National Maternal Death Surveillance and Response (MDSR) Annual Report, 2009 EFY

Ethiopian Public Health Institute
Center for Public Health Emergency Management (PHEM)

December, 2010 E.C

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Acronyms and Abbreviations

ANC	Antenatal Care
CBC	Complete Blood Count
EDHS	Ethiopian Demographic Health Survey
EFY	Ethiopian Fiscal Year
EmONC	Emergency Obstetric and Neonatal Care
EPHI	Ethiopian Public Health Institute
FBAF	Facility Based Abstraction Form
FMOH	Federal Ministry of Health
HDA	Health Development Army
HDP	Health Development Program
HSTP	Health Sector Transformation Plan
ICU	Intensive Care Unit
IDSR	Integrated Disease Surveillance and Response
LARC	Long Acting Reversible Contraception
LB	Live Birth
MBB	Mini Blood Bank
MDRF	Maternal Death Report Format
MDSR	Maternal Death Surveillance and Response
MMR	Maternal Mortality Ratio
MNCH	Maternal Neonatal and Child Health
NASG	Non-pneumatic Anti-shock Garment
PFSA	Pharmaceuticals Fund and Supply Agency
PHEM	Public Health Emergency Management
PNC	Post Natal Care
PPH	Post-Partum Hemorrhage
RHB	Regional Health Bureau
RMNCH	Reproductive, Maternal, Newborn and Child health
RRT	Rapid Response Team
SNNP	Southern Nations Nationality and Peoples
TWG	Technical Working Group

Acknowledgements

This 2009 EFY maternal death surveillance and response annual report is prepared by Ethiopian Public Health Institute with the participation from the national Maternal and Perinatal Death Surveillance and Response (MPDSR) Technical Working Group (TWG) members from different stakeholders at various levels of the health system. The Ethiopian Public Health Institute - Public Health Emergency Management center would like to express its appreciation and gratitude to all those who were involved in the preparation of this annual report.

Additionally, EPHI would like to thank the Evidence for Action (E4A)/WHO project for technical and financial support provided for the preparation of this report.

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Forward

For the third consecutive year, Ethiopia has synthesized nationally aggregated data on maternal deaths that have been reported through the Ethiopian Maternal Death Surveillance and Response (MDSR) system. In this Annual MDSR report, we present data for maternal deaths that have occurred in the Ethiopian fiscal year (EFY) 2009.

This report provides an overview of maternal mortality throughout the country, highlighting key indicators by geography and socio-demographic distribution of deaths, as well as data on its causes and determinants. As in previous reports, the three Delay model is used to characterize shortcomings in the health system related to community knowledge and preparedness (delay in recognizing a problem), transport costs and infrastructure (delay in reaching care), and clinical service quality (delay in obtaining required care). Recommendations for addressing these delays follows interpretation of the data in a chapter focused on evidence-based responses at every level of the health system.

This report also provides some indication of the functioning of MDSR. Over time, the number of reported maternal deaths has been rising across all regions, but reporting gaps still remain. First, the number of deaths notified through IDSR surveillance falls well below estimates of the actual number of maternal deaths occurring in Ethiopia. An estimated 7.4% of total deaths are currently being captured through weekly surveillance, with slightly more (8%) recorded through the review process using the case-based maternal death reporting forms (MDRF). Furthermore, the proportion of deaths being captured through surveillance lags behind those that have undergone the full MDSR process from notification, through investigation and review, suggesting full integration of maternal mortality into IDSR has not yet been completed. These are areas for improvement as the system continues to grow and strengthen.

The MDSR data put other sources of information into context, thus deepening our understanding of the Ethiopian maternal health landscape. Each MDSR annual report can be compared to other studies such as the recent EmONC report, and will be used to contribute to identification of quality improvement measures.

Feyesa Regasa (Dr)
PHEM A/Directorate Director

Executive Summary

This is the third National report from the Maternal Death Surveillance and Response system (MDSR), presenting maternal deaths reported to the National MDSR database during the Ethiopian fiscal year 2009. It covers progress toward full MDSR implementation, summarizing reporting levels through surveillance and case review in each region. It also presents key indicators on causes of death, determinants, and recommendations for evidence based responses throughout the health system.

In total, 1065 maternal deaths were entered into the database from Maternal Death Reporting Formats (MDRF). Among case-based reports, roughly half came from verbal autopsies conducted in the community (52%) and facility based abstractions (48%).

Analysis of MDRFs shows that hemorrhage remains the greatest cause of death, at 45% of all maternal deaths. Other causes trail significantly behind this primary cause of death, with the second most frequent causes being Hypertensive Diseases of Pregnancy (HDP) and anemia, both at 16%. The majority of deaths occurred in the post-partum period (67%) and to women with no education (58%).

The place of death reflected the high proportion of deaths reported through facilities, with 72% deaths occurring in hospitals or health centers, although this is likely to be an artifact of better facility-based reporting. Deaths in transit accounted for 13% of deaths, while home based deaths were 14%.

Determinants of maternal deaths were distributed across the three delays, with 63.4% of all deaths citing at least one Delay 1 factor, 42.5% citing Delay 2, and 46.7% citing Delay 3. The top 5 barriers to obtaining life-saving care were (1) delay in taking decision to seek care (37%); (2) delayed departure from home (30%); (3) failure to recognize the problem (27%); (4) delayed arrival at facility (24%) and (5) delayed referral between facilities (23%). These clearly point to the need for improvements in referral mechanisms and transport arrangements, starting with community awareness of key danger signs so they can raise the alarm, followed by more efficient means to procure transport and reach the most appropriate health facility.

Examples of best practices at community, health facility, woreda, zonal, regional and national levels are detailed in the Response chapter, and highlight the important role that MDSR data play in helping to identify practical and feasible quality improvement measures.

Summary of Key Recommendations

At community level:

- **Improve ANC quality** by including individualized birth preparedness plans. Every woman in her first pregnancy should know she is at risk of pre-eclampsia, and should be aware of the signs. Older pregnant women should understand they are at risk of hemorrhage.
- Make **iron supplementation** available to all pregnant women
- **Family planning** should focus on high parity and young women

At facility level:

- **Improve postnatal monitoring** to check for possible risk of hemorrhage and anemia. Ensure women leave the facility understanding their individual risk and the importance of receiving PNC.
- **Strengthen referral systems** so that transport is readily available at all times, and the referring facility has checked that the next level of care is available and prepared for the woman's arrival.
- **Build up infrastructure** systems to ensure essential drugs and supplies are always in stock and staffs are adequately trained for procedures they are expected to perform**.**
- All health facilities should have a **protocol for the management of hemorrhage** and this should be rehearsed on a regular basis.
- Every labor ward should have an **emergency drugs box** immediately available

At woreda, zonal or sub-city level:

- **Check transport** regularly to ensure ambulances are available, well-maintained, have fuel and a driver.
- Promote **community awareness** through dialogues and local events.
- **Coordinate** supply chains to ensure essential drugs and supplies are always available in all facilities.

At Regional and National level:

- **Ensure timely and regular review** of data from lower levels to target support and resources.
- Facilitate **safe delivery and PNC** by supporting construction and maintenance of Maternity Waiting Homes.
- **Implement** national policies and strategies, such as the Hemorrhage Action Plan.

PART I - MDSR System Performance and Geographical Coverage

1.1 MDSR System Performance

Based on the recommendation from the Commission on Information and Accountability for Women's and Children's Health's, the Federal Ministry of Health (FMOH) of Ethiopia has been implementing Maternal Death Surveillance and Response (MDSR) since 2013, which has been integrated with the existing national public health emergency management (PHEM) system 2014.

Ethiopia's Maternal Death Surveillance and Response (MDSR) system shows significant improvement in its capacity to capture maternal deaths occurring in communities as well as in health facilities compared with previous years. During the current fiscal year, the system captured 7.4% of estimated maternal deaths, which is 151 % and 53% greater than the proportion of estimated maternal deaths reported in the previous two consecutive years 2007 and 2008 EFY respectively.

Due to differences in population size between reporting regions and city administrations, the number of maternal deaths reported also differs across regions. As shown in the table 1 below, 972 MD (7.4% ranging from 1.2% to 43.3%) of the estimated MD (based on EDHS 2016) were reported through weekly PHEM reports during the reporting fiscal year. Dire Dawa city administration and Harari regions reported 43.3% and 25.3% of the expected number of MD. Lower proportions of MD reports were received from Ethiopia Somali and SNNPR regions, which were 1.2% and 2.2% respectively.

In regard to maternal death case based (MDRF) reporting, the majority of reporting regions and city administrations, with the exception of Somali region, started to review and report weekly maternal deaths using MDRF. Some gaps are observed in the number of MDRFs received from regions compared to the number of deaths reported through weekly surveillance. In a well-functioning system, roughly the same number of MDRFs and weekly reported maternal deaths should be received. Some discrepancy between surveillance and review reports are expected, as not all weekly reported maternal deaths will be eligible for investigation, reviewing and report by final case based reporting formats. Furthermore, investigation for some deaths may not be carried out due to some families being difficult to locate following a death, refuse to participate in a verbal autopsy or suspected maternal deaths reported weekly may be turned to be accidental or incidental deaths during verification. Thus the number of MDRFs is likely to be smaller than the total number of MDs reported through weekly surveillance.

As shown in table 1 below, among weekly notified maternal deaths, 942 (96.9% ranging from 0 % to 266 %) of MDs were reviewed and reported using the MDRF. Tigray, Benishangul- Gumuz, SNNP and Afar regions reported greater number of MDRFs, which is 223%, 201%, 209.6% and 266.1 % respectively. Regional achievement greater than 100% on MDRF may reflect that some maternal death reports received with MDRF were not reported through weekly PHEM reporting system. Availability and functionality of rapid response team (RRT) at health centers and/or Maternal Death Surveillance and Response committee at hospitals for reviewing and provide response to the death may be responsible for the lower performance seen in some reporting regions.

Table 1: Reported maternal deaths versus estimated maternal deaths and Weekly Vs MDRF reports based on EDHS 2016, July 1, 2008 to June 30, 2009 E.C

Regions	Expected	Reported MD	%	MDRF	MDRF Vs Weekly	MDRF Vs Expected
Addis Ababa	324	45	13.9%	44	97.8%	13.6%
Afar	216	11	5.1%	23	209.1%	10.6%
Amhara	2964	258	8.7%	215	83.3%	7.3%
Benishangul-G	144	25	17.4%	30	120.0%	20.8%
Dire Dawa	60	26	43.3%	20	76.9%	33.3%
Gambella	48	6	12.5%	6	100.0%	12.5%
Harari	32	8	25.3%	7	87.5%	22.1%
Oromia	5112	476	9.3%	329	69.1%	6.4%
SNNPR	2760	62	2.2%	165	266.1%	6.0%
Ethiopia - Somali	756	9	1.2%	0	0.0%	0.0%
Tigray	732	46	6.3%	103	223.9%	14.1%
National	**13147**	**972**	**7.4%**	**942**	**96.9%**	**7.2%**

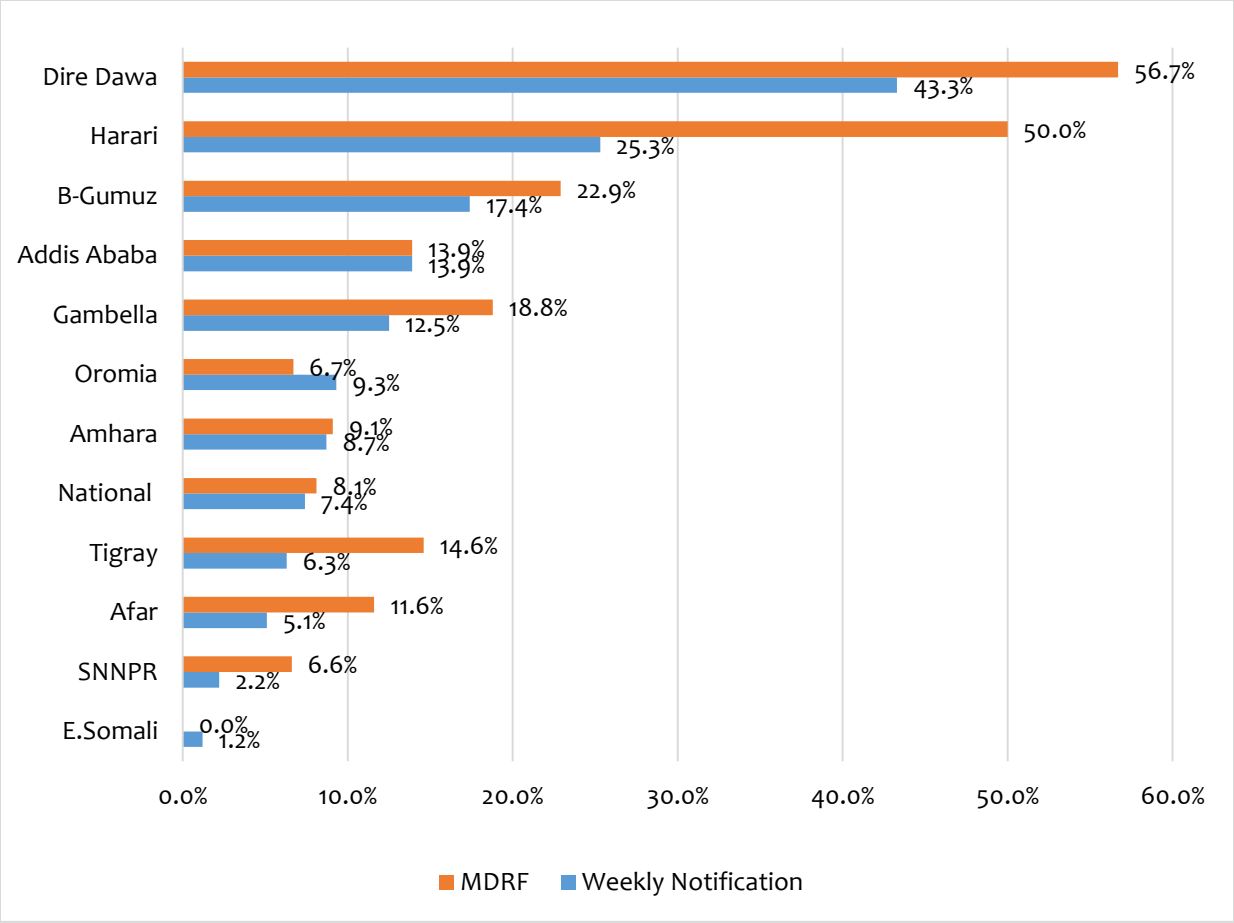

Figure 1: Proportion of reported maternal deaths against the estimated number of deaths by region and National levels based on EDHS 2016 MMR of 422 per 100,000 LBs, July 1, 2008 to June 30, 2009 E.C

Weekly PHEM reporting increased throughout the year. MDRF reports also show an increasing trend. There are some inconsistencies, however, and higher numbers of MDRFs are reported at 3 monthly intervals (October, January and April), suggesting that MDSR committees review deaths to coincide with quarterly reporting requirements rather than on a regular and routine basis.

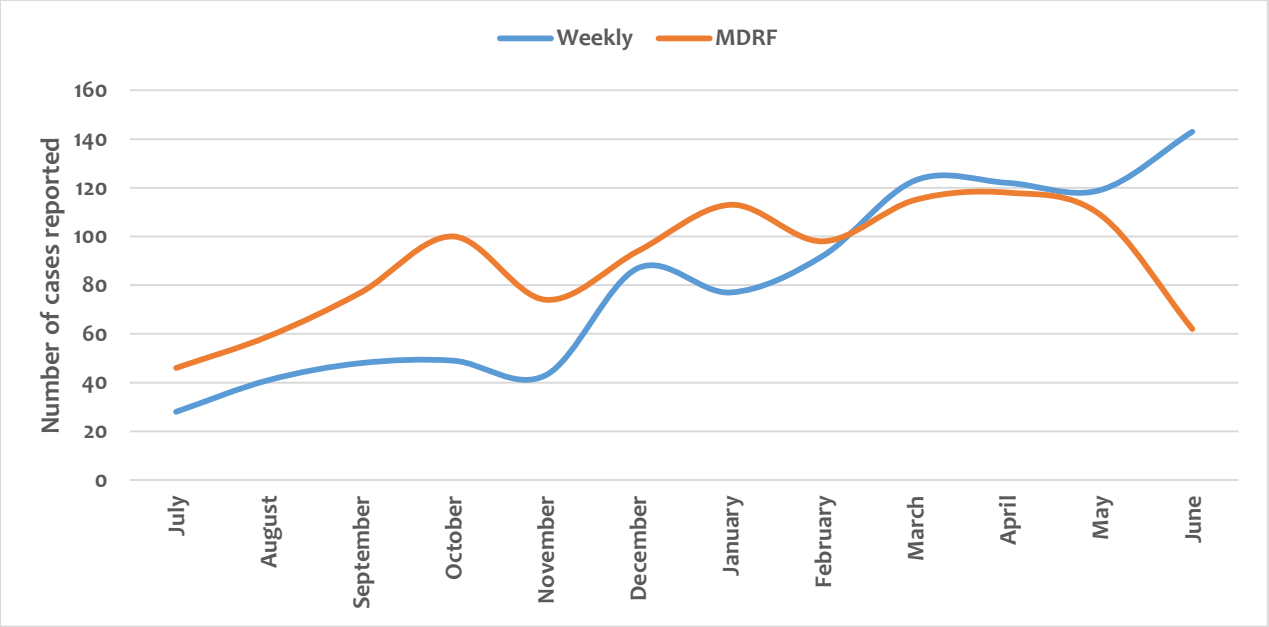

Figure 2: Weekly and Case based MD reports (MDRF) trend per reporting months from July 1, 2008 to June 30, 2009 E.C

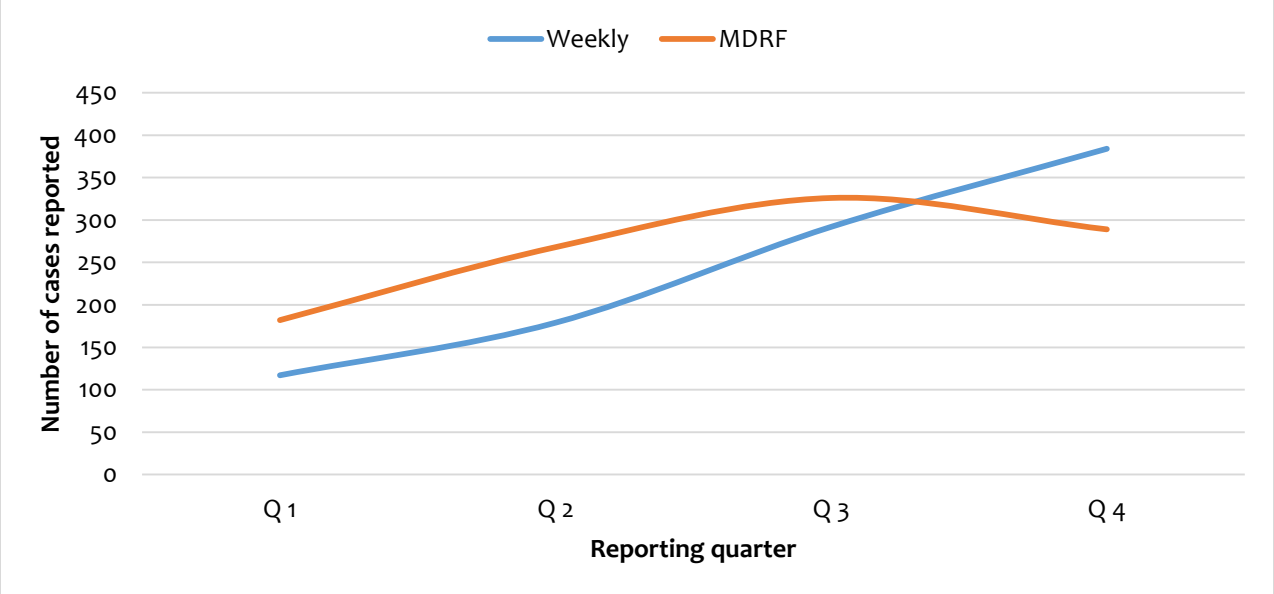

Figure 3: Weekly and Case based MD reports (MDRF) trend per reporting quarters from July 1, 2008 to June 30, 2009 E.C

1.2 Geographical Coverage of System

The MDSR system has been implemented as a system integrated within Public Health Emergency Management (PHEM) since 2007 throughout the country. Nonetheless, some gaps remain in reaching the target population size and geographical area compared with other surveillance system. Sensitivity of the maternal mortality and the relative complexity of this specific surveillance may be responsible for lower MDSR surveillance performance.

Geographical coverage of MDSR has markedly improved compared with previous years. Before the system was started to be implemented throughout the country at the end of 2007 E.C, the system was started in 37 selected zones and sub-cities under 5 regions and two city administrations, representing around 32.4% of zones in the country.

As shown in figures 4 and 5, in 2010 only 16% of zones and sub-cities were silent for weekly maternal death reporting. The highest numbers of silent areas were from Oromia and Ethio-somali region. Regarding MDRF reporting, 33.3% of zones and sub-cities were without maternal death report (zero report) in this fiscal year. The highest number of silent areas for case based reporting were from Ethiopia Somali region. All zones in Ethiopia Somali regions were silent for maternal death case based report during the reporting fiscal year.

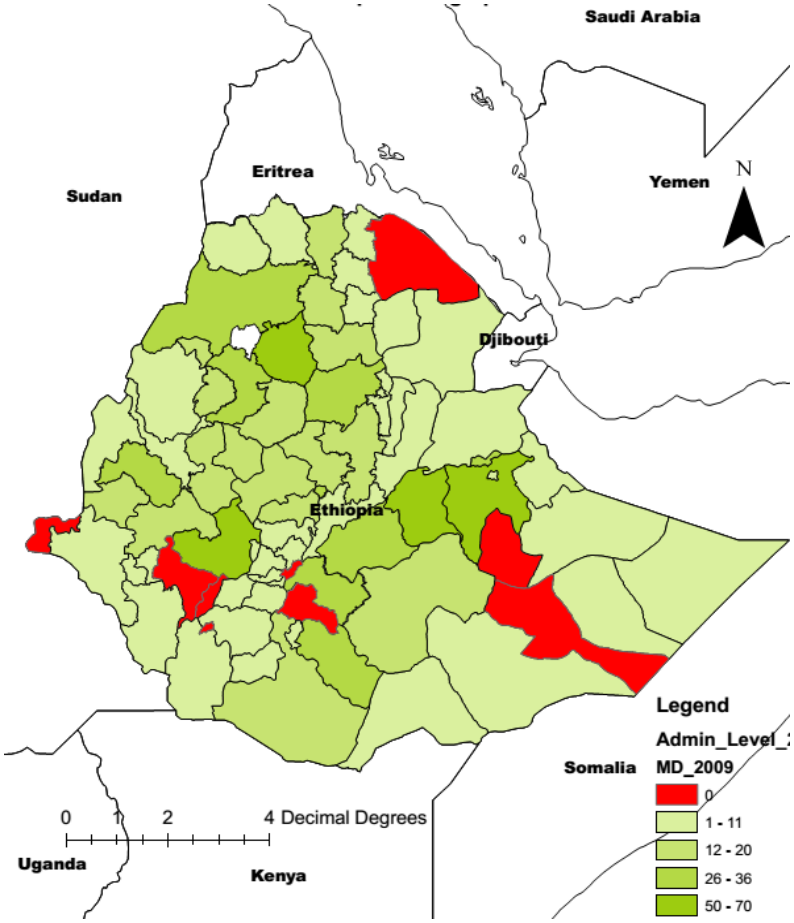

Figure 4: Maternal death weekly reporting status in zones and sub-cities in 2009 EFY, Ethiopia

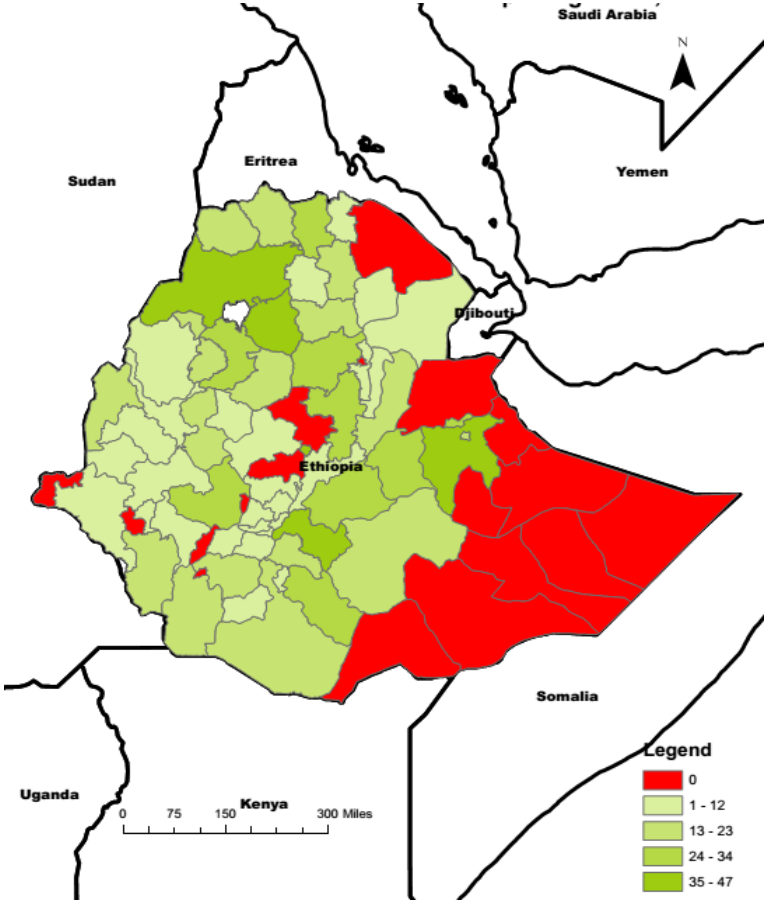

Figure 5: Maternal death MDRF reporting status in zones and sub-cities in 2009 EFY, Ethiopia

1.3 Maternal Death Reporting

1.3.1 Weekly Maternal Death Reporting

In the current fiscal year, 972 maternal death reports were received through weekly PHEM reporting from all regions and city administrations. There is significant difference in number of maternal deaths reported from regions and city administrations. (Figure 6)

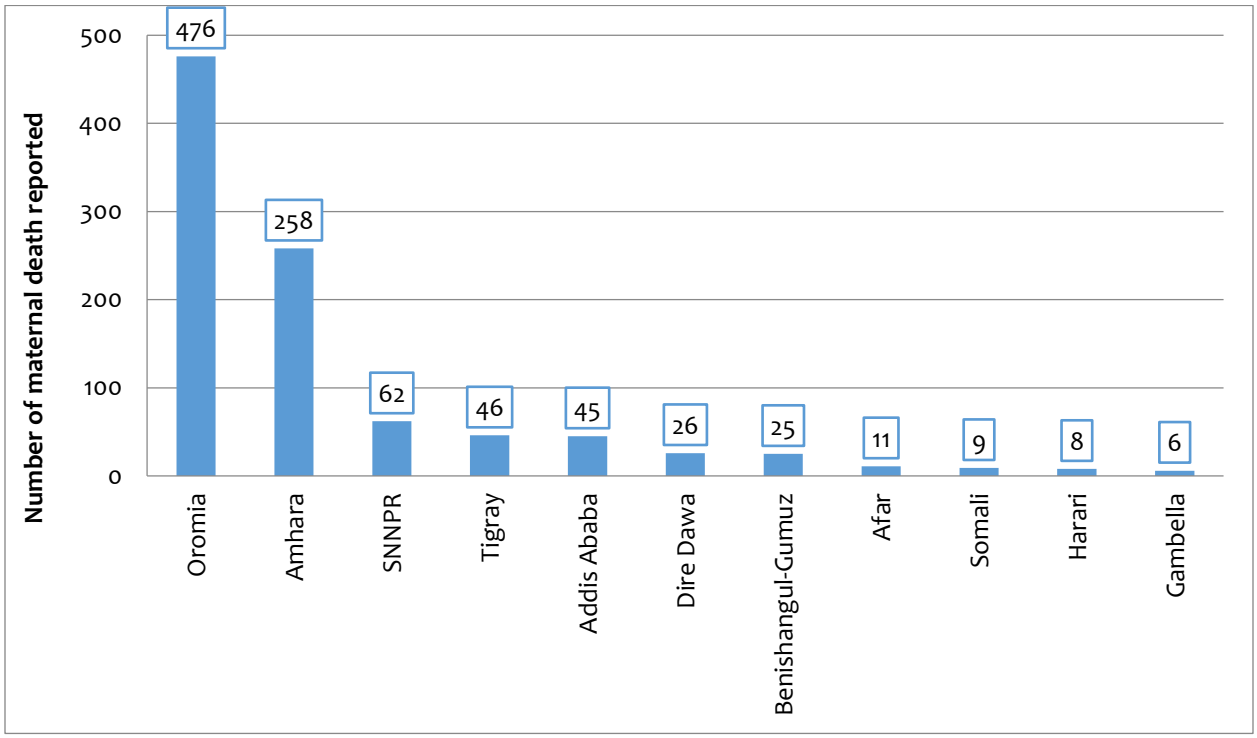

Figure 6: Weekly maternal death reporting distribution per reporting regions and city administrations from July 1, 2008 to June 30, 2009 E.C (N=972)

As shown in Figure 7, national weekly maternal death reports increased throughout the year. As Figures 8, 9 and 10 illustrate, the increase in weekly reporting was consistent across the agrarian regions but not the case in other regions.

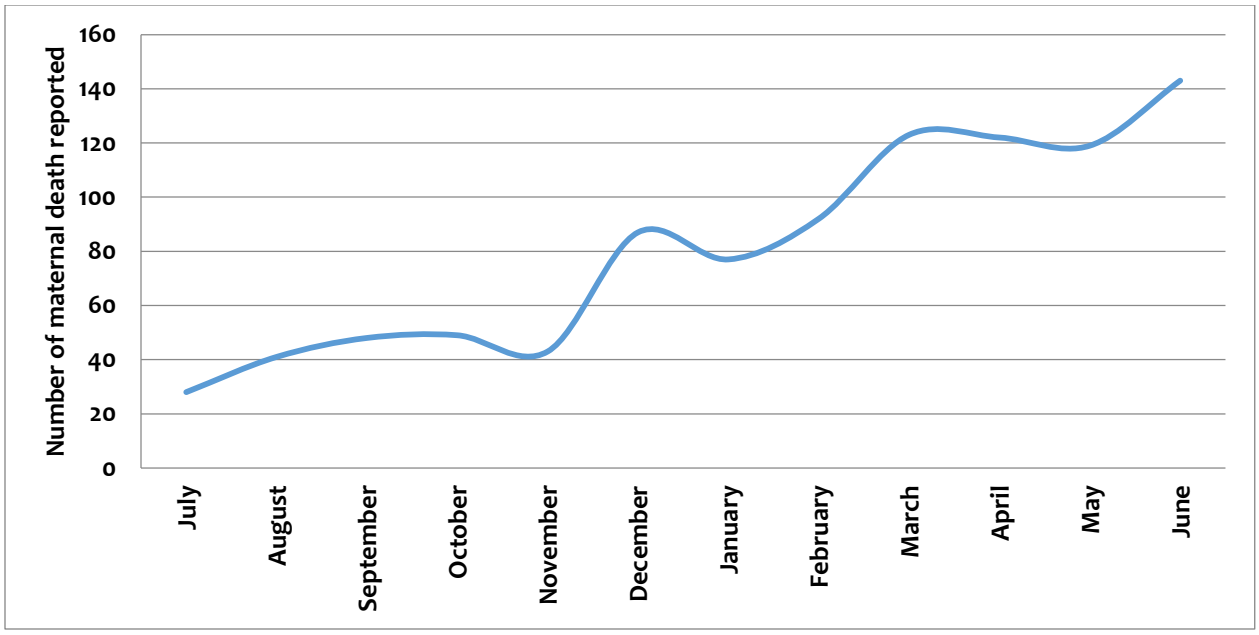

Figure 7: Weekly maternal death reporting trend over reporting months from July 1, 2008 to June 30, 2009 E.C (N=972)

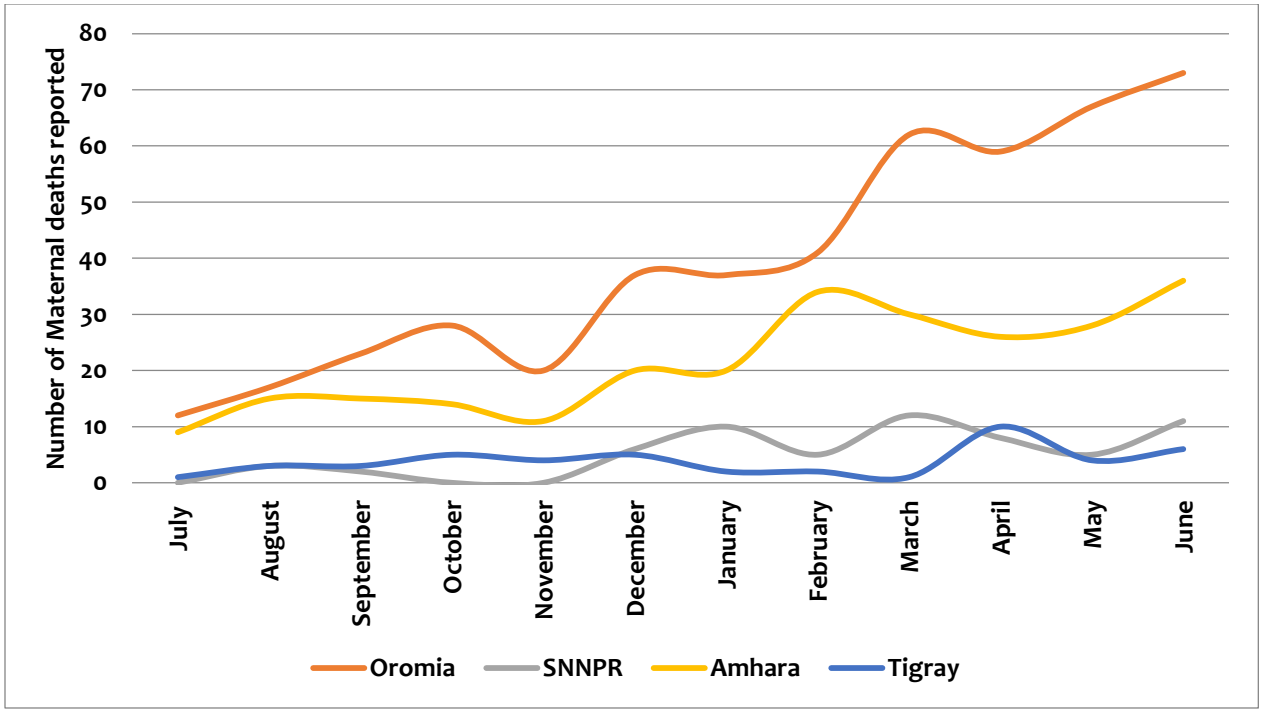

Figure 8: Agrarian regions maternal death reporting trend per reporting month from July 1, 2008 to June 30, 2009 E.C

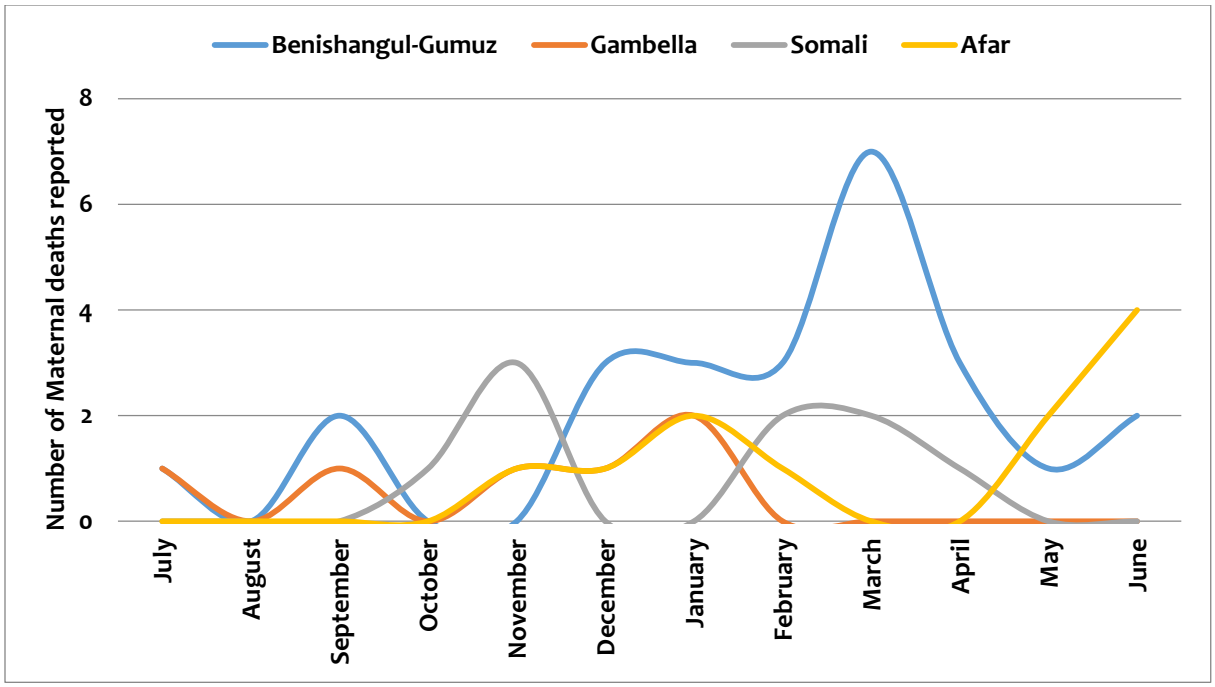

Figure 9: Emerging regions maternal death reporting trend per reporting months from July 1, 2008 to June 30, 2009 E.C

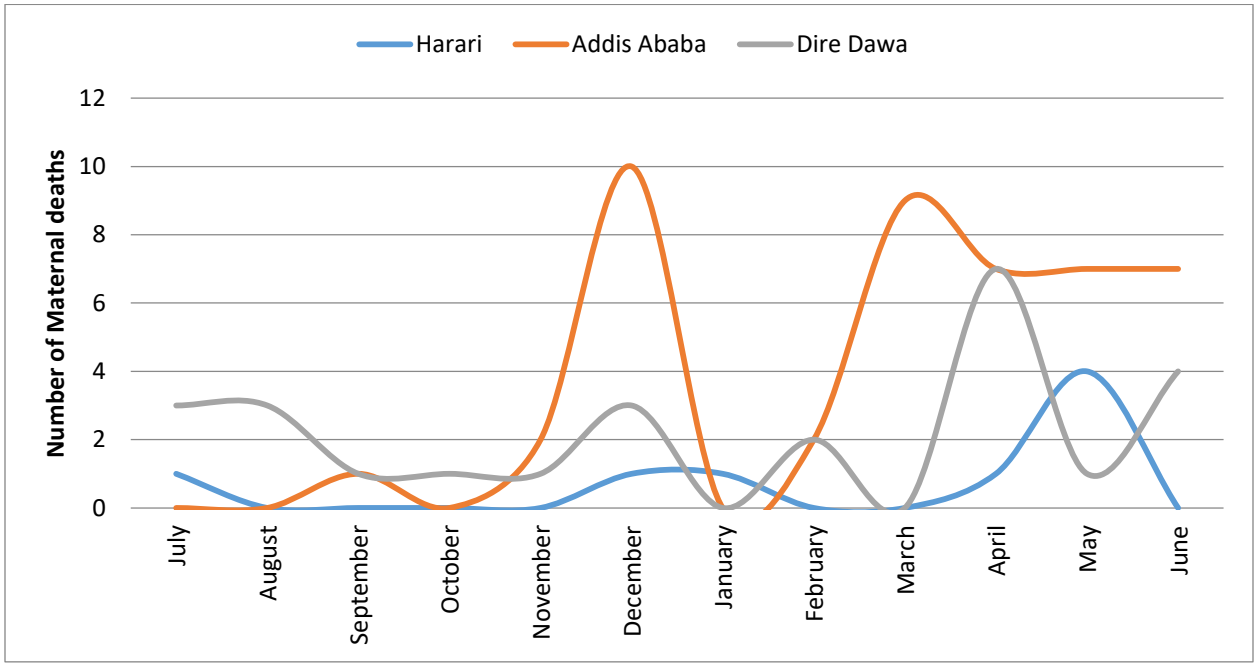

Figure 10: City administrations maternal death reporting per reporting months from July 1, 2008 to June 30, 2009 E.C

1.3.2 Maternal Death Case Based Reporting (MDRF)

All maternal deaths reported through weekly reporting system are expected to be reviewed and reported by MDRF within one month after weekly reporting. During the reporting period 1065 MD (including late reports from last year) were reported by MDRF to central PHEM from all regions and city administrations except Ethiopia Somali region. The number of MDRFs received at central level was only 942. A total of 123 late reports were also received centrally. The figure below shows the total MDRF reports received per reporting regions and city administrations.

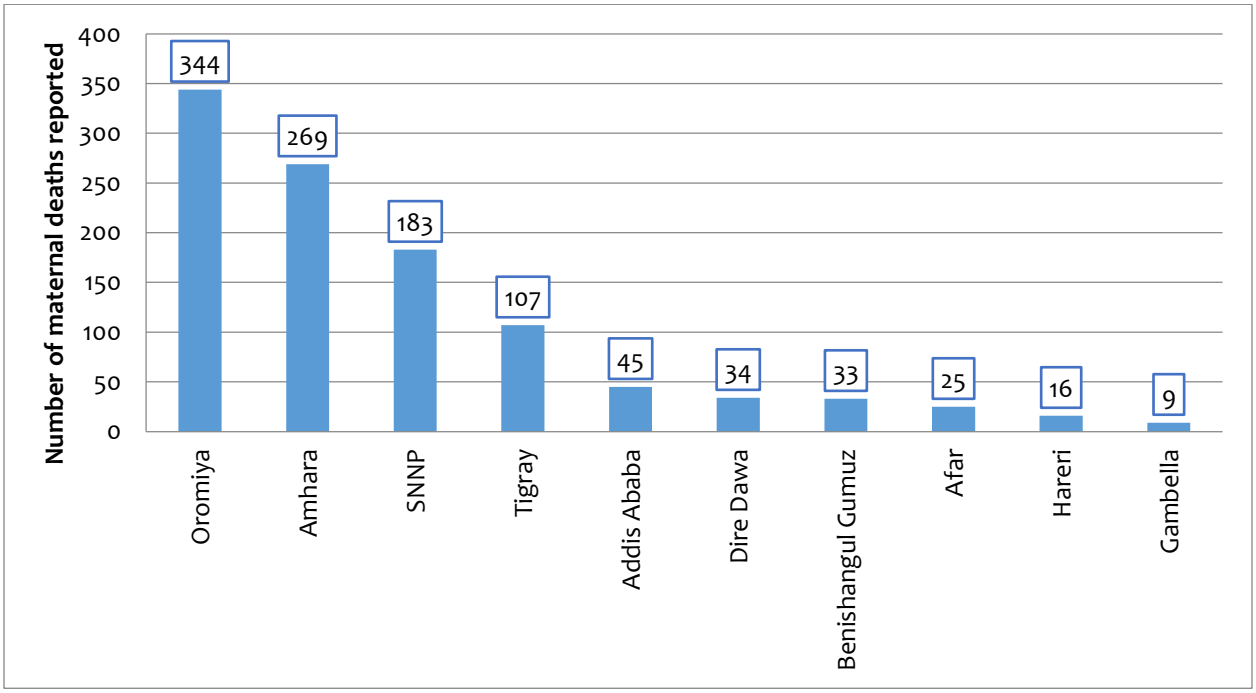

Figure 11: Maternal death case based reports distribution per reporting regions from July 1, 2008 to June 30, 2009 E.C

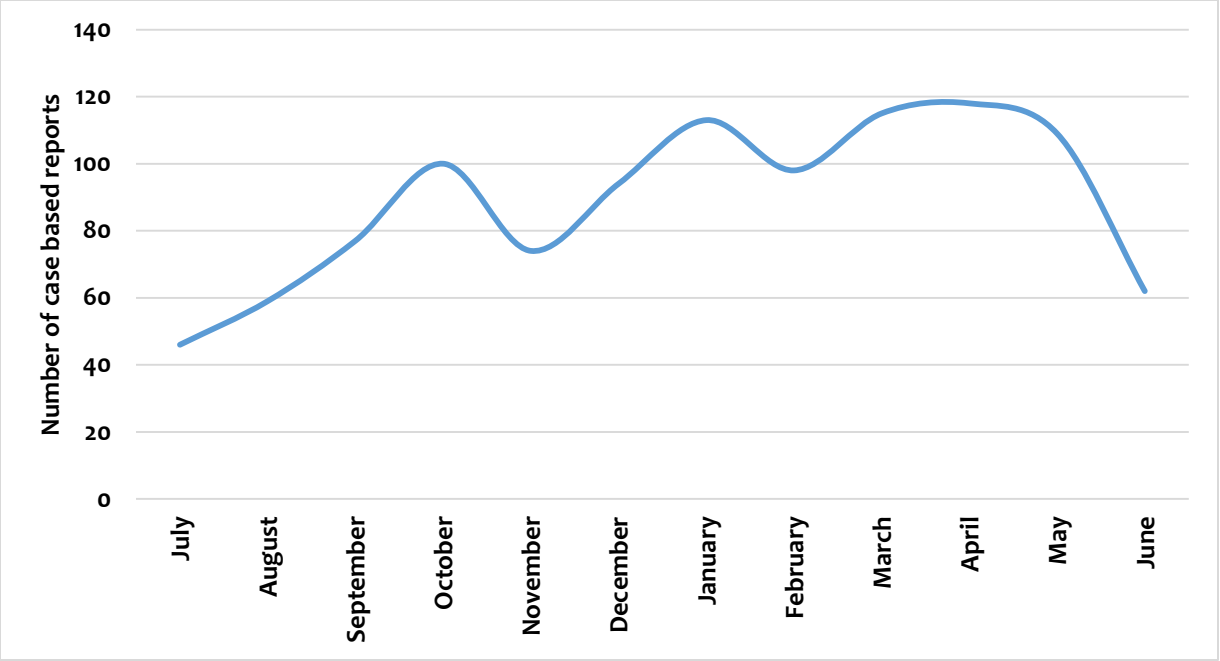

Figure 12: Maternal death case based reporting per reporting months from July 1, 2008 to June 30, 2009 E.C (N= 1065)

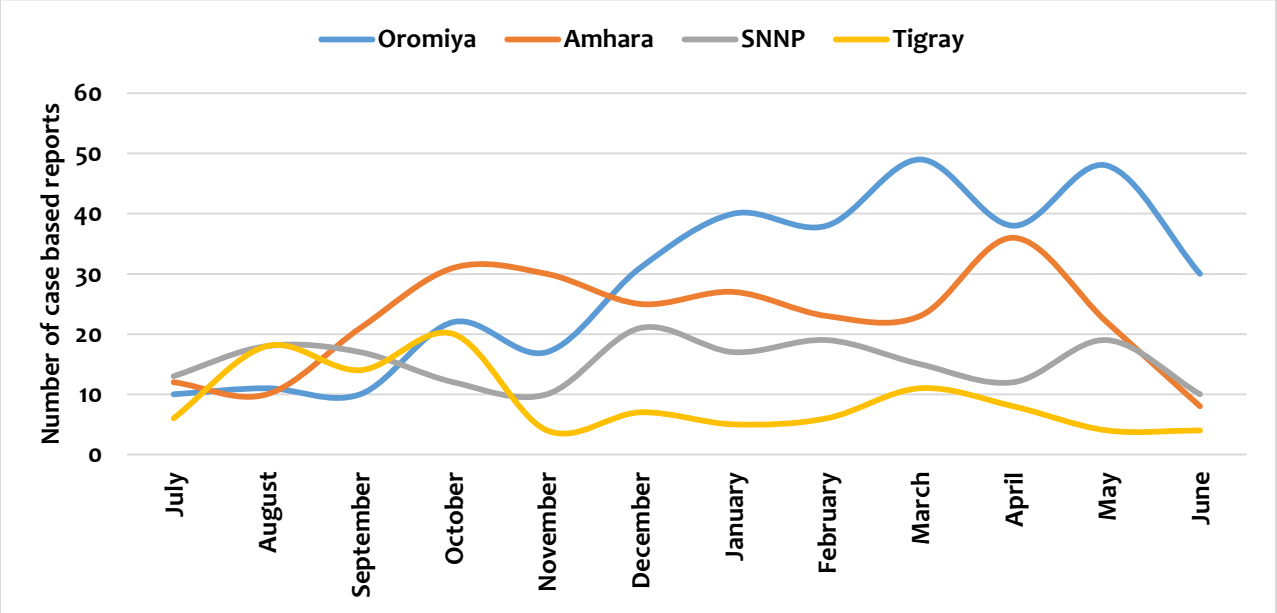

Figure 13: Agrarian regions maternal death case based reporting trend per reporting month from July 1, 2008 to June 30, 2009 E.C

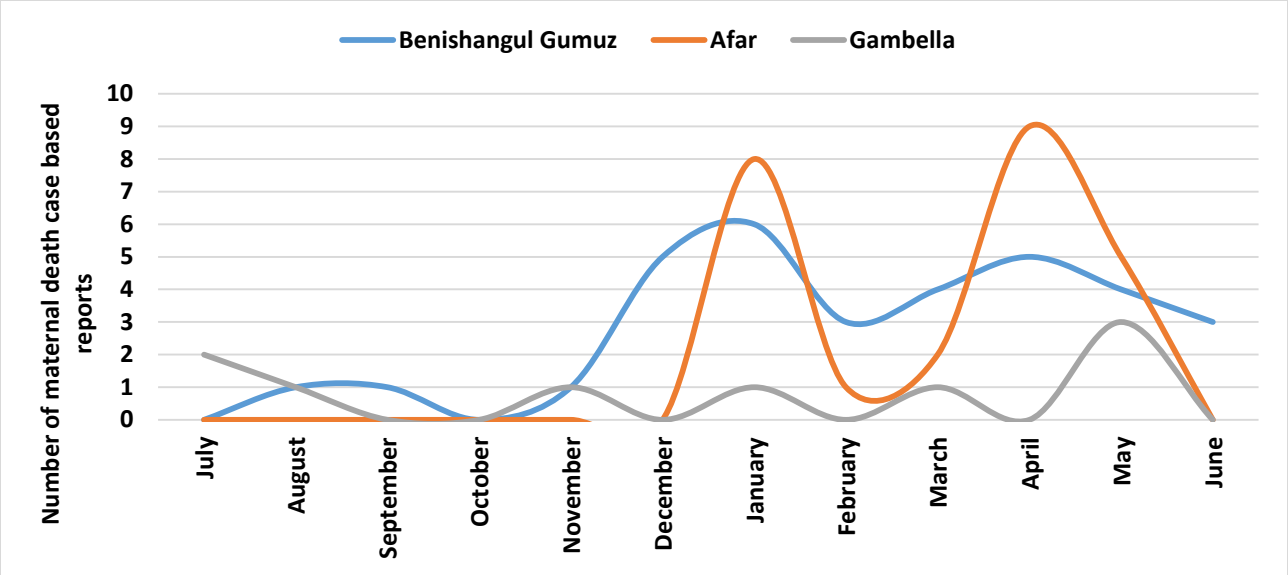

Figure 14: Emerging regions maternal death case based reporting trend per reporting month from July 1, 2008 to June 30, 2009 E.C

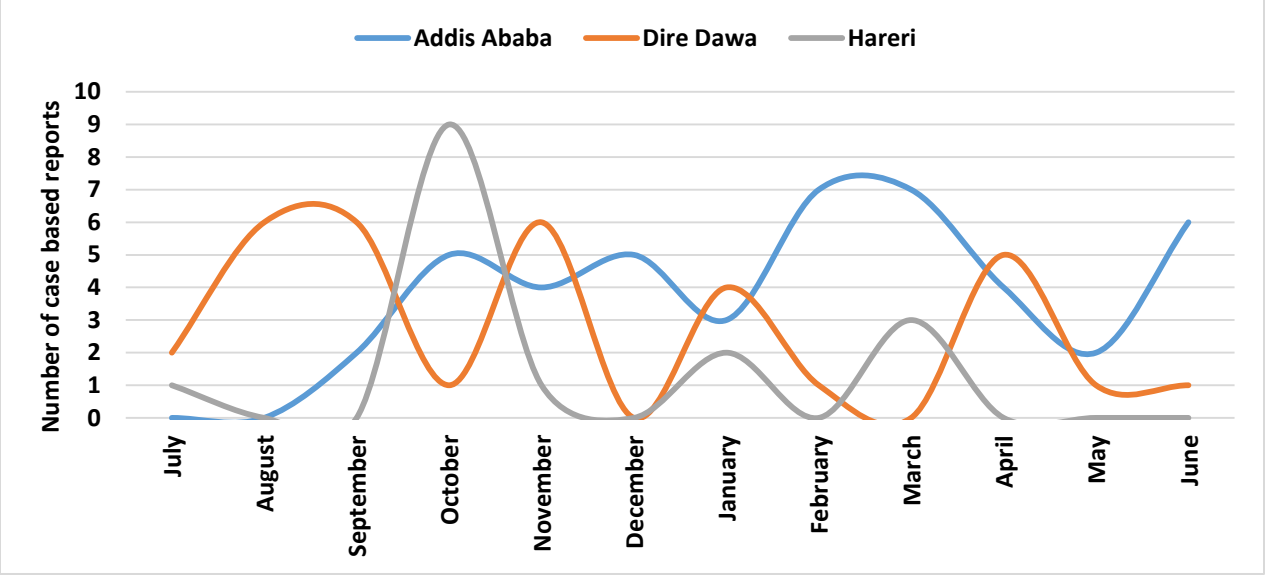

Figure 15: City administration Maternal death case based reporting trend per reporting month from July 1, 2008 to June 30, 2009 E.C

Part II - Findings of Analysis of Reported Maternal Deaths in 2009 EFY

A total of 1065 MDRFs were reported from Hamle 1/2008 to Senie 30/ 2009 from 8 Regions and 2 city administrations, with the exception of Ethiopian Somali region. All of these are included in the data analysis. The number of MDRFs received was 942, plus a further 123 late reports, all of which are also analysed for this report. Almost half of the data were abstracted from verbal autopsy and a similar proportion from facility based abstraction forms (FBAF). Figure 16 illustrates the proportion of MDRFs extracted from Verbal autopsy and FBAF.

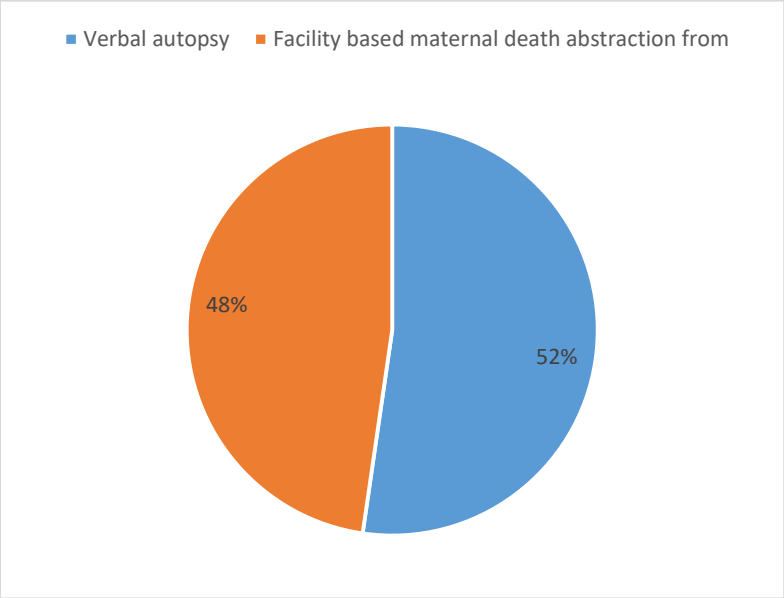

Figure 16: Maternal death case based reporting and data sources, N=761, Facility based abstraction and Verbal autopsy

2.1 Background Characteristics of Deceased Women

2.1.1 Socio-demographic Profile

Details of the socio-demographic and pregnancy related characteristics of women who died in 2009 is presented in the Annex. Figure 17 shows that the majority of women who died were in the 20-34-year age group (67% of 1065 total reported maternal deaths). The youngest mother who died was a girl of 14 and the oldest was above 44 years of age. As illustrated in Figure 18, most deceased women had a history of 2-4 births.

As to the timing of deaths in relation to pregnancy, the majority (71%) of the deaths occurred either during delivery or postpartum period (Figure 19). Overall 15% died during pregnancy, 16% during delivery and 68% during the postpartum period. As presented in the Annex, hemorrhage caused most of the deaths during all three periods; it accounted for 48%, 34%, and 53% of deaths during pregnancy, delivery, and within 42 days after delivery or termination of pregnancy respectively either from APH, abortion or PPH. Next to hemorrhage, eclampsia and anemia are the commonest causes both among those who died while pregnant (24%) and those who died during post-partum period (17%). During delivery, obstructed labour is the second commonest cause of death, accounting for 22% of maternal deaths during delivery.

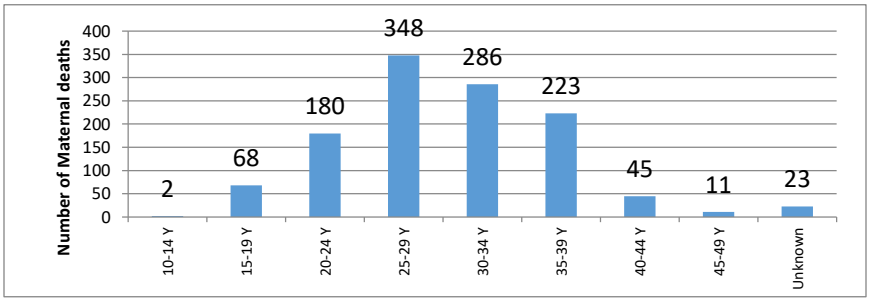

Figure 17: Age groups for all reported maternal deaths N=1065

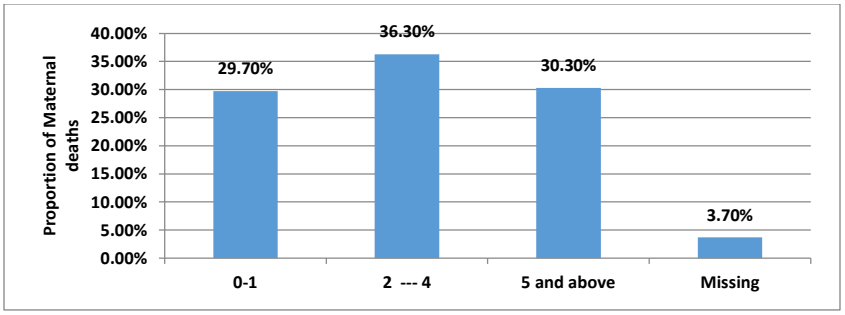

Figure 18: Parity status of reported maternal deaths N=1065

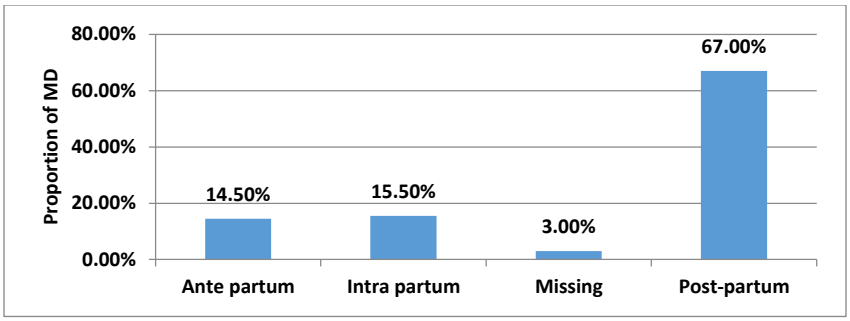

Figure 19: Timing of the deceased women in relation to pregnancy N=1065

2.1.2 Place of Delivery

As is shown in Figure 20, of 1065 reported maternal deaths, the majority (72 %) died in health facilities: about 64% died at hospital and 7% in health centers; while about 10 % died on the way to health facilities and 14 % at home. As detailed in the Annex, deaths in facilities are primarily attributed to the three most common causes: Hemorrhage, HDP, and Anemia followed by sepsis and obstructed labour. These three top causes accounted for 38%, 22%, and 15% of those who died at hospitals and for 53%, 7%, and 19% of those who died at health centers respectively.

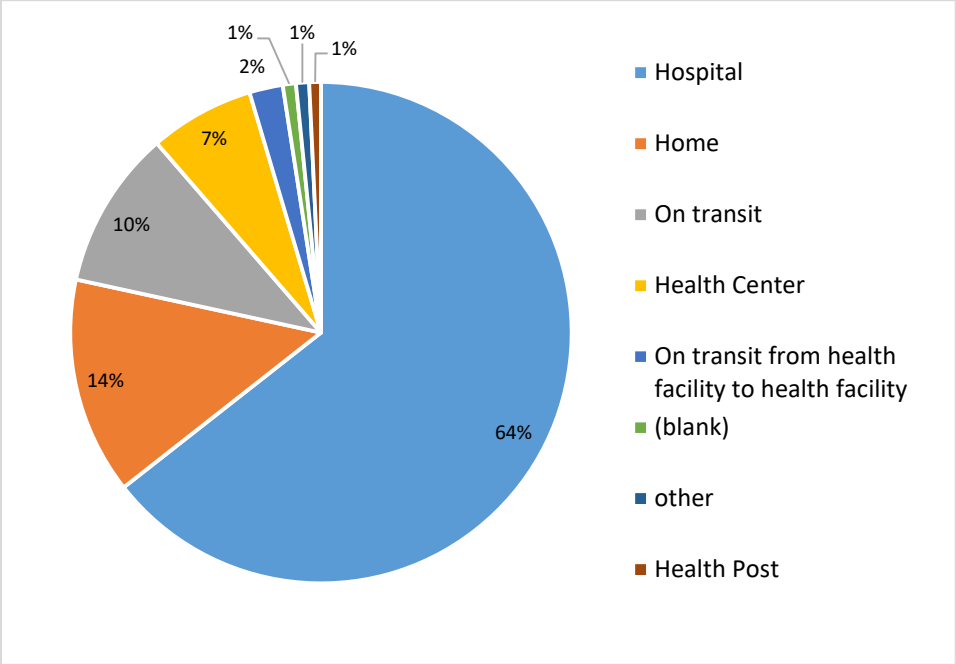

Figure 20 Place of death reported for the deceased women N=1065

2.1.3 Causes and Trends of Maternal Deaths

Of the 1065 reported maternal deaths, 96% had one or more assigned causes. Among deaths happened during 2009 EFY, direct causes were identified for 84% and indirect causes were identified in 11% of the reported cases. Some deaths had both direct and indirect causes listed on the MDRF, making it difficult to analyze accurately. In 223 (21%) of case based reports, no cause of death was provided.

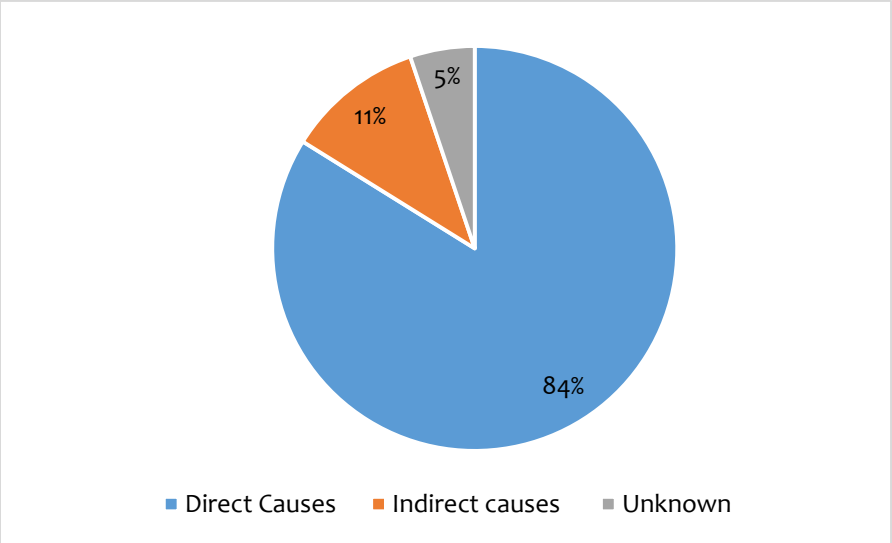

Figure 21. Maternal causes of deaths, N=1065

Obstetric hemorrhage remains the leading cause of maternal death at 37%, followed by Eclampsia, and sepsis, accounting for 15% and 12% respectively (Figure 22). As in previous years, obstructed labour, abortion and embolism are less common causes of maternal deaths. Obstructed labour caused 65 reported maternal deaths, accounting for under 10% of maternal deaths except in Harari, where 4 of the 16 reported deaths in the region were attributed to it. These cases of obstructed labour in Harari occurred among women referred from surrounding zones of Oromia including East Hararge and West Hararge. Only 14 deaths related to abortion were reported, from B/Gumze, Addis Ababa and Dire Dewa. Similarly, embolism is rare, reported from Addis Ababa and Amhara only.

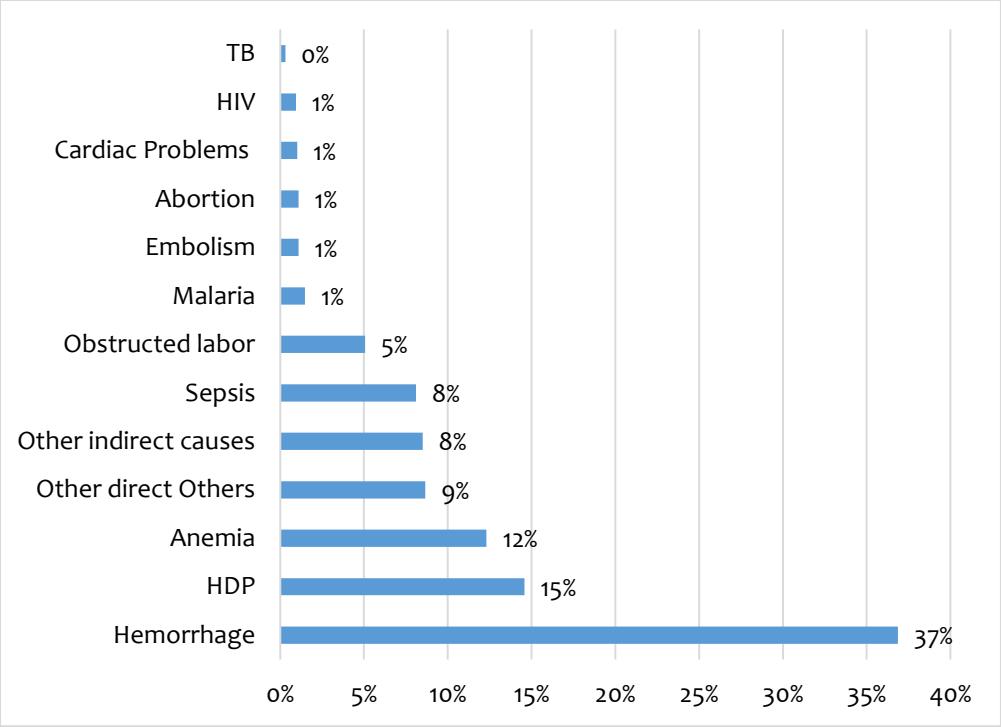

Figure 22: Breakdown of Causes of death, N=1065

Among indirect causes, 50% of deaths were attributed to anemia, being the largest single cause of indirect maternal deaths in 2009, followed by malaria and HIV with proportion of 6 % and 4%. The proportion of anemia as a cause is high in Gambella Afar and B/Gumze; Gambella with highest proportion (69%) which might be explained by the highest proportion of reported deaths due to malaria from Gambella (22%). The proportion of deaths attributed to HIV was low, at 4% of indirect maternal deaths.

Table 2 provides the detailed breakdown for both direct and indirect causes of maternal deaths, for all deaths reported through weekly surveillance. They make clear that the 2009 MDSR data, as in previous years, indicate that there remains an urgent need to focus on the prevention and management of obstetric hemorrhage, with particular attention paid to the postnatal period, when women appear most at risk.

Table 2: Types of Maternal death causes from Direct and Indirect causes, N=1065

Causes	Frequency	Percentage from direct causes	Percentage from all causes
Direct causes of maternal deaths			
Hemorrhage	473	49%	44%
HDP	184	19%	17%
Other direct causes	111	12%	10%
Sepsis	104	11%	10%
Obstructed labor	65	7%	6%
Abortion	14	1%	1%
Embolism	14	1%	1%
Total	965	100%	NA
Indirect causes of maternal death			
Anemia	158	50%	15%
Other indirect causes	112	35%	11%
Malaria	19	6%	2%
HIV	12	4%	1%
Cardiac	11	3%	1%
TB	4	1%	0%
Total	316	100%	NA
Note: Proportions of total maternal deaths do not add up to 100% as there are deaths with more than one causes assigned.			

Table 3 shows causes of maternal deaths over the last 4 consecutive years since 2006. Obstetric Hemorrhage, HDP and Anemia remain the 3 leading causes. Although the proportion of deaths attributed to hemorrhage appears to have fallen slightly, this is compatible with random variation as well as the shift in sources of data to increasingly capture facility based reports. Similarly, although there appears to be an increase in the number of deaths reported due to Amniotic Fluid Embolism (AFE), these were largely concentrated in Addis Ababa. The small variation in proportion of deaths from pre-clampsia/ eclampsia, sepsis, obstructed labour/uterine rupture is no greater than would be expected by chance. Anemia was the commonest cause of indirect maternal death and which was the 3rd leading overall cause of maternal death in the last Report.

Table 3: Trend of causes of maternal deaths from 2006 to 2009

Causes of death	2006		2007		2008		2009	
	Freq.	%	Freq.	%	Freq.	%	Freq.	%
Direct Causes								
Hemorrhage	41	57.7%	162	52.8%	271	47.5%	473	49.7%
HDP	3	4.2%	25	8.1%	53	9.3%	184	19.3%
Obstructed labour	8	11.3%	40	13.0%	108	18.9%	65	6.8%
Abortion	4	5.6%	12	3.9%	7	1.2%	14	1.5%
Sepsis	10	14.1%	32	10.4%	49	8.6%	104	10.9%
Direct Others	5	7.0%	36	11.7%	82	14.4%	111	11.7%
Indirect causes								
Anemia	2	6.7%	5	4.5%	10	5.4%	158	51.8%
Indirect Others	0	0.0%	5	4.5%	9	4.9%	112	36.7%
TB	0	0.0%	1	0.9%	0	0.0%	4	1.3%
HIV	10	33.3%	47	42.3%	54	29.3%	12	3.9%
Malaria	18	60.0%	53	47.7%	111	60.3%	19	6.2%

2.1.4 Regional Comparison of Causes of Maternal Deaths in 2009

As in the previous two years (2007 and 2008 E.C), the majority of maternal deaths in most regions is due to hemorrhage. Hemorrhage accounted for more than 40% of reported maternal deaths in 6 regions (the highest being in Oromia at 53%) and above 30% in 2 regions (Tigray and Addis Ababa). The lowest proportion is from Afar and B/Gumze, attributed to 20% and 18% of the reported maternal deaths respectively. The proportion of deaths due to HDP is high in 5 Regions (Dire Dewa 32%, Afar 28%, B/G 24% and AA 24%) and lowest in Gambella (0%). Anemia is high in 3 regions (Gambella, Afar and B/Gumze) accounting for 67%, 32% and 24% of causes of deaths in those regions. The highest proportion of deaths due to obstructed labour is in Harari with 25% followed by 7% in Oromia, SNNPR and Amhara. While most regions reported zero deaths from Embolism, the highest proportion of maternal deaths attributed to Embolism was reported from Addis Ababa which is 7 cases, 16% of the total deaths, followed by Amhara with 8 cases among the total of 269 deaths (3%). Regarding HIV related maternal deaths, the highest proportion of maternal deaths accounted for by HIV is reported from Gambella (11%) followed by Addis Ababa and Tigray with 4% each. This finding is well explained

by the prevalence of HIV in the general population being the highest in Gambella and Addis Ababa according to the 2016 EDHS. The highest proportion of mothers whose deaths were attributed to Malaria is reported from Gambella, 22% of their reported maternal deaths.

2.2. Contributing factors

Delays in seeking, accessing and receiving care during obstetric emergencies are usually classified into three categories. Delay 1 refers to the time from the start of a woman's illness to the time the problem is recognized as requiring care; Delay 2 refers to the time from acknowledging a problem to reaching an appropriate health facility; and Delay 3 refers to the time from arrival at a care facility to receiving the requisite treatment. Understanding these contributing factors/reasons for delays in receiving life-saving treatment will help future services to be improved in response to these needs.

The diagram below shows the distribution of the 3 Delays and their overlap. Delay 1 factors were cited in 28.4% of maternal death reviews, representing the most common delay. Added together, Delays 1 and 2 were determinants in 83.7% of maternal deaths. Although Delay 2 is overall the least common factor, suggesting that once the decision has been made for a woman to seek care, transport does not pose as significant a major barrier, it nonetheless played a role in 39.5% of deaths.

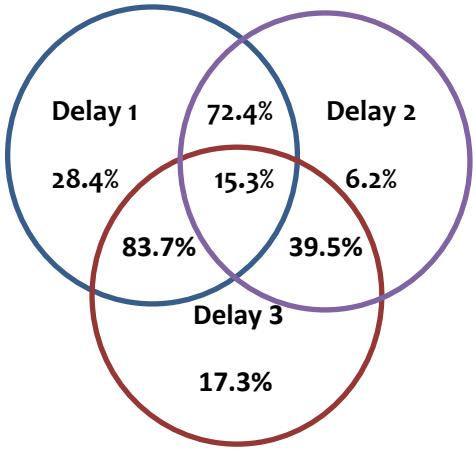

Diagram 1: Share of contributing factors for the deceased women's reported, N= 1065

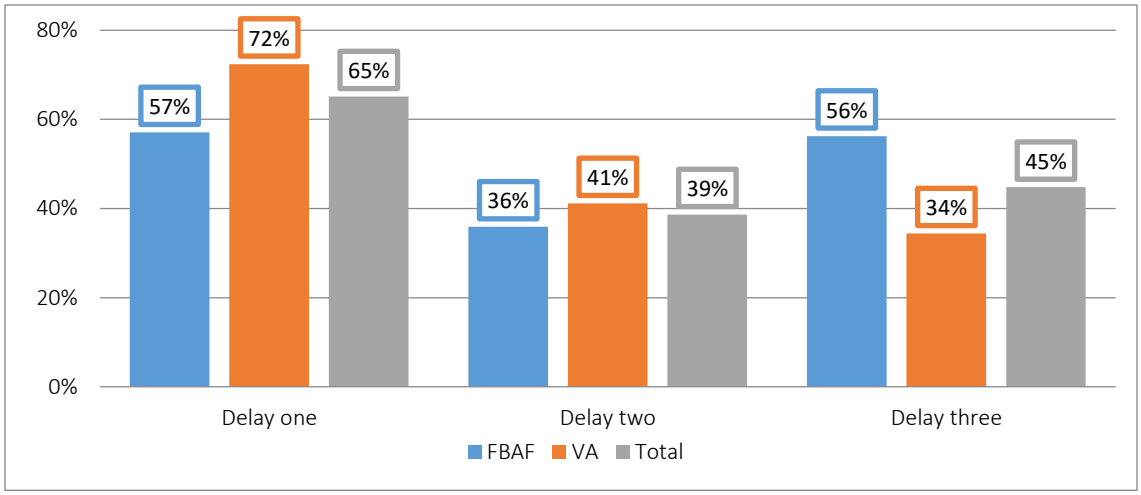

Figure 23: Distribution of the 3 delays

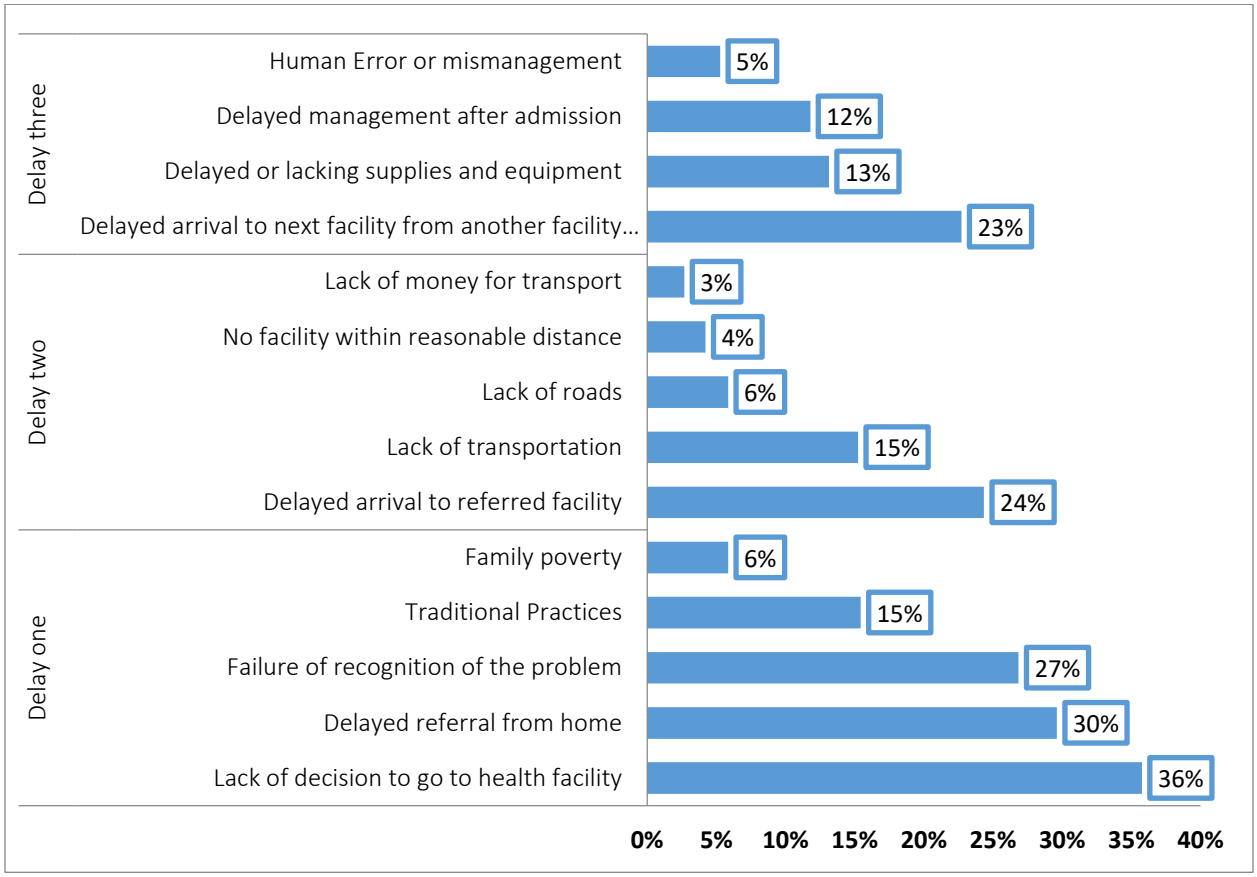

Figure 24: Details of the 3 delays

2.2 Specific Causes of Death

2.2.1 Obstetric Hemorrhage

Obstetric Hemorrhage is the leading causes of death, accounting for just under half of direct causes and 44% of all deaths. There were 473 maternal deaths from hemorrhage, the majority (426; 90%) of whom died either during delivery or within 42 days after delivery from PPH while a small proportion (8%; 38) died during pregnancy. The most affected women were those between 25 to 34 years of age (55 %) and most died in hospitals (263; 56% of all deaths from hemorrhage). Women with high parity and older age are at higher risk compared to younger and low parity (Table 4).

Table 4: Selected socio-demographic and pregnancy related characteristics of maternal deaths due to obstetric hemorrhage

Variables	Category	Frequency	Percent
Places of death	Health Center	**38**	**8.0**
	Health Post	**3**	**.6**
	Home	**86**	**18.2**
	Hospital	**263**	**55.6**
	On transit from home to HF	**66**	**14.0**
	On transit from HF to HF	**11**	**2.3**
	other	**2**	**.4**
	Missing	**4**	**.8**
Parity	0-1	**108**	**20**
	2 to 4	171	**40**
	5 & above	**194**	**40**
Age group	15-19	**25**	**5.3**
	20-24	**56**	**11.8**
	25-29	**128**	**27.1**
	30-34	**131**	**27.7**
	35-39	**93**	**19.7**
	40-44	**23**	**4.9**
	45-49	**6**	**1.3**
	Missing	**11**	**2.3**
Timing in relation to pregnancy	Antepartum	**38**	**8.0**
	Intrapartum	**56**	**11.8**
	Postpartum	**370**	**78.2**
	Missing	**9**	**1.9**

2.2.2 Hypertensive Disorder of Pregnancy (Preeclampsia/ Eclampsia)

Table 5 shows the distribution of hypertensive disorder of pregnancy by selected socio-demographic and pregnancy related characteristics. In total 184 deaths due to pre-eclampsia and eclampsia were reported, over half of which occurred to women between 20 to 29 years of age (53%), compared to older age who are more likely to be at greater risk for PPH and deaths, with lower parity (69% in those below 4 history of delivery) and majority of them died at hospital (152; 82% of all deaths from eclampsia) and during postpartum period (115; 63% of all deaths from Eclampsia).

Table 5: selected socio-demographic and pregnancy related characteristics of maternal deaths due to HDP Hamle 1, 2008 to Senie 30 2009 E.C

Variables	Category	Frequency	Percent
Age group	15-19	9	4.9
	20-24	37	20.1
	25-29	61	33.2
	30-34	31	16.8
	35-39	35	19
	40-44	6	3.3
	45-49	2	1.1
	Missing	3	1.6
Parity	0-1	72	39.1
	2 to 4	55	29.9
	5 & above	57	31
Places of death	Health Center	5	2.7
	Health Post	2	1.1
	Home	11	6
	Hospital	151	82.1
	On transit from home to HF	6	3.3
	On transit from HF to HF	5	2.7
	other	3	1.6
	Missing	1	0.5
Timing in relation to pregnancy	Antepartum	38	20.7
	Intrapartum	26	14.1
	Postpartum	115	62.5
	Missing	5	2.7

2.2.3 Anemia

Table 6 below shows socio-demographic related characteristics of maternal deaths due to Anemia. Similar to 2007 and 2008 results, anemia was the third most frequent cause of all maternal deaths. There were 158 deaths from Anemia, primarily among women with high parity and during post-partum period.

Table 6: selected socio-demographic and pregnancy related characteristics of maternal deaths sue to anemia

Variable	Category	Frequency	Percent
Age group	15-19	7	4.4
	20-24	26	16.5
	25-29	46	29.1
	30-34	43	27.2
	35-39	26	16.5
	40-44	6	3.8
	45-49	2	1.3
	Missing	2	1.3
Parity	0-1	48	30.4
	2 to 4	51	32.3
	5 & above	59	37.3
Places of death	Health Center	14	8.9
	Home	21	13.3
	Hospital	102	64.6
	On transit from home to HF	18	11.4
	On transit from HF to HF	1	0.6
	other	2	1.3
Timing in relation to pregnancy	Antepartum	27	17.1
	Intrapartum	16	10.1
	Postpartum	110	69.6
	Missing	5	3.2
Total		158	100

PART III - Response

Taking action in response to maternal death is the primary function of the MDSR system.

Responses to MDSR data should take place at all levels of the health system including the community, all health facilities, and all administrative levels i.e. Woreda, zonal, regional and national.

So far there is no national mechanism to capture responses that have been put in place throughout the country as the MDSR system evolves. However, it is clear that over time, and once fully operational, the MDSR system will generate data and analysis to guide improvements to MNCH quality and ultimately improve health outcomes themselves.

As MDSR data accumulates in Ethiopia, there is a growing number of responses that have already been taken. In this section, real time examples from MDSR in Ethiopia through 2009 are provided.

3.1 Community Level Response

Community interventions can have a substantial impact on improving maternal health.

Examples of effective interventions include;

- **Improving Community knowledge** of the need for health seeking behavior
- **Health education** including risk factors and dangers signs through antenatal care and pregnant women conferences
- Ensuring **iron supplements** are provided to all women attending ANC
- Increasing uptake of **ANC and birth preparedness** plans, such as using maternity waiting homes or arranging transport to health facilities during labour
- Improving the **quality of ANC**, for example to include individualized birth preparedness plans. Every woman in her first pregnancy should know she is at risk of developing pre-eclampsia and should be aware of the danger signs. Likewise, every older or high parity woman is at risk of haemorrhage and should be aware of the danger signs
- Availability of **family planning services** with particular focus on availability to high parity and young women
- Support for accessible **transport**

- Identification and **safe referral** of women with complications

COMMUNITY EXAMPLE 1 :
IMPROVING COMMUNITY KNOWLEDGE AND ARRANGING TRANSPORT

A woman delivered her third baby at a health centre but the placenta was retained. Attempts to remove the placenta at the health centre were unsuccessful. She was referred to the local hospital and an ambulance called. The health centre was separated from the hospital by a river with an incomplete bridge. The ambulance driver waited for 3 hours at the bridge for the woman to arrive. By the time of arrival, the mother was dead.

The community had been assisting with the bridge construction but progress had been delayed. After discussion it was agreed to further accelerate the building of the bridge, which is now functional.

COMMUNITY EXAMPLE 2:
Health Education and Family planning

An 18 year old was pregnant with her boyfriend and married another. She decided to terminate the pregnancy to protect her marriage and took traditional medicine. After taking the medicine she vomited continuously and was taken to the hospital where she delivered a pre-term baby which lived for 6 hours. She collapsed and died immediately after delivery.
After the case was discussed by the facility MDSR committee,

- *Community awareness of the dangers of traditional abortifiacients was raised*
- *Education sessions about abortion and family planning were held in the school.*

COMMUNITY EXAMPLE 3 :
Improved availability of Iron to antenatal patients

After 2 maternal deaths from anaemia in one woreda it was realized that many women were not getting the iron ordered as they had to go to the hospital pharmacy.

As a result iron tablets were made available at the time of the ANC appointment with the midwife. The number of women with anaemia has reduced.

3.2 Facility Level Response

If properly reviewed, each death should identify systemic problems that contributed to it and can be corrected. Responses at this level include:

- **Staffing levels**- is there sufficient staff to meet the demands for quality maternal health care including EmONC?
- **Knowledge and skills-** are the staff adequately trained to work as a team and deliver safe obstetric emergency care?
- **Infrastructure problems** including supplies of blood, essential drugs and equipment
- **Referral mechanisms between facilities**

Facilities that regularly review maternal deaths develop an institutional memory, making recurrence less likely. One common observation is that once MDSR starts, the level of documentation improves. Good documentation leads to better, more organized and effective care.

All the cases detailed here are real cases of maternal deaths that have taken place in the 2008/9 period. They have been selected for this report as they demonstrate evidence of good MDSR practice in response at facility level. They are also all commonly occurring cases across the country.

The first case described here demonstrates that MDSR can lead to improved two-way communication between facilities and build capacity of referring facilities.

FACILITY EXAMPLE 1: Improvement in a primary hospital following a death from uterine rupture

A 25year old in her 3rd pregnancy went into labour at home and intended to deliver at home. However after 12 hours she travelled to the nearby health centre where she was found to have weak contractions and looked anaemic. On examination the babies head was high and she was 7 cm dilated. There was no fetal heart present and she was referred to the nearby primary hospital.

At the primary hospital her haematocrit was 54% and a diagnosis of hydrocephalic fetus with probable uterine rupture was made. Ambulance to take her to the referral hospital was ordered but it was 4hours before the ambulance was available and she died in transit.

The maternal death was reported from both the primary hospital and the referral hospital and a joint review was undertaken.

In response to this woman's death there has been action taken to establish a mini blood bank at the primary hospital by obtaining a medical fridge. In addition the transport arrangements in the evening and overnight have been reviewed so that ambulances are available 24/7. The need to access skilled birth attendance was emphasized at the woman's health development army meeting.

Comment

It was good practice for the hospitals to review this case together. All hospitals should report maternal deaths even if the woman is dead on arrival.

Although the primary problem was lack of health seeking behavior, improvements have been made at the primary hospital in response to this death.

The second case described here demonstrates the need for women and their families to understand the need for postnatal care.

FACILITY 2: An avoidable death from Anaemia

A 35 years old 4+0 delivered a baby normally at a primary hospital. She had mild bleeding after delivery during her first postnatal day.

She had a haematocrit of 40% on admission and her haematocrit was 28% on discharge. She went home before the second result was available as she was keen to get home.

At home she complained of a headache and her family took her to the local health centre. The health centre referred her back to the hospital but there was a 6 hour wait for an ambulance.

At the time of her arrival at the hospital she was cyanosed and gasping. CPR was started and an attempt to put an intravenous line made but she died .

Comment

The first CBC showed this woman was anaemic. She needed proper treatment for her anaemia before discharge. It is inevitable that after delivery she will have a lower haematocrit and be severely anaemic.

Responses

The need to follow up blood tests and confirm results before discharge was fed back to all medical, midwifery and nursing staff.

The lack of ambulance at the health centre was taken up by the woreda and reported to the regional health bureau.

The third case again demonstrates how MDSR can improve communication between facilities for the benefit of both.

FACILITY 3: An institution with a memory

A referral hospital had been practicing MDSR for over a year. There were an increasing number of maternal deaths. The multiprofessional MDSR committee recognized that a contributing factor was overcrowding and therefore a delay in treating very sick patients at the hospital. Many of the increasing referrals were from neighboring regions.

In response to this there were two actions

1. Residents from the referral hospital discussed the problem with the neighboring RHBs . The Regional Health Bureaus strengthened the support to the referring hospitals and health centers and ensured mini blood banks were equipped to deal with cases of hemorrhage and anemia.
2. The lead clinicians at the referral hospital organized mentoring and education sessions at the catchment area health centers on selected topics

The fourth case described shows that even if a death is considered unavoidable it should be reviewed as important lessons can always be learnt.

FACILITY 4: A death from pulmonary embolism with avoidable factors

A 28year old woman who had had a previous Caesarean Section attended for ANC four times and knew that she needed to deliver at the local hospital. She attended when labour started and subsequently had a Caesarean Section, delivering a healthy baby.
She died 5 days postnatally of pulmonary embolism.

Although the facility MDSR committee determined that the death was unavoidable they found several areas of substandard care:

- *Poor documentation throughout , particularly inadequate vital signs*
- *Lack of an ICU and lack of recovery room*
- *Lack of adequate staff in the postnatal ward*
- *Lack of provision of Elective C/S*

As a result Staffing in the postnatal ward has improved and staff has been trained about improved documentation, particularly recording vital signs in a timely way.

Schedules are being reorganized to facilitate Elective Caesarean Sections and the facility is working towards providing an ICU and recovery areas.

3.3 Woreda/ Zone/ Sub-city Level Response

Responses from administrators at this level are crucial for the improved access to and availability of quality maternal healthcare. Responses at this level include

- Devising strategies to address **barriers for health seeking behavior** by using cultural and community sensitive issues by using such interventions as community dialogue and HDA
- Check existing **transport** options functioning optimally and address any gaps (eg ambulance maintenance and fuel availability)
- Equipping health facilities with all **essential supplies** and equipment and needed **health care workers**

In 2009 EFY, significant improvement in Woreda level discussion and response to MDSR data. Many health administrations at this level have started to discuss MDSR data at zonal meetings including zonal and woreda government officials, Woreda Health Office heads and Women Affairs and women leagues, representatives of NGOs and youth groups.

Woreda response: use of aggregated MDSR data to resolve transport problem

A woreda MDSR committee reviewed 7 deaths in the last year. Six of the seven deaths had followed delay in transfer of the women to the referral hospital. The common cause of delay was lack of availability of an ambulance. It was apparent that the ambulance was being misused. The issue was discussed at a conference about referral delays.

Ambulance availability is currently not a problem.

This example demonstrates the power of MDSR when disaggregated data is reviewed and commonly occurring problems are highlighted.

Woreda response 2: Focused further training for poorly functioning health centres

Following review of maternal deaths at woreda level, it was noted that one health centre had a significantly higher mortality rate than any other, this was discussed with the referral hospital. The staff from the poorly functioning health centre were given further training at the referral hospital to increase their capacity.

Zonal Case study: Zonal review of MDSR data
The following is an example of good practice at zonal level

Zonal response

A zonal MDSR committee reviewed 30 deaths. The zone has 17 woredas and 2 hospitals. 9 of the17 woredas and 1 of the 2 hospitals were actively reporting and reviewing Maternal Deaths.

- *64% of the deaths had had a verbal autopsy carried out.*
- *75% of the deaths reported were in grand multipara – those in their 5th or higher pregnancy*
- *80% of the deaths reviewed occurred post natally.*
- *64% of deaths were caused by hemorrhage*
- *The overwhelming contributory factors were delay in seeking care or obtaining transport*

This data clearly leads to the responses of

- *Increasing and improving availability and uptake up of LARC family planning in high parity women in this zone*
- *Improving the quality of ANC particularly in relation to high parity, older women who are at risk of hemorrhage. Knowledge of danger signs.*
- *Improving transport systems and availability of Maternity Waiting Homes*

MDSR information is a powerful source of real data to help woredas and zones prioritize their activities to improve MNCH. 30 women died in this zone leaving over 200 children motherless.

3.4 Regional Level Response

Responses at this level are the slowest to be determined and implemented for a combination of reasons, including conflict of other emergency health issues and lack of capacity at Regional level. However, 2009 has seen some positive steps at this level. Strong leadership is required to prioritize the MDSR process.

Responses at this level need to be prioritized on their

- potential impact on reducing maternal mortality,
- feasibility including costs, resource requirements
- ease of implementation

Regional response: A functional Rapid Response Team an effective tool of change

Amhara RHB has convened an RRT with membership from multiple directorates including PFSA (the body responsible for providing essential drugs and equipment), Health Extension Leaders, MNCH, Blood Bank, Curative and Supply Teams.
The group is chaired by PHEM and develops responses to the Maternal death data from the region. At the first meeting the main focus in terms of response to maternal death data was on increasing efficiency of Regional PFSA to ensure availability of essential drugs and equipment at facility level.
At the second meeting the major outcomes involved:

• Blood related issues including increasing the use of other blood products rather than whole blood. This requires training and orientation of healthcare professionals to create a demand for less expensive and longer lasting blood products. This process has started at one referral and one district hospital.

• Use of MDSR data and information from the Regional Annual report to inform future planning.

• Focus on improving functionality of specific primary hospitals with provision of essential equipment e.g. refrigerator and ambulances for 24/7 use.

3.5 National Level Response

Longer term strategic plans are expected at this level to focus on key priorities.

At National level there have been the following responses to MDSR data:

1. Coordination of National MDSR Committee which met in Hawassa in May 2009 to review maternal death data, analyses the data in consideration of other data sets eg. EmONC (2016) DHS (2011 & 2014), Census data and SPA data.
2. The above meeting resulted in a further four policy briefs being released making recommendations relevant to:
    - Delay 1: focusses on Maternity Waiting Homes, strengthening ANC and raising community awareness
    - Delay 2: focusses on improving the efficient and effective use of emergency transportation and expansion and strengthening maternity waiting homes
    - Delay 3: focusses on improving the quality of care of hemorrhage
    - Improving the MDSR system functionality focusing on advocacy, documentation of best practices on maternal death responses and strengthening monitoring and evaluation.

    These policy briefs were distributed to the Regions and Partners.
3. The MDSR data for 2009 was presented to the Regional representatives and Partners at the Annual RMNCHA meeting in Addis Ababa in August 2009.
4. At FMOH there is now an TWG for MDSR which meets regularly and involves members from EPHI, MCH directorate, PMLU/PFSA, partners
5. The FMOH/MCH directorate response to Hemorrhage was prepared and actions are being taken:

National Response plan includes the following major initiatives to end mortality and morbidity due to obstetric hemorrhage:

- *Establishing Mini-Blood-Bank at all hospitals without MBB (procurement of essential equipment process started)*
- *Initiation of catchment based clinical RMNCH mentorship focusing on creating sustainable linkage between primary/general hospitals and health centers (National guideline development started, training of mentors and initiation of the program in 100 hospitals in Ethiopia for the first phase will done following the finalization of the guideline).*
- *Use of NASG in all health facilities (procurement of nearly 4500 NASG has been started, guideline will be developed incorporated in the PPH and Eclampsia guidelines for immediate Actions)*
- *Strengthening Drug therapy for PPH management (Tranexamic Acid, Misoprostol PGE1 community based distribution and Balloon Tamponade) are being on discussion with FMHACA*

PART IV - Recommendations

Key recommendations include the following:

At community level:

- **Improve ANC quality** by including individualized birth preparedness plans. Every woman in her first pregnancy should know she is at risk of pre-eclampsia, and should be aware of the signs. Older pregnant women should understand they are at risk of haemorrhage.
- Make **iron supplementation** available to all pregnant women
- **Family planning** should focus on high parity and young women

At facility level:

- **Improve postnatal monitoring** to check for possible risk of hemorrhage and anemia. Ensure women leave the facility understanding their individual risk and the importance of receiving PNC.
- Strengthen **referral systems** so that transport is readily available at all times, and the referring facility has checked that the next level of care is available and prepared for the woman's arrival.
- **Build up infrastructure systems** to ensure essential drugs and supplies are always in stock and staffs are adequately trained for procedures they are expected to perform.
- All health facilities should have a **protocol for the management of hemorrhage** and this should be rehearsed on a regular basis.
- Every labor ward should have **an emergency drugs box** immediately available.

At woreds, zonal or sub-city level:

- **Check transport** regularly to ensure ambulances are available, well-maintained, have fuel and a driver.
- Promote **community awareness** through dialogues and local events.
- **Coordinate** supply chains to ensure essential drugs and supplies are always available in all facilities.

At Regional and National level:

- **Ensure timely and regular review** of data from lower levels to target support and resources.
- Facilitate **safe delivery and PNC** by supporting construction and maintenance of Maternity Waiting Homes.
- **Implement** national policies and strategies, such as the Hemorrhage Action Plan.

Annex 1: Socio-demographic characteristics of deceased women's, 2009 EFY

Variables	Category	Direct Causes		Indirect Causes		Total	
		Freq.	%	Freq.	%	Freq.	%
Age Category	10-14 Y	1	0.1%	1	0.4%	2	0.2%
	15-19 Y	56	6.2%	12	4.2%	68	5.7%
	20-24 Y	135	15.0%	45	15.8%	180	15.2%
	25-29 Y	255	28.3%	93	32.7%	348	29.3%
	30-34 Y	211	23.4%	75	26.4%	286	24.1%
	35-39 Y	177	19.6%	46	16.2%	223	18.8%
	40-44 Y	39	4.3%	6	2.1%	45	3.8%
	45-49 Y	9	1.0%	2	0.7%	11	0.9%
	Unknown	19	2.1%	4	1.4%	23	1.9%
Parity	0-1	263	29.2%	89	31.3%	352	29.7%
	2 --- 4	323	35.8%	108	38.0%	431	36.3%
	5 and above	285	31.6%	74	26.1%	359	30.3%
	Missing	31	3.4%	13	4.6%	44	3.7%
Level of Education	College and above	28	3.1%	13	4.6%	41	3.5%
	Elementary school	99	11.0%	30	10.6%	129	10.9%
	High school	43	4.8%	19	6.7%	62	5.2%
	I dont know	117	13.0%	44	15.5%	161	13.6%
	Illetrate	448	49.7%	127	44.7%	575	48.5%
	Missing	78	8.6%	28	9.9%	106	8.9%
	No formal edu but can read and write	89	9.9%	23	8.1%	112	9.4%
Marital Status	Divorced	10	1.2%	2	0.7%	12	1.0%
	Married	839	96.8%	270	96.8%	1109	96.8%
	single	17	2.0%	7	2.5%	24	2.1%
	Widowed	1	0.1%	0	0.0%	1	0.1%
Place of death	Health Center	61	6.8%	24	8.5%	85	7.2%
	Health Post	7	0.8%	1	0.4%	8	0.7%
	Home	120	13.4%	36	12.7%	156	13.2%
	Hospital	580	64.8%	193	68.2%	773	65.6%
	On transit	96	10.7%	26	9.2%	122	10.4%
	On transit from hf to hf	23	2.6%	1	0.4%	24	2.0%
	other	8	0.9%	2	0.7%	10	0.8%
Residence of deceased	Rural	207	72.6%	56	68.3%	263	71.7%
	Urban	78	27.4%	26	31.7%	104	28.3%
Timing in relation to Pregnancy	Ante partum	114	12.6%	58	20.4%	172	14.5%
	Intra partum	149	16.5%	35	12.3%	184	15.5%
	Missing	25	2.8%	10	3.5%	35	3.0%
	Post-partum	614	68.1%	181	63.7%	795	67.0%

Annex 2: Causes of death by places of death, data source and age group Table 3: Causes of death by places of death, data source and age group

Characteristics	Hemorrhage	Obstructed labor	HDP	Abortion	Sepsis	Embolism	Other direct causes	Anemia	Malaria	HIIV	TTB	Other indirect causes	Total MDs
Places of deaths													
Health Center	53%	6%	7%	3%	6%	1%	10%	19%	1%	1%	0%	11%	72
Health Post	38%	0%	25%	0%	0%	0%	25%	0%	0%	0%	0%	13%	8
Home	58%	5%	7%	0%	9%	1%	5%	14%	1%	1%	0%	9%	149
Hospital	38%	6%	22%	2%	12%	1%	12%	15%	2%	1%	1%	12%	686
On transit from Home to HF	61%	10%	6%	0%	5%	0%	9%	17%	0%	1%	0%	7%	109
On transit from HF to HF	48%	17%	22%	0%	4%	4%	4%	4%	0%	0%	0%	0%	23
other	22%	0%	33%	0%	0%	0%	44%	22%	11%	0%	0%	0%	9
Unknown	44%	0%	11%	0%	11%	11%	11%	0%	0%	0%	0%	11%	9
Timing													
Antepartum	24%	6%	24%	5%	6%	1%	10%	17%	3%	0%	1%	17%	161
Intrapartum	34%	22%	16%	0%	5%	5%	16%	10%	0%	0%	0%	12%	164
Postpartum	53%	3%	16%	1%	12%	1%	9%	16%	2%	2%	0%	9%	704
Unknown	25%	6%	14%	3%	14%	0%	14%	14%	3%	3%	0%	11%	36

Annex 3: The distribution of causes of maternal deaths by Region from Senie 30, 2008 to Hamle 2009

Causes of death	Hemorrhage	Obstructed labour	HDP	Abortion	Sepsis	Embolism	Other direct causes	Anemia	Malaria	HIV	TB	Other indirect causes	Total MDs
A.A	38%	0%	24%	2%	2%	16%	2%	4%	0%	4%	0%	20%	**45**
Afar	20%	4%	28%	0%	20%	0%	0%	32%	4%	0%	0%	0%	**25**
Amhara	47%	7%	19%	1%	9%	3%	9%	8%	0%	0%	0%	7%	**269**
Be.Gu	18%	3%	24%	6%	21%	0%	0%	24%	3%	0%	0%	15%	**33**
D.D	41%	6%	32%	3%	15%	0%	3%	12%	0%	0%	0%	0%	**34**
Gambella	44%	0%	0%	0%	0%	0%	11%	67%	22%	11%	0%	22%	**9**
Hareri	50%	25%	19%	0%	6%	0%	0%	6%	0%	0%	0%	0%	**16**
Oromia	53%	7%	16%	1%	10%	0%	12%	17%	1%	0%	1%	14%	**344**
SNNP	40%	7%	15%	2%	9%	0%	15%	16%	1%	2%	1%	8%	**183**
Tigray	35%	3%	12%	0%	8%	0%	13%	19%	7%	4%	0%	12%	**107**