Evaluation of The MacArthur Foundation's Work in Mexico to Reduce Maternal Mortality, 2002-2008

By Jill Gay[1] and Deborah Billings[2]

Introduction

From 2002 – 2008, The John D. and Catherine T. MacArthur Foundation invested US $5,000,000 in Mexico to contribute to a reduction in maternal mortality. Grant recipients included civil society organizations (CSOs) working at local, state and national levels in selected states with high maternal mortality ratios. Recipients also included CSOs based in Mexico City that have worked to address one specific cause of maternal mortality, unsafe abortion, which is a highly stigmatized cause of women dying throughout Mexico. Grant recipients advocated for improved public policies and health sector practices; conducted research to inform public policy; and monitored and publicized budget allocations to ensure that public sector resources were dedicated to addressing maternal mortality. Grantees focused their work on the needs of uninsured, low income and indigenous women in three states of high need- Chiapas, Guerrero, and Oaxaca- as well as on changing state and national level policies.

Researchers Jill Gay and Deborah Billings traveled to Mexico from September 22 – October 7, 2008 and conducted 60 interviews with grantees and stakeholders, including Ministry of Health officials, representatives of CSOs and researchers in Guerrero, Chiapas and Oaxaca. We also conducted interviews with leaders of US-based organizations active in work on maternal health in Mexico. We made site visits to clinics, hospitals and maternity homes, where women receive care during pregnancy, labor and postpartum, and to CSO offices. We traveled to one rural community in Chiapas and one semi-urban community in Guerrero to better understand the conditions in which women live and the challenges they face in seeking maternal health services.

By endorsing the Millennium Development Goals (MDGs), the Government of Mexico made a commitment to reduce maternal mortality significantly by 2015, aiming to decrease the number of maternal deaths throughout the country to 547 per year (for a maternal mortality ratio (MMR) of 22.3[3]). Important advances in reducing maternal mortality in Mexico have been made during the last seven years. However, interviews with stakeholders and our own analysis of health data indicate that for Mexico to reach MDG5 by 2015, investments will need to be made in strategic interventions that can be carried out in a sustained manner over the next eight years (2008-2015). Constant vigilance and evaluation will be needed to ensure that goals are met, particularly in states where maternal mortality is highest. Concentrated and strategic interventions must be scaled-up to state and national levels (Cragin et al., 2007: 51; Foundation grantee, 2008).

I.A.Why fund work to address and decrease maternal mortality?

"Maternal mortality is a fundamental indicator of social development and health in a country, including the Millennium Development Goals; it is a grave problem of public health and social injustice that reveals some of the most profound inequities in health…"
(Ministry of Health, Mexico, 2008[4]).

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[3] Maternal mortality ratio is the number of maternal deaths per 100,000 live births. It is the measurement most often used to indicate the level of maternal mortality in a defined area.
[4] All translations from Spanish to English, both in interviews and documents, were made by the co-authors.

"If we improve maternal health, we will positively affect health overall"
Dr. Patricia Uribe, General Director, National Center for Reproductive Health and Gender, 2008.

In 2000, the United Nations identified eight global priorities to help end poverty, known as the Millennium Development Goals (MDGs). MDG5 is focused on maternal health and its main indicator is the reduction of maternal mortality by 75% from 1990 to 2015. As of 2007, more than 300 million women in the developing world suffer from illness brought about by pregnancy and childbirth and nearly 536,000 die each year. Of the women who die in childbirth, 99% live in developing countries (Obaid, 2007).

Maternal mortality is an important indicator of whether women have access to the health services that they need to help make important reproductive health decisions in their lives. Access itself is related to a range of determinants, including resource allocation to create and sustain services, political will, awareness of the signs of pregnancy complications, and the ability to act on that knowledge to seek care. Most women's deaths are preventable through proven interventions, including skilled birth attendants and emergency obstetric care. That maternal mortality continues at high rates in many parts of the world makes it an important social justice and human rights issue (International Initiative on Maternal Mortality and Human Rights, 2008).

The cost of addressing maternal mortality throughout the world is relatively low. "It would cost the world less than two and half days worth of military spending to save the lives of 6 million mothers, newborns and children every year" (Thoraya Obaid, director of UNFPA cited in Helzner, 2008: 25). Interventions can be cost-effective as investments made often benefit all health services. The MacArthur Foundation is one of the few donors that have prioritized combating maternal mortality as a core part of its portfolio.

I.B.The importance of funding work to address maternal mortality in Mexico

Maternal mortality is higher in Mexico than in other countries with similar economic indicators (World Bank, 2001 cited in Walker et al., 2004). *"[We have] an unacceptable level of maternal deaths…." (*Dr. Jose Angel Cordova Villalobos, Minister of Health, Mexico, 2007). In Mexico, as in other parts of the world, calculating maternal mortality rates and ratios is challenging. Experts agree that most figures are underestimates of the true problem, due to underreporting and misclassification of maternal deaths. Accurate maternal mortality rates are difficult to determine and maternal mortality ratios continue to have very wide uncertainty bounds (Hill et al., 2007). The Mexican Ministry of Health has made important improvements in the quality and reliability of maternal mortality statistics. Since 2003, the Ministry of Health of Mexico has used the international "gold standard" for determining maternal mortality ratios- the Reproductive Age Mortality Studies (RAMOS) approach, which is the most accurate methodology to measure maternal mortality. Despite initiating RAMOS in Mexico only in 2003, "the implementation of the methodology has been effective and successful and has been used consistently throughout Mexico" (UNFPA et al., 2007:54). Between 2003 and 2006, the Ministry of Health estimated an increase of 15% in the registration of maternal deaths nationally (Ministry of Health, 2007: 19). Given trends in the reduction of maternal mortality in Mexico over the past decade, a reasonable assumption is that such "increases" are due almost exclusively to better reporting of maternal deaths.

Mexico has achieved notable reductions in maternal mortality during the last 17 years. From 1990-2007, the maternal mortality ratio decreased by 37.5% . However, the Government's stated goals over time have not been met. By the year 2000, Mexico aimed to have an MMR of 45.2 when, in reality, Mexico had a MMR of 72.6. The number of maternal deaths per year decreased from 2,189 in 1990 to 1,543 in 2000 while the goal set for the year 2000 was 1,094 maternal deaths (Hofbauer et al. 2006). At the same

time, the *rate of decrease* in maternal mortality more than doubled from the period 1990-1999 (8.98% cumulative decrease) as compared to the period 2000-2007 (23.4% cumulative decrease). This change coincided with a three-fold increase in the Mexican government's financial commitment to interventions aimed at decreasing maternal deaths.

Our own analysis (Appendix 1) shows that if Mexico continues to invest in reducing maternal mortality as a priority goal and maintains the strategic interventions that are discussed throughout this report, it is very likely that maternal mortality will decrease *at least* by an additional 25% over the next eight years (2008-2015). This is the same rate by which maternal mortality decreased from 2000 through 2007 when the Foundation and other donors made targeted investments in reducing maternal mortality and when the Mexican government increased its commitment to decrease maternal deaths. While the MDG5 goal of 547 deaths is not attained in our analysis, the number of maternal deaths is greatly reduced over time. A reasonable argument also could be made that the percentage decrease could be even larger than 25%, given that during the past eight years, effective interventions such as emergency obstetric care were adopted as policy and initiated in practice. This current period (2008-2015) could be a time of consolidation and strengthening of such interventions, such that their impact on maternal mortality is larger and the changes made are most likely to continue over time. Thus, we also present a scenario in which maternal mortality decreases by 40% over the next eight years. The MDG5 goal is almost reached. The MDG process itself has placed maternal mortality on the political agenda of national and state governments, as well as CSOs, throughout Mexico. Dr. Julio Frenk, Minister of Health of Mexico from 2000-2006, emphasized that: *"Whether or not the actual target of MDG5 is reached, opportunities exist in Mexico at this historic moment that, if acted upon, would continue to have a significant and strong impact on the causes of maternal mortality…The MacArthur Foundation is already a well-established actor and well-respected in Mexico. The Foundation's funding has been so important in Mexico and has made the movement for reducing maternal mortality sustainable."* (Frenk, 2008)[5]

I.B.1. *Main causes of maternal mortality in Mexico and galvanizing support to address them*
During a four-year period (2004-2007), the causes of maternal mortality remained fairly constant. Hypertension during pregnancy and hemorrhage during pregnancy, labor and postpartum account for approximately 50% of all maternal deaths in Mexico. Some of these causes of maternal mortality are preventable. For example, unsafe abortion can be greatly reduced when contraceptive methods that prevent unwanted pregnancy are accessible and safe, legal abortion services are available to women. Other complications cannot be predicted but are treatable when emergency services are ready to serve women. Maternal deaths are most concentrated among the poorest women without insurance coverage.

Among the most significant shifts in policy and practice aimed at reducing maternal mortality during the past few years is the move from a risk-reduction approach to one that focuses on emergency obstetric care (EmOC). The most effective life-saving intervention to prevent maternal deaths is for a woman to have access to a functioning emergency obstetric care facility, with skilled attendants, essential equipment, supplies and drugs (Maine and Rosenfield, 1999; Graham et al., 2001 cited in Gay et al., 2003).

Notable achievements in reducing maternal mortality by addressing some of it main causes were made from 1994-2006 throughout Mexico. These include increasing skilled attendance at birth from 70% (2000) to 94% (2006), decreasing the percentage of women who died at home without ever received medical care from 17% (2002) to 13% (2006) and increasing the number of municipalities that pay for the

[5] Dr. Julio Frenk, 2008, Minister of Health, Mexico from 2000-2006. Dean, Harvard School of Public Health; President, CARSO Health Institute; Senior Fellow, Bill & Melinda Gates Foundation.

transport of women needing emergency obstetric care from 12 (2004) to 118 (2006) (Ministry of Health, 2007). The Ministry of Health's goals for improving EmOC throughout the country are outlined in their 2007 plan and focus on improving both health sector interventions as well as socio-cultural interventions, such as translation services for indigenous population (Ministry of Health, 2007: 32-34, 39, 45). The Foundation can use its reputational assets in important ways to help stakeholders build on the government's national plans and goals to meet MDG5.

II. What are the most effective ways to reduce maternal mortality in Mexico?

The most effective ways to reduce maternal mortality in Mexico are by increasing access to emergency obstetric care; improving women's access to safe abortion services; reducing unmet need in family planning; improving human resources, both through transforming medical education and by instituting a midwifery model of care; improving quality of care; and continuing to report and analyze causes of maternal deaths. "*Vision: In Mexico in 2012, a greater number of women… will have access to health services which are culturally competent, organized in networks which resolve health problems and guaranteeing timely attention and quality care during pregnancy, labor and delivery and postpartum…*" (Ministry of Health, Mexico, 2007: 31).

Within the maternal health community, a broad consensus emerged about the basic "…health-sector strategies for [the] reduction of maternal mortality, which include (Starrs, 2007: 1285): comprehensive reproductive health care, including family planning and safe abortion, or where necessary postabortion care; skilled care for all pregnant women during pregnancy and especially childbirth; emergency care for all women and infants with life-threatening complications;" and postnatal care within the first two days.

A study co-authored by Foundation grantee Dr. Goldie found that for Mexico the most effective strategy for decreasing maternal mortality is to increase coverage of family planning, ensure access to safe abortion services and enhance women's access to comprehensive emergency obstetric care (Hu et al., 2007). This combined strategy reduced mortality by 75% by 2015 and cost less than current practice (Hu et al., 2007). Since Mexico needs to reduce maternal mortality by 75% to reach MDG 5, Hu et al., 2007 is the most evidenced-based road map to reaching Mexico's goal of MDG5.[6] However, the recommendations of Hu et al., 2007 fall short of addressing issues related to health service human resources and quality of care which impact on whether the services will be utilized.

Mexico is complex so that "one homogenous strategy [for reducing maternal mortality] will not work" (Nunez, 2008), making the Mexican experience relevant to other countries such as India where health indicators vary widely among regions and within states and where the cultural context is diverse. Mexico has high maternal mortality in two very different settings: urban centers and rural areas populated mostly by indigenous people. An estimated 40% of maternal mortality in urban areas is due to poor quality care delivered in hospital settings (Ministry of Health, Mexico, 2007: 26). Nationally, one in three hospital deaths resulted from inadequate or wrong medication in case of eclampsia/pre-eclampsia; one in ten hospital deaths occurred because of poor surgical techniques (Ministry of Health, Mexico, 2007: 26). In indigenous areas, one in three births is not attended by medical personnel in rural areas (Ministry of Health, 2007:26). "Maternal mortality in Mexico has an indigenous face. Official statistics demonstrate

[6] There are noted weaknesses in the Hu et al., 2007 study. The authors use data on fistula from Africa to estimate medical costs from obstetric complications, while cases of obstetric fistula have not been documented by UNFPA in Latin America. It seems unlikely that antenatal care has no impact on mortality or morbidity, as assumed in this model, since this can be an important opportunity in which women learn about the danger signs during pregnancy and delivery, thereby strengthening the EmOC model. Postpartum care is stated as having a negligible impact on mortality yet is important to detect and treat postpartum hemorrhage, a major cause of maternal mortality. Lastly, transport costs to health care facilities are not included in costs.

that indigenous women have three times higher risk than non-indigenous women of dying because of causes related to maternity" (Freyermuth, 2006a cited in Meneses, 2007:19).

II.B.Ensure women's access to comprehensive emergency obstetric care. Advances in Ministry of Health official programs have been made with: "…more emphasis on increasing the capacity of medical services to provide emergency obstetric care…" (Ministry of Health, Mexico, Subsecretary of Health Prevention and Promotion, 2007: 12).

II.C. Improve women's access to legal and safe abortion services. Globally, unsafe abortion is a major cause of maternal mortality worldwide (Grimes et al., 2006) and an estimated five million women are admitted to hospital for treatment of unsafe abortion complications each year (Berer, 2007). "Safe abortion has few health consequences, whereas unsafe abortions are a threat to women's health and survival" (Sedgh et al., 2007: 1338). "*Unsafe abortion is a major health problem here in Mexico among youth…*" Dominguez, 2008[7]. The induced abortion rate of 33 per 1,000 women of reproductive age in Mexico is relatively high by worldwide standards, where abortion incidence is estimated to be 29 in developing countries overall. About one in six women who had abortions in 2006 throughout Mexico were hospitalized for complications resulting from unsafe practices (Juarez et al., 2008). First trimester abortion was legalized by the Mexico City by the Legislative Assembly in April 2007 (van Dijk et al., 2007).

II.D. Improve Access to Family Planning Services. While improving family planning services overall is clearly outside the scope of MacArthur Foundation guidelines for grants, Mexico will not reach MDG 5 without improvements in this area (see Hu et al., 2007). In 2005, 13% of maternal deaths occurred in adolescents. Adolescents who become pregnant die at a higher rate than other age groups (Ministry of Health, 2007). The majority of adolescent pregnancies are not planned and have often led to unsafe abortions resulting in maternal mortality (Ministry of Health, 2007:41). In 2006, more than 25% of currently pregnant women aged 15 to 44 years of age reported that their pregnancy was unintended; it is unclear what percent are adolescents (Juarez et al., 2008). Adolescents age 13 to 16 who speak an indigenous language are almost three times less likely than their Spanish-speaking counterparts to have heard of contraceptive methods. Over 67% of adolescents aged 13 to 16 who speak an indigenous language use no contraception at first sexual intercourse, compared to around 41% for Spanish-speaking counterparts (Palma, 2008b).

II.E. Improve human resources

II.E.1. Transform medical education. One critical gap in Mexico is the presence of skilled attendants throughout pregnancy and birth. A study conducted in Mexico reviewing the curriculum for competency in maternal health of medical students at the National Autonomous University of Mexico (UNAM), arguably Mexico's most prestigious medical school, found the score for competency at 43%, as compared to obstetric nurses at 54% and a midwifery school at 83%, demonstrating the need for improvements in curriculum for nurses and physicians (Cragin et al., 2007). The Mexican medical system as it is currently structured gives responsibilities to medical residents (*pasantes*) who have graduated from medical school but do not have clinical training. There are 13,000 medical school graduates in Mexico each year, with approximately 18% of them unable to find paying positions (Lara, 2008). Residents serve only one year, with high staff turnover in areas with the highest maternal mortality. "Residents see their work as a big favor they do for the community, rather than understanding that indigenous populations in our country

[7] Dr. Dominguez is Representative of UNFPA in Mexico and as such, is not a Foundation grantee.

also have a right to health" (Foundation grantee[8], 2008). Students are generally misinformed or uninformed about state level abortion laws (González de León-Aguirre et al., 2008). In addition to needing improved surgical techniques, "Physicians need to be trained to assist in a normal birth without conducting a Cesarean section" noted one former Foundation grantee.

The midwifery model of care[9] aims to support women in culturally appropriate and respectful ways throughout pregnancy, birth and the postpartum period. This includes fostering an environment where women can be accompanied throughout the pregnancy and birthing processes if the woman so chooses. A Cochrane Collaboration review of 15 trials found that the continuous presence of a support person from caregivers (i.e., nurses, midwives, or lay people) "reduced the likelihood of medication for pain relief, operative vaginal delivery, cesarean delivery, and a 5-minute Apgar score less than 7" (Hodnett, 2000 in Gay et al., 2003). Globally, "the evidence is strongly in favor of midwives as the main providers [of maternal health care]… Additionally, the expectation that all births will be attended by a doctor is problematic if high coverage is to be attained, since deployment and retention might be more difficult and because of higher salary and training costs. Moreover, doctors have been shown to over-medicalise childbirth…" (Jokhio et al., 2005; Koblinsky et al., 1999 cited in Campbell et al., 2006:1291).

II.F. Improve quality of care in health care facilities at all levels with cultural competency and care guided by principles of respect and dignity.

In Mexico, pre-eclampsia/ eclampsia is the first cause of maternal mortality (Engenderhealth, 2007). Although conclusive evidence is available showing the superiority of magnesium sulfate over other drugs in treating eclampsia and pre-eclampsia (Magpie Trial Collaborative Group, 2002 cited in Hussein, 2007; Duley et al., 2003), magnesium sulfate for eclampsia is not widely used in Mexico. Inadequate medical curricula and training as well as packaging with contraindicated dosages of magnesium sulfate in Mexico (Engenderhealth, 2007) are responsible for non-use.

High rates of cesarean sections which are not medically indicated also lead to increased maternal mortality and morbidity (Alves, 2007). Between 1988 and 2000, 24.1% of all births were C-sections (Campero et al., 2007). It is estimated by global experts that no more than 15% of births should require C-sections – and it is critical that women who actually need C-sections are those who are getting them (Gay et al, 2003).

Translation and interpretation for women speaking indigenous languages is key to providing quality care. A study conducted in Chiapas found that 33% of primary care posts did not have any translation or interpretation services available to patients (Meneses, 2007: 33).

II.G. Reporting and analyzing the causes of maternal deaths. Mexico has dramatically improved the accuracy of reporting of maternal deaths. Globally, one of the ten major strategies for achieving safer pregnancy1987-2007 is reviewing maternal deaths as a means for improving care (Hussein, 2007). However, any system that requires an investigation into each maternal death needs to be perceived as a learning experience that can transform the health system instead of a punitive search for culpability. AIDEM[10] as it is currently constituted first assumes culpability of the physician.

[8] The authors refer to "Foundation grantee" rather than the name of the source to protect the confidentiality of the speaker. "Foundation grantee" can refer to any person interviewed by Ms. Gay and/or Dr. Billings and does not always refer to the same person.

[9] http://mana.org/definitions.html; this is one translation of *parto humanizado*

[10] AIDEM: The Group for Immediate Attention of Maternal Deaths/ Grupo de Atención Inmediata a Defunciones Maternas consists of experts from the Federal Government charged with investigating maternal deaths to increase accuracy of reporting and asses how to reduce maternal mortality.

Campero et al. (2006) and Walker et al. (2004) found significant underreporting of violent deaths related to pregnancy and suggest that "[v]iolent deaths related to pregnancy should be included in official maternal mortality statistics... This would …guide appropriate prevention and care policies, programs and services."

II.H. Conduct research and evaluation and disseminate findings to guide practice. The Foundation has supported a host of important research projects, particularly qualitative and quantitative studies of maternal mortality, work on the use of magnesium sulfate and on unsafe abortion, which have been used to develop, guide and even scale-up interventions that began as smaller pilot studies. These results, lessons learned and strategies need to be disseminated more broadly to CSOs and Ministries of Health throughout the country.

III. How has the Foundation contributed to addressing maternal mortality in Mexico?

III.B. Meeting significant benchmarks and with progress needed in some States. The Foundation's benchmark goal stated in its Mexico strategy was to contribute to a 10% decrease from 1999 figures. Numerous factors, including but not limited to the work of Foundation grantees, contributed to a decline of 13% in the national MMR between 2002 and 2007, from 63.9 to 55.6.

The Foundation has focused efforts on three States that have among the highest levels of maternal mortality and a large number of indigenous populations in Mexico: Chiapas, Oaxaca, and Guerrero. As was done at the national level, Foundation targets at the state level were set at a 10 percent reduction of the corrected 1999 MMR, so that by 2007 the MMR in Chiapas would be 88; Oaxaca, 73; and Guerrero, 88. The five-year goal was surpassed in Chiapas but not in the states of Oaxaca and Guerrero. Foundation support to civil society organizations, in addition to other factors, contributed to improvements in both registration and prevention of maternal death.

III.C.The Foundation framework for scaling up: An effective way to reduce maternal mortality
III.C.1. The Foundation's framework for scaling up. The Scaling Up Management (SUM) Framework, developed by Management Systems International (MSI) with the support of the Foundation, has been used by the Foundation to guide grantees to develop and implement a scale up plan (Cooley and Kohl, 2006). This framework is a sound one. A core strategy of the Foundation in Mexico has been to strengthen and solidify civil society organizations, helping to develop mechanisms that link CSOs with governmental institutions, in particular Ministries of Health. Scale-up of any intervention cannot take place without the interchanges and linkages between CSOs and government that the Foundation has fostered.

III.C.3. Foundation-supported civil society organizations have galvanized increased government resources for maternal health. The work of Foundation grantees, especially the Women's Health Coalition, a collaboration of twelve organizations, has made an impact on state and federal budgets dedicated to maternal health. In 2007, in large part due to the pressure exerted by civil society organizations, the Mexican Ministry of Health stated the following goal: "Adopt a model of budgeting based on results that facilitates accounting and generates incentives for State and public administrations to comply with set goals" (Ministry of Health, Mexico, 2007: 53). Maternal health budgets have increased over the last decade (Avila-Burgos et al.,, 2007 cited in INSAD 2008b; INSAD, 2008b). The budget for the Federal National Center for Equity in Reproductive Health and Gender, which has led the Federal government to adopt evidence-based norms, had a budget increase from USD$ 2 million in 2002 to USD$ 69 million in

2008 (Layton et al., 2007: 31-32; Uribe, 2008; Diaz, 2008). Progress has been achieved at the State level also.

However, problems remain. Recent changes have meant that The Ministry of Health's National Accounts System, SICUENTAS, does not permit to identify in any detail resources for specific programs (INSAD, 2008b). "The institutional willingness to inform and the legal mechanisms to access information concerning actions taken to reduce maternal mortality are clearly insufficient either to inform the public or to make it transparent what the government is doing" (Diaz, 2006: 17). In the State of Chiapas as of 2006, there remained almost 3 million people not included in any social security system. Strong, well-informed and experienced CSO participants have been essential to important scale-up processes that have taken place with key interventions to address maternal mortality. The Foundation needs to continue to foster civil society-government collaboration.

III.C.4. Foundation-supported civil society organizations have been at the forefront of producing evidence and advocacy for new government policies based on best scientific data. In both the geographic areas and the content areas, CSOs have produced evidence and advocacy materials that have convinced the government to change course. CSO-led pilot projects and pressure on government have led to institutional adoption, key for scaling-up, including the Federal Ministry of Health's adoption of the EmOC rather than risk approach; legalization of abortion in Mexico City; and the alarm and transport system. Government authorities directly use the materials developed by civil society organizations funded by the Foundation."*Maternal mortality rates have gone down in the Region of Tenejapa, State of Chiapas because of the radio programs and the mural in the town of Tenejapa which have taught the population the danger signals requiring emergency obstetric care"*(Olvera, 2008[11]). Materials developed by civil society organizations funded by the Foundation, among others, provide information on danger signs requiring emergency obstetric care (http://www.ciesas.edu.mx/).[12]

III.C.5. Foundation-supported civil society organizations have promoted collaboration among States, facilitating scale-up . The Safe Motherhood Committees, supported by the Foundation, foster collaboration between governmental authorities and CSOs, which have resulted in key advances in maternal health in Mexico. The Foundation should continue and increase the sharing of lessons learned across states. Materials developed by Foundation grantees have been used by government entities: for example, the film, *Paso a Paso*

III.C.6.a. Foundation grantees contributed to ensuring access to emergency obstetric care. Foundation grantees have been of critical importance in developing the 2008 Federal Ministry of Health guidelines that replaced a risk-based approach with the more scientifically sound approach of increasing access to emergency obstetric care.

III.C.6.b. Foundation grantees contributed to ensuring access to safe abortion services**.** The Foundation has led the way for Mexico and Latin America to recognize the public health burden of abortion as a key element in reducing maternal mortality. Foundation grantees Gire, Católicas por el Derecho a Decidir, Ipas, Population Council, Equidad de Genero have worked for decades to ensure that women have access to safe, legal abortion and postabortion care. Their efforts have focused on disseminating information that has been used to inform policy and legislative debates, research, training with the health sector,

[11] State of Chiapas Committee for the Right to a Voluntary and Safe Maternity, which receives no Foundation funds
[12] 2007. "Todas y Todos en Alerta por una Maternidad Segura" are radio spots developed by Foundation grantee CIESAS.

creation of youth activist networks, and general awareness-raising among the Mexican population of the important and detrimental impact that unsafe (illegal) abortion has on the health of women. The data, arguments and approaches that they have developed collaboratively since 2000 were used to educate Supreme Court justices on the issue, who ruled in 2008 that the Mexico City law legalizing abortions up to 12 weeks was constitutional.

III.C.6.d. Foundation grantees contributed to improving human resources for maternal health
III.C.6.d.i. Transform Medical Education. Foundation grantees have been at the forefront of transforming medical education. Since 2000, Ipas Mexico has been working to incorporate abortion-related content and general human rights and reproductive health content into the curricula of medical and nursing schools throughout Mexico.

III.C.6.d.ii. Implement a Midwifery Model of Care . Many of the leaders in Mexico advocating for a midwifery model of care are Foundation grantees. Foundation grantees have created model programs which provide culturally competent quality of care with largely indigenous populations backed by emergency obstetric care. In the township of Tenejapa, State of Chiapas, women come to give birth, accompanied by the support of whom they choose, including their husbands and traditional midwives.

Increased numbers of women who choose to give birth in a facility with a physician on site, which also allows midwives to practice on-site, and who use a midwifery model of care demonstrates that the commitment to quality care and cultural competence has been met. This should be considered a model for all of Mexico. In Comitán, Chiapas, a maternity home was built near the hospital so that women would have access to emergency obstetric care if needed. Another model project is Casa de Salud de la Mujer Indigena in the town of Ometepec[13], State of Guerrero. Construction is almost complete for a maternity home to enable women to be near the hospital in case of obstetric emergency or for normal birth at the Maternity Home.

III.C.6.e. Foundation grantees contributed to improving quality of care for maternal health. Foundation grantees are leaders in quality of care. While most sites in Mexico does not use magnesium sulfate despite conclusive evidence, in the rural area of Tenejapa, Chiapas, where Foundation grantees are active, this is the drug of choice by physicians. In a visit to Tenejapa municipality, Ms. Gay and Dr. Billings requested to review the “Caja Roja,” a cardboard box with essential supplies for emergency obstetric care. In this setting, the “Caja Roja,” had magnesium sulfate.

CSOs that are Foundation grantees, among others, mobilized the community to build a Maternal Birthing Center and to conduct public education programs with the communities in this region (population 45,000) to recognize when, where and how to obtain emergency obstetric care. Needed ambulance services are provided at no cost to the family. Maps have been developed showing where clinics are located, names of personnel who work at the clinics and what hours the clinics are open (Freyermuth, 2006: 33). The Maternity Birthing Center, opened in 2007, is equipped to stabilize women with obstetric emergencies so that they can be transported by ambulance to the hospital in San Cristobal de las Casas within two hours.

Cultural Competency, Dignity and Respect
The National Safe Motherhood Committee is beginning to focus on issues of cultural competency (Foundation grantee, 2008). A study in Comitán, Chiapas conducted by the CISC found that clinical care from physicians was perceived by indigenous women as untrustworthy and disrepectful (Tinoco, 2008). Many Foundation grantees approach their work from a gender perspective and incorporate the long-term

[13] Ometepec has a population of approximately 50,000.

task of changing gender norms and power relations into their activities, recognizing that existing gender relations often leave women without the ability to make important decisions regarding their own lives and health. Through work on gender norms, men come to value women's lives and thus help with emergency transport and other emergency needs. Foundation grantees are part of those leading the way in training for providers on treating women with dignity and respect.

III.C.6.f. Foundation supported grantees for maternal health have contributed to reporting and analyzing the causes of maternal deaths**.** Due in part to advocacy and research by Foundation grantees, the Mexican Ministry of Health has greatly increased the accuracy of the reporting of maternal deaths.

III.C.5.g. Foundation supported grantees for maternal health have contributed to conducting research but more is needed in dissemination of findings to guide practice. A key element in the success of combating maternal mortality has been the research which documented the assessment of government initiatives and to substantiate policy proposal (Layton et al., 2007). *"The MacArthur Foundation support could not have been more successful. There have been very few times that research has led to such a dramatic change in policy. While MacArthur Foundation was not the only donor in Mexico, the MacArthur Foundation played a vital role and has a central role to continue to play on maternal mortality in Mexico."* (Langer, 2008)[14] The Foundation has supported both research and advocacy undertaken by civil society organizations as well as the National and State Safe Motherhood Committees to ensure women's access to comprehensive EmOC. This work needs to continue and needs to be scaled-up such that successful interventions become part of statewide programming in all health systems. While the Foundation has made a significant contribution at promoting research, no efforts to broadly disseminate findings (within and beyond Mexico) have been supported.

IV. Recommendations for moving forward to improve MM in Mexico: The role of the Foundation

All current activities of the Foundation in Mexico are important contributions to reducing maternal mortality. No evidence was found of any programs or elements that should be scaled back, reduced or eliminated. Much of the work already accomplished by the Foundation and Foundation grantees is in the process of being taken to scale by the government and will need to be monitored by Foundation grantees to ensure that scale up occurs. In other important areas, Foundation grantees are at the vanguard of pilot projects that still need to be developed and then taken to scale. Without any increase in either financial resources or human resources, we do not recommend changing the Foundation portfolio. Efforts should continue to bring current best practices to scale, to increase access to EmOC and safe abortion, and improve quality of care. With additional resources, the Foundation could consider:

IV. A.1. Ensure access to emergency obstetric care: In part due to the efforts of Foundation grantees, the Federal Government of Mexico has adopted an evidenced-based model of EmOC. However, Foundation grantees will need to continue to monitor that policy is translated into practice.

IV.A.2. Improve women's access to safe abortion: The Foundation should continue to support efforts in the States of Oaxaca, Guerrero and Chiapas to adopt an evidence-based public health strategy with regard

[14] Dr. Langer worked on maternal mortality in Mexico from the 1990s until 2005, first as Director of Research on Women's Health at the National Institute of Public Health (Instituto Nacional de Salud Publica) and later as the Population Council's Regional Director for Latin America and the Caribbean, based in Mexico City, which has received Foundation grants for work on maternal mortality since 2002.

to abortion and postabortion care. The Foundation should support work to have manual vacuum aspiration (MVA) become the technology of choice in health systems and to adopt evidence-based uses of misoprostol for early abortion and postabortion care. Supporting studies that help to register mifepristone and misoprostol as an effective regime for medical abortion is also important. Additional work is needed so that youth and women facing unwanted pregnancies know that legal and safe abortion is available in Mexico City. More work is needed at the state levels to ensure that services are provided, particularly in the case of pregnancy resulting from rape.

IV.A3. Improve Access to Family Planning Services: Address barriers that young men and women face in accessing contraceptives; service and policy-related work on abortion and postabortion care should emphasize the importance of family planning information.

IV.A.4. Improving human resources, transforming medical education and implementing a midwifery model of care: In order to improve human resources, the Foundation would need to explore, in collaboration with governmental authorities, medical, nursing, and midwife educators, as well as current and past Foundation grantees, how best to improve human resources to reduce maternal mortality. Creating a midwife cadre or by increasing the knowledge, skills and scope of practice of nurses are other strategies to consider. Currently, Mexico does not have a professional cadre of midwives large enough to make a notable impact on maternal mortality. Policy changes would be needed to authorize either nurses or midwives to conduct certain interventions. What is possible in the Mexican context and what would be the most efficient use of resources should be assessed. It is unlikely that physicians will provide all care in all communities in Mexico. CSOs that advocate for the midwifery model of care should be given support by the Foundation for a stronger collective political voice aimed at influencing policy and practice.

IV.A.5. Improve quality of care: Intensive work is needed to scale up the work in quality of care. Magnesium sulfate needs to be used throughout Mexican health services. Pre-service and in-service training must be conducted to improve both technical competence and patient-provider relations. Translation services must be available to women and their families as well as allowing women to be accompanied by a person of their choice throughout labor and delivery. The number of C-sections must be reduced and the procedure used when medically indicated.

IV.A.6. Report and analyze the causes of maternal deaths: An assessment should be made whether it is worthwhile to invest any further resources beyond what has already been accomplished in reporting and analyzing causes of maternal deaths. Please refer to Appendix 2 for additional web-based resources.

IV.A.7. Conduct research and evaluation and disseminate findings to guide practice: The Foundation should invest in providing information technology support to grantees. This investment will be an important contribution to scale up. The Foundation needs to increase dissemination of Foundation grantees' innovative and successful work in Mexico. The Foundation should share lessons learned from Mexico throughout Mexico and with other countries.

IV.B. How the Foundation could help Mexico meet MDG 5 by expanding outside of current priority States: Interventions shown to be successful need to be scaled-up significantly throughout Mexico. In the scaling-up process, interventions also need to be modified to fit local contexts and realities. CSOs that the Foundation could support to focus on maternal mortality exist in some of the additional states. However, these CSOs have not focused their work exclusively on maternal health and would need both additional resources and technical assistance to engender scale-up within their respective States in a way currently accomplished by CSOs supported by the Foundation in the priority States of Oaxaca, Chiapas and Guerrero. There are reasonable arguments to expand work to Mexico City. The organizations

supported by the Foundation in Mexico City, while national in their scope, could also assist in creating the favorable policy environment to reduce maternal mortality in Mexico City.

V. Conclusions

Reducing maternal mortality will help meet MDG 5, will positively impact the overall health not just of Mexican women but the health of all Mexicans and can be accomplished at relatively low cost. As a US-based global Foundation, the MacArthur Foundation´s continued on-the- ground presence in Latin America through the Mexico office plays a central role in maintaining the region on the international safe motherhood agenda. Foundation efforts have contributed enormously to reduced maternal mortality in Mexico.

The Foundation has contributed to some significant benchmarks, with progress needed in some States. The Foundation's theoretical framework for scaling up has been sound and has led to strengthening key CSOs' work on maternal health. Foundation grantees have been key to galvanizing increased dedicated government resources for maternal health. Foundation grantees have been at the forefront of conducting research and advocacy based on scientific data and Foundation grantees have promoted collaboration among States. The Foundation and its grantees have supported key civil society organizations which have made vital contributions to ensuring access to EmOC; safe abortion; family planning; improving human resources and quality of care; reporting and analyzing causes of maternal deaths; and research.

All current activities of the Foundation in Mexico contribute in important ways to reducing maternal mortality. No evidence was found of any programs or elements that should be scaled back or eliminated. Much of the work already accomplished by the Foundation and Foundation grantees is in the process of being taken to scale by the government and will need to be monitored by Foundation grantees to ensure that scale up occurs. In other important areas, Foundation grantees are at the vanguard of pilot projects that still need to be developed and then taken to scale. Without any increase in either financial or human resources, we do not recommend changing the Foundation portfolio. Efforts should continue to bring current best practices to scale and to increase access to EmOC and safe abortion.

Two major new endeavors which would impact on maternal mortality would be for the Foundation to focus on efforts to improve human resources and quality of care. This would require exploring in collaboration with governmental authorities, medical, nursing, and midwife educators, as well as current and past Foundation grantees, how best to improve human resources to reduce maternal mortality. A careful assessment would be needed to select which quality of care issues to target and which Foundation grantees could scale up efforts in this area.

Additional efforts are needed by the Foundation and grantees to disseminate this important body of work. The most critical gap of current Foundation efforts is the need to share lessons learned and disseminate materials both within Mexico and globally, as well as facilitate dissemination of recent global research within Mexico.

The Foundation could help Mexico meet MDG 5 by expanding outside of the Foundation's current priority states of Chiapas, Oaxaca and Guerrero, but could only do so with additional staff and resources. The Foundation continues to play an important role in reducing maternal mortality as the world heads to 2015.

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Appendix 1.

Projected number of maternal deaths, 2015 with a 25% and 40% decrease in 2007 maternal deaths

State	**Number of maternal deaths, 2007[1]**	**Number of maternal deaths, 2015 with a 25% decrease from 2007**	**Number of maternal deaths, 2015 with a 40% decrease from 2007**
Colima	2	1	1
Campeche	3	2	2
Aguascalientes	4	3	2
Nayarit	4	3	2
Tlaxcala	7	5	4
Baja California Sur	8	6	5
Zacatecas	11	8	7
Coahuila	13	10	8
Durango	14	10	8
Quintana Roo	14	11	8
Morelos	15	11	9
Nuevo Leon	17	13	10
Queretaro	17	13	10
Sonora	20	15	12
Yucatan	20	15	12
Baja California	22	16	13
Tabasco	23	17	14
Sinaloa	25	19	15
Tamaulipas	25	19	15
Hidalgo	30	22	18
San Luis Potosí	30	23	18
Michoacán	39	29	23
Guanajuato	40	30	24
Chihuahua	46	34	28
Jalisco	46	35	28
Puebla	61	46	37
Guerrero	67	50	40
Oaxaca	70	52	41
Chiapas	77	58	46
Mexico City/DF	87	65	52
Veracruz	98	73	59
State of Mexico	148	111	59
TOTAL	***1102***	***825***	***660***

[1]Source: Assumptions and modeling by Deborah Billings. Data from: Centro Nacional de Equidad de Genero y Salud Reproductiva, Mexican Federal Ministry of Health. 2008. "Defunciones maternas Estados Unidos Mexicanos, 2007." Mexico City, Mexico. Note: Informacion preliminar DGIS/SSA, hasta el 30/06/08.

Appendix 2
Additional sources to measure maternal mortality from Graham et al., 2008

Relevant additional web-based resources to inform measurement of maternal mortality include:

- Maternal Mortality Measurement Resource: www.maternal-mortality-measurement.org
- Initiative for Maternal Mortality Programme Assessment (Immpact): www.immpact-international.org
- Health Metrics Network: www.who.int/healthmetrics
- Measure Evaluation: www.cpc.unc.edu/measure
- WHO Reproductive Health and Research: www.who.int/reproductive-health

(From Graham et al., 2008).