Global Development Network

Strengthening Institutions to Improve Public Expenditure Accountability

Stimulating Policy Alternatives for Better Maternal Health:

The Case of Nepal

Devendra PD Shreshtha
Policy Research and Development (PRAD) Nepal

13 May 2013

GDN Global Development Network
The Global Research Capacity Building Program™

Table of Contents

Context

Over half a million women across the world die from maternal causes each year (The Lancet, 2006). In the world's poorest countries, the risk of a woman dying from maternal causes is about one in six. Globally, one woman in 74 will die from pregnancy or childbirth. Lifetime chances of dying from maternal causes in Nepal are estimated to be one in 80 (Population Reference Bureau data sheet, 2011).

Millennium Development Goal MDG-5 is arguably the heart of the MDGs and aims for a three-quarter reduction in the maternal mortality rate (MMR). Globally it has been claimed that with recent trends in the reduction in MMR, the MDG-5 target of 141 per 100,000 live births by 2015 will be difficult to achieve (The Lancet, 2006). The power of MDG-5 is its potential impact on poverty reduction, women's empowerment, child survival and infectious disease, as well as its foundation in women's right to health and survival. The goal cannot be achieved without a strong health system that ensures access to medical assistance for obstetric emergencies.

Situation of Maternal Mortality in Nepal

In Nepal, the maternal mortality ratio is estimated to have declined from 539 in 1996 to 281 in 2006. A survey of eight districts in 2009 has shown that maternal mortality has further reduced to 229 per 100,000 live births (Pradhan et al., 2010). The recently released MDG Progress Report 2010 states that Nepal is on track in achieving most of its targets by 2015. The report further claimed that the target of reducing the mortality rate to 54 per 1,000 live births from about five will be met before 2015. Efforts to expand access to facility based deliveries and therefore skilled attendance at delivery have resulted in dramatic changes in the place of delivery and, together with a decline in fertility, have contributed to the dramatic reduction in maternal mortality in Nepal (Oot, 2011).

The recent preliminary results of the NDHS 2011 also suggest continued remarkable progress towards achieving MDGs 4 and 5. This is indeed a significant achievement and points towards meeting the MMR target set for 2015. The Ministry of Health and Population (MOHP) in its revised Safe Motherhood and Neonatal Health Long Term Plan 2006–2017 has set the target for attaining an MMR of 134 per 100,000 live births and a reduction in the neonatal mortality rate from 33 per 1,000 to 15 per 1,000 by the year 2017. Nepal was recently awarded the Achievement Award for MDG-5 in New York for reducing maternal mortality. Despite this progress, however, more remains to be done to stay on track to meet the 2015 MDG target and to continue to improve health and survival beyond.

Of the maternal deaths, about 40 percent occurred at home, 7 percent on the way to a health facility, and 41 percent at the health facility. The direct causes of maternal deaths in Nepal are attributed mostly to post-partum hemorrhage (24 percent), eclampsia (21 percent) and sepsis (5 percent) (Pradhan, et al., 2009). The number of deliveries attended by health workers increased from 18 percent in 2003–2004 to 32 percent in 2007–2008 (Department of Health Services [DOHS], 2011; CBS, 2011).

Increasing skilled attendance at birth is an essential component of the safe motherhood program. Unskilled birth attendants play an important role in delivery in Nepal. Two-fifths

(40 percent) of live deliveries are still attended by relatives, 11 percent by traditional birth attendants (TBA), and 3 percent are left to manage on their own. The presence of skilled birth attendants during delivery has gone up to 36 percent (MOHP, New Era and IFC International, 2012). In the drive to achieve the MDG of reducing maternal mortality by three-quarters by 2015, Nepal has set a target of 60 percent of all births being assisted by skilled birth attendants (SBAs). To help attain this target, the Policy on Skilled Birth Attendants was endorsed in 2006 by the MOHP. The policy document identifies the significance of SBAs at every birth and it also embodies the government's commitment to training and deploying doctors, nurses and auxiliary nurse midwives (ANMs) with the required skills across the country. Although the government has made significant improvements in reducing maternal mortality, the number of births attended by SBAs remains a challenge that could impede Nepal from achieving majority MDG-5. Doubts have been raised from various quarters if the target will be achieved, given the need to provide training to a large number of health professionals. Much needs to be done to further improve the maternal health status in the country as the figures are still high by international standards.

Review of the Literature

Using a combined community and hospital based study of three safe motherhood districts in Nepal, the study found that 70.5 percent of maternal deaths were due to direct causes which include post-partum hemorrhage, with or without a retained placenta, obstructed labour, pre-eclampsia/eclampsia, and puerperal (FHD, 1998).

Manandhar et al. (2004) in their study of rural Nepal found that women's group activities influenced them to seek skilled births attendants, resulting in a 30 percent reduction in neonatal mortality and an 80 percent reduction in maternal mortality. The evaluation of Nepal's Safer Motherhood Project (1997–2004) concluded that supply side interventions are inefficient in reducing the high level of maternal deaths in Nepal (Rath et al., 2007).

Strengthening services helps increase service utilization. A hospital based study in Lahan Hospital in Nepal showed a significant, almost double, rise in institutional deliveries from 933 in the baseline year 2004–05 to 1,738 in 2006–07. This increase has been attributed to strengthening services in Lahan Hospital (Baker et al., 2007).

A comparative analysis of the last three demographic health surveys of 1996, 2001 and 2006 in Nepal documented a significant decline in maternal mortality, a considerable increase by more than 50 percent of women reporting access to at least one antenatal care visit between 1996 and 2006, and a considerable increase in the percentage of births assisted by SBAs, from under 10 percent in 1996 to 20 percent in 2006 (Pant et al., 2008).

Maternal causes accounted for 93 percent of pregnancy related deaths. Over 80 percent of women who died from maternal causes in hospital were emergency admissions and already in a critical state when admitted. These are the findings from an eight-district study on "Maternal Mortality and Morbidity in Nepal 2008–09 (MOHP et.al., 2010).

In a cross sectional study of health facilities entitled “Obstetric Morbidity and Related Care Seeking Behavior in Nepal”, it was found that the availability of basic health infrastructure is unsatisfactory. The study further revealed that there is an acute shortage of qualified human resources and essential equipment and drugs in the health facility to provide quality reproductive service. An ANC client survey found that service providers did not inform women about possible danger signs during pregnancy. It was, however, notable that three-fourths of ANC clients selected this health service because of proximity (DOHS, 2011).

The Maternal Survival Series of The Lancet highlighted three barriers to the use of professional skilled care in childbirth: financial, physical and functional. The series concluded that the best strategy for addressing these barriers and thereby reducing maternal deaths was to scale up coverage of deliveries by midwifes working in teams in health centers (Koblinsky et al., 2006).

An impact evaluation study of village midwives (VM) in two districts of Java in Indonesia found that maternal deaths reduced by identifying complications, making timely referrals, and facilitating access to hospitals (PRB, 2007). In another cost benefit analysis of village midwifery in Indonesia, the average annual cost to the government of providing a VM was estimated to be US$ 4,000. The study further revealed that resident midwives were less expensive ($48 per delivery) than midwives who split their time between villages ($60 per delivery) (PRB, 2007).

In a randomized control trial study to examine the effectiveness of TBA training programs in four countries—Pakistan, Bangladesh, Malawi and Guatemala— involving over 2,000 TBAs and 27,000 the authors concluded that the potential of TBA training to reduce peri-neonatal mortality is promising when combined with improved health services (Sibley et al (2007)...

An experimental study covering the four-year period 2001 to 2005 in Burkino Faso found that: (i) women tend to use maternal health services close to home, (ii) women use only a well-functioning health care system, and (iii) women are more likely to use health services if they are affordable (PRB, 2007).

Empirical studies carried out in many countries, most notably China, Cuba, Egypt, Jordan, Malaysia, Sri Lanka, Thailand and Tunisia, indicate that skilled midwives functioning in or very close to the community can have a drastic impact on reducing maternal and neonatal mortality (UNFPA, 2011).

Creative strategies (such as output-based assistance in East Africa and Southeast Asia, cash incentives for deliveries in hospitals in India, and training and deployment of community midwives in Afghanistan) demonstrate considerable promise as a means of increasing access to maternal health services for the poor (Patra et al., 2011).

The Problem

Data have shown that only 32 percent of births take place at health facilities and 67 percent deliveries take place at home (CBS, 2011). There is inadequate access to government facilities for institutional delivery. The met need for emergency obstetric care was estimated to be only 18.5 percent in 2005–06 (Barker et al., 2007). Facility based services for deliveries are very limited; they are provided mainly by Primary Health Care Centers (PHCC) and other sophisticated facilities whose numbers are limited and concentrated in urban areas. There is only one PHCC in one election constituency. resulting in limited access to institutional delivery. Furthermore, there is a shortage of SBAs in the facility; 41 percent pregnancy related deaths occur in health facilities, indicating that more women visit facilities when they suffer complications and are often too late.

Maternal deaths occur mainly just before, during, or immediately after delivery, often from complications that cannot be predicted during pregnancy and are difficult to prevent. This implies that all women need access to skilled care during childbirth and immediately after, and some of them may need timely access to emergency care.

Studies have shown that geographical accessibility has an impact on the utilization of services (Matthews and Gubhaju 2004; Niraula 1994). In the Western and Middle Western hill regions of Nepal, travelling time was found to have a significant effect on use of antenatal services. It was about twice as high when the health post was located within the community. Studies have also shown a direct correlation between the availability of emergency obstetric care (EOC) facilities and the case fatality rate (CFR) (MOHP, New ERA, and IFC International 2012). This indicates the need to improve EOC services in the existing health facilities to help reduce both CFR and MMR.

Safe motherhood experts have proposed a variety of strategies over the last 20 years to help reduce maternal deaths, based on care in health facilities as well as at home and in the community (PRB, 2007). Some strategies focus on increasing SBAs at delivery while others focus on eliminating delays in care seeking during pregnancy and delivery—such as awareness of danger signs, referral systems, or emergency obstetric services at health centers and district hospitals.

In a review covering Bolivia, China, Egypt, Honduras, Indonesia, Jamaica and Zimbabwe, Koblinsky and Campbell (2003) identified six factors in successfully reducing maternal mortality:

- Greater availability of birthing facilities.
- Increased availability of SBAs located near the home.
- Formalized referral links between facilities, beginning with providers at the community level.
- Free or reduced costs for services and transport to services.
- Public accountability for providers' performance.
- Strong government policy guidance.

Many studies have documented that access to facility based services is limited in Nepal and more so in rural areas. Two-fifths of the women considered distance to health facility as one

of leading barriers in seeking care during pregnancy and at the time of delivery (FHD, New ERA and Macro International, 2007). Limited access to facility based delivery services and lack of SBAs are the two major impediments in attaining MDG-5. Against this background we argue that (i) increased access to birthing facilities and (ii) increased availability of SBAs near the home/village will help to further reduce maternal mortality in Nepal.

Policy Goal and Alternatives

1. Policy Goal

Though there has been a significant decline in maternal mortality in Nepal, it still remains high at 229 per 100,000 live births. Sixty-seven percent deliveries still take place at home (CBS, 2011) and only 36 percent are conducted by SBAs (MOHP, New ERA and IFC International, 2012). Increasing skilled attendance at birth and increasing access to facilities are two essential components of the safe motherhood program which eventually contributes in the reduction of maternal deaths.

In light of the above, two goals have been set:

- Ultimate Goal: to reduce the maternal mortality ratio.
- Intermediate Goal: to help increase the number of institutional deliveries and increase the deliveries conducted by SBAs.

2. Policy Alternatives

Given the policy goals, two policy alternatives are proposed to achieve them:

- Scale up the existing birthing centers (BCs) by establishing more 24-hour centers at the health post (HP) level.
- Train and deploy more SBAs from the village itself.

The two alternatives merit some discussion. Both alternatives are in line with the Koblinsky and Campbell framework. We have, however, limited ourselves to the first two measures suggested in their framework. The first policy alternative is to scale up the existing BCs by establishing more 24-hour BCs. We argue that this will significantly increase access to facilities which, in turn, will improve institutional deliveries. The centers will be equipped with all the necessary instruments for normal deliveries and will be manned by SBAs. In Nepal, a doctor, nurse, or auxiliary nurse-midwife who has received standard training in an internationally defined set of core midwifery skills qualify as SBAs. There is an acute shortage of SBAs in Nepal. In many health facilities, safe motherhood services are provided by general health workers. In view of this, providing training and deploying SBAs has been considered an integral part of the first alternative. If BCs are manned by such trained birth attendants, the quality of services is likely to increase, thereby reducing the lifetime risk of maternal deaths.

It is very important to point out at what level of health facility the first policy alternative is being attempted. The first alternative will be attempted in health posts (HP) where 24- hour

BCs facilities are lacking. In Nepal, one HP typically serves a population of 20 to 25,000 people. The HP works as a referral center for four to five sub-health posts (SHP).

The term 'skilled attendant' refers exclusively to people with midwifery skills (for example, doctors, midwives, and nurses) who have been trained and have the necessary skills to manage normal deliveries and diagnose, manage, or refer obstetric complications. They must be able to recognize the onset of complications, perform essential interventions, start treatment, and supervise the referral of mother and baby for interventions that are beyond their competence or not possible in the particular setting. Skilled attendance at all births is considered to be the single most critical intervention for ensuring safe motherhood because it hastens the timely delivery of emergency obstetric and newborn care when life-threatening complications arise. Skilled attendance denotes not only the presence of midwives and others with midwifery skills (MOMS), but also the enabling environment they need in order to be able to perform capably (UNFPA, 2011).

As already stated, one of the major barriers in seeking maternal health services is the shortage of skilled health personnel in the villages. Because of the coverage of HPs, the problem of access will remain one of the barriers as far as maternal health services are concerned. The SHP still remains the most accessible health facility for the rural masses whose number currently stands at 1,615 (MOF, 2012). There is one SHP in each village development committee (VDC).[1] Since it would not be economically feasible to establish 24-hour BCs in all the SHPs, for our present simulation we propose to train and deploy more SBAs so that safe motherhood services can be provided in the village/near the home as the second alternative. ANMs will be deployed and trained for midwifery to provide the services. The basic objective of this alternative is to eliminate the barrier that distance poses to accessing skilled care by posting resident SBAs in the village. Other approaches such as the rural ultra sound program have also been piloted in the country, but their effectiveness has yet to be assessed.

We would like to simulate between these two alternatives.

Maternal Health Interventions in Nepal

a. Nepal Safe Motherhood Project

- Improve the quality and quantity of midwifery and EOC services through strengthened service provision (infrastructure, equipment/supplies and training).
- Increase access to services by stimulating demand for EOC services and reducing barriers to access by improving the social context for midwifery /obstetric services.

b. Support to Safe Motherhood Program (SSMP)

- Provide technical and financial support to the Family Health Division (FHD) of Department of Health Services (DOHS) to implement safe motherhood programs throughout the country.

[1] These are the lowest hierarchy of local government in Nepal.

- Strengthen both the supply and demand sides to increase access of the poor and marginalized to EOC services

c. Safe Delivery Incentive Program (SIDP)

This scheme was introduced in all 75 districts in August 2005 to address financial barriers to women accessing maternity services. It creates an incentive to deliver in a health facility by covering the transport cost for all pregnant women and providing free services in 25 low HDI districts. There are also financial incentives for service providers assisting deliveries either at home or in a health facility, to encourage them to provide services. The program has the following provisions:

d. Ama Surakshya Krayakram (Free Maternity Services)

- Provide free maternity services for all women attending health facilities for maternity services in addition to a cash incentive to cover transportation cost. Previously it was known as the Mothers' Incentive Program (MIS) under which all pregnant women who delivered in designated government health facilities were entitled to NPR 1,500 ($ 20), 1,000 ($ 13) and 500 ($ 7) in mountain, hill and Terai regions, respectively.

f. Free Delivery Service

***** Provide cash as per the fixed unit cost to the health facilities providing maternity services.

- Normal delivery at health facilities with 25 or more beds for NPR 1,500 facilities and health facilities with less than 25 beds, NPR 1,000.
- Complicated deliveries at NPR 3,000; C-sections at NPR 7,000.
- Cover the cost of all required drugs, supplies, instruments, and a small incentive to health workers of NPR 300.

g. Incentive to Health Workers for home deliveries

- Provide NPR 200 to discourage home based delivery.

h. In addition to these, a woman gets NPR 400:

- if she completes four ANC visits;
- has an institutional delivery; and
- visits a PNC but is not eligible if she delivers at home.

i. Increasing coverage of SBAs

- To increase the coverage of SBAs, doctors, nurses and ANMs are provided with in-service training as a short term measure, and for the mid-term, the pre-service course for ANMs has been restructured to include 18 months' midwifery and six months' general nursing.

<u>Growth of Birthing Centers in Nepal</u>

The growth of BCs in Nepal is illustrated in Table 1.

Table 1: Growth of Birthing Centers with 24-hour Delivery Services by Type of Facilities, 2007–08 to 2009–10

	Type of Facilities			
Fiscal Year	PHCC	HP	SHP	Total
2007/08	168	219	35	422
2008/09	167	301	64	532
2009/10	148	406	137	691

Source: DOHS, MOHP Annual Report, 2066–67 (2009–10), Table 3b.1.

Physical Target

Physical targets have been set for simulating the policy alternatives. They are basically guided by MOHP and MDG targets (see Table 2).

The assumption regarding the proportion of institutional deliveries was made on the basis of past trends. Between 2006 and 2011, the increase in the proportion of institutional deliveries almost doubled from 18 percent in 2006 to 35 percent in 2011 (MOHP, New ERA and IFC International, 2012). We assume that at the minimum, the same growth trend will continue in the coming years.

Though the target set for SBA assisted deliveries appears ambitious, it has been set to help attain the MDG target of reaching 60 percent deliveries conducted by SBAs by 2015.

Table 2: BCs, Institutional Deliveries, SBA attended births, and MMR Targets

	2012/13	2013/14	2014/15	2015/16	2016/17
No. of Birthing Centers to be Established	54	54	54	54	54
Institutional Delivery (%)	38	42	47	53	60
Share of HP in Institutional Delivery	30	35	40	45	50
% of Deliveries Conducted by SBAs	36	43	51	60*	70
Maternal Mortality Ratio (per 100,000 live births)					134**

* MDGs target. ** DOHS, Annual Report, 2009–10.

Methodology

The methodology used in this exercise is basically exploratory and secondary source reviews. The study demands the cost estimation of establishing BCs. The standards set by the family health division (FHD) of the MOHP in the working guidelines of BCs have been reviewed. Nepal's Safe Motherhood Program has estimated the cost of establishing BCs by different ecological regions. We, however, considered the average cost in our calculation. The training cost to SBAs by the National Health Training Center (NHTC) of the MOHP has been adopted.

Age-specific fertility rates (ASFR) of 2006 and 2011 have been adopted to estimate the expected number of births for different years from 2012 to 2016 (Table 4.) The steps involve extrapolation of ASFR for each year under consideration. The second step is to project the number of women in the reproductive age 15 to 49 years. The projections for each year from 2012 to 2016 are made on the basis of the projected number of women of reproductive age in 2006 and 2011. The number of women of different age groups were then multiplied with the ASFR of the respective year to obtain the expected number of births.

The number of total deliveries, institutional deliveries and number of health posts were obtained from the latest Annual Report 2066–67 of the DOHS.

The assumption regarding the proportion of institutional deliveries was made on the basis of past trends. Between 2006 and 2011, the increase in the proportion of institutional deliveries has almost doubled from 18 percent in 2006 to 35 percent in 2011, as already mentioned.

The benefit and equity aspect of the expenditure on establishing BCs has been assessed using Nepal Demographic Health Survey 2011 and Nepal Living Standard Survey 2010–11 facility utilization results by wealth and consumption quintiles.

Assumptions

The simulation exercise of the policy alternatives involves the following assumptions:

• Crude Birth Rate for 2012 is 26.2.
• Institutional delivery will increase by 5 percent every year.
• Recurrent cost for BCs for year 1 will be 75 percent only. It is based on the premise that construction of BCs will require three months to complete for which no recurrent cost will be incurred. • Recurrent cost is calculated on base case scenario.
• All deliveries turn into successful live births.
• Maternal death is 175 per 1,00,000 live births.
• One ANM will be deployed and trained in each BC.

- 54 BCs will be established every year with a total of 270 new BCs by the end of 2016–17.
- On average, one SBA attends 100 births per year.[2]
- The training cost of SBAs will remain unchanged.

RESULTS

COST ESTIMATION

A. Alternative One: Scaling up BCs

Table 3: Basic Parameters

S.No	Parameters	Value
1.	Total Population 2011	26,620,809
2.	Total # of Health Posts, Journal of Health, Population, and Nutrition	675
3.	Health Posts with Birthing Centers	406
4.	Health Posts without Birthing centers	270
5	**Unit Cost of Birthing Centers**	
5.1	Average Establishment (Capital) Cost*	NPR 5,000,000 (US $ 62,500.00) at US $ 1 = 80 NPR
5.2	Recurrent Cost	NPR 250,000 (US $ 3125.00)
5.3	SBA Training Cost**	NPR 70,000 (US $ 875.00)

*****Average Cost of building, equipment and furniture as per the standards for BCs at 2010/11 prices.
** One-time cost.

Table 4: Establishment of Birthing Centers at Health Posts and Cost Estimation

		Cost of Birthing Centers			
Fiscal Year	**No. of BCs to be Established**	**Establishment Cost**	**Training Cost**	**Recurrent Cost**	**Total Cost**
2012/13	54	270000000.0	3780000.0	10125000.0	283905000.0
2013/14	54	270000000.0	3780000.0	23625000.0	297405000.0
2014/15	54	270000000.0	3780000.0	37125000.0	310905000.0
2015/16	54	270000000.0	3780000.0	50625000.0	324405000.0
2016/17	54	270000000.0	3780000.0	64125000.0	337905000.0
Total	**270**	**1,350,000,000.0**	**18,900,000.00**	**185,625,000.0**	**1,554,525,000.00**

Source: Based on our computation.

The cost estimation of the new BCs to be established every year is illustrated in Table 4. Our target is to equip the remaining 270 HPs with 24-hour birthing facilities by establishing equal

[2] Based on the current number of SBAs and births assisted by SBAs in a year. In Ghana it is estimated to be 150 deliveries annually per midwife (Walraven and Week, 1999) while in Bangladesh it is estimated at a much lower level of only 23 births per year (Health Bulletin 2011, MoHFW, Government of Bangladesh) .

numbers of BCs each year until the end of 2016–17. The total cost to be incurred during the five-year period is estimated at NPR 1.56 billion. The establishment cost alone accounts for 86.8 percent of total cost. The share of recurrent cost is only 12 percent. The training cost is, however, limited to only 1.2 percent.

The estimated unit cost of institutional deliveries at new BCs is presented in the last column of Table 5.

Table 5: Institutional Deliveries, Share of New Birthing Centers and Estimated Unit Cost of Delivery

Fiscal Year	Expected Births*	Institutional Delivery as % of Expected Births**	No. of Institutional Deliveries	Share of HP in Institutional Deliveries	No. of Inst. Deliveries at HP	Inst. Deliveries Attributed to New BCs@	Unit Cost of Inst. Deliveries at New BCs (NPR)$
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
2012/13	646744	38	245763	30	73729	8655	32802
2013/14	631285	42	265140	35	92799	19499	15253
2014/15	614678	47	288899	40	115559	32959	9433
2015/16	598071	53	316978	45	142640	49534	6549
2016/17	581464	60	348878	50	174439	69672	4850
	3072242	**Total**	**1465657**		**599166**	**180319**	**8621**

*Extrapolated on the basis of 2006 and 2011 ASFR and projected women of the reproductive age group of 15 to 49 between 2006 and 2011.

** Based on targeted increase presented in Table 2.

*** Based on targeted increase presented in Table 2.

@ Derivation Process: A= Total No of HPs having BCs in 2011–12 which is 406; B=New BCs established each year, i.e. 54 (refer to Physical Target Table 2); Column 7 = Column 6 / (A + B)* 54, i.e. 73729/ (406+54)* 54=8655. For subsequent years, the number of new BCs gets cumulated as 54,108, 162, 216 and 270.

- $ Col. 8 = Total cost of establishing new BCs/Col. 7, i.e. for 2012–13 for example, NPR 283,905,000/8655 =NPR 32802, Refer to last column of Table 4.

Alternative Two: Training and Deployment of Resident SBAs at the Village Level

Table 6: Number of SBAs Required and the Estimated Total Cost for Goal Attainment

Year	Expected Births	% of Deliveries Conducted by SBAs -Targeted	Births Attended by SBAs	No. of SBAs Required to Attain Target *	Training Cost**	Annual Salary	Total Cost
2012	646744	36%	232827	2328+	Already trained***	454014288	454014288
2013	631285	43%	271452	2328 + 386 =2714	27037297	529332473	556369770
2014	614678	51%	313485	2714+420 = 3134	29423261	611297271	640720532
2015	598071	60%	358842	3134 +454 = 3588	31749774	699743070	731492844
Total			**1176609**		88210332	2,294,387,102	2,382,597,434

Note: * It is assumed that one SBA on average attends 100 births per year. This however may vary from facility to facility.

** Training cost is NPR 70,000

*** According to the DOHS Annual Report and Journal of Health, Population, and Nutrition 2009–10, the number of SBAs was 1,686. We assume that the remaining 642 have received SBA training between 2009–10 and 2011–12. Hence no training cost is required.

$ Salary is assumed at NPR 15,000/month and computed for 13 months. In Nepal, one month's salary is paid as an allowance at the Dashain festival.

Our results show that the country should have 3,588 trained SBAs by the end of 2015 in order to achieve the target of 60 percent SBA assisted deliveries, given the present level of 36 percent of assisted deliveries in 2012.[3] An additional 1,260 SBAs need to be trained and deployed in the village. The estimated total cost of providing training and deployment is NPR 2.38 billion, equivalent to US$ 27.70 million (1 US $ = NPR 86).

Cost Effectiveness Analysis

An attempt has been made at a cost effectiveness analysis of both the policy alternatives. The results are presented separately for each.

24-Hour Birthing Centers

An attempt has been made to assess the additional cost required to bring pregnant women for deliveries at the newly established BCs. This is presented in Table 5. The unit cost of institutional deliveries at the new BCs is quite high: NPR 32,802 in year one, which significantly reduces in subsequent years. At the end of five years, the unit cost reduces to NPR 4,850 due to the continuous rise in the share of institutional births attributed to HPs. The average unit cost of institutional deliveries is estimated to be NPR 8,621. Considering

[3] The 2005 *World Health Report* of the WHO estimates that by 2030, approximately 700,000 SBAs will be required to ensure full coverage by SBAs worldwide: 330,000 newly-trained SBAs, along with 370,000 replacements for those who will be lost to attrition (WHO 2005).

this amount, it can be seen as cost effective. The results basically indicate that the newly established BCs (270 over five years) will provide delivery services to 1,80,319 women who would otherwise have probably given birth at home. Institutional deliveries are also expected to increase every year, rising from 8,655 deliveries in year one to about 70,000 deliveries in year five. This is indeed quite remarkable.

Training and Deployment of Resident SBAs

The annual average cost to the government of providing training and deploying SBAs in the village was about NPR 664,000, equivalent to US$ 7,721. This is quite high as compared to some other countries. The average annual cost to the government of providing a village midwife in Indonesia was estimated to be US$ 4,000 (PRB, 2007). The cost per delivery is estimated to be NPR 2,025, equivalent to US$ 23.54 which is much lower as compared to US$ 48 in Indonesia (PRB, 2007).

Summary Result: Comparison between Two Policy Alternatives

Table 7: Comparison between Two Policy Alternatives, Key Measures

Measures	Alternative One Scaling up 24-hour BCs	Alternative Two Training & Deployment of SBAs at the Village
Cost of New Birthing Centers	NPR 1.56 billion	
Total Cost of Providing Training and Deployment of SBAs		NPR 2.38 billion (Equivalent to US $ 27.70 million)
Deliveries	180319 institutional deliveries	1,176,609 SBA assisted Deliveries
Unit Cost of Institutional Deliveries at New BCs	NPR 32802 – Year One NPR 4850 - Year Five	
Average Unit Cost of Delivery	NPR 8621	NPR 2025
Average Cost of Providing Training and Deploying SBAs in the Village		NPR 664,000 Equivalent to US $ 7721)

Though the total cost of alternative two is much greater than alternative one, a comparison of the unit cost of deliveries between the two alternatives indicates that alternative two is more cost effective than alternative one (NPR 2,025 vs. NPR 8,621). The effectiveness indicator considered here is the number of deliveries**.** However, in the absence of data it is difficult to pinpoint which alternative is more favorable from a policy intervention point of view in reducing the MMR.

Deaths averted due to pregnancy related complications could be another indicator of effectiveness. In the absence of data we could not use this as an effectiveness indicator. It should, however, be noted that our estimate is sensitive to the assumptions made.

Benefit Incidence Analysis

24-hour Birthing Centers

Who is expected to use the services of 24-hour BCs? Or, who will enjoy the benefits from the proposed newly established BCs? Can the establishment of new BCs be justified from a social equity point of view? These are some of the questions we should be able to answer to justify our recommended policy alternatives. We have used the estimation of the service utilization pattern as reported in NDHS, 2006 and 2011. These reports present the estimates of place of delivery by wealth quintile. Deliveries at government health facilities have been treated as the proxy of benefits received from BCs. Using these data we have estimated the benefit incidence of 24-hour BCs by wealth quintile for 2006 and 2011.

Data presented in Table 8 shows that deliveries at government facilities have doubled to 26 percent in 2011 from 13 percent in 2006. One can also observe that the benefits of the government facilities for the poor quintile group is only 6 percent, while their use by the richest quintile was as high as 48 percent in 2006. This is obviously not favorable from an equity standpoint. But if one makes a comparison with the NDHS 2011 estimates of births delivered at a government facility by wealth quintile, there is a gradual reversal in the trend in favor of the poor quintile as compared to the richest quintile. The poorest quintile using the services has doubled from 5 percent in 2006 to 10 percent in 2011. The use of government facilities by the richest wealth quintile has drastically reduced from 48 percent in 2006 to 26 percent in 2011. It is assumed that the same patterns of service utilization will hold for 24-hour BCs. We, therefore, conclude that though the services of BCs are enjoyed more by the upper wealth quintile, in the long run more and more poor people will gradually benefit and the objective of social equity of government expenditure will be attained.

Skilled Birth Attendants

Again, who is expected to use the services of SBAs? Who will benefit from the SBAs deployed in the village? Will their deployment be justified from a social equity point of view? We have used the data on assistance during delivery collected in NDHS 2006 and 2011 to examine this issue. The NDHS reports present the estimates of SBA assisted deliveries by wealth quintile. The survey defined SBA assisted deliveries as deliveries conducted by doctors and nurse/midwife. Using these data we have estimated the benefit incidence of SBA assisted deliveries by wealth quintile for 2006 and 2011.

Table 8: Total Births & Share of Government Facilities by Wealth Quintile, 2006 & 2011, Nepal

	NDHS 2006				NDHS 2011			
Wealth Quintile	**No. of Births**	**Delivered at Govt. Facility (%)**	**No. of Births Delivered at Govt. Facility**	**Share of Wealth Quintile**	**No. of Births**	**Delivered at Govt. Facility (%)**	**No of Births Delivered at Govt. Facility**	**Share of Wealth Quintile**
Poorest	1412	3.0	42	5	1390	9.6	133	10
II	1180	6.9	81	11	1182	19.7	233	17
III	1132	9.3	105	15	1133	28.4	322	23
IV	983	15.3	150	21	938	36.3	340	24
Richest	838	41.2	345	48	748	49.5	370	26
Total Births	5545		725	100%	5391		1399	100%
Share of Govt. Facility		13.1				26.0		

Source: NDHS, 2006 & 2011, and author's calculations.

Table 9: Share of Births Assisted by SBAs by Wealth Quintile, 2006 and 2011, Nepal

	NDHS 2006				NDHS 2011			
Wealth Quintile	**No. of Births**	**SBA Assisted Births (%)**	**No. of SBA Assisted Births**	**Share of Wealth Quintile**	**No. of Births**	**SBA Assisted Births (%)**	**No. of SBA Assisted Births**	**Share of Wealth Quintile**
Poorest	1412	4.8	68	7	1390	10.7	149	8
II	1180	10.1	119	11	1182	23.7	280	14
III	1132	12.4	140	14	1133	35.9	407	21
IV	983	23.0	226	22	938	53.0	497	26
Richest	838	57.8	484	47	748	81.5	610	31
Total # of Births	5545		1038	100%	5391		1942	100%
% of SBA Assisted Deliveries		18.7				36.0		

Source: NDHS, 2006 & 2011, and author's calculations.

Data presented in Table 9 shows that SBA assisted deliveries have also doubled: to 36 percent in 2011 from 18.7 percent in 2006. It can be observed that the poor benefit only 7 percent, while the use of SBAs by the richest group was as high as 47 percent in 2006. A comparison with the NDHS 2011 estimates of SBA assisted deliveries by wealth quintile revealed a reversal in the trend in favor of the poor quintile as compared to the richest one.

The richest quintile with SBA assisted deliveries reduced significantly from 47 percent in 2006 to 31 percent in 2011, while there has been a marginal increase in the poorest quintile. In the subsequent two wealth quintiles II and III, the increase in SBA assisted deliveries has been quite significant. It can be surmised that the same patterns of SBA assisted deliveries will hold in coming years. It can be safely argued that though SBA assisted deliveries are more among the richest wealth quintile (31 percent in 2011), in the long run a greater number of poor people will gradually be benefitted and the objective of social equity of government expenditure will be attained.

One can thus infer that though the expenditure in establishing new BCs and deploying SBAs in villages are not advisable from the equity point of view in the short run, one can justify it in the long term as more and more of the poor will gradually benefit. Moreover, it is the poor who are in dire need of services at their doorstep due to their inability to access better services.

It is, however, difficult to gauge the relative importance of the two alternatives from a benefit incidence standpoint. A comparison of unit cost data shows that alternative two—SBA training and deployment—is more cost effective. So far as the place of delivery data is concerned, only 26 percent of births take place in a government facility. The share of 24-hour BCs will be much lower in that case. On the other hand, SBA assisted deliveries stand at 38 percent. So, from both the perspective of unit cost and service coverage, alternative two seems a more plausible one that will help attain the MDG goal of SBA attended deliveries and thereby a reduction in MMR.

Feasibility of Policy Options

A preliminary analysis shows that the policy alternatives are feasible if the government increases resources in the health sector or reprioritizes resource allocation towards maternal health. However, a more rigorous exercise is required to assess the feasibility of various policy options. Providing training to an additional 1,260 SBAs by the end of 2015 is equally challenging, given the capability of the National Health Training Center of the Government of Nepal. Its capacity also needs to be further strengthened. Partnership with private training institutions could be explored. With respect to the quality of data available to gauge the feasibility of policy options, the Ministry of Health and Population carries out periodic surveys to assess the impact and effectiveness of various programs. The Nepal Health Sector Support Program II also envisages conducting large scale household surveys. Such a data base together with the HMIS could also be used to assess feasibility. As a part of the National Health Account (NHA) preparation, the MOHP is planning to conduct a nationally representative facility survey. Completion and availability of the survey data would further help in making our exercise more evidence based.

Equity of the Alternatives

The proposed alternatives plan to establish 24-hour birthing centers at the HP level. This expanded service at the health post level will improve access to maternal health services. Such services will largely benefit the poor and marginalized pregnant women as it is they who give birth at home. This alternative will improve their access to institutional deliveries as the facilities will be more accessibly located. The NDHS 2011 as well as the NLSS 2010–11 survey data also revealed that wealthier people tend to use private services whereas the

poorest use government facilities. The health seeking behavior of women from the mid to poorer classes towards government facilities duly addresses the equity concern of the alternatives**.**

Financing Mechanism

There could be several ways of financing the policy alternatives proposed.

- One mechanism is that the government fully finance the amount of NPR 1.56 billion needed from its own resources. It has been estimated that currently the government has been spending about 3 billion on maternal and child health services. If the government is able to increase the present share of the health budget to 10 percent of the annual budget, this option seems possible.
- The second mechanism could come from local government. The grants, both conditional and unconditional, that the local bodies receive from the central government are increasing over the years. It has also been made mandatory for the local bodies to spend 20 percent of the resources in the social sector. In such a situation, it should be possible on the part of the local bodies to support the recurrent cost of the BCs.
- The third alternative could be community participation. In many parts of the country, the community pays the salary of the ANM who manages the BCs. Such possibilities could also be explored. Thus, a combined effort by the government and community in establishing the 24-hour BCs is worth exploring. The government could build infrastructure and the community could support the cost of operating the center.
- As already mentioned, the government has been providing NPR 1,500, 1,000 and 500 in the mountain, hill and Terai regions, respectively, as an incentive to those pregnant women who give birth at health institutions. This is to encourage them to visit health institutions for safe delivery. The gradual withdrawal of this incentive will also save a reasonably large amount which can be used for financing the alternatives we have suggested. We argue that once access to institutional deliveries is improved through 24-hour BCs and resident SBA deployment, the incentive provided for institutional deliveries could be gradually withdrawn. It is our strong belief that if people are made to select between better access to services or incentives, an overwhelmingly larger number will opt for the former. If the incentive is withdrawn by 20 percent every year, completely phasing it out by the fifth year in 2016–17, it would save the country NPR 931 million in the five-year period (Table 10). The table also shows the amount that could be saved through a phase-wise withdrawal every year. It is estimated that each year, more than 250 million is spent in giving mothers incentives to deliver at health facilities. With this saving, about NPR 1 billion can finance alternative two which has been found to be more cost effective. Therefore, the best means of financing the policy alternative proposed is to phase out the maternity incentive scheme. This amount could alternatively be used either in establishing more birthing centers or equipping the existing BCs with blood bank facilities.

Table 10: Number of Institutional Deliveries, Cost of Incentive and Amount Saved through Gradual Phasing out of Incentive

Year	No. of Institutional Deliveries	Cost of Incentive @ NPR 1,000 per Institutional Delivery	Amount Saved if Incentive is Gradually withdrawn @ 20% Annually
2012/13	245763	245,763,000	49,152,600
2013/14	265140	265,140,000	106,056,000
2014/15	288899	288,899,000	173,339,400
2015/16	316978	316,978,000	253,582,400
2016/17	348878	348,878,000	348,878,000
Total	1465657	1,465,658,000	931,008,400

Source: Column 4 of Table 5.

Note: The average has been obtained by taking the incentive amount of NPR1,500, 1,000 and 500 for the mountain, hill and Terai, respectively.

- The fourth alternative could be to reprioritize the health sector's budget allocation. But such a strategy will obviously be at the cost of other health services. Therefore, a detailed account of the cost and benefit of reprioritization is needed before considering this option.

References

Barker, Carol E, Bird, C. E., Pradhan, Ajit, and Shakya, G. (2007). "Support to the Safe Motherhood Program in Nepal: An Integrated Approach". Reproductive Health Matters, 15(30):81-90 Journal of Health, Population, and Nutrition

CBS (2011). Nepal Living Standard Survey 2010–11, CBS, NPC.

CBS (2011). Population Census of Nepal 2011, CBS.

DOHS (2011). Annual Report 2066–67, (2009–10), DOHS, MOHP.

FHD (1998). Maternal Mortality and Morbidity Study, FHD, DOHS, MOHP.

FHD, New ERA, and Macro International (2007). Nepal Demographic Health Survey 2006, MOHP.

FHD (undated). Ama Surakshya Karyakram Karyavidhi Nirdeshika 2065, Pratham Sansodhan 2066 (in Nepali). Mother Safety Program Working Guidelines 2065, First Amendment 2066 (2009–10), Family Health Division, Teku.

Institute of Policy Studies (2004). "Review of Costs and Financing of Reproductive Health Services, Better Reproductive Health for Poor Women in South Asia" Institute of Policy Studies, Health Policy Program, Sri Lanka.

Koblinsky, M. E., Campbell, O. (2003). "Factors Affecting the Reduction of Maternal Mortality", in Koblinsky (eds.), Reducing Maternal Mortality: Learning from Bolivia, China, Egypt, Honduras, Indonesia, Jamaica and Zimbabwe. World Bank, Washington DC, pp. 5-37.
Koblinsky et al., (2006). "Going to Scale with Professional Care". The Lancet, 368, No. 9544 (1377–86).

Manandhar, D. et al. (2004). "Effects of Participatory Intervention with Women's Groups Birth Outcome in Nepal: Cluster Randomized Controlled Trail". The Lancet, 364, pp. 970–79.
MOHP/CBS (2003). Population Projection for Nepal 2001–2021, MOHP and CBS.

MOHP/GTZ (2010). Nepal at the Crossroads: Setting the Stage for Improved Social Health Protection. Final Report of a Joint Assessment of MOHP-GTZ, HSSP, DOHS.

MOHP, USAID, SSMP/Nepal and DFID (2010). Nepal Maternal Mortality and Morbidity Study 2008–09, FHD, DOHS, MOHP.

MOHP, New ERA and IFC International (2012). Nepal Demographic Health Survey 2011, MOHP.

Oot, D. (2011). "Maternal, Newborn and Child Health in Nepal", Journal of Nepal Health Research Council, 9(2): II.

Pant, et al. (2008). Improvement in mMternal Health in Nepal. Further Analysis of the 2006 Nepal Demographic and Health Survey. SSMP, Kathmandu, Nepal.

Patra, Nodla, et al., (2011). "Where There Are (Few) Skilled Birth Attendants". Journal of Health, Population, and Nutrition, 29(2): 81.

Population Reference Bureau (2007). "Economic and Financial Tools Assess Safe Motherhood Programme Costs and Benefits", in Delivering Safer Motherhood: Sharing the Evidence, PRB, Washington DC and University of Aberdeen, Scotland.

Population Reference Bureau (2011). "The World's Women and Girls 2011 Data Sheet", PRB, Washington DC.

Poudyal, S. R. (2004). Costing Analysis of the Increasing Access Component of the Nepal Safer Motherhood Programme, at: www.nsmp.org.

Pradhan, Ajit . et al., (2010). "Nepal Maternal Mortality and Morbidity Study 2008/09", MOHP/SSMP Nepal/USAID/DFID

Rath, A.D, Basnet I., Cole, M., Subedi, H.N, Thomas, D., and Murray, S. F. (2007). "Improving Emergency Obstetric Care in a Context of Very High Maternal Mortality: The Nepal Safer Motherhood Project 1997-2004". Reproductive Health Matters, 15(30): 72-80.

Sibley, LM et al (2007)," Traditional Birth Attendant Training for Improving Health Behaviours and Pregnancy Outcomes**" ,** Obstetrics & Gynecology: Volume 110 - Issue 5 - pp 1017-1018

The Lancet (2006). "Maternal Survival" Series.

UNFPA (2011). State of the World's Midwifery 2011 Report: Delivering Health. Saving Lives.

WHO (2005). World Health Report: Make Every Mother and Child Count, p. 219. Geneva.