

## Monitoring obstetric practice... where are the patients with obstetric complications?

E Goodburn, W Graham, V Lema, H Damisoni, J Hussein

The Malawi Safe Motherhood project has seven main components, one of which is improvement of systems to monitor maternal health. Seven indicators have been selected which measure availability, utilisation and quality of emergency obstetric care, following the UNICEF/WHO/UNFPA "Guidelines for Monitoring the Availability and Use of Obstetric Services, 1997". As this is one of the first large projects to implement these indicators to date, their introduction has followed a rigorous process of needs assessments, tools development, operations research and field testing. In this article we describe the first three of these processes, and we then examine the problem of obstetric patient flow - where are women with obstetric complications to be found within a district hospital? This information is essential if the extent of the problem of obstetric morbidity and mortality is to be accurately measured.

### Introduction

Improvement of the maternal health monitoring system is one of the major outputs of the Malawi Safe Motherhood Project. The conventional approach to monitoring progress in reduction of maternal mortality is to use indicators such as maternal mortality rates and ratios. In theory, repeated measurements over time could be used to monitor trends. However, in many developing countries, vital registration systems may not be comprehensive, leading to serious drawbacks in measuring maternal mortality. Even newer and innovative methods like the "sisterhood" method are costly, require large sample sizes and provide information for a period approximately 10 years before the survey.

The UNICEF/WHO/UNFPA "Guidelines for Monitoring the Availability and Use of Obstetric Services" proposes an alternative approach based on monitoring the processes, or interventions, aimed at reducing maternal mortality<sup>1</sup>. The advantages include a lower cost and ability to reflect the current situation. Furthermore, the indicators provide useful information essential for guiding policies and programmes and assess the availability, use and quality of obstetric services.

The Safe Motherhood Project is one of the first large projects to use these indicators as part of a monitoring system. Introduction of the indicators has followed a rigorous process of needs assessment, tools development, operations research and field testing.

### Needs assessment

A needs assessment was initially carried out with the objective of identifying a minimal list of feasible indicators to monitor

project progress, including constraints and limitations of existing systems.

**Figure 1: Problems and solutions of existing maternal monitoring systems**

<i>Problem</i>	<i>Solution</i>
* Multiple registers with different formats exist	* Develop a minimal set of standard registers
* Too much information is collected which is often not used	* Define indicators and data needs clearly
* Information is not well summarised or recorded	* Develop standard report formats suitable for integration with the greater health information system
Information is not well analysed or used	* Train staff to summarise, analyse and use the data for planning and distribution of services

### Existing systems

Despite recent work aimed at rationalisation and integration of forms, decentralisation and computerisation, semi-structured interviews with the Ministry of Health and Population staff from central to provider level revealed major weaknesses and problem areas in the maternal health data collected (Figure 1).

Participatory Learning for Action (PLA) techniques were also used as part of the needs assessment to investigate the potential for a community monitoring system. Quantitative monitoring of community based data on a regular basis was found not to be feasible. Maternal audit and critical incident techniques were likely to be most suitable for community feedback.

### Identification of feasible indicators

Review of the project literature, logical framework and the "Guidelines" resulted in agreement on a minimal group of feasible indicators for monitoring the project (Table 1). The development of Indicators which necessitated creation of a completely new data collection system were avoided because of the major inputs required to establish and sustain them.

**Table 1: Project indicators and definitions**

<i>Indicator</i>	<i>Definition</i>	<i>Minimum acceptable levels</i>	<i>Utility</i>
Availability (Amount) of essential obstetric care	Proportion of essential obstetric care (EOC) facilities per 500,000 population	At least: 4 Basic EOCs/500,000 1 Comprehensive EOC/500,000	Measures utilisation
Proportion of institutional births (Institutional delivery rate)	Proportion of deliveries in an essential obstetric care facility to estimated births	At least: 15% of all births take place in either a BEOC or CEOC	Measures access
Population based Caesarean section rate	Proportion of Caesarean sections to all births in the population	5-15%	Measures utilisation & access
Case fatality rate	Proportion of direct maternal deaths to emergency obstetric complications	Less than 1%	Measures quality
Met need	Proportion of emergency obstetric complications to an estimated 15% obstetric complication rate	At least: 100% of women who have complications are treated in an EOC facility	Measures quality

Based on the definition of obstetric care functions provided in the "Guidelines", the project adapted the key signal functions of basic and comprehensive essential obstetric care facilities appropriate to Malawi (Table 2).

**Table 2:**  
**Signal functions for obstetric care services in Malawi.**

<i>Basic essential obstetric care services (BEOC)</i>	<i>Currently making efforts for inclusion in BEOC functions</i>	<i>Comprehensive essential obstetric care services (CEOC)</i>
1. Administer parenteral antibiotics	4. Perform manual removal of placenta	1-6 plus 7 & 8 below
2. Administer parenteral oxytocics	5. Perform removal of retained products	7. Perform surgery (CS)
3. Administer parenteral anticonvulsants	6. Perform assisted vaginal delivery	8. Transfuse blood

### Tools development

This process followed on from the needs assessment and aimed to identify, and as far as possible, resolve, problems in data collection and analysis. A workshop was held with participation from district level personnel involved in the collation of data and central level officials from the Ministry of Health and Population.

The tools developed included registers, reporting forms, visual display formats and quality assurance checklists. Several very relevant issues were raised during the workshop (Figure 3), some requiring resolution through operations research before field testing of the tools.

**Figure 3:**  
**Issues raised during the tools development workshop**

<i>Issue</i>	<i>Decisions</i>
* Identification of appropriate catchment populations for CEOC facilities	* Unresolved: needs study before the field test
* Distinction between functioning and non functioning facilities	* Use a dot system on the availability map, each dot representing a signal function
* Frequency of calculation	* Individual facilities should report monthly, and data will be collated and analysed quarterly
* Inclusion of indirect maternal complications/deaths into met need and CFR calculations	* Only direct complications and direct deaths should be included
* Appropriateness of using 15% (expected obstetric complications) in Malawi	* Unresolved: Needs study.
* Double counting due to (a) women with more than one complication and (b) referrals	* (a) Each admission is counted separately, although this will not resolve the double counting * (b) unresolved: Needs study
* Positioning of register within the facility to minimise omissions and duplication	* Unresolved: Needs study before the field test
* Data reporting form content	* Only one box is required for all complications and should be completed monthly
* Definition of signal functions of basic and essential obstetric care facilities	* Use international definitions

### Operations research

The needs assessment and tools development workshop highlighted several areas where more detailed knowledge was required before implementation of the monitoring system. Operational research was therefore planned to resolve five major issues.

- \* Obstetric patient flow in hospitals to allow correct siting of registers.
- \* Recording of complications to assess undercounting of cases.
- \* Maternal death identification to minimise undercounting of maternal deaths.
- \* Patterns and recording of referrals to assess overcounting of cases.
- \* Stability of catchment populations to minimise denominator errors.
- \* These five questions were developed into two research projects:
- \* Determining patterns of obstetric patient flow.
- \* Determining catchment areas and obstetric referral patterns.

### Determining patterns of obstetric patient flow

The purpose of this study was to develop an appropriate design and determine the siting of key obstetric registers in order to facilitate and gauge the accuracy of the numerators for the selected project indicators. The research objective was to determine the obstetric patient flow in hospitals and the extent of misreporting of obstetric emergencies and maternal deaths.

Registers used need to capture information on the occurrence of emergency obstetric complications at all stages of pregnancy and the puerperium. Sources of error were identified in the existing system during the needs assessment and tools development workshop and were generally confined to the hospital level. Errors included:

- \* Data scattered through up to four registers in the maternity wards, plus other registers in the female or gynaecology wards, and sometimes registers at other sites in the hospital, for example the admission book.
- \* Obstetric emergency conditions recorded in the in patient notes but not necessarily in registers, particularly if the condition developed after delivery. Underreporting on the number of complications could result.
- \* Obstetric emergency cases recorded in several registers leading to the risk of double counting.
- \* Maternal deaths not recorded, particularly if they occur shortly after arrival, or if they occur on a ward other than a maternity ward.

### Methods

Two sites were selected which were representative of hospitals in the region: Chiradzulu District Hospital, which functions as a District Hospital, and Zomba Central Hospital which functions as a referral and District Hospital. A retrospective record review comprising tracing and cross referencing of selected obstetric cases across all relevant registers was undertaken, forwards from admission and backwards from discharge, with reference to the case notes.

## Sample size

In each facility, the aim was to select 10 cases of each emergency obstetric complication, totalling 100 cases, and 100 normal cases, over a period of one year (1998). Female deaths were selected as available for the last three completed years. Sample sizes were selected for convenience and not intended for statistical significance.

## Results

Cases were located initially from the outpatient department, delivery, female ward or theatre books. 98 cases of emergency obstetric complications\* were identified, 107 normal obstetric cases and 54 female deaths in Zomba. In Chiradzulu, 56 cases of emergency obstetric complications, 104 normal cases and 15 maternal deaths were included in the study.

Most cases were entered in one or more registers, 91.8% in Zomba and 69.6% in Chiradzulu (Table 3). As expected, the pattern which emerged was that women in late pregnancy tend to be mainly recorded in the maternity ward, delivery book and theatre (the maternity loop) but not in the out-patients department or the female ward. Those in early pregnancy and in the post partum period tend to be recorded in the outpatients department, female ward and theatre books (the female ward loop). Analysis of the patient flow maps confirmed that in both hospitals, the two loops of patient flow exist, which are closed to each other. Crossover occurred in only 3 cases.

**Table 3: Patient flow for obstetric emergencies**

Hospital	Number of cases identified within reference period	Type of investigation	Case notes located or flow map completed	Case entered in more than one register	Categories of obstetric patient flow through hospital by type of case		
					Maternity-Labour ward-Theatre (mortuary) Maternity loop (ML)	OPD-Female ward-Theatre (mortuary) Female loop (FL)	Cross over ML and FL
Zomba	98	Case notes	64.9%	91.8%	56	41	0
Chiradzulu	56	Case notes	60.7%	69.6%	31	9	3
		Patient flow	99%				
		Patient flow	76.8%				

The investigation of obstetric cases recorded as normal revealed that 7.5% of cases in Zomba Hospital and 4.8% in Chiradzulu Hospital should have had a complication recorded (Table 4)

**Table 4: Proportion of "normal" obstetric cases with complications**

Hospital	Number of cases recorded as "normal"	Cases recorded as "normal" with obstetric emergencies or other serious complication	
		N	%
Zomba	107	8	7.5
Chiradzulu	104	5	4.8

The female deaths identified were classified as those occurring in pregnancy or the post partum period, and those where it was impossible to tell from the records if the death had occurred in pregnancy or the post partum period (Table 5). More than a sixth of pregnant and post partum deaths occurred in the female ward.

On examination of the case notes, 80-90% of the

pregnant and postpartum deaths were direct maternal deaths. However, only 7% had been originally classified as maternal in Chiradzulu Hospital while 80% were originally classified as maternal in Zomba Hospital.

\* Defined in this study as antepartum haemorrhage, postpartum haemorrhage, pre eclampsia, eclampsia, obstructed labour, ruptured uterus, retained placenta, postpartum sepsis, ectopic pregnancy, abortion complications.

**Table 5: Female deaths**

Hospital	Female deaths identified	Female deaths identified to be in pregnancy/ Post partum	Unable to tell if death was in pregnancy/ Post partum	Pregnancy/ Post partum deaths in maternity or labour ward	Pregnancy/ Post partum deaths in female ward
Zomba	100	54	23	63.0%	14.8%
Chiradzulu	189	15	50	60.0%	13.3%

## 4.1.5 Discussion

It is clear that to avoid substantial omissions, collection of maternity data must include data from the female (or gynaecology) ward. The finding of two closed loops of patient flow with minimal crossover indicated that to capture all admissions and minimise potential for double counting, two registers (for the female ward and the maternity ward) should be developed to replace the existing books.

The study suggested that although the proportion in emergency obstetric cases misclassified as "normal" were fairly low, the potential for undercounting exists. To ensure that all essential information is recorded, the registers will include a column where emergency obstetric cases are identified and can be easily counted.

Misclassification of maternal deaths and undercounting due to deaths occurring outside the maternity unit could be minimised by including a column in the female ward register dedicated to identifying pregnant and post partum women. The importance of training and improving the quality of record keeping cannot be overemphasized.

It is not possible to estimate the extent of biases in this study. However, the high proportion of missing case notes - over a third - at both sites and the difficulties of completing patient flow maps for so many cases in Chiradzulu indicate that selection biases are very likely to influence the data collected in the monitoring system. These omissions would not be of concern if they were a random sample of all cases, but this is not certain. In many service settings, the cases with adverse outcomes are often those most difficult to retrieve.

The study also cannot be seen to reflect the situation in large tertiary referral hospitals, where the labour wards, postnatal and antenatal wards may operate independently of each other. For example, siting of the registers in only the antenatal ward will miss women admitted directly to other wards, or who develop problems in labour, or the postpartum period.

Elizabeth Goodburn, Wendy Graham, Valentino Lema, Henry Damisoni, Julia Hussein MALAWI SAFE MOTHERHOOD PROJECT, BLANTYRE

The material in this paper was presented at the 4th International Scientific Meeting of the Royal College of Obstetricians and Gynaecologists, Cape Town, 4-6th October 1999 by Julia Hussein and Valentino Lema

1. UNICEF/WHO/UNFPA 1997 Guidelines for Monitoring the Availability and Use of Obstetric Services UNICEF New York
2. WHO 1994 Indicators to Monitor Maternal Health Goals: Report of a Technical Working Group WHO/FHE/MSM/94.14 Geneva