

# The evidence-base for facility-based deliveries in low- and middle-income countries

Working paper Norwegian  
Knowledge Center for the Health  
Services  
May 2008

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**Background:** The Norwegian government is heavily involved in international initiatives to reach health-related Millennium Development Goals (MDGs), in particular those related to improving maternal, newborn and child health.

- One strategy being promoted (e.g. in the World Health Report 2005: Make every mother and child count) is facility-based deliveries, i.e. that women give birth in health-centres and similar health facilities, typically with the attendance of skilled health personnel (e.g. midwives), rather than at home (with or without a skilled attendant). As the effectiveness of this strategy is currently disputed there is a need to compile the current evidence on this topic to better inform future decision making. **Method:** We searched for systematic reviews (SRs) in The Cochrane Database of Systematic Reviews, Database of Abstracts of Reviews of Effects, and the Health Technology Assessment Database, using text-word combinations “delivery and maternal” and “traditional birth attendant”. We also searched PubMed for systematic reviews using text words birth, delivery, “delivery rooms”, “maternal mortality” and “neonatal mortality”, *(fortsetter på baksiden)*

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Working paper: ISBN 978-82-8121-205-3

May 2008

 kunnskapssenteret

*(fortsettelsen fra forsiden)* and the MIDIRS-database using text words “developing countries and birth and review” and “facility based”. • In addition, we scanned the list of reviews from the Cochrane Pregnancy and Child-birth Review Group. • Finally, we contacted several international experts in the field and asked whether they were aware of systematic reviews of direct relevance to our topic. **Results:** We did not identify any systematic reviews of studies comparing facility-based delivery with home-based delivery in low and middle income countries. We identified two overview-articles where the effectiveness of promoting facility-based delivery was a main topic. • We identified a discussion paper on skilled attendance at delivery which we felt was relevant. Finally, we identified an economic analysis of strategies for maternal and neonatal health in developing countries, which included cost-effectiveness estimates for the provision of skilled care during delivery. The two overviews we identified did not use a formal definition, but implicitly defined “facility-based delivery” as giving birth at a permanent health-facility with the presence of a skilled birth attendant.

**The evidence-base for facility-based  
deliveries in low- and middle-  
income countries**

<b>Title</b>	The evidence-base for facility-based deliveries in low- and middle income countries
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<b>ISBN</b>	978-82-8121-205-3
<b>Project number</b>	900
<b>Type of report</b>	Working paper
<b>Nr. of pages</b>	16
<b>Client</b>	Norad
<b>Citation</b>	Fretheim A, Hviding K. The evidence-base for facility-based deliveries in low- and middle-income countries. Working paper. Oslo: Nasjonalt kunnskapssenter for helsetjenesten, 2008.

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Norwegian Knowledge Centre for the Health Services  
Oslo, May 2008

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# Preface

The Norwegian Knowledge Centre for the Health Services received a request from Norad April 18<sup>th</sup> 2008, where the task was to provide a brief outline of the evidence-base for promoting facility-based deliveries in low- and middle income countries. This would include a brief discussion of the term “facility-based delivery” and what the most relevant outcome-measures are in this context. Cost-effectiveness considerations were also requested. The deadline was set to April 30<sup>th</sup>.

Due to the short dead-line and that no systematic reviews on the topic were found, it was decided, in consultation with Norad, that the scope of the report would be limited to reviewing and referring to selected discussion papers that addressed facility-based deliveries.

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# Objective

To provide a summary of the evidence including cost-effectiveness considerations for facility-based deliveries in low- and middle income countries, as an effective strategy to reduce morbidity and mortality.

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# Background

The Norwegian government is heavily involved in international initiatives to reach health-related Millennium Development Goals (MDGs), in particular those related to improving maternal, newborn and child health (MDGs 4 & 5).

One strategy being promoted (e.g. in the *World Health Report 2005: Make every mother and child count*) is facility-based deliveries, i.e. that women give birth in health-centres and similar health facilities, typically with the attendance of skilled health personnel (e.g. midwives), rather than at home (with or without a skilled attendant). As the effectiveness of this strategy is currently disputed there is a need to compile the current evidence on this topic to better inform future decision making.



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# Method

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## LITERATURE SEARCH

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We searched for systematic reviews (SRs) in The Cochrane Database of Systematic Reviews, Database of Abstracts of Reviews of Effects, and the Health Technology Assessment Database, using text-word combinations “delivery and maternal” and “traditional birth attendant”.

We also searched PubMed for systematic reviews using text words birth, delivery, “delivery rooms”, “maternal mortality” and “neonatal mortality”, and the MIDIRS-database using text words “developing countries and birth and review” and “facility based”.

In addition, we scanned the list of reviews from the Cochrane Pregnancy and Childbirth Review Group.

Finally, we contacted several international experts in the field and asked whether they were aware of systematic reviews of direct relevance to our topic.

We did not conduct formal quality assessments of the literature we retrieved.

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# Results

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## SEARCH FOR LITERATURE

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We did not identify any systematic reviews of studies comparing facility-based delivery with home-based delivery in low and middle income countries. We identified two overview-articles where the effectiveness of promoting facility-based delivery was a main topic (1;2). One of the overviews included a cost-effectiveness analysis (2). The conclusions in the overviews were partly informed by existing systematic reviews of single clinical interventions, partly by other sources of information, and supported by logical arguments. The authors did not report having conducted a systematic search for relevant literature. One overview was characterised as a “research-informed viewpoint” (1).

We also identified a review/discussion paper on skilled attendance at delivery (3), which we felt was relevant for the topic. Finally, we identified an economic analysis of strategies for maternal and neonatal health in developing countries, which included cost-effectiveness estimates for the provision of skilled care during delivery (4).

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## FACILITY-BASED DELIVERIES

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The two overviews we identified did not use a formal definition, but implicitly defined “facility-based delivery” as giving birth at a permanent health-facility with the presence of a skilled birth attendant who has the necessary equipment and drugs available, including the possibility of prompt referral to hospital care. The authors considered local health centres to be the best primary facility for deliveries with “midwives as the main providers, but other attendants working with them in a team”. They stated that “the treatment components would include all basic emergency obstetric functions, apart from blood transfusions or surgery, which would be available at the referral level as comprehensive emergency obstetric care” (1).

The line of arguments leading to the recommendation that facility-based deliveries should be promoted was similar in the two overviews (1;2):

1. There are several clinical interventions and strategies that can reduce maternal mortality and thus need to be available for women in labour, e.g. early detection of complications followed by early referral. The effectiveness of many single interventions has been documented through rigorous evaluations (randomised controlled trials).
2. Many clinical interventions require skilled personnel (nurse, midwife, doctor), e.g. antibiotics for premature rupture of membranes, manual removal of placenta, provision of intravenous drips.
3. The most practical and efficient way of organising skilled attendance of deliveries is by bringing women to a health centre or similar facility. There the skilled attendant, typically a midwife, can attend more than one delivery at a time, and have the required equipment at hand. There may also be auxiliary personnel available (e.g. doctors), as well as easy access to transport to the next level of care (hospital).

In these overviews, the main focus was on reducing the maternal mortality burden. The authors acknowledged that strong evidence in favour of a facility-based strategy compared to a home-based strategy is lacking. They stated that such a strategy “is not without its challenges, uncertainties, and limitations”, e.g. ensuring “24-h availability of service”, and overcoming access barriers related to “distance, cost, and cultural acceptability” (1). However, the authors concluded that “A health centre intra-partum strategy can be justified as the best bet to bring down high rates of maternal mortality” (1).

The authors also called for more rigorous evaluations of different implementation strategies for increased availability of skilled attendance during delivery.

### **Cost-effectiveness**

One of the cost-effectiveness analyses we identified was a model-based comparison of different scenarios where the content and coverage of intervention packages for prenatal and intrapartum care varied (2). One of the main findings was that improvement at the primary care level seemed to be the most cost-effective strategies, including provision of basic emergency obstetric care at the health centre level in some scenarios. One assumption in the model was that women who participate in prenatal care also take advantage of professional delivery. “Prenatal care is, thus, a crucial entry point to the health system.” However, the authors themselves issued “a note of caution” regarding their analysis: “our model has necessarily used a number of assumptions for which data are extremely limited, and it remains fairly crude, having been subject only to a limited sensitivity analysis” (2).

The other economic analysis modelled the cost-effectiveness of various combinations of 21 interventions to improve maternal and neonatal health. Among

these were i) normal delivery by skilled attendant, ii) active management of third stage labour, and iii) initial management of post-partum haemorrhage (4). The effect-estimates for these interventions were based on “expert panel assessment of available evidence”. Regarding the use of skilled attendants and timely referral to hospitals, the authors concluded that “Although these services require considerably more resources than community based and antenatal care packages, they are effective in reducing maternal and neonatal morbidity and mortality and, as such, are also highly cost effective.” The authors recognised that “possible limitations of the analysis need to be carefully considered”, e.g. that “many of the interventions we analysed are based on limited efficacy trials or expert opinion”.

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## **SKILLED BIRTH ATTENDANCE**

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The presence of a skilled birth attendant with the necessary remedies at hand is a prerequisite and the main argument for promoting facility-based deliveries. We therefore decided to also include a review-paper addressing the “scientific justification” for skilled birth “attendance”, i.e. the combination of skilled attendants and “an enabling environment of equipment, supplies, drugs and transport for referral” (3).

The basis for promoting skilled birth attendance is much based on observational studies, e.g. comparisons of maternal mortality ratios in areas with high and low levels of skilled attendance during deliveries. However, the observed associations between maternal mortality ratios and the rate of skilled attendance is not always clear-cut, and the authors acknowledged that no rigorous evaluations have been carried out to show that women delivering with skilled attendance have a lower risk of dying than women delivering without.

The authors concluded that while “skilled attendance could work to reduce maternal mortality at the individual level; we do not know reliably if it can or has”, but they added: “This is not to suggest that skilled attendance for all deliveries should not be a goal, but it does raise questions about the most effective and efficient intermediate steps to reaching it” (3).

Using skilled birth-attendants for home-deliveries is an alternative strategy to facility based delivery which was also discussed in the two other overviews (1;2). The arguments against this approach are mostly logical: that home conditions can be extremely basic, that this is an inefficient use of skilled attendants’ time, and that the ability to cope with emergencies is limited when auxiliaries and organised transport is not readily available.

Relying on community health workers or traditional birth attendants for intra-partum care was briefly addressed in the overviews, but the authors pointed out that

**”unless training is to the level of a skilled attendant, community health workers will not be able to provide most elements of an effective package of interventions” (1).**

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# Discussion

Due to the short dead-line and that no systematic reviews on facility-based deliveries were found, it was agreed that the scope of the report would be limited to reviewing and referring to selected discussion papers addressing facility-based deliveries.

We did not find a formal definition of “facility-based deliveries”, but the term implies having a permanent health facility where skilled attendance for deliveries is being provided.

There seems to be no solid direct evidence that facility-based deliveries lead to improved maternal health outcomes relative to home-based deliveries. A key premise for promoting facility-based deliveries is that skilled attendance during delivery is an effective means of reducing maternal mortality.

Despite the lack of rigorous evaluations comparing deliveries with or without skilled attendance, there is a strong consensus in the professional community in support of promoting skilled attendance. One of the established indicators to monitor progress towards MDG 5 (reduction of maternal mortality ratios) is “skilled attendance at delivery”. However, it should be noted that the reliability of this indicator is questionable. For instance, what constitutes “skilled” is not universally accepted, and what “attendance” implies in terms of timing and length of presence is often not accounted for (5).

The rationale behind promoting facility-based deliveries is largely practical: The proponents claim that this is the most efficient way of ensuring skilled attendance at delivery. There are several convincing arguments in support of this view.

Whether delivering at a health facility is beneficial or not to the woman and her child, is likely to depend on the quality of care being provided at the facility. Unless a skilled person is present and has the necessary means for intervention and prompt referral during delivery, the case for promoting facility-based deliveries is weak.

Potential negative effects of delivering at health facilities are only briefly addressed in the publications we have reviewed. It is, for example, conceivable that the risk of infection is higher at a health facility than at home. To what extent such

consequences may outweigh the relative advantages from delivering at a health-facility, is difficult to assess.

We have based most of this working paper on the evidence and logical arguments presented in a relatively recent paper (published 2006) (1). In a response to this article concerns were raised about whether implementing facility-based deliveries is the best option in all settings in the short-term: “In many communities with high maternal mortality, this strategy is simply not achievable with current resources and infrastructure, and without other evidence-based options, countries could be left without adequate guidance about how to proceed” (6). It was also pointed out that some governments, “without robust evidence”, have been persuaded to stop training programmes for traditional birth attendants (TBAs). The critics questioned this policy by referring to the encouraging findings from a Pakistani trial of TBA-training. However, they did acknowledge that “a delivery attended by a skilled attendant in a health facility should be a woman’s right, if that is her choice.”

Implementing a system of facility-based deliveries poses several challenges that could potentially limit the strategy’s impact on maternal survival. Providing the necessary infrastructure and human resources, including 24 h availability and the required training, is one major hurdle. Another is related to whether women will in fact choose to deliver at their health centre. Traditions, transport-costs, the behaviour of health professional towards women in labour and other factors can limit women’s desire to deliver at the designated facility.

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# Conclusions

Due to the lack of rigorous evaluations of facility-based deliveries, as well as of the use of skilled attendance, the effectiveness of these strategies is difficult to assess. Consequently, cost-effectiveness analyses are necessarily based on inaccurate effect-estimates and yield uncertain conclusions. However, there are several logical arguments in favour of the position that such strategies can have an impact on important health outcomes, including maternal mortality.

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## NEED FOR FURTHER RESEARCH

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Rigorous evaluations of facility-based deliveries and of skilled attendance at birth are lacking. Because the logical arguments in favour of these strategies are quite convincing, it may not be perceived as ethically acceptable to conduct randomised controlled trials of their effectiveness. However, at least three feasible approaches can provide better estimates of the relative gains from using skilled birth attendants and facility-based deliveries:

1. A systematic review should be conducted to ensure that existing impact-evaluations of sufficient scientific rigour are identified, critically appraised and summarised in one document. The Cochrane Effective Practice and Organisation of Care (EPOC) Review Group has included “Facility-based versus non-facility-based deliveries in low and middle-income countries” on their list of priority topics for reviews (Andy Oxman, personal communication).
2. It may be practically and ethically feasible to conduct randomised trials of such strategies in some circumstances, as suggested in one of the reviews we have referred to above: “A natural opportunity to use this experimental design may arise where countries are committed to skilled attendance as defined above, but are unable to implement this across all districts at the same time. If districts can be randomised in terms the order in which implementation occurs, the cluster randomised trial design may be feasible” (3).
3. If a randomised study is not feasible, other designs for rigorous impact-evaluations should be considered.



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