

**INDICATORS FOR:  
OBSTRUCTED AND PROLONGED LABOR,  
PUERPERAL SEPSIS AND POSTPARTUM HEMORRHAGE**

**PROFILE OF ADMISSION, HOSPITAL MANAGEMENT,  
COVERAGE AND REFERRAL**

**WORKING PAPER: 21**

**October, 1994**



**MotherCare™**

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**USAID**



U S Agency for  
International Development  
Office of Health

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For The Safe Pregnancy Evaluation Project  
The Carolina Population Center  
In Collaboration with  
Tulane University  
The Futures Group

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Report Prepared for  
The United States Agency for International Development  
Office of Health  
Contract HRN-5966-C-00-3038-00

This document was made possible through the support provided by the United States Agency for International Development (USAID), Office of Health, under the terms of Contract No HRN-5966-C-00-3038-00, and John Snow, Inc (JSI)

The opinions expressed herein are those of the author(s) and do not necessarily reflect the views of USAID or of JSI

## **Acknowledgements**

Dr Oona Campbell and Dr Carine Ronsmans of the Maternal and Child Health Epidemiology Unit of the London School of Hygiene and Tropical Medicine, participated in the development of the conceptual framework of the indicators for maternal obstetric complications, specifically for postpartum hemorrhage and puerperal sepsis

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## **OVERVIEW SUMMARY ON HOW TO DEVELOP INDICATORS FOR MATERNAL HEALTH OUTCOMES**

Ideally, one would like to show a health impact on the community (or population being served) However, in most settings, showing an impact on maternal mortality in the community is not possible because of the difficulties of measuring maternal deaths It is equally difficult to measure maternal morbidities in the community This is because, despite their being more common than maternal deaths, they are still comparatively rare, and we don't have much experience measuring them in the community (further work based on our model questionnaire and on Kate Stewart's DHS work may change this) On the other hand, we are lucky that since most maternal complications can only effectively be treated in a health facility, we can assess our health impact by looking at three indicators profile at admission, hospital management, and estimated coverage Taken **together**, these three types of indicators give us a picture of the health impact of our interventions

Note these health service health impact indicators must be collected at each health facility in the catchment area health post, health center, hospital Some are too detailed for the lower levels and will need to be modified

Note **Source of data** these were are designed to be possible from the admission register, the labor register, the operating theater register and the discharge register Some indicators ask for data which may not be present in all registers (i e , time of delivery of baby and time of delivery of placenta), and these may need to be added Also, if data items required on a single indicator are present on more than one register, it is important to determine if these need to be linked, and if so, how this is to be done For example, if the numerator is ruptured uterus admissions and the denominator is all deliveries, it is alright if these are in separate registers However if the numerator is number of women with puerperal sepsis (not admitted with sepsis) after prolonged labor developing in hospital and the denominator is all deliveries, then two items are needed for the numerator complication on admission and complication developing during hospitalization These two items must be in the same register, or must be able to be linked (by the woman's name or ID number) across registers (this is likely to be time consuming and difficult)

Point about numbers If we are talking about tens of numbers in the health facility, make sure you need statistics before implementing a health/management information system Consider doing audits or case reviews instead If you are talking about hundreds or thousands, it becomes acceptable to worry about statistics and a health information system

As noted in some of the above points, the selection of appropriate indicators is not only dependent on the nature and scope of the intervention, but also on the context in which the information is to be used and interpreted

It is essential to consider the practical aspects of data collection and use at the same time as developing lists of indicators A particular measure, such as the percentage of septic cases with pre-existing infection, may be a desirable indicator of health impact but may not be feasible to gather reliably in a particular district hospital setting

Consideration needs to be given not only to data sources in terms of completeness (i.e., are all health facilities used by women covered by the information system?) and reliability, but also to the personnel for gathering the information (i.e., can nursing staff be expected to undertake information gathering?) and to the costs

The feasibility of an indicator in a particular context is also affected by the size of the catchment population, for example, trends in absolute numbers of cases can be hard to interpret owing to random fluctuations where the numbers are small

The suitability of an indicator can thus not be determined in the abstract but requires careful evaluation within the level and context at which the data will be gathered and used

**DON'T LOOK AT SINGLE INDICATORS IN ISOLATION!  
YOU NEED MORE THAN ONE PARAMETER**

For each indicator, we attempt to provide the following

Definition (Calculation of indicator)

Data requirements

Data sources

Purpose and issues (including other desirable indicators to facilitate interpretation, and advantages, disadvantages--limitations)

**Impact on obstetric complications will be assessed by using three indicators, taken together**

- 1 Profile of admissions**
- 2 Hospital management**
- 3 Estimated coverage**

**Data on these indicators must be collected at each health facility in the catchment area**

**Each type of indicator will necessarily generate several indicators and it should be left up to the countries and projects which indicators they are able to collect. Some may not be in a position to assess hospital or health center management, but a profile of admissions, estimated coverage and case fatality may constitute a beginning to a more in depth process which could be achieved through medical audit**

## **OVERVIEW SUMMARY ON HOW TO DEVELOP INDICATORS FOR PERINATAL HEALTH OUTCOMES**

In contrast to maternal morbidity and mortality, perinatal mortality is much more common, and it should be possible to show a health impact on the community (or population being served). This would involve reporting on stillbirths and early neonatal deaths in the community and could be done with a pre and post survey. An approach similar to the one taken with maternal health would be less successful for still births if most births took place in the community. This is because one would not necessarily expect them to come in to the facility to be properly managed. However, some aspects of improvements in hospital management with perinatal deaths could be assessed by looking at indicators such as the intrapartum stillbirths occurring in hospital. The impact of this on the level of stillbirths in the community would depend on the percentage of deliveries in the health facilities, and the percentage of stillbirths that are intrapartum. Also, interventions aimed at neonates that are delivered in health facilities (for example, incubators) can be monitored in a similar way to the maternal health outcomes (i.e., by looking at coverage, admission profiles, and hospital management).

## I INDICATORS OBSTRUCTED LABOR

**Indicators to assess the potential impact of interventions aimed at reducing morbidity and mortality associated with obstructed labor**

### Definition of Obstructed Labor

Obstructed labor is a condition in which there is a mechanical barrier to the passage of the fetus through the birth canal which can only be relieved by an operative procedure

Which interventions have the potential to reduce deaths from obstructed labor?

#### 1 Prevention of obstructed labor

- 1 1 Selection of primigravidae  $\leq 16$  yrs and  $< 150m$  for hospital delivery
- 1 2 diagnosis and referral of transverse lie at term
- 1 3 better management of labor

##### a) in community

- involving the community to transfer young, short primigravidae for labor to health facility
- recognition of transverse lie by traditional birth attendant (if she exists) and referral
- referral after 12 hours of hard labor at home or in health center (definition of hard labor the contractions are so frequent that the woman cannot do any ordinary household activity)

##### b) in health facility

- recognize transverse lie in labor early and refer to facility with operative delivery
- better management of first stage of labor
  - Manage with a partograph and refer as soon as dilatation goes to right of alert line from health center to hospital, or
  - refer immediately from health center to hospital if woman has been in labor for 12 hours in the health center or is admitted from home with 12 hours of labor and not near delivery
- better management of second stage of labor prevent prolonged second stage and refer after 1/2 to 1 hour if not delivered (**never use oxytocin augmentation in a health center without facility for operative delivery**)

**2 Better management of prolonged/obstructed labor once it occurs**

a) in health center

- Start fluid replacement
  
- give antibiotics in case of offensive liquor and/or rupture of membranes > 12 hours and or fever

b) in hospital

- resuscitate the woman with obstructed labor or ruptured uterus IV fluids, naso-gastric tube, antibiotics,
  
- arrange for operative procedure with speed
  
- manage woman with prolonged labor (cervical dilatation at or beyond action line) or referred from home or health center with prolonged labor judiciously either oxytocin augmentation depending on the maternal and fetal condition or operative delivery

**If these interventions are effective, then we expect**

in the community

- > reduction in the incidence of obstructed labor and rupture of the uterus in the community
- > decrease in prolonged labor in the community but referrals to the health facility for prolonged labor may increase, hence admissions for prolonged labor may increase
- > reduction in death from ruptured uterus
- > reduction in vesico or recto-vaginal fistula (VVF,RVF)

in the hospital

- > reduction in incidence of prolonged/obstructed labor with the use of the partograph
- > reduction in incidence of ruptured uterus
- > reduction in incidence of postpartum hemorrhage
- > reduction in incidence of puerperal sepsis
- > reduction in incidence of VVF/RVF
- > reduction or increase in caesarean section (depends on prevalence before assessment)
- > reduction in case fatality from obstructed labor/ ruptured uterus
- > reduction in case fatality from puerperal sepsis
- > increase in referral for transverse lie /breech
- > increase in referral for prolonged labor
- > reduction in the incidence of retained placenta in the community and reduction in admissions for retained placenta

**Impact on obstructed labor will be assessed by using three indicators, taken together**

**1 Profile of admissions**

**2 Hospital management**

**3 Estimated coverage**

**Data on these indicators must be collected at each health facility in the catchment area**

**Each type of indicator will necessarily generate several indicators and it should be left up to the countries and projects which indicators they are able to collect. Some may not be in a position to assess hospital or health center management, but a profile of admissions, estimated coverage and case fatality may constitute a beginning to a more in depth process which could be achieved through medical audit**

## **A PROFILE OF ADMISSIONS**

### **INDICATOR 1 Number of deliveries per year**

#### **Defintion/Calculation of indicator**

The number of women who have been admitted for delivery and have actually given birth per year Absolute numbers No calculation required

#### **Data requirements**

Number of women who have been admitted for delivery and have actually given birth per year Absolute numbers No calculation required

#### **Data sources**

Register in the labor ward These data are usually routinely collected Note also to exclude women who were admitted in false labor and subsequently sent home

#### **Purpose and issues**

Note that the actual number of women having given birth in the facility is required This excludes women admitted with a complication after she has given birth at home (BBA = born before arrival), e g for a retained placenta, or a woman admitted with a ruptured uterus who dies before she is delivered

**Purpose** to register all births in the hospital from which a denominator will be derived

**Causality** pregnancy related mortality/morbidity will be registered

**Feasibility** the births can be registered easily if a delivery/labor ward register is in place

**Responsiveness** good, if all births are registered

**Population- or facility-based** facility-based

## **INDICATOR 2 Number of admissions for**

- a) prolonged labor (> 12 hours or at the action line on the partograph)**
- b) obstructed labor**
- c) ruptured uterus**
- d) retained placenta**
- e) postpartum hemorrhage**

### **Definiton/Calculation of indicator**

Number of admissions for prolonged labor, obstructed labor, ruptured uterus, retained placenta and postpartum hemorrhage The definition is determined by the diagnosis and thus relies on the person registering and the woman's report If this presents a problem, some attempt needs to be made to standardize or verify admission diagnoses

Absolute numbers no calculation is required

### **Data requirements**

Separate column in labor ward or admission register for complications which were present on admission and those that developed after admission

### **Data sources**

Most likely the labor ward register (possibly also operating theater register, admission or discharge register)

### **Purpose and issues**

In order to be able to assess quality of care in the hospital it is important to note whether the woman was admitted with the complication or developed it in the hospital

Women who arrive moribund, for instance with a ruptured uterus, may not even be admitted formally if they die upon arrival These women are not always registered so that the hospital does not get blamed for the demise However, for the purpose of estimating coverage of complications in a health facility, it is important to register the woman This should become clear to the staff if they are being involved in the effort to reduce maternal mortality and morbidity from the beginning Nobody is being blamed

**Purpose** to calculate the proportion of women with complications on admission in labor and/or develop complications after admission This is a proxy measure for the percent of women with complications in the population who were treated in health centers or hospitals

- Causality** it is assumed that an increase in percent of women with complications treated in hospitals, will reduce mortality/morbidity in the community
- Feasibility** easy to collect if the labor ward register is set up accordingly
- Responsiveness** Very responsive as it gives a good idea of the percent of women with complications which are treated in a health facility
- Population- or facility-based** even though data collection is facility based, it is a proxy measure for access of pregnant women with complications

### **INDICATOR 3 Percentage of deliveries admitted with prolonged labor**

#### **Definition**

Prolonged labor can be defined as follows

a) in definite hard labor for > 12 hours (hard labor is when the woman has labor pains which prevent her from doing ordinary household work and make her want to lie down)

(This definition can be changed at country level)

b) labor which has progressed to or crossed the action line on the partograph

#### **Calculation**

$$\frac{\text{admission for prolonged labor}}{\text{number of deliveries}} \times 100$$

#### **Data requirements**

Number of women who have been admitted for delivery and have actually given birth per year  
Absolute numbers No calculation required

Separate column in labor ward or admission register for complications which were present on admission and those that developed after admission

#### **Data sources**

Register in the labor ward These data are usually routinely collected Note also to exclude women who were admitted in false labor and subsequently sent home

Most likely the labor ward register (possibly also operating theater register, admission or discharge register)

#### **Purpose and issues**

It would be helpful to register whether the women with prolonged labor came from home or have been transferred from a health center Depending on the intervention at either community or health center level or both, the number of referrals may increase which is good This may show a concomitant decrease in obstructed labor and/or ruptured uterus

Because prolonged labor is associated with increased risk of retained placenta and sepsis, it is important to differentiate between women admitted in prolonged labor or having developed

prolonged labor in the labor ward. The latter information is not usually registered in the labor ward register and needs to be included if that indicator is needed for evaluation.

**Purpose** to determine the number of women admitted with prolonged labor as a percent of all complications. This is also a proxy measure for the percent of women with prolonged labor in the community who are treated in hospitals.

**Causality** an increase of admissions with prolonged labor should reduce the proportion of admissions with obstructed labor/ruptured uterus, retained placenta and sepsis. It should also reduce mortality from these causes both in the hospital (case fatality) and community.

**Feasibility** possible to collect if the labor ward register is set up to record this information and there is a definition for diagnosis of prolonged labor.

**Responsiveness** very responsive, if women/TBAs and staff in peripheral health services recognize prolonged labor early, make referrals and families comply with the referral.

**Population- or facility-based** facility based but a proxy for percent of women with complications which reach a health facility.

**INDICATOR 4****Percentage of deliveries admitted with obstructed labor/rupture of the uterus****Definition**

Obstructed labor is a condition when due to a mechanical barrier the baby cannot be delivered through the birth canal without an operative procedure. The woman may be in shock because of severe sepsis from prolonged labor. This is to be differentiated from ruptured uterus when uterine activity has usually ceased (except in rare cases of posterior rupture) and the woman may be in shock from severe internal hemorrhage. A woman with a ruptured uterus requires a laparotomy to extract the baby and either repair of the uterus or a hysterectomy.

**Calculation**

$$\frac{\text{admissions for obstructed labor/ruptured uterus}}{\text{number of deliveries}} \times 100$$
**Data requirements**

Separate column in labor ward or admission register for complications which were present at admission and those that developed after admission.

**Data sources**

Labor ward, admission and operating theater registers

**Purpose and issues**

In order to be able to assess quality of care in the hospital it is important to note whether the woman was admitted with the complication or developed it in the hospital.

Women who arrive moribund, for instance with a ruptured uterus, may not even be admitted formally if they die upon arrival. These women are not always registered so that the hospital does not get blamed for the demise. However, for the purpose of estimating coverage of complications in a health facility, it is important to register the woman. This should become clear to the staff if they are being involved in the effort to reduce maternal mortality and morbidity from the beginning. Nobody is being blamed.

**Purpose** to determine the number of women admitted with obstructed labor as a percent of all complications. This is also a proxy measure for the percent of women with obstructed labor in the community treated in hospital.

- Causality** an increase of admissions with obstructed labor/ruptured uterus should reduce the proportion of admissions with sepsis and vesico-vaginal (VVF) or recto-vaginal fistula (RVF) It should also reduce mortality from obstructed labor/ruptured uterus both in the hospital (case fatality rate) and community
- Feasibility** Possible to collect if the labor ward register is set up to record this information and there is a definition for diagnosis of obstructed labor
- Responsiveness** very responsive, if women/TBAs, peripheral health services personnel recognize prolonged labor early, make referrals and families comply with referral
- Population- or facility-based** facility based but a proxy for percent of women with complications which reach a health facility

## B HOSPITAL MANAGEMENT

**INDICATOR 5**      **Percentage of women developing prolonged labor in the hospital  
(should be  $\leq$  15% of normal labor)**

### Definition

Prolonged labor in hospital 2 definitions

1 if partograph labor has progressed to or beyond the action line

2 of no partograph (crude way) 90% of women not admitted with prolonged labor should be delivered within 12 hours of admission in established labor

### Calculation

#### For definition 1

Women who have progressed to or beyond the action line  
-----x 100  
number of women on partograph

#### For definition 2

Women in established labor but admitted without prolonged labor not delivered within 12 hours  
----- X 100  
number of women admitted in normal labor (not prolonged or obstructed)

### Data requirements

Number of women who have been admitted for delivery and have actually given birth per year  
Absolute numbers No calculation required

Separate column in labor ward or admission register for complications which were present on admission and those that developed after admission

### Data source

Register in the labor ward These data are usually routinely collected Note also to exclude women who were admitted in false labor and subsequently sent home

Most likely the labor ward register (possibly also operating theater register, admission or discharge register)

**Purpose and issues**

This indicator will give an idea of the early recognition of prolonged labor

If the partograph is not completed for every woman who should have one, then the indicator is hardly valuable. It requires that all women have a partograph in labor except those admitted at 9 cm and full dilatation of the cervix. The delivery register should therefore have a column to indicate whether the woman had a partograph in labor.

It should be possible to calculate the length of labor in the labor ward from the admission dilatation and admission time to delivery time. This is usually registered in the labor ward admission register.

This calculation excludes women who have been referred with prolonged labor from outside the hospital whether on a partograph or not.

**Purpose** This indicator assesses quality of labor management in hospital. In hospital prolonged labor should be prevented or recognized early and appropriately managed. If there are many women who develop prolonged obstructed labor when they were admitted without this complication, it says something about quality of care.

**Causality** If there is a problem with prolonged labor in hospital, there will also be problems with PPH, retained placenta and sepsis. Morbidity will be more severe and hospital stay will be prolonged.

**Feasibility** This is not easy to collect from registers unless admission time and admission dilatation are recorded in the admission register. If quality of care is to be assessed, an effort needs to be made to include these parameters in the admission register. A medical audit (record review) for all cases with prolonged labor is not feasible.

**Responsiveness** Management of labor with a partograph to prevent prolonged labor and improve labor management is a proven intervention. It reduces PPH, sepsis, intrapartum fetal deaths.

**Population- or facility-based** It is facility-based.

## **INDICATOR 6 Number of incorrectly managed cases of prolonged labor**

Correct management of prolonged labor = careful assessment and management at the action line of the partograph. If no partograph is used, a re-assessment should be performed if there is stasis in cervical dilatation over a period of 4 hours.

### **Definition of correct management at action line or if stasis of dilatation over a period of 4 hours**

- Options
- 1 Augmentation of labor with intravenous infusion of oxytocin
  - 2 Operative delivery
  - 3 Supportive management only with IV fluids  $\pm$  pain relief and  $\pm$  antibiotics if rupture of membranes  $>$  12 hours
  - 4 Delivery not later than 7 hours after action line or commencement of oxytocin augmentation in delay of labor

Incorrect management of prolonged labor = omission of any of the above and continuation of labor without medical decision.

### **Calculation**

$$\frac{\text{number of incorrectly managed cases of prolonged labor}}{\text{number of cases with prolonged labor occurring during hospitalization}} \times 100$$

### **Data requirements**

- a) number of women who have been managed in labor with a partograph
- b) number of women who reached the action line on the partograph
- c) if no partograph is in use, then number of women not delivered within the labor ward within 12 hours
- d) details on management of labor

### **Data sources**

- 1 Labor ward register
- 2 Case records and completed partographs if in use

## **Purpose and issues**

If the quality of labor management is to be assessed with or without a partograph, case records need to be reviewed and or observations need to be made. The decision at action line on the partograph and in a prolonged labor is a physician's decision as the woman is now a high risk labor case.

There needs to be a note that the midwife has informed the physician at the right moment and that an assessment has been made leading to a management decision. Whether that decision is appropriate needs to be reviewed either through case audit or in a staff meeting at the beginning of the day when all partographs are reviewed. These are decisions to be made by the labor ward staff in the respective place.

Note Similar indicators can be constructed for puerperal sepsis and postpartum hemorrhage/retained placenta after prolonged labor. The rationale being that both puerperal sepsis and retained placenta can be reduced when deviation from normal labor is recognized early and managed appropriately, thereby preventing prolonged labor > 12 hours and obstructed labor.

This applies only to those women whose labor was managed in hospital and who were admitted without complications.

**Purpose** This indicator assesses quality of labor management against a protocol once prolonged labor is diagnosed.

**Causality** If labor is managed correctly once early signs of prolonged labor are diagnosed, severe sequelae will be prevented, e.g. hemorrhage, sepsis, obstruction/ruptured uterus, VVF and RVF. It also impacts on perinatal mortality.

**Feasibility** This is difficult to assess and requires commitment if occurrence of prolonged labor in the unit is a problem. It requires establishment of protocols and a medical audit to assess adherence to the protocol.

**Responsiveness** If labor is managed correctly, complications in mother and newborn as mentioned above, will be reduced.

**Population- or facility-based** It is facility-based.

**INDICATOR 7      Percentage of women admitted with obstructed labor/ ruptured uterus not delivered within 1 - 2 hours**

**Defintion**

The condition of obstructed labor/ ruptured uterus is an emergency and requires prompt action after initial resuscitation of the woman. It is therefore reasonable to expect that the woman should be delivered within 1 - 2 hours of admission, taking into consideration time to prepare the operating theater if required.

**Calculation**

$$\frac{\text{number of women admitted with obstructed labor/ ruptured uterus not delivered within 1-2 hours}}{\text{number of women admitted with obstructed labor}} \times 100$$

**Data requirements**

Registration of time of admission, time of operation/delivery and details on condition of the woman on admission and her management.

**Data sources**

- 1 Labor ward register
- 2 Operating theater register
- 3 Case records and medical audit/case review process

**Purpose and issues**

The time interval between admission of a patient and actual operation for relief of the obstruction or laparotomy for ruptured uterus is an indicator of quality of care. Too rigid adherence to a time interval should be guarded against as the time interval between admission and operation is also related to the condition of the patient on arrival. This is the reason for a case review process which needs to be encouraged.

Note also that the most common cause of obstructed labor is cephalo-pelvic disproportion (CPD). This is a condition which in many instances is over-diagnosed. With the introduction of partograph management, diagnosis of CPD has been demonstrated to fall in a WHO multicenter trial on the partograph (World Health Organization partograph in management of labor, Lancet Vol 343 No 8910, pp1399-1404, June 1994). Concomitant with improved labor management and diagnosis of CPD cesarean section rates were reduced.

Therefore, another indicator for hospital management and quality of labor management could be the percentage of cesarean sections performed for prolonged labor

**Purpose** To assess the hospital's ability to respond to a life-threatening obstetric emergency and is an indicator of quality of care

**Causality** The more efficiently the emergency is dealt with the greater reduction in severe sequelae from obstructed labor and maternal mortality Case-fatality will be reduced

**Feasibility** It is possible to collect this information provided date and time of admission and date and time of procedure are recorded in the records It requires a medical record review

**Responsiveness** If improvement for emergency obstetric treatment is instituted, there should be a reduction in case fatality

**Population- or facility-based** facility-based

## C CASE FATALITY

### INDICATOR 8 Percentage of deaths occurring among women with obstructed labor

#### Definition

Case fatality refers to deaths from specific causes where the denominator and the numerator contain the same condition

#### Calculation

$$\frac{\text{deaths from obstructed labor/ruptured uterus}}{\text{number of women with obstructed labor/ruptured uterus (at admission + occurring during hospitalization)}} \times 100$$

#### Data requirements

Separate column in labor ward or admission register for complications which were present on admission and those that developed after admission

Number of women who have been admitted for delivery and have actually given birth per year  
Absolute numbers No calculation required

#### Data sources

Register in the labor ward These data are usually routinely collected Note also to exclude women who were admitted in false labor and subsequently sent home

Most likely the labor ward register (possibly also operating theater register, admission or discharge register)

Labor ward, admission and operating theater registers

#### Purpose and issues

Case fatality is a good indicator for hospital management Several studies in Africa and Asia are showing that even though the incidence of admission from obstructed labor/ruptured uterus has not changed considerably over the last two decades, case fatality has decreased This is a clear indication that management in hospital improved However, women may also have come earlier rather than moribund when treatment could be more successful Conversely, if an intervention in the hospital has taken place, women may now come from further away but still be in moribund condition and thus case fatality may not change or even increase

Individual case audit of any obstetric calamity is recommended regardless whether the patient survives or dies. Application of protocols cannot be isolated from availability of drugs and supplies which are necessary to treat the condition satisfactorily, availability of staff who have also the skills required for management of the condition.

Delays at community level need different interventions from delays in hospital. There is a notion that women will seek hospital care more when hospital practices and attitudes improve, but cultural and especially economic barriers play an important part in the use of services.

- Purpose** To assess change in the case fatality rate over time due to improvement of the obstetric service
- Causality** If case fatality can be reduced, maternal morbidity and mortality will be reduced from obstructed labor
- Feasibility** It can be obtained as a routine, provided the relevant information on obstructed labor is recorded on admission in the labor ward register
- Responsiveness** Very responsive to management/programmatic intervention to improve labor management inside the hospital. Could also be responsive to community intervention if we assume that women are referred earlier and are admitted in less critical condition
- Population- or facility-based** facility-based. The denominator is women admitted to hospital with prolonged/obstructed labor

## D COVERAGE

### **INDICATOR 9      Proportion of expected women with prolonged labor in the community getting to hospital**

#### **Definition**

Prolonged labor can be defined as follows

a) in definite hard labor for > 12 hours (hard labor is when the woman has labor pains which prevent her from doing ordinary household work and make her want to lie down)

(This definition can be changed at country level)

b) labor which has progressed to or crossed the action line on the partograph

#### **Calculation**

number of admissions for prolonged labor  
----- X 100  
expected number of prolonged labor in the community

To calculate the denominator CBR x population in catchment area x 10% If births are registered, then 10% of number of births in the catchment area

The definition of the denominator is the expected number of women with prolonged labor in the community 10% of births in the population living in the catchment area of the hospital

#### **Data requirements**

a) for numerator number of admissions for prolonged labor in labor ward

b) for denominator number of births, expected or actually registered

This requires - mapping of district/catchment area and health facilities  
- population in district/catchment area  
- crude birth rate in country (preferably rural/urban differential and relevant for that particular district)

#### **Data source**

a) for numerator admission register in labor ward

b) for denominator DHS, statistical bureau, UNICEF State of the World's Children, World Development Report

### **Purpose and issues**

Unless community based data are available, the prevalence of prolonged labor in the community remains conjecture Even then, community surveys depend on excellent interviewer training and supervision, and definitions of terms

Whether this indicator of coverage is useful will depend on the obstetric service organization in the district If there are no peripheral services and hospital practice improves, the number of cases admitted may increase However, if the periphery is strengthened and labor is managed with a partograph in health centers, admission in the referral hospital may actually decrease (recent example from Ghana, Kusi Yeboah, personal communication) However, referral may also decrease if hospital practice deteriorates

If the intervention in the community was successful, one would hope that overall incidence of prolonged labor would decrease, making the denominator an overestimate

- Purpose** To assess the proportion of women with prolonged/obstructed labor out of all expected women with prolonged/obstructed labor in the community reaching the hospital
- Causality** If more women with early prolonged labor reach the hospital, morbidity and deaths from obstructed labor/ruptured uterus will decrease both in the hospital and the community
- Feasibility** Difficult to obtain because little is known about the incidence of prolonged/obstructed labor in the community
- Responsiveness** Responsive to programmatic intervention both at the community and hospital level Women will come earlier to hospital if they recognize danger signs and there will be a reduction in deaths and morbidity from prolonged/obstructed labor
- Population- or facility-based** both in that the denominator is a calculation from a CBR x % from prolonged/obstructed labor The numerator will come from hospital records

**INDICATOR 10      Proportion of expected women with obstructed labor/ruptured uterus  
in the community getting to the hospital**

Calculation, data requirements, data source, purpose and issues are the same as for indicator 9  
The incidence of ruptured uterus and obstructed labor is usually unavailable and is even more  
prone to conjecture Furthermore, the incidence varies enormously by region and within countries  
as so much depends on the general status of health of the woman, cultural and traditional customs  
and access to hospital services

It may be reasonable to combine prolonged and obstructed labor in the numerator and increase  
the per cent in the denominator to 15%

## E REFERRAL

### INDICATOR 11 Referral of women with ruptured uterus from home or peripheral health facility

#### Purpose and issues

It could be useful and important to look at **referral** (at each level of the health service) as an indicator related to coverage. For example, the hospital may note that it had 30 admissions for ruptured uterus, of which 20 (67%) are self-referred and 10 (33%) are referred from a health center. Coupled with data from the health center showing no admissions of women with a ruptured uterus would suggest that the ruptured uterus may have developed in the health center. In the lower level facilities it may also be possible to have a column of data on referral to a higher level facility. In that case, the number of referrals to the hospital from the health center in the previous example should be 10. If it is more, it suggests some women are not arriving at the higher level facility (hospital).

Note these indicators on referral also assume that all service delivery points are covered. If, for example, there are two hospitals (a mission and a government hospital), both must be included, as must all health centers and health posts providing relevant care. If there are many private sources of care and these cannot be covered, then these indicators may not be feasible.

- Purpose** To assess where referrals in health facilities come from and who is the person referring
- Causality** If women with prolonged/obstructed labor are referred in a serious condition from the village to the health center, morbidity and mortality will not change unless women come earlier. If women are referred earlier from the health center to the hospital, the hospital mortality and morbidity from complications of obstructed labor should decrease.
- Feasibility** It is difficult to get referrals recorded in labor ward admission registers. If it is a policy decision to evaluate referrals, then a space has to be found in admission registers and in referral books to record this information.
- Responsiveness** Recording of place and person who originates the referral and recording of place and person as source of referral on admission, will provide information on where to target the major intervention. If all women with obstructed labor arrive already obstructed from the village in the health center, the intervention needs to be targeted at village level. If women did get obstructed in the health center before referral, the intervention needs to address labor management at the health center.
- Population- or facility-based** Facility-based, but all facilities in the catchment population have to be included

## II INDICATORS PUERPERAL SEPSIS

(Can be post-abortion or postpartum post abortion should be developed as part of incomplete abortion indicator )

### Rationale

- a) prevention of puerperal sepsis
- b) prevention of prolonged labor
- c) infection control in hospital
- d) skilful suturing techniques
- e) complete delivery of placenta and membranes
- f) diagnosis of puerperal sepsis early
- g) prevention of puerperal sepsis getting life-threatening
- h) reduction in case fatality from puerperal sepsis
- i) referral of puerperal sepsis from community
- j) referral of severe puerperal sepsis earlier from peripheral levels of health system
- k) reduction of sepsis following caesarean sections
- l) reduction of women with infected episiotomies

### Definition of puerperal sepsis

Genital tract infections, occurring from the onset of rupture of membranes or labor, during labor, or before the 42nd day postpartum in which **two or more** of the following are present (WHO 1992)

- 1 Pelvic pain
- 2 Fever perceived, or a raised temperature of  $\geq 38.5\text{ C}$  on one occasion within 24 hours
- 3 Abdominal vaginal discharge, e.g. presence of pus
- 4 Abnormal smell/foul odor of discharge
- 5 Delay in the rate of reduction of the size of the uterus ( $< 2\text{cm/day}$  in first 8 days from 20 cm to 2 cm above the symphysis pubis)

### 1 Prevention of puerperal sepsis (occurrence)

- a) in the community

Teach families/TBAs to seek care when membranes are ruptured 12 hours or longer without labor

Teach families/TBAs to transfer women in labor for  $\geq 12$  hours

Teach families/TBAs to recognize signs of puerperal sepsis ( fever, pain, foul odor of discharge etc and seek treatment

Teach side effects from insertion of substances into vagina during prolonged labor at home

b) in the health facility

Prevention of complication developing serious sepsis should include prophylactic antibiotics for

- a) prolonged labor before caesarean section
- b) retained placenta
- c) instrumental deliveries/manipulations
- d) possibly in case of prolonged labor (at action line or when fever developing before that time)
- e) prolonged rupture of membranes at term

Prevention of prolonged labor or timely referral from health center to hospital (see prolonged labor under postpartum hemorrhage), check for completeness of placenta and membranes, manage third stage with oxytocic drug, skilful suturing technique, antiseptic and aseptic technique in labor ward and in operating theater for caesarean sections and operative vaginal deliveries, safe sterilizing procedures in labor ward and theater

## **2 Management of puerperal sepsis once it occurs**

a) in health center

If condition of patient is serious (very high fever, tachycardia and other signs and symptoms as above) **emergency treatment** stat dose of broad spectrum antibiotics and IV fluids if possible, arrange for referral to hospital

b) in hospital

Broad spectrum antibiotics stat, metronidazole stat, ergometrine IM or IV Assessment of pelvic infection and possibility of pelvic abscess, IV infusion, pain relief, treatment of anaemia (History taking and good nursing care are considered routine )

**If this intervention works, then we expect**

in the community

- > reduced incidence of puerperal sepsis overall
- > reduction of cases with severe sepsis
- > increased admission of women with prolonged rupture of membranes (PROM) or labor (both  $\geq$  12 hours)
- > reduced deaths from postpartum sepsis

in the hospital

- > increased referral of women with puerperal sepsis (not necessarily, because of self treatment)
- > increased referral for PROM
- > reduced incidence of puerperal sepsis from PROM
- > reduced incidence of puerperal sepsis from episiotomy
- > reduced incidence of puerperal sepsis after normal and prolonged labor
- > reduced incidence of sepsis after caesarean section in women who require the operation during pregnancy or labor not septic prior to admission (excluding those women who are admitted in obstructed labor with sepsis for emergency caesarean section)
- > reduced incidence of women with sepsis after episiotomy, excluding those women who were admitted in second stage with sepsis
- > reduced incidence of admissions for ruptured uterus
- > increased incidence for prolonged labor
- > reduced deaths from postpartum sepsis

**A PROFILE OF CAUSES FOR ADMISSION**

**1 number of cases on admission**

- a) number of deliveries/year
- b) number of admissions with prolonged/obstructed labor/year
- c) number of admissions with puerperal sepsis/year
- d) number of admissions with retained placenta/year
- e) number of caesarean sections on admission/year for prolonged/obstructed labor/ruptured uterus with and without sepsis on admission
- f) number of admissions of women with prolonged rupture of membranes ( $\geq$  12 hours)

**2 proportion of complicated cases on admission in labor/total number of admitted cases in labor**

**3 proportion of complicated cases on admission after labor/total number of admissions after labor**

---

## **INDICATOR 1 Number of deliveries per year in hospital**

### **Definition/Calculation of indicator**

Number of deliveries per year in hospital  
Absolute numbers in hospital (no calculation is needed)

### **Data requirements**

Number of deliveries per year in hospital

### **Data sources**

Register in labor ward  
Possibly discharge register

### **Purpose and issues**

In order to get as accurate a denominator as possible, births registration needs to be complete with mode of delivery broken down so that spontaneous vaginal and operative deliveries can be separated and also caesarean sections

There may be women who have been admitted after delivery of their baby at home, but with a retained placenta (BBA = born before arrival) These need to be recorded separately as they are not strictly institutional births

It is helpful to ascertain how registration of women on admission is effected, for example women may be admitted in false labor and discharged - where are they recorded? Is there a separate register Often admissions and actual deliveries are recorded separately

- INDICATOR 2**      **Number of admissions for**
- a) **prolonged labor, obstructed labor**
  - b) **ruptured uterus**
  - c) **prolonged rupture of membranes (PROM)**
  - d) **retained placenta**
  - e) **puerperal sepsis**

**Definition/Calculation of indicator**

Number of admissions for prolonged/obstructed labor, ruptured uterus, prolonged rupture of membranes (PROM), retained placenta, puerperal sepsis  
No calculation is required, absolute numbers used

**Data requirements**

Separate column for complication on admission and those that develop after admission

**Data sources**

Labor ward register for prolonged obstructed labor, ruptured uterus, prolonged rupture of membranes retained placenta

Admission register and/or labor ward register for women admitted for puerperal sepsis

Discharge register may have data on final diagnosis

**Purpose and issues**

It is important to distinguish between women admitted with a complication from outside and those women who develop the complication inside the hospital if improvements in management due to management protocols and life saving skills training is to be demonstrated

We expect probably changes in the pattern of admissions with complications from the community after an IEC campaign. Some of these may be better managed inside the hospital but that depends a great deal on the seriousness of the patients condition on admission. We cannot prove that training and protocols have an impact on these cases if they arrive moribund

Post-caesarean section sepsis is difficult to reduce in women admitted with sepsis, but if it is a problem post-operatively for women without sepsis at time of operation, then improvement in management practices should be demonstrated

Women admitted with puerperal sepsis from outside, usually are admitted to a postnatal ward or an 'isolation' or 'septic' ward and not through the labor ward. When calculating proportions of women admitted with puerperal sepsis, the denominator issues needs to be decided upon (discussed under Indicator 6)

### **INDICATOR 3 Percentage of postpartum admissions for puerperal sepsis**

#### **Definition/Calculation**

number of admissions for puerperal sepsis  
----- x 100  
admissions for puerperal sepsis, PPH, retained placenta, postpartum eclampsia

#### **Data requirements**

Separate column for complications on admission both in labor ward and in postnatal ward

#### **Data sources**

Labor ward register, postnatal ward register, register of admissions in respective wards where these women are admitted, discharge register

#### **Purpose and issues**

This indicator gives the proportion of one specific complication occurring after birth of the baby elsewhere (at home, in health center or rural hospital) for which women refer themselves or are being referred, out of several selected complications which may occur after birth for which women are admitted. It will however not tell us about severity of cases and numbers may either increase or decrease with an effective IEC campaign.

It may not be a good indicator of the distribution of complications for which women are admitted postnatally, because there may be considerable self-treatment for sepsis by obtaining antibiotics from pharmacies or markets. Successful self-treatment for eclampsia and retained placenta may occur to a lesser degree or may be tried first.

It is important to consider other complications which may have caused the puerperal sepsis.

## B HOSPITAL MANAGEMENT

### INDICATOR 4 Percentage of women developing sepsis after admission in labor

#### Definition/Calculation of indicator

$$\frac{\text{Number of women admitted in labor without sepsis, developing sepsis after labor}}{\text{Number of women admitted in labor without sepsis giving birth}} \times 100$$

#### Data requirements

Separate column for complications on admission and those that developed after admission

#### Data sources

Labor ward register and postnatal ward register If there is a separate book where women are registered if they come for check-up after discharge, this needs to be taken into consideration Discharge registers may also contain data

#### Purpose and issues

It is desirable to distinguish between women who were admitted in labor without sepsis and those admitted with sepsis as this provides a picture of development of sepsis related to hospital practice which is amenable to correct case management and infection control

Registering all women with puerperal sepsis requires distinction between those admitted during labor with or without sepsis and those with sepsis after labor/delivery at home These are three different measures and give an indication of either hospital-, home- or combined home and hospital practice

It is recommended that women admitted with puerperal sepsis after home birth are excluded from this measurement It is therefore important to ascertain where admissions for complications after home or home births are registered Readmissions for puerperal sepsis after early discharge from hospital after delivery needs to be noted The amount of sepsis caused by the hospitals which is detected will to some extent depend on the length of stay in the hospital They sooner they discharge women, the less sepsis they will detect, and the more will occur at home

**INDICATOR 5      Percentage of women admitted without sepsis but sepsis developed during labor/delivery or after labor, correctly managed**

**Defintion/Calculation**

$$\frac{\text{number of incorrectly managed cases of sepsis among women admitted without sepsis}}{\text{total number of women admitted without sepsis, who developed sepsis during labor/delivery/after delivery}} \times 100$$

Correct management is set out at the beginning of the section on puerperal sepsis, but needs to conform to local protocol development

**Data requirements**

Number of deliveries admitted with complication of sepsis, prolonged rupture of membranes, prolonged/obstructed labor

Number of women developing puerperal sepsis after delivery

**Data sources**

Register in the labor ward with columns separating complications present on admission and developing during the stay in the labor ward

Register of women in postnatal ward with column for complications

Some data may be on a discharge register

A detailed management analysis requires case review

**Purpose and issues**

The majority of women developing puerperal sepsis are probably admitted with conditions predisposing to puerperal sepsis e.g prolonged/obstructed labor, ruptured uterus, prolonged rupture of membranes, retained placenta. If these are prevalent on admission it is important that indicators separate women admitted with sepsis and/or conditions predisposing to sepsis from women developing sepsis who were admitted without any of these conditions

The hospital may wish to assess management practices in both scenarios. For instance, a recent study in Enugu found that 40% of maternal deaths due to sepsis were after caesarean section after obstructed labor. This emphasizes two points: 1) that women need to be referred earlier to be admitted in less moribund condition, 2) that hospital management may need to improve regarding fulminating sepsis and development of pelvic abscess

Because of multifactorial conditions contributing to puerperal sepsis, the analysis needs to take more conditions into consideration than for instance the discussion on postpartum hemorrhage

**INDICATOR 6      Proportion of women with puerperal sepsis after prolonged labor developing in the hospital (prolonged labor should be <15%)**

**Defintion/Calculation**

number of women with puerperal sepsis (not admitted with sepsis) after prolonged labor developing in hospital

$$\frac{\text{-----}}{\text{all deliveries}} \times 100$$

**Data requirement**

Number of deliveries admitted with complication of sepsis, prolonged rupture of membranes, prolonged/obstructed labor

Number of women developing puerperal sepsis after delivery

**Data source**

Register in the labor ward with columns separating complications present on admission and developing during the stay in the labor ward

Register of women in postnatal ward with column for complications

Some data may be on a discharge register

A detailed management analysis requires case review

**Purpose and issues**

This indicator looks at women developing sepsis in conjunction with one other complication which may contribute to the development of sepsis. This is important when clinical management issues are under consideration.

Indicator #6 can be repeated for other conditions, e.g. prolonged rupture of membranes, obstructed labor, ruptured uterus

If retained placenta and puerperal sepsis are under consideration simultaneously, women who have labored in the hospital and those who were admitted with retained placenta from outside need to be distinguished, both in the numerator and in the denominator

## **C CASE FATALITY**

**INDICATOR 7 Proportion of women who die from puerperal sepsis out of all women with puerperal sepsis**

### **Definition**

number of deaths from puerperal sepsis  
----- x 100  
number of cases of puerperal sepsis

This indicator can be refined to include or exclude women admitted with sepsis due to conditions such as obstructed labor, ruptured uterus, prolonged rupture of membranes, retained placenta

### **Data requirements**

Data which distinguish between problems present on admission from problems occurring in the health facility

### **Data sources**

Registers in labor ward with columns distinguishing between problems present on admission from those occurring after admission

### **Purpose and issues**

Case fatality is a good measure of management in hospital provided it distinguishes between women who have the complication present on admission which predisposes to the complication under study and those who do not

Application of protocols cannot be isolated from availability of drugs and supplies which are necessary to treat the condition satisfactorily, availability of staff and staff who have the skills required for management of the condition

Case fatality will be influenced by the condition of the woman on admission. If more women are coming in because of improved hospital practice, but still not early enough, case fatality may not change. Interventions at community level are equally important once hospital practice has improved. The notion that women will avail themselves of hospital services more when hospital practice improves, needs further investigation. There may be cultural and economic barriers to use of services

## D COVERAGE

### INDICATOR 8 Proportion of expected women with puerperal sepsis in the community getting to hospital

#### Definition

number of admissions for puerperal sepsis  
 ----- X 100  
 expected number of cases of puerperal sepsis in the community

#### Calculation

To calculate denominator CBR x population in catchment area x 15% (?) If births are registered, then 15 per cent of number of births in the catchment area (the 15% are based on the Tanjungsari, Indonesia community-based study)

The definition of the denominator is expected number of women with puerperal sepsis in the community 15% of births in population living in catchment area of hospital

#### Data requirements

- a) for numerator number of admissions for puerperal sepsis in postnatal or gynecology ward
- b) for denominator number of births, expected or actually registered

This requires

- mapping of district/catchment area and health facilities
- population in district/catchment area
- crude birth rate in country (preferably rural/urban differential and relevant for that particular district)

#### Data source

- a) for numerator admission register in postnatal and gynecology ward or discharge register
- b) for denominator DHS, statistical bureau, UNICEF State of the World's children, World Development report

#### Purpose and issues

Unless community-based data are available, the prevalence of puerperal sepsis in the community remains conjecture. Even then, community surveys depend on excellent interviewer training and supervision and definition of terms.

Even in the world at large, obstetric textbooks differ on definitions of puerperal sepsis. The WHO definition, as given in the beginning of the section on puerperal sepsis is advised.

Whether this indicator of coverage is useful will depend on the obstetric service organization in the district. If there are no peripheral services and hospital practice improves, the number of cases admitted may increase. However, if the periphery is strengthened, admission in the referral hospital may actually decrease. This may also be the case if hospital practice deteriorates.

If the intervention in the community was successful, one would hope that the overall incidence of puerperal sepsis would decrease, making this denominator an overestimate.

### III INDICATORS POSTPARTUM HEMORRHAGE

**Indicators to assess the potential impact of interventions aimed at reducing morbidity and mortality associated with postpartum hemorrhage**

#### **Definition of postpartum hemorrhage**

- vaginal delivery (exclude c-section hemorrhage)
- pregnancy duration >28 weeks (exclude abortion hemorrhage)
- blood loss
  - if assessed in health facility  $\geq 500\text{cc}$ , or blood loss can be less if the condition of the woman deteriorates (but do you still call it PPH then? Barbara thinks yes but will check)
  - if assessed with home interview blood loss such that the woman's clothes were soaked and the woman was unable to sit up (If the woman went to a health facility, ask whether a drip was given, whether the placenta had to be removed or whether the cord was pulled followed by heavy bleeding, this may support the diagnosis of PPH))

**Which interventions have the potential to reduce deaths from postpartum hemorrhage (PPH)?**

#### **1 Prevention of PPH**

\*better management of labor

##### a) in community

- referral after 12 hours of hard labor
- definition of hard labor the contractions are so frequent that the woman cannot do any ordinary household activities
- empty bladder during all stages of labor

\*early recognition of danger signs in the community

##### b) in health facility

- better management of first stage encourage frequent urinating, prevent prolonged labor, prevent premature pushing before full cervical dilatation
- better management of second stage prevent prolonged labor, prevent serious tears (female genital mutilation, timely episiotomy), make sure the bladder is empty
- better management of third stage give oxytocic after delivery of anterior shoulder, manage retained placenta better

## 2 Better management of PPH once it occurs

a) in health center

oxytocics, fluid replacement, suturing of tears, manual removal of placenta

b) in hospital

oxytocics, blood replacement, suturing of tears, manual removal of placenta, surgical operations

**If these interventions are effective, they may**

Reduce the incidence of prolonged labor in the community although referrals to the health facility for prolonged labor may increase, hence admissions for prolonged labor may increase

Reduce the proportion of prolonged labor that are incorrectly managed at the health facility

Reduce the incidence of retained placenta in the community and reduce admissions for retained placenta

Increase early referral for excessive blood loss

Reduce the proportion of PPH that are incorrectly managed at the health facility

## **A PROFILE OF ADMISSIONS**

### **INDICATOR 1 Number of deliveries per year**

#### **Definition/Calculation of indicator**

Number of deliveries per year  
Absolute number, no calculation is needed

#### **Data requirements**

Number of deliveries per year

#### **Data sources**

Register at labor ward (note that admission register may include women sent back home undelivered because they were not in labor) Usually routinely collected Another possible source is a discharge register

#### **Purpose and issues**

Note that the actual number of women having given birth in the facility is required This excludes women admitted with a complication after she has given birth at home (BBA = born before arrival), e g for a retained placenta, or a woman admitted with a ruptured uterus who dies before she is delivered

**Purpose** to register all births in the hospital from which a denominator will be derived

**Causality** pregnancy related mortality/morbidity will be registered

**Feasibility** the births can be registered easily if a delivery/labor ward register is in place

**Responsiveness** good, if all births are registered

**Population- or facility-based** facility-based

- INDICATOR 2**      **Number of admissions for**
- a)      **retained placenta**
  - b)      **prolonged labor**
  - c)      **postpartum hemorrhage**

**Definition/Calculation of indicator**

Number of admissions for postpartum hemorrhage, retained placenta, and prolonged labor/year  
Here we are relying on the definition of the person registering and women report (If this is terribly important, some attempt can be made to train those registering to standardize definition )

Absolute number no calculation is required

**Data requirements**

Separate column for complications on admission and those that developed after admission

Proxy may be (type of delivery including note of BBA and complications) This proxy will not work for prolonged labor

**Data sources**

Probably labor ward register (possibly admission register or discharge register)

**Purpose and issues**

In order to be able to assess quality of care in the hospital it is important to note whether the woman was admitted with the complication or developed it in the hospital

Women who arrive moribund, for instance with a ruptured uterus, may not even be admitted formally if they die upon arrival. These women are not always registered so that the hospital does not get blamed for the demise. However, for the purpose of estimating coverage of complications in a health facility, it is important to register the woman. This should become clear to the staff if they are being involved in the effort to reduce maternal mortality and morbidity from the beginning. Nobody is being blamed.

**Purpose** to calculate the proportion of women with complications on admission in labor and/or develop complications after admission. This is a proxy measure for the percent of women with complications in the population who were treated in health centers or hospitals.

**Causality** it is assumed that an increase in percent of women with complications treated in hospitals, will reduce mortality/morbidity in the community.

**Feasibility** easy to collect if the labor ward register is set up accordingly.

**Responsiveness** Very responsive as it gives a good idea of the percent of women with complications which are treated in a health facility

**Population- or facility-based** even though data collection is facility based, it is a proxy measure for access of pregnant women with complications

**INDICATOR 3      Percentage of deliveries admitted with (for) prolonged labor****Definition/Calculation of indicator**

admissions for prolonged labor  
 -----X 100  
 number of deliveries

**Data requirements**

Number of deliveries per year

Separate column for complications on admission and those that developed after admission

Proxy may be (type of delivery including note of BBA and complications) This proxy will not work for prolonged labor

**Data sources**

Register at labor ward (note that admission register may include women sent back home undelivered because they were not in labor) Usually routinely collected Another possible source is a discharge register

Probably labor ward register (possibly admission register or discharge register)

**Purpose and issues**

It would be helpful to register whether the women with prolonged labor came from home or have been transferred from a health center Depending on the intervention at either community or health center level or both, the number of referrals may increase which is good This may show a concomitant decrease in obstructed labor and/or ruptured uterus

Because prolonged labor is associated with increased risk of retained placenta and sepsis, it is important to differentiate between women admitted in prolonged labor or having developed prolonged labor in the labor ward The latter information is not usually registered in the labor ward register and needs to be included if that indicator is needed for evaluation

**Purpose** to determine the number of women admitted with prolonged labor as a percent of all complications This is also a proxy measure for the percent of women with prolonged labor in the community who are treated in hospitals

**Causality** an increase of admissions with prolonged labor should reduce the proportion of admissions with obstructed labor/ruptured uterus, retained placenta and sepsis It should also reduce mortality from these causes both in the hospital (case fatality) and community

**Feasibility** possible to collect if the labor ward register is set up to record this information and there is a definition for diagnosis of prolonged labor

**Responsiveness** very responsive, if women/TBAs and staff in peripheral health services recognize prolonged labor early, make referrals and families comply with the referral

**Population- or facility-based** facility based but a proxy for percent of women with complications which reach a health facility

**B HOSPITAL MANAGEMENT**

**INDICATOR 4      Number of cases of prolonged labor developing in the hospital (should be <15% or normal labors)**

**Definition**

Prolonged labor in hospital 2 definitions

- 1      if partograph labor has progressed to or beyond the action line
- 2      of no partograph (crude way) 90% of women not admitted with prolonged labor should be delivered within 12 hours of admission in established labor

**Calculation**

For definition 1

$$\frac{\text{women who have progressed to or beyond the action line}}{\text{number of women on partograph}} \times 100$$

For definition 2

$$\frac{\text{women in established labor but admitted without prolonged labor not delivered within 12 hours}}{\text{number of women admitted in normal labor (not prolonged or obstructed)}} \times 100$$

**Data requirements**

Number of women who have been admitted for delivery and have actually given birth per year  
 Absolute numbers No calculation required

Separate column in labor ward or admission register for complications which were present on admission and those that developed after admission

**Data source**

Register in the labor ward These data are usually routinely collected Note also to exclude women who were admitted in false labor and subsequently sent home

Most likely the labor ward register (possibly also operating theater register, admission or discharge register)

### **Purpose and issues**

This indicator will give an idea of the early recognition of prolonged labor

If the partograph is not completed for every woman who should have one, then the indicator is hardly valuable. It requires that all women have a partograph in labor except those admitted at 9 cm and full dilatation of the cervix. The delivery register should therefore have a column to indicate whether the woman had a partograph in labor.

It should be possible to calculate the length of labor in the labor ward from the admission dilatation and admission time to delivery time. This is usually registered in the labor ward admission register.

This calculation excludes women who have been referred with prolonged labor from outside the hospital whether on a partograph or not.

**Purpose** This indicator assesses quality of labor management in hospital. In hospital prolonged labor should be prevented or recognized early and appropriately managed. If there are many women who develop prolonged obstructed labor when they were admitted without this complication, it says something about quality of care.

**Causality** If there is a problem with prolonged labor in hospital, there will also be problems with PPH, retained placenta and sepsis. Morbidity will be more severe and hospital stay will be prolonged.

**Feasibility** This is not easy to collect from registers unless admission time and admission dilatation are recorded in the admission register. If quality of care is to be assessed, an effort needs to be made to include these parameters in the admission register. A medical audit (record review) for all cases with prolonged labor is not feasible.

**Responsiveness** Management of labor with a partograph to prevent prolonged labor and improve labor management is a proven intervention. It reduces PPH, sepsis, intrapartum fetal deaths.

**Population- or facility-based** It is facility-based.

## **INDICATOR 5a**

### **Definition/Calculation**

number of women admitted in normal labor (without other complications) not delivered within 12 hours

---

number of cases of women admitted in normal (not prolonged or obstructed) labor

For correct management of prolonged labor, see prolonged labor section

### **Data requirements**

Number of women who have been admitted for delivery and have actually given birth per year  
Absolute numbers No calculation required

Separate column in labor ward or admission register for complications which were present on admission and those that developed after admission

### **Data source**

Register in the labor ward These data are usually routinely collected Note also to exclude women who were admitted in false labor and subsequently sent home

Most likely the labor ward register (possibly also operating theater register, admission or discharge register)

### **Purpose and issues**

This indicator will give an idea of the early recognition of prolonged labor

If the partograph is not completed for every woman who should have one, then the indicator is hardly valuable It requires that all women have a partograph in labor except those admitted at 9 cm and full dilatation of the cervix The delivery register should therefore have a column to indicate whether the woman had a partograph in labor

It should be possible to calculate the length of labor in the labor ward from the admission dilatation and admission time to delivery time This is usually registered in the labor ward admission register

This calculation excludes women who have been referred with prolonged labor from outside the hospital whether on a partograph or not

**Purpose** This indicator assesses quality of labor management in hospital. In hospital prolonged labor should be prevented or recognized early and appropriately managed. If there are many women who develop prolonged obstructed labor when they were admitted without this complication, it says something about quality of care.

**Causality** If there is a problem with prolonged labor in hospital, there will also be problems with PPH, retained placenta and sepsis. Morbidity will be more severe and hospital stay will be prolonged.

**Feasibility** This is not easy to collect from registers unless admission time and admission dilatation are recorded in the admission register. If quality of care is to be assessed, an effort needs to be made to include these parameters in the admission register. A medical audit (record review) for all cases with prolonged labor is not feasible.

**Responsiveness** Management of labor with a partograph to prevent prolonged labor and improve labor management is a proven intervention. It reduces PPH, sepsis, intrapartum fetal deaths.

**Population- or facility-based** It is facility-based.

## INDICATOR 5b

### Defintion/Calculation

number of incorrectly managed cases of retained placenta not delivered within 1/2 hour of admission or occurrence

-----  
number of cases of retained placenta (at admission + occurring during hospitalization)

Correct management of retained placenta (empty bladder if necessary, oxytocic + controlled cord traction, if this fails IV fluid + manual removal of placenta + antibiotic) + time-interval between intervention and placenta removal

---> case review or observation?

Retained placenta placenta not delivered after 1 hour after delivery of the baby

Incorrect management placenta not delivered within half an hour of admission or occurrence (this will underestimate number of incorrectly treated retained placentas, but it is the best we can get)

To get this you will need the number of cases of retained placenta developing in the hospital (information needed but not indicator of a problem)

## INDICATOR 5c

### Definiton/Calculation

number of correctly managed cases of PPH

-----  
number of cases of PPH (at admission + occurring during hospitalization)

Cannot get except through case reviews

Correct management of PPH = rubbing up contraction, giving or repeating oxytocin, if placenta in, manage as retained placenta if placenta out, rub up contraction, catheterize bladder, give oxytocin, iv infusion, ?blood replacement, check and suture lacerations (cervical, perineal, vaginal), emergency laparotomy in case of ruptured uterus, follow-up for haemoglobin

=== > case reviews compare actual management against protocols

Incorrectly managed in this case death from PPH (recognizing that this excludes raging sepsis following PPH and secondary PPH complications)

## INDICATOR 6

### Definition/Calculation

number of cases of PPH occurring in hospital

-----  
number of deliveries in hospital

To get this, you will need number of cases of PPH occurring in hospital (not an indicator)

This tells us how well active management of third stage is working

(Process indicator to is percentage of hospital deliveries that are actively managed in third stage  
Need number of hospital deliveries and number of actively managed third stages )

**C CASE FATALITY**

**INDICATOR 7**

deaths from PPH

-----  
number of cases of PPH (at admission + occurring during hospitalization)

**D COVERAGE****INDICATOR 8a Proportions of expected prolonged labor in the community getting to hospital****Calculation**

$$\frac{\text{number of admissions for prolonged labor}}{\text{expected number of cases of prolonged labor in community}} \times 100$$

To calculate denominator CBR X population in catchment area X 10 percent Or births in catchment area X 10 percent

Definition of denominator is expected number of cases of prolonged labor in community 10% of births in population living in catchment area of hospital

**Data requirements**

For denominator  
 catchment area for health facility (mapping)  
 population in catchment area  
 crude birth rate in country (preferably urban/rural), or number of births

For numerator number of admissions for prolonged labor

**Data source**

Numerator as above, Denominator statistical bureau, UNICEF State of the worlds children, DHS, WDR etc

**Purpose and issues**

10 percent is used as the expected number of prolonged labors occurring in a population based on data from Matlab

**INDICATOR 8b Proportions of expected retained placenta in the community getting to hospital**

**Definition/Calculation**

number of admissions for retained placenta

-----  
expected number of cases of retained placenta in community

Expected number of cases of retained placenta in community 6% of births in population living in catchment area of hospital (from Matlab)

**INDICATOR 8c Proportions of expected PPH in the community getting to hospital**

**Defintion/Calculation**

number of admissions for PPH

-----  
expected number of cases of PPH in community

Expected number of cases of PPH in community 10% of births in population living in catchment area of hospital (Malawi 8%, other studies 2-5%)

Prolonged labor  $\geq 12$  hours of hard labor

#### **IV SUMMARY OF INDICATORS FOR INCORRECT MANAGEMENT AT THE HEALTH FACILITY**

Note we are saying that these are indicators of incorrect management just because they are alright does not mean the management is correct Also, the caveats about sample size (they must be large enough) still apply

Source of data as stated in the introduction, these were are designed to be possible from the admission register, the labor register, the operating theater register and the discharge register

The model register suggests some of the data items which would be collected in ideal circumstances Other examples of registers exist for Nigeria

### Summary Table of Hospital Management Indicators

COMPLICATION	Case fatality indicator	Other indicator of incorrect management	Not possible without case review
prolonged labor		X (time based)	
obstructed labor		X (time based)	
retained placenta		X (time based)	
ruptured uterus		X (time based)	
PPH	X		
sepsis	X	X (sepsis)	
eclampsia/ preeclampsia	X		
PROM			X
incomplete abortion	X		
APH			X
c-section		X (sepsis) X (indication)	
episiotomy		X (sepsis)	

**NOTE** All data for use in all indicators may be fudged if those filling the registers are chastised for problems Time based may particularly be susceptible to fudging

## V INDICATORS REFERRAL

The main way we plan to look at referral is to look (at each level) where women are being referred from, by complication at admission. For example the hospital may note that it had 30 admissions for ruptured uterus, of which 20 (67%) are self referred and 10 (33%) are referred from a health center.

Coupled with data from the health center showing no admissions for ruptures uterus would suggest that the ruptured uteruses may have developed in the health center. In lower level facilities it may also be possible to have a column of data on referral to a higher level facility. In that case, the number of referrals to the hospital from the health center in the previous example for ruptured uterus should be 10. If it is more, it suggests some women are not arriving at the higher level facility (hospital).

Note these indicators on referral also assume that all service delivery points are covered. If, for example, there are two hospitals (a mission and a government hospital), both must be included, as must all health centers and health posts providing relevant care. If there are many private sources of care and these cannot be covered, then these indicators may not be feasible.

**Information on Referrals in Registers**

**1 Hospital**

Referred from			
Self	TBA	Health Post	Health Center

**2 Health Center**

Referred from		
Self	TBA	Health Post

Referred to	
Hospital	Other

**3 Health Post**

Referred from	
Self	TBA

Referred to	
Health Center	Hospital

## **VI OTHER TYPES OF INDICATORS**

### **INDICATOR 1 Indication of shift in catchment area, e g distance, length of time, in or outside catchment area, region**

**Issue** help interpret numbers of cases admitted at the health facility, you want this indicator for every complication for which you observed change

Proportion of a specific complication which is coming from far (define far this may be measured in travelling time (i e , more than 4 hours), of distance (more than 10 km) or part of catchment area, or within and outside catchment area)

### **INDICATOR 2 Indication of severity of women's condition on admission**

**Issue** this may help interpret hospital management of admissions if there is a change in the severity of admitted cases following the intervention For example, if women come from further away, they may have worse complications and so case fatality may increase, despite better management However, this will require collecting a lot more data for most conditions

With both these indicators, it may be possible to do in-depth case reviews on a sample of cases to help interpretation

**MODEL REGISTER**

This is an example of the items one may want to have included on the registers. We realize these items may come from several registers. The principle we have assumed is the less writing we require, the more will be completed. For this reason, for example, if complications developing can be specified in advance, and just ticked off, this will be better than having a blank space.

Referred from				Date of Admission	Complication on admission							Time of Admission	Complication developing	Type of delivery	Time of delivery of baby/operation	Time of delivery of placenta	Vital status of mother	Indication for cesarean	epistomy
Self	TBA	Health Post	Health Center		PH	PR													
		x																	
			x																

## GLOSSARY OF DEFINITIONS FOR INDICATORS AND DATA REQUIREMENTS

Data sources for these indicators are assumed to be admission registers, labor ward registers, and operating theater registers

### **1 prolonged labor**

% of women admitted in normal labor (without other complications) not delivered within 12 hours

for women admitted with prolonged labor case review will be the only way to get at incorrect management

Data complication at admission, time of admission, time of delivery

### **2 obstructed labor**

% of women admitted with obstructed labor not delivered within 1 hour

Data complication at admission, time of admission, time of delivery

### **3 retained placenta**

% of placentas not delivered within 1/2 hour of admission or occurrence

Data time of delivery, time of delivery of placenta

### **4 ruptured uterus**

% of women admitted with ruptured uterus not delivered/operated on within 2 hours

Data complication at admission, time of admission, time of delivery/time of operation

### **5 postpartum hemorrhage (PPH)**

case fatality

deaths from PPH

-----  
number of cases of PPH (at admission + occurring during hospitalization)

Data complication at admission, complication developing, cause of death

**6 sepsis**

admitted without sepsis

% of women admitted without sepsis who develop sepsis

admitted with sepsis

case fatality

deaths from sepsis

-----  
number of cases of sepsis at admission

Data complication at admission, complication developing, cause of death

**7 eclampsia and pre-eclampsia**

case fatality

deaths from pre-eclampsia and/or eclampsia

-----  
number of cases of pre-eclampsia and/or eclampsia at admission or developing

Data complication at admission, complication developing, cause of death

**8 prolonged (> =12 hours) premature rupture of membranes**

not possible with simple information from register Needs case review

**9 incomplete abortion**

case fatality

deaths from septic abortion

-----  
number of cases septic abortion

If death from abortion due to hemorrhage is a problem then add these to the numerator and denominator

We are not making a note of whether this abortion was induced or spontaneous

Data complication at admission, complication developing, cause of death

## **10 antepartum hemorrhage**

No indicator for correct management, you need a case review

## **11 C-section**

% of c-sections performed on women admitted without sepsis, obstructed labor, ruptured uterus, or PROM who develop sepsis after surgery

proportion of c-sections by cause

Data complication on admission, complication developing, type of delivery, indication for c-section

## **12 episiotomy**

% of episiotomies performed on women admitted without sepsis, obstructed labor, ruptured uterus, or PROM who develop sepsis after episiotomy

Data complication on admission, complication, note of episiotomy