Professionals with Delivery Skills: Backbone of the Health System and Key to Reaching the Maternal Health Millennium Development Goal

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The attainment of the fifth Millennium Development Goal requires adequate national reserves of skilled birth attendants. Nurses, midwives, and their equivalents form the frontline of the formal health system are a critical element of global efforts to reduce ill-health and poverty in the poorest areas of the world. Planning and policies supporting these cadres of workers must be placed high on the development agenda and championed by key international and national players. This article first sets forth an argument for the equity and efficiency of nurses, midwives, and their equivalents as the cadre largely responsible for maternal health. Second, it traces the root causes of neglect of this critical cadre, including a vacuum in political will in the context of poverty, lack of protections for frontline workers, the historical political position of the field of midwifery, lack of a pipeline of secondary school graduates, and gender inequity. Investment in the largely female cadre that cares for the majority of the world's poorer women has simply not been a high enough priority. Five key policy recommendations include harnessing political will and adequate metrics, protection of frontline workers' safety and livelihoods, ensuring an adequate pipeline with a focus on girls' education, donor support for training and professional organizations, and a rapid scale-up of a robust cadre of delivery care professionals. Finally, a call for unified international support of rapid scale-up of cadres of delivery care workers is put forth.

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The reduction of maternal death rates, which are 50 to 400 times higher in low-income than in industrialized countries is an urgent political and ethical imperative (1-3). Maternal mortality is the fifth of eight Millennium Development Goals (MDG) guiding global development policy. Focus on this MDG can ensure that women's lives are seen as an integral part of any effort to improve well-being for the marginalized populations in the developing world (4). After decades of experimentation with training traditional birth attendants (TBA) and providing antenatal care (ANC), an emerg-

ing consensus on a key to preventing maternal deaths is the provision of skilled attendants able to prevent, detect, and manage or refer for the major obstetric complications (5-7).

Professionals with delivery skills, or skilled birth attendants (SBA), are the cadre of health workers necessary to reduce maternal and neonatal mortality, making this cadre the fulcrum for reaching the MDG for maternal health. The required planning and management of this cadre is vast in scope – an estimated 334 000 additional professionals are needed by 2015 to reach 73% coverage (8).

A focus on nurses and midwives must be set in the context of international reckoning on the demise of health systems and the crisis in the global health workforce. Critical to the new focus on health systems are key strategic human resource questions, such as "Who are the delivery care professionals in each country?" and "What plans exist or should exist to support their livelihoods and increase their numbers?"

The question of human resources for health has received long overdue attention from the international public health community (8-10). A viable health workforce is the key to a strong health system that is necessary for reaching the MDGs (7,11). But the unique clinical skills needed for delivery care require explicit policy attention. Nurses, midwives, and new cadres of workers must be supported and cultivated as part of any national development and poverty reduction plan. Promising new initiatives like the Countdown to 2015 track key interventions to reach the maternal health MDGs in 68 priority countries. The Countdown data – and other proponents of health systems strengthening – point to the low coverage of SBAs as a major impediment to reaching MDGs 4 and 5 (12-15). These groups could go still farther in targeting and monitoring the training and support of new cadres of professionals with delivery skills as key to expanding coverage.

This article is a call for sustained international attention to professionals with delivery care skills. The preconditions for the professional cadre necessary to reduce maternal mortality in much of the developing world today are outlined herein. First, the article explores the rationale for bolstering this cadre of workers based upon considerations of equity and efficiency. Second, it examines the obstacles which have historically hindered robust, sustainable development of this cadre in countries where it is desperately needed. And finally, the paper closes with a set of five policy recommendations for ensuring that the development of a highly skilled cadre of health workers with competency in pregnancy management and delivery skills becomes an integral part of national development plans.

Unique nature of pregnancy and delivery care: nurses and midwives as an equitable, efficient cadre

More than many other health interventions under the purview of the district health care system, saving a woman's life during an obstetric emergency is a highly labor- and skill-intensive interaction. Some 60% of maternal deaths occur within the critical 24- to 48-hour period after childbirth (16). The causes of maternal complications are known – hemorrhage, infection, hypertension, obstructed labor, and complications of unsafe abortion. However, the majority of life-threatening maternal complications in childbirth are not predictable. This fact, coupled with a very significant need for speed and accuracy in decision-making, referral, and intervention, necessitates the 24-hour presence of a well-trained professional highly skilled in managing labor and its complications (17).

The clinical skills needed are fundamentally different from the skill set associated with other pressing community health issues, such as monitoring anti-retroviral therapy, treating

tuberculosis, or diagnosing and treating malaria (Table 1). In many settings, though, the frontline health worker is providing all of these health functions as well as the urgent care associated with obstetric emergencies. Thus, the question of delivery care professionals is linked to all of the health MDGs and to many aspects of health system strengthening. Streamlining programs, priorities, and workers along the continuum of care is a new and welcome focus on the international health agenda (14,18).

Equity and coverage are central to the ability of nations to reduce maternal mortality. In countries where the health workforce is grossly undersupplied, simply maintaining the status quo is unethical and contrary to human rights principles (19). Data and decades of experience in the developing world tell us the following: a) most women are currently delivering without a skilled attendant, but in many places the use of a skilled attendant is increasing (20); b) professionals with delivery skills (doctor, nurse, or midwife) are in short supply in the countries with high maternal mortality rates (22,23); and c) poor women are more likely to die in childbirth and less likely to have a skilled attendant present at their births (18). Given these facts, what is the most cost-effective, equitable means of remedying the current situation?

The World Health Organization (WHO) estimates that an additional 340 000 midwives must be trained over the next 10 years with support from additional 24 000 birthing units, 27 000 doctors and technicians, and 11 000 maternity units within facilities (8). Achieving equity in the distribution of health workers will require large numbers of skilled professionals, likely "substitutes" for internationally recognized professionals or mid-level professionals, particularly in Africa. In 25 of 47 sub-Saharan African countries, non-physician clinicians play an important role in the health system, with many of them being specifically trained in obstetrics and in 5 countries in Cesarean sections (Ethiopia, Ghana, Malawi, Mozambique, and Tanzania) (24). Upgrading of basic facilities and new cadres of comprehensive workers, nurses, and midwives may well be the most cost-effective solution for reaching poor and marginalized populations (20).

Nursing and midwifery are seen as essential in improving the health and well-being of marginalized groups, particularly poor women (16,25). In part, nurses, midwives, and non-physician clinicians are less expensive to train and maintain on salary, thus allowing a broader distribution across the population for lower cost. Evidence from Pakistan, Myanmar, and Sri Lanka suggests that 2.5 to 3 nurses can be trained for the cost of one physician's training (26). Studies also show that for many services, non-physician clinicians, nurses, and midwives, if properly trained, can provide quality of care on par with physicians (16). Thus, wider coverage can be obtained without sacri-

Table 1. Three major misconceptions held about skilled birth attendants (SBA)

Misconception	Clarification
SBAs are community workers and/or midwives, not physicians and nurses	Many SBAs are indeed nurses and doctors, not necessarily only midwives. An international consensus has formed around a definition of SBA, according to the World Health Organization definition: "A skilled attendant is an accredited health professional – such as a midwife, doctor or nurse – who has been educated and trained to proficiency in the skills needed to manage normal (uncomplicated) pregnancies, childbirth and the immediate postpartum period, and in the identification, management and referral of complications in women and newborns."
SBAs only perform functions related to the assistance with childbirth	Importantly, skilled birth attendants do not just care for childbearing women. The same nurses and midwives who will attend births can also provide HIV/AIDS counseling and treatment, prescribe antiretroviral medications, resuscitate newborns, provide directly observed therapy, and malaria treatment. These workers often function as midwife, nurse, and physician.
Physicians and nurses are trained in delivery, both normal and complicated as an integral part of medical or nursing curricula	This is often not the case; enhanced training in these areas is imperative for nurses and physicians, particularly those charged with attending to a rural population.

ficing quality. In general, nurses and midwives also score high marks in client satisfaction and quality of care, often providing continuity of care that is so important from pregnancy through childbirth and the immediate postpartum period (16,18).

In short, many countries must undertake a massive training and deployment of nurses and midwives (and in some cases clinical officers). This call is echoed in the "Action Plan to Prevent Brain Drain" put forth by Physicians for Human Rights (9), in which they state that African countries should seek to cultivate advanced practice roles for nurses, including the ability to prescribe and dispense medication. WHO is also promoting the importance of nurses and midwives in revitalizing health systems (20,27-29). All of those now engaged in reaching the MDGs must speak in a unified voice to bolster support – both budgetary and policy – for professionals with delivery skills. The World Bank, WHO, academic centers working on maternal mortality, the groups working on human resources for health, and ministries of health must explicitly address the scaling-up of professionals with delivery care skills.

Root causes of neglect of this critical cadre: why are nurses and midwives underutilized or undersupplied?

Nursing and midwifery services account for the majority of health personnel – as much as 90% in some countries (16,22). And in many countries they represent as much as 50% of the overall labor force (20,30). Thus, this largely female workforce is not only the backbone of the health system, but also a potentially powerful economic engine. Nurses and midwives form the frontline of the formal health system are a critical element of global efforts to reduce ill-health and poverty in the poorest areas of the world. The lack of adequate funding and policy support for nurses and midwives – despite their disproportionate share of the health workforce – has multiple root causes. The following section explores five root causes underlying the lack of sustained policy attention to nurses, midwives, and associated cadres of delivery care professionals and the resulting shortages. The root causes are as follows:

1. Vacuum in political will in the context of poverty
2. Lack of guarantees of basic livelihoods
3. Insufficient supply of health workers in pipeline (not enough girls in secondary education)
4. A field in isolation amidst turf battles
5. Gender inequity in training and in the field

There is an emerging body of literature documenting the antecedents of the human resources for health crisis including brain drain, the HIV/AIDS crisis, health system deficiencies, insufficient domestic spending on health, donor policies, and macroeconomic policies (10,11,23,31). This paper does not attempt to summarize all of that literature, but rather points to certain root causes spe-

Table 2. Barriers to and policy recommendations for supporting health professionals with delivery skills

Historical barriers to supporting midwives and nurses	Policy recommendations and implications
Vacuum in political will in the context of poverty	Harnessing political will through parliaments and high level management capacity; sustained international call for a focus building cadres with delivery skills; systematizing of indicators and yardstick for measuring progress
Lack of guarantee of basic livelihoods for professionals	Incentives and protections for frontline health workers with particular attention to nurses and midwives
Insufficient supply of health workers in pipeline (not enough girls in primary and finishing secondary education)	Link delivery care professionals and the pipeline of secondary school graduates to economic development plans
Midwifery has been a field isolated amidst turf battles	Donor support for professional organizations including nurses, midwives, and non-physician clinicians
Gender inequity in training and in the field	Rapid scale-up with gender-sensitive policies

cific to midwives and nurses (Table 2). Although it is difficult to entangle these root causes, it is hypothesized that sex inequity and poverty underpin all of the other causes explored here.

1. Vacuum in political will in the context of poverty

The Safe Motherhood movement has always been entangled in the issue of human resources for health and issues of equity. Central questions in the field have revolved around the issue of what is the optimal type of health worker given severe resource constraints and geographical inaccessibility. Underinvestment in nurses and midwives as part of health workforce planning stems in part from a lack of sustained political will, quick fixes, and chronic underfunding.

Quick fixes were exemplified in the early focus on TBAs as a key to reducing maternal mortality. Donor funding tended to focus on short-term strategies like in-service training of specific cadres of workers rather than strategic rethinking of the whole of the health workforce and its adequacy for the task of improving population health (11,31,32). In addition, International Monetary Fund (IMF) and World Bank policies may well have exacerbated the human resource crisis. Hiring freezes placed on civil servants cut the rolls of nurses and midwives, leaving a perverse situation in which qualified nurses are working in other professions, or not at all, even in countries with a dire shortage of health staff (5,9,31,33). Workers were retrenched or required to retire early in an effort to reduce the bloated civil service in many African countries, but critics argue that cuts were made without adequate regard for the skills most critical to population health – and indeed, the higher skilled workers tended to leave (31). Ministries of health are left still facing the issue of how to develop a cadre of nurse-midwives to cover the country 20 years in the future (11).

The vacuum in political commitment is starkly reflected in the lack of leadership in maternal health policy. A qualitative study of India's maternal health division identified a dearth of top management capacity for Safe Motherhood as a bottleneck for progress in reducing maternal mortality (34). This unit was charged with overseeing all of the technical and administrative aspects of all the maternal health activities for the whole of India, with its one billion people and 27 million births in more than 30 states and union territories (34) – a country with a maternal mortality burden that contributes more to the total number of maternal deaths each year than the maternal mortality burden in any other country. Yet the study found that the maternal health unit was composed of only 3 officers – one director of maternal health and two assistant commissioners.

Finally, measurement and metrics have been sorely lacking. To a great extent, our understanding of the nature and extent of the human resource crisis is defined by the data available. And in the field of maternal health, and particularly for SBAs, we are extremely limited by the data. Even now, the data on the distribution of professionals with delivery care, quality of care, and training competency are limited.

2. Lack of a guarantee to basic livelihoods

Nurses, midwives, and other mid-level health professionals are too often seen as cogs in the wheels of the health system – human resources to be counted (or not), deployed, and regulated. Despite their valuable contribution to national economies and health systems, insufficient attention has been given to viable career paths over a lifetime. Factors including exit and entry from the system, protection from violence, non-monetary incentives including professional stature, continuing education, and pensions limit the potential of these pro-

fessionals. In many countries, remuneration is inadequate to cover housing, transport, good education for midwives' children, and medical fees. Violence and exposure to HIV/AIDS constrain livelihoods for this cadre as well.

The lack of adequate livelihoods for health workers is linked to gender discrimination. As coverage of rural populations is a persistent problem in many countries, the incentives and disincentives for female workers to be posted in remote areas must be given serious weight. In general, married female staff follow their husbands who, if they are professionals, tend to work and live in urban settings. The fact that most of the health workforce is female means that the geographic misdistribution of health workers is, in no small part, due to the traditional gender norms of a wife following a husband to his place of work (31,35). But the decision is economic too – without a guaranteed livable wage, the decision to work in a rural post is contrary to the interest of a nurse's or midwife's family well-being. It is worth noting that thousands of women are willing to migrate, often without their families, to another continent to earn a higher wage for the provision of health services.

Finally, women are less likely to move to managerial or policymaking positions in the health field. Thus, their labor issues are less likely to be represented and championed at higher levels in health management, and thus, in the ministry of health (36-38). Donors and international agencies must partner with ministries of health, country by country, to build an accredited cadre of delivery care professionals to reach the maternal health MDG.

3. Insufficient pipeline: undersupply of young women with secondary education

A fundamental cause of nursing and midwifery shortages in many developing countries is a sheer lack of resources, coupled with a lack of long-term, strategic planning for human resources development. The undersupply of nurses and midwives means that the scarce professionals who do exist are overburdened and overly stressed. Research documents nurse-to-patient ratios of 1 to 30, even 40 or 50 patients, which is far beyond a viable workload.

Gender inequity exists not only within the hierarchy of health workers, but in the "pipeline" – the supply of people with adequate secondary education ready to enter health-related careers. In order to train adequate numbers of nurses and midwives (and physicians and obstetricians), an adequate supply of secondary school graduates (particularly girls because of women's preferences for female birth attendants) must be ensured. Although this paper notes that the vast majority of nurses and midwives in the developing world are female, this need not remain the case except where it is documented that women prefer a female provider. Nor should the female association with nursing and midwifery deter active policy incentives for girls to plan careers in medicine and obstetrics and gynecology for all of these fields need new entrants. However, the paucity of women with professional qualifications was seen as a direct result of girls having a more discontinuous or incomplete school history, as in Uganda (39), and high university dropout rates due to insufficient preparation in secondary school (31). School fees were also seen as beyond the reach of most families and a reason for dropping out of nursing school (31,39). In countries such as Malawi, the numbers of secondary school graduates are too small to fill the ranks of health professionals needed.

Moreover, data compiled from the 10 countries with the highest maternal mortality ratio (MMR) show that the density of SBAs is extremely low. In these countries, the percentage of girls completing primary school is low as is the gender parity of secondary school com-

Table 3. Lack of a pipeline for nurses and midwives: the top 10 countries with the highest maternal mortality ratios and girls education indicators

Country	Maternal deaths per 100 000 live births in 1995*	Nurses (density per 1000)†	Midwives (density per 1000)†	Percentage of births with skilled health personnel‡	Primary school completion rate for girls‡	Gender parity index for secondary education (girls/boys enrolled)
Sierra Leone	2000	0.36	–	41.7	–	0.74
Afghanistan	1900	0.22	–	14.3	17.7	0.33
Malawi	1800	0.59	–	56.1	56.7	0.81
Angola	1700	1.15	0.04	44.7	–	0.78
Niger	1600	0.22	0.00	15.7	22.3	0.68
Tanzania	1500	0.37	–	46.3	70.5	0.82
Rwanda	1400	0.42	0.01	38.6	38.4	0.89
Mali	1200	0.49	0.04	40.6	30.8	0.62
Central African Republic	1100	0.30	0.13	44.1	16.4	0.40
Chad	1100	0.27	0.01	14.4	21.2	0.33

*According to reference 5.
†According to reference 21.
‡Data years range from 1991-2005. Available from: *http://millenniumindicators.un.org/unsd/mdg/Data.aspx*.

pletion (Table 3). The "pipeline" effect of girls' education and eventual careers in midwifery and nursing is the one that deserves further scrutiny on a country by country basis.

4. Midwifery: a field in isolation amidst turf battles

In many health systems, the skills necessary to save a woman's life, or obstetric skills, are seen as a specialized field under the purview of midwives. The practice of midwifery is often seen as lying at the intersection of traditional birth practices and biomedical practice (40). Physicians and general practitioners, even nurses, are not necessarily trained in basic delivery skills, life saving skills, or diagnosis and referral for the main maternal complications during labor and delivery. This point is crucial, for it is often assumed that a general practitioner would be the optimal frontline provider in developing countries. But a general physician who is untrained in normal delivery and life-saving skills is not a viable option for saving women's lives. Even where physicians are well-trained in managing deliveries, they are not likely to be deployed in adequate numbers to remote rural stations.

Yet even where midwives are active, "midwifery" is sometimes not legally recognized as a profession at all. And where recognized, the scope of the profession is often highly regulated and circumscribed. Indeed, even reproductive health programs and policies often fail to mention maternal mortality and the appropriate service providers to reduce it (41). In many countries, midwifery is a marginalized field without professional stature or political voice.

Even in resource-poor settings where midwives might be seen as the optimal provider for dealing with normal deliveries, they are not always accepted by the populations in which they serve (42). Midwives provide valuable reproductive health services across the lifespan of women and across the continuum of care. From antenatal care to reproductive health services including family planning and HIV/AIDS counseling, to delivery, to postpartum care of mother and newborn, the role of a frontline nurse or midwife extends well beyond delivery and childbirth. In fact, in many settings, midwifery and nursing are almost interchangeable – a fact recognized in the profession of nurse-midwife. And yet, turf battles occur between midwives and nurses and within the profession of nursing. Enrolled nurses and registered nurses are often caught in a hierarchical system, which pits them against one another rather than uniting them in a mission to improve women's health (35).

In many places, the integration of midwifery practice into the formal university system and into formal clinical care did not occur, perhaps in part because of the historical turf

issues, which conspired to set midwifery in opposition to modern medical care. And nursing and other forms of clinical practice too, are too often seen as distinct from midwifery, when in the field at the district health post, the activities of these two types of health worker are often indistinguishable in practice, if not in training. Perhaps this explains the recent trend toward training comprehensive nurses in both nursing and midwifery.

Midwifery and the formal teaching of clinical midwifery skills has traditionally been isolated as a field and in practice. Obstetricians, the few that there are in the poorest countries, are often trained in medical schools just as they are in the West. The two types of health worker – obstetrician and nurse or midwife – do not interact until they meet in a remote district health center. Yet, it is here that emergency obstetric care, as provided through a functioning referral system, could save women's lives. In part, this "separation" may be due to the influence of Western style education, which educates strict cadres or groupings of health professionals. Alternatively, the isolation of midwifery may be seen as discrimination against women health workers who deal with "women's issues." In some settings, there exists a misunderstanding about the level of clinical competency a well-trained professional midwife can attain and a confusion of this role with that of a traditional birth attendant. Professional societies for midwives and nurses, where they exist, tend to be weaker and less politically powerful than their counterparts in the licensed physicians organizations, thereby limiting their voice in policy (43).

5. Gender inequity

Maternal mortality reduction is hampered by gender inequity on two fronts – the gender discrimination against the health worker and the additional inequity faced by their patients – primarily poor pregnant and delivering women. The policy vacuum around many cadres of nurses and midwives is caused in part by gender inequity in the form of gender segmentation of the labor force and gender discrimination in the workplace.

Professions such as nursing, which are disproportionately comprised of women workers, tend to confer a "gender penalty" (43-46). Though women predominate in the field, they tend to fall disproportionately at the bottom of the occupational hierarchy with men assuming the leadership position. This disadvantage of belonging to a "typically female" occupation has ramifications not only for the earnings of nurses and midwives, but for their stature in the eyes of society (and in the eyes of other professional groups), their career paths and expectations about their time and altruism – women in these professions earn lower wages as compared with the average earnings of all women in all other occupational groups and as compared with men in jobs of a comparable level (43). Once established, relationships between wages paid to different jobs (ie, relativities) change very little over time, so historical inequities remain unless deliberately changed (43).

Compounding the problem, job evaluation systems are often gender-biased and fail to capture or value the work of nurses and other women workers, thus perpetuating existing wage inequities (22). Female workers, such as nurses and midwives, are caught in a "double domesticity," wherein their roles in the home are duplicated in the workplace, with little recognition or opportunity to advance into more autonomous, more prestigious jobs over the course of a career (46). A recent investigation confirmed that nurses were underpaid because evaluations revealed that job-related skills were not treated as skills, but as qualities intrinsic to being a woman (44,45).

Studies in the developed world have demonstrated that nurses and other "typically fe-

male" professionals tend to advance more slowly than their male counterparts within the profession (47). While the literature in the developing world is not extensive, it seems reasonable to postulate that the lack of clear career paths for many mid-level health professionals may be tied to the gender specificity of nursing and midwifery (36). Working hours, conditions of service, incentive structure, and career structures tend to be typically male patterns of employment (36). Exit and entry from the labor market for the purposes of raising a family and part-time career structures are not the norm in most of the poorest countries with the greatest needs for obstetric care. And yet, such flexible career structures may be necessary to allow nurses and midwives viable livelihoods and to adequately cover the population with quality obstetric care services (33).

The issue of gender in the field of nursing and midwifery has been highlighted by the International Labor Organization in its portrayal of nursing as an occupation with the highest risk of violence and an occupation that suffers from unfair differentials in wages (44,48). Violence against female professionals or the threat of violence or sexual harassment in the workplace in developing countries has been understudied, but is believed to be widespread (44,49,50). Unsafe, hostile, and even abusive and violent work environments endanger nursing and midwifery professionals (37,38,40,49). The lack of a safe workplace compromises the health and well-being of female staff as well as their patients. In particular, the lack of personal safety at health posts and other frontline health facilities often staffed by a single female health worker will make it highly unlikely that the facility can be open 24 hours a day. And yet, round-the-clock coverage is precisely what must be guaranteed for provision of adequate emergency obstetric care due to the unpredictable nature of obstetric emergencies. Detailed, gender-based qualitative research may shed light on strategies to keep frontline female providers safe in facilities and on teams where safety is prioritized.

Moreover, the burden of HIV/AIDS takes its toll on nurses and midwives as another form of physical insecurity and stress. As the main frontline service providers combating HIV/AIDS, nurses bear a disproportionate burden of care, and yet are not adequately informed and protected themselves (9). Policies are not necessarily in place to prevent and care for nurses and midwives (and other health workers) at risk of contracting HIV. Fear of occupational exposure to HIV/AIDS is an underlying cause of low morale and poor quality of care (9,37). And an in-depth qualitative study of nurses dealing with the HIV/AIDS epidemic found that nurses and midwives felt that they were not adequately informed about the disease's prevention, symptoms, or treatment (37).

At the international level, the lack of prioritization of midwives and others with midwifery skills reveals an aggregated gender bias. Investment in the largely female cadre that cares for the majority of the world's poorer women has simply not been a priority (38).

Recommendations and implications for policy

Policies for human resources for health must place a sharp focus on each country's cadre of professionals with pregnancy and delivery care competency, and each plan for action must be country-specific. Each country should endorse and incorporate the joint statement by WHO, International Confederation of Midwives, and the International Federation of Gynecology and Obstetrics, which includes a list of core competencies for a skilled birth attendant (14). Any global, national, or local human resource plan or strategy must explicitly integrate planning and accreditation for pro-

fessionals with delivery skills and any plan for delivery care professionals must be undertaken within the context of the overall health workforce and health systems plan, with strategies for the long-term careers of the professionals with delivery skills and plans for their supervision and continuing education.

More specifically, the following five recommendations can act as guiding principles for countries seeking rapid progress on the maternal health MDG (Figure 1). Each policy initiative builds on the next, though the first, harnessing political will, is the precursor to the others.

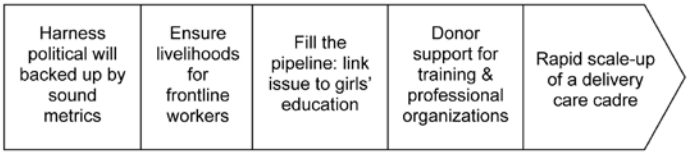

Figure 1. Steps to build a delivery care cadre in low-resource settings.

1. Harness political will backed up by sound metrics

The Countdown to 2015 Group documents that although official development assistance for maternal and newborn health has increased by 66% from 2003 to 2006, it was not well targeted to countries with the greatest maternal health needs (51). Funding must be channeled to those who need it most.

Donors, professional organizations, and non-governmental organizations alone are insufficient; because of the complexity of policymaking in the areas of maternal health and human resources, multiple policy entry points are needed. Parliaments may be mobilized to help catalyze new categories of workers, particularly cadres focused on rural areas. Advanced practice roles for nurses may be carved out, including the ability to prescribe and dispense medication. Professionalization of midwifery and acceleration of new non-physician clinician trainings may also be facilitated at the parliamentary level.

Accountability of local officials for quality of care has been cited as a crucial management tool in China and Malaysia (52). In Guatemala, the government passed a 2002 law, which mandates that municipal governments, civil societies, and community members become involved in interventions to reduce maternal mortality (50). Mexico's National Safe Motherhood Committee is seen as playing a key role in efforts on behalf of midwives there. Presence of a high-level spokesperson is often a catalyst for action as well. The White Ribbon Alliance facilitated such a post in Kuningan, West Java, using the district head, Minister of Women's Empowerment, Minister for Human Rights (former), and members of local parliament to launch the "desa siaga" (aware village) program and the revolving fund (53). Each country should have a critical mass of midwives, nurses, and/or comprehensive workers trained at the graduate level to work with international partnerships to advance research and advocacy for workers with pregnancy and delivery skills. Nurse and midwife leaders should be encouraged to be posted in senior decision-making positions to make effective demands for resources to advance these professions (54). Leadership and high-level attention to issues of maternal mortality is essential; small pilot projects alone will not catalyze national change (38). Multiple entry points to policy should be supported, including support of parliamentary committees, female representation in parliaments, and female leadership in human resource development. In order to support nurses and midwives, enabling legislation must recognize and support them as professionals and a legal infrastructure must buttress their practice. Top management posts for skilled attendants should be created. Donors should support the roles of Chief Nursing Officer and Chief Midwifery Officer (or their equivalents) in the ministry of health.

Metrics that track progress toward goals and hold politicians to their promises must be developed. The 2006 World Health Report

depicts a threshold level of coverage by physicians, nurses, and midwives at somewhere between 2.3 and 2.5 per 1000 population in order to ensure access to skilled birth attendance for 80% of the population (21). A new indicator, the midwife-to-births indicator, has been proposed as a succinct way to measure the need for professionals with delivery skills based upon total fertility rate (38). A particular country's targeted midwife-to-population ratio may be adjusted based upon the density of the population. It should also be accompanied by metrics for "backup" teams, providing the full range of emergency obstetric care. A top priority for this field is strong leadership committed to meeting targets and tracking the progress toward targets with appropriate metrics.

Equity and distribution should be an important factor in planning and tracking. A density statistic on the number of health professionals per 10 000 in the population does not address the distribution of the health workers across the population or reveal whether poor and remote areas are served. Country-specific policies based upon skill mix, unmet need, population distribution, and resources should be devised. Koblinsky et al (55) have proposed that in areas of extreme deprivation, a mixed team comprised of fully trained midwives and midwife assistants working in a health facility would be the most efficient, equitable way to rapidly scale-up coverage. Metrics to match these team formations should be added to the list where appropriate. The management and evaluation of such strategies, tailored to specific country settings, should be a top priority for poverty reduction and maternal mortality reduction.

Ratios and density calculations must be accompanied by indicators which measure quality of care. Indicators specific to measuring management quality may include social welfare, such as housing, good schools for children, capacity for living as a family unit, and nondiscriminatory policies and practices to protect women against sexual harassment, abuse, and violence (54). The box shows more comprehensive set of metrics for each country to consider in building its cadre of delivery professionals.

Box. Set of metrics for building the cadre of delivery professionals
Human resources for delivery care:
Births attended by a SBA
Midwives-to-birth ratio by geographic sub-unit
Management posts per delivery care professional
Backup nurses and doctors per midwife by geographic sub-unit
Policy metrics (eg, midwives authorized to administer a set of core life saving interventions)
Supply and long-term planning:
Number of full-time nurse and midwife vacant posts or to-be-recruited posts over total posts (28)
Appropriate measures of pipeline: secondary school graduates
Number of new nurse and midwife graduates from health educational institutions over the total supply
Equity and quality of care:
Equity of geographic distribution of skilled care and functioning emergency obstetric care facilities (basic and omprehensive)
Equity in access across social groups
Quality of care and competency measures

2. Ensure livelihoods of frontline health workers

Midwifery and nursing should not be fields in isolation from each other or from other cadres of workers with frontline primary health care responsibility. These fields and their members must be understood by all policymakers interested in poverty reduction. Women's health underpins much of economic development and women workers support much of the health system. As such, a country's master plan for human resource development must tackle the issue of delivery care, the stock and flow of workers with pregnancy and delivery skills, the assurance of adequate livelihoods for these workers, and the assessment and upgrading of skills for these workers.

Countries must undertake an analysis of current status of delivery care professionals, integrating this into ongoing health workforce planning, possibly through census tracking. Medium to long-term planning necessitates planning for mid-level professionals who are trained to core competencies and compensated adequately. Students' background should be reflective of the demographic groups most in need of health providers (eg, rural, ethnic minority, and women).

Health workers must be valued as the lifeblood of the health system, and strong protections against violence and illness (especially HIV/AIDS) are an essential obligation of the health system. Viable career paths for all types of health workers must be planned, with particular attention to career incentives (and protections) for nurses and midwives in rural areas. The health workforce must be unified in mission, but inherent tensions between different types of health providers within the system must be understood and accounted for. Finally, particular attention must be paid to nurses and midwives – to their training, deployment, career paths, supervision, and continuing education. The pernicious effects of gender discrimination warrant task forces at the country level to retool career paths and remove gender-based barriers that may have hampered development of these cadres.

3. Fill the nurse/midwife pipeline: make link to secondary school participation explicit

The pipeline of women (and men) graduating from secondary school is a precursor to scaling-up the cadre of workers with delivery skills. Donors and policymakers must explicitly recognize the link between secondary school education for girls and future cadres of health workers. Non-traditional entry points must be capitalized upon for bolstering the critical services nurses and midwives perform. The tools used by bilateral development agencies to allocate resources and plan development priorities – Poverty Reduction Strategy Papers and Medium-Term Expenditure Frameworks – are an appropriate vehicle for securing medium- and long-term commitment to health workforce development, especially for nurses and midwives. The "pipeline" of women (and men) begins with a robust set of graduates from secondary school education; educational goals and maternal health goals should be recognized as linked in this often overlooked way. Indeed, the third Millennium Development Goal highlights the importance of girls' education to poverty reduction, but proponents do not always make the direct link to maternal mortality reduction.

Ministries of health, along with education and other ministries involved in workforce planning must determine whether the numbers of professionals trained in pregnancy and delivery care needed to reach the population are even possible given the numbers of secondary school graduates. Innovative in-service training within secondary school may offer an efficient way to build a robust cadre of midwives and nurses. Proponents of the MDGs must support the links between the education, gender, and maternal health goals through specific policy recommendations, including targets for secondary school graduates, midwifery and nursing school enrollment, teachers, graduates, and innovative models for training and scaling-up.

4. Seed networks and professional organizations

Accreditation and building of solid professional associations for nurses, midwives, and non-physician clinicians are an important corollary to ensuring the livelihoods of these workers (56,57). Countries must officially accredit midwives and other delivery care professionals, have clear policies on which kind of health provider can provide particular services, disseminate clear clinical protocol, and consider delegation/upskilling for the short-term.

Professional associations can perform a political lobbying function to mobilize communities and target parliaments and ministries of health (33). They can also directly lobby donors, and national associations could be used as partnering organizations for needs assessments for emergency obstetric care. Standards setting, promotion of self assessments and auditing, continuing medical education for members, awareness-raising, and team building are additional functions of strong professional organizations (58). Twinning with nurses' associations in countries with solid professional associations is another strategy worth pursuing.

The Partnership for Maternal, Newborn and Child Health has released a Joint Statement on Health Professional Groups, being key to reaching MDGs 4 and 5 (59). These and other similar efforts will set important objectives for professional groups to work together toward the MDGs, rather than letting turf battles obscure the important role that each group has to play in saving women's lives. Alternative models, such as Uganda's decision to comprehensively train nurses in nursing and midwifery (comprehensive nurses) or scaling-up training of non-physician clinicians, may be a more realistic option for many countries (60).

Donors should support professional associations, networks, and accreditation of nurses and midwives, building their capacity to influence policy and undertake important research. Ideally, a major foundation or bilateral should forge the way and champion the long-term commitment necessary to build training strategies and strong professional associations for these core health workers.

5 Rapidly scale-up a robust cadre of delivery care professionals

Funds should be marshaled to support international efforts to map and determine the nature and training of health workers providing maternity care in all countries in the world, with a particular focus on the poorest, high mortality countries, starting with the top ten countries with the highest MMR (Table 3). Innovative approaches must be championed and supported. New forms of health workers are being considered, such as comprehensive nurses competent to perform all basic nursing and midwifery skills at the village or district level. Cadres of workers trained and deployed to reduce maternal mortality must be planned in the context of a functioning health system and referral system and with specific linkage to other health professionals. Teams of midwives and midwife assistants working in facilities could increase coverage of maternity care by up to 40% by 2015. This option promises scaling-up as much as 10 times as rapidly as would a strategy using dedicated or multi-purpose skilled births attendants at home deliveries (55).

All efforts to scale-up nursing and midwifery cadres should be carefully documented and studied. The current evidence-base for effective interventions in maternal health workers is small and limited to a tiny subset of countries (33). The International Confederation of Midwives and International Confederation of Nurses should continue to work together to support nurses and midwives as a cadre to reduce maternal mortality and improve reproductive health, but they should receive greater support to do so. All players at the international and national levels should adequately fund and support top-level management capacity to oversee systemic changes for cadres of delivery care professionals.

Donors and national governments must recognize that there is no good short cut to training a health workforce to competently manage normal deliveries and complications in childbirth. A scale-up of professionals with delivery skills will require the unified and unwavering commitment of all stakeholders working to meet the maternal health MDG, including

the WHO, the World Bank, bilaterals, Countdown to 2015, civil society, and ministries of health, finance, and education. These groups must work to place this cadre high on national development plans, because it is the fulcrum for meeting the maternal health MDG.

A massive scaling-up of delivery care professionals must be sparked immediately, creatively, and sustainably with explicit attention to the gender issues that face this cadre and a focus on the countries with the greatest need (55,57).

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