
Impact of a critical health workforce shortage on child health in Zimbabwe: a country case study on progress in child survival, 2000–2013

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Abstract

Despite notable progress reducing global under-five mortality rates, insufficient progress in most sub-Saharan African nations has prevented the achievement of Millennium Development Goal four (MDG#4) to reduce under-five mortality by two-thirds between 1990 and 2015. Country-level assessments of factors underlying why some African countries have not been able to achieve MDG#4 have not been published. Zimbabwe was included in a four-country study examining barriers and facilitators of under-five survival between 2000 and 2013 due to its comparatively slow progress towards MDG#4. A review of national health policy and strategy documents and analysis of qualitative data identified Zimbabwe's critical shortage of health workers and diminished opportunities for professional training and education as an overarching challenge. Moreover, this insufficient health workforce severely limited the availability, quality, and utilization of life-saving health services for pregnant women and children during the study period. The impact of these challenges was most evident in Zimbabwe's persistently high neonatal mortality rate, and was likely compounded by policy gaps failing to authorize midwives to deliver life-saving interventions and to ensure health staff make home post-natal care visits soon after birth. Similarly, the lack of a national policy authorizing lower-level cadres of health workers to provide community-based treatment of pneumonia contributed to low coverage of this effective intervention and high child mortality. Zimbabwe has recently begun to address these challenges through comprehensive policies and strategies targeting improved recruitment and retention of experienced senior providers and by shifting responsibility of basic maternal, neonatal and child health services to lower-level cadres and community health workers that require less training, are geographically broadly distributed, and are more cost-effective, however the impact of these interventions could not be assessed within the scope and timeframe of the current study.

Keywords: Maternal and child health; Millennium Development Goals, health policy; Under-five mortality, qualitative research; Zimbabwe

Key Messages

- Zimbabwe has reported stagnant coverage levels of a number of effective interventions recommended for maternal, neonatal and child health. The country's shortage of human resources for health is one of the key factors contributing to inadequate progress in reducing under-five mortality and achieving towards Millennium Development Goal #4.
- Implementation of specific policies authorizing midwives and community health workers to deliver core life-saving interventions could facilitate reduction of neonatal and under-five mortality.
- Implementing the available national strategies to develop the recruitment, retention, and training of health workers and scaling up the use of task shifting of responsibility for providing basic maternal and child health services to lower-level cadres could accelerate progress in reducing under-five deaths.

Introduction

Since the Millennium Development Goals (MDG) were set in 2000, global under-five mortality has decreased by 53% and the lives of an estimated 48 million children under age five have been saved (United Nations, 2000, UNICEF *et al.* 2015). However, mortality rates remain high, particularly in sub-Saharan Africa where approximately half of global under-five deaths occurred in 2015. Of note, achievement of MDG#4 – reducing under-five mortality by two-thirds between 1990 and 2015 – was variable across the region and only 12 countries met their MDG#4 target (UNICEF *et al.* 2015). It is therefore important to understand the factors underlying why some African countries have been able to achieve MDG#4 while others have not, particularly as countries look ahead to the 2030 Sustainable Development Goal of reducing under-five mortality to < 25 deaths per 1,000 (United Nations, 2015).

Case-studies assessing progress in reducing child mortality have been published for countries that successfully met MDG#4, including Niger, Uganda, Malawi, Ethiopia, and Rwanda (Amouzou *et al.* 2012, Kuruvilla *et al.* 2014, Mbonye *et al.* 2012, Zimba *et al.* 2012). There are no published case studies, however, from countries not meeting MDG#4 that could highlight the specific barriers countries face in their efforts to reduce under-five mortality. As part of a comprehensive study of sub-Saharan African countries with varying achievement of MDG#4 (Kipp *et al.* 2016, Haley *et al.* 2016), Zimbabwe was evaluated as a country that made insufficient progress given the minimal decrease in under-five mortality from 75.8 deaths per 1,000 live births in 1990 to 70.7 deaths in 2015 (average rate of reduction [ARR] of 0.3%) (Figure 1). The overall flat ARR masks a large increase in mortality between 1990 and 2000 before decreasing between 2000 and 2015 (UNICEF *et al.* 2015). Infant mortality has followed a similar pattern, while neonatal mortality remained relatively unchanged between 1990 and 2015.

Zimbabwe's lack of progress in improving child survival reflects significant economic, social, political, environmental and health-related challenges the country has faced over the past few decades as described in more detail by others (Ojikutu *et al.* 2008, Premkumar and Tebandeke, 2011, Chirisa *et al.* 2015) and the Zimbabwe reports referenced below. Following its independence through the 1980s, Zimbabwe was widely recognized for its robust health delivery system, high-quality clinical services and major gains in coverage of effective interventions associated with child survival (Osika *et al.* 2010). Beginning in the mid-1990s, however, the country experienced a prolonged socio-economic collapse, which resulted in the deterioration of the national health system, a decline in the availability of public health services and worsening of key health indicators, including under-five mortality (Osika *et al.* 2010, Zimbabwe Ministry of Health and Child Welfare [ZMOHCW], 2010a, ZMOHCW, 2010b). Although all six WHO health system building

blocks (World Health Organization [WHO], 2007) were profoundly affected, one of the most dire consequences was that an estimated three million skilled workers, including many health professionals, left Zimbabwe for better wages and conditions in neighbouring African countries and overseas (Osika *et al.* 2010).

In the parent study assessing barriers and facilitators influencing progress in child survival four African countries (Haley *et al.* 2016), we evaluated national policy and strategy documents, qualitative data, and quantitative indicator data. Challenges to achieving MDG#4 that were most salient to Zimbabwe were identified, as well as some national responses that appear promising. We report here on the national health workforce shortage, which was consistently and extensively reported as an overarching health care factor contributing to Zimbabwe's failure to achieve MDG#4.

Methods

The period of interest for this case study, and the parent study on child survival in sub-Saharan Africa, was 2000-2013. Data sources include quantitative MNCH indicator data obtained for years nearest to 2000 and 2013 (details below), a review of national policies and strategies issued between 2000 and 2013, and key informant interviews and focus groups with community women conducted in 2013.

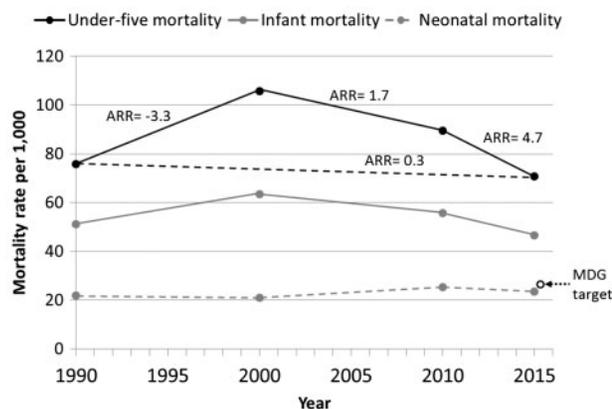


Figure 1. Under-five, infant, and neonatal mortality rates for Zimbabwe in 1990, 2000, 2010, and 2015 (solid circles) with annual rates of reduction (ARR) for each period (solid and dashed lines) and the Millennium Development Goal (MDG) target (dotted arrow, open circle)
Source: Levels and Trends in Child Mortality: Report 2015 - Estimates Developed by the United Nations Inter-agency Group for Child Mortality Estimation (UNICEF *et al.*, 2015).

Table 1. Content areas and key questions and themes related to child survival explored during the review of national health policies and strategies, key informant interview, and focus groups with community women

Content Areas	Cross-cutting Questions for review of national policies and strategies	Themes explored across content areas with key informants	Themes explored across content areas with community women
Health care system	What policies and strategies related to child health were in place between 2000 and 2011 (including changes during this period)?	Issues related to program evaluation, access and utilization, coverage, impact, and sustainability, as appropriate	Barriers and facilitators to accessing and utilizing MNCH services, including cultural and community factors
Leadership and governance ^a			
Accountability ^a	What were challenges hindering progress towards MDG#4?	Knowledge and experiences related to MNCH across the <i>health care continuum</i> (prenatal care through age 5 years)	Experiences related to MNCH across the <i>health care continuum</i>
Policies, regulations and laws ^a			
National health strategies ^b	What were facilitators enabling progress towards MDG#4?	Knowledge and experiences related to MNCH across the <i>health system continuum</i> (community to tertiary hospitals)	Experiences related to MNCH across the <i>health system continuum</i>
Maternal, neonatal and child health (MNCH) Interventions			
Clinical standards and guidelines ^b	What plans for change or improvements were either implemented after 2011 or were proposed as a measure to improve child survival going forward?		
Commodities and essential medicines			
Financial flows and resources ^b			
Effective partnerships ^b			
Health Information Systems			
/Monitoring and Evaluation ^a			
Contextual issues ^c			

^aAssessed only in the review of national policies and strategies.

^bAssessed only in the review of national policies and strategies and in key informant interviews.

^cDomestic and international conflict, political upheaval, environmental crises, water and sanitation, nutrition and food security, education, human rights, gender-based issues and other social determinants of health.

Quantitative indicator data

Data were obtained on core indicators related to MDG#4 monitored by Countdown to 2015 (Victoria *et al.* 2003). The data source for most indicators was the World Bank Data Catalogue (World Bank), a repository of national, regional, and global indicator data compiled from officially-recognized sources, including national Demographic and Health Surveys (DHS). Data for indicators not readily available from the World Bank Data Catalogue were obtained from national sources including Zimbabwe's 1999 and 2010/11 DHS or national documents including Zimbabwe's 2009 Health Workforce Observatory and 2012 Health System Assessment (Central Statistical Office [CSO] and Central Statistical Office, 2000, Zimbabwe National Statistics Agency [ZIMSTAT] and Zimbabwe National Statistics Agency, 2012, Osika *et al.* 2010, Zimbabwe Health Workforce Observatory, 2009). Given the scope of the larger study and recognizing that data are not always available for the exact years of interest, indicator data were obtained most closely corresponding to the beginning of the study period in 2000 (range 1998-2003) and the end in 2013 (available only for 2009-2011) to enable description of trends during the period.

Review of national policies and strategies related to child health

Based on a review of the peer-reviewed literature and published global strategies relating to child survival, an information abstraction guide was developed to guide the document procurement and review process (Table 1). Policies and strategies pertaining to overall national health, MNCH, and other sectors involved in child health (e.g., education, water and sanitation, agriculture and nutrition) were obtained from the WHO African Region office, WHO country focal points for Zimbabwe, and Zimbabwe's Ministry of Health and Child Care (MOHCC, formerly known as the Ministry of Health and Child Welfare). These documents were reviewed and any additional documents referenced and deemed important were then obtained and reviewed (Supplementary Material, Table S1).

Each document was reviewed multiple times by a single reviewer (CAH) and relevant information was recorded as outlined in the

abstraction guide to standardize abstraction and summarization of content across documents. To avoid introducing bias, information abstracted from country documents was reported as stated in the original source, with care not to overstate or minimize the original information or to add commentary not included in the source document.

Qualitative study procedures

Study location and participants

Participants were included from both urban and rural areas to ensure that experiences and opinions related to MNCH better represented Zimbabweans. The study was conducted in Mashonaland West because it was logistically accessible to study interviewers and reported under-five mortality ARRs comparable to the national ARR in the 1999 and 2010 Zimbabwe DHS. Within this province, Makonde District was selected as the urban site, consisting of the capital of Chinhoyi and the town of Banket, while the rural site was the Zvimba District surrounding Chinhoyi.

Qualitative data were obtained from semi-structured interviews with key informants from the MOHCC, donor organizations, community-based organizations (CBO) involved in MNCH, and health care providers (HCP). Data were also obtained from focus group discussions with local community women who had sought MNCH services. All study interviews and focus group discussions were conducted between October 9 and November 26, 2013.

Eligibility criteria and identification of study participants

Inclusion criteria for all participants included: 1) being ≥ 18 years of age, 2) having adequate knowledge or experiences related to childhood survival specified for each participant group below (Table 2), 3) speaking English or Shona, and 4) ability to provide written or verbal informed consent.

The research team collaborated with the Family Health Director in Zimbabwe's MOHCC, the WHO focal point for child health, and the Medical Officer at the Provincial Hospital to generate lists of potential participants for each key informant group. These individuals were then contacted through telephone calls and in-person

Table 2. Additional inclusion criteria for each key informant group

Key Informant Type	Description
Ministry of Health and Child Care	<ul style="list-style-type: none"> National or provincial-level officials working in government-level health care system administration, policy-making, program development, or leadership. All officials working in areas related to maternal, neonatal and child health (MNCH) were eligible.
Donor Partners	<ul style="list-style-type: none"> Individuals working as directors, managers, or other leaders of entities providing financial or other aid for MNCH services, or serving as the implementing partner. International or national organizations focusing entirely on MNCH or with MNCH as one component of their mission. Organizations had to be officially registered in the country.
Members of Community-Based Organizations	<ul style="list-style-type: none"> Directors, leaders, or managers working for a Community-Based Organization (CBO) involved in or providing referrals to MNCH services within the study site. Organizations had to be officially registered in the country.
Health Care Providers	<ul style="list-style-type: none"> Professionally trained physicians, nurses, clinical officers, or other health-related staff such as environmental health technicians, pharmacists, or community health workers. Working in a health facility providing MNCH care.

Table 3. Characteristics of key informants in the four participant groups, Zimbabwe

	MOHCC		Donor		CBO		Providers	
	(n=6)		(n=6)		(n=6)		(n=12)	
Sex, N (%)								
Male	2	(33)	1	(17)	3	(50)	2	(17)
Female	4	(67)	5	(83)	3	(50)	10	(83)
Median Age in years (IQR)	45	(44, 46)	52	(45, 58)	40	(30, 48)	34.5	(32, 38)
Ethnicity, N (%)								
Shona (Manyika)	0	(0)	1	(17)	4	(67)	0	(0)
Shona (Zezuru)	2	(33)	1	(17)	0	(0)	5	(42)
Shona (unspecified)	2	(33)	2	(33)	2	(33)	3	(25)
Other ^a	2	(33)	2	(33)	0	(0)	4	(67)
Education, N (%)								
Primary	0	(0)	0	(0)	0	(0)	0	(0)
Secondary	2	(33)	0	(0)	0	(0)	0	(0)
Post-secondary	4	(66)	6	(100)	6	(100)	12	(100)
Median years working for organization (IQR)	22	(20, 23)	5	(2, 7)	6.5	(3, 8)	7.5	(6, 10.5)

^aOther includes one each of Shona (Karanga), Shona (Korekore), Ndebele, or not stated (n = 5).

Note: CBO = community-based organization; IQR = interquartile range; MNCH = maternal, neonatal and child health; MOHCC = Ministry of Health and Child Care.

to request participation, and recruitment was facilitated through a letter of support from an MOHCC official. Similar numbers of participants were enrolled from each key informant group, which intentionally included a range of ages, work experiences, and positions/roles.

Efforts were also made to balance the number of urban and rural participants within the HCP and CBO groups. Basic demographic characteristics of the key informants are shown in Table 3.

Two focus groups each were held in Chinhoyi and surrounding rural areas. An initial sample of women was recruited by referrals from antenatal care (ANC) clinics and from other women who visited the hospitals in the study area. Additional study participants were then identified through snowball sampling. Efforts were made to include women with diverse experiences regarding MNCH, and to balance participants' educational level, parity, and number of live and deceased children in each group. Table 4 includes basic demographic characteristics of the focus group women.

Interview and discussion guides

Guides for key informant interviews and focus group discussions were developed to focus on barriers to and facilitators for improving child survival, in alignment with content areas for the national document review (Table 1). These guides were pilot tested through cognitive interviewing (Collins, 2003) and revised as needed prior to the study. Not all topics were appropriate for each key informant group, however each topic was asked of at least two groups. Although individual interviews and group discussions allowed participants to discuss the entire period from 2000 forward, most recalled more recent information and experiences.

Data collection and analysis

All interviews and focus group discussions were conducted in English or Shona and were audio recorded. Key informant interviews were conducted by a single research assistant while two research assistants conducted focus group discussions to facilitate

Table 4. Characteristics of female focus group participants, Zimbabwe

	Rural participants		Urban participants	
	(n=19)		(n=20)	
Age, Median in years (IQR)	26	(22, 28)	29	(26, 33)
Ethnicity, n (%)				
Shona (Zezuru)	9	(47)	1	(5)
Shona (unspecified)	10	(53)	17	(85)
Other ^a	0	(0)	2	(10)
Education, n (%)				
Primary	3	(16)	5	(25)
Secondary	16	(84)	14	(70)
Post-secondary	0	(0)	1	(5)
Travel time to health care (dry season), n (%)				
Less than one hour	10	(53)	17	(85)
One to two hours	8	(42)	3	(15)
More than two hours	1	(5)	0	(0)
Number of living children, Median (IQR)	2	(1, 3)	2	(1.5, 2)
Age of youngest child, Median (IQR)	1 year	(0 month, 3 year)	4 month	(1 month, 4 year)
Any children who died <5yrs old, n (%)				
No	14	(74)	9	(45)
Yes	5	(26)	10	(50) [†]
Place of delivery for latest pregnancy, n (%)				
Health facility	16	(84)	19	(95)
Home	2	(11)	1	(5)
En route to health facility	1	(5)	0	(0)
Birth Attendant for latest pregnancy, n (%)				
Doctor	1	(5)	3	(15)
Nurse/midwife	15	(79)	17	(85)
Traditional birth attendant	3	(16)	0	(0)

^aOther includes Shona (Korekore) and one from Mozambique. [†]Data missing for one participant.

discussion and take field notes. Audio recordings were transcribed by the research assistants, translated into English as needed, and field notes were incorporated into the transcript. Transcripts were coded and analysed using the qualitative software Atlas.ti (Murh, 2004). Deductive themes were determined *a priori* based on interview guides and key MNCH topics identified in the literature review. Additional themes were also discerned upon review of the transcripts. Within the identified themes, text was reviewed for patterns of consistency, variation, relationships between themes and exemplary cases or quotations (Nastasi and Schensul, 2005, Schensul, 1993).

Ethical approval

This study was approved by the Institutional Review Board of Vanderbilt University, the Joint Parirenyatwa Hospital and College of Health Sciences Research Ethics Committee, and the Medical Research Council of Zimbabwe.

Results

MNCH indicator coverage data

Among core indicators of MNCH in Zimbabwe for which data were available for both 2000 and 2013, coverage levels in 2000 were generally high but nearly all remained stagnant or decreased over time (Figure 2). Data from 2000 were not available for four indicators (HIV positive pregnant women receiving antiretroviral therapy (ART), children with acute respiratory infection (ARI) given antibiotic, diarrhoea treatment, and use of insecticide treated

bednets), making it unclear whether coverage increased, decreased, or remained stagnant.

Major themes from national documents, key informant interviews, and focus groups with community women Impact of the human resources for health shortage on availability of child health services

The availability of health workers in Zimbabwe at the peak of the crisis in 2009 is shown in Table 5. With over 6,940 vacant positions across all staff cadres, the public health system was operating at only 57% of staffing capacity. The low density of physicians (0.067 per 1000 population) was far below the minimum level of 0.2 recommended by WHO, and included a paucity of specialists (Osika *et al.* 2010, WHO, 2006a). According to national documents, substantial outmigration, transfers to the private sector or non-health fields, early retirement, HIV/AIDS and death, all contributed to health workforce attrition and were compounded by a low replacement rate. Key informants cited inadequate government funding, administrative issues such as hiring freezes, and outdated human resource plans and staff establishments. National documents further indicated that not all lower level facilities had trained, on-call physicians after hours and that midwives were not available in most primary care facilities. Moreover, an inequitable distribution of remaining HCPs left many rural areas severely underserved.

If the government does not have money...then it's unable to pay its human capital... we have public hospitals training most of the health personnel in this country...if they move away it means they are moving away with their expertise...the government or

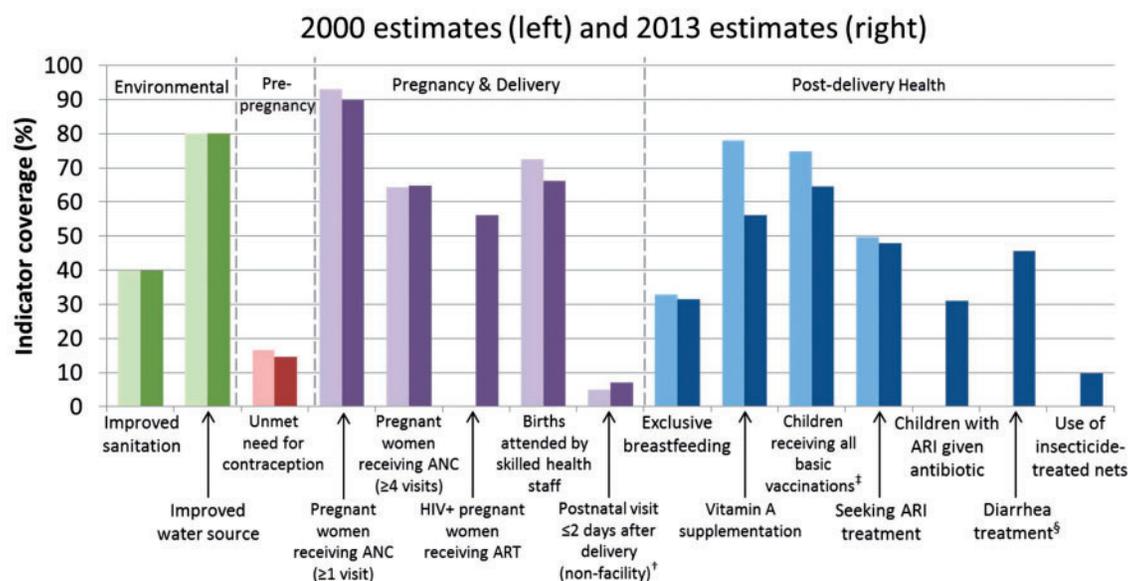


Figure 2. Limited change in child survival indicator coverage in Zimbabwe, 2000–2013*

*Estimates for Zimbabwe were not always available for years 2000 and 2013, in which case the nearest estimates from the period between 1999 and 2002 or 2009 and 2011 were used; data were not available for the four indicators showing no coverage during the 2000 time period.

[†]among births outside a health facility (excludes facility births)

[‡]Children 12–23 months old who have received Bacillus Calmette–Guérin (BCG), measles and three doses each of diphtheria, pertussis, and tetanus (DPT) and polio vaccine (excluding polio vaccine given at birth)

[§]Children under 5 receiving oral rehydration and continued feeding

Source: country DHS and the World Development Indicators Data Catalogue from the World Bank (accessed August 2015)

NOTES: ANC=antenatal care; ART=antiretroviral therapy; ARI=acute respiratory infection

Table 5. Health Worker Staffing levels per Selected Cadre, 2009

Cadre	# of Staff for Full Health System Operations ^a	# of Staff in Place, January 2009 ^a	Shortfall ^a	% of Cadre Staffed ^a	Healthworker per 1000 population ^b
Doctor	1,505	508	997	34%	0.067
Registered general nurse	7,688	5,087	2,601	66%	1.349
Primary care nurse	2,500	1,778	722	71%	
Pharmacist	132	37	95	28%	0.031
Pharmacy technician	185	90	95	49%	
Laboratory scientists	385	245	140	64%	0.022
State-certified medical laboratory technician	120	31	89	26%	
Environmental health officers	277	64	213	23%	0.092
Health services administrator	62	28	34	45%	NA
Total for all cadres nationally [†]	16,049	9,109	6,940	57%	2.253

Sources: Adapted from.

^aOsika et al., 2010 and.

^bZimbabwe Health Workforce Observatory, 2009.

[†]Includes cadres not shown in this table, such as dentists and radiographers.

hospitals remain training ground for other institutions that can pay well." (45-year old, female CBO official)

"I wanted to say if only we could have two or three trained people, though the assistant can be there, the trained ones should be 2 or 3... the [assistants] will be those who help [but] that becomes a problem because they will be overwhelmed." (29-year old, urban woman with 2 children)

"We have a critical shortage of midwives... You train them, they serve their 1-year bonding, because of the poor remuneration within the Ministry, they go... because they are the community leaders there, they are experienced, they have all the knowledge,

the know-how, so we are losing them to other competitors." (46-year old, female MOHCC official)

All key informants and community women identified the shortage of health workers as a major challenge for child survival in Zimbabwe. National policies and strategies also linked insufficient health staffing levels to inadequate availability of services across the continuum of care from pregnancy through childhood and across all care settings from remote communities to urban referral centres. Many health facilities closed due to staffing shortages, and critical services including emergency obstetrics and neonatal care

(EmONC), transfusion services, caesarean sections and newborn resuscitation were not available at many hospitals that remained in service. Compounding the problem, staff-dependent outreach mobile services in many rural settings were no longer able to provide community-based preventive and curative MNCH interventions. As a result, many pregnant women and their children had to travel long distances to reach a functional district or provincial health centre. Community women further described experiencing long lines while waiting for MNCH services at their local clinic due to the lack of health workers. Higher-level public facilities were described as poorly equipped and under-financed, making them unable to attract and retain essential staff required to deliver life-saving MNCH interventions.

“An obstacle to greater access is really the human resources factor because... we see that the staff is overwhelmed and cannot pay appropriate attention...in theory they should be available everywhere but there is a practice of having a private clinics and so it's not so easy to get the doctor when you want him or her for an emergency...” (52-year old, female donor partner)

“If you go to our public institutions ... the specialists are not there...The nurses are there and they are manning [the clinical services] and they have to phone the doctor wherever he or she is to come and see this patient who has [a complication]... if you come on Friday, Saturday, Sunday you are kept there until Monday” (45-year old, female donor partner)

“As for some of us who are pregnant, if you come and you are in labour, you might find a person who is not able to examine you properly, they just examine you and leave you to deliver by yourself when they are gone” (24-year old, rural woman with 3 children)

According to several key informants, many providers with dual professional responsibilities prioritized their time working in private clinics instead of public facilities. Some community women also described this inequity, noting that the availability of experienced physicians and midwives was much better in the private sector. Outside of the public health sector, some mission hospitals and private clinics increased their services, but this was insufficient to meet demand during the years of crisis and many Zimbabweans could not afford even the minimal out-of-pocket cost entailed.

National documents also identified several crucial policy gaps during the study period that affected the availability of providers to deliver important MNCH interventions. At delivery, midwives had only partial support authorizing them to administer life-saving interventions during labour and childbirth. Additionally, there was no policy requiring trained health workers to conduct home post-natal care (PNC) visits in the first week of life to identify newborns who required care. For older children, community-based Village Health Workers (VHW) were authorized to carry out rapid testing and treatment for malaria and to treat diarrhoea with oral rehydration solution and zinc, but were not allowed to provide life-saving antibiotics for ARI (ZMOHCW, 2010a, *Countdown to 2015, 2012, Requejo et al. 2014*).

Impact of the human resources for health shortage on quality of MNCH care

National documents reported that the system-wide deficiency in the health workforce led to overworked and discontent health workers, resulting in low motivation to provide good quality care. MNCH providers were further strained by working under adverse conditions caused by chronic underfinancing, frequent shortages of supplies and drugs, debilitated facilities and equipment, and limited

transportation and information, communication and technology infrastructure. The documents also noted that poor communication affected continuity of care between system levels and between the private and public sectors. Although these issues were reported across all levels of the health system, they were felt to be particularly severe at the community level and in rural areas.

With the loss of senior staff, less experienced staff assumed positions they were ill equipped for, with few remaining mentors to provide on-the-job training. The resultant knowledge and skills gap among health care workers was specified as a barrier to the appropriate assessment and treatment of sick children. Furthermore, high attrition of experienced managers limited the provision of supportive supervision and performance monitoring of all cadres of health workers. The closure of several training facilities and medical schools due to budget constraints further reduced available training and educational opportunities. Vacant academic posts at medical schools and nurse tutor posts, outdated training materials and curricula, and a lack of tools to guide treatment at the point of care also contributed to poor qualification among graduating health professionals.

Both key informants and community women echoed the poor quality of MNCH reported by national documents. Community women specifically described the quality of MNCH services in terms of their own experiences with impatient and uncaring healthcare providers. Further, women specified that poor treatment caused them to delay or limit their use of health services. Community women also reported that some health providers inappropriately charge for basic supplies required for treatment or expect additional ‘under-the-table’ payments despite Zimbabwe’s national policy waiving user fees for pregnant women and children under 5 years.

“The trainings are scarce. You can have one training for the whole of the year and training only 25 participants in a district. So it's very difficult if you train 25 participants; some will go to school, some will resign, some will transfer, so [that] will leave [the untrained] personnel...” (34-year old, female MOHCC official)

Quality is a major challenge right now for this country... some of [the doctors] are unable to do cesarean sections, so we really need to bring in senior doctors just to go to the district to mentor them, to show them and to improve the skill of those health sectors.” (58-year old, male donor partner)

“At this hospital, a patient who is admitted in the private ward is treated differently because they have the money and they are treated on time. You will wait if you do not have money and they will not even look at you.” (29-year old, urban woman with 2 children)

“Others treat us roughly. If you go to the clinic and you are poor and if you go without gloves, or razor and all that is needed, they can leave you and assist the other patient who has all the things needed. So this is a worrisome issue when I [am] pregnant...” (39-year old, urban woman with 4 children)

National documents stated that traditional medicine is widely available as a long-standing part of Zimbabwe’s overall health care system, but did not describe the utilization or quality of care provided by traditional health workers. Participants had mixed opinions regarding traditional healers. Some key informants felt they could be a valuable asset given their high profile in the community, especially if they could be trained to make referrals and provide accurate health information and counseling to promote the use of MNCH care by skilled providers. Other key informants and most community women expressed concern about the quality of care provided by traditional healers.

"The traditional midwives they have an important role. . . if there is good communication between them then they help, because they can do a delivery." (32-year old, female HCP)

"Giving birth at home [with a traditional birth attendant] is bad in that I will not know [the baby's] position. . . So when I am at home they will force me to give birth and I will get hurt or tear. And when I tear [at home], no one will see me together. You will stay like that or the wound will get septic. . . if they force things, she may break the uterus or the traditional birth attendant may not have gloves, she may have a wound; they hold your baby without gloves and may infect the baby." (33-year old, urban woman with five children)

Recent efforts to addressing Zimbabwe's health workforce crisis

Recruitment, retention, and distribution of human resources for health. National documents identified several important policies and strategies that were implemented during the study period in response to the deterioration of the health workforce. In 2008, Zimbabwe implemented an Emergency Retention Scheme with assistance from partners, which was felt to have somewhat stabilized the public health sector and has been credited with decreasing the number of resignations (Chimbari *et al.* 2008, Osika *et al.* 2010, ZMOHCW, 2010b, Dieleman *et al.* 2012, Zimbabwe Health Workforce Observatory, 2009). Subsequently, a National Human Resources for Health Policy was developed to facilitate the optimum production, training, management and retention of health workers in the public health sector. Zimbabwe's Human Resources for Health Strategic Plan, 2010 – 2014 (ZMOHCW, 2010c), was then issued to operationalize this policy. In 2011, the government and external partners enacted Zimbabwe's Health Transition Fund as a vehicle to reduce maternal and under-five mortality by abolishing user fees and supporting high impact interventions and health system strengthening (ZMOHCW, 2011). This 5-year pooled fund addressed four core elements, including specific measures to ensure retention of an adequate, skilled, and productive health workforce by providing satisfactory incomes and incentives, high-quality training and supervision, and adequate tools required for high quality care.

Because these measures were implemented towards the end of the study period, data regarding their effectiveness had not yet been assessed or reported in national documents or surveys. Some key informants did suggest that the workforce shortage might be improving, citing facilitators such as the provision of additional training for midwifery and nursing skills, higher pay, financial and housing incentives, and allowing workers to have expanded responsibilities. Financial assistance from external partners through the Health Transition Fund was highlighted as a promising measure to improve the health workforce and essential MNCH services, particularly ANC and skilled birth attendance. However, some key informants expressed concern that improved access to MNCH interventions resulting from the Health Transition Fund would create increased demand and overburden limited resources at the facilities. Several key informants also noted concern regarding uneven availability of assistance and the long-term sustainability of the Fund.

"To return this one on the job [to attract more providers]. . . we are paying retention allowance. . . we could see that the district hospital almost fifty percent of them were empty [before the incentives]; now, at least one hundred percent of them have one doctor in each district to provide comprehensive service very well. . . and this [is] the good thing with this Health Transition Fund. . ." (58-year old, male donor partner)

"We have got the Health Transition Fund which is aiding us to have every pregnant mother to book at 14 weeks freely. . . it is

aiding us to detect any complications. . . also. . . increase midwives [who] are being trained so that they will have skills in dealing with maternal and neonatal issues. . . also there are workshops which are being handled to equip staff with knowledge on neonatal." (34-year old, female MOHCC official)

Measures to expand the roles and responsibilities of health workers.

Towards the end of the study period, Zimbabwe issued the revised National Health Strategy (NHS), "Equity and Quality in Health-A People's Right (2009 – 2013)", which aimed to restore the availability of high quality health services throughout the country and to address challenges related to the deficient health workforce (ZMOHCW, 2010b). This NHS included measures to shift responsibility for basic MNCH services to lower-level health workers such as a generic cadre of Primary Care Nurses trained specifically to enhance services at the primary care level. A *Village Health Worker Strategic Direction* was also issued in 2010 to re-introduce the use of community-based VHWs to deliver core health interventions closer to the population, coordinate referrals, and to educate and counsel individuals and families to maintain good health (Zimbabwe Health Workforce Observatory, 2009, ZMOHCW, 2010d). Key informants and community women confirmed that VHWs facilitated improved access and utilization of MNCH services by encouraging women to utilize ANC and facility-based deliveries, while also following-up on patients in the community after referral to higher-level facilities.

"The mothers are attending ANC [antenatal care clinics] because we have village health workers. They talk to the mothers . . . and encourage them to attend, so I think the program is working well since the number of ANC mothers attending is increasing." (32-year old, female HCP)

"[MNCH interventions] are all accepted now . . . because of education and the promotion [provided by village health workers] they are accepted. Mothers know that you must go for growth monitoring every month . . . Maybe [in] certain areas we'd need to educate more, especially when it comes to ANC. . . . but it's now more of behaviour change on the part of the mothers involved, but the information is out." (33-year old, female donor partner)

"With the grassroots we have the village health workers as our main source of information as we have direct contact with them so if there is any patient we want to follow up they have got sort of forms which they use. . . and they give the patient a slip, and we also communicate with the village health worker that the patient has received medication or review we send feed back to the village health worker." (35-year old, male HCP)

Discussion

Zimbabwe has experienced a prolonged socio-economic collapse resulting in the deterioration of the national health system and a decline in the availability of public health services (Ojikutu *et al.* 2008, Osika *et al.* 2010, ZMOHCW, 2010a, ZMOHCW, 2010b, Premkumar and Tebandeke, 2011, Chirisa *et al.* 2015). In this context, this study found that Zimbabwe's critical health workforce shortage and diminished opportunities for professional training and education were consistently reported as a barrier to the availability, quality, and utilization of MNCH services between 2000 and 2013, thus hindering progress towards MDG#4. The country's lack of progress in reducing neonatal mortality during the study period is of particular concern, and has been compounded by several significant

policy gaps affecting authorization of midwives to deliver life-saving interventions and for health staff to make home visits for PNC. Similarly, the lack of a policy authorizing community-based health workers to provide antibiotics for ARI likely contributed to high pneumonia-related mortality.

The centrality of the health workforce for improving health services and population health outcomes is well established, and is considered a 'critical precondition' to achieving the Millennium Development Goals (WHO, 2014a). Moreover, lack of a skilled health workforce is a recognized barrier to the provision of MNCH care and is of great concern to many African countries facing health-related human resource crises in the setting of persistently high child mortality (Anyangwe and Mtonga, 2007, WHO, 2006a, Campbell *et al.* 2013, Dolea *et al.* 2009). Zimbabwe meets the WHO criteria for having a critical shortage of health workers, defined as fewer than 2.28 doctors, nurses and midwives per 1000 population and having <80% of deliveries attended by a skilled birth attendant (Campbell *et al.* 2013, WHO, 2006a). This problem arises from challenges affecting recruitment and retention of health workers, insufficient training and supervision, inadequate skills-mix, inadequate pay, poor work environments, limited opportunities for career development and continuing education, lack of performance-related rewards and recognition, and better employment opportunities in the private sector or in other countries (Frenk *et al.* 2010, Anyangwe and Mtonga, 2007, WHO, 2006a, Chen *et al.* 2004). The resulting sub-optimal quality of care and even maltreatment of patients has been shown to inhibit utilization of effective MNCH services even when they are available (Campbell *et al.* 2013). This 'quality gap' is most prominent for births within facilities, contributing to the low proportion of pregnant women and newborns receiving recommended packages of services that prevent deaths during pregnancy, childbirth and the neonatal period (Friberg *et al.* 2010). Governments and health policy makers in sub-Saharan Africa can maximize lives saved through measures that guarantee both high quality MNCH care and increased coverage levels (Kinney *et al.* 2010). Proven strategies to enhance quality of care include: continuous health staff education and training; regular monitoring, feedback, and supportive supervision; national policies promoting quality assurance; and broad community involvement (Althabe *et al.* 2008, Van Den Broek and Graham, 2009, Mutungi *et al.* 2008, Kongnyuy *et al.* 2009, Montagu, 2003). Zimbabwe used two overarching approaches to begin addressing the shortage, maldistribution, and insufficient quality of human resources for health. The first was to develop and implement comprehensive national human resources for health policies and financing strategies to optimize the development of their health workforce in accordance with international recommendations (WHO, 2006b, Campbell *et al.* 2013, WHO, 2010). Several countries that have successfully reduced under-five mortality concurrently improved their health workforce capacity and productivity through comprehensive emergency human resources plans targeting recruitment and retention, expanded domestic training, decentralization of human resource management, and use of incentives such as wage increases, low-cost housing and loans, heightened security, free health care, expanded opportunities for professional advancement, and results-based financial incentives. (Palmer, 2006, Kuruvilla *et al.* 2014, Global Health Workforce Alliance, 2014, Campbell *et al.* 2013, WHO, 2010).

The second health workforce development measure utilized in Zimbabwe was to increase efficiency of existing resources by shifting responsibilities to cadres of workers who may be more available, less expensive and require less training. The WHO has endorsed task-shifting towards health workers with lower-level qualifications

as a means of 'optimizing the delivery of key, effective interventions' where there are not enough higher-level providers and specialists. In many African countries, non-physician clinicians and nurse-equivalents have successfully been used to increase access to critical services (Anyangwe and Mtonga, 2007, Sanders *et al.* 2009, Gopinathan *et al.* 2014, Chilopora *et al.* 2007, Fenton *et al.* 2003, Gessesew *et al.* 2011, Mullan and Frehywot, 2007). Midwives in particular offer an effective, affordable and sustainable means of increasing skilled care at birth because they can be trained to deliver most maternal and newborn interventions, facilitate appropriate referrals to specialists and EmONC services, and encourage appropriate health promotion and care seeking behaviours (Colvin *et al.* 2013, Homer *et al.* 2014, Renfrew *et al.* 2015, ten Hoope-Bender *et al.* 2014, Van Lerberghe *et al.* 2014). Of note, morbidity and mortality outcomes associated with task shifting to nurses and other non-physician clinicians are similar to physician-centred models of care delivery, though this practice is most effective when workers are carefully trained and supervised and when community representatives are included in the planning and evaluation processes (Callaghan *et al.* 2010, WHO, 2008, Laurant *et al.* 2005, Gessesew *et al.* 2011, Hofmeyr *et al.* 2009, Dawson *et al.* 2014, Argaw *et al.* 2008). As shown in Zimbabwe, specific policy support is required to authorize task-shifting of essential services, such as allowing midwives to perform life-saving measures at birth and community-level workers to treat uncomplicated ARI, diarrhoea, and malaria.

Task-shifting to lay personnel in community and primary care settings such as Zimbabwe's VHWs is another effective way to meet local population health needs while maintaining good clinical outcomes (WHO, 2012, Lewin *et al.* 2010, Lehmann and Sanders, 2007, Laurant *et al.* 2005). If properly trained, supported and authorized, community health workers can improve child survival by increasing access to curative and preventative MNCH interventions, facilitating referrals and continuity of care between providers and health system levels and promoting healthy behaviours and health service utilization (Gopinathan *et al.* 2014, WHO, 2012, Glenton *et al.* 2013, Perry and Zulliger, 2012, Oona *et al.* 2006). In a study of nine African countries, Friberg and colleagues demonstrated that expanding the community-level workforce could potentially achieve a 20% coverage increase for selected community-based or outreach interventions thus saving an estimated 486 000 lives with low additional cost (Friberg *et al.* 2010). In other countries, community health workers have been used to successfully deliver essential primary health care services for women and children (Banteyerga, 2011), improve the quality of care through increased MNCH knowledge practices (Karim *et al.* 2013), increased access to care through door-to-door outreach (Johnson *et al.* 2013), and daily village clinics where they diagnose and treat common childhood illnesses (Zimba *et al.* 2012). Case-studies from countries that successfully achieved MDG#4 also recognized the use of lay workers to deliver preventive and curative interventions for pregnant women and children as a key facilitator of child survival (WHO, 2014b, Haver *et al.* 2015, Mbonye *et al.* 2012, Amouzou *et al.* 2012). Studies have also shown that local traditional birth attendants can be trained to deliver certain interventions, assist with facility-based deliveries, make referrals to skilled services, and promote basic newborn care in the community (WHO, 2012, Colvin *et al.* 2013, Darmstadt *et al.* 2009, Prata *et al.* 2011, Mullan and Frehywot, 2007, Samb *et al.* 2007, Laurant *et al.* 2005, Gessesew *et al.* 2011, Thetard and Macheso, 2004, Pereira *et al.* 2007). As a long-included part of Zimbabwe's health care system, traditional birth attendants could thus potentially be used to expand availability of

some basic health services as long as appropriate training and supervision is guaranteed.

Our study utilized several data sources to better understand Zimbabwe's insufficient progress towards MDG#4, but a few limitations should be noted. First, the various policies and strategies reviewed covered different and sometimes overlapping time periods, making it difficult to distinguish current from outdated information. Second, it was difficult to determine whether or when a specific policy or strategy had been implemented unless specifically stated. Study co-authors affiliated with the WHO and the MOHCC clarified areas of uncertainty when possible. Additionally, most documents reviewed were issued between 2007 and 2012 even though the review was intended to cover the entire time period 2000-2013. While these documents included a valuable retrospective assessment of national challenges experienced during most of the study period and introduced newer strategies targeting such challenges, assessments of the impact of these more recent policies or strategies had not been published by the study's conclusion. The qualitative study was limited by the relatively small sample of participants whose views and experiences may not be generalizable to all Zimbabweans. However, participants were selected from geographic areas reflecting Zimbabwe's national trends in under-five mortality and included key informants with national-level responsibilities. Moreover, data from both the qualitative study and national document were highly consistent with each other, further supporting the validity of our findings. Additionally, while we asked participants to consider the entire study period from 2000 to 2013, many focused more heavily on their recent experiences and opinions. However, some key informants had extensive involvement in MNCH spanning many years and many community women had older children and thus longer experience with MNCH services.

Conclusion

Zimbabwe's critical shortage of skilled workers was a prominent obstacle to achieving MDG#4, severely limiting coverage of effective MNCH interventions and provision of quality care. Recently implemented strategies to overcome this challenge appear promising, and should be fully evaluated to determine their effectiveness. In the meantime, health leaders should continue to prioritize MNCH among health and development goals, and to explore sustainable solutions that can enable a rejuvenated, skilled and effective health workforce to restore the country's position as one of the pre-eminent health systems in sub-Saharan Africa. Studies like this one can provide meaningful information to help struggling countries address their own human resources for health challenges and thus attain health goals such as reduced under-five mortality.

Supplementary Data

Supplementary data are available at *HEAPOL* online

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Ethics

The Institutional Review Boards at Vanderbilt University Medical Center, the Medical Research Council of Zimbabwe, and the Joint Parirenyatwa Hospital and College of Health Sciences Research Ethics Committee approved the qualitative study component of the case study.

Conflict of interest statement. None declared.

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