Nirantar: Intervention and Advocacy for Continuum of Maternal and Newborn Care from Pregnancy to One Year After Delivery, Rajasthan, India

Background:

India witnesses the largest number of maternal deaths in any single country, and within India, Rajasthan has among the highest maternal death rates. Most maternal deaths occur in the first 7 days after delivery. In the case of neonatal deaths India has the highest share in the world -- over 1 million babies die in India before the age of 28 days. The early postpartum period has been recognized to be a time of heightened risk for both mother and newborn. While significant progress has occurred in developing community based approaches for promoting neonatal health, similar attention has not been paid to improving maternal health during the postpartum period. From a health systems standpoint, vertical approaches to reducing maternal and neonatal mortality lead to sub-optimal use of human and financial resources.

Rajasthan is a large state in India, with a population of 56.4 million, 77% of which is rural, and has a high maternal mortality ratio (455 per 100,000 live births) and high neonatal mortality rate of 49 per 1000 live births ("*State of India's Newborns*" 2005).

Continuum of care for maternal and neonatal infant health care project was implemented by Action Research & Training for Health (ARTH), Udaipur, India. It was supported by a three-year grant, commencing 1 June 2006- 31 May 2009 (#06-86673 -000-GSS) awarded by the Mac Arthur Foundation. The project received two no cost extensions for the period, one for 2009-2010 and another from April 2010 to March 2011.

All the major activities as per the original project proposal were completed by March 2010, except the end line survey, which was conducted in the year to follow. Due to the interest income earned during the project period, the project had balance funds of RS 2080148 ($ 47503) at the end of March 2010.

In the year 2010-11, these balance funds ($ 47503) were used up in completing the end line survey, printing the advocacy materials, and supporting the construction of our training centre. The approval for budget for no cost extension was sought through letters dated 12 May 2010 and 6 December 2010; this was approved by the Foundation.

The objectives, design and outcomes of the project and interventions are outlined below along with data from 2011-2012 as ARTH has continued to maintain elements of the continuum of care support beyond the completion of the initial project timeline in an effort to maintain support for improved maternal and neonatal healthcare.

Objective:

1. To reduce maternal and neonatal mortality and morbidity in field area by providing an integrated care for mother and newborn in postpartum period to all women and newborns irrespective of place of delivery.
2. To carry out evidence based advocacy for maternal -- neonatal health (including safe abortion) in a decentralized manner across the seven divisions of Rajasthan state, using a gender, rights and health systems approach.

Program Intervention area:

The programme is centered on the two ARTH RCH centers run by nurse-midwives and with doctors providing consultancy twice a week.

Table 1: Location and population covered by 2 health centres

ARTH RCH Centre	Panchayat Samiti	Villages Covered	Total Population (at time of intervention)	Percentage SC+St
Kadiya	Badgaon	22	23990	42
Kuncholi	Kumbhalgarh	19	24784	50
	Gogunda	8	12094	48
Total Average		48	60868	47

ARTH RCH center Kadiya is 25 kilometers away from the ARTH main office while the Kuncholi RCH center is 52 kilometers away.

Strategy/Approach:

a. To register all pregnant women within the ARTH field area through village-based workers or volunteers and motivate them to seek at least four antenatal check-ups and deliver in an institution

b. To record all births in field area irrespective of place of delivery: A variety of persons in the village (village health workers, key informants, ASHAs and other field staff, family members) visit each village and seek birth information as soon as possible. They report all deliveries in these 49 villages to health centers by telephoning at ARTH RCH centre or traveling there. They receive a small incentive to report deliveries early.

c. To provide 2 home level postnatal visits to all postpartum women and their newborns irrespective of place of delivery: After the delivery information is recorded, nurse-midwives pay a home visit to the house of the recently delivered woman, the first visit is made preferably at 3 days after delivery and the second visit at 6-7 days after delivery. Nurse midwives use a structured checklist and examination, including hemoglobin test to detect and manage postpartum maternal and neonatal complications. Based on the severity of these complications, they either manage them or refer them to ARTH RCH center or to referral hospitals. The service package provided by NMs has been shown below.

Service Package During Postnatal Visit	
Mother	**Newborn**
Structured questionnaire, including that for postpartum depression and maternal morbidities	Enquiry about problems using a structured checklist
Examination: **• General exam including pulse, BP and respiratory rate** **• Hemoglobin test for anemia** **• Breast and abdominal examination** **• Perineal and pelvic exam. if any complaint related to these areas**	Examination: • Physical exam including temperature, respiratory rate • Weight • Observation for local infections in eyes, umbilicus • Examination for sepsis
Counseling and information on : **• Diet, work** **• Danger signs**	Counseling and information on : • Diet, work • Danger signs
• Medications as per condition **• Referral support**	**• Medications as per the condition** **• Referral support**

d. To provide 3 visits between 14 to 28 days by ASHAs or village health workers:
Village health workers and ASHAs visit the women at 14, 21, and 28 days after delivery, and thereafter at 6 months and 12 months. They use these visits to address maternal morbidity among women and at the same time provide education on newborn care, immunization, complementary feeding and initiating use of contraceptives.
e. To generate a range of information materials suited to the local language and context, on the maternal-neonatal, child health and safe abortion situation and interventions while increasing maternal and child health advocacy capabilities among civil society organizations and building pressure in districts of Rajasthan for implementing policies and programs influencing maternal – neonatal health.

Progress/Outcomes:

1. Developing a model for integrated care to mother and newborns for providing continuum of care:

For integrating skilled attendance with community outreach for changing family and community practices for maternal, newborn and infant health, the intervention was further evolved to include the following components:

i. **Pregnancy registration:** Pregnant women have been identified in field area by village health workers, ASHAs or ARTH outreach staff in the context of routine village visits for other purposes and are registered by the field health centre. During the period of April 2008-March 2009, 105.5% of the expected number of pregnancies were registered. These numbers become closer by 2012 where 101.2% of the expected number of deliveries were reported.

ii. **Antenatal care:** Women whose pregnancies are registered by VHWs/ ASHAs are motivated to visit the health centre for antenatal care. They are also motivated to receive complete antenatal care. Between January and December 2008 82% of women whose deliveries were

reported had received antenatal care. This number steadily increased over the next four years to 95.2%.

iii. **Delivery reporting:** In an effort to ensure that all deliveries, irrespective of the place of delivery, were reported to ARTH as close to the birth as possible, so that a nurse can make a PNC visit as early as possible, an orientation was provided to Village Health Workers (VHWs), Accredited Social Health Activists (ASHAs), TBAs/village volunteers (key informants), family members and ARTH staff who visit the villages for other purposes. These persons received an incentive for reporting the delivery, which is higher if the delivery is reported within 48 hours and reduces as time following the delivery increases. Between January and December of 2008, data revealed that 89.4% of the expected deliveries were reported, 62% of which were reported within the first 3 days and 75% were reported within 7 days. Within the first 3 years of the project, the median interval between delivery and report was 2 days after home deliveries and 1 day after institutional deliveries at other institutions. Between 2009 and 2012, the average percentage of deliveries reported within 3 days was 84.2% (on a yearly basis, the percentage increased over time) and the average percentage of deliveries reported within 7 days was 92% (also increasing yearly). This trend reflects an increase in the number of deliveries being reported through this system over the course of the project. However, it also highlights a continuing need for more timely reports given the risk of problems that can occur within the first week following delivery, many of which can be critical for a newborn.

Figure 2a

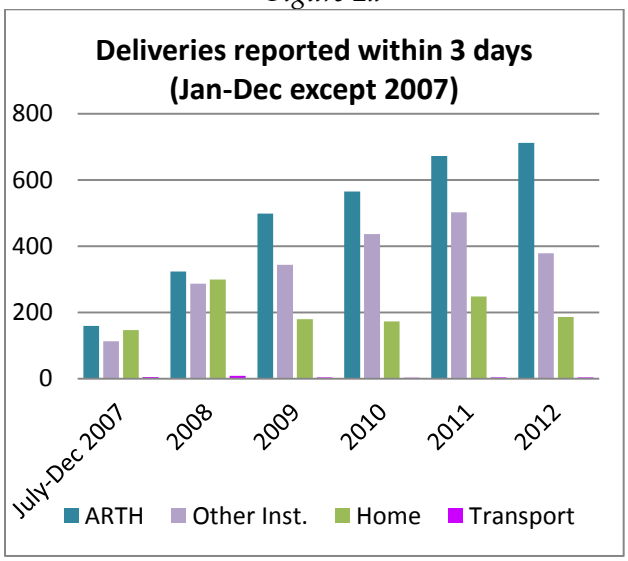


Figure 3

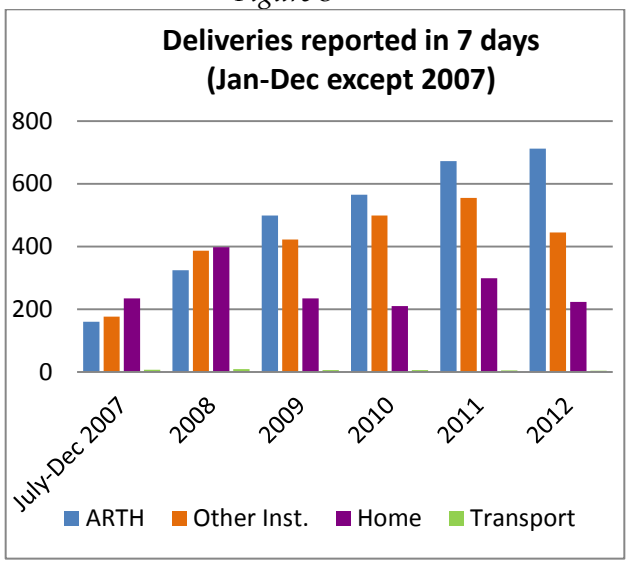


Table 4

Timeliness of reporting of deliveries (Ap 2009-Dec 2012)				
	ARTH deliveries (n=2265)	home deliveries (n=1108)	Delivery at other institutions (n=2094)	Total (n=5467)
% of deliveries reported in 3 days	100.0%	66.2%	74.6%	83.4%
% of deliveries reported in 7 days	100.0%	81.0%	86.7%	91.0%

Source of reporting of deliveries: In 2 clusters of our field area, the main strategy for reporting of non ARTH deliveries is different - in Kuncholi field area (27 villages), 30 ASHAs have been trained and motivated to report deliveries, while in Kadiya field area (22 villages), 3 village health workers have been the main strategy. The initial data shows that in Kuncholi field area, 31% of all deliveries were reported by ASHAs while in Kadiya field area, 59% of deliveries were reported by village health workers. A similar trend continued through to 2012 with a slight decrease in reporting by ASHAs in the Kuncholi field area while there was an increase in reporting by VHWs in the Kadiya field area. Overall, there are multiple sources for reporting and no single one can report all cases in a timely manner. This indicates that for large scale programmes, if postnatal care is to be provided for deliveries conducted in other institutions, multiple sources will have to continue to be trained and used for getting accurate delivery reports, since relying only on ASHAs or VHWs might mean only having one third of all reports.

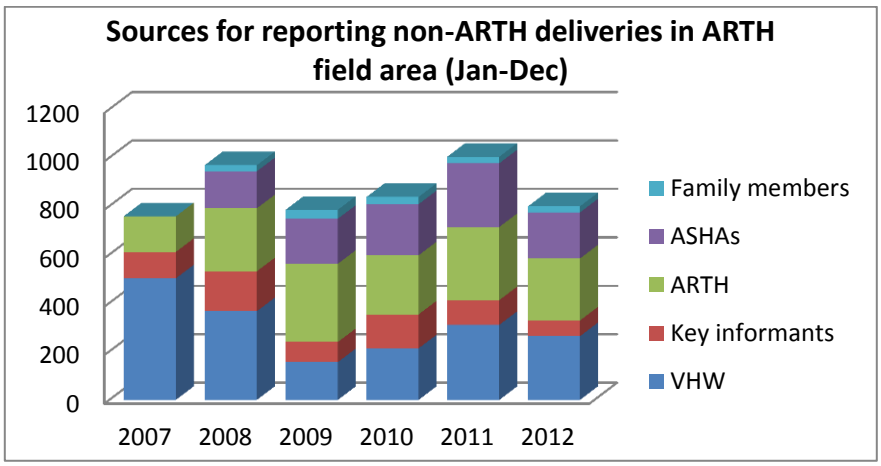
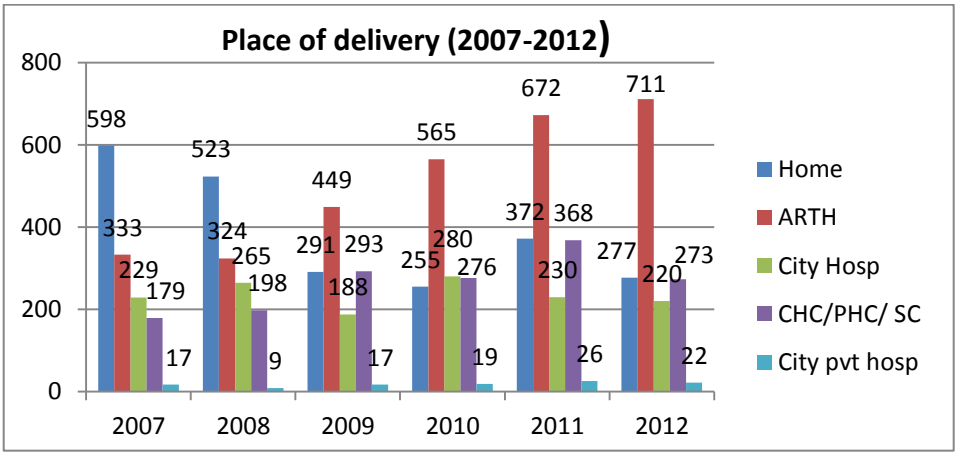


Figure 5

iv. **Attendance at deliveries:** The proportion of women delivering at institutions and through professionally trained birth attendants has been progressively increasing over the course of the years since the project began. While government incentives to birth in government institutions has had some effect on this trend, figure 6 indicates that ARTH's deliveries have more than doubled in 2012 as compared to 2007 while home deliveries reported have halved. While hospital births reported have fluctuated over time, they have, on averaged, stayed about the same.

Figure 6



Similarly, the neonatal and perinatal mortality rates have been declining over the same period of time in ARTH facilities and, more recently, in other institutions. These rates still vary greatly year to year at home births, with perinatal mortality rates spiking in 2012. This suggests that, while home births are on the decline, there is still a great need for more trained women providing birth and delivery services in rural communities as well as education for mothers regarding perinatal and neonatal healthcare.

Figure 7

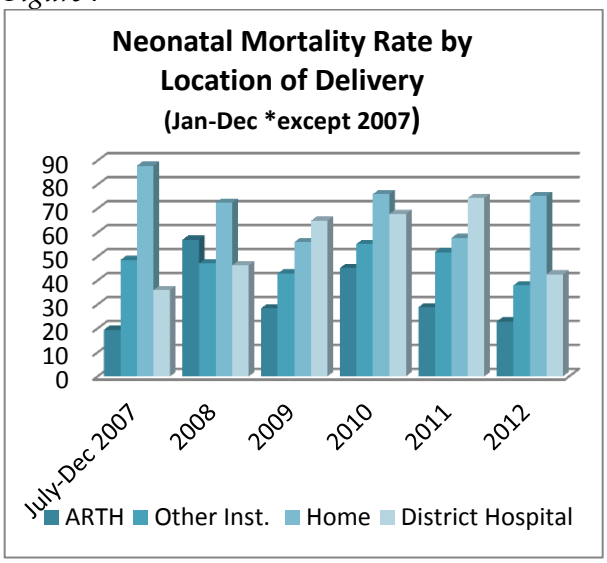
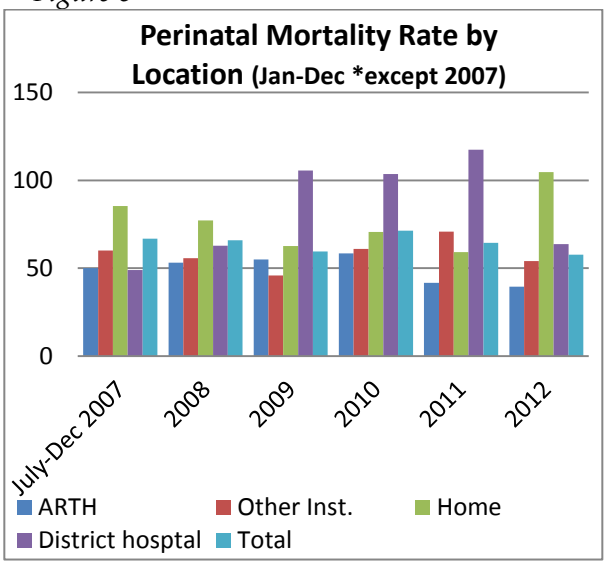


Figure 8



v. **Early postnatal visits by nurse-midwives:** Since the majority of maternal deaths occur in the first week after delivery, ARTH introduced the intervention of 2 postpartum visits in the first week. For this, a system of delivery reports has been linked to daily visits by nurse midwives. The aim is to detect complications in mothers and newborns as early as possible and manage these problems. The first visit is made as early as possible after delivery, preferably on day 2-4, while the second visit is made at around day 6-9.

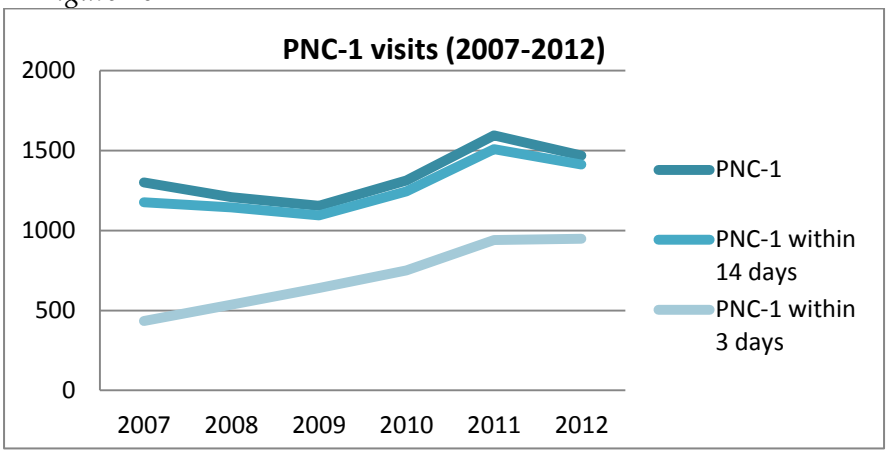
Table 9

Table 2: Proportion of women who received a PNC visit (January 2008-December 2012)

	ARTH delivery	Home Delivery	Delivery at other institutions	Total
% of women whos deliveries were reported and received PNC-1 visit	99.1%	92.2%	91.4%	94.0%
% of women whos deliveries were reported and received PNC-1 within 4 days	99.0%	86.6%	85.1%	91.2%
% of women whos deliveries were reported and received PNC-2 visit	96.0%	79.5%	81.3%	85.5%
% of women whos deliveries were reported and received PNC-2 within 10 days	95.6%	72.9%	84.4%	82.0%
Median (& mean) interval between delivery and PNC-1	3 (3.4) days	4 (4.8) days	4 (5.7) days	3 (4.1) days
Median (& mean) interval between delivery and PNC-2	7 (7.8 days)	8 (9.6) days	8 (9.3) days	7 (8.5) days

Over the course of this intervention, there has been a steady increase in the number of PNC-1 and PNC-2 visits, increasing from 1300 PNC-1 visits completed in 2007 to 1469 in 2012 (95% of reported deliveries to 98%), and 741 PNC-2 visits in 2007 to 1392 in 2012 (55% of reported deliveries to 93%). The total median intervals of both PNC-1 and PNC-2 visits are within the targeted time period, averaging 3 days for PNC-1 visits and 7 days for PNC-2 visits. As mentioned earlier, the timeliness of reporting of deliveries has been improving over the course of the intervention and, as this directly impacts the PNC visit timings by nurse-midwives, the brevity of such gaps is essential.

Figure 10



Maternal and neonatal problems detected by nurse-midwives during PNC visits: NMs, using a pre-made and very structured post-natal form, inquired with the mothers about any maternal and/or neonatal problems that are or were occurring while also examining the women and babies in order to detect and treat any problems. The primary types of problems in the later stages of the project remain the same. The primary noteable difference is the increase in percentage of new mothers with moderate anemia (54.5% in 2007 to 62.5% in 2012) and a decrease in women diagnosed with severe anemia (5.5% to 3.9%), indicating a potential overall worsening of an already serious problem among pregnant women and new mothers within Rajasthan's rural communities. After examining further, we found that severe anemia was more frequent among women with home delivery and among women belonging to scheduled castes and tribes. The prevalence of severe anemia was more among multiparous women (having 3 or more children) than among those with 1-2 children. However, it was not significantly different between women who received antenatal care and those who did not. However, we do not have information on whether women consumed iron tablets during pregnancy or not or whether they had anemia prior to delivery. Other problems that arise are included in Table 11 below.

It should be noted that in the data, there are fairly large increases in the number of moderate and severe anemia cases as well as variations in other categories (such as Primary PPH) for particular years, which may indicate inconsistencies in how the results are being read and determined. The actual number and percentages in certain years may, therefore, be slightly higher or lower depending on the category. In the case of Primary PPH, despite the larger increase one year, there seems to be an increase in cases over the course of the project, putting into question the causes given the overall decrease in home births where the management of the third stage of labour is often not followed as rigorously as in clinic and hospital births. The management

protocols followed by these NMs have been documented and incorporated into ARTH's guidelines for nurse-midwives.

Table 11

Types of Maternal Problems Detected During First Week Postnatal Visits (2007-2012)												
	2007 (n=1301)		2008 (n=1208)		2009 (n=1154)		2010 (n=1313)		2011 (n=1594)		2012 (n=1471)	
Maternal complication	number	%	number	%	number	%	number	%	number	%	number	%
Primary PPH	3	0.2%	18	1.5%	58	5.0%	22	1.7%	16	1.0%	10	0.7%
Secondary PPH	3	0.2%	4	0.3%	12	1.0%	1	0.1%	2	0.1%	1	0.1%
Fever	17	1.3%	17	1.4%	18	1.6%	22	1.7%	31	1.9%	24	1.6%
Hypertension	4	0.3%	13	1.1%	29	2.5%	8	0.6%	1	0.1%	4	0.3%
Eclampsia	0	0.0%	0	0.0%	0	0.0%	3	0.2%	0	0.0%	1	0.1%
Moderate anemia	709	54.5%	696	57.6%	873	75.6%	1026	78.1%	1057	66.3%	920	62.5%
Severe anemia	71	5.5%	62	5.1%	47	4.1%	106	8.1%	71	4.5%	57	3.9%
Pereneal problems	27	2.1%	79	6.5%	50	4.3%	68	5.2%	48	3.0%	22	1.5%
Breast problems	33	2.5%	81	6.7%	48	4.2%	80	6.1%	49	3.1%	41	2.8%
PP Depression	4	0.3%	4	0.3%	0	0.0%	0	0.0%	3	0.2%	1	0.1%
Cough, breathing problems, asthm	7	0.5%	35	2.9%	35	3.0%	52	4.0%	82	5.1%	41	2.8%
TB	0	0.0%	1	0.1%	1	0.1%	1	0.1%	0	0.0%	1	0.1%
Urinary infection	0	0.0%	35	2.9%	59	5.1%	44	3.4%	22	1.4%	14	1.0%
Urinary incontinence	0	0.0%	2	0.2%	2	0.2%	0	0.0%	0	0.0%	0	0.0%
Prolapse	1	0.1%	2	0.2%	3	0.3%	2	0.2%	2	0.1%	1	0.1%
Other	8	0.6%	0	0.0%	15	1.3%	17	1.3%	22	1.4%	21	1.4%

Most noteable in the changes of neonatal problems over the last few years is an increase in low birth weight babies (1.5-2.49 kg) from 16.7% in 2007 to 27.5% in 2012, peaking in 2010 along with the number of cases of local infections. Whether or not there is a correlation between the two, or if documentation is completely accurate, as mentioned earlier, is unknown. This research is not designed to determine how these two are directly linked or not, but given the tendency for low weight babies to be susceptible to additional health problems, the link seems likely. The sources of these problems also point to larger health and healthy food access issues that exist in this area that could have major impacts on the number of these cases we see today. Other neonatal health problems detected include:

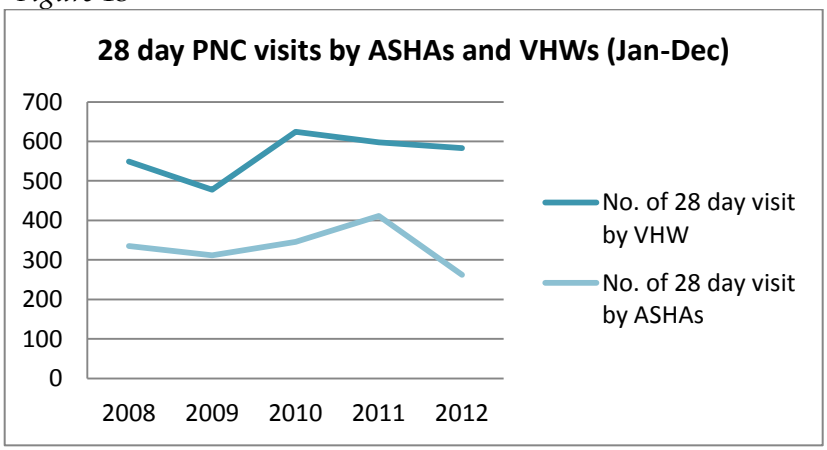
Table 12

Neonatal problems detected during PNC (2007-2012)												
	2007 (n=1301)		2008 (n=1208)		2009 (n=1154)		2010 (n=1313)		2011 (n=1594)		2012 (n=1471)	
Problem	number	%	number	%	number	%	number	%	number	%	number	%
Low birth weight (1.5-2.49 kg)	217	16.7%	301	24.9%	302	26.2%	408	31.1%	444	27.9%	404	27.5%
Very low birth weight <1.5 kg	8	0.6%	20	1.7%	13	1.1%	23	1.8%	25	1.6%	11	0.7%
Hypothermia	7	0.5%	21	1.7%	40	3.5%	66	5.0%	25	1.6%	6	0.4%
Serious illness/neonatal sepsis	8	0.6%	22	1.8%	15	1.3%	44	3.4%	36	2.3%	20	1.4%
local infection	31	2.4%	40	3.3%	46	4.0%	244	18.6%	238	14.9%	87	5.9%
jaundice	1	0.1%	8	0.7%	4	0.3%	6	0.5%	5	0.3%	1	0.1%
breastfeeding problems	15	1.2%	15	1.2%	15	1.3%	13	1.0%	3	0.2%	3	0.2%
congenital anomalies	3	0.2%	6	0.5%	6	0.5%	6	0.5%	10	0.6%	4	0.3%
thrush	1	0.1%	4	0.3%	5	0.4%	9	0.7%	10	0.6%	5	0.3%
other	7	0.5%	17	1.4%	35	3.0%	97	7.4%	98	6.1%	58	3.9%

vi. **Further Follow-up visits between 14 and 28 days by VHWs/ASHAs:** A system of further follow-up visits was implemented in order to provide further postnatal care and counselling to mothers whereby VHWs/ASHAs visit all delivered women 3 times between 14 and 28

days post-delivery. While two supervisors verify their performance at the village level, check whether the visits actually took place and whether the information recorded by them was accurate, experiences with them conducting these visits has been mixed. In the initial stages of the project, 60-80% of women were being visited in the intended time period, however over time enthusiasm and performance declined to 60% of overall women receiving these services. In the Kadiya field area, where VHWs were conducting these follow-ups, 90% of the women who were designated to receive these visits received them, while in the Kuncholi area, the numbers declined to 42%.

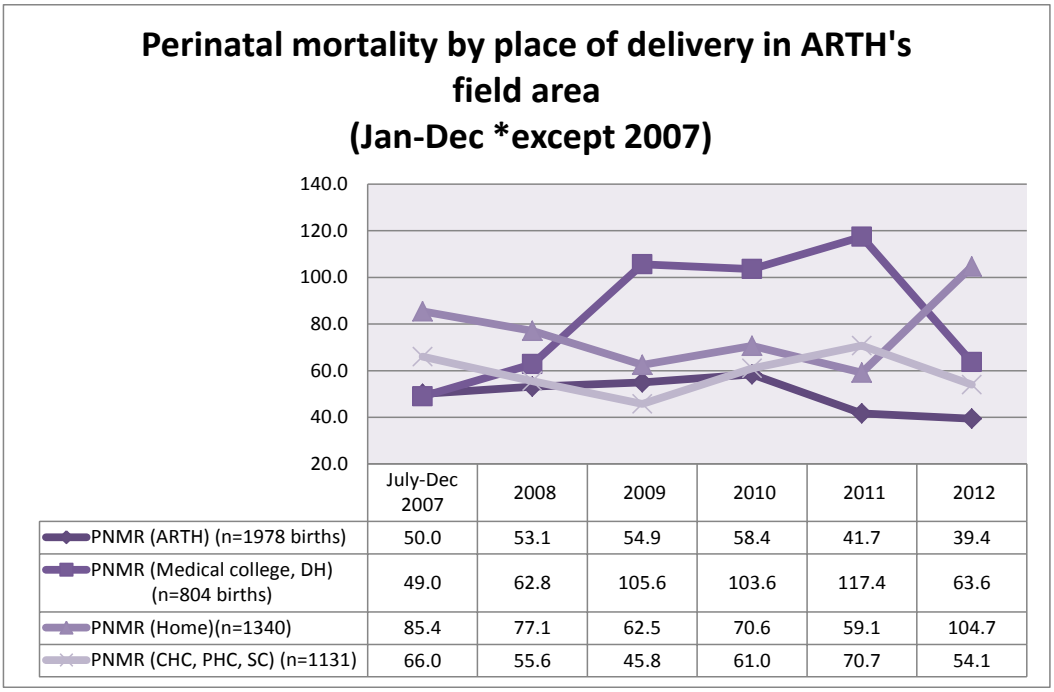
Figure 13



vii. Clinic based visits between 42 days and 12 months at health centres: During postnatal visits, women are advised to come to the health centre after one and a half months for immunization and their own check-up. During these visits, maternal problems are also detected and managed. In order to ensure that integrated care is provided to mother and newborn, we have developed a pictorial postpartum care card, which has following parts:

- Pictorial section for education and counselling on maternal and neonatal care
- Checklist for history, examination, counselling and treatment for mother and newborn

viii. Perinatal outcome: Perinatal mortality rates, as mentioned earlier, have declined overall throughout the duration of this project and as the interventions continued. While there have been many fluctuations up and down when examined by location of delivery, the one exception that has spiked rather than declined has been in the case of home births where the rate dropped from 77.1 in 2008 to 59.1 in 2011 and sprang up again to 104.7 in 2012 (figure 14).



	July-Dec 2007	2008	2009	2010	2011	2012
PNMR (ARTH) (n=1978 births)	50.0	53.1	54.9	58.4	41.7	39.4
PNMR (Medical college, DH) (n=804 births)	49.0	62.8	105.6	103.6	117.4	63.6
PNMR (Home)(n=1340)	85.4	77.1	62.5	70.6	59.1	104.7
PNMR (CHC, PHC, SC) (n=1131)	66.0	55.6	45.8	61.0	70.7	54.1

Figure 14

Similarly, there has been an overall decline in the neonatal mortality rate (including early and late neonatal mortality rates), but only a very small dip (around 1.5%) in the still birth rate in the ARTH field area over the course of the project. The NMR may be more closely linked to the antenatal and postnatal visits women are receiving, accounting for part of the decline, as opposed to the still birth rate, which can also occur from a variety of other factors and aren't necessarily affected by these visits.

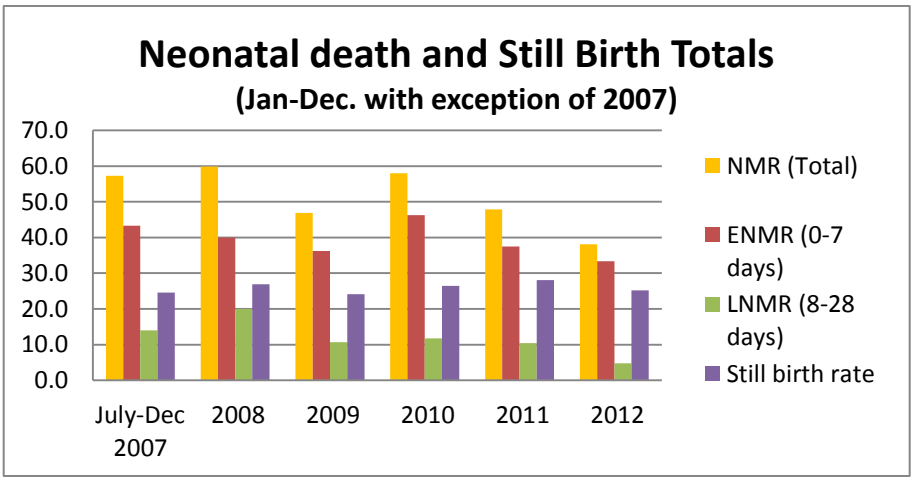
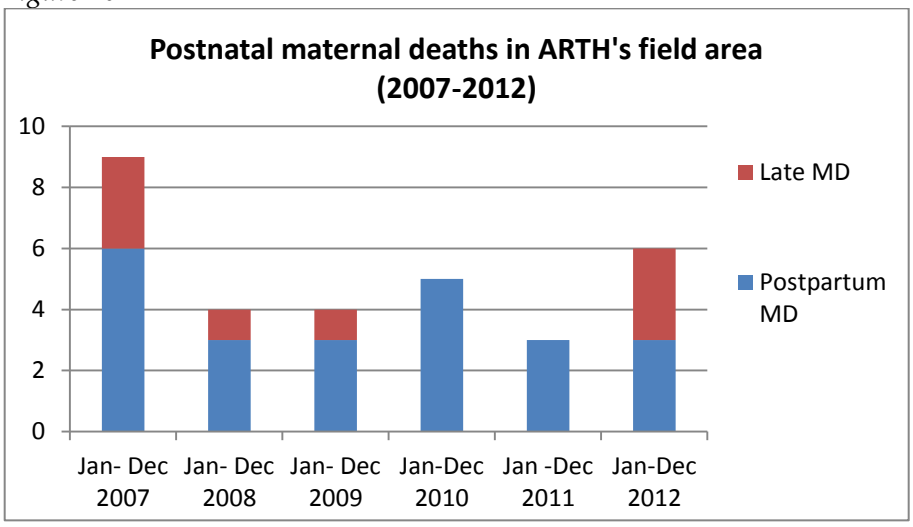


Figure 15

ix. Maternal outcomes: Over the course of the first 3 years of the project, maternal death was on the decline within the ARTH field area. Initially we expected to see this trend continue as the continuum of care program seemed to be having a positive impact on these levels, however over the last few years there has been some fluctuation (figure 16).

Figure 16



Similarly, the timings of postnatal maternal deaths also fluctuated, with a gradual decline in early postpartum maternal death (<24 hours after delivery) by 50%. This is significant because it may point to an increase in the amount of time women are staying in the birthing facilities and receiving more and improved care.

Figure 17

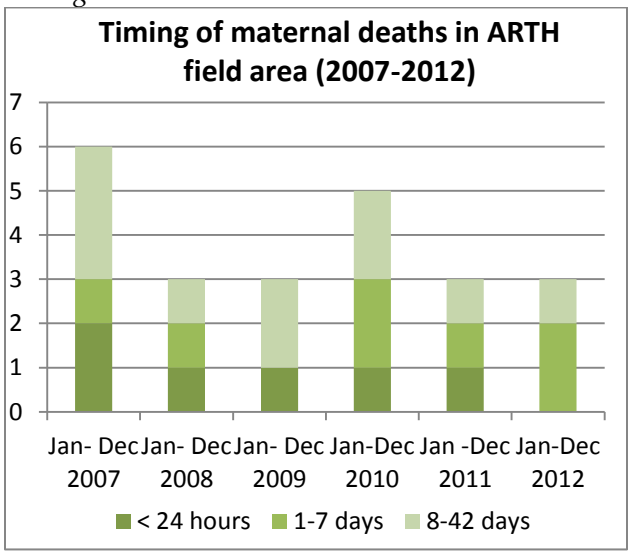
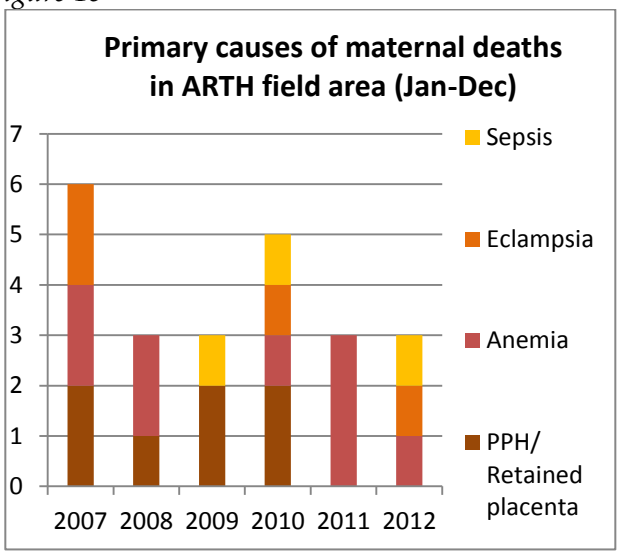


Figure 18



The primary causes of postnatal maternal death vary, however the consistent and dominant issues in this area are PPH/retained placenta and anemia. As mentioned earlier, there are correlations between anemia and other factors, such as home birth vs. institutional, certain castes and whether or not a woman has had multiple children. Other correlations were drawn as well and a linear correlation was discovered between the severity of anemia and perinatal and late neonatal mortality rates. As the severity of the anemia increases or decreases, so do the perinatal and neonatal mortality rates (figures 20 and 21).

Table 19: **Correlations of postpartum anemia 2007-2009**

	% with severe anemia	P value	Odds ratio
Caste		0.0000001<	2.82 (1.89-4.22)
• Scheduled caste or tribe (n=1596)	8.8		
• Other (n=1031)	3.3		
Place of delivery		0.0000000<	2.58 (1.87-3.57)
• Home (n=820)	11.1		
• Institutional (n=1779)	4.6		
Number of children ever borne		0.00060<	0.58 (0.42-0.80)
• 1-2 (n=1266)	4.9		
• 3 or more (n=1733)	8.3		
Whether received antenatal care		0.000784	1.14 (0.60-2.19)
• Received ANC (n=2416)	6.7		
• No ANC (n=202)	5.9		
Child outcome		0.00021	2.46 (1.49-4.02)
• Perinatal death (stillbirth + early neonatal death)	9.8		
• No perinatal death	4.3		

Figure 20

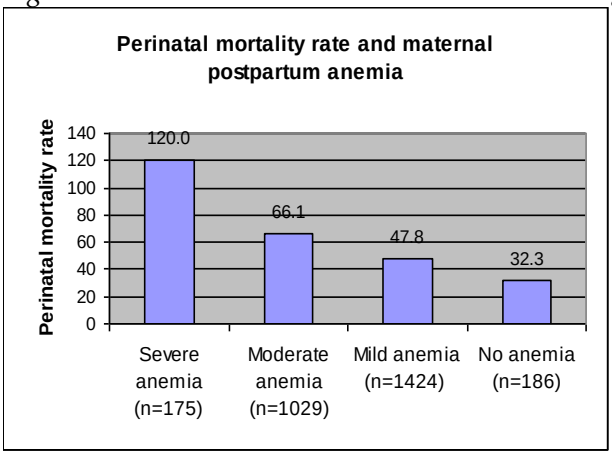
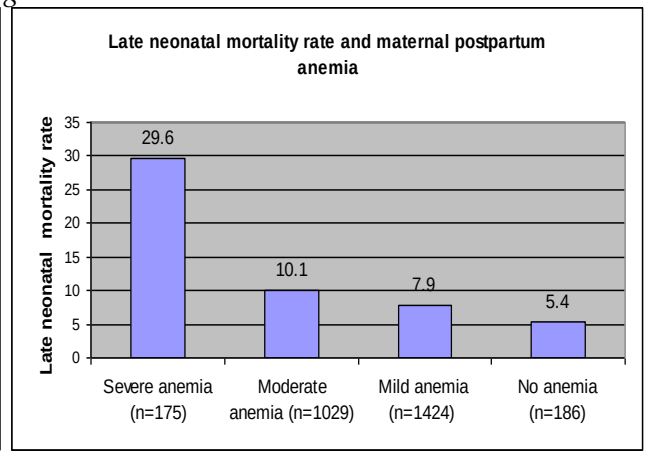


Figure 21



Given the link between anemia and home birth, there is a high probability that there are even more cases of anemia—both pre and postnatal-- that have gone undetected or that have been discovered late. The consequences of this are not clearly represented in the data, but what is evident is that if a woman is able to receive both antenatal testing and treatment for anemia, her chances of it persisting and having adverse postnatal outcomes decreases. Additionally, data reflects that if early postnatal care is provided along with consistent care, potential maternal and child mortality rate increases may be thwarted early on.

2. Extension Period:

End line Survey: Following the completion of the continuum of care program, an endline survey was conducted. It began in April 2010 covering a population of nearly 94000 (including 60000 in the field area and 34000 in a control area). The research manager analysed the data under the guidance of the project coordinator. Results of end line survey show that the maternal and neonatal mortality rates were significantly lower in our intervention area as compared to the control area, which had similar rates of antenatal care and institutional delivery. The major difference came in terms of rates of postpartum care. These results indicated that postpartum care contributed to better health outcomes for mothers and babies, especially in terms of reduced maternal mortality. This has been shown in table below:

Survey results 2010		
Area	Intervention area	Control area
Total households	12683	6863
Total population	60868	33119
% who received at least one ANC visit	84%	79%
Place of antenatal care		
• ARTH health centres	38.2	0.7
• SC/ Anganwadi	20.8	24.6
• Government hospitals	34%	67%
• Others	7%	7%
% having institutional delivery	74.8%	69.9%
• Government hospital	42.1	62.1
• Private hospital in city	3.6	7.4
• ARTH health centres	29.0	0.4
• Home	25.2	30.1
Type of delivery		
• % Caesarean	2.8	3.2
Of those delivering in an institution		

• Received JSY money	90.9	80.9
• Received blood transfusion	3.0	2.2
Whether ASHA or dai accompanied for institutional delivery	23.9	28.7
Initiation of breastfeeding within 6 hours after birth	75%	59%
% with a postpartum contact	73.9%	1.9%
% mothers who received a medicine in postpartum contact (who had a PNC visit)	59%	
% babies who received an injection	6.7	0.3
% babies who received a syrup	11.9	0.8
Postnatal Mortality Rate	Waiting for data	
Neonatal Mortality Rate	45.4	69.4
Late Neonatal Mortality Rate		
Maternal Mortality Ratio	206	757

Conclusion:

This pilot service experience suggests that home visits for maternal-neonatal postpartum care can feasibly be provided by trained nurse-midwives in a low resource primary-care setting in India. Important necessities affecting the success of such an intervention include:

- Early reporting of births, within 24 - 48 hours, by health facilities as well as by family/community members consisting of a range of informants in order to capture as many deliveries as possible. There is a need for an improvement in the reporting system in order the detect and treat maternal and neonatal problems quickly.
- Meticulous transport arrangements and route planning to enable midwives to reach women's homes in time
- Clear detection and management / referral protocols for postpartum conditions and complications

The data from these interventions show that timely follow-up as a result of prompt reporting of deliveries is also a significant factor in the reduction of neonatal and maternal mortality rates. There was an overall reduction in both cases over the course of the intervention as well as better results for both mother and baby in other areas of care. Problems that continue to persist despite the interventions made include:

- Moderate and severe anemia and fever (infection), among women, with potentially serious complications. These numbers did not decrease significantly over the course of the intervention and, in some cases increased, indicating additional changes in supportive care as well as maternal eating habits may need to be made.
- A strong link between perinatal and late neonatal mortality rates and the severity of maternal postpartum anemia
- Breast and perineal conditions are common but amenable to management by midwives
- While yearly levels vary, anemia and PPH continue to be significant causes of maternal death each year.
- Major neonatal health concerns are low birth weight and local infections

Overall, there were positive maternal and neonatal health outcomes as a result of increased reporting of delivery by medical and local informants, and postnatal care by nurse-midwives. There are further needs for improvement in reporting methods, given the variation in reporting by ASHAs and VHWs within the different areas within the ARTH field area, but they-VHWs in particular-have proven to be useful resources for the overall improvement of maternal and neonatal care.