Quality Improvement in Mozambique's Model Maternities: Linking improvement in standards with health outcomes and impacts

Background: The establishment and expansion of the Model Maternities Initiative

Based on positive results from implementing the SBM-R (Standards Based Management and Recognition) quality improvement process in its National Plan to Improve the Quality of Reproductive Health and Child Health Services, as well as its programs for Infection Control and Model Inpatient Wards, in August 2009 the Mozambique MOH launched the Model Maternities Initiative (MMI) with assistance from MCHIP in 34 of the nation's largest maternities – 25 hospitals and 9 health centers. Although these 34 maternities are only a small fraction of the 650 maternities in the country, this group of maternities accounts for 22% of all institutional births. All are training centers for health professionals, further multiplying their impact.

Selected Demographic and MNH Data for Mozambique	
Total Population	**22.9 million**
GDP per capita (USD)	**$428**
Maternal Mortality Ratio (deaths/100,000 live births)	**550**
Skilled birth attendant coverage	**54.3**
Antenatal care, 1+ visits	**90.6**
Neonatal mortality rate (deaths/1,000 live births)	**37.1**
Modern contraceptive prevalence rate	**14.2**
Total fertility rate	**5.6**
Total Health Expenditure per capita (USD)	**$24.72**

Sources: World Bank, Instituto Nacional de Estatistica Web site, 2010 projection, Mozambique 2011 Demographic and Health Survey, Mozambique Multiple Indicators Cluster Survey 2008, Population Reference Bureau 2011, World Population Data Sheet, WHO

The MMI uses a comprehensive and integrated approach to quality improvement that includes technical quality of care as well as client-oriented aspects of quality, like treating clients courteously, encouraging a labor and birth companion, and allowing birth in vertical positions, in keeping with cultural norms. From the inception of the MMI at the end of 2009 until June 2012, 701 health workers have been trained in the initiative, 196 of them as trainers. The initiative has expanded to 65 facilities, and now includes many medium sized maternities in health centers.

The Model Maternities Initiative integrated MNH package

- ANC, including MIP and PMTCT
- Essential Obstetric Care (AMSTL, partograph use), Essential Newborn Care, and BEmONC skills (MgSO4, treatment of hemorrhage, etc.)
- Newborn Resuscitation (HBB) and care of Low Birth weight infants (KMC)
- Post-natal care / Post-partum family planning
- Respectful care

Results: Promising evidence of improvement in standards, practices and mortality

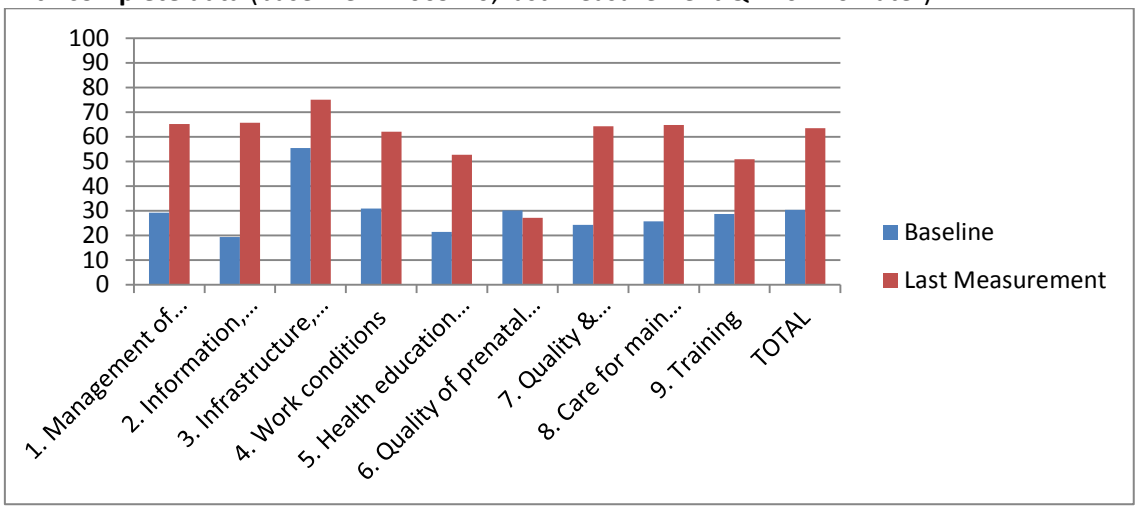
Table 1 shows the nine quality improvement content areas developed by a technical working group led by the MOH with participation of MCHIP and other partners. There are 79 standards to be measured at baseline and quarterly thereafter in an internal quality improvement process.

Table 1: Quality Standards for MMI

Subject Area	No. of Standards
1. Management of health services	9
2. Information, monitoring, and evaluation	5
3. Infrastructure, human and material resources	4
4. Work conditions	6
5. Health education and community participation	4
6. Quality of prenatal and postnatal care	11
7. Quality & humanization of care – labor, delivery &immediate postpartum period	25
8. Care for main maternal and newborn complications	9
9. Training	4
TOTAL	**79**

An analysis was done for 28 of the original 34 facilities that have data from the start of the initiative to the present for a complete examination of their performance. The quality data shows definitive improvement in eight of the nine quality areas (all except ANC/postnatal care).

Figure 1: Improvement in standards from baseline to present in 28 original MMI facilities with complete data (baseline in 2009-10; last measurement Q4 2011 or later)



The MOH in consultation with MCHIP also decided to track eight key indicators (see text box below), through the routine health information system (HIS) in a separate parallel register maintained in each of the MMI facilities. In January 2012, these indicators were included in the new integrated maternity registers. Routine reporting of these indicators has allowed analyses of the correlation of quality improvement processes with health outcomes (i.e., coverage with these key interventions), and even maternal mortality, which is also reported in the routine HIS.

The eight key MMI outcome indicators tracked and reported through the HIS

1. Use of Active Management of Third Stage of Labor
2. Use of Mg sulfate for severe pre-eclampsia / eclampsia
3. Partograph completely filled out
4. Presence of a labor companion
5. Presence of birth companion
6. Birth in vertical/semi-vertical position
7. Skin to skin contact, mother to newborn
8. Immediate breastfeeding

This original group of Model Maternities has shown corresponding gains in all eight of these key indicators since the start of the initiative. Figure 2 shows the gains in indicators of respectful care (labor and birth companion, deliveries in vertical/semi-vertical position). All started at zero at baseline; rose quickly to levels of 20-30% and have maintained these levels. Cramped space without privacy remains an issue in many of these maternities, limiting further progress. Figure 3 shows the indicators for newborn care (skin to skin contact and immediate breastfeeding), which have demonstrated even larger, rapid, and sustained gains.

Figure 2: Evolution of key respectful care indicators, Q4 2009 – Q4 2011

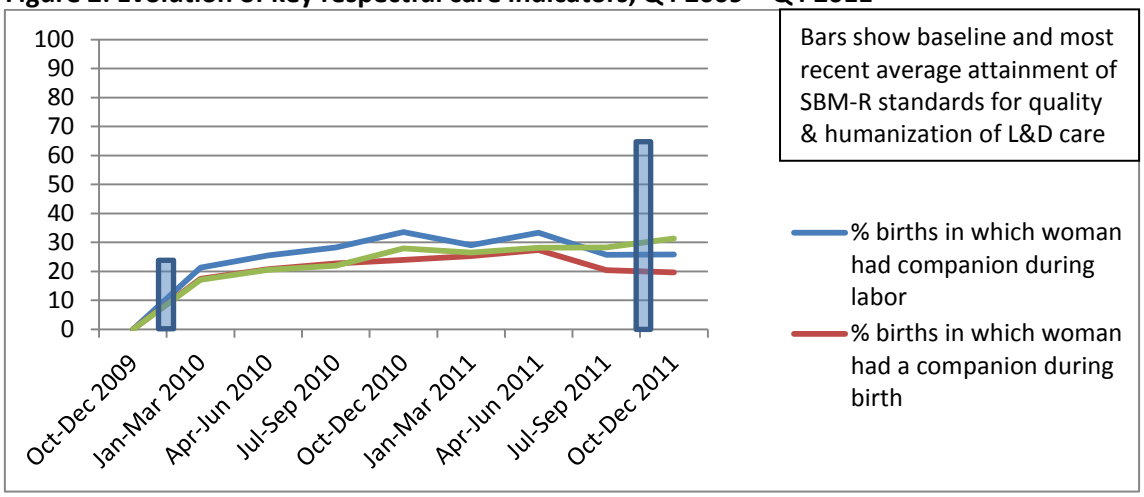
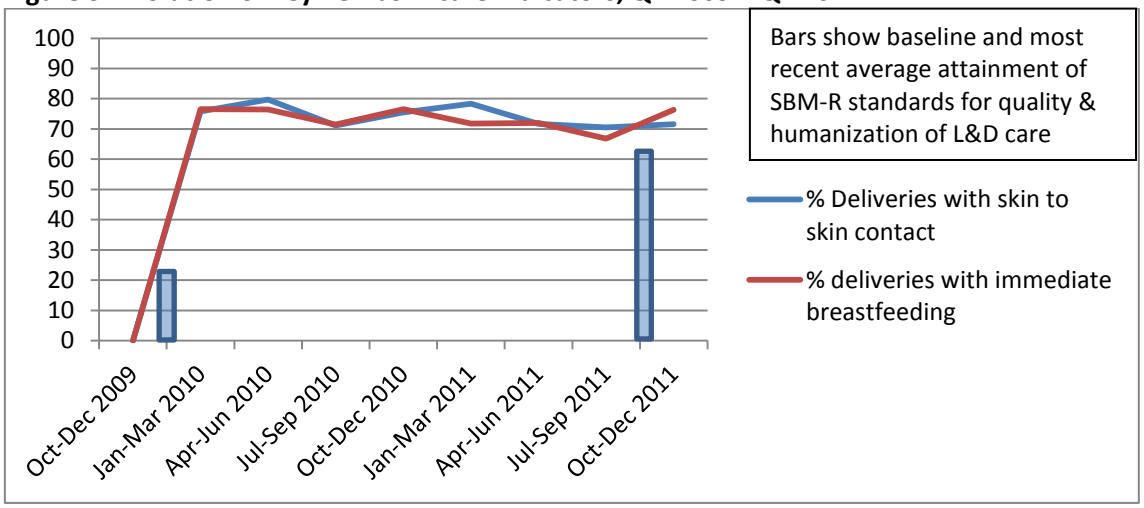
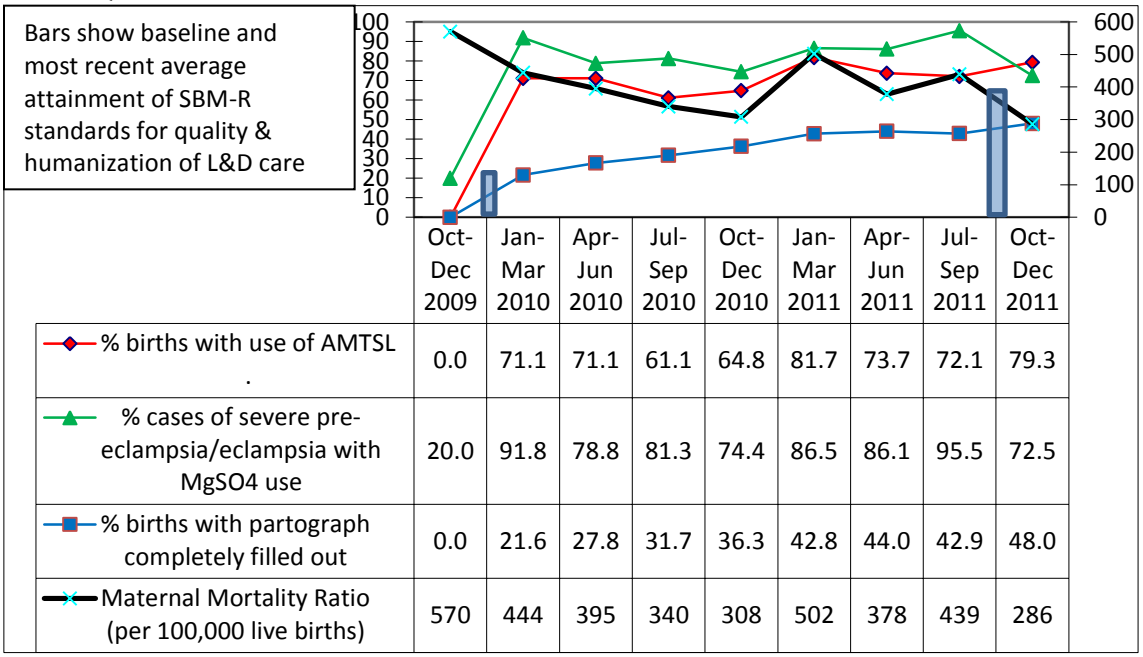


Figure 3: Evolution of key newborn care indicators, Q4 2009 – Q4 2011



The most impressive gains have been in the three maternal care indicators shown in Figure 4 (partograph completely filled out, use of AMTSL, and use of magnesium sulfate for severe pre-eclampsia/eclampsia). Although partograph use has only reached about 50%, both AMTSL use and use of magnesium sulfate quickly attained and maintained levels of 70-90%. These evidence-based interventions have been shown to have a high impact on three of the leading causes of maternal mortality (post-partum hemorrhage, eclampsia, and obstructed labor), so one would expect that these facilities would have experienced improvements in maternal mortality. A preliminary analysis of maternal deaths reported through the routine health information system shows that the institutional maternal mortality rate, calculated from reported maternal deaths and live births in these 28 MMI facilities, has dropped by over half in the first 24 months of the initiative, from 570 per 100,000 live births in the last quarter of 2009 to 286 in the last quarter of 2011.

Figure 4: Evolution of key maternal care indicators and institutional maternal mortality, Q4 2009 – Q4 2011



	Oct-Dec 2009	Jan-Mar 2010	Apr-Jun 2010	Jul-Sep 2010	Oct-Dec 2010	Jan-Mar 2011	Apr-Jun 2011	Jul-Sep 2011	Oct-Dec 2011
% births with use of AMTSL .	0.0	71.1	71.1	61.1	64.8	81.7	73.7	72.1	79.3
% cases of severe pre-eclampsia/eclampsia with MgSO4 use	20.0	91.8	78.8	81.3	74.4	86.5	86.1	95.5	72.5
% births with partograph completely filled out	0.0	21.6	27.8	31.7	36.3	42.8	44.0	42.9	48.0
Maternal Mortality Ratio (per 100,000 live births)	570	444	395	340	308	502	378	439	286

Next steps: Ongoing challenges and responses

MCHIP continues to assist the MOH to expand the MMI. By the end of 2014, the initiative will be in place in 125 health facilities, covering over half of all institutional births in the country. An exciting recent development was the MOH's roll-out of new registers in January 2012 that now include all the key indicators as well as cause specific morbidity and mortality information. This will allow more exact analyses correlating gains in quality, practice indicators, and maternal mortality. As the MOH expands the MMI there are several ongoing challenges for quality improvement that MCHIP is helping the MOH to address, as outlined below:

Ongoing challenge	MOH response with MCHIP support
Barriers to continued quality improvement posed by limitations in infrastructure and commodity supply	MCHIP is assisting the MOH in minor repairs, training on forecasting and alliances with others for improvement of commodity supply.
Human resource constraints making quarterly measurement of standards difficult	MCHIP is financing supervisors located in MOH provincial offices to assist facilities to measure standards quarterly.
Inconsistent use of data to improve quality	MCHIP, with other partners, is assisting the MOH to institute a graded incentive scheme for attainment of standards; giving technical and financial assistance to establish facility-community co-management committees to motivate improvement; helping establish district, provincial, and national quality committees to review data and implement improvement plans; helping improve the central MOH M&E unit and establish a national quality standards database.

ANNEX: How valid are the self-reported outcome data from MMI facilities?

The data from Model Maternities shows improvement and relatively high levels of attainment for the key outcome indicators. But self-reported data always raise questions about accuracy because of the possible bias caused by trying to "exaggerate good news." So just how much can we trust this data?

In this case, we are actually able largely to verify the validity of this self-reported data. In the last quarter of 2011, MCHIP assisted the MOH to do an observational quality of care study of the Model Maternities, to measure progress in the health facilities already in the initiative and act as a baseline in those facilities slated to enter in the coming years. Although not designed for this purpose, the findings from this Quality of Care (QoC) study were used to validate the simultaneously self-reported data on the coverage of key practices from the original 34 Model Maternities. Over 200 births were directly observed in a representative sample of Model Maternities facilities (as well as hundreds of additional births in non-Model facilities). The observations were done by trained nurse midwives from other facilities.

As can be seen in the table below, of the eight key outcome indicators reported in Model Maternities facilities, four of the eight key indicator values agreed within the sampling error of the QoC study (i.e., 10-12%, depending on the indicator value) compared to those reported simultaneously in the QoC study (magnesium sulfate use, partograph use, presence of labor companion, and presence of birth companion), two additional indicator values were within 20% (AMSTSL, skin to skin contact), and two were divergent by more than 20% (birth in a vertical/semi-vertical position and immediate breastfeeding). It is interesting to note that in some cases the QoC assessment actually gave a *higher* estimate of the use of key practices.

Table: Indicator values estimated from self-report and from analysis of observational data from the Quality of Care study, both from Q4 2011

Key Indicator	Self-report, Q4 2011	QoC study, Q4 2011
Use of Active Management of Third Stage of Labor	77%	63%*
Use of Mg sulfate for Severe Pre-eclampsia / Eclampsia	77%	78%**
Partograph completely filled out	49%	57%***
Presence of a labor companion	26%	33%
Presence of a birth companion	20%	26%
Birth in a vertical or semi-vertical position	31%	5%
Skin to skin contact between mother and newborn	72%	54%
Immediate breastfeeding	76%	28%

***** This uses a "relaxed" definition of AMTSL, i.e., administration of oxytocin within 3 minutes (not within FIGO definition of one minute) and also does not include controlled cord traction nor uterine massage. The strict FIGO definition of AMTSL yielded an estimate of 34% AMTSL use.
** The estimate from the QoC study is based on nine cases observed - seven cases of eclampsia and two cases of severe pre-eclampsia. Magnesium sulfate was administered in seven of these cases.
*** This corresponds to "partograph use" in the QoC assessment; however, the QoC assessment found that all partographs were filled out after birth rather than during labor.