

3. STRATEGIES FOR PREVENTING MATERNAL DEATHS

Meda N, Hounton S, De Brouwere V, Sombié I, Byass P; IMMPACT Burkina Evaluation Study Group. From evaluating a Skilled Care Initiative in rural Burkina Faso to policy implications for safe motherhood in Africa. Trop Med Int Health. 2008 Jul;13 Suppl 1:68-72.

Evaluation findings from a particular setting need to be generalized into policy implications if they are to find widespread use. **Skilled attendance at delivery is widely regarded as one of the most important intervention strategies for safe motherhood in low-resource settings, particularly in Africa**, but implementations of such strategies are often not rigorously evaluated or interpreted into future policy. Initiative for Maternal Mortality Programme Assessment (Immpact) has applied a package of research-based monitoring and evaluation tools to assess the Family Care International Skilled Care Initiative in Ouargaye District, Burkina Faso. This evaluation research aimed to generate reliable, evidence-based policies for accelerating safe motherhood programmes in Burkina Faso and elsewhere in Africa. Five policy priorities were identified as representing real chances of improving the safety of motherhood: **(1) enhancing national coverage of delivery by professionally skilled attendants; (2) to provide a network of 24-h basic emergency obstetric care within 5 km; (3) to have an effective referral system, equipped and resourced to undertake a reasonable number of Caesarean sections; (4) to promote community mobilization activities as a lever to increasing delivery care utilization; and (5) to implement strategies to remove financial barriers to delivery care.** To meet Millennium Development Goal five by 2015, both supply and demand side constraints on the provision of quality maternity care have to be addressed, which in turn need greater political commitment and funding.

PMID: 18578814 [PubMed - indexed for MEDLINE]

Madi BC, Hussein J, Hounton S, D'Ambruoso L, Achadi E, Arhinful DK; EQ. Setting priorities for safe motherhood programme evaluation: a participatory process in three developing countries. Health Policy. 2007 Sep;83(1):94-104. Epub 2007 Feb 20.

A participatory approach to priority setting in programme evaluation may help improve the allocation and more efficient use of scarce resources especially in low-income countries. **Research agendas that are the result of collaboration between researchers, programme managers, policy makers and other stakeholders have the potential to ensure rigorous studies are conducted on matters of local priority, based on local, expert knowledge.** This paper describes a process involving key stakeholders to elicit and prioritise evaluation needs for safe motherhood in three developing countries. A series of reiterative consultations with safe motherhood stakeholders from each country was conducted over a period of 36 months. In each country, the consultation process consisted of a series of participatory workshops; firstly, stakeholder's views on

evaluation were elicited with parallel descriptive work on the contexts. Secondly, priorities for evaluation were identified from stakeholders; thirdly, the evaluation-priorities were refined; and finally, the evaluation research questions, reflecting the identified priorities, were agreed and finalised. Three evaluation-questions were identified in each country, and one selected, on which a full scale evaluation was undertaken. While there is a great deal written about the importance of transparent and participatory priority setting in evaluation; few examples of how such processes could be implemented exist, particularly for maternal health programmes. **Our experience demonstrates that the investment in a participatory priority-setting effort is high but the process undertaken resulted in both globally and contextually-relevant priorities for evaluation.** This experience provides useful lessons for public health practitioners committed to bridging the research-policy interface.

PMID: 17313993 [PubMed - indexed for MEDLINE]

Dumont A, Tourigny C, Fournier P. Improving obstetric care in low-resource settings: implementation of facility-based maternal death reviews in five pilot hospitals in Senegal. Hum Resour Health. 2009 Jul 23;7:61.

ABSTRACT: BACKGROUND: In sub-Saharan Africa, maternal and perinatal mortality and morbidity are major problems. Service availability and quality of care in health facilities are heterogeneous and most often inadequate. In resource-poor settings, the facility-based maternal death review or audit is one of the most promising strategies to improve health service performance. We aim to explore and describe health workers' perceptions of facility-based maternal death reviews and to identify barriers to and facilitators of the implementation of this approach in pilot health facilities of Senegal. METHODS: This study was conducted in five reference hospitals in Senegal with different characteristics. Data were collected from focus group discussions, participant observations of audit meetings, audit documents and interviews with the staff of the maternity unit. Data were analysed by means of both quantitative and qualitative approaches. RESULTS: Health professionals and service administrators were receptive and adhered relatively well to the process and the results of the audits, although some considered the situation destabilizing or even threatening. The main barriers to the implementation of maternal deaths reviews were: (1) bad quality of information in medical files; (2) non-participation of the head of department in the audit meetings; (3) lack of feedback to the staff who did not attend the audit meetings. The main facilitators were: (1) high level of professional qualifications or experience of the data collector; (2) involvement of the head of the maternity unit, acting as a moderator during the audit meetings; (3) participation of managers in the audit session to plan appropriate and realistic actions to prevent other maternal deaths. CONCLUSION: **The identification of the barriers to and the facilitators of the implementation of maternal death reviews is an essential step for the future adaptation of this method in countries with few resources.** We recommend for future implementation of this method a prior enhancement of the perinatal information system and initial training of the members of the audit committee - particularly the data collector

and the head of the maternity unit. Local leadership is essential to promote, initiate and monitor the audit process in the health facilities.

PMID: 19627605 [PubMed - in process]

Paxton A, Maine D, Freedman L, Fry D, Lobis S. The evidence for emergency obstetric care. Int J Gynaecol Obstet. 2005 Feb;88(2):181-93. Epub 2005 Jan 8.

PURPOSE: We searched for evidence for the effectiveness of emergency obstetric care (EmOC) interventions in reducing maternal mortality primarily in developing countries. METHODS: We reviewed population-based studies with maternal mortality as the outcome variable and ranked them according to the system for ranking the quality of evidence and strength of recommendations developed by the US Preventive Services Task Force. A systematic search of published literature was conducted for this review, including searches of Medline, PubMed, Cochrane Database of Systematic Reviews, the Cochrane Pregnancy and Childbirth Database and the Cochrane Controlled Trials Register. RESULTS: The strength of the evidence is high in several studies with a design that places them in the second and third tier in the quality of evidence ranking system. No studies were found that are experimental in design that would give them a top ranking, due to the measurement challenges associated with maternal mortality, although many of the specific individual clinical interventions that comprise EmOC have been evaluated through experimental design. There is strong evidence based on studies, using quasi-experimental, observational and ecological designs, **to support the contention that EmOC must be a critical component of any program to reduce maternal mortality.**

PMID: 15694106 [PubMed - indexed for MEDLINE]

Ensor T, Ronoh J. Effective financing of maternal health services: a review of the literature. Health Policy. 2005 Dec;75(1):49-58.

Health care can be funded in a number of ways ranging from direct user charges (out of pocket) payments to indirect methods that pool across time (prepayment) and across different risk and wealth groups (insurance and general taxation). All these methods can be used to finance maternal health services. When assessing the impact of financing mechanisms it is important to be aware of the different ways they affect service delivery patterns and utilisation.

Specifically most systems have both equity and efficiency aspects that combine to impact on health service utilisation and health status. In general indirect methods that help families to pool the costs of maternal health services are preferable to direct methods of payment. It is also clear, however, that user charges may sometimes help to mitigate deficiencies in systems of pooled funding. Available literature suggests that financing mechanisms for maternal health services could be improved by systems that increase transparency, help to mitigate demand-side costs of services and provide funding for that promote transparent charging for services. While the limited experience of demand-side mechanisms for improving access to maternal health services more evaluation is required.

PMID: 16298228 [PubMed - indexed for MEDLINE]

Borghgi J, Ensor T, Somanathan A, Lissner C, Mills A; Lancet Maternal Survival Series steering group. Mobilising financial resources for maternal health. Lancet. 2006 Oct 21;368(9545):1457-65.

Coverage of cost-effective maternal health services remains poor due to insufficient supply and inadequate demand for these services among the poorest groups. Households pay too great a share of the costs of maternal health services, or do not seek care because they cannot afford the costs. Available evidence creates a strong case for **removal of user fees** and provision of universal coverage for pregnant women, particularly for delivery care. To be successful, governments must also replenish the income lost through the abolition of user fees. Where **insurance schemes** exist, maternal health care needs to be included in the benefits package, and careful design is needed to ensure uptake by the poorest people. **Voucher schemes** should be tested in low-income settings, and their costs and relative cost-effectiveness assessed. Further research is needed on methods to target financial assistance for **transport and time costs**. Current investment in maternal health is insufficient to meet the fifth Millennium Development Goal (MDG), and much greater resources are needed to scale up coverage of maternal health services and create demand. Existing global estimates are too crude to be of use for domestic planning, since resource requirements will vary; budgets need first to be developed at country-level. Donors need to increase financial contributions for maternal health in low-income countries to help fill the resource gap. Resource tracking at country and donor levels will help hold countries and donors to account for their commitments to achieving the maternal health MDG.

PMID: 17055948 [PubMed - indexed for MEDLINE]

Richard F, Ouédraogo C, Compaoré J, Dubourg D, De Brouwere V. Reducing financial barriers to emergency obstetric care: experience of cost sharing mechanism in a district hospital in Burkina Faso. Trop Med Int Health. 2007 Aug;12(8):972-81.

OBJECTIVE: To describe the implementation of a cost-sharing system for emergency obstetric care in an urban health district of Ouagadougou, Burkina Faso and analyse its results after 1 year of activity. **METHODS:** Service availability and use, service quality, knowledge of the cost-sharing system in the community and financial viability of the system were measured before and after the system was implemented. Different sources of data were used: community survey, anthropological study, routine data from hospital files and registers and specific data collected on major obstetric interventions (MOI) in all the hospitals utilized by the district population. Direct costs of MOI were collected for each patient through an individual form and monitored during the year 2005. Rates of MOI for absolute maternal indications (AMI) were calculated for the period 2003-2005. **RESULTS:** The direct cost of a MOI was on average 136US\$, including referral cost. Through the cost-sharing system this amount was shared between families (46US\$), health centres (15US\$), Ministry of Health (38US\$) and local

authority (37US\$). The scheme was started in January 2005. The rate of cost recovery was 91.3% and the balance at the end of 2005 was slightly positive (4.7% of the total contribution). The number of emergency referrals by health centres increased from 84 in 2004 to 683 in 2005. MOI per 100 expected births increased from 1.95% in 2003 to 3.56% in 2005 and MOI for AMI increased from 0.75% to 1.42%. CONCLUSIONS: **The dramatic increase in MOI suggests that the cost-sharing scheme decreased financial and geographical barriers to emergency obstetric care.** Other positive effects on quality of care were documented but the sustainability of such a system remains uncertain in the dynamic context of Burkina Faso (decentralization).

PMID: 17697092 [PubMed - indexed for MEDLINE]

Fofana P, Samai O, Kebbie A, Sengeh P. Promoting the use of obstetric services through community loan funds, Bo, Sierra Leone. The Bo PMM Team. Int J Gynaecol Obstet. 1997 Nov;59 Suppl 2:S225-30.

PRELIMINARY STUDIES: Focus group discussions revealed that a lack of funds often contributed to a delay for women receiving treatment for obstetric complications. INTERVENTIONS: Improvements were made in health facilities and transport, then, beginning in 1992, meetings were held to mobilize communities to establish emergency loan funds. Per capita levies were set and repayment was enforced by the most paramount chief of the area. Funds were managed by existing village development committees and loans were granted to women who could not pay hospital bills immediately. RESULTS: Of the six chiefdoms contacted, two successfully **established loan funds**. Utilization of Bo Government Hospital by women with complications from the two chiefdoms with loan funds increased from five in 1992 to 12 in 1993. Utilization from other chiefdoms remained basically unchanged. Of women from loan fund chiefdoms, half paid their hospital bills in full and one-third paid in part. COSTS: The cost of community mobilization was about US \$472. CONCLUSIONS: The establishment of loan funds depended on strong community leadership and required substantial mobilization efforts. **Where community loan funds are established, utilization of emergency obstetric care may increase.**

PMID: 9389635 [PubMed - indexed for MEDLINE]

Wilson JB, Collison AH, Richardson D, Kwofie G, Senah KA, Tinkorang EK. The maternity waiting home concept: the Nsawam, Ghana experience. The Accra PMM Team. Int J Gynaecol Obstet. 1997 Nov;59 Suppl 2:S165-72.

PRELIMINARY STUDIES: Focus group discussions with community members in Nsawam District, Ghana, identified poor roads, scarce transport and exorbitant fees for emergency transport as barriers to reaching the district hospital for treatment of an obstetric complication. INTERVENTIONS: To minimize delay in the event of a complication, a maternity waiting home (MWH) was established in Nsawam in 1994. One ward of an abandoned hospital was renovated and furnished for this purpose. The objective was to encourage women at high risk of obstetric complications to move to the MWH so they could be transferred to the hospital when labor began. RESULTS: Of 25 women referred to the MWH by

health personnel over 12 months, only one complied, for one night. Focus group discussions with community members and hospital staff later revealed that cost and hardship of staying away from home, absence of health personnel, distance from hospital, desolate surroundings and lack of perceived need were reasons for poor utilization. COSTS: The intervention cost approximately US \$10,500, shared approximately equally between the project and government. The main government contribution was the building. CONCLUSIONS: **It is important to consult potential users not only to identify problems, but also to identify appropriate solutions. Careful 'market research' should be done before launching interventions.**

PMID: 9389628 [PubMed - indexed for MEDLINE]

Asante F.A.; Chikwama C.; Daniel A. S; Armarkulemesu M; Evaluating the economic outcomes of the Policy of fee exemption for maternal delivery care in Ghana. GHANA. Ghana Med. J. 2007; Volume 41 (3): 110

SUMMARY

Background: The Government of Ghana's **fee exemption** policy for delivery care introduced in September 2003, aimed at reducing financial barriers to using maternal services. This policy also aimed to increase the rate of skilled attendance at delivery, reduce maternal and perinatal mortality rates and contribute to reducing poverty. Objective: To evaluate the economic outcomes of the policy on households in Ghana. Methods: Central and Volta regions were selected for the study. In each region, six districts were selected. A two stage sampling approach was used to identify women for a household cost survey. A sample of 1500 women in Volta region (made up of 750 women each before and after the exemption policy) and 750 women after the policy was introduced in Central region. Outcome Measures: Household out-of-pocket payment for maternal delivery and catastrophic out-of-pocket health payments. Results: There was a statistically significant decrease in the mean out-of-pocket payments for caesarean section (CS) and normal delivery at health facilities after the introduction of the policy. The percentage decrease was highest for CS at 28.40% followed by normal delivery at 25.80%. The incidence of catastrophic **out-of-pocket payments also fell**. At lower thresholds, the incidence of catastrophic delivery payment was concentrated more amongst the poor. For the poorest group (1st quintile) household out-of-pocket payments in excess of 2.5% of their pre-payment income dropped from 54.54% of the households to 46.38% after the exemption policy. The policy had a more positive impact on the extreme poor than the poor. The richest households (5th quintile) had a decline in out-of-pocket payments of 21.51% while the poor households (1st quintile) had a 13.18% decline. Conclusions: The policy was beneficial to users of the service. However, the rich benefited more than the poor. There is need for proper targeting to identify the poorest of the poor before policies are implemented to ensure maximum benefit by the target group.

Inegbenebor, U . Conceptual model for the prevention of maternal mortality in Nigeria. TROPICAL DOCTOR 37 (2):104-106 2007.

Abstract Maternal mortality rates are much higher in developing countries than in the developed countries. In Nigeria, rates between 500 and 1500 per 100,000 are common. Questionnaires were administered to 30 primary health centres in Edo central senatorial district of Nigeria in order to find out the staffing, 24 h staff coverage of the primary health centre and difficulties encountered in referring patients. It was found that most of the primary health centres had no doctor coverage. The average number of midwives per centre was two, and transport was not usually available for transfers especially at night. It was concluded that lack of commitment on the part of all tiers of government was the reason behind the high mortality rates, and a **conceptual model of one resident doctor per centre, with a 24 h coverage by midwives and a central ambulance centre for each local government area, was proposed for the reduction of maternal mortality, using the available resources in Nigeria.**

[Anon]. Almost 9 in 10 maternal deaths could be prevented, Zimbabwe study shows. Safe Mother (16):10 1995

Abstract The University of Zimbabwe and two universities in Sweden conducted a study in Masvingo Province in Zimbabwe to examine maternal deaths. There were 168 and 85 maternal deaths per 100,000 live births in rural and urban areas, respectively. 90% and 85% of maternal deaths in rural and urban areas, respectively, were preventable. Mother-related preventable factors were no prenatal care, lack of social support, and delay in seeking help. Traditional birth attendant-related preventable factors were delay in referring mother to health care, inability to understand the severity of the complication, and administration of the wrong treatment. Local clinic-related preventable factors included inadequate resources, poor communication, and poor training of health care staff. Hospital-related preventable factors were delayed treatment, wrong diagnosis, wrong treatment, no supplies, and inadequate skills. Lack of prenatal care was common among many women who died from pregnancy- or childbirth-related complications. More than 33% of maternal deaths in rural areas occurred because there were no means for transport to the nearest clinic or hospital. Women who were single, divorced, separated, or self-supporting during pregnancy were more likely to die due to lack of social support. Other risk factors were high rate of unwanted pregnancies, age 35 or above, previous fetal death or miscarriage, and parity 7 or above. The leading causes of maternal death in rural areas included hemorrhage (25%), sepsis after unsafe abortion (15%), and puerperal sepsis (13%). In urban areas, they were eclampsia (26%), sepsis after unsafe abortion (23%), puerperal sepsis (15%), and hemorrhage (10%). 50% of the maternal deaths occurred outside of a health facility. More than 50% had already delivered 5 times. **Recommendations to reduce maternal deaths were community-based health education on the risk factors of pregnancy and childbirth, improved health facilities, better training of health personnel, and improved family planning programs.**

Evjen-Olsen B; Evjen-Olsen O; Kvåle G. Achieving progress in maternal and neonatal health through integrated and comprehensive healthcare services – experiences from a programme in northern Tanzania. International Journal for Equity in Health 2009, 8:27

Background: An integrated and comprehensive hospital/community based health programme is presented, aimed at reducing maternal and child mortality and morbidity. It is run as part of a general programme of health care at a rural hospital situated in northern Tanzania. The purpose was through using research and statistics from the programme area, to illustrate how a hospital-based programme with a vision of integrated healthcare may have contributed to the lower figures on mortality found in the area. Such an approach may be of interest to policy makers, in relation to the global strategy that is now developed in order to meet the MDGs 4 and 5.

Programme setting: The hospital provides reproductive and child health services, PMTCT-plus, comprehensive emergency obstetric care, ambulance, radio and transport services, paediatric care, an HIV/AIDS programme, and a generalised healthcare service to a population of approximately 500 000.

Programme description and outcomes: We describe these services and their potential contribution to the reduction of the maternal and neonatal mortality ratios in the study area. Several studies from this area have showed a lower maternal mortality and neonatal mortality ratio compared to other studies from Tanzania and the national estimates. Many donor-funded programmes focusing on maternal and child health are vertical in their framework. However, the hospital, being the dominant supplier of health services in its catchment area, has maintained a horizontal approach through a comprehensive care programme. The total cost of the comprehensive hospital programme described is 3.2 million USD per year, corresponding to 6.4 USD per capita.

Conclusion: Considering the relatively low cost of a comprehensive hospital programme including outreach services and the lower mortality ratios found in the catchment area of the hospital, we argue that donor funds should be used for supporting horizontal programmes aimed at comprehensive healthcare services.

Through a strengthening of the collaboration between government and voluntary agency facilities, with clinical, preventive and managerial capabilities of the health facilities, the programmes will have a more sustainable impact and will achieve greater progress in the reduction of maternal and neonatal mortality, as opposed to vertical and segregated programmes that currently are commonly adopted for averting maternal and child deaths.

Thus, we conclude that horizontal and comprehensive services of the type described in this article should be considered as a prerequisite for sustainable health care delivery at all policy and decision-making levels of the local, national and international health care delivery pyramid.

**Countdown Working Group on Health Policy and Health Systems.
Assessment of the health system and policy environment as a critical**

complement to tracking intervention coverage for maternal, newborn, and child health. *Lancet* 2008; 371: 1284–93,

In 2008, the Countdown to 2015 initiative identified 68 priority countries for action on maternal, newborn, and child health. Much attention was paid to monitoring country-level progress in achieving high and equitable coverage with interventions effective in reducing mortality of mothers, newborn infants, and children up to 5 years of age. To have a broader understanding of the environment in which health services are delivered and health outcomes are produced is essential to ***increase intervention coverage***. Programmes to address MNCH rely on health systems to generate information needed for effective decisions and to achieve the expected outcomes. Governance and leadership are needed throughout the process not only to create policies and implement them but also to assure quality and efficiency of care, to finance health services sufficiently and in an equitable way, and to manage the health workforce. We present a systematic approach to assess the wider health system and policy environment needed to achieve positive outcomes for maternal, newborn, and child health. We report on results from 13 indicators and show gaps in policy adoption as well as weaknesses in other health system building blocks. We identify areas for future action in measurement of key indicators and their use to support decision making. We hope that this information will provide an additional dimension to the discussions on feasible and sustainable solutions to accelerate progress towards Millennium Development Goals 4 and 5, both at the global level but most importantly in individual countries.

Kwast BE. Reduction of maternal and perinatal mortality in rural and peri-urban settings: what works? *Eur J Obstet Gynecol Reprod Biol.* 1996 Oct;69(1):47-53.

The purpose of this article is two-fold: (i) to lay out conceptual frameworks for programming in the fields of maternal and neonatal health for the reduction of maternal and peri/neonatal mortality; (ii) to describe selected MotherCare demonstration projects in the first 5 years between 1989 and 1993 in Bolivia, Guatemala, Indonesia and ***Nigeria***. In Inquisivi, Bolivia, Save the Children/Bolivia, worked with 50 women's groups in remote rural villages in the Andean mountains. Through a participatory research process, the 'autodiagnosis', actions identified by women's groups included among others: provision of family planning through a local non-governmental organization (NGO), training of community birth attendants, income generating projects. In Quetzaltenango, Guatemala, access was improved through training of traditional birth attendants (TBAs) in timely recognition and referral of pregnancy/delivery/neonatal complications, while quality of care in health facilities was improved through modifying health professionals' attitude towards TBAs and clients, and implementation of management protocols. In Indonesia, the University of Padjadjaran addressed issues of referral and emergency obstetric care in the West-Java subdistrict of Tanjunsari. Birthing homes with radios were established in ten of the 27 villages in the district, where trained nurse/midwives provided maternity care on a regular basis. ***In Nigeria***

professional midwives were trained in interpersonal communication and lifesaving obstetric skills, while referral hospitals were refurbished and equipped.

While reduction in maternal mortality after such a short implementation period is difficult to demonstrate, all projects showed improvements in referral and in reduction in perinatal mortality.

PIP: This article presents an analysis of baseline data from four Mothercare projects that provided community-based maternal and child health services in rural Inquisivi, Bolivia; rural Quetzaltenango, Guatemala; rural Tanjungsari in West Java, Indonesia; and Bauchi state, Nigeria. Each project relied on different interventions. All women faced economic, psychological, sociocultural, technical, and administrative barriers in accessing services. The Safe Motherhood Initiative found that people's medical decisions were often based on nonmedical reasons and cultural appropriateness, and that the medical community needs to recognize their competitors in alternative health systems. Maternal and child survival are dependent upon recognition of the problem, decision making about care, access to care, and quality of care. A well-functioning program includes policy formulation, training, IEC, management and supervision, logistics and supplies, and research, monitoring, and evaluation. Study surveys were conducted during the early 1990s. In Bolivia, findings indicate that perinatal mortality declined during 1990-93 to 38/1000 births and fewer mothers died due to pregnancy or childbirth. Family planning use increased from 0 to 27%. The Bolivian project worked to strengthen women's groups. Findings from the Guatemalan project indicate that referrals from traditional birth attendants (TBAs) increased in both the implementation and the comparison areas, but significantly more so in the implementation area. Perinatal mortality among referred women decreased in both areas (from 22.2% to 11.8% in the intervention area). Indonesian results indicate that referrals to birthing centers by TBAs increased from 19% to 62%. Maternal mortality was halved; perinatal mortality declined to 35.8/1000. In Nigeria, maternal mortality declined among all causes.

PMID: 8909956 [PubMed - indexed for MEDLINE]

Kwast BE. Building a community-based maternity program. Int J Gynaecol Obstet. 1995 Jun;48 Suppl:S67-82.

The MotherCare Project has as its goal the reduction of maternal and neonatal mortality and related morbidities, and the promotion of the health of women and newborns. To achieve these goals, maternal and family planning programs were strengthened in both rural and urban settings through three intervention strategies--policy reform, affecting behaviors and improving services. **The fundamental premise in each project was to strengthen the weakest part of the maternity care pyramid, ensuring linkages among all levels of service--from community through to the referral hospital level.** In rural Andean populations of Bolivia, knowledge of danger signs and women's response to them improved, increasing in use of prenatal and family planning services through a participatory problem-solving and community-based strategy. In West Java, Indonesia, bringing professional midwifery services and facilities closer to women together has resulted in a positive response to their use. Augmenting this

intervention with a transport and intercommunication system together with improved hospital practice through perinatal mortality meetings and in-service training for doctors and midwives has reduced the maternal and perinatal mortality over a four year period. Hospital practice has improved in ***Uganda*** and in two states of ***Nigeria***, maternal mortality and morbidity have been reduced in the training facility where seminars for physicians, training of midwives in life saving midwifery and interpersonal communication skills have taken place, and equipment and supplies have been improved. Furthermore, in rural Guatemala, implementation of norms and protocols, expert supervision and sensitization of hospital staff to the needs of the community has increased referral by traditional birth attendants (TBAs) to the hospital and reduced perinatal mortality.

PMID: 7672176 [PubMed - indexed for MEDLINE]

Foord F. Gambia: evaluation of the mobile health care service in West Kiang district. World Health Stat Q. 1995;48(1):18-22.

A project to improve the quality of maternal health services was carried out over a 3-year period in West Kiang district, Gambia. **Coverage of maternal care was strengthened through upgrading of personnel, TBA training, improved treatment and referral schemes, and increased numbers of visits to rural outreach areas.** A control district was used to compare the impact of the interventions. During the project period of 3 years a single maternal death was registered in the intervention district, and 5 in the control area. While improved staffing and service provision led to higher degrees of coverage of maternal care services, reductions in maternal morbidity could not be documented in the intervention area. Given concern over the quality of the data possibly influencing this result, further research is necessary to determine the relationship between improved mobile maternal care services and their impact on maternal morbidity and perinatal outcome.

PIP: During 1989-91 the Dunn Nutrition Unit of the British Medical Research Council (MRC) conducted a study in the West Kiang district of Gambia to determine the effectiveness of using traditional birth attendants (TBAs) to identify pregnant women, register pregnant women early in a prenatal care program, treat anemia, identify obstetric problems with prompt referral to a hospital when indicated, and provide emergency treatment and rapid transfer of obstetric emergencies for specialist care. The MRC Dunn Nutrition Unit supplements government prenatal care services in the remote district of West Kiang via its mobile health care service. The interventions in West Kiang included improved staffing at Karantaba Health Centre, TBA training, community health nurse (CHN) training in essential laboratory tasks, and expansion of staff in West Kiang district. The remote district of Upper Baddibu did not receive this supplementary health service during the study period. By 23 weeks gestational age, women in West Kiang were more likely to be registered with the prenatal care service than those in Upper Baddibu (63.3% vs. 24%). Throughout pregnancy, the mean hemoglobin level was higher in West Kiang women than in Upper Baddibu women (11 vs. 8.4 g/dl). The upgrading of personnel, diagnostic, and therapeutic skills and adherence to established schedules and procedures significantly improved maternal care in West Kiang. The pregnant women in West Kiang were more likely to seek and receive medical care for minor and major conditions than those in Upper Baddibu (794 women/841 treatment episodes vs. 722/149, respectively). Maternal mortality was higher in Upper Baddibu than in West Kiang (7/1000 vs. 1.3/1000 live births). Yet both fetal deaths and early perinatal deaths were much higher in West Kiang than Upper Baddibu (39.9/1000 vs. 24.5/1000 births and 54.9/1000 vs. 39.6/1000, respectively). Underreporting in the control area may have accounted for the differences in pregnancy outcomes. It would also make it difficult to document the effect of the mobile health service unit on maternal health and pregnancy outcome.

PMID: 7571704 [PubMed - indexed for MEDLINE]

**Bhutta ZA, Darmstadt GL, Haws RA, Yakoob MY, Lawn JE.
Delivering interventions to reduce the global burden of stillbirths:
improving service supply and community demand. BMC Pregnancy
Childbirth. 2009 May 7;9 Suppl 1:S7.**

BACKGROUND: Although a number of antenatal and intrapartum interventions have shown some evidence of impact on stillbirth incidence, much confusion surrounds ideal strategies for delivering these interventions within health systems, particularly in low-/middle-income countries where 98% of the world's stillbirths occur. Improving the uptake of quality antenatal and intrapartum care is critical for evidence-based interventions to generate an impact at the population level. This concluding paper of a series of papers reviewing the evidence for stillbirth interventions examines the evidence for community and health systems approaches to improve uptake and quality of antenatal and intrapartum care, and synthesises programme and policy recommendations for how best to deliver evidence-based interventions at community and facility levels, across the continuum of care, to reduce stillbirths. **METHODS:** We systematically searched PubMed and the Cochrane Library for abstracts pertaining to community-based and health-systems strategies to increase uptake and quality of antenatal and intrapartum care services. We also sought abstracts which reported impact on stillbirths or perinatal mortality. Searches used multiple combinations of broad and specific search terms and prioritised rigorous randomised controlled trials and meta-analyses where available. Wherever eligible randomised controlled trials were identified after a Cochrane review had been published, we conducted new meta-analyses based on the original Cochrane criteria. **RESULTS:** In low-resource settings, cost, distance and the time needed to access care are major barriers for effective uptake of antenatal and particularly intrapartum services. A number of innovative strategies to surmount cost, distance, and time barriers to accessing care were identified and evaluated; of these, **community financial incentives, loan/insurance schemes, and maternity waiting homes seem promising**, but few studies have reported or evaluated the impact of the wide-scale implementation of these strategies on stillbirth rates. Strategies to improve quality of care by upgrading the skills of community cadres have shown demonstrable impact on perinatal mortality, particularly in conjunction with health systems strengthening and facilitation of referrals. Neonatal resuscitation training for physicians and other health workers shows potential to prevent many neonatal deaths currently misclassified as stillbirths. Perinatal audit systems, which aim to improve quality of care by identifying deficiencies in care, are a quality improvement measure that shows some evidence of benefit for changes in clinical practice that prevent stillbirths, and are strongly recommended wherever practical, whether as hospital case review or as confidential enquiry at district or national level. **CONCLUSION: Delivering interventions to reduce the global burden of stillbirths requires action at all levels of the health system. Packages of interventions should be tailored to local conditions, including local levels and causes of stillbirth, accessibility of care and health system resources and provider skill.** Antenatal care can potentially serve as a platform to deliver interventions to improve maternal nutrition, promote behaviour change

to reduce harmful exposures and risk of infections, screen for and treat risk factors, and encourage skilled attendance at birth. Following the example of high-income countries, improving intrapartum monitoring for fetal distress and access to Caesarean section in low-/middle-income countries appears to be key to reducing intrapartum stillbirth. In remote or low-resource settings, families and communities can be galvanised to demand and seek quality care through financial incentives and health promotion efforts of local cadres of health workers, though these interventions often require simultaneous health systems strengthening. Perinatal audit can aid in the development of better standards of care, improving quality in health systems. Effective strategies to prevent stillbirth are known; gaps remain in the data, the evidence and perhaps most significantly, the political will to implement these strategies at scale.

PMID: 19426470 [PubMed - indexed for MEDLINE]

Haws RA, Yakoob MY, Soomro T, Menezes EV, Darmstadt GL, Bhutta ZA. Reducing stillbirths: screening and monitoring during pregnancy and labour. BMC Pregnancy Childbirth. 2009 May 7;9 Suppl 1:S5.

BACKGROUND: Screening and monitoring in pregnancy are strategies used by healthcare providers to identify high-risk pregnancies so that they can provide more targeted and appropriate treatment and follow-up care, and to monitor fetal well-being in both low- and high-risk pregnancies. The use of many of these techniques is controversial and their ability to detect fetal compromise often unknown. Theoretically, appropriate management of maternal and fetal risk factors and complications that are detected in pregnancy and labour could prevent a large proportion of the world's 3.2 million estimated annual stillbirths, as well as minimise maternal and neonatal morbidity and mortality. **METHODS:** The fourth in a series of papers assessing the evidence base for prevention of stillbirths, this paper reviews available published evidence for the impact of 14 screening and monitoring interventions in pregnancy on stillbirth, including identification and management of high-risk pregnancies, advanced monitoring techniques, and monitoring of labour. Using broad and specific strategies to search PubMed and the Cochrane Library, we identified 221 relevant reviews and studies testing screening and monitoring interventions during the antenatal and intrapartum periods and reporting stillbirth or perinatal mortality as an outcome. **RESULTS:** We found a dearth of rigorous evidence of direct impact of any of these screening procedures and interventions on stillbirth incidence. Observational studies testing some interventions, including fetal movement monitoring and Doppler monitoring, showed some evidence of impact on stillbirths in selected high-risk populations, but require larger rigorous trials to confirm impact. Other interventions, such as amniotic fluid assessment for oligohydramnios, appear predictive of stillbirth risk, but studies are lacking which assess the impact on perinatal mortality of subsequent intervention based on test findings. Few rigorous studies of cardiotocography have reported stillbirth outcomes, but steep declines in stillbirth rates have been observed in high-income settings such as the U.S., where cardiotocography is used in conjunction with Caesarean section for fetal distress. **CONCLUSION:** There are numerous

research gaps and large, adequately controlled trials are still needed for most of the interventions we considered. The impact of monitoring interventions on stillbirth relies on use of effective and timely intervention should problems be detected. Numerous studies indicated that positive tests were associated with increased perinatal mortality, but while some tests had good sensitivity in detecting distress, false-positive rates were high for most tests, and questions remain about optimal timing, frequency, and implications of testing. Few studies included assessments of impact of subsequent intervention needed before recommending particular monitoring strategies as a means to decrease stillbirth incidence. In high-income countries such as the US, observational evidence suggests that widespread use of cardiotocography with Caesarean section for fetal distress has led to significant declines in stillbirth rates. **Efforts to increase availability of Caesarean section in low-/middle-income countries should be coupled with intrapartum monitoring technologies where resources and provider skills permit.**

PMID: 19426468 [PubMed - indexed for MEDLINE]

Kidney E, Winter HR, Khan KS, Gülmezoglu AM, Meads CA, Deeks JJ, Macarthur C. Systematic review of effect of community-level interventions to reduce maternal mortality. BMC Pregnancy Childbirth. 2009 Jan 20;9:2.

BACKGROUND: The objective was to provide a systematic review of the effectiveness of community-level interventions to reduce maternal mortality. METHODS: We searched published papers using Medline, Embase, Cochrane library, CINAHL, BNI, CAB ABSTRACTS, IBSS, Web of Science, LILACS and African Index Medicus from inception or at least 1982 to June 2006; searched unpublished works using National Research Register website, metaRegister and the WHO International Trial Registry portal. We hand searched major references. Selection criteria were maternity or childbearing age women, comparative study designs with concurrent controls, community-level interventions and maternal death as an outcome. We carried out study selection, data abstraction and quality assessment independently in duplicate. RESULTS: We found five cluster randomised controlled trials (RCT) and eight cohort studies of community-level interventions. We summarised results as odds ratios (OR) and confidence intervals (CI), combined using the Peto method for meta-analysis. Two high quality cluster RCTs, aimed at improving perinatal care practices, showed a reduction in maternal mortality reaching statistical significance (OR 0.62, 95% CI 0.39 to 0.98). Three equivalence RCTs of minimal goal-oriented versus usual antenatal care showed no difference in maternal mortality (1.09, 95% CI 0.53 to 2.25). The cohort studies were of low quality and did not contribute further evidence. CONCLUSION: **Community-level interventions of improved perinatal care practices can bring about a reduction in maternal mortality.** This challenges the view that investment in such interventions is not worthwhile. Programmes to improve maternal mortality should be evaluated using randomised controlled techniques to generate further evidence.

PMID: 19154588 [PubMed - indexed for MEDLINE]

Natoli L, Renzaho AM, Rinaudo T. Reducing harmful traditional practices in Adjibar, Ethiopia: lessons learned from the Adjibar Safe Motherhood Project. Contemp Nurse. 2008 May;29(1):110-9.

This paper assesses the impact of the Adjibar Safe Motherhood Project and derives lessons of value to future interventions. Amongst the participatory qualitative methods used were 15 group discussions, eight semi-structured interviews, a number of opportunistic informal discussions and observation. The information gathering was complemented by a detailed review of project documents. Field visits for data collection took place over a six day period in March 2005. The project was effective in raising awareness about maternal health, and the social, economic and health consequences of various harmful traditional practices (HTPs). It has also mobilised the community to monitor and report HTPs and has strengthened referral systems for counselling, support and treatment. A number of effective strategies were identified as having contributed to project success. These are presented using the framework offered by the Ottawa Charter for Health Promotion which presents five areas of public health action: **developing personal skills; strengthening community action; building healthy public policy; re-orienting health services; and, creating supportive environments**. This evaluation contributes to and strengthens the expanding body of literature about effective development practices to reduce HTPs. It demonstrates that addressing HTPs takes time and long term investment; both are necessary to enable better understanding of the social and cultural reasons for HTPs before attempting to address them, and to build the community trust necessary to overcome the natural resistance to challenging such deeply entrenched practices. The project also highlighted the importance of developing a multi pronged strategy based on engagement with a broad range of stakeholders and supportive legislation.

PMID: 18844548 [PubMed - indexed for MEDLINE]

Manandhar M, Maimbolwa M, Muulu E, Mulenga MM, O'Donovan D. Intersectoral debate on social research strengthens alliances, advocacy and action for maternal survival in Zambia. Health Promot Int. 2009 Mar;24(1):58-67. Epub 2008 Nov 12.

The Health Promotion Research Centre of the National University of Ireland, Galway and the University of Zambia's School of Medicine conducted operational research to understand and address the socio-cultural and gender contexts of maternal survival. Together with an analytical policy and programming review and qualitative research, the project process also involved the convening of 'Interest Group' meetings involving intersectoral stakeholders at Central (Lusaka) and Provincial (Kasama) levels. These meetings aimed to catalyse debate and stimulate advocacy on the project theme by using discussion of qualitative research as entry point. Participants came from government departments, civil society groups, the indigenous health system, academia, technical provider associations, and media, advocacy and human rights organisations. We found that engagement in Interest Groups was successful at Provincial level with lively

participation from civil society, media and advocacy stakeholders and strong engagement by the health system. The process was welcomed as an opportunity to fill gaps in understanding about underlying social determinants of health and jointly explore intervention approaches. Overburdened government staff at central level faced with disease-focused interventions rather than underlying contextual determinants, and a weak culture of health sector engagement with civil society, academics and activists, contributed to less successful functioning in Lusaka. Final Dissemination and Discussion Events incorporated material from Interest Group Meetings to stimulate wider discussion and make recommendations. **This project highlights the potential value of intersectoral stakeholder discussions from the inception stage of research to stimulate intersectoral exchange and alliance building, inform advocacy, and catalyse the process of research into action.**

PMID: 19008243 [PubMed - indexed for MEDLINE]

Dumont A, Fournier P, Fraser W, Haddad S, Traore M, Diop I, Gueye M, Gaye A, Couturier F, Pasquier JC, Beaudoin F, Lalonde A, Hatem M, Abrahamowicz M. QUARITE (quality of care, risk management and technology in obstetrics): a cluster-randomized trial of a multifaceted intervention to improve emergency obstetric care in Senegal and Mali. *Trials*. 2009 Sep 18;10:85.

BACKGROUND: Maternal and perinatal mortality are major problems for which progress in sub-Saharan Africa has been inadequate, even though childbirth services are available, even in the poorest countries. Reducing them is the aim of two of the main Millennium Development Goals. Many initiatives have been undertaken to remedy this situation, such as the **Advances in Labour and Risk Management (ALARM) International Program, whose purpose is to improve the quality of obstetric services in low-income countries.** However, few interventions have been evaluated, in this context, using rigorous methods for analyzing effectiveness in terms of health outcomes. The objective of this trial is to evaluate the effectiveness of the ALARM International Program (AIP) in reducing maternal mortality in referral hospitals in Senegal and Mali. Secondary goals include evaluation of the relationships between effectiveness and resource availability, service organization, medical practices, and satisfaction among health personnel. **METHODS/DESIGN:** This is an international, multi-centre, controlled cluster-randomized trial of a complex intervention. The intervention is based on the concept of evidence-based practice and on a combination of two approaches aimed at improving the performance of health personnel: 1) Educational outreach visits; and 2) the implementation of facility-based maternal death reviews. The unit of intervention is the public health facility equipped with a functional operating room. On the basis of consent provided by hospital authorities, 46 centres out of 49 eligible were selected in Mali and Senegal. Using randomization stratified by country and by level of care, 23 centres will be allocated to the intervention group and 23 to the control group. The intervention will last two years. It will be preceded by a pre-intervention one-year period for baseline data collection. A continuous clinical data collection system has been

set up in all participating centres. This, along with the inventory of resources and the satisfaction surveys administered to the health personnel, will allow us to measure results before, during, and after the intervention. The overall rate of maternal mortality measured in hospitals during the post-intervention period (Year 4) is the primary outcome. The evaluation will also include cost-effectiveness.

PMID: 19765280 [PubMed - indexed for MEDLINE]

Tumwine JK, Dungare PS. Maternity waiting shelters and pregnancy outcome: experience from a rural area in Zimbabwe. Ann Trop Paediatr. 1996 Mar;16(1):55-9.

Despite efforts to improve prenatal and perinatal health care in developing countries, child-birth remains hazardous for both mother and child. Several measures have been initiated to try to improve maternal and perinatal morbidity and mortality. One such measure is the establishment of **maternity waiting shelters at hospitals** where mothers can wait so that, when they go into labour or develop antenatal complications, they can transfer to the hospital wards for management and safe delivery. From May 1987 to April 1989, we evaluated pregnancy outcome among 280 women using such a shelter in a remote rural district in Zimbabwe. Perinatal mortality was higher (29.8 per 1000) among 773 non-waiting mothers than among the waiting mothers (25.0 per 1000), although this was not statistically significant ($p > 0.05$). However, there were significantly more low birthweight babies (11.4%) among the non-waiting mothers than among the waiting mothers (4.3%) ($p < 0.01$). Fetal deaths were more common than early neonatal deaths, suggesting that maternal factors accounted for most of the perinatal deaths. Poor pregnancy outcome was associated more with primigravidae and grand multigravidae than with those who had had one to four pregnancies. We conclude that maternity waiting shelters can contribute to preventing low birthweight and, to a lesser extent, improve perinatal outcome. There is a need to strengthen health care referral systems and to increase efforts to improve other determinants of perinatal and maternal morbidity and mortality. PIP: Delivery in developing countries remains dangerous for both mother and child. One approach to reducing the levels of maternal and perinatal morbidity and mortality involves the establishment of maternity waiting shelters in which expectant mothers can wait for labor or the development of antenatal complications. Should the latter occur, the women can be transferred to neighboring hospital wards for management and safe delivery. The authors evaluated pregnancy outcomes from May 1987 to April 1989 among 280 women using such a shelter in Chimanimani district, Zimbabwe. Perinatal mortality was 29.8/1000 among 773 nonwaiting mothers compared to 25.0/1000 among the 280 waiting mothers; the difference was not statistically significant. There were, however, significantly more low-birth-weight babies (11.4%) among nonwaiting mothers than among waiting mothers (4.3%). Fetal deaths were more common than early neonatal deaths, suggesting that maternal factors accounted for most of the perinatal deaths. Poor pregnancy outcome was associated more with primigravidae and grand multigravidae than with those who had had 1-4

pregnancies. The authors conclude that maternity waiting shelters can help prevent low birth weight and, to a lesser extent, improve perinatal outcome. Health care referral systems need to be strengthened and efforts made to improve other determinants of perinatal and maternal morbidity and mortality

PMID: 8787367 [PubMed - indexed for MEDLINE].

Chandramohan D, Cutts F, Millard P. The effect of stay in a maternity waiting home on perinatal mortality in rural Zimbabwe. J Trop Med Hyg. 1995 Aug;98(4):261-7.

A hospital-based cohort study was carried out in a district hospital in Zimbabwe to evaluate the effect of a maternity waiting home on perinatal mortality. Information on antenatal risk factors, use of antenatal care, access to the hospital and stage of labour on arrival was collected for each woman delivering at the hospital during the period 1989-1991 (n = 6438). Women who stayed in the maternity waiting home had a lower risk of perinatal death compared to women who came directly from home to the hospital during labour. The crude relative risk of perinatal death for the women coming from home was 1.7 (95% confidence interval (CI) 1.1-2.6; P < 0.05). After adjusting for the effect of potential confounding variables, the relative risk decreased to 1.5 (95% CI 0.95-2.5, P = 0.07). However, when the analysis was restricted to women with antenatal risk factors there was a significant 50% reduction in the risk of perinatal death for the women who stayed at the maternity waiting home compared to women who came from home during labour (adjusted relative risk 1.9; 95% CI 1.1-3.4; P < 0.05). **The use of maternity waiting homes has the potential to reduce perinatal mortality in rural areas with low geographic access to hospitals and merits further evaluation.**

PIP: Obstructed labor, prematurity, and antepartum hemorrhage are some of the important causes of perinatal mortality in developing countries. The development and use of maternity waiting homes (MWH), lodgings close to hospitals, have been recommended by the World Health Organization as a strategy for reducing levels of maternal morbidity and mortality. Although MWHs are designed mainly to reduce levels of intra- and post-partum maternal complications of high-risk pregnancies, they also have the potential to reduce adverse perinatal outcomes for newborns. This paper reports findings from a study conducted under routine program conditions in Zimbabwe which compared intra-hospital perinatal deaths among women who stayed in a MWH and those who came directly from home during labor, adjusted for potential confounding factors which may affect the incidence of perinatal mortality. Information was collected on the antenatal risk factors, use of antenatal care, access to the hospital, and stage of labor on arrival for each of the 6438 women delivering at Chipinge Hospital during the period 1989-1991. Women who stayed in the MWH had a lower risk of perinatal death compared to women who came directly from home to the hospital during labor; the crude relative risk of perinatal death for the women coming home was 1.7. Once adjusted for the effect of potential confounding, relative risk fell to 1.5. Among women with antenatal risk factors, however, those who stayed at the MWH were 50% less likely to experience a perinatal death than women who

came from home during labor. The authors therefore conclude that the use of MWHs has the potential to reduce perinatal mortality in rural areas with low geographic access to hospitals and merits further evaluation.

PMID: 7636923 [PubMed - indexed for MEDLINE]

WHO – Fact Sheet – MDG5. WHO/MPS/08.15

The Millennium Summit which gave birth to the Millennium Declaration and MDGs to be achieved by 2015. The MDG5 focuses on improving maternal health progress towards achieving the MDGs is monitored with a framework of measurable targets and indicators for each MDG that was defined in 2001. The monitoring framework for MDG5 was revised following the review of progress at the 2005 World Summit, with one new target and four new indicators.

According to the 2005 data, few low- and middle-income countries are on track to achieve the first MDG5 target i.e. reduce MMR by 75% between 1990 and 2015. In 56 of the 68 priority countries where 98% of the global maternal deaths occur, MMRs are still high >300/100,000 live births. At the regional level none of the MDG priority regions have achieved a 5.5% annual decline. In SSA the annual decline has been 0.1%. The proportion of births in low- and middle-income countries assisted by SBA increased from 47% in 1990 to 61% IN 2006.

However the coverage is far lower than the global targets set out at a special session of the UNGASS in 1999 (80% by 2005; 85% by 2010; 90% by 2015).

East Africa and Western Africa had the lowest SBAs at 34% and 41% respectively.

With regards to the four indicators for the second target i.e. “Achieve by 2015 universal access to reproductive health” use of contraceptives has improved impressively in the past two decades in many regions. But the unmet need for FP is still unacceptably high in low- and middle-income countries. In SSA 24% of women who want to delay or stop childbearing have no access to FP. Although ANC coverage has increased with 75% of women having at least one visit, majority in SSA 55% still do not have access to the recommended four visits. Adolescent fertility declined in most low- and middle-income countries between 1990 and 2000, but either remained stagnant or increased marginally between 2000 and 2005.

It concludes by stating that achieving MDG5 requires reduction of maternal mortality at a much faster rate in the future than it was reduced between 1990 and 2005. **Greater attention to improve sexual and reproductive care and universal access to all its aspect are required to prevent unintended pregnancies and unsafe abortions, to management of abortion complications, to prevent morbidity and mortality due to STIs including HIV and provide high-quality pregnancy and delivery care, including essential obstetric care.** Linkage between MDG5 and MDG4; MDG5 and MDG6; MDG5 and MDG3 and MDG5 and MDG1. Thus showing interrelationship among the MDGs.

M Islam, S Yoshida. MDG 5: how close are we to success? BJOG 2009;116 (Suppl.1):2-5

Only 6 years are left until 2015, the target date for achieving the Millennium Development Goals (MDG), yet improving maternal health (MDG 5) continues to lag behind. At the global level, maternal mortality still remains high in sub-Saharan Africa and Southeast Asian countries. Most deaths are preventable and occur due to unavailability of and/or poor quality of service. **Skilled care at facilities ensures safety, cleanliness, the availability of supplies and equipment, and it makes management and supervision easier. With the mixture of professionals in a facility, life-saving emergency care can be provided quickly. Wherever childbirth takes place, it is essential that the person who helps has the core competencies for safe delivery, has the necessary equipment and supplies, and has the option to refer to a functioning facility offering emergency obstetric and newborn care.** The continuing high incidence of maternal and perinatal mortality and morbidity is unacceptable precisely because it is solvable. We know how to make pregnancy and childbirth safe. The task is enormous but not insurmountable. Our efforts of investment need to be equal to the tasks and must be intensified if maternal and perinatal morbidity and mortality is to be reduced.

Keywords Skilled care, Maternal health, Maternal mortality ratio, Inequity, Quality, Access and coverage

Otchere SA, Kayo A. The challenges of improving emergency obstetric care in two rural districts in Mali. Int J Gynaecol Obstet. 2007 Nov;99(2):173-82. Epub 2007 Sep 27.

OBJECTIVE: We describe collaboration between Save the Children USA, the Averting Maternal Death and Disability (AMDD) program and the Ministry of Health of Mali, to improve the availability, quality and utilization of emergency obstetric care (EmOC) in Yanfolila and Bougouni rural districts in Sikasso Region of Mali. **METHODS:** Project planning, interventions and strategies between 2001 and 2004 were aimed at improving the capacity of 2 district hospitals to provide quality EmOC, sensitizing the community as partners to use services and to influence changes in policy at a national level through advocacy efforts. **RESULTS:** By the end of 2004, despite many health systems' challenges, the 2 hospitals were providing **comprehensive EmOC**. Providing 24-hour service proved difficult and, though not effectively institutionalized in the 2 hospitals, the UN Process Indicators showed modest improvements in quality and utilization of EmOC. Met need for EmOC increased from 9% in 2001 to 15% in 2004 in Bougouni and from 6% in 2001 to 15% in 2004 in Yanfolila. Case fatality rates declined by 69% (from 7% in 2001 to 2% in 2004) and by 38% (from 8% in 2001 to 5% in 2004) in Bougouni and Yanfolila, respectively. **DISCUSSION:** Although useful policy changes were achieved at the national level, more are needed if UN Guidelines are to be met. **Availability of more obstetric functions at the community level, and fewer staff transfers are among policy changes needed.** **CONCLUSION:** Save the Children's project experience showed that it is possible to improve the quality and use of EmOC in hospitals despite challenges;

we drew national attention to EmOC as a key strategy in maternal mortality reduction, and raised awareness of the need for improved EmOC services at clinics that are more accessible to the community.

[Anon]. Motherhood can be safer -- even where conditions are hard. Safe Mother (21):1-2 1996

Abstract The Prevention of Maternal Mortality (PMM) Network in West Africa has demonstrated that, even under sub-optimal conditions, motherhood can be safer and needless deaths can be avoided. The PMM Network's 10 teams from Ghana, Nigeria, and Sierra Leone designed projects to enable women with complications during pregnancy or delivery to overcome delays in deciding to seek medical help, travelling to a health facility, and receiving help after arriving at the facility. Operating rooms and blood banks were opened in some hospitals and health centers were upgraded at a cost under US \$15,000. In one case, an abandoned warehouse was turned into a health center. Other PMM activities included **staff training, making drugs more readily available, setting up a fund to lower drug prices, and increasing stocks of safe blood**. The teams arranged for **local truck drivers' unions to provide emergency transport and organized groups of men in remote villages to carry women in hammocks to motorized transport. The teams worked with traditional leaders and held educational sessions at community gatherings**. Even in the poorest areas, the number of women seeking care for obstetric complications increased and their risk of dying dropped. The PMM Network is supported by Columbia University's School of Public Health, with funding from the Carnegie Corporation.

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Pearson L, deBernis L, Shoo R. Maternal death review in Africa. Int J Gynaecol Obstet. 2009 Jul;106(1):89-94. Epub 2009 May 9.

OBJECTIVE: WHO, UNICEF, and UNFPA with other development partners have supported African Ministries of Health to institutionalize maternal death review (MDR) since 2003. To evaluate the program, its status, lessons learned, and the challenges to success were reviewed in 2007. METHODS: A standard self-administered questionnaire was sent to Ministries of Health in 46 Sub-Saharan African countries in May 2007. Completed questionnaires were returned by e-mail, processed, and analyzed. RESULTS: Thirty countries completed the survey questionnaire. Maternal death is a notifiable condition in 21 (67%) counties. A national committee has been set up to plan, coordinate, and implement MDR activities in 7 countries. Fifteen countries stated that facility-based MDR is the main method selected for conducting reviews of the causes of maternal death. Fourteen (47%) countries reported that national MDR guidelines had been developed and 12 (40%) had implemented the guidelines. Fifteen (50%) countries reported that maternal deaths were reviewed and analyzed. Only 7 countries reported that the government had allocated a budget for MDR. **Implementation of MDR has led to local policy changes and improvement in quality of maternal health services in several countries**. Ten of the 15 countries in which analysis has been conducted reported that recommendations

have been implemented at least at the health facility level. **CONCLUSION:** Although use of MDR is increasing in African countries, effective coverage is still low. The institutionalization of MDR requires political commitment, legal and administrative back-up, financial support, capacity development, simplified reporting forms and procedures, coordinated support of development partners, involvement of professional bodies, and regular supportive follow-up.

PMID: 19428010 [PubMed - indexed for MEDLINE]

Bossyns P, Abache R, Abdoulaye MS; Van Lerberghe W. Unaffordable or cost-effective?: introducing an emergency referral system in rural Niger. Trop. Med. Inter. Health 2005; 10 (9): 879–887,

Summary objectives An important investment was made in two health districts in Niger to organize an emergency referral system. This study estimates its impact and cost-effectiveness in relation with external determinants.
methods After installing a solar radio network in the health centres, emergency calls and related data were monitored over 7 years and investment and recurrent costs for the system were estimated.

Results The number of emergency calls increased significantly in both districts. In 2003, the total yearly cost for the district amounted to US\$ 14 147, the cost per useful and successful call was US\$ 49 and the cost per inhabitant and per year was about US\$ 0.06.

Conclusion The impressive and immediate impact on the health system, the relatively low recurrent cost and the minimal management requirements for the health service make the investment very worthwhile. **Organizing emergency evacuation systems should be a priority for any health district in the world.**
keywords referral system, emergency transport, accessibility, cost-effectiveness, communication

Fournier P, Dumont A, Tourigny C, Dunkley G, Dramé S Improved access to comprehensive emergency obstetric care and its effect on institutional maternal mortality in rural Mali. Bull World Health Organ. 2009 Jan;87(1):30-8.

OBJECTIVE: To evaluate the effect of a national referral system that aims to reduce maternal mortality rates through improving access to and the quality of emergency obstetric care in rural Mali (sub-Saharan Africa). **METHODS:** A maternity referral system that included basic and comprehensive emergency obstetric care, transportation to obstetric health services and community cost-sharing schemes was implemented in six rural health districts in Kayes region between December 2002 and November 2005. In an uncontrolled 'before and after' study, we recorded all obstetric emergencies, major obstetric interventions and maternal deaths during a 4-year observation period (1 January 2003 to 30 November 2006): the year prior to the intervention (P-1); the year of the intervention (P0), and 1 and 2 years after the intervention (P1 and P2, respectively). The primary outcome was the risk of death among obstetric emergency patients, calculated with crude case fatality rates and crude odds ratios. Analyses were adjusted for confounding variables using logistic

regression. FINDINGS: The number of women receiving emergency obstetric care doubled between P-1 and P2, and the rate of major obstetric interventions (mainly Caesarean sections) performed for absolute maternal indications increased from 0.13% in P-1 to 0.46% in P2. In women treated for an obstetric emergency, the risk of death 2 years after implementing the intervention was half the risk recorded before the intervention (odds ratio, OR: 0.48; 95% confidence interval, CI: 0.30-0.76). **Maternal mortality rates decreased more among women referred for emergency obstetric care than among those who presented to the district health centre without referral.** Nearly half (47.5%) of the reduction in deaths was attributable to fewer deaths from haemorrhage. CONCLUSION: **The intervention showed rapid effects due to the availability of major obstetric interventions in district health centres, reduced transport time to such centres for treatment, and reduced financial barriers to care.** Our results show that national programmes can be implemented in low-income countries without major external funding and that they can rapidly improve the coverage of obstetric services and significantly reduce the risk of death associated with obstetric complications.

PMID: 19197402 [PubMed - indexed for MEDLINE]

Hoffman JJ, Dzimadzi C, Lungu K, Ratsma EY, Hussein J. Motorcycle ambulances for referral of obstetric emergencies in rural Malawi: do they reduce delay and what do they cost? Int J Gynaecol Obstet. 2008 Aug;102(2):191-7. Epub 2008 Jun 16.

OBJECTIVES: To assess whether motorcycle ambulances placed at rural health centers are a more effective method of reducing referral delay for obstetric emergencies than a car ambulance at the district hospital, and to compare investment and operating costs with those of a 4 wheel drive car ambulance at the district hospital. METHODS: Motorcycle ambulances were placed at 3 remote rural health centers in Malawi. Data were collected over a 1-year period, from October 2001 to September 2002, using logbooks, cashbooks, referral forms, and maternity registers. RESULTS: **Depending on the site, median referral delay was reduced by 2-4.5 hours (35%-76%). Purchase price of a motorcycle ambulance was 19 times cheaper than for a car ambulance. Annual operating costs were US dollars 508, which was almost 24 times cheaper than for a car ambulance.** CONCLUSIONS: In resource-poor countries motorcycle ambulances at rural health centers are a useful means of referral for emergency obstetric care and a relatively cheap option for the health sector.

PMID: 18555998 [PubMed - indexed for MEDLINE]

Murray SF, Pearson SC. Maternity referral systems in developing countries: current knowledge and future research needs. Soc Sci Med. 2006 May;62(9):2205-15. Epub 2005 Dec 5.

A functioning referral system is generally considered to be a necessary element of successful Safe Motherhood programmes. This paper draws on a scoping review of available literature to identify key requisites for successful maternity

referral systems in developing countries, to highlight knowledge gaps, and to suggest items for a future research agenda. Key online social science, medical and health system bibliographic databases, and websites were searched in July 2004 for evidence relating to referral systems for maternity care. Documentary evidence on implementation is scarce, but it suggests that many healthcare systems in developing countries are failing to optimise women's rapid access to emergency obstetric care, and that the poor and marginalised are affected disproportionately. **Likely requisites for successful maternity referral systems include: a referral strategy informed by the assessment of population needs and health system capabilities; an adequately resourced referral centre; active collaboration between referral levels and across sectors; formalised communication and transport arrangements; agreed setting-specific protocols for referrer and receiver; supervision and accountability for providers' performance; affordable service costs; the capacity to monitor effectiveness; and underpinning all of these, policy support.** Theoretically informed social and organisational research is required on the referral care needs of the poor and marginalised, on the maternity workforce and organisation, and on the implications of the mixed economy of healthcare for referral networks. Clinical research is required to determine how maternity referral fits within newborn health priorities and where the needs are different. Finally, research is required to determine how and whether a more integrated approach to emergency care systems may benefit women and their communities. PMID: 16330139 [PubMed - indexed for MEDLINE]

Krasovec K. Auxiliary technologies related to transport and communication for obstetric emergencies. Int J Gynaecol Obstet. 2004 Jun;85 Suppl 1:S14-23.

OBJECTIVES: To review the evidence on appropriate transport and communications technologies for obstetrical referrals in developing countries. METHODS: Review of articles published in peer-reviewed journals and gray literature, supplemented by email and telephone consultations with key informants and field programmers. RESULTS: **A wide range of transportation options have been attempted. Initial approaches--such as those relying on ambulances owned and operated by health systems--have evolved into recommendations that emphasize community-based solutions. There are fewer options within the realm of communications technologies, and the recommendations are more consistent. Public health researchers are only beginning to evaluate the cost and effectiveness of different options.** CONCLUSIONS: One of the greatest barriers to effective use of transport and communications for obstetric emergencies is the short time interval necessary for action, which limits options for obstetric referrals more than for other medical referrals. Although evidence is still scarce, experience suggests that motorized transport is likely to be the most acceptable and effective transportation option. More sophisticated communications technologies such as cell phones are both practical and effective, and are increasingly becoming the technologies of choice for low-resource settings.

PMID: 15147850 [PubMed - indexed for MEDLINE]

Samai O, Sengeh P. Facilitating emergency obstetric care through transportation and communication, Bo, Sierra Leone. The Bo PMM Team. Int J Gynaecol Obstet. 1997 Nov; 59 Suppl 2:S157-64.

PRELIMINARY STUDIES: Focus group discussions revealed poor roads, few vehicles, and high transportation costs as major causes of delay in deciding to seek and in reaching emergency obstetric care. INTERVENTIONS: **Beginning in September 1992, a four-wheel drive vehicle was posted at Bo Government Hospital (BGH). Motorbikes to summon the vehicle were posted at the eight project-area primary health units (PHUs). Problems with the motorbike system (accidents, breakdowns) led to the installation of a radio system linking the hospital, PHUs and the referral vehicle.** These interventions were complemented by community education activities and earlier improvements in the health facilities. RESULTS: The number of women with major obstetric complications arriving at BGH from the project area increased from 0.9 to 2.6 per month, while case fatality rate dropped from 20% to 10%. In the post-intervention period, approximately half of women with complications from the project area utilizing BGH came by project vehicle. The mean time from the vehicle being called by the PHU to the patient's arrival at BGH was 3.1 h. Case fatality rate did not differ by whether or not women came by project vehicle. COSTS: Cost of the transport and communication intervention was approximately US \$75,000, including: vehicle, \$27,500; radios, \$12,500; motorbikes, \$27,000. CONCLUSIONS: Improvements in transport can help greater numbers of women with complications reach hospitals and may improve their chances of survival.

PMID: 9389627 [PubMed - indexed for MEDLINE]

Atkinson S, Ngwengwe A, Macwan'gi M, Ngulube TJ, Harpham T, O'Connell A. The referral process and urban health care in sub-Saharan Africa: the case of Lusaka, Zambia. Soc Sci Med. 1999 Jul;49(1):27-38.

Much of the current reform of urban health systems in sub-Saharan Africa focuses upon the referral system between different levels of care. It is often assumed that patients are by-passing primary facilities which leads to congestion at hospital outpatient departments. Zambia is well advanced in its health sector reform and this case study from the capital, Lusaka, explores the patterns of health seeking behaviour of the urban population, the reasons behind health care choices, the functioning of the referral system and the users' evaluations of the care received. Data were collected across three levels of the system: the community, local health centres and the main hospital (both in- and out-patients). Results showed those who by-passed health centres were doing so because they believed the hospital outpatient department to be cheaper and/or better supplied with drugs (not because they believed they would receive better technical care). Few users were given information about their diagnosis or reason for referral. The most striking result was the degree of unmet need for health services and the large number of individuals who were self-medicating

due to lack of money rather than the minor nature of their illness. **The current upgrading of urban health centres into 'reference centres' may provide a capacity for unmet need rather than decongesting the hospital outpatient department as originally intended.**

PMID: 10414838 [PubMed – indexed for MEDLINE]

Essien E, Ifenne D, Sabitu K, Musa A, Alti-Mu'azu M, Adidu V, Golji N, Mukaddas M. Community loan funds and transport services for obstetric emergencies in northern Nigeria. Int J Gynaecol Obstet. 1997 Nov;59 Suppl 2:S237-44.

PRELIMINARY STUDIES: Focus group discussions and a community survey indicated that inadequate funds and transport caused delays in deciding to seek emergency obstetric care and in reaching facilities. INTERVENTIONS: Following improvements in the quality of obstetric services, a community loan program was established in early 1995. **Community members determined its features: compulsory contributions; community administration; loans for obstetric complications only; no interest; a 6-month grace period; and 24-month repayment. A transport system was also established, in which private vehicle drivers agreed to respond to calls for emergency transport and charge a set fee.** RESULTS: The equivalent of US \$20,500 was collected from 81 annual and 2273 one-time contributors. Eighteen loans were approved in 9 months. Repayment data are not yet available. For the transport system, 23 drivers pledged permanent participation and 58 pledged to take part in 6-month rotations. They transported 18 women. COSTS: The cost of these interventions was \$3409 for the loan fund and \$2272 for the transport system. Sixty percent of the cost was paid by the community and the rest by the PMM project. CONCLUSIONS: Community-managed loan and transport systems for women with obstetric emergencies can be established and may contribute to reducing delay in obtaining emergency obstetric care.

PMID: 9389637 [PubMed - indexed for MEDLINE]

Shehu D, Ikeh AT, Kuna MJ. Mobilizing transport for obstetric emergencies in northwestern Nigeria. The Sokoto PMM Team. Int J Gynaecol Obstet. 1997 Nov;59 Suppl 2:S173-80.

PRELIMINARY STUDIES: Focus group discussions and a village case study in Kebbi State revealed delay in the transport of women with obstetric complications. Among contributing factors identified were shortages of vehicles and fuel, and unwillingness of drivers to transport women at affordable fares. INTERVENTIONS: **The cooperation of the local transport workers union was enlisted to address the situation. In 1993, drivers were sensitized and trained and a revolving emergency fuel fund was established. Prior to these activities, emergency obstetric services at nearby facilities had been upgraded.** RESULTS: Over two years, 29 women with obstetric complications were transported. Of these, only one died. Mean cost of transport to patients was US \$5.89. Mean time from the onset of complications to treatment was 9 h. Substantial numbers of non-obstetric patients in need of emergency care were

also transported. Although defaulting eventually resulted in depletion of the fuel fund, the reimbursement system had become sufficiently well-established that most drivers no longer requested funds in advance. COSTS: Cost of the transport intervention was US \$268, with 72% coming from project funds. CONCLUSIONS: Improving transport to emergency care does not necessarily require ambulances. Commercial transport owners and communities can be mobilized to provide affordable emergency transport for women with complications.

PMID: 9389629 [PubMed - indexed for MEDLINE]

Martey, J O; Djan, J O; Twum, S; Browne, E N; Opoku, S A. Referrals for obstetrical complications from Ejisu district, Ghana. West Afr J Med 17 (2):58-63 1998

Abstract A study of referrals due to obstetrical complications from the Ejisu district, Ashanti region, Ghana was done to determine the institutions that receive them, their outcome and the effectiveness of the referral system. This formed part of a multidisciplinary research on the prevention of maternal mortality in the district. It covered 15 health facilities in the district. The receiving institutions identified in the study were Komfo Anokye teaching Hospital (KATH) in Kumasi, Agogo Presbyterian Hospital in the neighbouring Ashanti Akim district and the St. Michael's Hospital at Pramso in the same district. In the period under review, there were 192 referrals from the district, 139 to KATH with 87 (63%) reporting, 19 to Pramso with 14 (74%) reporting and 34 to Agogo with 17 (50%) reporting. The 3 most important complications referred were maternal haemorrhage (29%), high-risk pregnancy (24%) and delayed second stage (21%). The referring institutions had a defaulting rate varying from 8-56% with a median of 42%. This study did not specifically investigate the factors influencing the high defaulting rates in some institutions. However, focus-group discussions (FGDs) held in selected communities revealed the following factors as inhibiting the utilization of health services: * prohibitive hospital fees; * illegal fees and bribes; * irregular transport and uncooperative drivers; * poor and unmotorable roads; * lack of drugs and essential supplies and; * negative staff attitudes. ***Those health facilities with low defaulting rates had their own transport or were close to major trunk roads.*** From the study, the referral system was very weak. It is also possible that some of the referrals reported at the receiving institutions but were not classified as such. Interventions to improve the situation are currently being implemented

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Ziraba AK, Mills S, Madise N, Saliku T, Fotso JCThe state of emergency obstetric care services in Nairobi informal settlements and environs: results from a maternity health facility survey. BMC Health Serv Res. 2009 Mar 12;9:46.

BACKGROUND: Maternal mortality in Sub-Saharan Africa remains a challenge with estimates exceeding 1,000 maternal deaths per 100,000 live births in some countries. Successful prevention of maternal deaths hinges on adequate and

quality emergency obstetric care. In addition to skilled personnel, there is need for a supportive environment in terms of essential drugs and supplies, equipment, and a referral system. Many household surveys report a reasonably high proportion of women delivering in health facilities. However, the quality and adequacy of facilities and personnel are often not assessed. The three delay model; 1) delay in making the decision to seek care; 2) delay in reaching an appropriate obstetric facility; and 3) delay in receiving appropriate care once at the facility guided this project. This paper examines aspects of the third delay by assessing quality of emergency obstetric care in terms of staffing, skills equipment and supplies. METHODS: We used data from a survey of 25 maternity health facilities within or near two slums in Nairobi that were mentioned by women in a household survey as places that they delivered. Ethical clearance was obtained from the Kenya Medical Research Institute. Permission was also sought from the Ministry of Health and the Medical Officer of Health. Data collection included interviews with the staff in-charge of maternity wards using structured questionnaires. We collected information on staffing levels, obstetric procedures performed, availability of equipment and supplies, referral system and health management information system. RESULTS: Out of the 25 health facilities, only two met the criteria for comprehensive emergency obstetric care (both located outside the two slums) while the others provided less than basic emergency obstetric care. Lack of obstetric skills, equipment, and supplies hamper many facilities from providing lifesaving emergency obstetric procedures. Accurate estimation of burden of morbidity and mortality was a challenge due to poor and incomplete medical records. CONCLUSION: The quality of emergency obstetric care services in Nairobi slums is poor and needs improvement. Specific areas that require attention include supervision, regulation of maternity facilities; and ensuring that basic equipment, supplies, and trained personnel are available in order to handle obstetric complications in both public and private facilities.

PMID: 19284626 [PubMed - indexed for MEDLINE]

Pearson L, Shoo R. Availability and use of emergency obstetric services: Kenya, Rwanda, Southern Sudan, and Uganda. Int J Gynaecol Obstet. 2005 Feb;88(2):208-15. Epub 2005 Jan 7.

The article summarises the baseline assessments of emergency obstetric care (EmOC) carried out in Uganda, Kenya, Southern Sudan, and Rwanda in 2003 and 2004. OBJECTIVES: Our objectives were to: (1) set up program baselines on the availability and utilization of EmOC services in these countries; (2) identify gaps and obstacles in providing EmOC services; and (3) make recommendations to governments based on evidence generated. METHODS: Data were collected from clinical record reviews, provider and client interviews, observations, and focus group discussions. Either random or universal sampling was applied in the selection of health facilities assessed. Local nurses and midwives participated in the data collection and, to some extent, data processing and analysis. RESULTS: The coverage of basic EmOC services ranged 0-1.1/500,000 population compared to the UN-recommended level of 4/500,000. The coverage of comprehensive EmOC services ranged 0.5-4.3/500,000 compared to the

recommended level of 1/500,000. Between 0.6% and 8.8% of all births took place in EmOC facilities, and 2.1% and 18.5% of all expected direct obstetric complications were treated. Cesarean section as a proportion of all births was between 0.1% and 1%. Shortage of trained staff especially mid-level providers, poor basic infrastructure such as lack of electricity and water supplies, inadequate supply of drugs and essential equipment, poor working conditions and staff morale, lack of communication and referral facilities, cost of treatment, and lack of accountability and proper management were identified as the main obstacles in providing 24-h quality EmOC services especially in remote and rural areas. CONCLUSIONS: Lack of basic EmOC services limits women's access to life-saving services during obstetric complications. To reduce maternal mortality ratio the states and development partners need to focus their effort to improve the coverage, quality, and utilization of EmOC services through supportive national policy, effective program strategies, increased budget allocation to maternal health program, **rural infrastructure development**, and regular monitoring, and evaluation of progress.

PMID: 15694109 [PubMed – indexed for MEDLINE]

Kayongo M, Butera J, Mboninyibuka D, Nyiransabimana B, Ntezimana A, Mukangamuje V. Improving availability of EmOC services in Rwanda-- CARE's experiences and lessons learned at Kabgayi Referral Hospital. Int J Gynaecol Obstet. 2006 Mar;92(3):291-8. Epub 2006 Jan 24.

OBJECTIVE: CARE's work in Rwanda was designed to improve the functional capacity of health facilities for the delivery of EmOC services. METHODS: The project supported a comprehensive package of focused interventions that included hospital renovations, provision of essential equipment, training of staff and improvement of management systems at the Kabgayi regional referral hospital. RESULTS: There was an increased level of preparedness for emergencies and ability to manage common obstetric complications according to evidence-based practices. These changes ultimately led to increased availability, quality and use of services as demonstrated by an increase in the demand for care of obstetric complications at the facility. The met need increased from 16% at the start of the project (2001) to 25% in 2004, while the cesarean rate remained essentially the same (1.9% and 3.2%) over the same time period. There were progressive declines in the case fatality rates from 2.2% in 2001 to 1.2% in 2004. CONCLUSION: **CARE's experience indicates that progress towards reducing maternal mortality requires specific efforts that support and strengthen existing health systems to provide skilled care that can save women's lives.**

PMID: 16442112 [PubMed - indexed for MEDLINE]

[No authors listed] Situation analyses of emergency obstetric care: Examples from eleven operations research projects in west Africa. The Prevention of Maternal Mortality Network. Soc Sci Med. 1995 Mar;40(5):657-67.

Situation analyses were conducted by 11 multidisciplinary teams in the West

African Prevention of Maternal Mortality (PMM) Network, with technical assistance from Columbia University's Center for Population and Family Health. Data on the functioning and use of facilities were used to identify resource needs and management problems at facilities providing emergency obstetric care in Ghana, Nigeria and Sierra Leone. **The researchers looked at the number and distribution of facilities, trends in utilization patterns, time from admission to treatment at facilities, functioning of referral systems, availability of essential supplies, staffing patterns, and staff perceptions of services. Research methods included patient flow studies, inventories of drugs and supplies, and retrospective reviews of hospital records.** Qualitative information was also collected through interviews with staff. This paper summarizes the principal findings of the situation analyses. Normal deliveries fell markedly where users' fees were initiated. However, the number of women with complications seen increased at several of these sites. The lack of drugs and supplies at the facilities had an adverse effect on utilization of non-emergency services and on women's survival chances. Users' fees and unavailability of supplies contributed to unacceptably long waiting times between admission and treatment at most sites. These long waiting times were also found to be associated with higher case fatality rates. Staff-to-patient ratios at the sites improved or remained stable, and do not appear to be associated with changes in quality of care. Strategies to address the problems identified include: the establishment of small revolving fund schemes to ensure the availability of supplies; the creation of 24-hr pharmacy services; the establishment of on-call rooms for staff; and the improvement of staff attitudes and morale through various types of training activities. These situation analyses were useful for assessing health system factors contributing to maternal deaths. The information on complicated cases and on hospital functioning provided a marked improvement over previous studies limited to data on deliveries and maternal deaths. Low-cost techniques such as the patient-flow studies and drug and supply inventories provided valuable information which was easily intelligible to program planners. These types of studies are recommended for use prior to the development of projects designed to reduce maternal deaths.

PMID: 7747201 [PubMed - indexed for MEDLINE]

Majoko F, Nyström L, Munjanja SP, Lindmark G. Effectiveness of referral system for antenatal and intra-partum problems in Gutu district, Zimbabwe. J Obstet Gynaecol. 2005 Oct;25(7):656-61.

We conducted a population-based cohort study to determine the prevalence of antenatal and intra-partum referrals, compliance with advice and perinatal outcomes in referred pregnant women in Gutu district, Zimbabwe. The cohort was composed of 10,572 women who received antenatal care in 23 rural health centres (RHC) in Gutu district between January 1995 and June 1998. Pregnancy records of women with antenatal or intra-partum referral were analysed for indication, compliance and perinatal outcomes. Using women who had no antenatal referral or those who complied as referents, the association of referral with perinatal outcome was expressed as relative risk (RR) with 95% confidence

intervals (CI). A total of 30% of women (3,094/10,572) had an antenatal referral. Among women attending RHC in labour, 13% (694/5,338) were referred intra-partum. Nulliparous and women younger than 20 years were more likely to be referred. Nurse - midwives' compliance with referral recommendations was low as 59% women with historical risk factors and 52% with raised blood pressure (>140/90 mmHg) were not referred. Women complied with referral advice except when indication was high parity. Women with antenatal referral were more likely to have hospital delivery, 70% vs 18% ($p < 0.001$). A total of 13% (993/7,478) of women referred themselves for hospital delivery. The risk of perinatal death was elevated among intra-partum referrals (RR 3.4; 95% CI 1.7 - 6.8), self-referrals (RR 2.6; 95% CI 1.5 - 4.5) and also among women with historical risk factors who were not referred (RR 4.8; 95% CI 2.5 - 9.2). **We concluded that although there was a functional referral system in Gutu district its efficiency was reduced by failure of health personnel to comply with referral recommendations. Women took appropriate action for most referral indications.**

PMID: 16263538 [PubMed - indexed for MEDLINE]

Carrin G; Waelkens M-P; Criel B; Community-based health insurance in developing countries: a study of its contribution to the performance of health financing systems. Tropical Medicine and International Health 2005; 10 (8) 799–811,

Summary We studied the potential of community-based health insurance (CHI) to contribute to the performance of health financing systems. The international empirical evidence is analysed on the basis of the three health financing subfunctions as outlined in the World Health Report 2000: revenue collection, pooling of resources and purchasing of services. The evidence indicates that achievements of CHI in each of these subfunctions so far have been modest, although many CHI schemes still are relatively young and would need more time to develop. We present an overview of the main factors influencing the performance of CHI on these financing subfunctions and discuss a set of proposals to increase CHI performance. The proposals pertain to the demand for and the supply of health care in the community; to the technical, managerial and institutional set-up of CHI; and to the rational use of subsidies.

Keywords performance of financing health systems, health financing, community health insurance, developing countries

Mills S, Williams JE, Wak G, Hodgson A. Maternal mortality decline in the Kassena-Nankana district of northern Ghana. Matern Child Health J. 2008 Sep;12(5):577-85. Epub 2007 Oct 23.

OBJECTIVE: In the absence of an adequate vital registration system in Ghana, the Navrongo demographic surveillance system (NDSS) established in 1993 presents a viable alternative to monitor, in a poor rural district, the UN Millennium Development Goal on maternal health (MDG) of reducing maternal mortality by 75% between 1990 and 2015. METHODS: Of the 518 women aged 12-49 years identified in the NDSS database to have died in the Kassena-Nankana district in

the period January 2002-December 2004, spouses or family members completed verbal autopsy interviews for 516 female deaths. RESULT: Of the 516 female deaths, 45 were identified as maternal deaths. 71% of the maternal deaths were attributed to direct maternal causes while 29% were due to indirect maternal causes. Abortion-related deaths were the most frequent cause of maternal deaths. The maternal mortality ratio for the period 2002-2004 was 373 maternal deaths per 100,000 live births indicating a 40% reduction of maternal mortality from the 1995-1996 level of 637 maternal deaths per 100,000 live births. However, the health-facility based maternal mortality ratio in the district (which excludes maternal deaths outside health facilities) was 141 maternal deaths per 100,000 live births for the period 2002-2004. CONCLUSION: **This district may be on track to achieve the MDG on maternal health. Ultimately, strengthening vital registration systems to provide timely information to policymakers should supersede the other methods of measuring maternal mortality.**

PMID: 17957459 [PubMed - indexed for MEDLINE]

Ross L, Simkhada P, Smith WC. Evaluating effectiveness of complex interventions aimed at reducing maternal mortality in developing countries. J Public Health (Oxf). 2005 Dec;27(4):331-7. Epub 2005 Oct 18.

BACKGROUND: Reducing the worldwide mortality ratio by 75 per cent between 1990 and 2015 is a key Millennium Development Goal. Randomized controlled trials (RCTs) are the accepted 'gold standard' to assess the effectiveness of interventions but they are not always appropriate for practical, ethical or economic reasons in developing countries. This study examines the use of cluster randomized trials and quasi-experimental (nonrandomized) study designs to evaluate complex interventions implemented to reduce maternal mortality. METHODS: We systematically searched electronic databases including MEDLINE, EMBASE, CINAHL, BNI, ASSIA, IBSS, CSA and COCHRANE. English language publications between 1990 and 2003 were included. Studies that assessed the effects of complex interventions aimed at reducing maternal mortality in developing countries were included. RESULTS: Four cluster randomized trials and eleven quasi-experimental studies were identified. Two cluster randomized trials examined reduction in prenatal visits with no adverse effects on maternal mortality. Two trials assessed the effects of vitamin A supplementation. Both trials found a significant reduction in maternal mortality ratios after vitamin A supplementation. **A decline in maternal deaths was reported in eight of the nonrandomized studies. Measuring maternal mortality was a frequent problem because of insufficient sample sizes and/or poor recording methods.** Other limitations include lack of suitable comparison groups and difficulties assessing the effects of confounding factors in the quasi-experimental studies. CONCLUSIONS: RCTs may not be appropriate to evaluate complex interventions in maternal mortality and cluster RCTs and quasi-experimental designs may be more suitable. However, further work is required to improve the robustness of such alternative study designs.

PMID: 16234263 [PubMed - indexed for MEDLINE]

Paxton A, Maine D, Freedman L, Fry D, Lobis S. The evidence for emergency obstetric care. Int J Gynaecol Obstet. 2005 Feb;88(2):181-93. Epub 2005 Jan 8.

PURPOSE: We searched for evidence for the effectiveness of emergency obstetric care (EmOC) interventions in reducing maternal mortality primarily in developing countries. METHODS: We reviewed population-based studies with maternal mortality as the outcome variable and ranked them according to the system for ranking the quality of evidence and strength of recommendations developed by the US Preventive Services Task Force. A systematic search of published literature was conducted for this review, including searches of Medline, PubMed, Cochrane Database of Systematic Reviews, the Cochrane Pregnancy and Childbirth Database and the Cochrane Controlled Trials Register. RESULTS: The strength of the evidence is high in several studies with a design that places them in the second and third tier in the quality of evidence ranking system. No studies were found that are experimental in design that would give them a top ranking, due to the measurement challenges associated with maternal mortality, although many of the specific individual clinical interventions that comprise EmOC have been evaluated through experimental design. **There is strong evidence based on studies, using quasi-experimental, observational and ecological designs, to support the contention that EmOC must be a critical component of any program to reduce maternal mortality.**

PMID: 15694106 [PubMed - indexed for MEDLINE]

Koblinsky MA, Campbell O, Heichelheim J. Organizing delivery care: what works for safe motherhood? Bull World Health Organ. 1999;77(5):399-406.

The various means of delivering essential obstetric services are described for settings in which the maternal mortality ratio is relatively low. This review yields four basic models of care, which are best described by organizational characteristics relating to where women give birth and who performs deliveries. In Model 1, deliveries are conducted at home by a community member who has received brief training. In Model 2, delivery takes place at home but is performed by a professional. In Model 3, delivery is performed by a professional in a basic essential obstetric care facility, and in Model 4 all women give birth in a comprehensive essential obstetric care facility with the help of professionals. In each of these models it is assumed that providers do not increase the risk to women, either iatrogenically or through traditional practices. Although there have been some successes with Model 1, there is no evidence that it can provide a maternal mortality ratio under 100 per 100,000 live births. If strong referral mechanisms are in place the introduction of a professional attendant can lead to a marked reduction in the maternal mortality ratio. Countries using Models 2-4, involving the use of professional attendants at delivery, have reduced maternal mortality ratios to 50 or less per 100,000. However, Model 4, although arguably the most advanced, does not necessarily reduce the maternal mortality ratio to less than 100 per 100,000. It appears that not all countries are ready to adopt Model 4, and its affordability by many developing countries is doubtful. There are

few data making it possible to determine which configuration with professional attendance is the most cost-effective, and what the constraints are with respect to training, skill maintenance, supervision, regulation, acceptability to women, and other criteria. **A successful transition to Models 2-4 requires strong links with the community through either traditional providers or popular demand.**

PIP: This study aims to clarify the processes involved in reducing maternal mortality by reviewing national-level data from developing countries. Various processes of delivering essential obstetric services are described in settings where mortality ratio is relatively low. This paper yields four basic models of care, which are best described by organizational characteristics relating to where women give birth and who conducts the deliveries. In Model 1, community members who have received brief training conduct deliveries at home. In Model 2, delivery takes place at home but is performed by a professional. In Model 3, delivery is performed by a professional in a basic essential obstetric care facility. In Model 4, all women give birth in a comprehensive essential obstetric care facility with the help of professionals. Some features of successful models of safe motherhood care are shown. A list of national programs and projects exemplifying each model of care and their respective maternal mortality ratios is also tabulated. In each of these models it is assumed that professional providers of care do not increase risks to women, either by drug procedure or through traditional practices. Results reveal that although Model 1 has achieved some success, there is no evidence that it can produce a maternal mortality ratio under 100/100,00 live births. With the introduction of a professional attendant, as in Model 2-4, the ratio can be reduced to 50 or lower if strong referral mechanisms are in place. It should be noted, however, that Model 4 does not necessarily reduce the ratio to below 100/100,000 live births. Not all countries appear ready to adopt Model 4, and it is doubtful whether it is affordable for many developing countries. A successful transition to Models 2-4 requires strong links to the community through traditional providers or popular demand.

PMID: 10361757 [PubMed - indexed for MEDLINE]

Scott S, Ronsmans C. The relationship between birth with a health professional and maternal mortality in observational studies: a review of the literature. Trop Med Int Health. 2009 Sep 30. [Epub ahead of print]

Summary Objective To examine the nature of the association between maternal mortality and birth with a health professional in observational studies. Methods Review of ecological studies relating the overall proportion of births with a health professional with the maternal mortality ratio at national level, and studies exploring the relationship between the presence of a health professional at birth and the risk of dying at the individual level. We report methodological challenges, including data quality and sources and the analytical approaches used. For the individual studies, crude odds ratios and 95% confidence intervals were calculated. Results The 10 ecological studies are largely descriptive, a causal inference is tentative and there is poor controlling of confounders. The 10 individual studies examining the risk of death with and without a health

professional showed little evidence that giving birth with a health professional reduces a woman's risk of dying, and in some settings it appears to be associated with an increased risk of death. Conclusions: **None of these study designs are optimal in evaluating the impact of births with a health professional on reducing maternal mortality.** Analytically, greater insights can be gained by examining ecological relationships within countries, and by complementing the individual analyses with information on the health status of women when they first reach the health professional and whether or not the women planned to have a health professional present during birth.

PMID: 19793070 [PubMed - as supplied by publisher]

Mbonye AK, Asimwe JB, Kabarangira J, Nanda G, Orinda V. Emergency obstetric care as the priority intervention to reduce maternal mortality in Uganda. *Int J Gynaecol Obstet.* 2007 Mar;96(3):220-5.** Epub 2007 Feb 8.**

PURPOSE: We conducted a survey to determine availability of emergency obstetric care (EmOC) to provide baseline data for monitoring provision of obstetric care services in Uganda. METHODS: The survey, covering 54 districts and 553 health facilities, assessed availability of EmOC signal functions. Following this, performance improvement process was implemented in 20 district hospitals to scale-up EmOC services. FINDINGS: A maternal mortality ratio (MMR) of 671/100,000 live births was recorded. Hemorrhage, 42.2%, was the leading direct cause of maternal deaths, and malaria accounted for 65.5% of the indirect causes. Among the obstetric complications, abortion accounted for 38.9% of direct and malaria 87.4% of indirect causes. Removal of retained products (OR 3.3, P<0.002), assisted vaginal delivery (OR 3.3, P<0.001) and blood transfusion (OR 13.7, P<0.001) were the missing signal functions contributing to maternal deaths. Most health facilities expected to offer basic EmOC, 349 (97.2%) were not offering them. **Using the performance improvement process, availability of EmOC in the 20 hospitals improved significantly.** CONCLUSION: An integrated programming approach aiming at increasing access to EmOC, malaria treatment and prevention services could reduce maternal mortality in Uganda.

PMID: 17292370 [PubMed - indexed for MEDLINE]

Paul Bossyns, Ranaou Abache , Mahaman Sani Abdoulaye; Wim Van Lerberghe Unaffordable or cost-effective?: introducing an emergency referral system in rural Niger. Trop. Med. Inter. Health 2005; 10 (9): 879–887,

Objectives: An important investment was made in two health districts in Niger to organize an emergency referral system. This study estimates its impact and cost-effectiveness in relation with external determinants. methods After installing a solar radio network in the health centres, emergency calls and related data were monitored over 7 years and investment and recurrent costs for the system were estimated.

Results The number of emergency calls increased significantly in both districts. In 2003, the total yearly cost for the district amounted to US\$ 14 147, the cost per useful and successful call was US\$ 49 and the cost per inhabitant and per year was about US\$ 0.06.

Conclusion The impressive and immediate impact on the health system, the relatively low recurrent cost and the minimal management requirements for the health service make the investment very worthwhile. Organizing emergency evacuation systems should be a priority for any health district in the world.

Keywords referral system, emergency transport, accessibility, cost-effectiveness, communication

PMID: 19197402 [PubMed - indexed for MEDLINE]

Page C, Lewycka S, Colbourn T, Mwansambo C, Meguid T, Chiudzu G, Utley M, Costello AM. Estimation of potential effects of improved community-based drug provision, to augment health-facility strengthening, on maternal mortality due to post-partum haemorrhage and sepsis in sub-Saharan Africa: an equity-effectiveness model. Lancet. 2009 Oct 24;374(9699):1441-8. Epub 2009 Sep 23.

BACKGROUND: Maternal mortality in Africa has changed little since 1990. We developed a mathematical model with the aim to assess whether improved community-based access to life-saving drugs, to augment a core programme of health-facility strengthening, could reduce maternal mortality due to post-partum haemorrhage or sepsis. METHODS: We developed a mathematical model by considering the key events leading to maternal death from post-partum haemorrhage or sepsis after delivery. With parameter estimates from published work of occurrence of post-partum haemorrhage and sepsis, case fatality, and the effectiveness of drugs, we used this model to estimate the effect of three potential packages of interventions: 1) health-facility strengthening; 2) health-facility strengthening combined with improved drug provision via antenatal-care appointments and community health workers; and 3) all interventions in package two combined with improved community-based drug provision via female volunteers in villages. The model was applied to Malawi and sub-Saharan Africa. FINDINGS: In the implementation of the model, the lowest risk deliveries were those in health facilities. With the model we estimated that of 2860 maternal deaths from post-partum haemorrhage or sepsis per year in Malawi, intervention package one could prevent 210 (7%) deaths, package two 720 (25%) deaths, and package three 1020 (36%) deaths. In sub-Saharan Africa, we estimated that

of 182 000 of such maternal deaths per year, these three packages could prevent 21 300 (12%), 43 800 (24%), and 59 000 (32%) deaths, respectively. The estimated effect of community-based drug provision was greatest for the poorest women. INTERPRETATION: **Community provision of misoprostol and antibiotics to reduce maternal deaths from post-partum haemorrhage and sepsis could be a highly effective addition to health-facility strengthening in Africa.** Investigation of such interventions is urgently needed to establish the risks, benefits, and challenges of widespread implementation. FUNDING: Institute of Child Health and Faculty of Mathematical and Physical Sciences, University College London, and a donation from John and Ann-Margaret Walton.

PMID: 19783291 [PubMed - indexed for MEDLINE]

Hussein L Kidanto, Ingrid Mogren, Jos van Roosmalen⁴, Angela N Thomas, Siriel N Massawe, Lennarth Nystrom; Gunilla Lindmark. Introduction of a qualitative perinatal audit at Muhimbili National Hospital, Dar es Salaam, Tanzania. *BMC Pregnancy and Childbirth* 2009, 9:45 doi:10.1186/1471-2393-9-45.

The perinatal mortality rate (PMR) in Tanzania is among the highest in the world. Therefore, to reduce perinatal mortality needs a major effort in order to achieve the Millennium Development Goal no. 4 to reduce child mortality by two third (MDG4). Although the Tanzania Demographic and Health Survey showed a decrease in under - 5- mortality from 147 deaths/1000 in 1994 to 1999 to 112 deaths/1000 in 2000 to 2004, the neonatal mortality rate (32/1000 live births) had not declined. The reduction of child deaths can only be achieved if perinatal survival is improved; several studies have indicated up to half of the perinatal deaths globally occur as a direct consequence of poorly managed deliveries. Hospital-based studies in low income countries have shown that 3 out of 4 perinatal deaths may be due to suboptimal care. Our previous study in Dar es Salaam 1999-2003 estimated the PMR at 123 per 1000 total births and the majority of these deaths were assumed preventable. Thus, reduction of PMR and improvement of maternal and child health requires identification of service-related factors leading to perinatal deaths. One approach is to perform clinical audits in obstetric care, i.e. retrospective critical reviews of clinically undesirable pregnancy-related events. Perinatal mortality audits in obstetrics are intended to determine primary and final causes of death as well as suboptimal factors and missed opportunities to ascertain how to improve future management. Preventable factors could be health professional related, such as a health provider failing to perform recommended procedures, or be administration related, such as unavailability of necessary drugs, other preventable factors could be patient-related, such as delay to seek medical assistance due to various reasons. The fundamental goal of establishing perinatal audits in areas with high PMR is to reduce the number of perinatal deaths through an improvement in the quality of care. Several studies have shown a strong association between the establishment of an effective audit process and improvement of the quality of maternal health services and a reduction of maternal and perinatal foetal mortality rates. The aim of this study was to introduce a qualitative perinatal audit in an urban tertiary centre in Tanzania, the main focus being on obstetric care during labour and delivery.

World Health Organisation. Monitoring emergency obstetric care: a handbook. WHO Geneva, 2009.

Reducing maternal mortality has arrived at the top of health and development agendas. To achieve the Millennium Development Goal of a 75% reduction in the maternal mortality ratio between 1990 and 2015, countries throughout the world are investing more energy and resources into providing equitable, adequate maternal health services. One way of reducing maternal mortality is by improving the availability, accessibility, quality and use of services for the treatment of complications that arise during pregnancy and childbirth. These services are collectively known as Emergency Obstetric Care (EmOC). Sound programmes for reducing maternal mortality, like all public health programmes, should have clear indicators in order to identify needs, monitor implementation and measure progress. In order to fulfill these functions, the data used to construct the indicators should be either already available or relatively easy and economical to obtain. The indicators should be able to show progress over a relatively short time, in small as well as large areas. Most importantly, the indicators should provide clear guidance for programmes—showing which components are working well, which need more input or need to be changed and what additional research is needed. For a variety of technical and financial reasons, the maternal mortality ratio does not meet these requirements. Consequently, in 1991, UNICEF asked Columbia University (New York City, New York, United States of America) to design a new set of indicators for EmOC. The first version was tested in 1992. In 1997, the indicators were published as *Guidelines for monitoring the availability and use of obstetric services*, issued by UNICEF, WHO and UNFPA (1). These indicators have been used by ministries of health, international agencies and programme managers in over 50 countries around the world. In June 2006, an international panel of experts participated in a technical consultation in Geneva to discuss modifications to the existing indicators for EmOC and revisions to the *Guidelines*, taking into account the accumulated experience and increased knowledge in the area of maternal health care. The present handbook contains the agreed changes, including two new indicators and an additional signal function, with updated evidence and new resources. In addition, the *Guidelines* were renamed as the Handbook, to emphasize the practical purpose of this publication. The purpose of this handbook is to describe the indicators and to give guidance on conducting studies to people working in the field. It includes a list of life-saving services, or 'signal functions', that define a health facility with regard to its capacity to treat obstetric and newborn emergencies. The emphasis is on actual rather than theoretical functioning. On the basis of the performance of life-saving services in the past 3 months, facilities are categorized as 'basic' or 'comprehensive'. The section on signal functions also includes answers to frequently asked questions. The EmOC indicators described in this handbook can be used to measure progress in a programmatic continuum: from the availability of and access to EmOC to the use and quality of those services. The indicators address the following questions:

- Are there enough facilities providing EmOC?

<ul style="list-style-type: none"> • Are the facilities well distributed? • Are enough women using the facilities? • Are the right women (i.e. women with obstetric complications) using the facilities? • Are enough critical services being provided? • Is the quality of the services adequate? <p>The handbook provides a description of each indicator and how it is constructed and how it can be used; the minimum and/or maximum acceptable level (if appropriate); the background of the indicator; data collection and analysis; interpretation and presentation of the indicator; and suggestions for supplementary studies. There is a further section on interpretation of the full set of indicators. Sample forms for data collection and analysis are provided. Use of these EmOC indicators to assess needs can help programme planners to identify priorities and interventions. Regular monitoring of the indicators alerts managers to areas in which advances have been made and those that need strengthening. Close attention to the functioning of key services and programmes can substantially and rapidly reduce maternal mortality in developing countries.</p>
<p>WHO 2008. Maternal Mortality in 2005 : Estimates developed by WHO, UNICEF, UNFPA, and The World Bank. WHO Geneva, Switzerland 2007</p>
<p>A total of 14 countries had MMRs of at least 1000, of which 13 (excluding Afghanistan) were in the sub-Saharan African region. These countries are (listed in descending order): Sierra Leone (2100), Niger (1800), Afghanistan (1800), Chad (1500), Somalia (1400), Angola (1400), Rwanda (1300), Liberia (1200), Guinea Bissau (1100), Burundi (1100), the Democratic Republic of the Congo (1100), Nigeria (1100), Malawi (1100), and Cameroon (1000). By contrast, Ireland had an MMR of 1.</p> <p>The adult lifetime risk of maternal death (the probability that a 15-year-old female will die eventually from a maternal cause) is highest in Africa (at 1 in 26), followed by Oceania (1 in 62) and Asia (1 in 120), while the developed regions had the smallest lifetime risk (1 in 7300). Of all 171 countries and territories for which estimates were made, Niger had the highest estimated lifetime risk of 1 in 7, in stark contrast to Ireland, which had the lowest lifetime risk of 1 in 48 000. These estimates provide an up-to-date indication of the extent of the maternal mortality problem globally. They strongly indicate a need for both improved action for maternal mortality reduction and increased efforts for the generation of robust data to provide better estimates in the future.</p> <p>The separate analysis of trends shows that, at the global level, maternal mortality has decreased at an average of less than 1% annually between 1990 and 2005 – far below the 5.5% annual decline, which is necessary to achieve the fifth MDG, concerning maternal mortality reduction. To achieve that goal, MMRs will need to decrease at a much faster rate in the future – especially in sub-Saharan Africa, where the annual decline has so far been approximately 0.1%. <u>Achieving this goal requires increased attention to improved health care for women, including high-quality emergency obstetric care.</u></p>

Hongoro C, Musonza TG, Macq J, Anozie A. A qualitative assessment of the referral system at district level in Zimbabwe: implications on efficiency and effective delivery of health services. Cent Afr J Med. 1998 Apr;44(4):93-7

OBJECTIVE: To qualitatively assess the referral system at district level from the consumers' point of view and assess implications it had on efficiency and effectiveness of service delivery. DESIGN: Descriptive study. SETTING: Districts of Tsholotsho and Murewa. SUBJECTS: Subjects of the study included community members, ward health team members outpatient department (OPD). MAIN OUTCOME MEASURES: The nature and magnitude of the problem; health seeking behaviour; the perceived role of a hospital versus a health centre; knowledge on the referral system; user fees and the referral system and communication between the service and the community; and perceptions on the referral system. RESULTS: The community does not know the functional differences between a hospital and a clinic. What is clearly known is the physical differences that exist between the two. That is one of the reasons why the choice of a point of entry into the health care delivery system is not always correct. People do understand the mechanics of referring a patient to higher levels of care but they were not happy with the high hospital charges. Although the majority are eligible for free treatment the issues of high transport and other indirect costs were mentioned. There is no effective communication system between the service and the users. This manifested itself through the lack of knowledge or the existence and role of ward health teams or clinic committees. This lack of communication seems to be a major determinant in the failures of many a good policy. The impact of the new fee structure of January 1994 was minimal at district level because the communities felt that although referred patients do not pay hospital consultation fees, once admitted the patient still has to pay or at least prove that he/she is eligible for free services. The inconvenience of proving eligibility for free care still exists. CONCLUSION: In general, the community did not fully comprehend the purposes and intentions of the new user fees policy of January 1994 which was meant to rationalise the referral system. Generally, communities are seldom consulted in time to ensure effective policy implementation and realisation of the intended impact. Impressions generated on the impact of the problem of the referral system on resource use at hospital level show that it has been considerable, although this study did not quantify it. **Unnecessary overloading of referral centres negatively affected the care of referral cases, which actually required hospital care, due to competition with primary care cases.**

PIP: This exploratory study describes the nature and magnitude of the problem of health referrals, health-seeking behavior, perceptions, and knowledge at the district level in Zimbabwe. Data were obtained from focus groups with 159 persons in Tsholotsho and 132 persons in Murewa; from discussions with health personnel from the 6 health centers in Murewa and the 2 rural hospitals in Tsholotsho; and from records among a systematic sample of 400 new outpatients during October 1993 and March 1994 in Murewa district. Findings indicate that 71.8% in outpatient departments at Murewa Hospital had no access to a health center. 24.3% by-passed the health center for treatment at the

hospital. 3.8% were referred by health centers. The absolute number of referrals did not change during 1991-93. However, the number directly accessing services from outside the district rose. Focus group participants reported their intention to use the nearest clinic for an illness. In Tsholotsho, people initially used the village community worker/headman. If illness was perceived as serious, patients would go to a hospital. For minor illness, people used traditional herbal remedies. If illness did not change after remedies, the clinic was consulted. Some illnesses were perceived as outside the realm of medicine. Most distinguished between a health center and a hospital, but were unaware of the important, superior functions of the health center. Most did not understand the logic behind the referral system, but appreciated referrals and not the cost of hospital treatment or transportation. The community was unaware of Ward Health Teams. Many did not understand the new fee policy introduced in 1994.

Dzadeyson E. Study on maternal mortality and neonatal morbidity in Africa. Rural Integrated Relief Service-Ghana. 2007

OVERVIEW

Many African countries have been hit by an exodus of medical personnel to overseas destinations in recent years. "Only 42% of births in the African region are attended by skilled personnel," Emmanuel Dzadeyson at the National conference on maternal and new-born health in Ghana, emphasised. Unsafe abortions are also high among adolescents, according to Emmanuel Dzadeyson. Experts, who are drawn from various international organisations are examining the extent of the problem on the continent and will suggest ways of reducing the death rates among mothers and infants. African governments' health budgets were also identified as inadequate to deal with obstetric cases. "The percentage of GDP (gross domestic product) devoted to health in sub-Saharan Africa remains at between one percent and 3.7% compared to the large percentage spent on arms," they conveyed. "If nothing is done to arrest the trend (of high and growing maternal and child deaths), it is estimated that there will be 2.5 million maternal deaths, 2.5 million child deaths and 49 million maternal disabilities in the region over the next 10 years, Emmanuel Dzadeyson noted. He states that more than half of the 600,000 women who die every year from pregnancy-related causes were in the African region which constitutes only 12% of the world's population and 17% of its births. Maternal mortality ratio in Africa remains the highest in the world with the average actually increasing from 870 per 100,000 live births in 1990 to 1,000 per 100,000 live births in 2001. According to a WHO-sponsored study made available at the National I workshop on improving maternal and neonatal health in Ghana, neonatal morbidity and mortality rates is currently estimated at 45 deaths per 1,000 live births and contribute about 50% of the infant mortality rate in the Sub-sahara Africa. The findings of the study, presented by Elliot Hammond, a Consultant Neonatologist to the Rural Integrated Relief Service-Ghana, also show that stillbirths and deaths within the first seven days of life in Sub-sahara Africa was estimated at 76 per 1,000 live births. He also indicated that 70% of deliveries take place in the community where maternal and newborn births are usually not recorded. Eight countries were covered by the

study conducted between February 2001 and August 2007. Its goal was to develop or recommend evidence-based strategic interventions and establish sustainability in the institutionalization and implementation of identified remedial measures.

The study documents some of the causes of death as provided by health providers and facility records. These include: birth asphyxia (suffocation during birth), 40%; prematurity and low birth weight, 25%; infections, 20%; congenital defects, 10%, and acute surgical conditions, 3%. Other findings relate to unavailability of basic supplies and equipment, staff shortages and low morale, bad roads and long distances between referral points, continued use of traditional birth attendants (who are still popular and highly regarded) and preference of mothers to deliver in health facilities, although these are still largely perceived as not user-friendly.

The aim of the Initiative was to ensure that women and their newborns have access to the care they need through the strengthening of health systems and appropriate community-level actions." He stated that in spite of the harsh economic environment prevailing in Africa, the application of appropriate policies by governments would lead to improvements in the outcome of pregnancies irrespective of the economic status of countries. According to him, it was now time for African governments to focus on the availability of and accessibility to emergency obstetric care because emergencies constituted a major risk for maternal mortality in Africa. Other essential interventions, he said, were the reorganization of health systems, the strengthening of midwifery skills, and increasing the number of skilled birth attendants. He further concluded his presentation with a four-pronged call for action: action to place maternal and newborn health high on the agenda of governments and partners; to review policies, guidelines and programmes; to allocate and release resources and action to harness resources from communities and partners.

In an presentation made at the national conference on maternal and new-born health the Ghana, **Rural Integrated Relief Service-Ghana called for a greater involvement of men in caring for their spouses during pregnancy, basic education, improved health systems and the use of skilled birth attendants are key to reducing maternal and newborn mortality in Africa.** The Millennium Development Goals call for a 75% reduction in maternal mortality by in the African Region within the next decade. She notes that other factors crucial to attaining the goal included greater empowerment of women, allocation of adequate human and financial resources to the health sector, and greater availability of user-friendly information to improve individual, family and community knowledge of danger signs during pregnancy and labour. Emmanuel Dzadeyson emphasized that maternal deaths due to pregnancy-related complications were preventable. In another presentation to the meeting, the UNFPA Maternal Health Adviser outlined some of the reasons why African countries have failed to reduce maternal mortality. These include: lack of national commitment, financial support, coordination and partnership; increasing poverty and the low status of women; the adverse effects of HIV/AIDS, tuberculosis and malaria, and the use of inappropriate strategies to stem the growing tide of

maternal mortality. He stated that UNFPA's vision and strategy for maternal mortality reduction was based on three pillars: family planning, skilled attendance at all births and the availability of, and accessibility to, emergency obstetric care. Mothers, newborns, and children are inseparably linked in life and in health care needs. In the past, maternal and child health policy and programmes tended to address the mother and child separately, resulting in gaps in care which especially affect newborn babies. How can these gaps be addressed, especially during birth and the first days of life, when most mothers and newborns die, and at home, where most newborn deaths in Africa occur?

Policy and programme attention is shifting towards a maternal, newborn, and child health (MNCH) continuum of care. Instead of competing calls for mother or child, the focus is on universal coverage of effective interventions, integrating care throughout the lifecycle and building a comprehensive and responsive health system. The MNCH continuum of care can be achieved through a combination of well defined policies and strategies to improve home care practices and health care services throughout the lifecycle, building on existing programmes and packages. What is the current coverage of MNCH essential packages along the continuum of care, and how can these be strengthened to increase coverage, equity, and quality of care? Which interventions within the continuum of care would save newborn lives? Are there specific opportunities that could be seized?

Jowett M. Safe Motherhood interventions in low-income countries: an economic justification and evidence of cost effectiveness. Health Policy. 2000 Oct;53(3):201-28.

It is estimated that 1600 women die world-wide each day as a result of problems during pregnancy or childbirth. A large proportion of these deaths is preventable. This article examines the economic case for investing in safe motherhood interventions, and reviews key evidence of the cost effectiveness of safe motherhood interventions. According to one study, antenatal and maternal services comprise two of the six most cost effective sets of health interventions in low-income countries. However, little detailed evidence exists regarding the relative cost effectiveness of antenatal care, post-abortion care and essential obstetric care. Despite this there is clear evidence that interventions such as substituting manual vacuum aspiration for dilatation and curettage can result in significant savings both for health facilities and patients. **The paper estimates first that 26% of maternal deaths are avoidable through antenatal/community-based interventions, costing around 30% of the WHO Mother Baby Package; and secondly that access to quality essential obstetric care can prevent a further 48% of maternal deaths, consuming 24% of total Mother Baby Package costs.** Further work on the cost effectiveness of safe motherhood interventions would provide useful information for policy makers concerned with reducing maternal mortality in the most efficient manner possible.

Hounton S, Byass P, Brahim B. Towards reduction of maternal and perinatal mortality in rural Burkina Faso: communities are not empty vessels. Glob Health Action. 2009 May 7;2. doi: 10.3402/gha.v2i0.1947.

BACKGROUND: Reducing maternal and perinatal mortality in sub Saharan Africa remains challenging and requires effective and context specific interventions. OBJECTIVE: The aims of this paper were to demonstrate the impact of the community mobilisation of the Skilled Care Initiative (SCI) in reducing maternal and perinatal mortality and to describe the concept and implementation in order to guide replication and scaling up. DESIGNS: A quasi experimental design was used to assess the extent to which the SCI was associated with increased institutional births, maternal and perinatal mortality reduction in an intervention (Ouargaye) versus a comparison (Diapaga) district. A geo-referenced census was conducted to retrospectively assess changes in outcomes and process measures. A detailed description of activities, rationale and timing of implementation were gathered from the SCI project officers and summarised. Data analyses included descriptive statistics and multivariate analyses. RESULTS: At macro level, the main significant difference between Ouargaye and Diapaga districts was the scope and intensity of the community-based interventions implemented in Ouargaye. There was a temporal association relationship before and after the implementation of the demand-driven interventions and a remarkable 30% increase in institutional births in the intervention district compared to 10% increase in comparison district. There was a significant reduction of perinatal mortality rates (OR =0.75, CI 0.70-0.80) in intervention district and a larger decrease in maternal mortality ratios in intervention district, although statistical significance was not reached. A comprehensive framework of community mobilisation strategy is proposed to improve maternal and child health in poorest communities. CONCLUSION: **Controlling for the availability and quality of health services, working in partnership and effectively with communities, and not for them - hence characterising communities as not being empty vessels - can have impacts on outcomes.** Here, in the district with a community mobilisation programme, there was a marked increase in institutional births and reductions in maternal and perinatal deaths.

PMID: 20027267 [PubMed - in process]

Hounton S, Menten J, Ouédraogo M, Dubourg D, Meda N, Ronsmans C, Byass P, De Brouwere V. Effects of a Skilled Care Initiative on pregnancy-related mortality in rural Burkina Faso. Trop Med Int Health. 2008 Jul;13 Suppl 1:53-60.

OBJECTIVE: The aim of this paper is to assess to what extent a Skilled Care Initiative (SCI) was associated with pregnancy-related mortality in Ouargaye district, Burkina Faso. METHODS: We used a quasi-experimental design to compare pregnancy-related mortality within the intervention district (health facility areas covered by the SCI vs. areas not covered) and between the intervention district (Ouargaye) and a comparison district (Diapaga). Population-based data were used to examine differences in pregnancy-related mortality levels, their

determinants and how they related to uptake of care, as well as examining contexts and mechanisms of pregnancy-related deaths that occurred. Data analyses included descriptive statistics, univariate and multivariate regression analyses. RESULTS: The main risk factors for pregnancy-related mortality in rural Burkina Faso were age (extreme ages of reproductive period), low coverage of antenatal care and low institutional delivery. The introduction of the SCI, as implemented within the study reference period, had no appreciable effect on pregnancy-related mortality. CONCLUSION: Although the SCI was conceptually well designed and implemented, structural constraints may have limited its effectiveness for reducing pregnancy-related mortality within its period of implementation. **Lessons have been identified which might enable similar skilled attendance strategies to make their full potential impact on pregnancy-related mortality in remote and rural settings.**

PMID: 18578812 [PubMed - indexed for MEDLINE]

Hounton S, Sombié I, Meda N, Bassane B, Byass P, Stanton C, De Brouwere V. Methods for evaluating effectiveness and cost-effectiveness of a Skilled Care Initiative in rural Burkina Faso. Trop Med Int Health. 2008 Jul;13 Suppl 1:14-24.

INTRODUCTION: This paper aims to describe the design, methods and approaches used to assess the effectiveness and cost-effectiveness of the Skilled Care Initiative in reducing pregnancy-related and perinatal mortality in Ouargaye district, Burkina Faso. METHODS: The evaluation used a quasi-experimental design, mixed methods and a composite of tools to compare mortality and severe morbidity (near-miss) of women in reproductive age, perinatal mortality, facility functionality, perceived quality of care, utilisation of maternal health services, and costs borne by families and the health care system for maternal health care in Ouargaye and Diapaga districts. Structured questionnaires and interview guides were developed, pre-tested and piloted prior to the main survey. The evaluation was carried out from January to July 2006. A household census was used to retrospectively assess pregnancy-related and perinatal mortality over the previous 5 years, and causes of pregnancy-related death were identified using a newly developed and tested probabilistic model for interpreting verbal autopsy data. Data were directly entered into Personal Digital Assistant devices at the point of interview. Analyses included univariate and multivariate regressions and incremental cost-effectiveness ratios. RESULTS: A population census covering over half a million people, three qualitative surveys and facility surveys in 47 health centres have been carried out. CONCLUSION: A partnership with key stakeholders and the use of mixed methods proved feasible for evaluating complex safe motherhood strategies, and the use of hand-held computers proved possible for direct data capture, even in this remote rural environment.

PMID: 18578808 [PubMed - indexed for MEDLINE]

Shiffman J, Okonofua FE. The state of political priority for safe motherhood in Nigeria. BJOG. 2007 Feb;114(2):127-33.

Achieving the ambitious maternal mortality reduction aims of the Millennium Development Goals will require more than generating sufficient donor support and carrying out appropriate medical interventions. It also will necessitate convincing governments in developing countries to give the cause political priority. The generation of political priority, however, is a subject that has received minimal research attention. In this article, we assess the state of political priority for maternal mortality reduction in Nigeria, which has more maternal deaths in childbirth than any country except India. We also identify challenges that advocates face in promoting priority. We find that after decades of neglect, a policy window has opened for safe motherhood in Nigeria, giving hope for future maternal mortality reduction. However, priority is as yet in its infancy, as advocates have yet to coalesce into a potent political force pushing the government to action. **The case of Nigeria suggests that there is an urgent need for safe motherhood policy communities in countries with high maternal mortality to transform their moral and technical authority into political power, pushing policy-makers to action.** We offer a number of suggestions on how they may do so.

PMID: 17305890 [PubMed - indexed for MEDLINE]

Shiffman J. Generating political priority for maternal mortality reduction in 5 developing countries. Am J Public Health. 2007 May;97(5):796-803. Epub 2007 Mar 29.

I conducted case studies on the level of political priority given to maternal mortality reduction in 5 countries: Guatemala, Honduras, India, Indonesia, and Nigeria. Among the factors that shaped political priority were international agency efforts to establish a global norm about the unacceptability of maternal death; those agencies' provision of financial and technical resources; the degree of cohesion among national safe motherhood policy communities; the presence of national political champions to promote the cause; the deployment of credible evidence to show policymakers a problem existed; the generation of clear policy alternatives to demonstrate the problem was surmountable; and the organization of attention-generating events to create national visibility for the issue. **The experiences of these 5 countries offer guidance on how political priority can be generated for other health causes in developing countries.**

PMID: 17395848 [PubMed - indexed for MEDLINE]

Cham M, Vangen S, Sundby J. Maternal deaths in rural Gambia. Glob Public Health. 2007;2(4):359-72.

The objective of this study was to determine causes and contributing factors to maternal deaths in a poor rural setting. We included all maternal deaths (N =42), identified from January to September 2002, in a remote area of The Gambia. To gain a comprehensive picture of medical causes and contributing factors a combination of audit procedure and verbal autopsy was applied. The results showed that anaemia (n =12) was the leading cause of death followed by

haemorrhage (n =10), eclampsia (n =8) and obstructed labour (n =8). Placental abruption accounted for 9 of the 10 haemorrhage cases. Substandard obstetric care was identified for the majority of deaths. Substantial inadequacies were revealed at the hospital, characterized by operational difficulties and an uncoordinated emergency preparedness, including malfunction of the blood transfusion service, failure to obtain operative delivery, poor birth monitoring and lack of trained personnel, electricity, medical equipment and drugs. Substandard primary care and logistic difficulties within the referral process further complicated the situation. **Delay in seeking care by the cases themselves played a less important role.** It was concluded that interventions, addressing the profound deficiencies within the health care system and increasing access to emergency obstetric care, are warranted to reduce maternal deaths in a poor setting such as rural Gambia.

PMID: 19283633 [PubMed - indexed for MEDLINE]

Daramola AO, Elesha SO, Banjo AA. Medical audit of maternal deaths in the Lagos University Teaching Hospital, Nigeria. East Afr Med J. 2005 Jun;82(6):285-9.

OBJECTIVES: To determine the rate of autopsy certification of maternal deaths; evaluate concordance and/discordance rates between autopsy and clinical diagnoses of maternal deaths, and to compare these with findings from other parts of the world. DESIGN: Retrospective study. SETTING: The Lagos University Teaching Hospital (LUTH), Nigeria between January 1989 and December 1998. SUBJECTS: Women who died from pregnancy-related complications having been on admission in or having presented as emergencies to LUTH. RESULTS: In the study period, 445 maternal deaths were registered in the LUTH mortuary. Autopsies were performed on 371 of these, giving an autopsy rate of 83.37%. Only 230 cases were found suitable for evaluation of concordance and discordance. Two hundred and six of these (89.57%) had related clinical and autopsy diagnoses (concordance) while 24 (10.43%) had completely unrelated diagnoses (discordance). CONCLUSION: **Adequate investigation of cause of death using the autopsy will assist in accurately determining the sequence of events that result in death and hence provide required statistics for the planning of appropriate interventions.**

PMID: 16175778 [PubMed - indexed for MEDLINE]

Adamu YM, Salihu HM, Sathiakumar N, Alexander GR. Maternal mortality in Northern Nigeria: a population-based study. Eur J Obstet Gynecol Reprod Biol. 2003 Aug 15;109(2):153-9.

OBJECTIVES: To determine the incidence and causes of maternal mortality as well as its temporal distribution over the last decade (1990-1999). STUDY DESIGN: All maternal deaths recorded within the study period in the State of Kano, Northern Nigeria, were analyzed. Maternal mortality ratios (MMR) were computed using the Poisson assumption to derive confidence intervals around the estimates. A non-linear regression model was fitted to obtain the best temporal trajectory for MMR across the decade of study. RESULTS: A total of

4154 maternal deaths occurred among 171,621 deliveries, yielding an MMR of 2420 deaths per 100,000. Eclampsia, ruptured uterus and anemia were responsible for about 50% of maternal deaths. CONCLUSION: We found one of the highest maternal mortality ratios in the world. **Maternal mortality could be reduced by half at study site with effective interventions targeted to prevent deaths from eclampsia, ruptured uterus and anemia.**

PMID: 12860333 [PubMed - indexed for MEDLINE]

Mekbib T, Kassaye E, Getachew A, Tadesse T, Debebe A. The FIGO Save the Mothers Initiative: the Ethiopia-Sweden collaboration. Int J Gynaecol Obstet. 2003 Apr;81(1):93-102.

The overall goal of the FIGO Save the Mothers Fund was to establish basic and comprehensive emergency obstetric care (EmOC) with the specific objectives of increasing the availability and utilization of quality obstetric care as measured by the UN indicators. As a result of this commitment by FIGO, the Ethiopian Society of Obstetricians and Gynecologists (ESOG) launched the Save the Mothers Project (SMP) in West Showa Zone (WSZ), Ethiopia in 1998 to implement and test a demonstration project and evaluate the feasibility and impact of the intervention. The overall objectives matched FIGO's-reducing maternal deaths by promoting the availability, access and utilization of EmOC services for women with complications of pregnancy and childbirth. The intervention package included capacity building as a major activity, and physicians and other service providers from Ambo Hospital, Shenen and Ijaji Health Centers were trained in EmOC. This was intended to combat the high staff turnover in the area. Equipment, materials and supplies were also provided to the demonstration sites to enable them provide basic and comprehensive EmOC services. The interventions, begun in 1999, led to improvements in availability, utilization and met need, which suggests that such an approach may eventually lead to the reduction of maternal deaths. The cesarean section rate for Ambo Hospital increased from 3.7% in 1998 to 17.3% in 2001--an almost six-fold increase. At Ambo Hospital both the total number of deliveries and cases admitted with obstetric complications have increased from baseline. Patients with obstructed labor comprise 39% of all obstetric patients making it the leading cause of hospitalization. Obstetric hemorrhage comes next with 24% of all admissions. The case fatality rate (CFR) (for direct maternal deaths) decreased from 7.2% at baseline, to 4.6% in 2001--showing a definite trend of improvement. Currently, there is 24-h EmOC service at Ambo Hospital where an obstetrician and general medical practitioners with EmOC training are responsible for the service. Shenen and Ijaji health Centers are upgraded in terms of training of staff members, provision of equipment and supplies, and regular supervision so that the community in these areas has access to basic EmOC services. To replicate similar activities, in a setting like ours, EmOC projects have to be low cost to attract decision-makers. **The SMP used almost US dollars 100,000 over 3 years to ensure availability of EmOC services for women in WSZ. A favorable political climate such as maintenance of relative peace, and flexibility in adapting to local conditions also contributed to the success of**

<i>the SMP.</i>
PMID: 12676407 [PubMed - indexed for MEDLINE]
Geelhoed DW, Visser LE, Asare K, Schagen van Leeuwen JH, van Roosmalen J. Trends in maternal mortality: a 13-year hospital-based study in rural Ghana. Eur J Obstet Gynecol Reprod Biol. 2003 Apr 25;107(2):135-9.
OBJECTIVE: To measure the impact of the Safe Motherhood Initiative (SMI) on hospital-based maternal mortality since its start in 1987. STUDY DESIGN: Retrospective analysis of all 229 maternal deaths in a district hospital in rural Ghana, between 1 January 1987 and 1 January 2000. Main outcome measures were maternal mortality ratio and relative contribution of causes of maternal deaths to overall maternal mortality. Chi-square test was used to assess differences in proportions, and relative risks with confidence intervals were calculated. RESULTS: The overall maternal mortality ratio of 1077/100,000 live births did not change significantly during the study period. However, the relative contributions of sepsis, hemorrhage, obstructed labor, anemia/sickle cell disease and (pre-) eclampsia diminished, while abortion complications increased significantly. CONCLUSIONS: <u>The Safe Motherhood Initiative in the study area has contributed to the reduction of maternal mortality due to causes against which interventions were directed.</u> Abortion complications as cause of maternal mortality need to be included in interventions and research.
PMID: 12648857 [PubMed - indexed for MEDLINE]
Roth DM, Mbizvo MT. Promoting safe motherhood in the community: the case for strategies that include men. Afr J Reprod Health. 2001 Aug;5(2):10-21.
Although a decade has now passed since the launching of the Safe Motherhood Initiative, maternal mortality continues to be the health indicator showing the greatest disparity between developed and developing countries. Recently revised WHO and UNICEF figures indicate that an estimated 90% of the 585,000 worldwide maternal deaths that occur each year take place in sub-Saharan Africa and Asia. In terms of the lifetime risk of maternal death, this disparity remains striking: 1 in 12 women in parts of sub-Saharan Africa, compared with 1 in 4,000 women in Northern Europe. In addition, for every woman who dies, an estimated 16-17 will suffer from pregnancy-related complications. Research suggests that, in addition to biomedical interventions and the strengthening of health care services, improving awareness of obstetric complications among members of a pregnant woman's immediate and wider social network is an important step in improving her chances of survival when such complications occur. Many of the interventions implemented so far have focused exclusively on improving women's knowledge and practices as they relate to maternal health issues. Nevertheless, it is now increasingly being recognised that the actions required to achieve improvements in reproductive health outcomes in general, and maternal health in particular, should involve communities in the process and encourage men's active participation. Despite this, very few studies on risk perceptions or

interventions to raise community awareness of obstetric risk factors, their complications and their consequences have targeted men. **The present article argues for the development and testing of risk awareness interventions, which, in addition to women, target men in their familial and social roles within communities and as workers within health care services as a means of improving maternal health outcomes.**

PMID: 12471909 [PubMed - indexed for MEDLINE]

Ande B, Chiwuzie J, Akpala W, Oronsaye A, Okojie O, Okolocha C, Omorogbe S, Onoguwe B, Oikeh E. Improving obstetric care at the district hospital, Ekpoma, Nigeria. The Benin PMM Team. Int J Gynaecol Obstet. 1997 Nov;59 Suppl 2:S47-53.

PRELIMINARY STUDIES: Facility reviews and focus group discussions revealed several factors at the district hospital contributing to maternal deaths in Ekpoma District, Nigeria. INTERVENTIONS: In response, the necessary equipment for the operating theater, labor suite and laboratory were repaired or purchased. A blood bank and standby generator were repaired. Drugs and consumable material were purchased and a revolving fund established. Refresher courses were held for medical officers, nursing staff and laboratory technicians. At a later stage, community interventions focused on improving access and reducing delay in seeking care. RESULTS: The number of cesarean sections performed increased from zero in 1990-1991 to between seven and 13/year in the period 1992-1995. The number of women with major obstetric complications seen at the hospital increased from seven in 1990 (5% of obstetric admissions) to a high of 29 (20% of obstetric admissions) in 1993. These gains were not sustained, however. In 1995, only 12 women with complications (9% of obstetric admissions) were seen. COSTS: The cost of improvements was approximately US \$12,800, of which 41% was paid by the government and the rest by the project. CONCLUSIONS: **Improving obstetric care at the district hospital can increase use by women with complications. However, sociopolitical and economic problems can hamper success.**

PMID: 9389613 [PubMed - indexed for MEDLINE]

Adam T, Lim SS, Mehta S, Bhutta ZA, Fogstad H, Mathai M, Zupan J, Darmstadt GL Cost effectiveness analysis of strategies for maternal and neonatal health in developing countries. BMJ. 2005 Nov 12;331(7525):1107.

OBJECTIVE: To determine the costs and benefits of interventions for maternal and newborn health to assess the appropriateness of current strategies and guide future plans to attain the millennium development goals. DESIGN: Cost effectiveness analysis. SETTING: Two regions classified by the World Health Organization according to their epidemiological grouping: Afr-E, those countries in sub-Saharan Africa with very high adult and high child mortality, and Sear-D, comprising countries in South East Asia with high adult and high child mortality. DATA SOURCES: Effectiveness data from several sources, including trials, observational studies, and expert opinion. For resource inputs, quantities came from WHO guidelines, literature, and expert opinion, and prices from the WHO

choosing interventions that are cost effective database. MAIN OUTCOME MEASURES: Cost per disability adjusted life year (DALY) averted in year 2000 international dollars. RESULTS: The most cost effective mix of interventions was similar in Afr-E and Sear-D. These were the community based newborn care package, followed by antenatal care (tetanus toxoid, screening for pre-eclampsia, screening and treatment of asymptomatic bacteriuria and syphilis); skilled attendance at birth, offering first level maternal and neonatal care around childbirth; and emergency obstetric and neonatal care around and after birth. Screening and treatment of maternal syphilis, community based management of neonatal pneumonia, and steroids given during the antenatal period were relatively less cost effective in Sear-D. Scaling up all of the included interventions to 95% coverage would halve neonatal and maternal deaths. CONCLUSION: **Preventive interventions at the community level for newborn babies and at the primary care level for mothers and newborn babies are extremely cost effective, but the millennium development goals for maternal and child health will not be achieved without universal access to clinical services as well.**

PMID: 16282407 [PubMed - indexed for MEDLINE]

Seale AC, Mwaniki M, Newton CR, Berkley JA. Maternal and early onset neonatal bacterial sepsis: burden and strategies for prevention in sub-Saharan Africa. Lancet Infect Dis. 2009 Jul;9(7):428-38.

Maternal and child health are high priorities for international development. Through a Review of published work, we show substantial gaps in current knowledge on incidence (cases per live births), aetiology, and risk factors for both maternal and early onset neonatal bacterial sepsis in sub-Saharan Africa. Although existing published data suggest that sepsis causes about 10% of all maternal deaths and 26% of neonatal deaths, these are likely to be considerable underestimates because of methodological limitations. Successful intervention strategies in resource-rich settings and early studies in sub-Saharan Africa suggest that the burden of maternal and early onset neonatal bacterial sepsis could be reduced through simple interventions, including antiseptic and antibiotic treatment. **An effective way to expedite evidence to guide interventions and determine the incidence, aetiology, and risk factors for sepsis in sub-Saharan Africa would be through a multiarmed factorial intervention trial aimed at reducing both maternal and early onset neonatal bacterial sepsis in sub-Saharan Africa.**

PMID: 19555902 [PubMed - indexed for MEDLINE]

Dongmo R, Fenieys D, Aminou M, Calvez T, Gruénais ME, Thonneau P. Introduction of an obstetric health information system: results of a pilot study in North Cameroon. Rev Epidemiol Sante Publique. 2006 Dec;54(6):507-15.

BACKGROUND: International safe motherhood programs have placed increasing emphasis on assessing progress in reducing maternal mortality in developing countries. We assess the feasibility and relevance of an obstetric

health information system introduced in Maroua urban district in North Cameroon. METHODS: During the study period, an obstetric observation register was introduced for obstetric data collection, complemented by anthropological case studies on maternal deaths. RESULTS: At the end of the study period, implementation and data collection processes were correctly done, and the overall rate of completion of obstetric registers was 95% (ranging from 82.5% to 98.5% between maternity units). Eight hundred and twenty-six deliveries (n=826) were recorded and evenly distributed over the nine weeks of the study period. Eight women (1%) were transferred from non-surgical to surgical health facilities. Thirteen C-sections (n=13; 1.6%; CI: 0.8-2.7%) mainly in the provincial hospital of Maroua (11/13), and four maternal deaths were recorded, giving a maternal mortality rate of 4/826 (484 for 100,000; CI: 132-1240 for 100,000 deliveries). Nevertheless, anthropological enquiry recorded five maternal deaths during the same study period. Analysis of the geographical origin of these women showed that four of the five came from very remote areas. Rapid analysis and dissemination of results have initiated changes in obstetric practices (introduction of the partograph, modifications in the attitudes of health personnel), and also to the creation of a network between maternity units (those with and without surgical facilities) and provincial health headquarters. CONCLUSION: **The introduction and use of a basic obstetric health information system combined with anthropological survey can provide a relatively accurate assessment of the maternal health situation. Such knowledge would be an excellent basis for implementing obstetric networking and relevant tools for active management of the obstetric pyramid at a regional level in developing countries.**

PMID: 17194982 [PubMed - indexed for MEDLINE]

Sépou A, Yanza MC, Nguembi E, Dotte GR, Nali MN. Analysis of transfers in the Gynecology and Obstetrics Department of Bangui Hospital. Sante. 2000 Nov-Dec;10(6):399-405.

During a study carried out over twelve months in the National Reference Center for Gynecology and Obstetrics at Bangui Hospital, we recorded 1,369 cases of evacuation in a total 5,020 admissions to the department. This corresponds to a frequency of 27.3%. In 73.8% of cases, this intervention was performed for obstetric reasons. It was justified in 73.1% of cases, and 96.5% of the justified interventions were for obstetric reasons. The unjustified interventions led to a normal delivery in 97% of cases. Errors in diagnosis were detected in 16.5% of the cases. In terms of prognosis, we recorded 91 deaths in the perinatal period (96 per thousand live births) and 37 maternal deaths (of the 39 recorded in the department), accounting for 94.9% of all maternal deaths, with a mortality rate of 2.7% for women undergoing uterine evacuation. Infant mortality was higher in cases of late intervention. **The most frequent causes of death of the mothers were hemorrhagia on delivery, severe infection, rupture of the uterus and the tearing of soft tissues.**

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