prescription

Denominator

- probability sample of community women
- population based registry of community members (especially usable if the accuracy of information has been verified by cross-checks with other sources of information)
- census data

Other Issues

- can limit the indicator to women attending health services, but the findings cannot be used as a surrogate for community information, unless the service takes care of all women in the community
- can limit the indicator to women coming for first post-partum visit, or to women who recently completed a pregnancy
- the denominator could include only those who are married or in a stable union, not pregnant, but fertile This would provide a measure of women (or couples) at risk of pregnancy, to whom family planning is more typically directed However, gathering the information about this denominator is more difficult than finding reproductive age women
- as a service indicator can use the number of new users in the service by method
- Another service indicator is Couple-Years of Protection -- CYP (WHO, 1995 p 79-80) This indicates the estimated amount of protection offered to users by the services provided It is calculated by taking the amount of each contraceptive method dispensed by the service divided by the "average quantity of each method used by a couple in one year" (p 80) For example

Contraceptive method	Amount distributed (A)	Estimated annual requirements per couple (B)	CYP (A–B)
Oral contraceptives	290,416	13 cycles	22,340
Condoms	193,596	144 pieces	1,344
Foaming tablets	87,221	144 tablets	606
Spermicidal foam or cream	1,116	6 tubes	186
			Total CYP = 24 476

(WHO 1995 p 80)

Some caution must be used in interpreting this indicator, as with all indicators that are calculated by combining numbers of people and time This indicator says that one CYP equals 12 couple-months of protection (or one couple-year of protection), but this 12 couple-months could mean one couple was protected for one year or that 12 different couples were protected for one month each The indicator is useful for comparison purposes, as it can be compared from time to time in the same services, and the indicator value in one service can be compared with that of another service (assuming that both services have used the same value for estimated requirements per couple)

- a percentage

$$\frac{\text{number of women between 25 and 58 years of age in the community during a specified time period who have had a Pap smear (cervical cytology or Pap test) within the preceding year}}{\text{number of women between 25 and 58 years of age in the same community during the same time period}} \times 100$$

Definition of Numerator

The words for Pap smear (Pap test or cervical cytology) should fit the understanding of the population in the indicator It means that a small sample has been taken of cervical cells (of the epithelial cells, the layer of cells on the cervix) and tested for the presence of abnormal cell development The Pap test is recommended on a periodic basis for women depending on their age, sexual activity, and the findings of the Pap tests made previously

In this indicator we use the year preceding the interview as the window of time for having had the test done This may vary depending on local practice In some countries after three of more negative Pap tests women without the known risk factors are told not to have a Pap test every year

The age of women included in the indicator needs to be appropriate for the country situation in being able to do the lab work and for the age of women having cancer of the cervix In some Latin American countries the age range is widened by including younger women, of age 20 or 22 Women with complete hysterectomies are still counseled to have a Pap test done

Definition of Denominator

All of the women between 25 and 58 years of age who reside in the selected communities during the time of the survey are included in the denominator and contribute to the numerator

What is Measured (see the Model)

- prevalence of practice of prevention - coverage

Reported Range

- The range varies widely around the world the lowest would be 0% in areas where

there is not a program of cervical cytology Reasonably high percentages of 67-72% have been reported in the last 5 years in the United States of America

Advantages

- can be used for program monitoring
- responds well to changes in program availability and access along with community education and information

Disadvantages

- alone it indicates use of a screening device only and does not indicate the prevalence of positive tests nor what happens to women who have a positive result The latter is important

Interpretation

This indicator serves to show program activity and initial acceptance, that is, what proportion of women are at least getting a Pap test The indicator is specific to a measuring coverage of a screening test during a short period of time (the preceding year) which fits with a program of yearly cervical cytology If the program is recommending less frequent cervical cytology, say every two years for all women then the indicator should be adjusted to fit the program recommendations A more general indicator would ask if a woman had ever had a Pap smear, but this would not be useful for specific program monitoring

This indicator only shows how successful the program has been in getting women to have the screening test The screening alone is only the first step, the program follow-up is crucial to successful prevention or treatment of cervical cancer (the ultimate goal of the program) Current public health practice says that without proper referral and treatment, it is probably ethical to screen for cervical cancer Hence the other indicators listed in "Other Issues" of this section are highly recommended

Population or Facility Based

- population based

Frequency of Collection

- yearly With a specific program the data collection should be timed to its needs and could be done more frequently
- will probably require two data collection times at minimum to see a change
- can be collected periodically thereafter (every 3-5 years) to detect long term changes in the level of knowledge due to migration

Methods and Sources of Information

Numerator

- SNIS
- laboratory registers where cervical cytology is done, if these laboratories are the only places where the test can be done Must make sure that you have a count of individual women and not of tests as an individual woman can have more than one test in a year
- community survey

Denominator

- probability sample of women 25-58 years of age in the community
- census that gives an current number of women in the desired age group
- population based register of women 25-58 years of age (especially usable if the accuracy of information has been verified by cross-checks with other sources of information)

Other Issues

- The indicator could be used among a facility population, but those percentages should not be used as measures of population coverage, since women who use specific facilities are different from the population of women who do NOT use those facilities
- To have a more precise picture of the results of a program to prevent or decrease the incidence of cervical cancer or decrease the mortality rate from cervical cancer, the following indicators are recommended

Prevalence of Positive Cervical Cytology

- a percentage

$$\frac{\text{number of women with a Pap test (cervical cytology) done in the community during a specified time period who have a positive result}}{\text{number of women with a Pap test (cervical cytology) done in the same community during the same time period}} \times 100$$

- a measure of disease shows need
- The definition of what is meant by a positive test must be prepared A "positive test"

says there is abnormal cell development present It could be from one cell to the full thickness of epithelial cells It can various things that there is dysplasia, or pre-invasive disease or carcinoma in situ, or invasive cancer The World Health Organization has guidelines for interpreting a positive test Those who are preparing the indicator for use need to consult with the local experts

- Ideally, the women who have a Pap test are followed up to find out which of them have a positive result
- must decide how to classify the women with questionable results who have to have repeat tests At minimum these women must be counted only once, do not count the total number of tests as the denominator
- This indicates the next step in the prevention program, that is, that the women with positive tests are identified These women must have further follow-up for the program to be successful

Referral of Positive Pap Test Cases for Treatment

- a percentage

$$\frac{\text{number of women with a positive Pap test (cervical cytology) in the community during a specified time period who are referred for confirmation of the diagnosis and treatment}}{\text{number of women with a positive Pap test (cervical cytology) in the same community and time period}} \times 100$$

- a process indicator indicates quality of care, in that the protocol to refer women to appropriate services should be measured
- Ideally, the women who have a positive result are followed up individually to find out which of them were referred to services that could provide the proper further diagnostic tests and treatment as necessary The program cannot be successful if women are not referred as appropriate

Treatment of Women with Positive Cervical Cytology

- a percentage

$$\frac{\text{number of women with a positive Pap test (cervical cytology) in the community during a specified time period who receive treatment or intervention}}{\text{number of women with a positive Pap test (cervical cytology) in the same community and time period}} \times 100$$

- a process indicator indicates quality of care, in that women who have positive cervical cytology receive treatment for their condition The indicator can be made more meaningful by including "receives adequate treatment, that is, according to protocol" is added to the measure
- Individual women should be followed to see if each received treatment as indicated
- Some women receive no active treatment and undergo a period of time where "waiting and watching" is the treatment You need to decide how to classify these women It is a form of passive treatment

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APPENDICES

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Appendix A
Obstetric Functions and Neonatal Special Care

Emergency obstetric care (EmOC) elements are a set of medical services aimed at addressing the needs of the estimated 15% of pregnant women who have severe, or life-threatening obstetric complications These medical services are aimed at saving lives by preventing deaths from these complications They are not aimed at preventing the complications from occurring -- only treating them once they have occurred Emergency obstetric care includes basic and comprehensive elements

comprehensive	basic
▸ basic functions plus	▸ parenteral antibiotics
▸ obstetric surgery, including cesarean section and laparotomy	▸ oxytocics
▸ anesthesia	▸ sedatives
▸ blood transfusion, including hemoglobin estimation	▸ manual removal of the placenta
	▸ removal of retained products of conception
	▸ assisted (vaginal) delivery, ventouse or forceps delivery

(MotherCare 1995 January version p 13 (The) Evaluation Project, 1995 revised p 4)

Table 1 lists various of these EmOC elements and the obstetric complication various treatments are used for Included in the table are elements that move toward preventing the severest forms of obstetric complications The basic elements listed above for emergency care together with elements of early detection and treatment form the basis of

Essential obstetric care (EmOC) These elements of care are provided for the estimated 40% of pregnant women who have some form of obstetric complication that requires medical care (MotherCare, 1995) The 40% figure includes those with life-threatening complications Some of the life-threatening complications begin in a modest way, and if not prevented from progressing cause the deaths of mothers and babies Essential care helps to detect these problems early and treat them so their progression can be stopped We do not have the knowledge currently to totally prevent most of the classic obstetric complications but we can treat them once they occur, and hopefully prevent the deaths that would result from them therefore early detection of problems is essential These added elements are

- identification and management of high risk women
- the partograph used to monitor and prevent prolonged labor
- maternity waiting homes
- basic emergency care elements
- bimanual compression of the uterus for early hemorrhage
- neonatal special care (NSC)

- family planning services

The comprehensive set of EmOC services are not needed in every health center The basic services should be more wide spread as part of essential obstetric services (EmOC) If more clinics have EmOC then the percentage of women in need of highly technical medical procedures to save their lives should be lower

Table 1
Recommended Interventions and Level of Care for Pregnancies with Complications

Causes of mortality	Early diagnosis by	Interventions at		
		Health post	Health center	Hospital
Antepartum hemorrhage	Vaginal bleeding after 5 months of pregnancy	Identification and referral	Stabilization if in shock, referral	Blood transfusion, consider cesarean section
Anemia	Pale conjunctiva, excessive tiredness or breathlessness	Higher dose of iron/folate, referral of severe cases	Treatment of very severe cases, intramuscular iron, referral of refractory cases	Treatment of very severe cases
Eclampsia/ pre-eclampsia	Raised blood pressure, edema, proteinuria	Blood pressure measurement and referral	Parenteral sedatives, assisted vaginal delivery	Prevention and control of fits, labour induction
Abortion	Vaginal bleeding in first 5 months of pregnancy	Conservative management of threatened abortion	Parenteral fluids, antibiotics, analgesics, evacuation of uterus	Surgical management
Obstructed/ prolonged labour	Labour pains for more than 12 hours	Identification and referral	Stabilization, assisted vaginal delivery, augmented labour	Cesarean section repair of ruptured uterus
Postpartum hemorrhage	Excessive bleeding following delivery	Oxytocics and bi-manual compression	Manual removal of placenta, repair minor tears	Laparotomy and repair of ruptured uterus
Sepsis	Fever with or without foul smelling discharge	Oral antibiotics	Parenteral antibiotics and fluids	Intravenous drugs, surgical drainage of pelvic abscess

From WHO 1994a p 7

Neonatal special care (NSC) is aimed especially at newborns who had a difficult birth or whose mother had a complicated pregnancy and/or labor and delivery The neonate may have asphyxia or a birth injury A primary need is for personnel involved in obstetrics to know how to resuscitate a newborn, to keep the baby warm, and to maintain a clean cord The basic elements of NSC are

- neonatal resuscitation
- oxygen availability
- warming
- hygienic cord care
- exclusive and immediate breastfeeding

(MotherCare, 1995 January version p 14)

The World Health Organization has recommended a "Mother-Baby Package" of care to prevent maternal and neonatal mortality For the neonate the emphasis is on special care for infections birth asphyxia hypothermia and breastfeeding Examples of suggestions for care appear in Table 2

Table 2
Recommended Interventions and Level of Care for Newborns with Complications

Causes of mortality	Early diagnosis by	Interventions at		
		Health post	Health center	Hospital
Birth asphyxia	Depressed/ absent breathing	Mouth-to-mouth/ mask breathing	Bag/mask ventilation, external cardiac massage	Intubation, ventilation oxygen therapy
Hypothermia	Cold feet weak cry/sucking	Warm towels and skin-to-skin contact for rewarming	Rewarming	Rewarming

From WHO 1994a p 7 and WHO 1994 11

Appendix B
Stable Indicators and Small Numbers

"Stable indicators" and "small numbers" refer to statistical issues, but they will be a common concern for most of the PROCOSI members Why? Because many of the conditions in maternal and neonatal health are "rare" occurrences in an epidemiological sense, that is, they happen to less than 10% of the target group It is the interaction of low rates of occurrence and small target population size that creates the problem of stable indicators

The term "stable indicator" means a statistic that does not jump up or down in value just because one or two people more (or less) died for example An indicator is a mathematical picture of community health states, and it is intended to help us find out when really important changes happen because of an intervention "Important" in a statistical sense that is, that through objective mathematical means we can be certain that something has really changed, and that if we introduced the intervention again we would see the change happen again

An example of the "small number problem" and its effect on the stability of an indicator is given below

Example of Small Number Problem		
1992	2 cases of disease U 20 people in target population percent ill is (2/20) X 100 = 10%	
1993	1 case of disease U (1 less case) 20 people in target population percent ill is (1/20) X 100 = 5%	↑ a large change
1994	3 cases of disease U (2 more cases) 20 people in target population percent ill is (3/20) X 100 = 15%	↑ a large change

The total number of people in the target population stays the same but the rates of disease U decrease from 10% to 5% in a single year a 50% decrease in the disease rate, but it is due to just 1 less person being ill If next year the number of people who have disease U went up to 3 people, the rates would leap up to 15% From epidemiology we know that the number of people ill can fluctuate from year to year without there being an epidemic (This does depend on the disease we are talking about but for most of the conditions experienced during pregnancy and the neonatal period, this statement is true) The numbers can fluctuate by 2 or 3 people very easily That is what is happening above The disease is somewhat rare and the number of people in the target population is small

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What happens with a bigger target population, the same rate of disease U in 1993, and the same change in the number of cases in 1994? See below

Example of a Stable Indicator		
1992	20 cases of disease U 200 people in target population percent ill is (20/200) X 100 = 10 0%	
1993	19 cases of disease U (1 less case) 200 people in target population percent ill is (19/200) X 100 = 9 5%	↑ a small change
1994	21 cases of disease U (2 more cases) 200 people in target population percent ill is (21/200) X 100 = 10 5%	↑ still a small change

The effect on the rates of a few cases less in 1993 than in 1992, or a few cases more in 1994 than in 1993 is small This is a stable indicator

An hypothetical example using maternal deaths gives another example of the small number problem that produces an unstable indicator because of a few deaths

Year 1 4 maternal deaths
1000 live births
Maternal mortality ratio = 400 maternal deaths per 100,000 live births

Year 2 5 maternal deaths
1002 live births
Maternal mortality ratio = 499 maternal deaths per 100,000 live births

Year 3 3 maternal deaths
995 live births
Maternal mortality ratio = 302 maternal deaths per 100,000 live births

Related to the use of stable indicators is the issue of statistical significance in saying that a program has brought about a change in an indicator This is a more difficult issue

In most cases maternal mortality ratios will be difficult to use to show statistically valid changes The sample sizes needed for doing this are huge

An example of a fictitious country with a crude birth rate of 45/1000, a total fertility of 5, an average size of household of 4 5, and an average number of adults per household of 2 The sample of households required for a 95% confidence interval with a tolerated error of 10%, for a given expected level of maternal mortality				
	Current Maternal Mortality Ratio			
Method	800	600	400	200
Household survev	244 939	327 243	491,852	985 679
Sisterhood method	3 134	4 244	6 467	13 133

From WHO 1994 14 p 34

Even with huge populations under study statistical significance requires large changes of 50% or more reduction in the maternal mortality ratio in most cases (WHO, 1994 14 pp 35-37)

The smallest acceptable number of deaths in the numerator of the maternal mortality ratio is not fixed and the decision is more correctlv made looking at statistical significance However as a guide but not to be taken as an absolute fact is the following

> The United Nations Demographic Yearbook makes a notation beside any maternal death indicator that is based on **30 or fewer deaths** (United Nations 1995 p 400)

A similar concern exists for severe obstetric complications An example has been given for a fictitious country of

- 500 000 people
- with a yearly birth rate of 0 04 or using a constant 40 births per 1000 population
- This means there will be 20 000 births (500000 X 0 04)
- Some 3000 severe obstetric complications are expected (assuming that 0 15 of pregnant women, that is 15%) have a severe obstetric complication, then (20000 X 0 15) = 3000) A figure for the year for the entire country
- If there are 24 districts in the country then
- about 125 severe obstetric complications will occur in each district during the year (assuming all districts are the same size)

In one district there are about 21 000 people, about 834 births, and about 125 severe obstetric

complications per year (Maine et al , 1992 p 18)

This number of complications could be small if for example, one were to use only postpartum hemorrhage as an indicator of quality of care The actual number of possible cases depends on the percentage of all severe obstetric complications that are

- postpartum hemorrhage, say it is
- 30% (a guess) of these complications, then there would be
- about 38 cases in a year in each district

If an indicator were to assess the frequency with which

- adequate treatment were given for the cases of postpartum hemorrhage appearing in health facilities, and
- if 60% (a guess) of women with this complication appear in health facilities then
- about 23 women would appear for care

Now there are only 23 cases to work with in your indicator Depending on the statistical issues of expected change in treatment with a new program, this number might be functional, or it might be too small These are issues that must be decided for each program, and require technical assistance to address For example, before the intervention is introduced you see that 50% of women with postpartum hemorrhage are not treated within 2 hours of their arrival in the facility The 23 cases you might have in the year of the intervention means that at the end of the intervention at least 90% of cases will have to be cared for within 2 hours of arrival for the intervention to have shown a statistically significant difference (using 80% power and 2-tailed 95% level of significance)

Appendix C
Reference Data from Bolivia

(Data specific to each indicator appears in the indicator section)

Population 1992-1995

- with censal omission = 7,413,833
- without censal omission = 6,835,864

Source National Institute of Statistics

- Annual births (in thousands) 1992-1994[a] = 325
- General fertility rate (children per woman)[a] = 5
- Crude fertility rate[a] = 2 83
- Infant mortality rate (per 1,000 live births)[a] = 75
- Death rate for children less than 5 years old (per 1,000 live births)[b] = 116
- Maternal mortality ratio (per 100,000 live births)[b] = 390
  (other figures 600 per 100,000 live births, 1988, (Plan Vida, 1994 p Anexo 1)
  480 per 100,000 live births, Plan Vida, 1994 p 16)
- Total population (in millions)[a] = 6 8
- Rate of population increase[a] = 2 1%
- Crude birth rate (per 1,000 inhabitants)[a] = 34 0
- Crude mortality rate (per 1 000 inhabitants)[a] = 12 0
- Net reproductive rate[a] = 2 34%

Source Publication of SNIS 1995

Maternity Care[b]

Percentage of births whose mother received

- care from a physician nurse auxiliary nurse or sanitarian during the pregnancy = 52 5% = 45% cared for by professionals (ENDSA, 1993)
- care from a physician nurse auxiliary nurse or sanitarian during childbirth = 47 2%

Immunization[b]

- Percentage of children 12 to 23 months of age with an immunization care = 35 1%

Breastfeeding and Nutrition of Children[b]

- Average duration of breastfeeding (in months) = 17 2
- Percentage of infants breastfeeding 0 to 1 months = 96 6

Utilization of Services[c]

- Coverage of prenatal care (1993) = 61 3% (# of new prenatal consults – estimated population of pregnant women)

- Average number of prenatal visits = 1 9 (all prenatal consults (new and repeats) – new prenatal consults)
- Coverage of deliveries in institutions = 22 8% (deliveries (vaginal and cesarean) occurring in hospitals – estimated number of pregnancies in the population)
- Coverage of childbirth in the home = 6 7% (deliveries done by health personnel in the home – estimated number of pregnancies in the population)
- Coverage of check ups on growth and development in children younger than 2 years = 52,4%

Sources

[a] = Instituto Nacional de Estadistica (I N E) [National Statistics Institute]

[b] = Encuesta Nacional de Demografía de Salud (ENDSA) del año 1994 [National Demographic and Health Survey]

[c] = The data are from the public sector, NGOs, and church clinics Does not include the Social Security clinics nor private clinics in SNIS, 1995

- Pregnancies with obstetric complication of some type (estimated by WHO) = 40% of all pregnancies (WHO, 1994 14, MotherCare, 1995)
- Direct serious (life threatening) obstetric complication = 15% of all pregnancies (WHO, 1994 14 p 18) This is considered to be a low to minimum estimate for most countries (The Evaluation Project, 1995) Some reports say that as many as 28% of pregnancies may have serious obstetric complications (The Evaluation Project 1995)
- Obstetric complication are estimated to occur in (MotherCare, 1995),
  - 10% of pregnancies with obstetric hemorrhage
  - 8% of pregnancies with sepsis
  - 5% of pregnancies with hypertensive disorders of pregnancy
  - 5% of pregnancies with obstructed labor

- Pregnancies that do not result in a live birth = 15% (WHO 1994 14 p 12)

Appendix D
Safe Pregnancy Indicators
the Basic Set from MotherCare, 1995

Annual Review

1 Met need for emergency obstetric care (EmOC)

2 Perinatal mortality rate

3 Percentage of perinatal deaths contributed by stillbirth and early neonatal death

4 Case fatality rate (CFR) -- all complications

5a Percent of all adults knowledge about maternal complications of pregnancy and childbirth

5b Percent of all adults knowledgeable about neonatal complications

6 Percent of pregnant women with at least 2 doses of tetanus toxoid immunization

7 Percent of pregnant who attended at least once during pregnancy by medically trained personnel for reasons related to pregnancy

8 Proportion of births attended by trained health personnel (excluding all TBA's--trained or untrained)

9 Number of facilities providing essential obstetric functions (EOF) per 500,000 population

10 Percent of women admitted with hemorrhage not delivered within 2 hours

11 Existence and implementation of a safe pregnancy strategic or operational plan

Decade Review

1 Maternal mortality ratio and rate

Appendix E
Modified Pathway to Survival - Blanks

Figure 10 a - blank

Modified "Pathway to Survival"

Maternal and Perinatal Health (MotherCare)

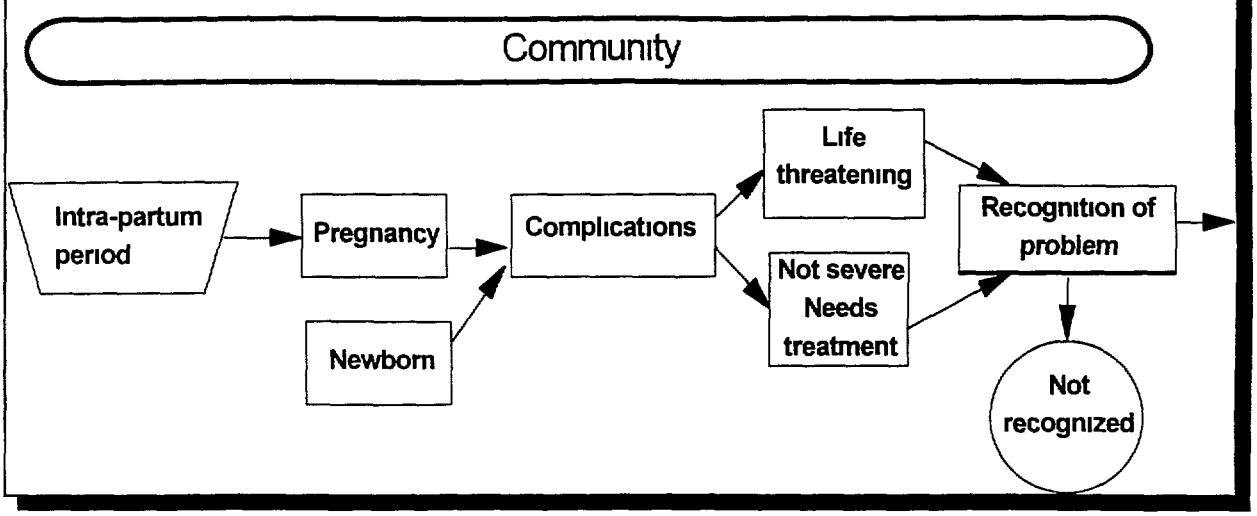
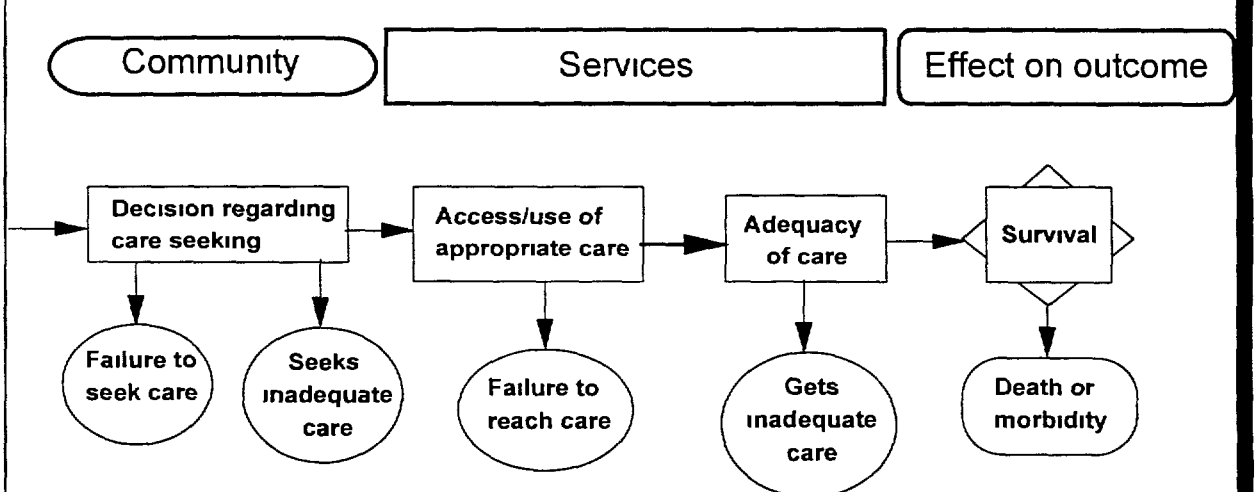


Figure 10 b - blank

Modified "Pathway to Survival"

Maternal and Perinatal Health (MotherCare)



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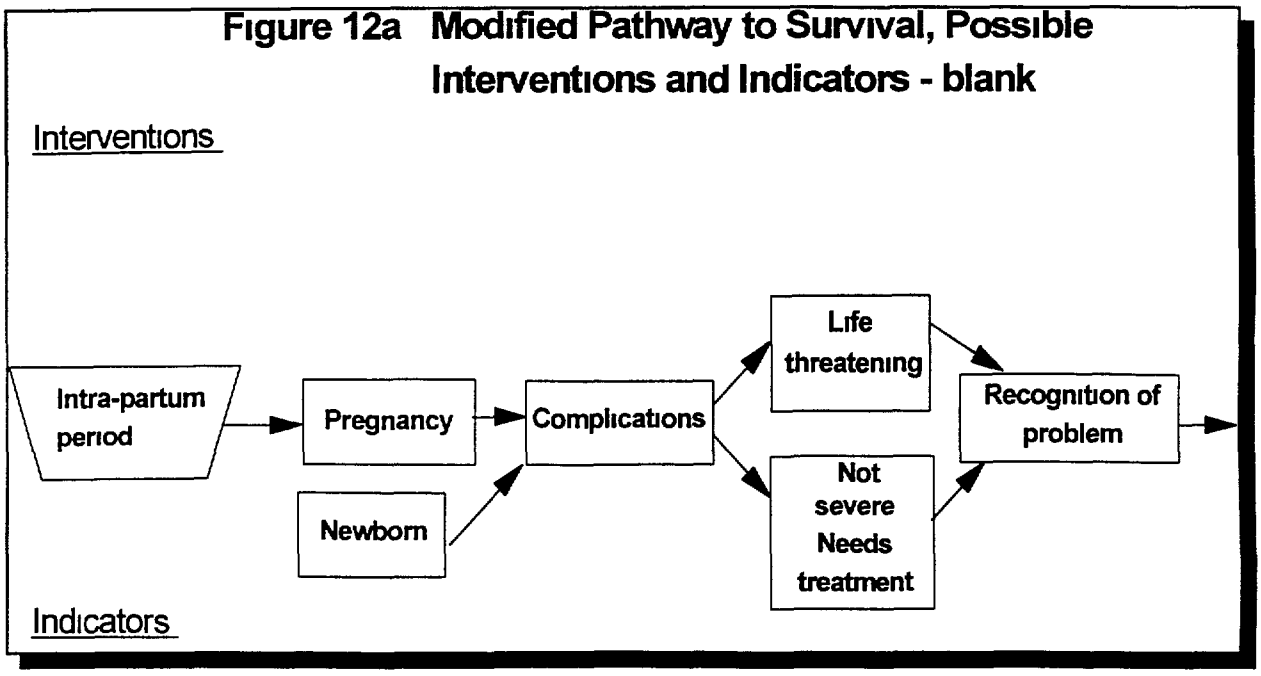
Figure 12a Modified Pathway to Survival, Possible Interventions and Indicators - blank
Interventions
Intra-partum period
Pregnancy
Newborn
Complications
Life threatening
Not severe Needs treatment
Recognition of problem
Indicators

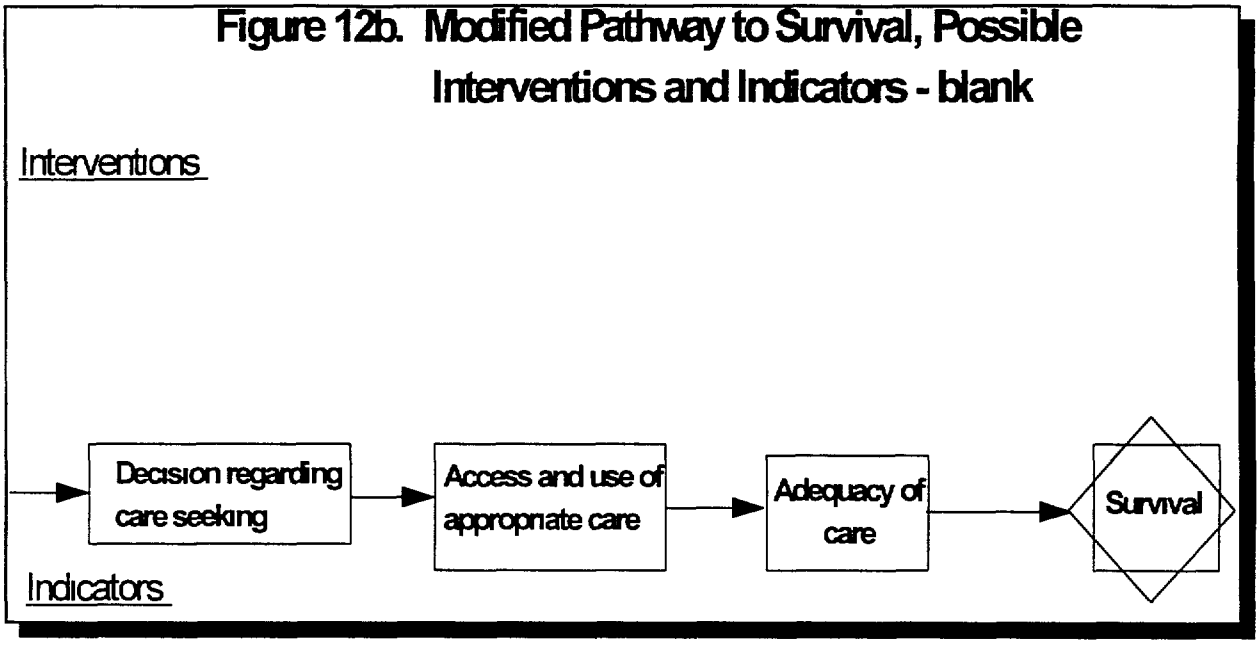
Figure 12b. Modified Pathway to Survival, Possible Interventions and Indicators - blank
Interventions
Decision regarding care seeking
Access and use of appropriate care
Adequacy of care
Survival
Indicators

References

Aday, LuAnn, Begley, Charles E , Lairson, David R , Slater, Carl H Evaluating the Medical Care System Effectiveness, Efficiency, and Equity Michigan Health Administration Press, 1993

Barros, F C , Victoria, C G , Vaughan, J P , and Estanislau, H J "Perinatal Mortality in Southern Brazil a Population-Based Study of 7392 Births " Bulletin of the World Health Organization 65 95-104, 1987

Benenson, A S editor Control of Communicable Diseases in Man Fifteenth Edition Washington, D C American Public Health Association, 1990

Bertrand Jane T , Magnani, Robert J , Knowles, James C Manual de indicadores para evaluacion de programas de planificacion familiar Proyecto Evaluacion Oficina de Poblacion, Agencia de los Estados Unidos para el Desarrollo Internacional (Numero de Contrato de la USAID DPE-3060-00-C-1054-00 Washington, D C 1995

Donabedian Avedis "The Quality of Medical Care " Science 200 856-864, 1978

ENDSA Organizacion Panamericana de la Salud Encuestas de demografía y salud Macro International Inc Oficina para America Latina y el Caribe USAID Poblacion y salud en America Latina Washington D C , Marzo 1993

(The) Evaluation Project Indicators for Reproductive Health, Revised draft March 10 Carolina Population Center, University of North Carolina at Chapel Hill, Chapel Hill 1995

Godber G "Confidential Inquiry into Maternal Deaths " in a Question of Quality? Roads to Quality Assurance in Medical Care Gordon Mc Lachlan, editor London Oxford University Press, 1976 pp 23-34

Harrison Abigail Assessing Maternal and Peri-neonatal Health Tools and Methods The MotherCare Experience MotherCare Project Virginia MotherCare Project, 1994

Kettner Peter M , Moroney, Robert M Martin Lawrence L Designing and Managing Programs an Effectiveness-Based Approach Sage Sourcebooks for the Human Services Series 11, Newbury Park Sage Publications, Inc , 1990

Maine Deborah, McCarthy, James, Ward, Victoria M Guidelines for Monitoring Progress in the Reduction of Maternal Mortality (A work in progress) Statistics and Monitoring section New York UNICEF, October, 1992

MotherCare Indicators for Reproductive Health - draft copy, Field Coordinators Workshop Based

on work by many groups as detailed in the paper Washington, D C John Snow Inc , January, 1995

PAHO-Organizacion Panamericana de la Salud Informe de avance del plan regional para la reduccion de la mortalidad materna Washington, D C , Junio, 1993

Plan Vida Plan nacional para la reduccion acelerada de la mortalidad materna, perinatal y del niño Bolivia 1994-1997 Ministerio de Desarrollo Humano, Secretaria Nacional de Salud, La Paz Bolivia, 1994

Selwyn Beatrice J PROCOSI Workshop on Indicators for Maternal and Neonatal Health Teaching materials MotherCare and PROCOSI sponsored La Paz, Bolivia 26-28 April 1995

SNIS-Sistema Nacional de Informacion en Salud Cartilla de Informacion Unidad de Planificacion Evaluacion Proyectos y Relaciones Internacionales, Secretaria Nacional de Salud, Ministerio de Desarrollo Humano, Bolivia Abril, 1995

United Nations 1993 Demographic Yearbook Forty-fifth issue Department for Economic and Social Information and Policy Analysis New York United Nations, 1995

WHO-World Health Organization Maternal Mortality Rates A Tabulation of Available Information Second edition WHO/FHE/86 3 Division of Family Health Geneva World Health Organization, 1986 3

WHO-World Health Organization Low Birth Weight a Tabulation of Available Information WHO/MCH/ 92 2 Maternal Health and Safe Motherhood Programme, Division of Family Health Geneva World Health Organization and UNICEF, 1992

WHO-World Health Organization Coverage of Maternity Care A Tabulation of Available Information Third edition WHO/FHE/MSM/93 Maternal Health and Safe Motherhood Programme Division of Family Health Geneva World Health Organization, 1993 7

WHO-World Health Organization "The Mother-Baby Package WHO's Guidelines Map the Road to Safer Motherhood" Safe Motherhood Newsletter 15 1-7, Geneva World Health Organization, July-October, 1994a

WHO-World Health Organization Introduction of the Mother-Baby Package Report of an Interregional Meeting 18-20 April, 1994 Geneva WHO/FHE/MSM/94 3 Maternal Health and Safe Motherhood Programme Division of Family Health Geneva World Health Organization 1994 3

WHO-World Health Organization Mother-Baby Package Implementing Safe Motherhood in Countries WHO/FHE/MSM/94 11 Maternal Health and Safe Motherhood Programme,

Division of Family Health, Geneva World Health Organization, 1994 11

WHO-World Health Organization Indicators to Monitor Maternal Health Goals Report of a Technical Working Group 8-12 November, 1993, Geneva WHO/FHE/MSM/94 14 Maternal Health and Safe Motherhood Programme, Division of Family Health Geneva World Health Organization, 1994 14

WHO-World Health Organization Community-Based Distribution of Contraceptives A Guide for Programme Managers Geneva World Health Organization, 1995