



Tracking Progress for Reproductive, Maternal, Neonatal and Child Health (RMNCH) services in Zambia



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Ministry of Health, Zambia

In collaboration with

School of Public Health, University of Zambia, Countdown to 2030 for Women's,
Children's and Adolescents' Health and University of Manitoba



African Population and
Health Research Center


Countdown to 2030
Women's, Children's & Adolescents' Health



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FOREWORD

The health sector has continued on its trajectory of pursuing universal health coverage while leaving no one behind. This is being done through health information strengthening. With maternal mortality being a public health emergency, the health sector is determined to having a strengthened and uninterrupted service delivery system across the continuum of care. For women, children and adolescents, this is being done by addressing key priority areas in the country towards Reproductive, Maternal, Newborn, Child and Adolescent Health (RMNCAH).

In order to effectively respond to the much-needed RMNCAH issues, it is important to understand the existing inequality needs. Equity analysis, such as this, to identify existing disparities in RMNCH interventions, is critical to targeted and responsive interventions of ensuring that no one is left behind.

The results in this report show that there has been improvement in child mortality and many of the RMNCH coverage indicators in Zambia. This is especially so in the rural areas, predominantly poor socio-economic and less educated groups. Evidence from this analysis as well as other studies suggest that equitable improvements in child health indicators could be attributed to the health policy and system changes in Zambia that have led to more equitable provision of RMNCH interventions in rural and poorer populations.

Despite the notable achievements, some significant lag remains in urban populations. This is especially evident among the marginalized poor populations and is suggestive of a need to re-adjust and reshape interventions to contextually target families in this group.

The Ministry together with its partners will take into account the notable achievements from this report and use them to prioritise investments towards the health systems strengthening. This will ensure equitable provision of essential health services and improvement of RMNCAH services.



Prof. Lackson Kasonka
Permanent Secretary - Technical Services
MINISTRY OF HEALTH

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Dr. Patricia Mupeta Bobo
Acting Director – Directorate of Public Health

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AARC	Average Annual Rate of Change
ANC	Antenatal Care
BCG	Bacille Calmette Guérin
CCI	Composite Coverage Index
CSO	Central Statistical Office
FP	Family planning
IPV	Inactivated Polio Vaccine
ITN	Insecticide Treated Net
MOH	Ministry of health
MR	Measles-Rubella
OPV	Oral Polio Vaccine
ORS	Oral Rehydration Salts
PNC	Postnatal Care
RMNCH	Reproductive, maternal, newborn and child health
SBA	Skilled birth attendance
U5MR	Under-five Mortality Rate
WHO	World Health Organization
ZDHS	Zambia Demographic and Health Survey



Executive Summary

Background

Although Zambia has achieved reductions in maternal, neonatal and child mortality rates, current levels are still unacceptably high, as the country remains among the countries in sub-Saharan region with higher mortality rates. Promising efforts are being made to accelerate improvement despite being restricted by social, economic and geographic disparities within the country. Monitoring existing inequalities in any given country is essential for achieving meaningful progress and for creating an equity-oriented health sector. Assessing how changes in the health policy and programme environment as well as the wider context have contributed to progress, or lack of progress, in Reproductive, Maternal, Neonatal, Child, and Adolescent Health (RMNCAH) indicators and child survival is also critical for determining whether actions in the health sector are successful in reducing inequalities and promoting equity.

Objective

The main objectives of this analysis were to enhance the understanding of factors affecting changes in child mortality and coverage of RMNCH interventions, with special focus on inequalities within Zambia, and to assess policies, strategies and health system changes that may have contributed to reductions or improvements in the levels of inequalities in coverage of health care interventions over time.

Methods

Using survey data from the Zambia Demographic and Health Surveys (ZDHS) (2001, 2007, 2013/2014, 2018), ratios, coverage and associated confidence intervals for specific indicators were estimated using Stata 15. RMNCH indicators were computed and compared by province, education, wealth quintile, gender, and place of residence (rural and urban). Child mortality rates were calculated using the syncmrates program. An overall measure of coverage across the continuum of care, the Composite Coverage Index (CCI), was also computed. A Policy and Programme Timeline Tool was adapted for identifying health policies, programmes and health systems changes that have been implemented to improve RMNCAH indicators and survival over time. Document review of all relevant national health sector documents, guidelines and strategies was conducted to complete the timeline tool, and to describe how equity was included in Zambia's national policies and programmes over time. Data analyses of the WHO Global Health Expenditure Database, Muskoka2 and Zambia's National Health Facility Censuses were also conducted to assess changes in health financing, and density of health facilities and human resources.

Results

Results from the analyses show that the national under-five mortality rate (among live births five years preceding the survey) has declined substantially from 168 to 61 per 1,000 live births between 2001 and 2018 ZDHS, although the target of 25 per 1,000 was not met. In contrast, neonatal mortality has not declined, and its contribution to under-five deaths doubled from 19% to 38% between 2001 and 2018. The largest contribution to the decline in under-five mortality was attributable to declines in the leading causes of HIV/AIDS, acute lower respiratory infections, diarrheal diseases, and measles. Zambia made relatively faster gains in U5MR than many of the neighbouring countries. The largest improvements in under-five mortality were reported in Eastern and North Western provinces, followed by Central province. The inequality gap in under-five mortality improved between rural and urban areas in most provinces, among the poorest 20% of the population, and less educated groups. Neonatal mortality did not decline between the last two surveys in most provinces and in both rural and urban areas. The best performing province by 2018 was North Western province, with 9 deaths per 1000 live births in the 10 years preceding the survey. Urban areas had a slightly higher NMR at 28 deaths per 1000 live births, compared to 23 deaths per 1000 live births in rural areas.

The Composite Coverage Index (CCI) improved from 62% to 76% between 2001 and 2018. Despite a rapid increase in the CCI among the poorest groups, Zambia did not outperform the majority of its regional peers. Central, Eastern, Luapula, Muchinga, Northern and Western provinces improved most, at over 15 points. Provinces with higher baseline CCI experienced less improvement (Lusaka and Copperbelt provinces) while those with lower baselines improved most. The CCI gap between urban versus rural areas narrowed from 12 to 5 percentage points between 2001/2 and 2018 respectively. By 2018, the CCI was lower among the urban poorest compared to the urban richest quintile (74% versus 80% respectively). The CCI among the urban poorest was also not better than that of women in rural areas (74%). Inequality gaps improved most for skilled birth attendance and postnatal care between wealth and education groups, and rural versus urban areas (especially since 2013/14), as well as for coverage of family planning demand satisfied (particularly between 2001-2013/14), and treatment seeking behaviour for diarrhoea.

The declines in U5MR and CCI were not directly correlated at provincial level. Absolute reductions in U5MR (10 years preceding) were correlated with absolute increases in CCI between wealth, education and residence groups between ZDHS 2001/2 and 2018. This suggests that the greatest improvements were experienced for the more vulnerable groups (lower two wealth quintiles, none or primary education, and women living in rural areas), and those living in Central, Eastern, Northern, North Western and Western, , and provinces. The improvements were greater in rural than urban areas for all provinces. The gap in both mortality and CCI also closed between wealth groups within both rural and urban areas. Improvements also occurred largely independent of any rise in absolute income or education levels among the lower socio-economic groups.

An analysis of policies, programmes and contextual factors show that since 2000, Zambia has been implementing health sector reforms at macro, health system and RMNCH specific levels, with the consistent vision to “provide equity of access to cost-effective, quality health care as close to the family as possible”. Broader decentralization and pro-poor policies, and the focus on primary health care and retention of staff in rural areas, likely supported the increase in coverage of RMNCH interventions that could provide primary and secondary prevention of infectious diseases previously causing the most child deaths. Increased funding in health overall, and specifically for HIV/AIDS and less so malaria and RMNCH, from national and international sources, alongside a focus on harmonizing programmes across sectors and the continuum of RMNCAH+N care, and increasing the density of health workers and health facilities particularly in rural and hard-to-reach areas, may have contributed to the positive improvements in the CCI and the notably large declines in U5MR for more disadvantaged socio-economic groups and regions.

Conclusion

The results from this analysis show that there has been improvement in child mortality and many of the RMNCH coverage indicators in Zambia, especially in the rural areas, as well as predominantly poor socioeconomic and less educated groups. Evidence from this analysis as well as other studies suggests that equitable improvements in child health indicators could be attributed to the intentional health policy and system changes in Zambia that have led to more equitable provision of RMNCH interventions in rural and poorer populations. The observed lag in urban populations suggest a need to re-adjust and reshape interventions to contextually target families in this group to ensure no one is being left behind.



CHAPTER 1: Introduction

Background

Maternal, newborn and child mortality remain a global health challenge, and maternal mortality is the leading cause of death among women of reproductive age in most developing countries (1, 2). Although Zambia has achieved reductions in maternal, neonatal and child mortality rates, current levels are still far from the Sustainable Development Goal targets for 2030. Over the past couple of decades, significant progress has been made in Zambia leading to decline in mortality rates. For instance, the maternal mortality ratio (MMR) declined from 729 per 100,000 live births in ZDHS 2002, to 591 deaths per 100,000 live births in ZDHS 2007, and a further decline to 278 deaths per 100,000 live births in ZDHS 2018 [3].

Reduction of morbidity and mortality for mothers and children can be increased by successful coverage of services (2, 3). A key element of the Sustainable Development Goals (SDGs) is to effectively improve equitable and universal coverage of essential preventative interventions for Reproductive Maternal, Neonatal and Child Health (RMNCH) (4), which means addressing systematic and inequalities or gaps in health between groups of people in the population based on their socio-economic -status, gender, residence, region or other equity stratifiers(5).

Target 3.8.1 of SDG 3 - on coverage of essential health services, including access to quality essential health-care services— is the key to attaining universal health coverage. In line with goals such as this, Zambia will need to better understand inequalities in health intervention coverage and outcomes in order to prioritise effective and equitable strategies for improving women’s and children’s health. This is also a key priority of the Ministry of Health’s (MoH) National Health Strategic plan in Zambia – 2017-2021.

Guided by the vision of achieving, “equity of access to cost effective quality health care as close to the family as possible” (6) since the 1990s, Zambia has made strides to improving the health system by implementing a number of health reforms around the six WHO health systems building blocks (7). For instance, Zambia is determined to committing sufficient government funding to the health sector in order to accelerate delivery of high-impact and cost-effective interventions, targeting people in most need (8). The government is also aiming to –expand the health workforce by increasing production - and recruitment of -frontline health workers (9).

Rationale for tracking progress towards Universal Health Coverage

Tracking progress towards universal coverage for women’s, children’s and adolescents’ health through coverage indicators, spanning the continuum of care from pregnancy prevention and planning through to childbirth and postnatal, is crucial. Unless significant efforts are made to identify coverage gaps along the continuum of care and where effective strategies need to be prioritized, Zambia may not attain the desired SDG targets by the year 2030.

Therefore, there is a need to examine current performance in coverage along the continuum of care in order to track progress and ensure that the set targets are achieved, and to understand what policies or strategies may have contributed to these improvements. The availability of four national DHS since 2000 provides an opportunity for a systematic assessment to track the progress of RMNCH interventions and survival trends in Zambia and enhance the understanding of factors that have contributed to change, with a focus on policies and strategies that could explain equity-related improvements.

This report presents the results of the first objective of the Countdown 2030 project in Zambia to look at changes in socio-economic and geographic inequalities in Reproductive, Maternal, Neonatal, Child, and Adolescent Health (RMNCAH) outcomes in the past two decades. The focus is on the national and provincial analysis using household survey data. The report consists of a general overview of the RMNCAH situation in Zambia, the purpose, objectives, and brief description of the project, and the methodology used to answer the objectives. The report provides results on childhood mortality and the RMNCAH Composite Coverage Index (CCI), disaggregated by key social, economic and geographic stratifiers, and concludes with recommendations. The report also provides a description of the policies and programmes that could explain the observed trends and levels of RMNCAH intervention coverage and health outcomes including the status of inequalities.

This analysis project was conducted in the context of the Zambia Countdown country collaboration, which aims to strengthen analysis in support of annual reviews of the national plans and GFF investment case, as well as enhance analytical capacity. The Countdown to 2030 for Women's, Children's, and Adolescents' Health is a multi-institutional partnership aiming to accelerate momentum to achieve the SDGs around ending preventable maternal, newborn, adolescent and child deaths. The initiative generates evidence on progress towards universal health coverage, with a focus on Africa. There are Countdown collaborations in 19 countries. The Zambia collaboration is led by the University of Zambia's School of Public Health and the Ministry of Health, in collaboration with University of Manitoba's Institute for Global Public Health, and the African Population and Health Research Center (APHRC).

Rationale of data analysis

Survey data from Demographic and Health Surveys (DHS) are the basis of most of the information collected about RMNCAH indicators. Almost every country in Eastern and Southern Africa, including Zambia, has conducted DHS every five years. The demand for analyses of this data and RMNCAH indicators is substantial: for governments to develop and monitor health sector strategies and plans; for civil society and media to monitor accountability and progress; and for global and regional partners to make strategic and targeted investments, situation analyses and monitoring data are critical.

Monitoring the current situation and trends in RMNCAH is also a critical component of the WHO/World Bank framework for monitoring UHC. Further, monitoring possible existing inequalities in any given country is essential for achieving meaningful progress and for creating an equity-oriented health sector. Importantly, assessing how changes in the health policy and programme environment as well as the wider context have contributed to progress, or lack of progress, in RMNCAH indicators and child survival is critical for determining whether actions in the health sector are successful in reducing inequalities and promoting equity [5].

Objectives

Main Objective

To enhance understandings of the factors affecting changes in child mortality and coverage of RMNCH interventions with special focus on inequalities within Zambia

Specific Objectives

- To estimate child mortality rates in terms of wealth, education, gender, residence, and at provincial level in Zambia over time
- To determine coverage and disparities for RMNCAH indicators by wealth, education, residence, and subnational region in Zambia over time
- To assess policies and strategies that may have contributed to reductions or improvements in the levels of inequalities in RMNCAH indicators over time



CHAPTER 2: Methods

The Zambia Demographic and Health Surveys (ZDHS) (2001, 2007, 2013/2014, 2018) were the main source of quantitative data for this analysis. These data were also supplemented with trends and causes of mortality data from the United Nations Inter-agency Group for Child Mortality Estimation (IGME), and the WHO's Maternal Child Epidemiology Estimation (MCEE) respectively.

First, using survey data from the DHS, ratios, coverage and associated confidence intervals for specific indicators were estimated. Estimates of RMNCH health indicators at national and provincial level were computed. -In addition, an assessment was made on how these indicators are distributed over time by gender, education, wealth quintile and place of residence to understand how the level of equity in the outcomes changed over time. Equiplots were used for the presentation of equity data, to compare absolute inequality for mortality and intervention coverage by groups and over time. STATA version 15 software was used for the analyses.

Child mortality rates were calculated using the syncmrates program in Stata 15. Estimates of under-five, post neonatal, child and neonatal mortality rates in terms of the number of deaths among children 0-59 months old, and 0-28 days after birth, respectively per 1000 live births at the national level were obtained. These were calculated among all live births in the five years preceding each round of the ZDHS with a focus on under-five and neonatal mortality rates for the stratified analyses.

As an overall measure of coverage across the continuum of care, the Composite Coverage Index (CCI) (10), which combines key RMNCH indicators into a single measure was computed. The CCI is a weighted average of coverage estimates of eight essential interventions that represent broad categories or stages across the continuum of care. The four categories are as follows: family planning, maternal and new born care, immunization, and case management of sick children. Each continuum stage is given equal weight and the CCI is then calculated as:

$$CCI = \frac{1}{4} \left(FPCmo + \frac{ANC4 + SBA}{2} + \frac{BCG + 2 \times DPT3 + MSL}{4} + CAREANYD \right)$$

Where:

- Reproductive care: Demand for family planning satisfied with modern methods among currently married and in need of contraception women (FPCmo);
- Maternal care: At least four antenatal care visits during last pregnancy (ANC4); Skilled birth attendant (SBA);
- Childhood immunization to children 12-23 months: BCG vaccination (BCG) 3 doses of DPT vaccination (DPT3); Measles vaccination (MSL);
- Management of childhood illness: Care-seeking for disease among children under 5 years with symptoms of fever, diarrhoea or suspected pneumonia in the last 2 weeks (CAREANYD).

This composite indicator is useful for comparative analyses within-country and over time (10, 11) and has also been shown to have a strong association with under-five mortality (12).

Second, to assess policies and strategies that may have contributed to reduction or improvements in inequalities for key RMNCAH indicators, the Countdown to 2030's Policy and Programme Timeline Tool was adapted (13). The Policy and Programme Timeline Tool is useful for identifying health policies, programmes and health systems changes that have been implemented in a country to improve RMNCAH indicators and survival over time from 1990 to present. The tool extends across five levels—including: national context, macro health systems and governance, health system building blocks, high impact policies specific to RMNCH, high impact research specific to RMNCH, and a cross-cutting component focused on partnerships and convening mechanisms (13, 14). For this analysis the focus was on three levels; macro health systems and governance, health system building blocks and high impact policies specific to RMNCAH.

Data from reports and health policy strategy documents published and implemented between 1990 to date, from the Zambian Ministry of Health, WHO and UN agencies and databases were reviewed. data on health systems inputs including financing data on expenditure for health and RMNCAH+N in the Global Health Expenditure Database and on RMNCH aid flows to Zambia in the Creditor Reporting System (Muskoka2) was analysed. Further analysis of the changes in human resources for health and infrastructure per capita in the WHO Global Health Database and Zambia's National Health Facility Census was conducted.



CHAPTER 3: Results

This section is organised into five parts. The first part provides results based on childhood mortality (under-five and neonatal). The second part provides results for the CCI, and the third part presents trends in selected RMNCH coverage indicators. The trends for all outcomes are presented at national level, and disaggregated by five equity stratifiers – wealth, education, residence, gender and province. The fourth part compares U5MR and CCI, while the fifth part presents results from the policy and health systems analysis.

Part I: Child Mortality

Main Points

- Zambia experienced a major decline in under-five mortality during the 2001-2018 period, declining from 168 to 61 per 1,000 live births, at a pace of nearly 6% per year, much faster than the average for Sub-Saharan Africa (SSA) (3.6%).
- The fastest decline was observed during the period 2007-2013/14 (7.3% per year) and slower during the period 2013/14 and 2018 surveys (4.4% per year). The UN estimates suggest that the periods of fastest decline were 2002-2006 (7-8% per year) and 2007-2010 (5-6% per year).
- The decline was almost exclusively due to major reductions in post-neonatal (1-11 months) and child (1-4 years) mortality, as neonatal mortality declined only slowly at 1.2% per year. As a result, the contribution of neonatal deaths to under-five deaths doubled from 19% to 38% between 2001 and 2018.
- According to WHO- Maternal Child Epidemiology Estimation (MCEE) data, the – reductions in under-five mortality –could be attributed to faster declines in deaths due to HIV/AIDS, acute lower respiratory infections, diarrheal diseases, malaria and measles.
- Zambia outperformed almost half of its regional peers (Eswatini, Lesotho, Madagascar, Namibia, Tanzania and Zimbabwe) in reducing under-five deaths (levels are lower than SSA, and average for Eastern and Southern Africa) owing to a catch up during 2002-2006.
- The average rate of decline of under-five mortality during the last 2 decades varies only moderately by province from 4.4% to 5.5% per year, with only Luapula lagging (3.8%).
- The inequality gap in under-five mortality between the poorest and richest reduced to almost none by ZDHS 2018 and this was not due to reducing gaps in absolute income.

- Neonatal mortality did not decline between the last two surveys in most provinces and in both rural and urban areas.
- The best performing province was North Western province, with 9 deaths per 1000 live births in the 10 years preceding the 2018 survey.
- Urban areas had a higher rate at 28 deaths/1000 live births, compared to 23 deaths/1000 live births in rural areas.

Overall, child mortality estimates have been declining since 2001 (see Figure 1). There was a major decline in the under-five mortality rate from 168 per 1,000 live births in 2001 to 61 per 1,000 live births in 2018 (all national rates refer to the five-year period preceding the surveys). This corresponds with an average annual rate of decline of 6.2% per year, which is much higher than the average rate of reduction of 3.6% per year for Sub-Saharan Africa as a whole during 2000-2019 (reduction from 152 to 76 per 1,000 live births), as estimated by the UN IGME. Zambia's decline was largest between the 2007 and 2013/14 surveys with an average annual rate of reduction of 7.3% per year. The declines were slower but still substantial between the 2001/02 and 2007 surveys (6.4% per year) and the 2013/14 and 2018 surveys (4.4% per year).

The major decline in under-five mortality was almost entirely due to declines in post-neonatal (1-11 months) and child (1-4 years) mortality, with average annual rates of decline of 8.5% and 8.7% per year, respectively. However, the neonatal mortality rate did not decline significantly between the 2001 and 2018. It declined from 37 to 27 per 1,000 live births between 2001/2 and 2018 at an average rate of decline of just 1.8% per year. The 2018 ZDHS neonatal mortality rate was far off the 2021 National Health Strategic Plan (NHSP) target of 12 per 1,000 live births, which is also the 2030 SDG target globally.

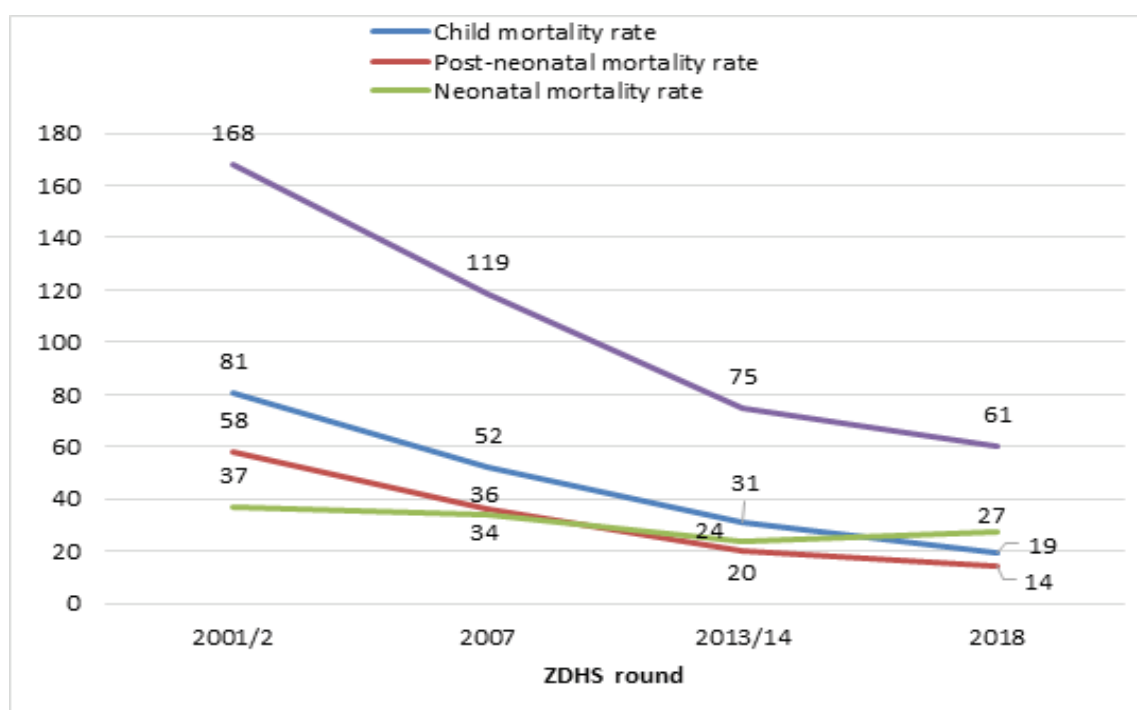


Figure 1: Child Mortality rate (1-4 years), post-neonatal mortality rate and NMR (2001, 2007, 2013 and 2018 ZDHS, five-years preceding)

² The UN IGME estimates for under-five mortality show a slightly lower pace of the decline: from 152 to 62 per 1,000 live births during 2000-2019, which is 4.8% average decline per year. The UN IGME estimates are based on multiple data points from a single survey, where as here only the data point for the last 5 years was used.

The proportional contribution of neonatal deaths to all under-five deaths was higher in 2018 (38%) and has doubled from 19% in 2001 to 38% in 2018. See Figure 2.

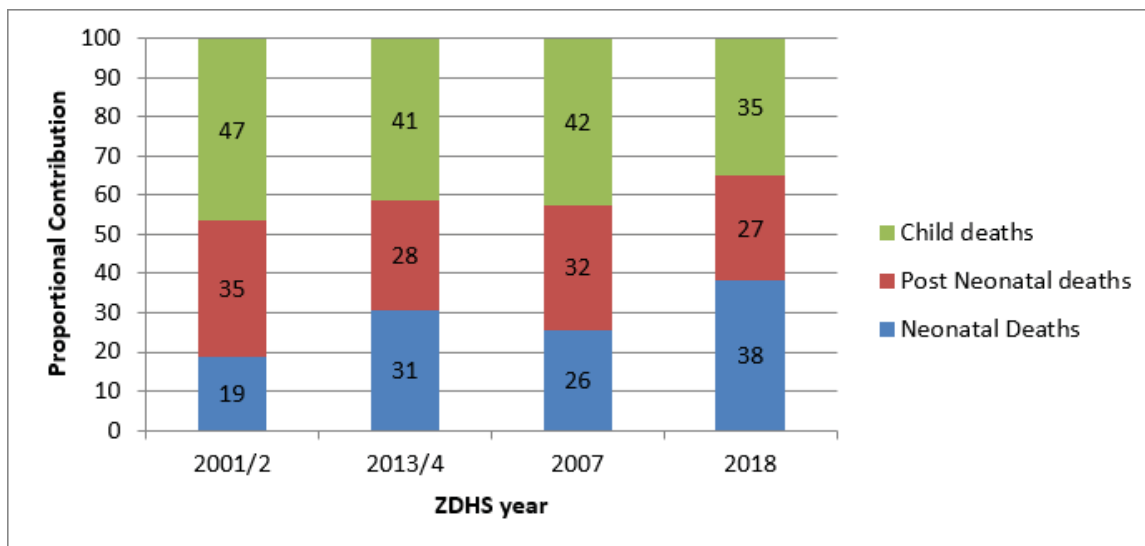


Figure 2: Proportional contribution of deaths to total deaths in under five children, ZDHS 2001/2, 2013/14, 2007, 2018

Figure 3 (below) shows the cause-specific mortality rates for the top 14 causes of death among neonates and children under 5 years from 2000 to 2017 according to the WHO's Maternal Child Epidemiology Estimation (MCEE). Acute lower respiratory infections were the leading cause of death between 2000 and 2002 with most of the cases occurring after the neonatal period. HIV/AIDS was the leading cause of death between 2003 and 2005 but has since declined to the 7th leading position between 2015 and 2017. Deaths caused by malaria after the neonatal period has steadily declined from 15 deaths/1000 live births between 2000-2002 to 5 deaths/1000 live births between 2015-2017.

According to the SAVVY, malaria was the leading cause of child deaths in 2015/2016, followed by perinatal and neonatal conditions. Both the MCEE and SAVVY show a significant reduction of deaths attributed to HIV/AIDS over the years. Between 2010-12 and 2015/16 SAVVY rounds, HIV-related deaths went down from the sixth ranked cause to the ninth in relation to other causes.

³<https://www.who.int/data/gho/data/indicators/indicator-details/GHO/deaths-per-1-000-live-births>

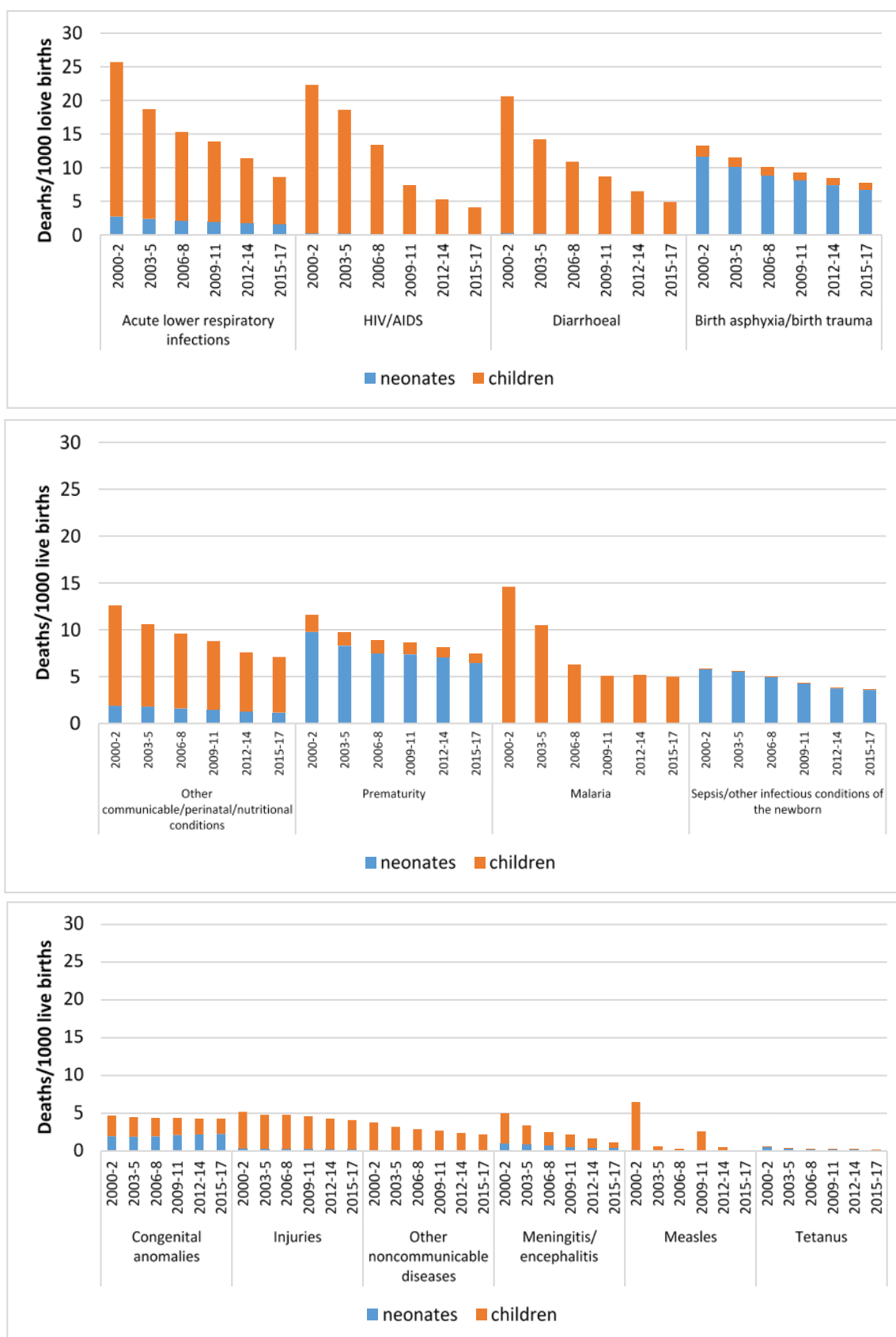


Figure 3: Top 14 cause-specific mortality rates among neonates and children under 5 years from 2000 to 2017, Zambia, MCEE 2000-2017

Looking at the absolute declines in cause-specific under-five mortality rates between 2000-2 and 2015-17 (MCEE data) in Table 1, the greatest contribution to the overall reduction in under-five mortality were from the declines in mortality related to HIV/AIDS (19.8%), acute lower respiratory infections (18.6%), diarrhoeal diseases (17.1%), malaria (10.5%), and measles (7%). In addition, birth asphyxia and prematurity-related deaths (the leading causes of neonatal mortality) contributed around 6% and 5% respectively to the overall under-five mortality decline.

Table 1: Contribution of leading causes to the overall under-five mortality decline in Zambia, MCEE 2000-2 to 2015-17

Lead causes of under-five mortality in Zambia, MCEE 2000 to 2017	Cause-specific U5MR, 2000-2 (per 1000 live births)	Cause-specific U5MR, 2015-17 (per 1000 live births)	Absolute decline between 2000-2 and 2015-17	Contribution to U5MR decline (%)
HIV/AIDS	22.3	4.1	18.2	19.8
Acute lower respiratory infections	25.7	8.6	17.1	18.6
Diarrheal diseases	20.6	4.9	15.7	17.1
Malaria	14.6	5	9.6	10.5
Measles	6.5	0.1	6.4	7.0
Other communicable/perinatal/nutritional conditions	12.6	7.1	5.5	6.0
Birth asphyxia/trauma	13.2	7.7	5.5	6.0
Prematurity	11.6	7.4	4.2	4.6
Meningitis/encephalitis	5	1.1	3.9	4.2
Sepsis/infectious conditions of the newborn	5.8	3.6	2.2	2.4
Other noncommunicable diseases	3.8	2.2	1.6	1.7
Injuries	5.2	4.1	1.1	1.2
Congenital anomalies	4.7	4.3	0.4	0.4
Tetanus	0.57	0.2	0.37	0.4

Regional comparison in the under-five mortality rate

Compared to its regional peers, Zambia has made tremendous progress in reducing the under-five mortality rate in the past two decades. Table 2 summarises the average annual rate of change (AARC) for 13 selected Sub-Saharan African countries, including Zambia. The AARC was calculated from the Demographic and Health Surveys over the past two decades.

Zambia was among the top three performers with an average annual rate of reduction of 6.6%. Only Mozambique (12.3%) and Rwanda (10.7%) had a statistically higher rate of reduction. Zambia outperformed almost half of its regional peers (Eswatini, Lesotho, Madagascar, Namibia, Tanzania and Zimbabwe).

Table 2: Average Annual Rate of Change (AARC) in the Under-Five Mortality Rate for Selected Sub-Saharan African Countries (%)

Country	Period analysed	Baseline USMR	AARC	LL	UL
Burundi	2010-2016	127.2	-7.5	-9.2	-5.9
Eswatini	2006-2014	105.3	-3.2	-5.1	-1.4
Ethiopia	2000-2019	187.8	-5.8	-6.4	-5.2
Kenya	1993-2014	93.2	-5.0	-6.0	-4.0
Lesotho	2004-2018	101.8	-1.2	-2.2	-0.2
Madagascar	1997-2018	163.9	-2.6	-3.3	-2.0
Malawi	2000-2015	202.7	-7.6	-8.0	-7.1
Mozambique	1997-2015	218.7	-12.3	-13.3	-11.4
Namibia	2000-2013	60.2	-0.3	-1.1	0.5
Rwanda	2000-2014	206.7	-10.7	-11.5	-10.0
Tanzania	1996-2015	144.8	-4.8	-5.6	-3.9
Uganda	1995-2016	156.2	-5.9	-6.5	-5.3
Zambia	1996-2018	192.1	-6.6	-7.2	-5.9
Zimbabwe	1994-2019	75.9	-0.1	-0.7	0.6

Note: LL and UL are the 95% lower and upper confidence bounds, respectively.

Provincial under five mortality rates and trends

Two analytical approaches were used to assess the levels and trends by province. The first is a direct assessment of the under-five mortality in each survey. The assessment of provincial levels and trends in under-five mortality was done using data for 10 years preceding the survey, to reduce sampling errors. The second approach used the annual provincial estimates produced by the United Nations Inter-agency Group for Child Mortality Estimation (UN-IGME).

Figure 4 shows the trends in under-five mortality rates across the ten provinces for the 2001/2, 2007, 2013/4 and 2018 ZDHS. There was a consistent decrease in the under-five mortality rate across all the ten provinces. However, the annual average rate of change (AARC) varied widely. The top five performing provinces in terms of the AARC between the 2001/2 and 2018

ZDHS were: North Western (9.4%: 130 to 26 per 1,000 live births), Central (8.3%: 192 to 47 per 1,000 live births), Western (7.4%: 201 to 57 per 1,000 live births), Northern (6.2%: 187 to 66 per 1,000 live births) and Copperbelt (5.8%: 134 to 50 per 1,000 live births) provinces.

Notably, Luapula province had the highest baseline under-five mortality rate (249 per 1,000 live births) but managed to reduce its under-five mortality rate by more than half, to 110 per 1,000 live births in 2018. However, its AARC of 4.8% was not fast enough to come anywhere close to the SDG target of 25 deaths per 1,000 live births.

⁴<https://childmortality.org/>

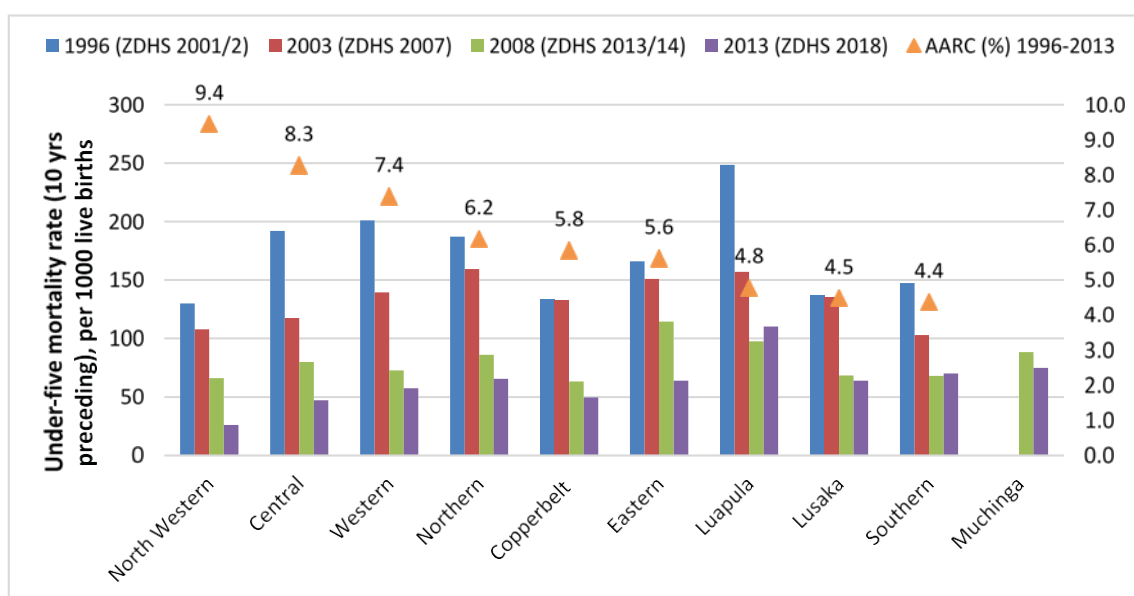


Figure 4: Under-Five Mortality Rate by Province, ZDHS 2001-2018

UN-IGME estimates were also used to summarise the trends in the under-five mortality rate between 1995 and 2015 (Figure 5). The estimates are based on the same set of surveys and census and show a consistent reduction in the under-five mortality rate across all the provinces but the variation in AARC between provinces is much smaller, as expected from an estimation model. The top five performing provinces are the same: Western (5.5%: 186 to 63 per 1, 000 live births), North Western (5.4%: 123 to 42 per 1, 000 live births), Northern (5.0%: 211 to 77 live births), Copperbelt (4.9%: 160 to 59 per live births) and Central (4.8%: 152 to 59 live births). UN-IGME estimates also show that although the under-five mortality rate for Luapula province was more than halved from 210 per 1, 000 live births in 1995 to 103 per 1, 000 live births in 2015, the AARC of 3.6% was not fast enough to meet national and global targets for under-five mortality rate.

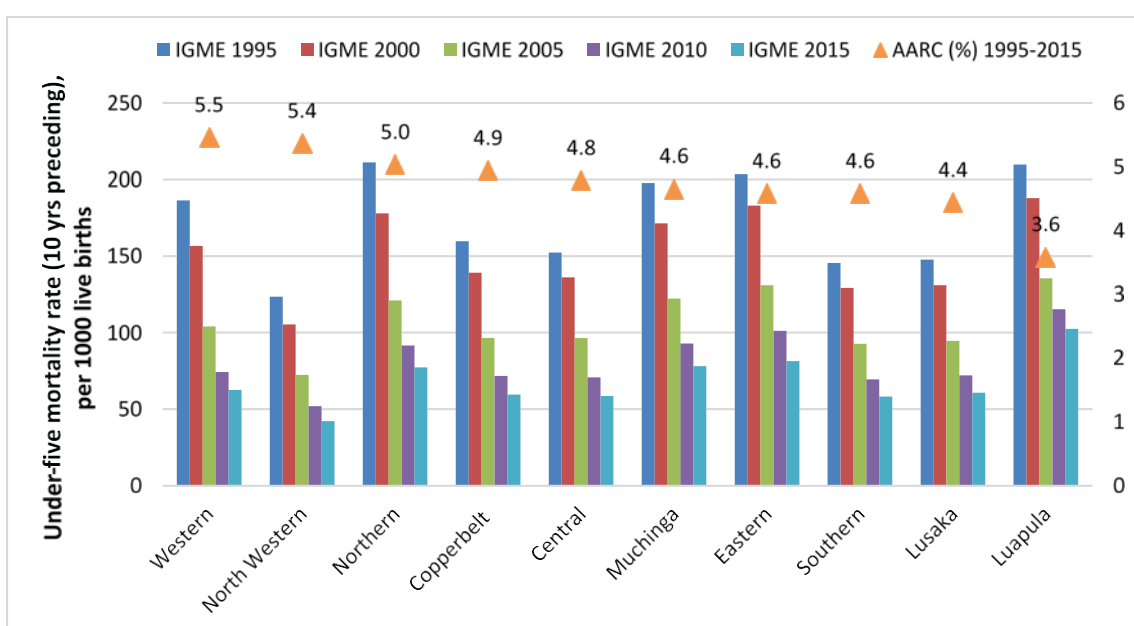


Figure 5: U5MR by province, UN-IGME 1995-2015

When the under-five mortality rate AARCs from the ZDHS and UN-IGME estimates are compared, two observations are clear. First, for both sets of estimates, the top five performing provinces in terms of the annual average rate of reduction are the same. These are Central, Copperbelt, Northern, North-Western and Western provinces. However, the ranking varies significantly across the two sets of estimates. For example, the top performing province based on the ZDHS estimates was North Western province, followed by Central province in second place. Based on the UN-IGME estimates, the latter province ranks fifth. Second, the ZDHS AARCs are higher and vary more than the UN-IGME AARCs (the latter are modelled estimates). For the ZDHS, the range for the AARCs is 5 percentage points; 9.4% for the top performer (North Western) compared to 4.4% for poorest performer (Southern). On the other hand, for the UN-IGME AARC estimates, the range is only 1.9 percentage points – 5.5% for the best performing province (Western) compared to 3.6% for the worst performing province (Luapula).

Urban – rural differences

Around 60% of Zambia’s population lived in rural areas in 2001/2, which reduced somewhat to 55% in 2018. According to the ZDHS, a remarkable reduction of the rural urban gap in under-five mortality occurred between 2001/2 (182 vs 140) and 2018 (62 vs 68) in rural and urban areas respectively. Although under-five mortality was higher in rural areas (182 per 1,000 live births) compared to urban areas (140 per 1,000 live births) in the 10 years preceding the 2001 ZDHS, there has been a steady decrease in rural areas compared to urban areas (Figure 6). In the 10 years preceding the 2018 survey, the rural areas were better off than the urban (62 per 1,000 live births versus 68 per 1,000 live births respectively).

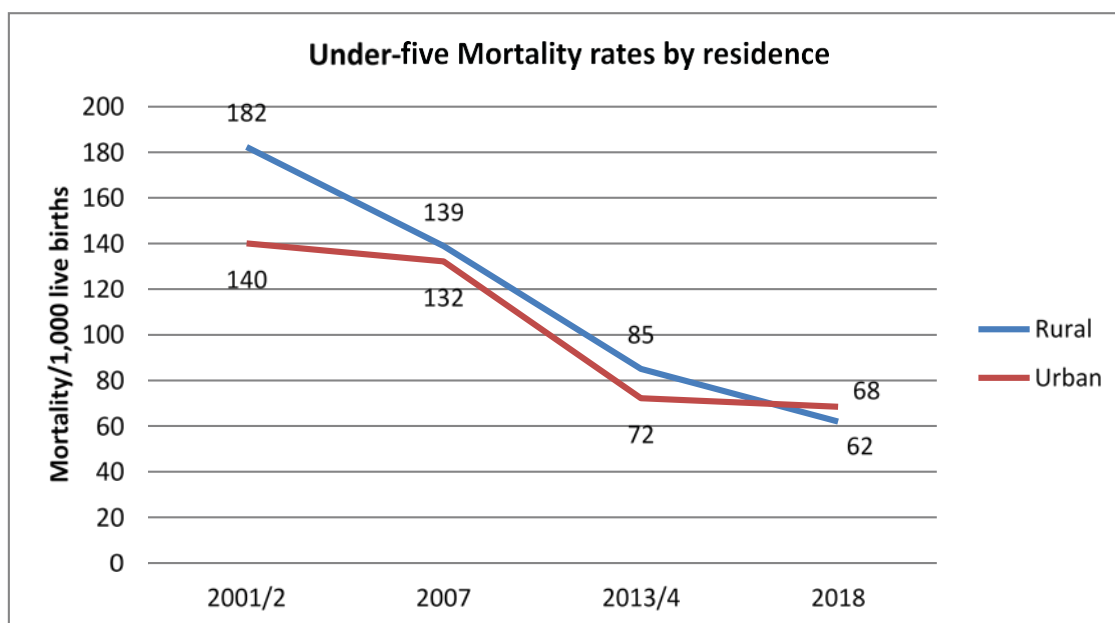


Figure 6: U5MR by residence, ZDHS 2001-2018

Disaggregation of data for under-five deaths by place of residence also shows that neonatal deaths in the urban areas are increasingly contributing to all under-five deaths since 2001/2 (9%) to 21% in 2018. In the urban areas, neonatal deaths increased from 14% to 21% between 2013/14 and 2018 ZDHS rounds, becoming the largest proportion of all under-five deaths in Zambia (Figure 7).

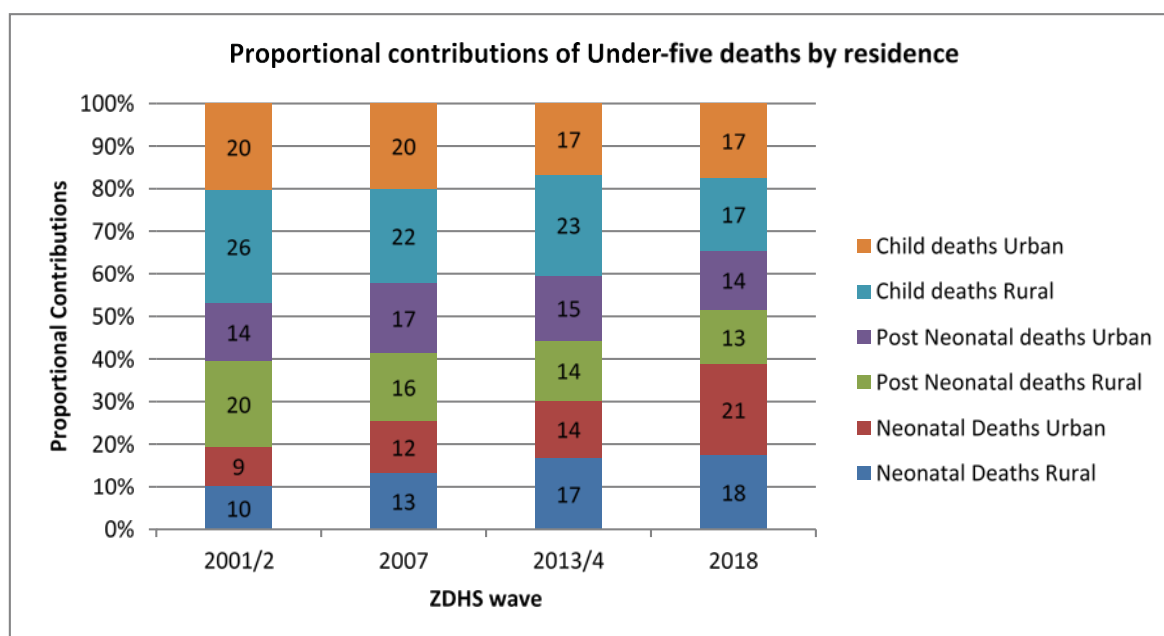


Figure 7: Proportional contribution of neonatal, post-neonatal and child deaths to under five deaths by residence, ZDHS 2013/14 and 2018

Differences between the poorest and richest households

Under-five mortality was also analysed in relation to wealth quintile based on household assets collected in the ZDHS (i.e., an indicator of economic status) using an equiplot. Figure 8 shows a significant decrease in under-five mortality over the two decades (roughly mid-nineties to 2015) particularly among the poorest and poor (Q1 and Q2) wealth quintiles. In ZDHS 2001/02 (mostly referring to mortality in the nineties) under-five mortality was very high in all three poorest quintiles with little difference between them. The fourth quintile had slightly lower mortality, but the biggest difference was with the wealthiest households where mortality was much lower. This pattern is called top inequality or mass deprivation. The gap in under-five mortality has also significantly narrowed in the 2018 ZDHS compared to the 2001 ZDHS. In the subsequent surveys the mortality pattern changed rapidly. Under-five mortality in the richest quintile declined until 2013/14 (with an unexpected increase in the ZDHS 2007), but at a much slower pace than all other wealth quintiles. The second richest quintile declined faster but shows the same stagnation as the richest in the most recent inter-survey interval. The declines in under-five mortality in the poorest three quintiles were impressive and continued in the most recent survey. The inequality pattern in Zambia changed from top inequality to linear in the ZDHS 2007 and 2013/14, and by ZDHS 2018 virtually no poor-rich inequalities persisted.

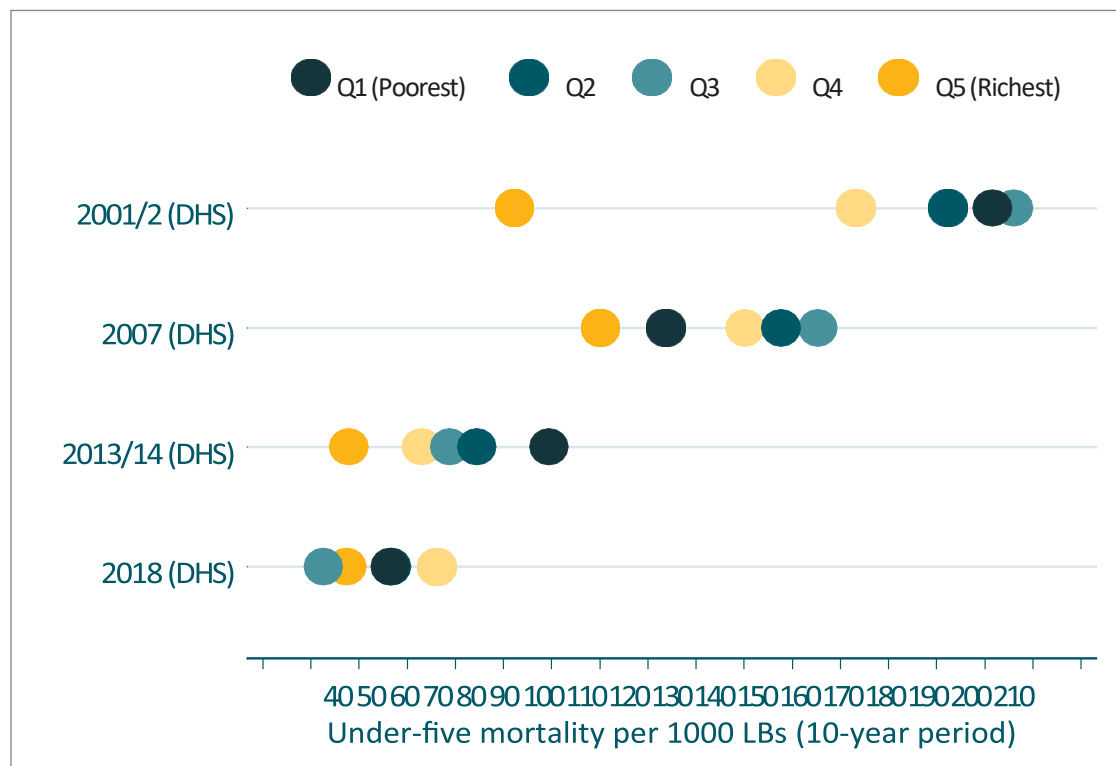


Figure 8: Under-five mortality rates by wealth, ZDHS 2001, 2007, 2013/14 and 2018

The reductions in the wealth-related gaps may be due to changes in the relative risk of mortality in each quintile or to changes in wealth differences between the quintiles (i.e. the income difference between Q1 and Q5 reduced over time) or a combination of the two factors. Further analysis of these major changes in wealth-related under-five mortality by including a measure of absolute income was conducted.

Analysis by absolute income is a way to compare countries using the same level of income. The calculation of absolute income for each percentile of distribution follows the Fink et al (2017) definition and includes the Gini index, gross domestic product (in 2011 US dollars, power purchasing parity) and the household expenditure (15). This method allows us to compare different countries or to measure the contribution on income changes in the performance of a given health indicator. Figure 9 shows the relationship between absolute income and under five mortality rates in the 2001 and 2018 surveys. As shown on the Figure, while the gap in mortality between the poorest and richest closed, the absolute income in the poorest group did not improve enough to suggest it played an important role in the mortality decline.

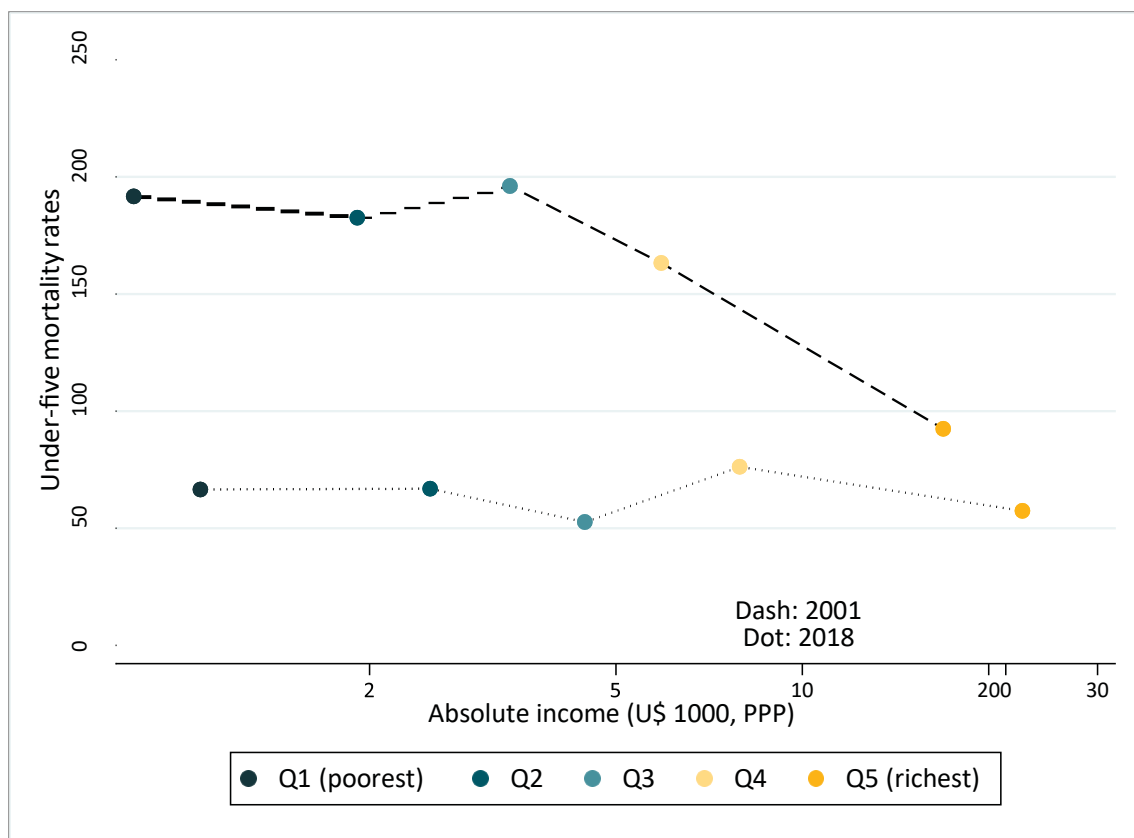


Figure 9: Under-five mortality rates by absolute income, ZDHS 2001 and 2018

Differences by wealth and residence

Under-five mortality rates (ten years preceding) were analysed by wealth tertiles and rural/urban residence in the ZDHS since 1996. Tertiles were used instead of quintiles to get more stable estimates when double-stratifying the mortality rates. Figure 10 shows that the U5MR gap between the wealthiest and poorest in rural areas was largest in the earlier rounds of ZDHS in the 1990s and early 2000s, but reduced among deaths occurring in 2013 (midpoint of deaths occurring 10 years preceding ZDHS 2018). In urban areas, there was less of a mortality gap by wealth and this declined as rates of mortality declined. Importantly, the rural mortality reduced among all groups so much that the disparity between rural and urban poor groups was much lower by 2013.



Figure 10: Under-five mortality rates by wealth tertiles and residence, ZDHS 1996 to 2018

Differences by gender

Data for under-five mortality was also disaggregated by gender over the four waves of ZDHS (ten years preceding 2001/2, 2007, 2013/14, 2018). Although there was a decline in mortality since 2001 ZDHS, male children have continued to be more likely to die compared to female children, in line with biological explanations (Figure 11). The gap in under-five mortality is narrower in 2018 ZDHS between the male and female children than it was in the 2007 and 2001/2 ZDHS in absolute terms, but this is not very different in relative terms (from 9% to 16% difference, or ratio of 1.1 to 1.2).

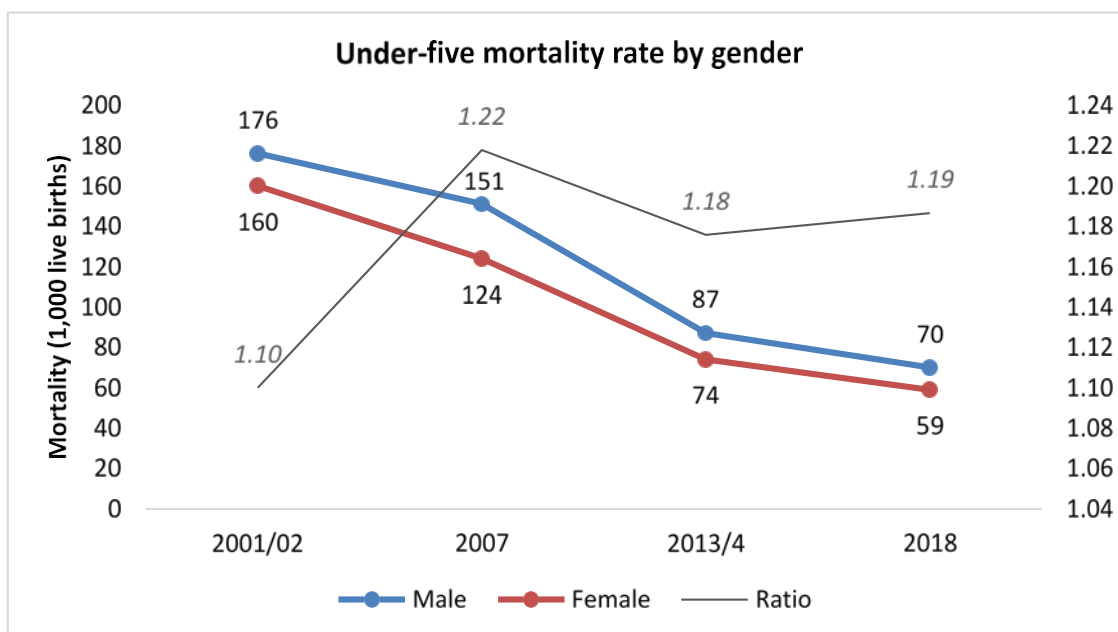


Figure 11: Under-five mortality rates by gender, ZDHS 2001-2018

Neonatal mortality rates and trends

Neonatal mortality levels and trends in the four surveys were analysed. In the four waves of the ZDHS, the number of neonatal deaths is small which leads to larger sampling errors and more inconsistencies in the trends over time, which should be considered when interpreting these figures.

Figure 12 shows neonatal mortality rates (among live births in ten years preceding the 2001/2 to 2018 surveys) disaggregated by province. Between the last two surveys (2013/14 ZDHS and 2018 ZDHS) neonatal mortality rate declined in four provinces, Eastern (from 35 to 25 deaths/1000 live births), North Western (from 20 to 9 deaths/1000 live births), Western (from 32 to 25 deaths/1000 live births), and Copperbelt provinces (from 25 to 16 deaths/1000 live births). Neonatal mortality rates seemed to have increased in Luapula, Lusaka, Muchinga and Southern province, with the highest increase being observed in Southern province (23 vs 33 deaths/1,000 live births). The best performing province was North Western province, with 9 deaths per 1000 live births in the 10 years preceding the 2018 survey.

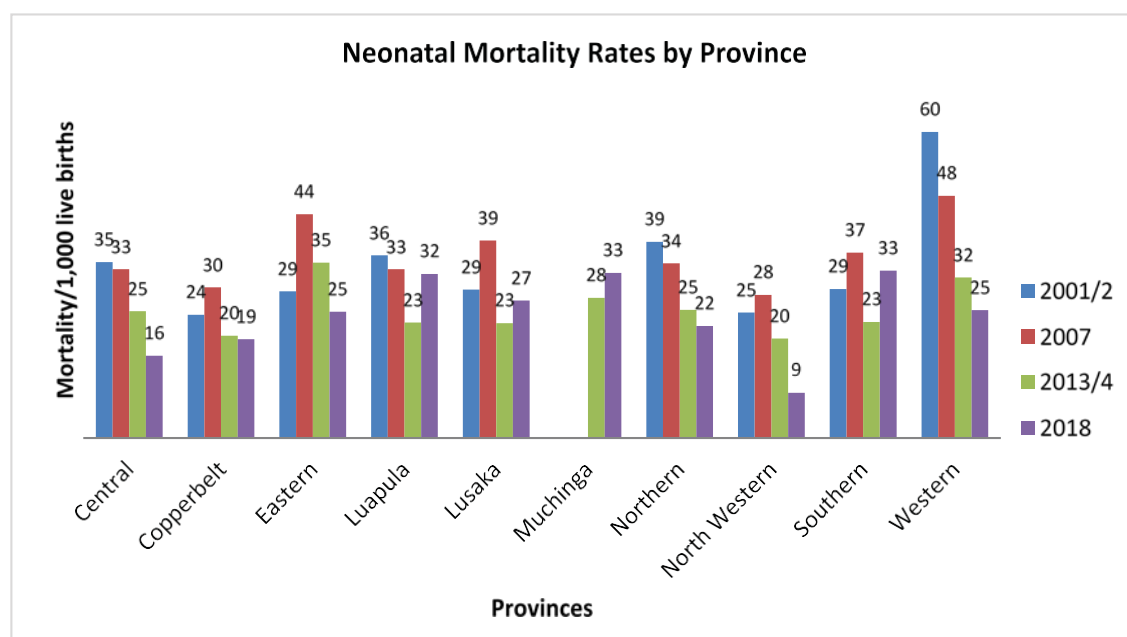


Figure 12: Neonatal Mortality in the 10 provinces from 2013/14 and 2018 ZDHS

A rural-urban comparison shows that neonatal mortality did not decline between 2013/14 ZDHS and 2018 ZDHS in both the rural and urban areas (Figure 13). In fact, in the 10 years preceding the 2018 survey, NMR was higher in urban areas at 28 deaths/1000 live births, compared to 23 deaths/1000 live births in rural areas. This increase in the urban areas could be contributing to the increasing NMR from 23 deaths per 1000 live births in 2013/14 to 27 deaths per 1000 live births in 2018.

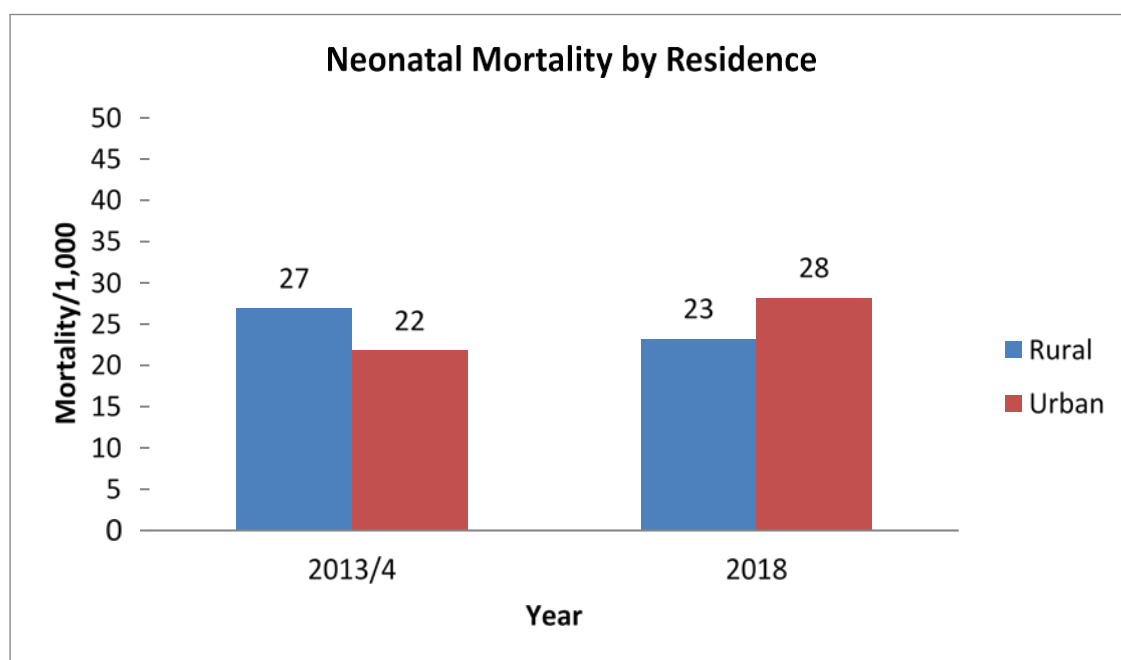


Figure 13: Neonatal Mortality Rates by residence, ZDHS 2013/14 and 2018

Figure 14 presents NMR by wealth quintile from the 2001, 2007, 2013/14 and 2018 ZDHS. Although a slight decline in NMR is observed in all the quintiles between 2007 and 2013/14 ZDHS, mortality increased among the richer and richest (Q4 and Q5) wealth quintiles, and the gap across the different quintiles widened in the 2018 ZDHS.

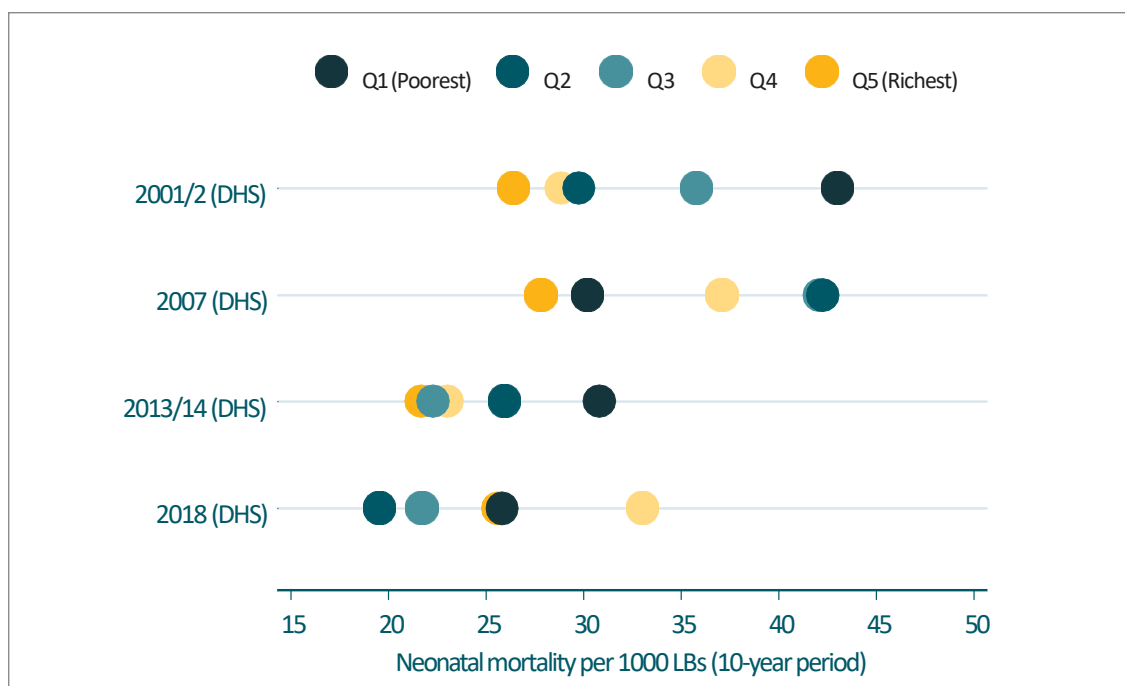


Figure 14: NMR by wealth, ZDHS 2001, 2007, 2013/14 and 2018

Analysis of national data for neonatal mortality was disaggregated by gender over the four survey years. Figure 15 shows that over time, male neonates were increasingly more likely to die than female neonates overall. It is notable that the gap in neonatal mortality between male and female neonates was wider in 2018 ZDHS.

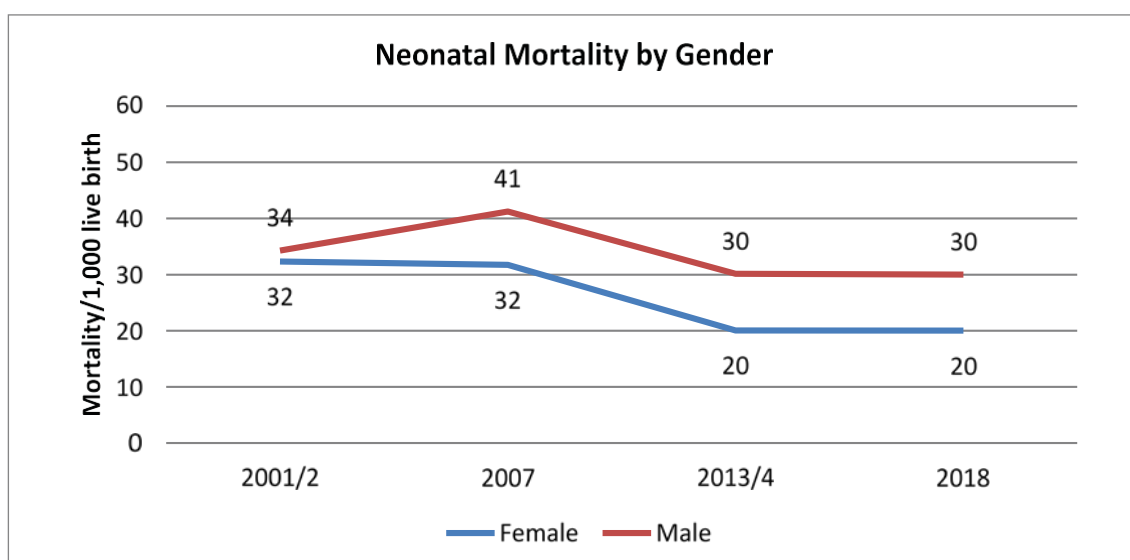


Figure 15: Neonatal Mortality Ratio by gender, ZDHS 2001-2018

PART II: Coverage (Composite Coverage Index - CCI) of RMNCH interventions

Main Points

- Between 2001/2 and 2018 ZDHS, Zambia's Composite Coverage Index (CCI) improved from 62% to 76% respectively.
- The annual average rate of increase in the CCI (1%) was modest compared to other countries in Sub-Saharan Africa.
- Despite a rapid increase in the CCI among the poorest groups, Zambia did not outperform the majority of its regional peers.
- Provinces with higher baseline CCI experienced less improvement (Lusaka and Copperbelt provinces) while those with lower baselines improved most, particularly Central, Eastern, Luapula, Northern and Western provinces at over 15 percentage points. While not present in earlier ZDHS rounds, Muchinga also improved notably between 2013/14 and 2018 by nearly 12 percentage points.
- The CCI gap between urban versus rural areas narrowed from 12 to 5 percentage points between 2001/2 and 2018.
- The CCI increased faster among women who were not educated and in the poorest 20% compared to those with more education and in the richest 20%.

National levels and trends

The Composite Coverage Index (CCI) is a summary measure of family planning, antenatal and delivery care, child immunization and treatment of sick children which is useful to assess overall trends in the continuum of care for RMNCH and particularly to assess inequalities in a simplified manner.

The national CCI improved from 62% to 76% from ZDHS 2000/02 to 2018, an AARC of 1.2% per year (Table 2). There was little change between the first two surveys but from ZDHS 2007 the pace increased to 1.6% per year between 2007 and 2013/14 and to 1.7% per year between 2013/14 and 2018.

Provincial trends

The CCI was estimated for all the provinces to show how comparable the provinces have been in Zambia (Table 3). The two urban provinces, Lusaka and Copperbelt, had much higher coverage than all other provinces in 2001/02, but over time this gap closed gradually. By 2018, Lusaka is still the province with highest coverage (and Copperbelt is third) but the gaps between provinces have come down considerably, with the relative ratio of the highest and lowest provincial CCI going from 1.5 to 1.2. Lusaka improved from 74 to 80% coverage, or 0.5% per annum on average, while Copperbelt also improved by 0.5% per annum on average. Comparatively, the CCI in Northern, Central and Western provinces improved most between 2001/2 and 2018 ZDHS. Central province improved fastest from 2013/14 to 2018 (average of 3.7% per annum), while Northern improved both in 2007-2013/14 and 2013-18 (3.7% and 3.3% respectively). Western province had its fastest gain earlier between 2001/2-2007 (3.6%). There has been a noticeable improvement overall in Luapula (fastest between 2007-2013/14) and Eastern (fastest in 2001/2 to 2007 and 2013/14-18).

Table 3: Ranking of provinces by Composite Coverage Index between 2001, 2007, 2013/14 & 2018 ZDHS

Province	2001/2 CCI (95% CI)	2007 CCI (95% CI)	2013/4 CCI (95% CI)	2018 CCI (95% CI)	AARC (%) 2001/2- 2007	AARC (%), 2007- 2013/14	AARC (%) 2013/14- 2018	AARC (%), 2001/2- 2018
Central	57 (52 - 62)	60 (52 - 67)	64 (61 - 68)	76 (73 - 80)	0.9	1.2	3.7	1.8
Copper- belt	71 (68 - 73)	69 (66 - 72)	77 (74 - 79)	77 (75 - 79)	-0.5	1.6	0.2	0.5
Eastern	61 (57 - 64)	70 (67 - 73)	72 (70 - 74)	79 (77 - 81)	2.7	0.3	2.0	1.6
Luapula	56 (52 - 60)	52 (48 - 55)	67 (64 - 70)	74 (72 - 76)	-1.6	4.1	2.2	1.7
Lusaka	74 (71 - 76)	71 (68 - 74)	78 (76 - 80)	80 (77 - 83)	-0.7	1.4	0.7	0.5
Muchinga	NA	NA	63 (59 - 66)	74 (68 - 81)	NA	NA	3.8	NA
Northern	50 (45 - 55)	48 (44 - 52)	61 (58 - 65)	71 (66 - 75)	-0.7	3.7	3.3	2.1
North Western	62 (56 - 68)	59 (54 - 68)	71 (69 - 74)	76 (72 - 80)	-1.0	3.0	1.5	1.2
Southern	60 (56 - 65)	68 (64 - 72)	69 (66 - 73)	73 (70 - 76)	2.2	0.3	1.2	1.2
Western	53 (48 - 58)	65 (59 - 70)	66 (61 - 70)	70 (65 - 74)	3.6	0.2	1.3	1.6
Relative ratio (highest/ lowest CCI)	1.46	1.47	1.27	1.15	0.1	-2.3	-2.1	-1.4
Popula- tion attrib- utable risk percent- age (%)	19.1	12.7	10.6	5.4	-7.3	-2.8	-14.9	-7.6
National	62 (61 - 63)	63 (61 - 65)	70 (69 - 71)	76 (75 - 77)	0.3	1.7	1.8	1.0

Regional country comparison of CCI changes

The preceding section has shown that Zambia managed to consistently increase the coverage of key reproductive, maternal, newborn and child health interventions between 2001/2 and 2018 at an annual average rate of at least 1%. However, when compared to other peer countries, its performance is less exceptional and slightly below the median of 12 countries within the subregion of eastern and southern Africa. As Table 4 shows, its annual average rate of change (increase) of 1% is lower than countries with much lower starting points such as Rwanda and Ethiopia. Yet Malawi (1.7%), and Kenya (1.5%) also achieved higher rates of progress. This is in contrast to the annual average reduction in the under-five mortality rate where Zambia had an above average regional performance.

Table 4: Annual Average Rate of Change (AARC) in the CCI for Selected Sub-Saharan African Countries (Overall) (%)

Country	Period analysed	Baseline CCI	AARC	LL	UL
Burundi	2010-2016	59.0	1.3	1.0	1.5
Eswatini	2006-2014	74.1	0.8	0.5	1.1
Ethiopia	2000-2019	16.7	1.8	1.6	2.0
Kenya	1993-2014	57.5	1.6	1.4	1.8
Lesotho	2004-2018	62.6	0.9	0.7	1.1
Madagascar	1997-2018	37.9	0.4	0.2	0.6
Malawi	2000-2015	51.9	1.9	1.8	2.0
Mozambique	1997-2015	37.6	0.8	0.5	1.1
Namibia	2000-2013	67.4	0.5	0.3	0.7
Rwanda	2000-2014	32.7	2.8	2.7	2.9
Tanzania	1996-2015	56.0	0.2	0.0	0.4
Uganda	1995-2016	43.8	1.3	1.2	1.4
Zimbabwe	1994-2019	66.5	1.4	1.2	1.6
Zambia	1996-2018	62.0	1.0	0.9	1.2
Median (13 countries)		56.0	1.3	1.0	1.4

Note: LL and UL are the 95% lower and upper confidence bounds, respectively.

Differences by residence

Inequalities in the RMNCH coverage (CCI) with regards to residence in urban or rural areas were measured from 2001 to 2018 ZDHS. Urban areas were generally performing better than the rural areas, although progress over time has been slow. The most recent 2018 ZDHS data shows that the absolute gap in CCI between urban and rural areas has closed noticeably, at 5 percentage points, compared to 12 percentage points in 2013/14 ZDHS (Figure 16). Also, compared to urban areas, rural areas have had substantial improvement over the years, thus contributing to the closing urban/rural gap in CCI since 2001.

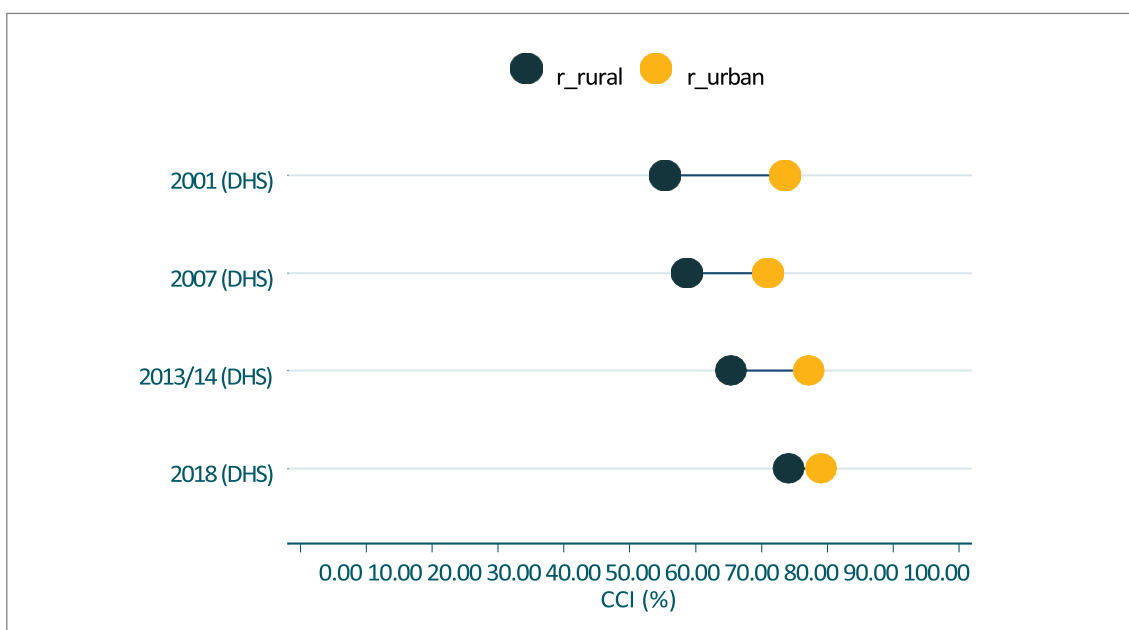


Figure 16: Composite Coverage Index by residence (rural vs urban)

Differences by education

Comparing mother's education levels, the CCI was steadily increasing among women without education, from 47% in 2001 to 68% in 2018 (Figure 17). The largest improvement between rounds was 8 percentage points, between 2013/14 and 2018.

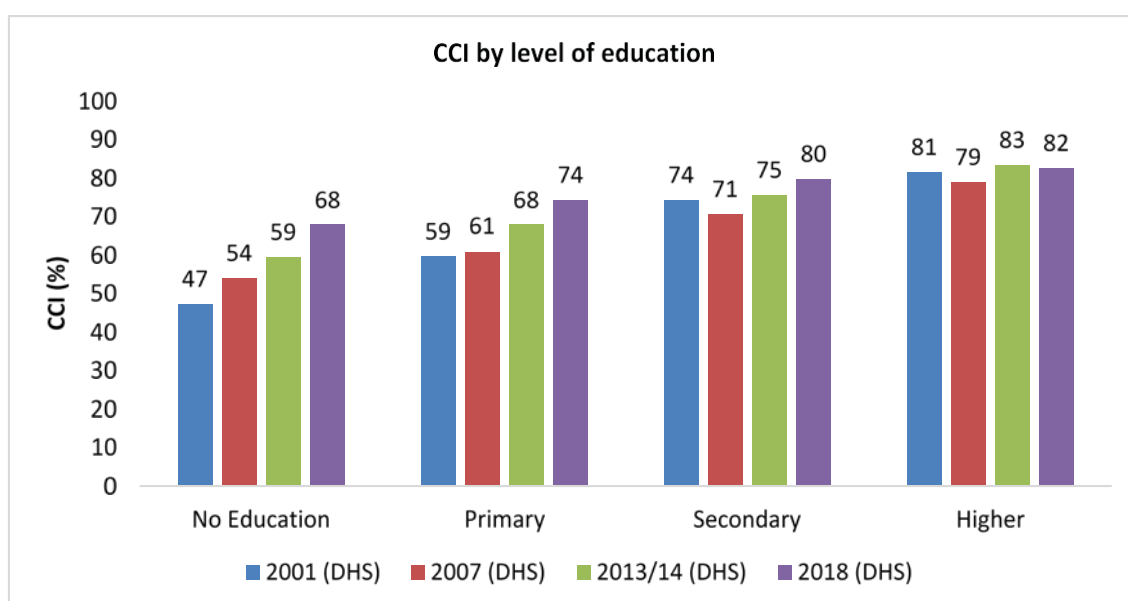


Figure 17: CCI by level of maternal education

Gap in CCI Coverage by level of education was largest in ZDHS 2001/22 (34%) between women with no education and those with higher education. The results presented in the equiplot below (Figure 18) show that the gap in the CCI coverage for essential services, between mothers with no education and those with higher education was more than halved in the 2018 ZDHS (14%), although women with no education have continually remained behind compared to women with primary, secondary and higher education.

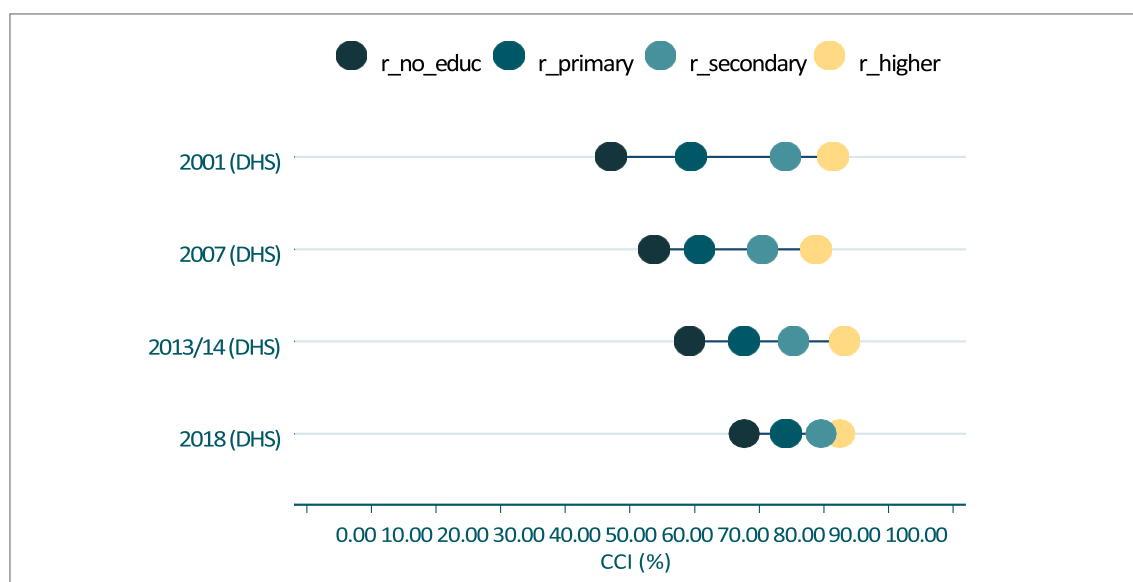


Figure 18: Composite Coverage Index for RMNCH intervention by level of maternal education, ZDHS 2001-2018

Difference by wealth

The gap in CCI across wealth quintiles has improved in the last five years (between 2013/14 and 2018) due to an improvement in the poorest three quintiles. The poorest – richest coverage difference reduced from about 30 to about 10 percentage points. However, the CCI remains lower among the poorest compared to the richer wealth groups (Figure 19).

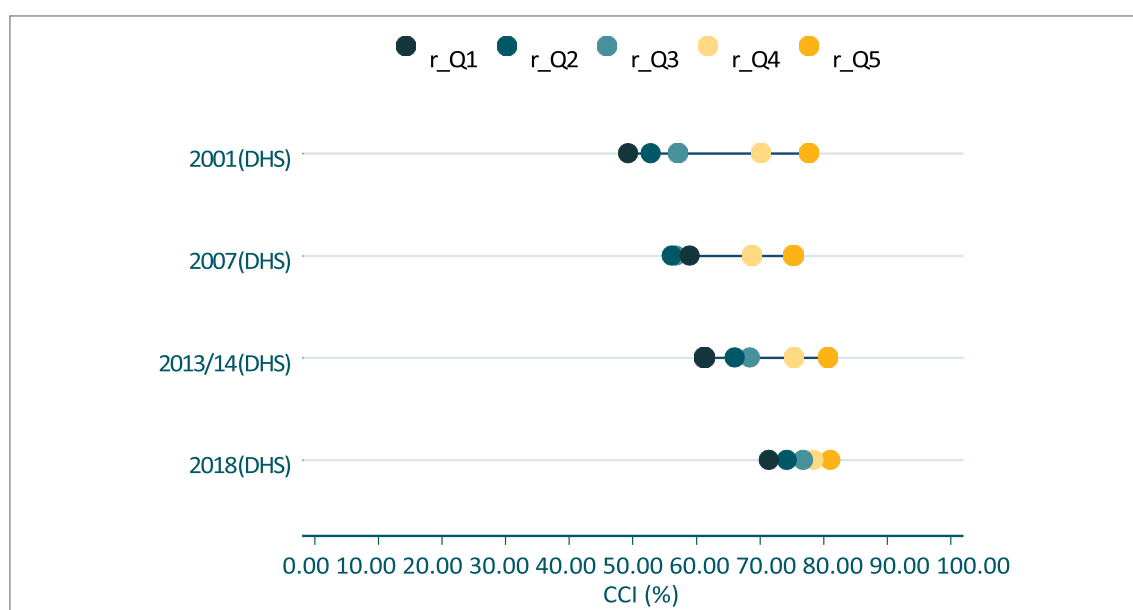


Figure 19: Composite Coverage index by wealth quintile, ZDHS 2001-2018

Over the past two decades, like other Sub-Saharan African countries, Zambia's annual average rate of change among the poorest (Q1) lay in the 1-2% range (Table 5). The exception was Rwanda, which had an AARC of 2.8%. On the other extreme, Tanzania was the only country among the 14 countries that had an AARC not significantly different from zero (0) among both richest and poorest. Zambia's AARC among the richest (Q5) was 0.2% with its performance not being significantly different from four other countries (Burundi, Lesotho, Madagascar and Uganda). Five out of twelve countries had a significantly higher AARC in the CCI among the richest: Rwanda (2.4%), Ethiopia (1.9%), Zimbabwe (1.1%), Kenya (1.1%) and Malawi (1.0%). Zambia was the third fastest on the reduction of the gap between the poorest and richest, as measured by the difference between the AARCs among the poorest and richest (Table 5).

Table 5: Annual Average Rate of Change in the CCI for Selected Sub-Saharan Africa Countries by Wealth Quintile (%)

	Poorest (Q1)			Richest (Q5)			Abs diff AARC between poorest and richest
Country	AARC	LL	UL	AARC	LL	UL	
Lesotho	1.8	1.4	2.1	0.3	-0.1	0.7	1.5
Mozambique	1.2	0.8	1.6	0	-0.2	0.3	1.2
Zambia	1.4	1.2	1.6	0.2	0.1	0.4	1.2
Namibia	1	0.6	1.4	-0.1	-0.5	0.3	1.1
Malawi	2.1	2	2.3	1.1	0.9	1.3	1.0
Uganda	1.5	1.3	1.7	0.5	0.3	0.7	1.0
Burundi	1.6	1.1	2.2	0.7	0.2	1.2	0.9
Zimbabwe	1.9	1.5	2.3	1.1	0.5	1.7	0.8
Eswatini	1.3	0.8	1.8	0.6	-0.1	1.3	0.7
Kenya	1.7	1.3	2	1.1	0.8	1.4	0.6
Tanzania	0.1	-0.3	0.5	-0.4	-0.7	-0.1	0.5
Rwanda	2.8	2.6	2.9	2.4	2.2	2.6	0.4
Madagascar	0.4	0.1	0.7	0.3	0.1	0.5	0.1
Ethiopia	1.2	1	1.4	1.9	1.5	2.2	-0.7

Note: LL and UL are the 95% lower and upper confidence bounds, respectively. Countries ranked in descending order according to difference between AARCs among the poorest and richest.

Comparisons of the CCI were also made based on the wealth quintile and residence combined. The CCI gap by wealth within rural and urban areas has reduced over time. In the rural areas, all wealth quintiles made substantial progress, most prominently in the two poorest quintiles (Q1 and Q2); they reduced the CCI gap to less than 10% and had an AARC of over 2% per year. The urban trends are less regular than the rural trends, partly because of the greater sampling errors in the smaller urban sample. The major progress was however concentrated in the poorest and poorer groups (Q1 and Q2). The wealthier quintiles made little progress in the urban settings (Table 6).

Table 6: Changes in CCI by wealth quintile and rural/urban residence, ZDHS 2001/2 to 2018

	2001/2	2007	2013/14	2018	AARC (%)
Rural Q1	48.9	58.9	61.5	69.0	2.03
Rural Q2	51.0	57.9	63.0	75.3	2.29
Rural Q3	55.3	56.4	66.5	74.0	1.72
Rural Q4	55.3	56.9	67.2	76.2	1.89
Rural Q5	65.8	63.9	71.0	77.9	0.99
Urban Q1	61.1	64.4	72.1	74.9	1.19
Urban Q2	71.0	67.5	75.5	80.8	0.76
Urban Q3	77.2	73.9	78.2	77.7	0.03
Urban Q4	75.2	75.9	80.7	81.7	0.49
Urban Q5	80.9	75.1	81.7	80.1	-0.06

Looking at the changes in CCI in rural compared to urban areas, the wealth gap reduced even more in the rural than the urban areas since 2001/2. By 2018, the urban poorest had coverage rates at the same level as the wealthier rural quintiles (Figure 20).

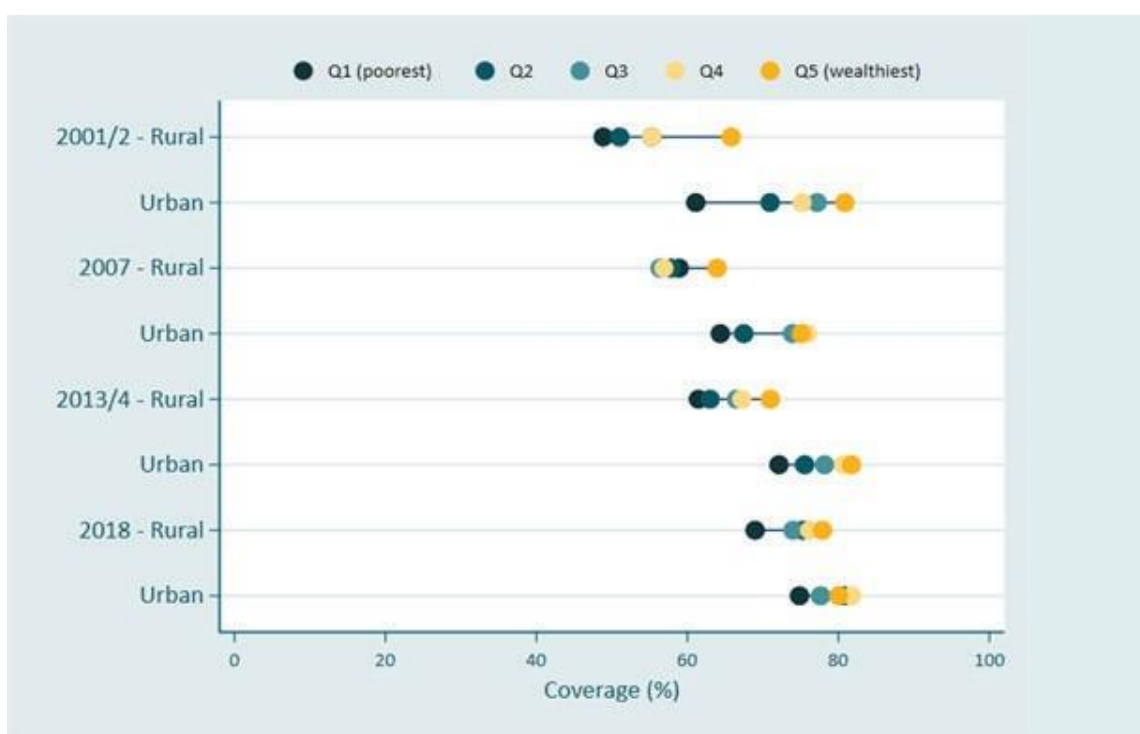


Figure 20: CCI by wealth quintiles in rural and urban areas, ZDHS 2001-2018

The urban poorest have done well compared to the wealthier urban households, but still remained behind over two decades compared to the urban richest. Notably, by ZDHS 2018, the urban poorest were performing no better than the rural areas (Figure 21).

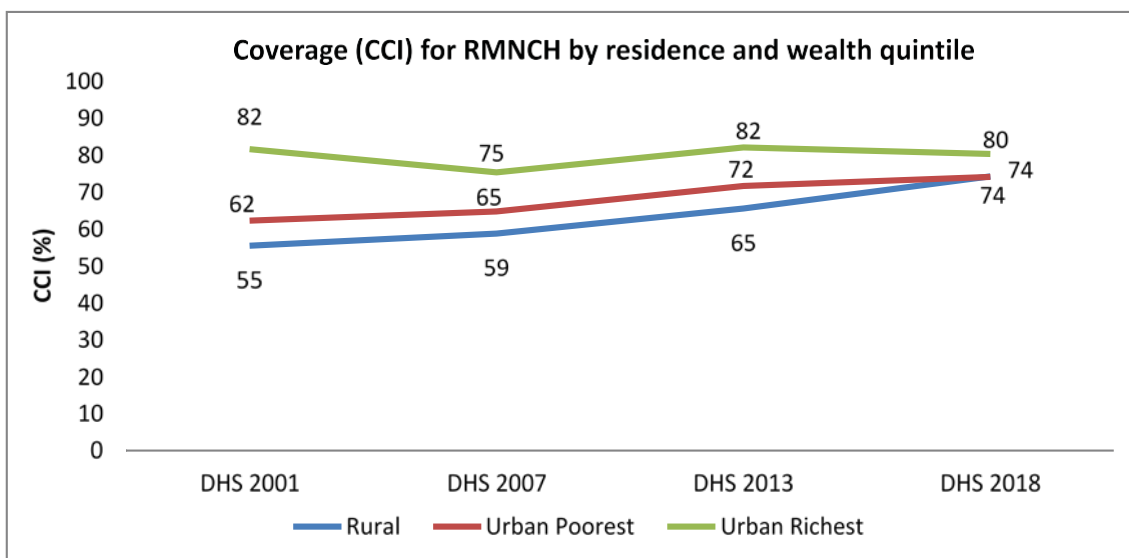


Figure 21: Coverage (CCI) by residence and wealth quintile, ZDHS 2001-2018

The coverage of specific interventions along the continuum of care were also analysed to understand which individual indicators contributed to the overall performance of the CCI (Figure 22).

As seen in Table 7 below, the highest contributors to the improvement observed in the CCI between 2001/2 and 2018 have been from improvements in coverage of Skilled Birth Attendants (3.9 %) and increase in demand for family planning satisfied by modern methods (2.5%). Significant to note is that the rate of increase was highest for the two indicators between 2007 and 2013/14 ZDHS while the lowest annual increase was observed in BCG Vaccination coverage at an annual rate of 0.5%.

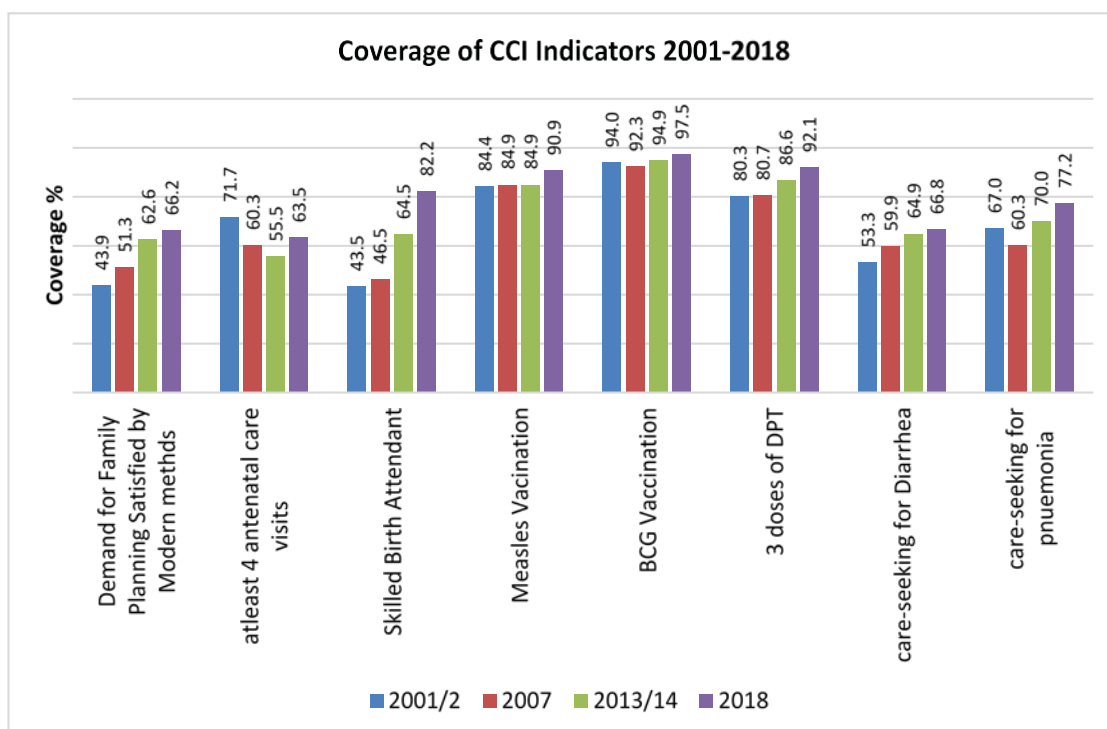


Figure 22: Coverage of individual CCI indicators, ZDHS 2001/2-2018

The gains in skilled birth attendant coverage were more among the rural population and the poorest population. The number of women with at least 4 antenatal care visits decreased annually by 0.7 between 2001/2 and 2018. Coverage of ANC 4+ among the urban population reduced from 80% in 2001/2 to 61% in 2018, while the coverage among the rural population reduced a slightly from 68% in 2001/2 to 65% in 2018.

Table 7: Trends in individual CCI indicators, ZDHS 2001/2-2018

Indicator				2018	AARC 2001/2- 2007	AARC 2007- 2013/14	AARC	AARC 2001- 2018
Demand for family planning satisfied by modern methods	43.9	51.3	62.6	66.2	2.8	3.6	1.0	2.5
At least 4 antenatal care visits	71.7	60.3	55.5	63.5	-3.1	-1.5	2.4	-0.7
Skilled birth attendance	43.5	46.5	64.5	82.2	1.2	5.9	4.4	3.9
Measles vaccination	84.4	84.9	84.9	90.9	0.1	0.0	1.2	0.5
BCG vaccination	94.0	92.3	94.9	97.5	-0.3	0.5	0.5	0.2
3 doses of DPT	80.3	80.7	86.6	92.1	0.1	1.3	1.1	0.8
Care-seeking for diarrhea	53.3	59.9	64.9	66.8	2.1	1.4	0.5	1.4
Care-seeking for pneumonia	67.0	60.3	70.0	77.2	-1.9	2.7	1.8	0.9

PART III: Coverage for selected RMNCH indicators

Main Points

- Between 2013/14 and 2018 ZDHS, improvements in coverage differed for all indicators across the continuum of care and between equity stratifiers.
- There was minimal change in family planning demand satisfied by modern methods among married women nationally, and in both urban and rural areas, though it improved more among poorer than richer women.
- There were improvements in coverage of antenatal care, and particularly skilled birth attendance and postnatal care within 48 hours, nationally and in all provinces.
- There was an increase in coverage of first antenatal care visit before 14 weeks among the poorest (16% to 43%) versus richest (26% to 35%) women, though it still remained low in both groups.
- Equity gaps in skilled birth attendance and postnatal care reduced greatly between wealth and education groups, and rural versus urban areas.
- Overall coverage for vaccination has increased, and specifically DPT3 and Measles, with more improvement in Luapula, Central and Southern Provinces.
- Coverage of care-seeking for children with pneumonia improved by 5 points nationally; it was highest and increased most in Central (15 percentage points), Eastern and Muchinga (12 points each), but decreased in Copperbelt (-5%) and North-Western (-2.6%) and Northern (-1.2%) Provinces
- Care-seeking for diarrhea did not increase much nationally (2%) as there were wide provincial differences; it improved most in North-Western and Central provinces (29 and 17 points respectively), but declined in Southern (-10) and Luapula (-2) Provinces

This section presents trends on coverage of selected RMNCH indicators for the last two ZDHS rounds to provide some additional markers of interest to assess coverage as well as quality, including early ANC before 14 weeks of pregnancy and PNC within 48 hours.

Reproductive Health

Demand satisfied for family planning by modern methods among married women

Nationally, there has been hardly any change in the proportion of married women with family planning demand satisfied by modern methods between 2013/14 and 2018 ZDHS from 70% to 72%.

Rural-urban disparities in the proportion of married women with family planning demand satisfied by modern methods have persisted since 2013/14, with rural women having lower rates (69%) compared to urban women (76%) (Figure 23) in 2018 ZDHS.

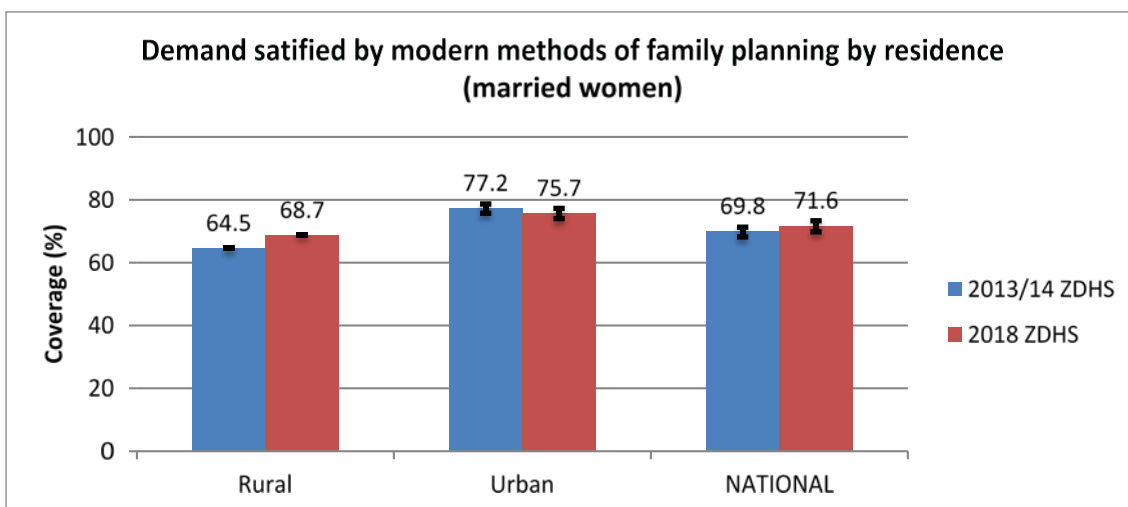


Figure 23: Demand satisfied for family planning by modern methods by residence (married women), ZDHS 2013/14 and 2018

Coverage of demand satisfied for family planning (modern methods) among married women also appears to become more equitable between socioeconomic (wealth) groups over time (Figure 24).

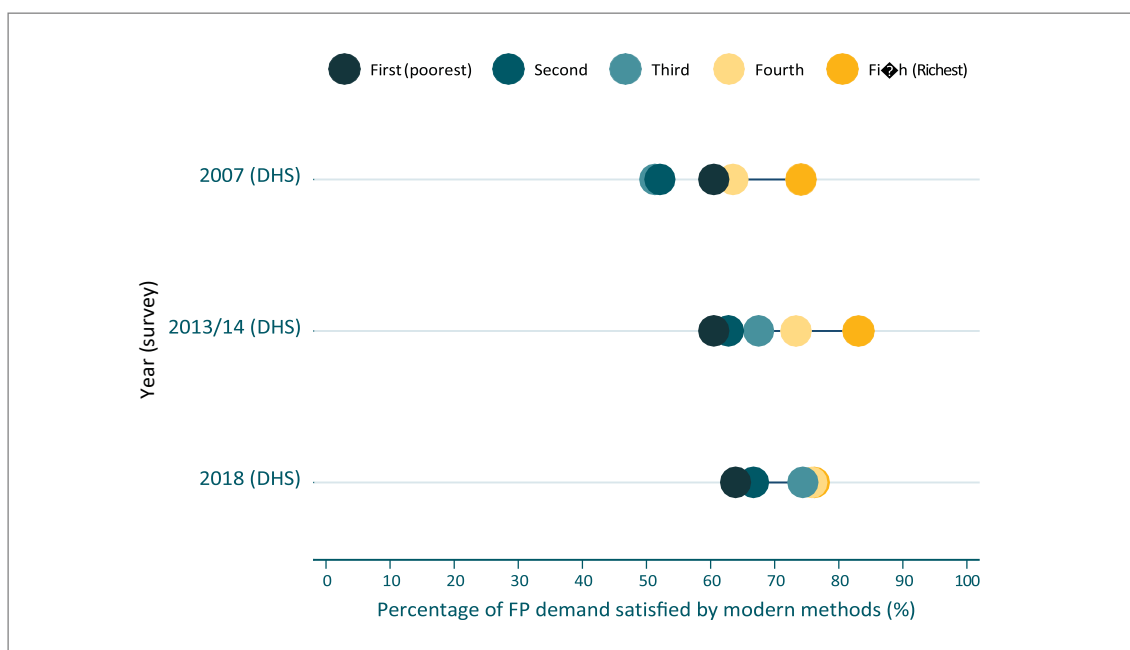


Figure 24: Coverage in demand satisfied for family planning by modern methods among married women by wealth quintile, ZDHS 2007, 2013/14 and 2018

Maternal and newborn health

Analysis of data for maternal and newborn health (MNH) indicators was done for 1st ANC within 14 weeks, 4+ANC, SBA, as well as postnatal care within 2 days. Overall, there has been an increase in coverage for maternal and newborn health indicators in all the provinces. Table 8 provides a summary of the results for the maternal and newborn health indicators by province. Eastern province has met the 2018 NHSP targets on all the four indicators analysed.

Overall, coverage of first ANC within 14 weeks has increased between 2013/14 and 2018 (12 percentage points increase). Muchinga province had the highest increase in coverage for first ANC visits before 14 weeks by 2018 ZDHS, followed by Western at 25 and 20 percentage points respectively. Only Eastern (48.9%) and Muchinga (48.4%) have met the coverage target (45%) based on the NHSP target by 2018. Three provinces (Luapula, Eastern and Muchinga S) have made a greater contribution (above 40%) to the national increase.

Coverage for SBA has also significantly increased between 2013/14 and 2018 ZDHS in all the provinces. The highest increase was in Southern Province, from 55% to 84%, followed by Central province, from 46% to 74% (Table 8). Western, Central, Northern and Luapula provinces did not meet the NHSP target of 79% for SBA by 2018.

The proportion of women attending postnatal care within 2 days has increased between 2013/14 and 2018 in all provinces except North-western which reduced by 4.6 percentage points.

Table 8: Coverage of selected maternal and newborn indicators by province, ZDHS 2013/14 and 2018

Province	Year	First ANC with- in 14 weeks	ANC at least four times	Skilled birth attendance	PNC within 2 days of child birth
Central	2013/14	19	54.7	46	44.4
	2018	24.0	60.0	74.2	61.2
	Difference (% points)	5	5.3	28.2	16.8
Copperbelt	2013/14	26	62.9	81.1	81.6
	2018	31.2	60.3	92.3*	83.1*
	Difference (% points)	5.2	-2.6	10.2	1.5
Eastern	2013/14	35.5	52.7	65.2	71.2
	2018	48.9*	65.1*	85.1*	69.5
	Difference (% points)	13.4	12.5	19.9	1.7
Luapula	2013/14	27.3	51.3	59.6	53.3
	2018	44	65*	74.0	69.4
	Difference (% points)	16.1	13.4	14.4	16.1
Lusaka	2013/14	23.9	54.7	89.3	83.0
	2018	29.3	58.5	92.4*	83.6*
	Difference (% points)	5.4	3.8	3.1	0.6

***2018 NHSP target met**

Table 8: Coverage of selected maternal and newborn indicators by province, ZDHS 2013/14 and 2018
(Continuation)

Province	Year	First ANC with- in 14 weeks	ANC at least four times	Skilled birth attendance	PNC within 2 days of child birth
Muchinga	2013/14	23.3	53.8	56.8	52.0
	2018	48.4*	68.9*	79.2*	70.3
	Difference (% points)	25.1	15.1	22.4	20.8
Northern	2013/14	17.7	52.5	45.5	49.2
	2018	37.4	66.8*	71.3	54.4
	Difference (% points)	19.7	14.3	25.8	5.2
North- Western	2013/14	21.3	54.9	71.1	75.3
	2018	32.3	69.8*	79.5*	70.7
	Difference (% points)	11	14.9	8.4	-4.6
Southern	2013/14	25.3	59.9	55.4	58.5
	2018	39.7	68*	84.0*	65
	Difference (% points)	14.4	8,1	28.6	9.6
Western	2013/14	15.6	50.6	57.5	43.1
	2018	35.8	59.23	72.2	57.6
	Difference (% points)	20.2	8.6	14.74	14.5
National	2013/14	24.4	55.5	64.6	63.4
	2018	36.7	63.5	82.2*	69.7
	Difference (% points)	12.3	8	17.6	6
National Target for 2018		45	65	79	74

***2018 NHSP target met**

First ANC within 14 weeks

Inequalities among mothers in attendance of ANC before 14 weeks were compared between rural and urban residence from 2007 to 2018 ZDHS. As shown in the graph and equiplot in Figure 25 a and b, overall coverage in rural areas is improving and generally better than the urban areas. Notably, the gap in coverage has become wider in the 2018 ZDHS in favour of the rural (40.8%) versus urban (30.3%) areas, with a 10-percentage points difference.

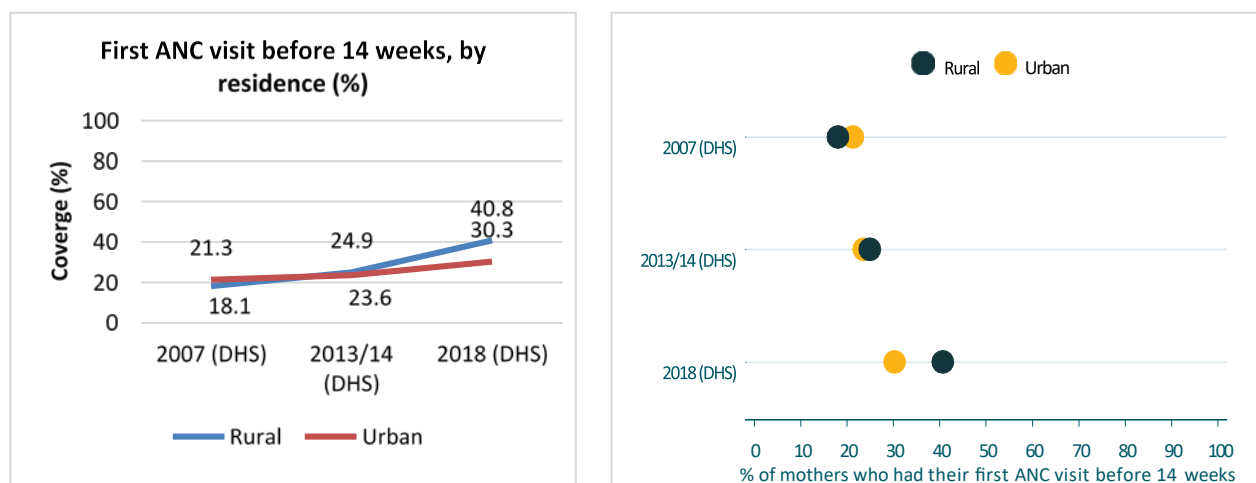


Figure 25: First ANC before 14 weeks (%) by residence, ZDHS 2007, 2013/14 and 2018

Comparison of ANC before 14 weeks by wealth quintile reveals a noticeable increase in coverage between 2013/14 and 2018 ZDHS among women in all quintiles (Figure 26). Notably the increase is higher among the poorest women, at 43% in 2018 ZDHS compared to 24% in 2013/14.

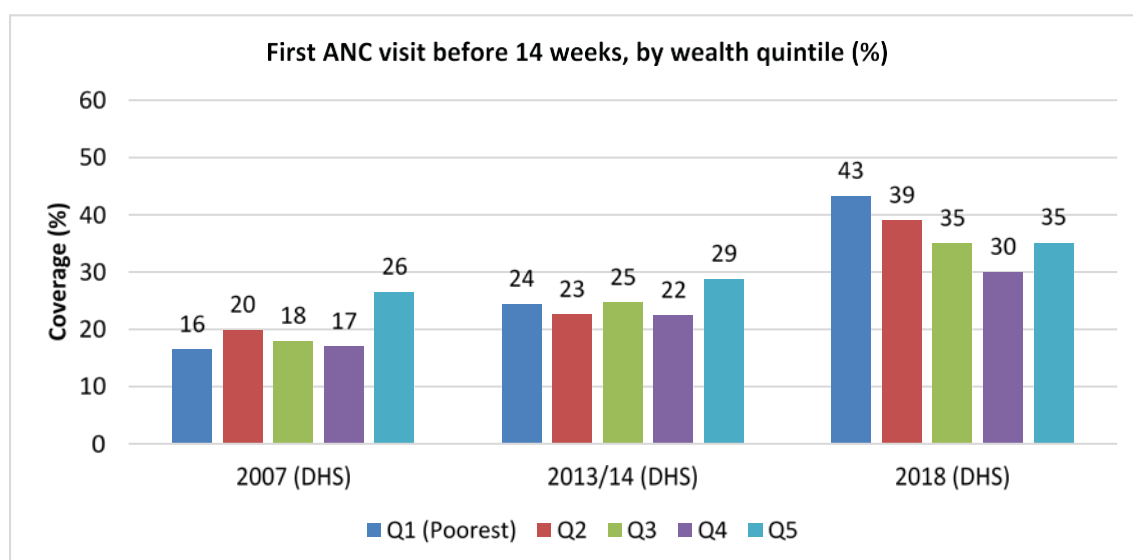


Figure 26: First ANC visit before 14 weeks (%) by wealth quintile, ZDHS 2007, 2013/14 and 2018

The equiplots in Figure 27 A and B show that the gap in coverage for first ANC before 14 weeks across different wealth quintiles is widening with the richest being left behind (2018 ZDHS). In contrast, within urban populations, poorer women are being left behind, with a wider gap of 18 percentage points between the urban richest and poorest due to greater increases in coverage among the richest group in the 2018 ZDHS.

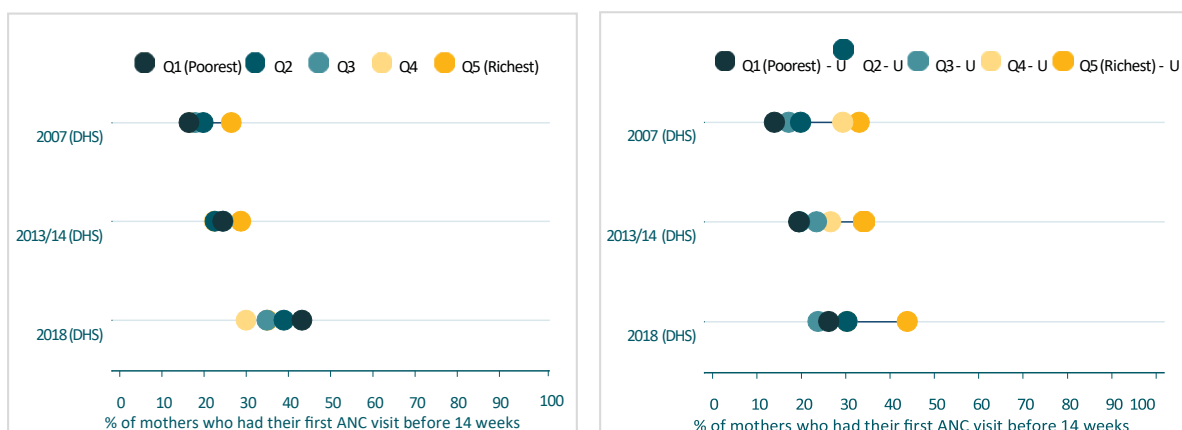


Figure 27: First ANC visits before 14 weeks (%) by wealth quintile and residence, ZDHS 2007, 2013/14 and 2018

Skilled Birth Attendance (SBA)

Turning to SBA, rural-urban disparities in coverage seem to be closing over time, with much greater progress among mothers living in the rural areas compared to urban areas (Figure 28).

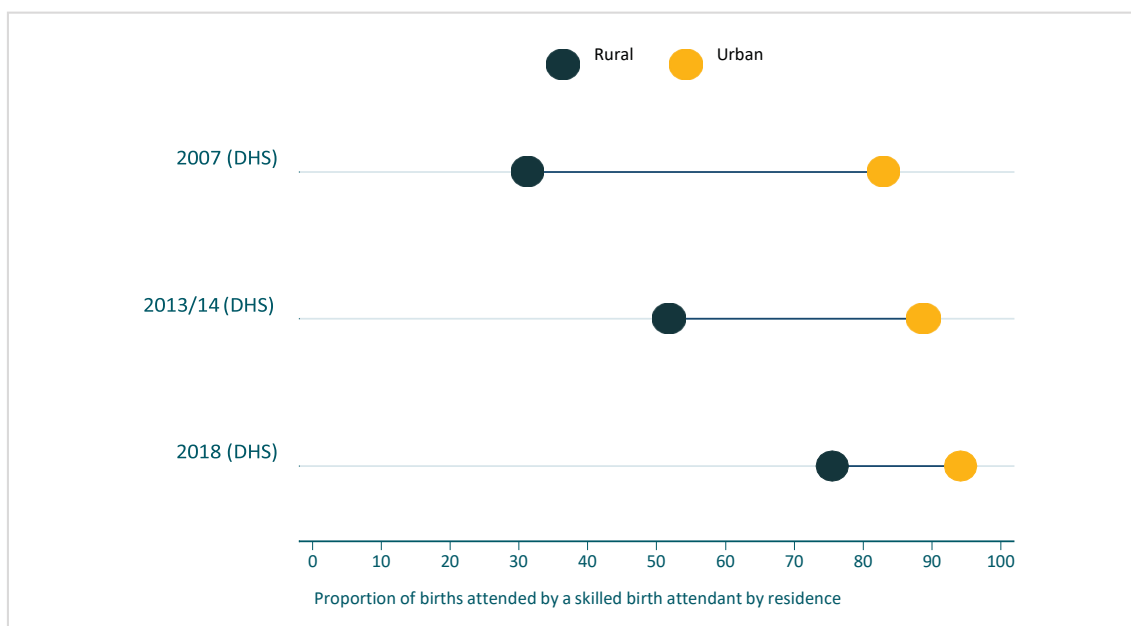


Figure 28: Skilled birth attendance (%) by residence, ZDHS 2007, 2013/14, and 2018

The difference in coverage of SBA among the poorest and richest mothers has declined over the years, though inequality gaps still exist (Figure 29). Notably, compared to the wide gap in 2007, the gap reduced because coverage increased faster among women in the poorest three wealth quintiles between 2013/14 and 2018 ZDHS (Figure 29 A). This was also evident only within urban communities (Figure 29 B), yet the poorest remain further behind everyone else.

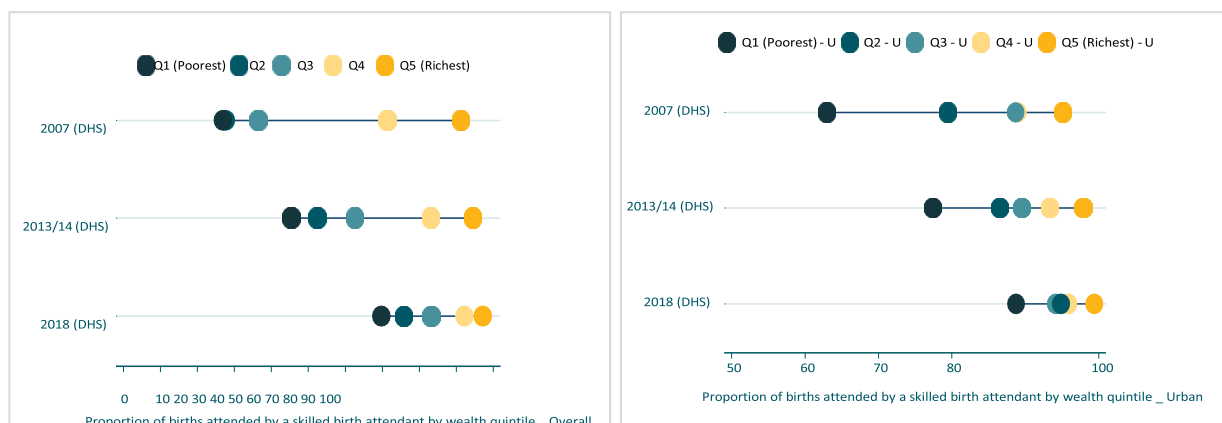


Figure 29: Skilled birth attendance by wealth quintile overall and within urban areas, ZDHS 2007, 2013/14 and 2018

Postnatal care within 2 days after childbirth

Though not included in the CCI, the postnatal period and particularly the week after birth is a critical phase in the lives of mothers and newborn babies, as most maternal and neonatal deaths occur during this time. The WHO guidelines recommend women to receive postnatal care within 2 days after giving birth. Analysis of the ZDHS data from 2013/14 to 2018 showed an increase in coverage of postnatal care within 2 days with the highest increase in Muchinga (20 percentage point) followed by Luapula (17 percentage points) (Figure 30).

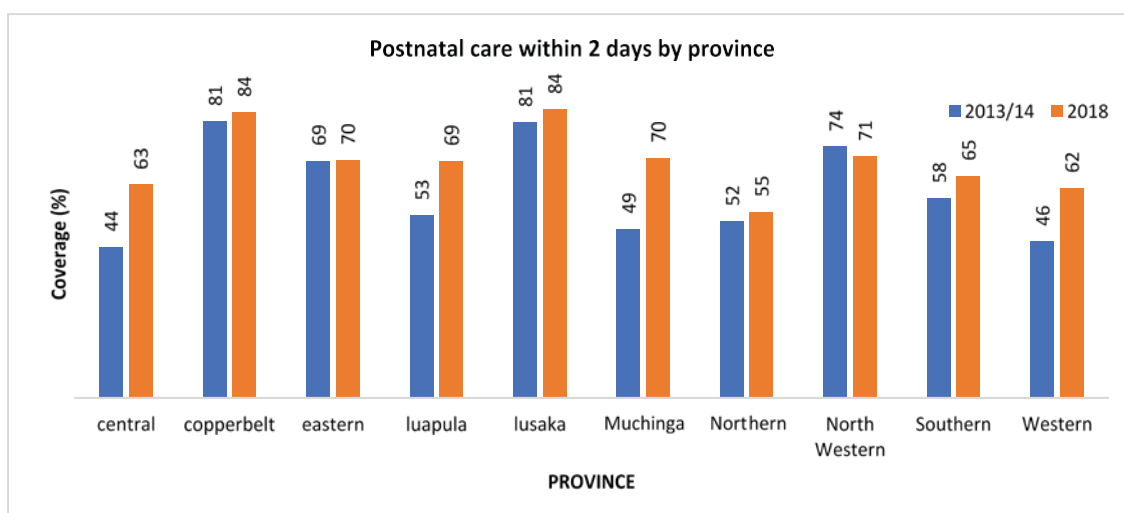


Figure 30: Coverage of postnatal care within 2 days by province, ZDHS 2013/14 and 2018

Coverage for postnatal care within 2 days of birth was compared between places of residence from 2007 to 2018 ZDHS. As shown in Figure 31, overall coverage in rural areas was improving over time, although it is lower than the urban areas. Notably, as shown in Figure 31 B, the gap in coverage slightly reduced in the recent 2018 DHS between rural (64%) and urban (82%) areas compared to previous waves.

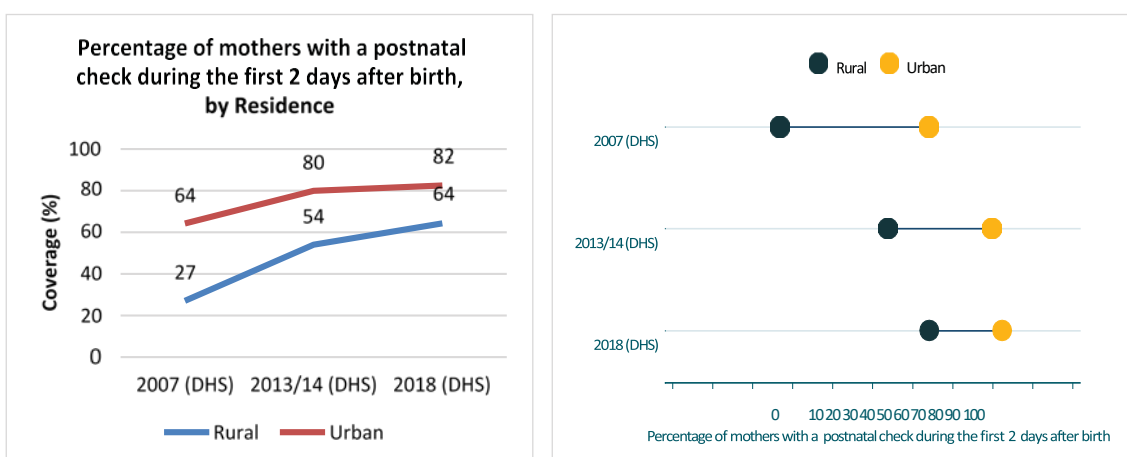


Figure 31: Coverage of postnatal check during the first 2 days after birth by residence, ZDHS 2007, 2013/14 and 2018

A comparison of the coverage gap in postnatal care during the first 2 days after birth between the richest and poorest wealth quintiles reveals a noticeable reduction in inequality. The inequality gap reduced from 48 percentage points difference in 2007 ZDHS to 26.6 percentage points difference in 2018 ZDHS. (Table 9).

Table 9: Percentage of postnatal check during the first 2 days after birth by wealth quintile, ZDHS 2007, 2013/14 and 2018

ZDHS round	Q1 (Poorest)	Q5 (Richest)	Difference (percentage points)
2007	24.4	72.6	48
2013/14	46.6	83.8	37
2018	58.1	84.7	26.6

Although there has been a reduction in the inequality gap in coverage for PNC in the first 2 days after birth between the poorest and richest women from the 2007 to 2018 ZDHS, the inequality still exists and remains unacceptably wide in the 2018 ZDHS, (Figure 32).

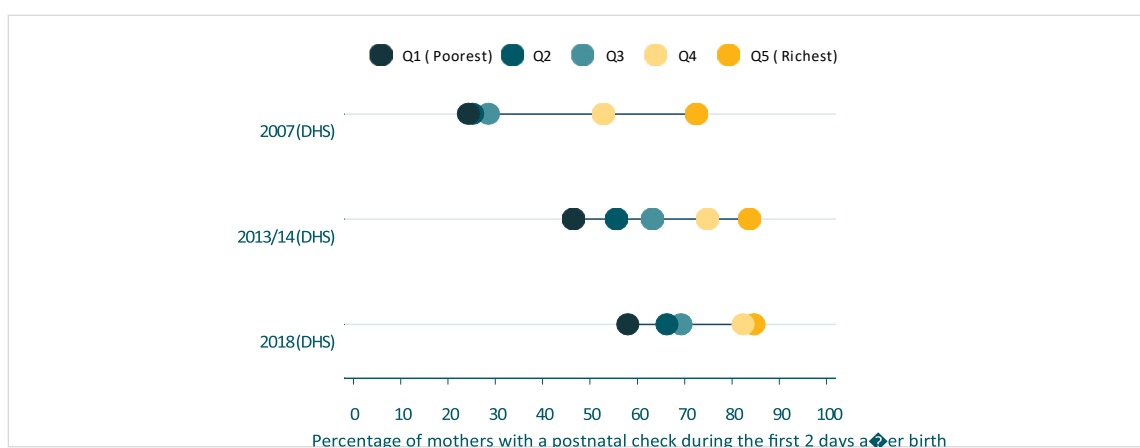


Figure 32: postnatal care within 2 days after birth by wealth quintile, ZDHS 2007, 2013/14 and 2018

Analysis of data on coverage of postnatal care within 2 days shows higher coverage for women who are educated than for those without education at the three time points. As shown in Figure 33, coverage for postnatal care within 48 hours after birth has been steadily increasing among women without education and those with primary education from 46% to 53% and 59% to 67%, between 2013/14 and 2018 respectively. The gap between women without education and those with education is slightly smaller in 2018 compared to 2013/14 ZDHS.

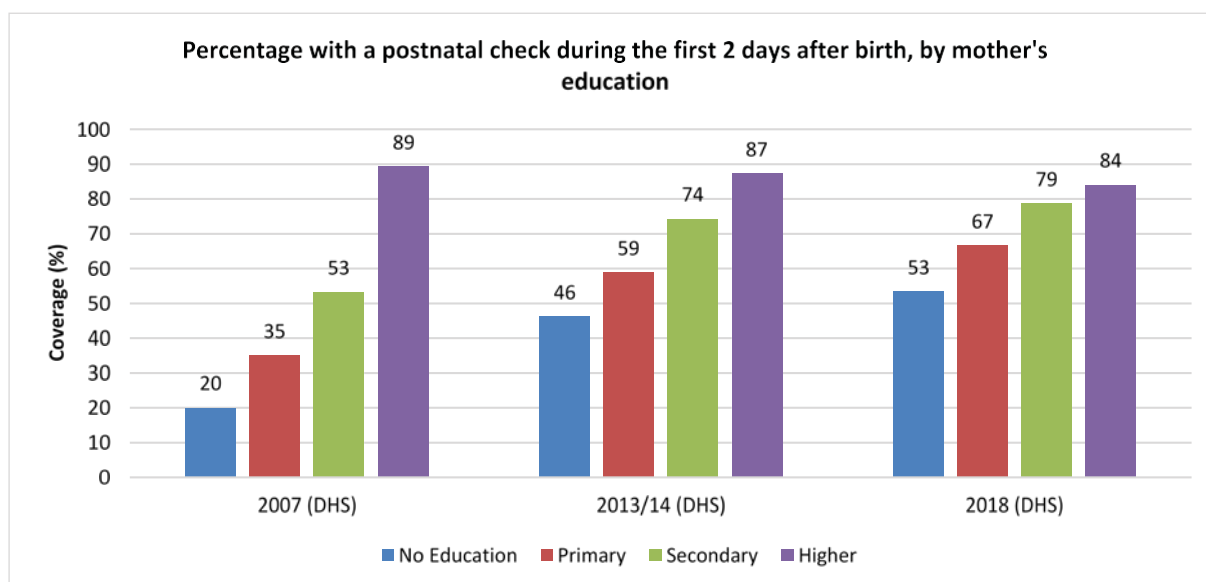


Figure 33: coverage for PNC during the first 48 hours after birth, by mother's education, ZDHS 2007, 2013/14 and 2018

Coverage for selected child health indicators

Overall coverage for vaccination, and specifically DPT3 and Measles, has increased between 2013/14 and 2018 in all ten provinces. The coverage was higher in Luapula province for both DPT3 (11.6 percentage points) and Measles (12.8), followed by Southern province for DPT3 (9.1) and Measles (8.5). The proportion of children that have been vaccinated with BCG has reduced in Eastern (-0.5 percentage points) and Muchinga (-2 percentage points) provinces over the five years between the last two surveys (Table 10).

The proportion for care-seeking behaviours has also increased between 2013/14 and 2018 ZDHS, particularly for pneumonia compared to diarrhoea (Table 10). Coverage of care-seeking for children with pneumonia increased by 12.2, 12, 5.9 and 2.8 percentage points in Eastern, Muchinga, Luapula and Southern province respectively, which were higher than the national average. However, minimal improvement was observed nationally (2 percentage points difference), Muchinga (1.7 percentage points) for coverage for care seeking for diarrhoea. There was a reduction in Southern (-10.1) and Luapula (-2) provinces. Eastern province has met the national target by 2018 (82%) for care seeking for pneumonia.

Table 10: Coverage of child health indicators by province, ZDHS 2013/14 and 2018

Province	Year	DPT3	Measles	BCG	Care seek- ing pneu- monia	Care seeking for diarrhoea
Central	2013/14	83.4	80.6	89.2	61.9	60.8
	2018	93.5	91.6	98.9	77.6	77.6
	Difference	10.1	11	9.7	15.7	16.8
Copperbelt	2013/14	95.3	91.2	97.8	78.0	63.02
	2018	95.6	88.2	98.9	72.1	72.05
	Difference	0.3	-3	1.1	-5.9	9
Eastern	2013/14	89.4	86.4	97.6	72.7	65.6
	2018	94.4	93.2	97.1	84.9*	66.4
	Difference	5	7.2	-0.5	12.2	0.8
Luapula	2013/14	80.1	78.0	92.9	79.6	85.5
	2018	91.7	90.8	97.3	73.3	71.3
	Difference	11.6	12.8	4.4	5.9	-2
Muchinga	2013/14	80.4	83.2	95.5	67.3	52.7
	2018	86.8	85.4	93.5	79.3	54.4
	Difference	6.4	2.2	-2	12	1.7
Northern	2013/14	87.0	87.6	94.6	68.1	54.1
	2018	88.7	88.5	96.2	66.9	66.9
	Difference	1.7	0.9	1.6	-1.2	12.8
North West- ern	2013/14	84.8	84.5	97.1	86.0	54.1
	2018	90.6	87.2	98.1	83.4	83.4
	Difference	5.8	2.7	1	-2.6	29.3
Southern	2013/14	83.6	86.0	92.2	68.5	65.1
	2018	92.7	94.5	98.0	71.3	55
	Difference	9.1	8.5	5.8	2.8	-10.1
Western	2013/14	81.9	76.1	93.5	63.8	66.6
	2018	82.6	86.8	99.5	70.0	70.1
	Difference	0.7	10.7	6	6.2	3.5
National	2013/14	86.6	84.9	94.9	71.9	64.8
	2018	92.1	90.9	97.5	77.2	66.8
	Difference	5.5	6	2.6	5.3	2
2018 National Target					82	79

*Target met

PART IV: Comparing mortality and CCI by province and socio-economic groups

Main Points

- Over the last two decades, Zambia's average annual rate of change in under-five mortality rate was faster than the average for the region, but was a bit slower than average for CCI; this was also the case among the poorest groups.
- Comparing the trends for inequalities in mortality and CCI in Zambia since 2000, the declines in U5MR and CCI were not directly correlated at provincial level.
- Absolute reductions in U5MR (10 years preceding) were correlated with absolute increases in CCI between wealth, education and residence groups between ZDHS 2001/2 and 2018.
- The greatest improvements were experienced for the more vulnerable groups (lower two wealth quintiles, none or primary education, and women living in rural areas), and those living in Central, Northern, Western, Eastern, and North Western provinces.
- The improvements were greater in rural than urban areas for all provinces.
- The gap in both mortality and CCI also closed between wealth groups within both rural and urban areas. Improvements also occurred largely independent of any rise in absolute income or education levels among the lower socio-economic groups.

The national trends in U5MR and CCI were compared between Zambia and its neighbours (Figure 34). The average annual rate of change in U5MR was greater (-6.6%) than many of the neighbours except Malawi, Rwanda, Burundi and Mozambique (Burundi's last DHS was more recent in 2010). Meanwhile, Zambia's average reduction in CCI was lower than many of its neighbours at just below 1% per annum.

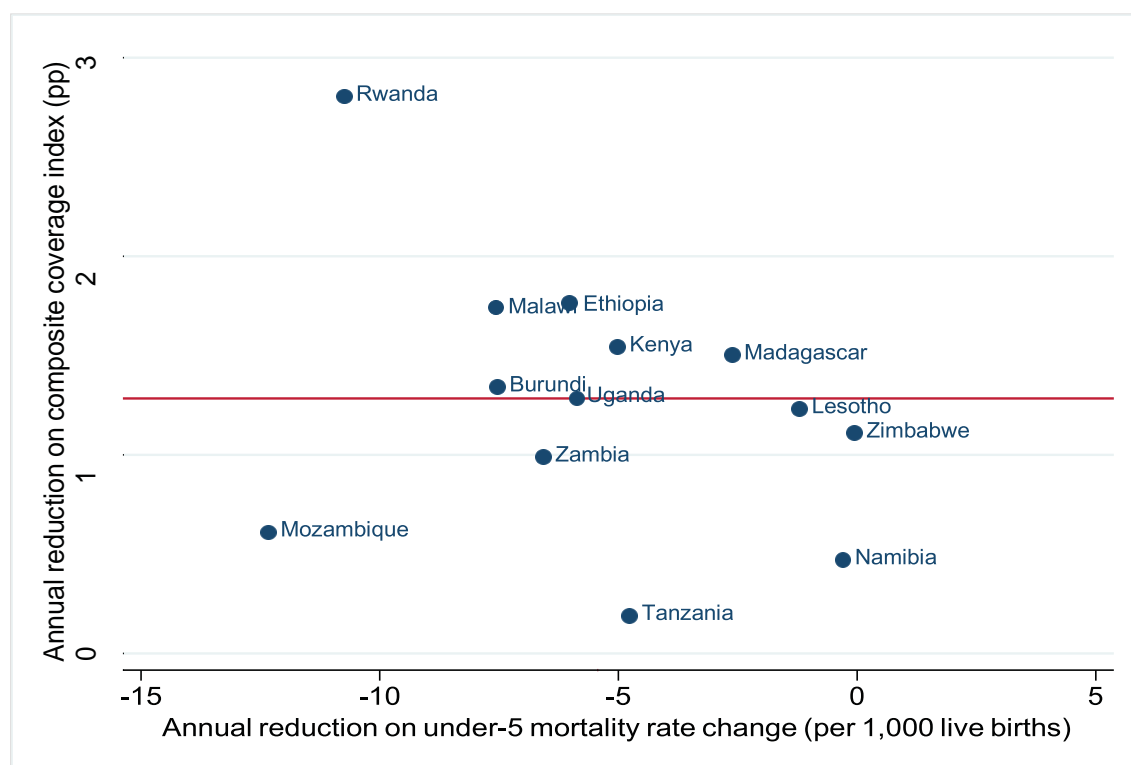


Figure 34: Average annual rate of change (%) in U5MR and CCI in Zambia and neighbours, DHS 1994-2019

Looking at the changes in U5MR by CCI in Zambia among the poorest group only (Figure 35), a similar picture appears. The average annual rate of change in U5MR among Zambia's poorest (-6.7%) was faster than many of its neighbours, while for CCI the rate of change was lower than many nearby countries at an average of 1% per annum.

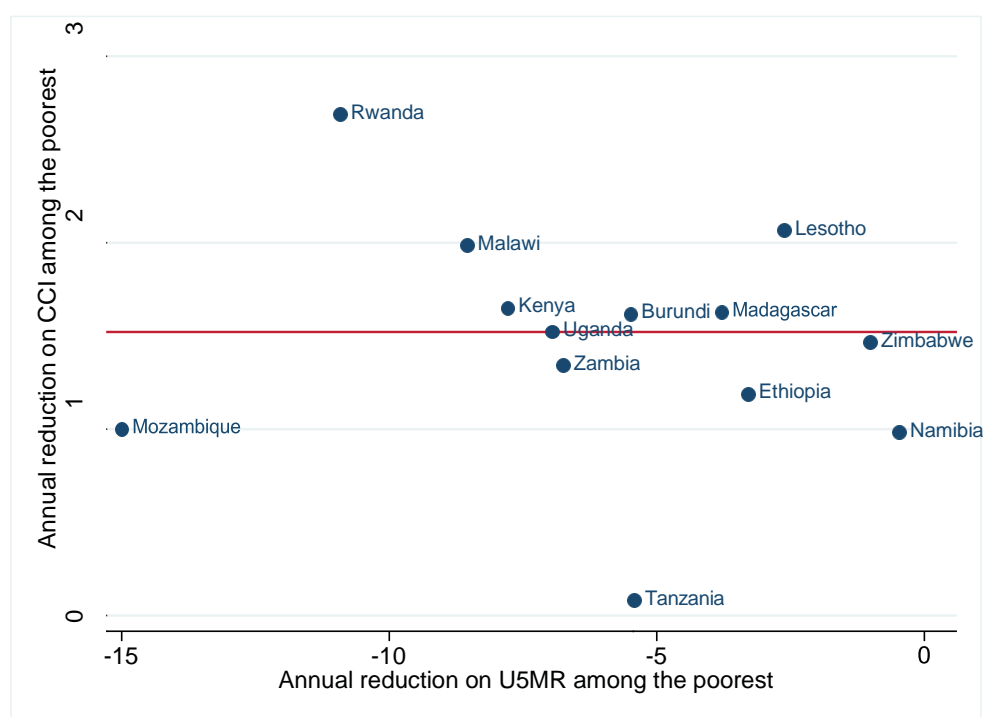


Figure 35: Average annual rate of change (%) in U5MR and CCI among the poorest wealth quintile in Zambia and neighbours, DHS 1994-2019

Provincial comparison of trends in mortality and CCI

This report also estimated national and provincial RMNCH indicators and inequalities, with a focus on child mortality and intervention coverage. Table 11 below presents provinces' relative improvements over time using the AARC in U5MR and NMR (10 years preceding) between 2007 (midpoint 2003) and 2018 (midpoint 2013) ZDHS waves. It also ranks the provinces' relative improvements in CCI by AARC, between the ZDHS waves 2001/2 and 2013/14 (assuming the CCI reflects one year preceding on average across indicators), which are closest to the midpoints of the ZDHS waves used for U5MR.

The table indicates that the AARC for U5MR reduced relatively more quickly than NMR between 2003-2013 (midpoints of ZDHS 2018 and 2007), nationally and in all provinces, owing to the increasing proportion of all under-five mortality occurring in the neonatal period. The fastest improvements in both U5MR and NMR were achieved by North-Western, Central, and Western provinces. Swift gains of over 7% per annum on average were also seen in Copperbelt and Northern provinces for U5MR. Gains of over 4% per annum on average occurred in Eastern, Northern and Copperbelt provinces for NMR. Luapula improved slowest in both U5MR and NMR, followed by Southern, and Lusaka provinces.

The CCI did not decline as starkly, but still improved in all provinces between 2000 and 2012 (ZDHS 2001/2 and 2013/14). Western, Northern, Luapula, followed by Eastern had the greatest gains in CCI between 2001 and 2012. The slowest gains were in Lusaka and Copperbelt, which started with a higher baseline CCI, as well as Central and North Western provinces.

Table 11: Average annual rate of change in mortality (2003-2013) and CCI (2000/1-2012/13), by province

	Decrease in U5MR (2003- 2013)		Decrease in NMR (2003- 2013)		Increase in CCI (2000- 2012)	
Province	AARC (%)	Rank	AARC (%)	Rank	AARC (%)	Rank
Central	9.1	3	7.2	2	1.0	7
Copperbelt	9.9	2	4.2	6	0.6	8
Eastern	8.6	6	5.7	4	1.4	4
Luapula	3.5	9	0.3	9	1.5	3
Lusaka	7.5	7	3.6	7	0.5	9
Northern	8.9	4	4.4	5	1.6	2
North West- ern	14.2	1	11.5	1	1.1	6
Southern	3.8	8	1.0	8	1.2	5
Western	8.9	5	6.4	3	1.8	1
National	7.6		3.8		1.1	

The report also looked closely at whether faster increases in a province's CCI was accompanied by declines in mortality within the past two decades, as the RMNCH programs intended. These comparisons focus on under-five mortality, where greater gains were made than neonatal mortality. A comparison of provinces' relative improvements in U5MR (10 years preceding, ZDHS 2007 to 2018) and CCI (ZDHS 2001/2 to 2013/14) was made as in table 11 to use as comparable time periods in Figure 36. This was also compared to the IGME estimates for U5MR compared to the AARC for CCI in ZDHS.

—Figure 36 shows an inverse relationship between U5MR and CCI in each province., Gains in both U5MR and CCI were not noticeably correlated across provinces. The largest declines in U5MR was observed in North-Western province and were accompanied by the highest absolute increases in CCI, despite it having the second lowest baseline mortality level. Western, Northern and Eastern provinces improved moderately in U5MR, yet had improved relatively faster in CCI in the ZDHS. Luapula and Southern improved in CCI but not as much in U5MR. Conversely, Copperbelt and Lusaka improved somewhat more in U5MR, but less for CCI. Muchinga was not examined over time due to changes in boundaries.

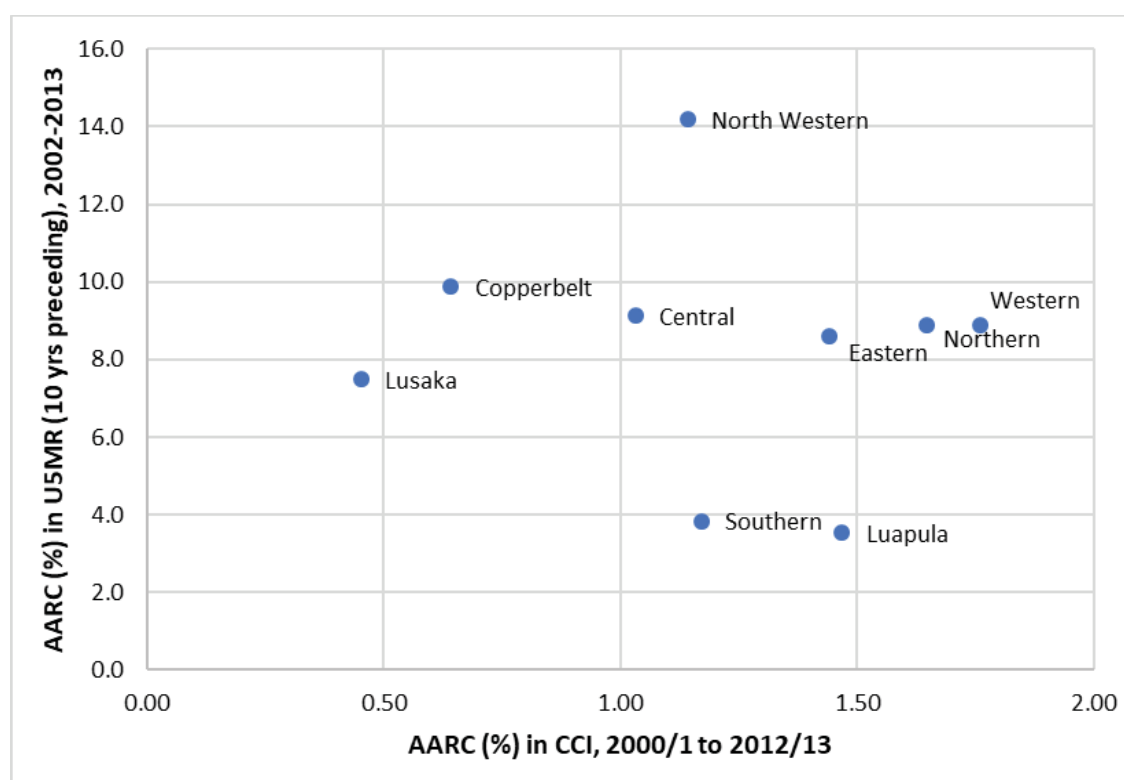


Figure 36: Average annual rate of change in U5MR and CCI by province, ZDHS 2001/2 to 2018

These provincial differences may be partly explained by variable improvements among urban/rural, wealth or education groups within provinces. It would be difficult to conduct intra-provincial analyses using ZDHS data across two levels of stratification - by province and residence, wealth or education - thus increasing the risk of imprecise estimation with large standard errors and confidence intervals. To mitigate this concern, an intra-province analysis of mortality and then CCI by residence was conducted, which only has two categories.

In the earlier results on under-five mortality, it showed that the rates had improved more in rural than urban areas. Table 12 summarises the CCI results by both province and residence for the 2001/2, 2007, 2013/14 and 2018 waves of the ZDHS. It shows the absolute changes in each province's urban and rural areas and the relative urban-rural gap at each time point, and how this changed over time in terms of the AARC. Between the 2013/14 and 2018 ZDHS, the CCI increased faster in rural areas across all provinces. Likewise, there was a narrowing of the rural-urban gaps (relative ratio) in coverage of RMNCH interventions along the continuum of care for most provinces, though less for Lusaka and Southern where the gap was lower initially. The closing of the gap between rural versus urban areas occurred earlier in some provinces, such as Eastern, Western and North-Western. Northern province made its fastest improvements in closing the rural-urban CCI gap between 2007 and 2013/14, though Luapula, Southern, Western and Central also showed improvement. The period of fastest gains for many provinces was most recent, between 2013/14 and 2018, including in Central, Copperbelt, and Luapula.

Table 12: Composite Coverage Index (%) by Province and Residence

Province	Residence	2001/2	2007	2013/14	2018	AARC (2001/2-2007)	AARC (2007-2013/14)	AARC (2013/14-2018)
Central	Urban	73.8	71.4	74.4	80.2	-0.6	0.6	1.7
	Rural	51.7	54.9	62	74.9	1.1	1.9	4.2
	Urban/rural ratio	1.4	1.3	1.2	1.1	-1.7	-1.2	-2.5
Copperbelt	Urban	73.6	71.5	79.3	77.7	-0.5	1.6	-0.5
	Rural	62.8	63.8	67.8	75.9	0.3	0.9	2.5
	Urban/rural ratio	1.2	1.1	1.2	1.0	-0.8	0.7	-3.0
Eastern	Urban	76.2	73.8	78.2	82.1	-0.6	0.9	1.1
	Rural	58.8	69.4	71.2	78.4	3.0	0.4	2.1
	Urban/rural ratio	1.3	1.1	1.1	1.0	-3.6	0.5	-1.1
Luapula	Urban	69.6	63.2	75.8	76.5	-1.8	2.8	0.2
	Rural	53.8	49.3	65.1	73.3	-1.6	4.3	2.6
	Urban/rural ratio	1.3	1.3	1.2	1.0	-0.2	-1.5	-2.4
Lusaka	Urban	74.6	70.8	77.8	80	-1.0	1.5	0.6
	Rural	68.2	68.6	77	82.9	0.1	1.8	1.6
	Urban/rural ratio	1.1	1.0	1.0	1.0	-1.1	-0.3	-1.0
Muchinga	Urban	-	-	70.4	82.9			3.6
	Rural	-	-	61.1	73.1			4.0
	Urban/rural ratio			1.2	1.1			-0.4
Northern	Urban	66.5	68.1	70.8	77.6	0.4	0.6	2.0
	Rural	47.6	47.7	59.3	69.6	0.0	3.3	3.6
	Urban/rural ratio	1.4	1.4	1.2	1.1	0.4	-2.8	-1.5
North Western	Urban	74.7	68	75.1	78.7	-1.7	1.5	1.0
	Rural	60.0	59.2	69.8	75.5	-0.2	2.5	1.7
	Urban/rural ratio	1.2	1.1	1.1	1.0	-1.5	-1.0	-0.7
Southern	Urban	64.5	81.3	79.2	79.2	4.2	-0.4	0.0
	Rural	59.1	61.5	66.6	70.8	0.7	1.2	1.4
	Urban/rural ratio	1.1	1.3	1.2	1.1	3.5	-1.6	-1.4
Western	Urban	75.4	78.2	73.8	77.1	0.7	-0.9	1.0
	Rural	51.3	61.4	63.8	67.7	3.3	0.6	1.3
	Urban/rural ratio	1.5	1.3	1.2	1.1	-2.6	-1.5	-0.3

The Annual Average Rate of Change in under-five mortality and CCI were compared by province and residence between ZDHS 2001/2 and 2018 and ZDHS 2001/2 and 2013/14 respectively (Figure 37). This shows that there were greater improvements in both mortality and CCI among women living in rural than urban areas in all provinces (except that Luapula had improved U5MR more in urban than rural areas). This was especially true in Central and Northern provinces followed by Western with a poorer U5MR and CCI baselines, as well as Eastern and North Western with slightly better baselines. Among the urban sample, Southern and Northern provinces had relatively faster improvements in CCI (despite higher baselines), but not U5MR (with worse baselines). Meanwhile, urban North-Western and Central seemed to experience faster improvements in U5MR but not as much for CCI (also with better baselines). Muchinga was not included as it was a newer province.

It is important to note that the U5MR estimates and related AARC values must be interpreted cautiously for these results by province and residence. In particular, there were large confidence intervals for Lusaka and Copperbelt with smaller samples of people living in rural areas (less than 20%), and the rest of the provinces with smaller samples living in urban areas (though the urban sample increased for some of them by 2018). See Appendix for tables with province's rural/urban sample sizes and confidence intervals for U5MR.

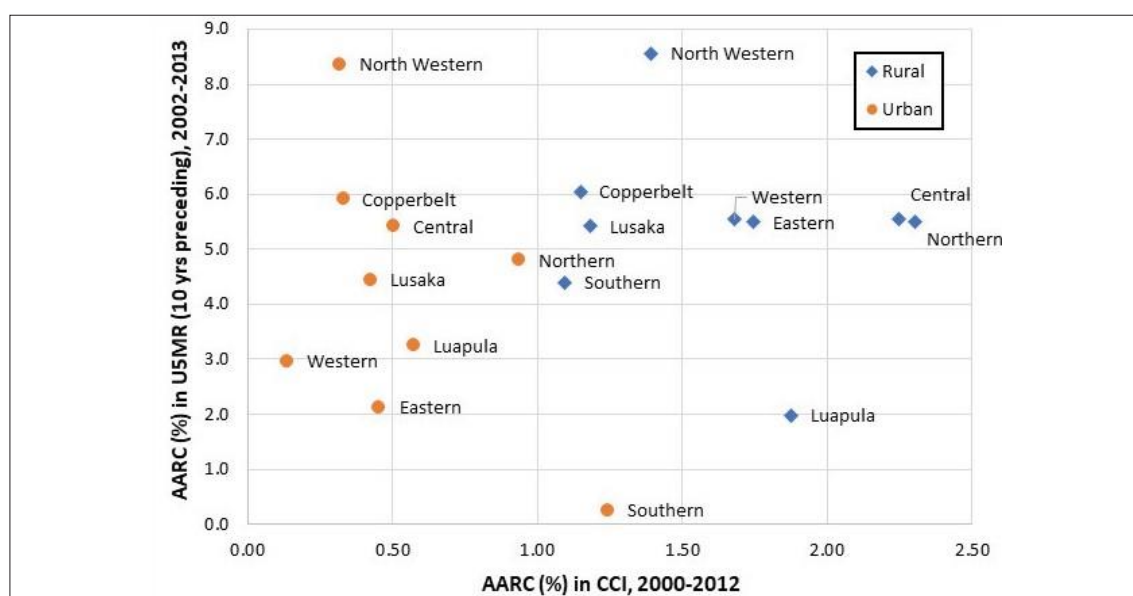


Figure 37: Comparison of average annual rate of change (AARC, %) in CCI and U5MR (10 years preceding) by province and residence, ZDHS 2001/2-2018 (2013/14-2018)

Comparison of trends in mortality and CCI across socio-economic groups and residence

Comparing the average annual reductions in U5MR (10 years preceding, between ZDHS 2007 and 2018) and absolute increases in CCI (ZDHS 2001/2 and 2013/14) between wealth, education and residence groups, Figure 38 shows that the greatest relative improvements in both indicators were experienced for the more vulnerable groups. This included women in the lower two wealth quintiles (and the middle quintile, with greater gains in mortality than CCI), those with none or primary education, and those living in rural areas. It is worth noting that the baseline mortality levels were lower in the more advantaged groups where gains were smaller

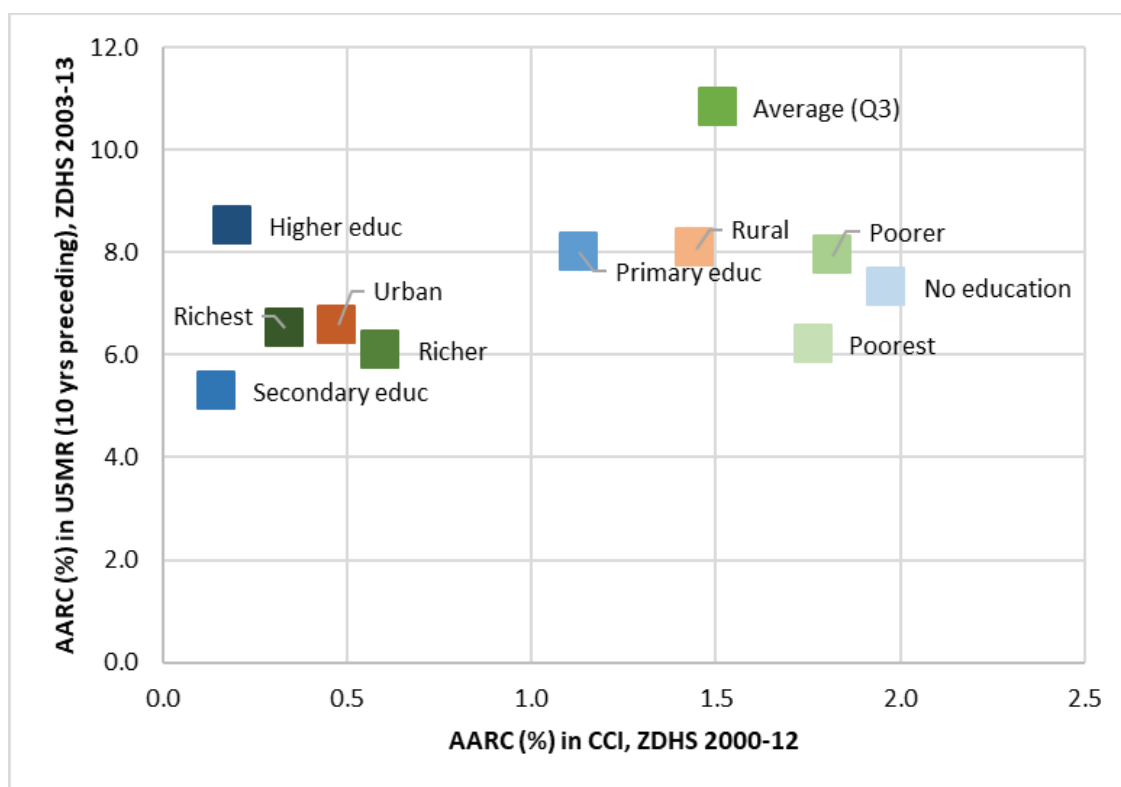


Figure 38: Comparison of absolute reduction in U5MR and absolute increase in CCI by wealth, education and residence, ZDHS 2001/2-2018

Comparing improvements in NMR (10 years preceding) by CCI in the same time periods for different wealth, education and rural/urban residence groups (Figure 39), it appears that the greatest gains were once again among women in the lower wealth and education groups, and in rural areas. This also might help explain the smaller gains in provinces being mostly urban like Lusaka and Copperbelt, given that the urban and richest groups had minimal reduction in NMR. The fact that the highest reductions in NMR were in Western, Northern, Eastern, Central and North-Western provinces could also be associated with the predominant rural districts there, where greater gains were made, although other contextual factors would be valuable to compare within these provinces in the future. The greater improvements in NMR and CCI for women who were poorer, less educated or living in rural areas may be related to the much greater improvements among those groups in skilled birth attendance and postnatal care within 48

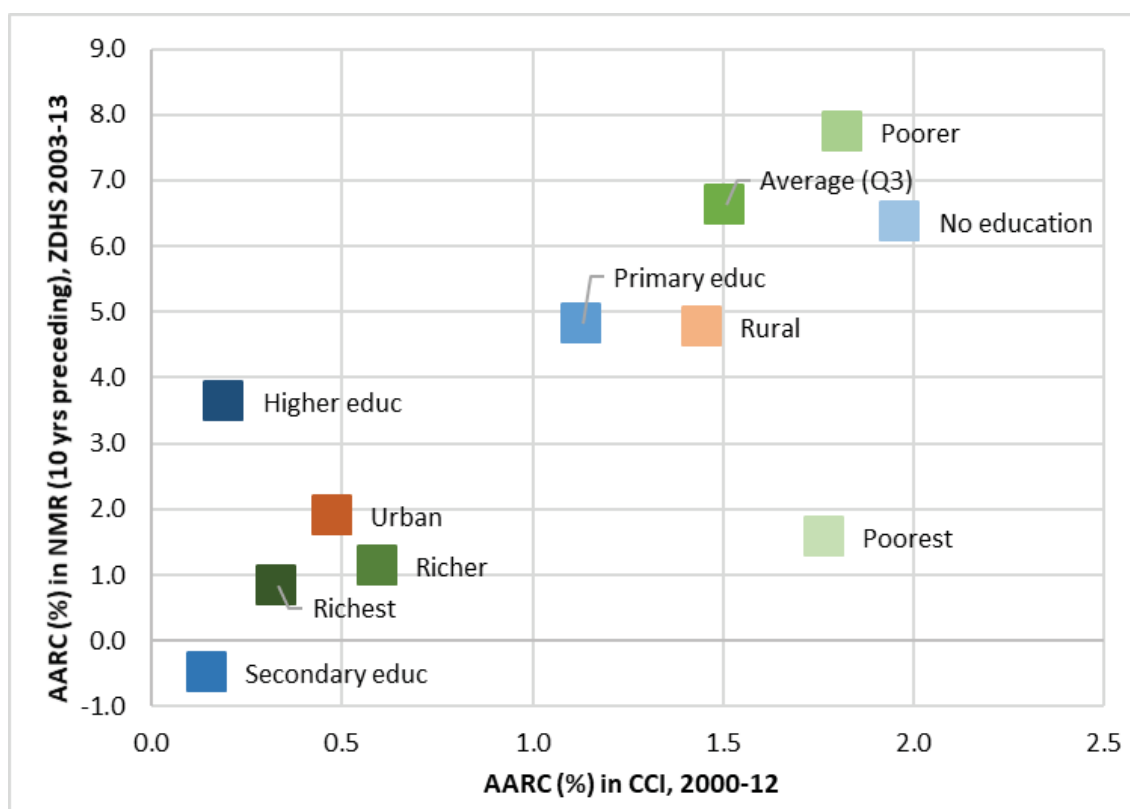


Figure 39: Correlation between absolute reduction in NMR and absolute increase in CCI by residence and wealth quintile, ZDHS 2001/2-2018

These comparisons indicate that there have been important gains in equity for both mortality reduction and coverage of key RMNCH interventions in Zambia, particularly for women living in Central, Northern, Western, Eastern, and North-Western provinces. There have also been greater improvements among those living in rural areas in most provinces, and for women with none or primary education levels, and who are in the poorest and poorer wealth groups. Further analysis of how policies, programmes and contextual factors may have contributed to greater improvements in mortality and RMNCH intervention coverage among those living in rural areas and with less education or wealth, than for richer, more educated and urban-dwelling groups, will help to understand these observed equality trends in Zambia in the last two decades.

PART V: Policy and health systems analysis

Main Points

- An analysis of policies, programmes and contextual changes over time show that since 2000, Zambia has been implementing health sector reforms at macro, health system and RMNCH specific levels, with the consistent vision to “provide equity of access to cost-effective, quality health care as close to the family as possible”.
- The emphasis on decentralization and pro-poor policies, and on primary health and particularly retention of staff in rural areas, likely supported the increase in coverage of RMNCH interventions that could provide primary and secondary prevention of infectious diseases (HIV/AIDs, ALRIs, malaria, diarrhoea) causing the most child deaths.

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- Another factor was increased funding in health overall, and specifically for HIV/AIDS and less so malaria and RMNCH, from national and international sources, as well as removal of user fees since 2006 to reduce out of pocket expenditure.
 - Zambia's focus on harmonizing programmes across sectors and the continuum of RMNCAH+N care likely improved coverage and child health outcomes more holistically.
 - Increases in the density of health workers and health facilities delivering services, particularly in hard-to-reach areas through wider community engagement, may have contributed to the positive improvements in the CCI and the notably large declines in U5MR for more disadvantaged socio-economic groups and regions.

Overall, estimates for child mortality rates and coverage show that Zambia experienced a major decline in under-five mortality as well as significant improvement in coverage for RMNCH indicators during the 2001 to 2018 period. This was faster than the average for under-five mortality among neighbouring countries in sub-Saharan Africa. The improvements made were greatest improvements among vulnerable groups, (lower two wealth quintiles, none or primary education, and those living in rural areas). To further understand what Zambia did to reduce the levels of inequalities in RMNCAH indicators over time, Zambia's policy and health system inputs were explored through a comprehensive analysis of the general health sector policies, and RMNCH strategies and guidelines, as well as the health system inputs over time in available data and research.

Policies and strategies to improve RMNCH

Based on the policy analysis, Zambia has been implementing health sector reforms since 1992 at macro, health system and RMNCH-specific levels, with the vision to “provide equity of access to cost-effective, quality health care as close to the family as possible”. These health sector and policy reforms have since taken a holistic approach to health sector development through the Sector Wide Approach since the 1990s, which brought together the government and other stakeholders in ensuring efficient and effective utilization of programme resources. The health sector's mission through the Basic Health Care package introduced in 1996 was to significantly increase life expectancy by promoting equitable access to services, such as primary health care, which has led to sustained investment for mother's and children's survival in an equitable and needs-based way.

The success in improving RMNCAH indicators may be attributable to the integration of RMNCAH services across the continuum of care. In that regard, the health sector has focused on implementing one plan introduced in 2011 to communicate and address RMNCAH services. Since the 1990s, other successive health sector reforms and policies that prioritized equitable access to services were introduced. This included recommitment to primary health care since 2008, which led to establishment of rural health centres, training of more nurses, and increased pay for doctors. Also, Zambia removed user fees in 2006 for rural areas, 2007 for peri-urban areas, and 2012 for urban areas as well (9, 16-18).

To provide direct financing to districts and encourage bottom-up planning and management, a needs-based financing formula and national system-wide performance-based contracting through the Central Board of Health were put in place in the mid-1990s (16, 19). The Central Board of Health was an autonomous body responsible for service provision contracted in by the Ministry of Health as the purchaser of services, but was dissolved in 2006 with the Ministry of Health taking responsibility again for provision. Performance based contracting was followed by results-based financing projects in several districts since 2008 (20).

Further, Zambia's health system reforms focused on multi-sectoral collaboration and horizontal programming. This was likely critical to addressing RMNCH interventions with a more holistic approach through broader development programmes, guided by international recommendations and resolutions including the children's rights to health, the road map for MDG 4, UHC, PHC and evidence-based RMNCH interventions (16-18). The Zambian government has worked in partnership with external donors to align national priorities across sectors such as community development, education, nutrition, WaSH, and other health issues (malaria prevention, HIV/AIDS) to coordinate resources, planning, and delivery of services (17). In 2013, the Ministry of Health and Ministry of Community Development were merged to create the Ministry of Community Development and Maternal and Child Health, with the ministry of health focusing more on health policy, research and curative care (16, 18).

Since the 2000s, the health sector arm of the Government has also developed and embedded plans aimed at strengthening and prioritizing Reproductive, Maternal, Neonatal, Child and Adolescent Health (RMNCAH) services into its broader National Development Plans, Sector Strategic Plans and Programmes Strategic plans. These plans have been used to enhance the provision of services by prioritising the availability of skilled personnel, infrastructure and equipment to appropriately deliver RMNCAH services to the most rural and poor or vulnerable populations in the country. At the higher national level is the national Development Plan, the country's 'blue print' for eliminating poverty and accelerating development efforts towards the vision 2030 of leaving no one behind, which has been developed and revised since 2002.

Policies and guidelines have also been developed, reviewed and updated over time to strengthen the health system and specifically to improve the manner in which RMNCAH services are delivered. The National Health Strategy has been developed and updated over the years with a focus on delivering quality health services across the continuum of care for RMNCAH. Also in place since 2006 are the Human Resources for Health Strategic Plans and the user fee removal policy. Other strategies to strengthen facility-based services providing RMNCAH interventions have focused on improving availability by expanding rural health posts, and maternity homes nearby, training more nurses to do deliveries and abandoning TBAs, improving accessibility, and quality in terms of trained staff, drugs/equipment particularly at facilities. The Human Resources for Health Strategic Plans since 2006 has explicitly aimed to train, recruit and deploy many cadres of health care providers, particularly to rural areas where the need was greatest. These strategies may have contributed to the equitable improvements in coverage of antenatal and postnatal (within 48 hours) check-ups, as well as skilled birth attendance whether at higher or lower level facilities.

These policies and strategies have guided changes in the health systems and the improvement of RMNCAH indicators. They were developed in accordance with environmental changes, taking into account international guidance, as well as changes in protocols. These guiding principles have been institutionalized at every level of health service delivery and were to be used to guide service provision. Notably, since 2000, child health achieved more programmatic progress through the addition of Integrated Management of Childhood Illness (IMCI) and the Expanded Program on Immunisation (EPI), including Prevention of Mother to Child Transmission (PMTCT), compared to maternal health. Since 2001, attention was also paid to prevention of malaria through the introduction of Insecticide Treated Nets (ITNs) and drugs (IPTp) for prevention of malaria.

There have also been efforts to improve equity in RMNCH by enhancing the community voice, ownership, and involvement in service delivery. This included the Child Health weeks, the creation of Neighbourhood Health Committees, Safe Motherhood Action Groups, Community Health Workers, and Community Health Assistants. To improve service provision closer to families, the bi-annual Child Health Weeks were to provide community-based outreach for immunizations, ITN distribution and others (18).

The term “community health worker” (CHW) has been noted as an umbrella term that embraces a variety of community health aides that have different responsibilities. Due to a critical shortage of human resources for health (HRH) in Zambia, the Community Health Worker strategy was developed with the aim of training a community cadre selected by the community, particularly in rural areas, to provide primary health care (PHC) since 1983. More recently through the Worker Strategy in 2009, the Community Health Strategy in 2010, and the Community Health Assistant (CHA) programme in 2012, strategies like task shifting to CHWs, SMAGs, and CHAs have been established.

Overall, the major PHC functions performed by the CHWs are disease prevention and curative care for tuberculosis (TB), HIV/AIDS, malaria, diarrhoea, referrals, reproductive health, family planning education and services, and care for children under the age of five. CHWs such as SMAGs provide follow-up care including home visits for pregnant and post-natal mothers, and defaulter tracing for malnourished children and immunizations. The new cadre of Community Health Assistants (CHAs) was given one year of more formalized training, and started working on a monthly salary paid by the government. The CHAs have varied responsibilities in delivering RMNCH interventions, particularly within rural areas, by promoting awareness, acceptability and access to services. CHAs are meant to educate and monitor pregnant women, link them to services, and provide cIMCI and iCCM (18).

Figure 40 shows the timeline for Zambia’s main macro-level, health system and RMNCAH-specific policies and strategies, and their formulation, implementation and evaluation between 2000 and 2018.

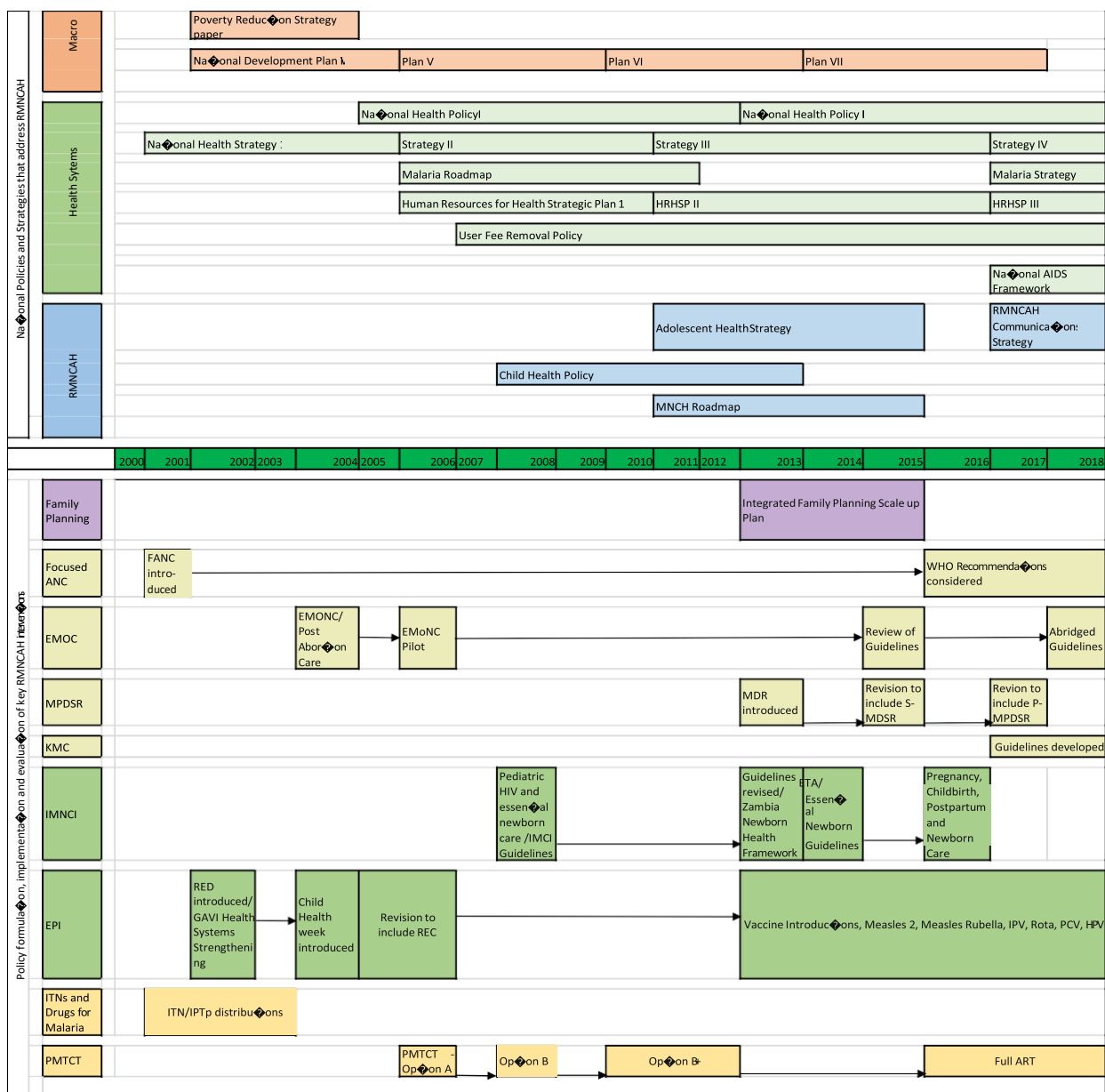


Figure 40: Policy and health system changes RMNCH over two decades in Zambia Health system strengthening and implementation to improve RMNCH

Health system strengthening and implementation to improve RMNCH

In Zambia, health system improvements have occurred over time in ways that may have contributed to equity in health outcomes, including RMNCH services. In terms of financing, overall government health expenditure and external health expenditure increased between 2000 and 2018, and private health expenditure and out of pocket expenditure declined, according to the Global Health Expenditure database (Figure 41). The greatest increase occurred around 2005 to 2007, with a doubling of the total per capita health expenditure. Since then the increase has been modest, hovering around \$70-80 per capita in most years until 2018. The government health expenditure started to increase from 2009 to 2014 and levelled off at around

\$30 per capita, or just over 30% of the total health expenditure. Notably, out of pocket expenses as a percentage of current health expenditure was slightly lower in 2018, which indicates the impact of user fee removal (Figure 41).

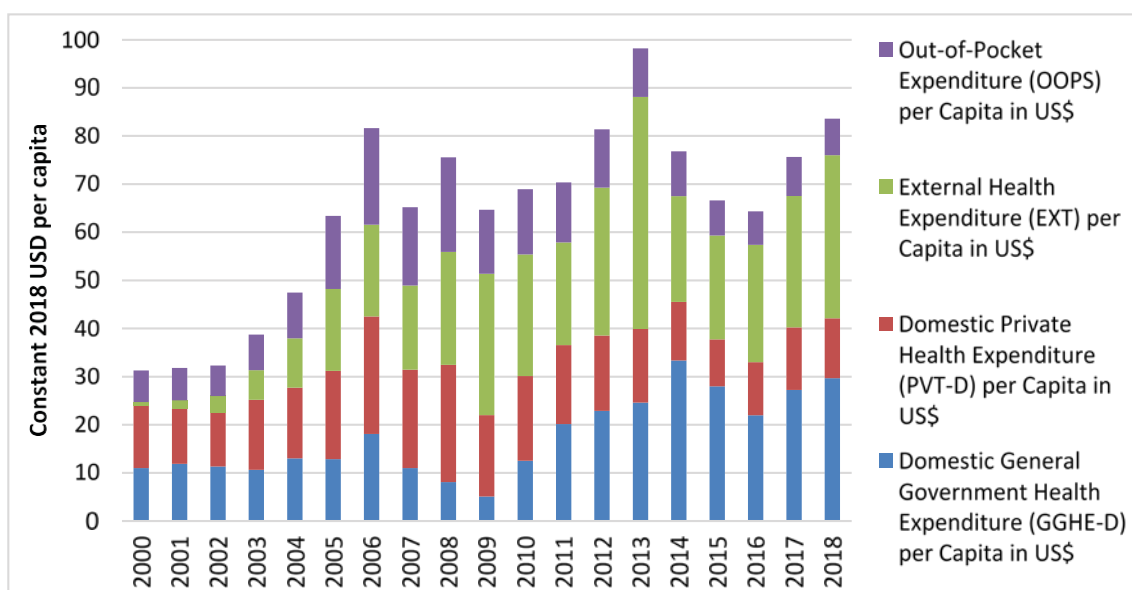


Figure 41: Health financing by source in Zambia, GHE Database 2000-18

For RMNCH specifically, the GHE data for the last five years showed that Zambia's domestic government expenditure on maternal health and family planning remained fairly constant, as well as for HIV/AIDS, and malaria (Figure 42). External funding was higher than domestic expenditure for HIV/AIDS and malaria, and to a lesser extent immunization programmes, and this remained fairly even over time. There was lower external and especially domestic funding per capita on nutrition according to this data source, though investments in CHWs and CHAs may contribute indirectly.

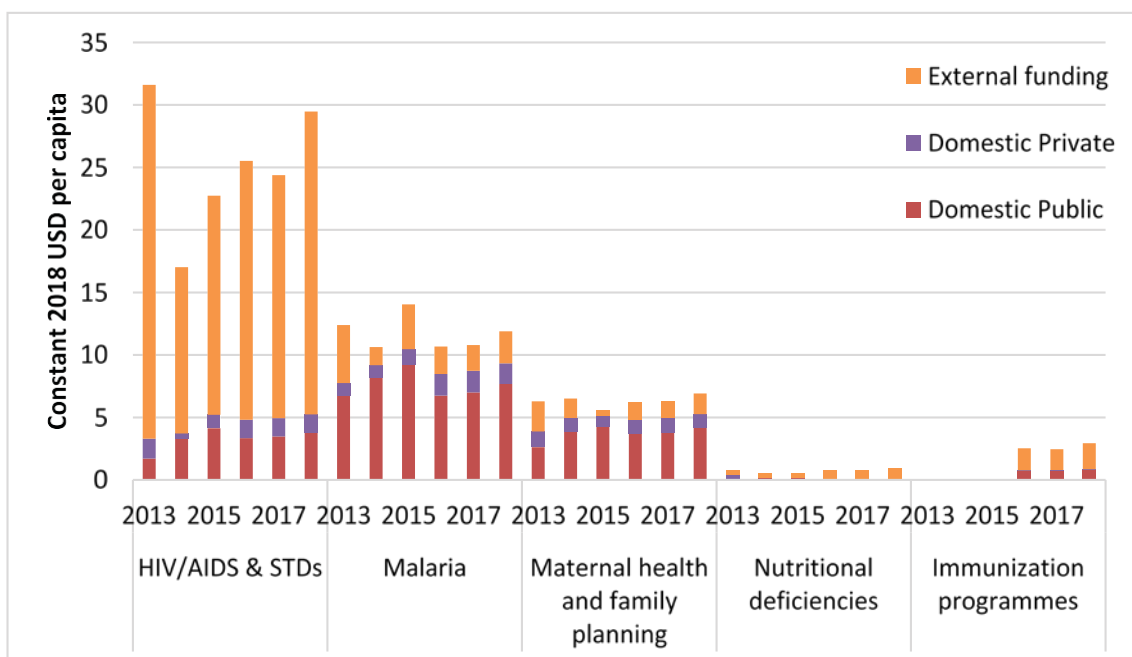


Figure 42: Financing for maternal and child health conditions by external, domestic public and private sources, GHE database 2013-18

The Creditor Reporting System (CRS) data shows that external funding in USD million for RMNCH in Zambia increased substantially from 51 to 233 million USD (constant 2016) between 2002 and 2017 (Figure 43).

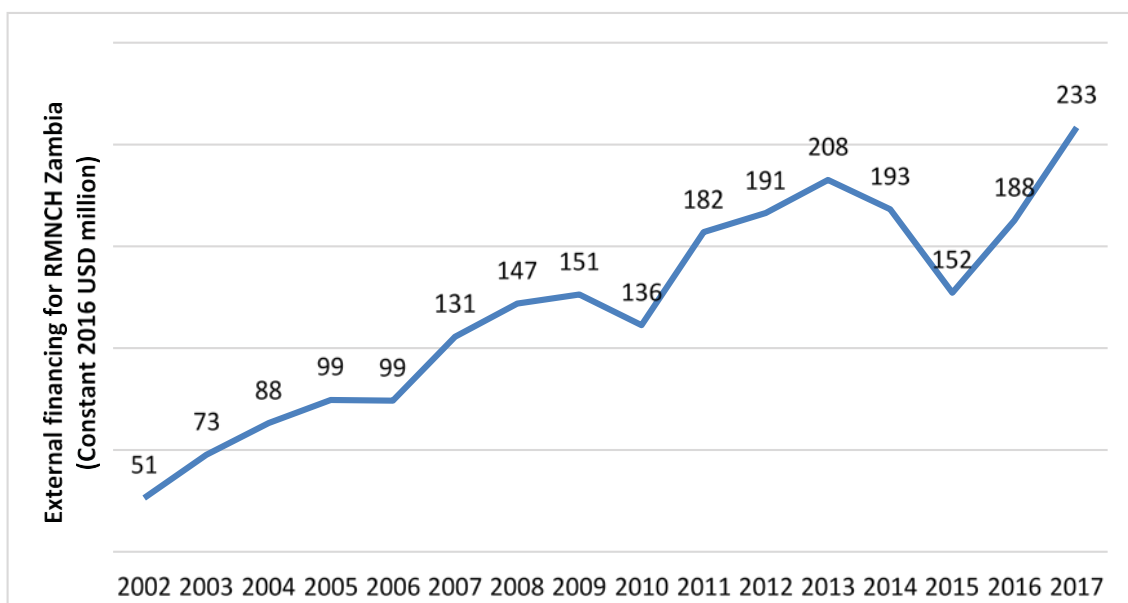


Figure 43: External donor financing for RMNCH in Zambia, CRS data (Muskoka2) 2002-17

Zambia has also worked to improve accessibility to quality care by increasing the numbers and distribution of facilities and trained human resources for health. The country has aimed to ensure that over 80% of households in the urban and rural areas are within 5 kilometres radius of a health facility. This is backed by another goal of having every health facility staffed by at least one skilled personnel. These goals are being achieved through policies mandating the construction of health posts, mini hospitals and first level hospitals across the country, and especially in rural areas. As shown on Figure 44, there was an increase in the number of facilities per 100,000 population that were constructed, particularly health posts that target rural populations. For instance, the facility density for health posts was 6.1 per 100,000 population in 2017 compared 0.8 per 100,000 population in 2005 nationally. However, the density of larger health facilities, such as health centres and hospitals, did not increase over time. In 2005, there were 9.4 larger health facilities (health centres and hospitals) per 100,000 population and in 2017 this was 9.1 or about one facility for 100,000 population. It is worth noting that the health facility density in Zambia would be higher if all private facilities were counted, though there is a dearth of related data.

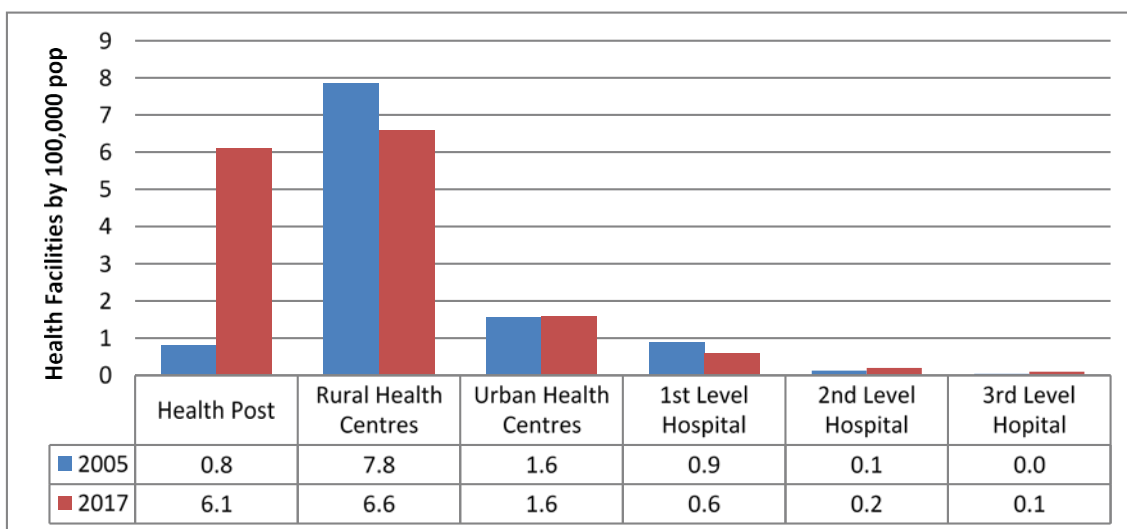


Figure 44: Facility density per 100,000 population (by level of care), NHFC data

Provincial level differences in the public facility densities were observed in 2017. As shown in Figure 45, Luapula, North Western and Western provinces (with the largest rural areas) had higher facilities densities compared to other provinces in the country.

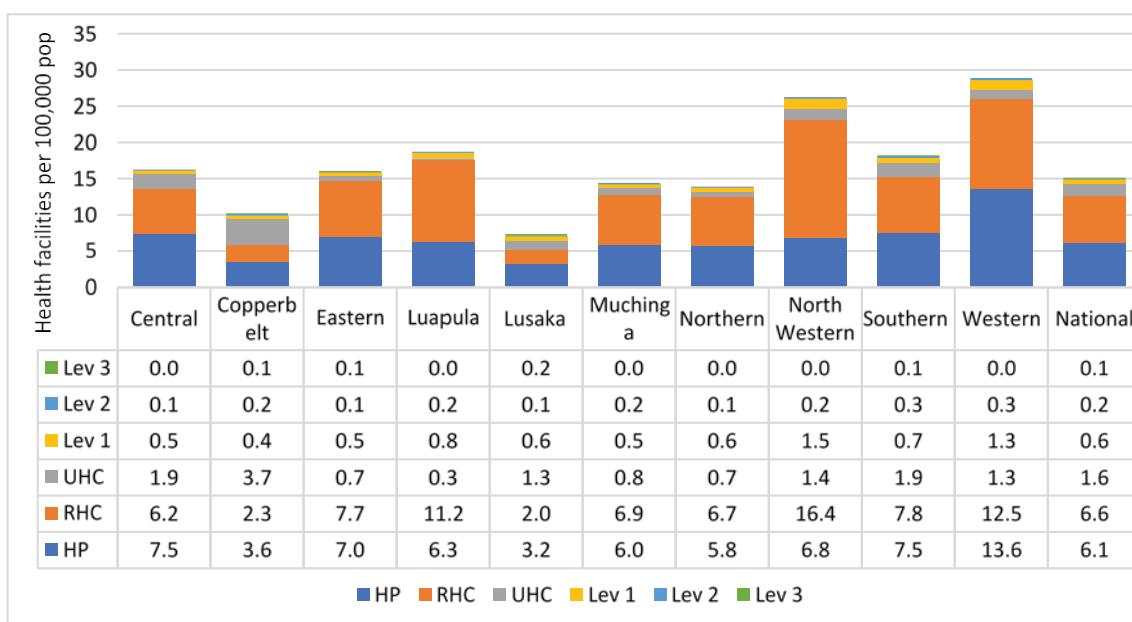


Figure 45: Provincial Facility density per 100,000 Population (By Level of Care), NHFC data

In addition, through the national health policies such as the Human Resources Strategic Plans (the first being in 2011-2017), Zambia improved production of core health workers from training institutions. To do this, it increased recruitment and distribution of critical cadres, also engaging private partnerships. For instance, the density of core health workers between 2008 and 2018 by cadre is shown in Figure 46. In 2018, there were an estimated 10.2 nurses and midwives per 10,000 people compared to 7.1 nurses per 10,000 people in 2008. There was a small increase in density of physicians at around 0.9 per 10,000 in 2016 compared to 0.6 per 10,000 population in 2008.

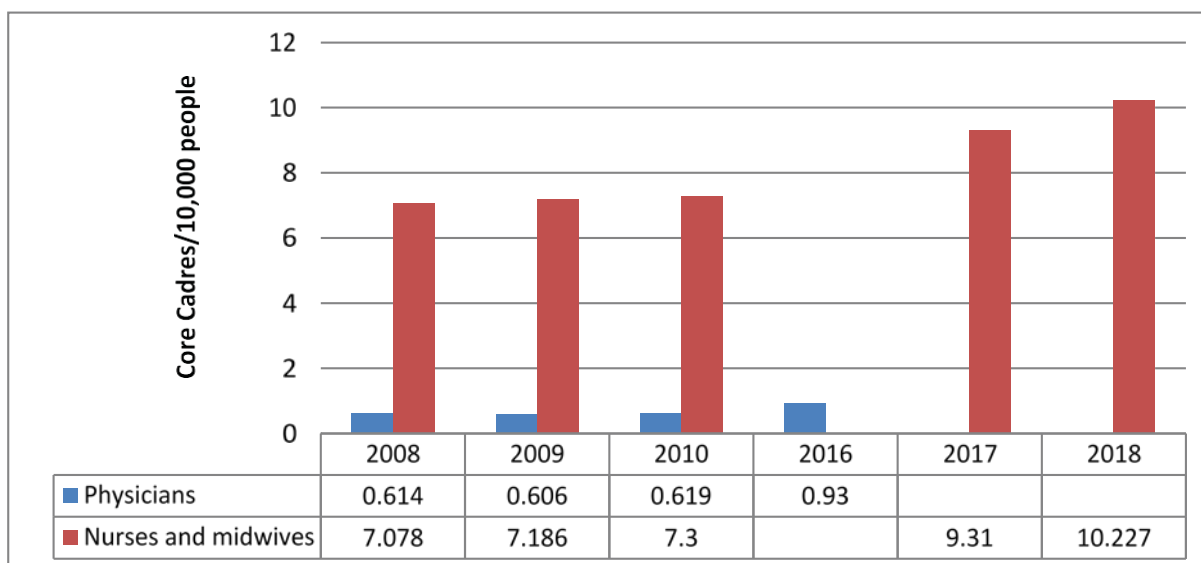


Figure 46: Density of Core health workers per 10,000 population by cadre; Source: WHO Global Health Database

The density of health workers in 2018 and 2019 was tracked by the Ministry of Health for 2018 and 2019 as well (Table 13). There was a further increase in the density of physicians from 1.1 to 1.3 per 10,000 population. The density of nurses increased again to 11.3 per 10,000 by 2019.

Table 13: Density of health workers per 10,000 population by cadre, total core health professionals and all health professionals, 2018 and 2019, Ministry of Health

	2018	2019
Doctor	1.1	1.3
Clinical officer	1.8	1.8
Midwife	2.2	2.2
Nurse	9.8	11.3
Core health professionals	14.9	16.5
All health professionals	20.5	22.0

Comparing provinces in 2019 (Figure 47), there was a higher density of nurses in Lusaka and Copperbelt per 10,000 (being the most urban), followed by Western, Southern, Northern and North Western. The density of doctors was also higher in Lusaka and Copperbelt.

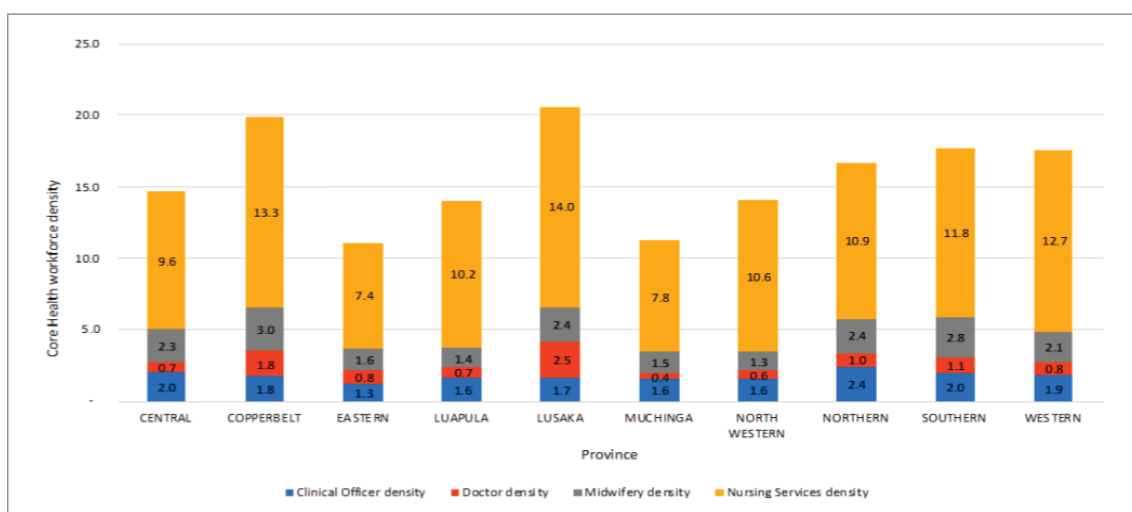


Figure 47: Core health worker density per 10,000 population, Ministry of Health, 2019

Further, using streamlined cadres such as the Community Health Assistants and Safe Motherhood Action Groups at the community level has helped in the delivery and implementation of interventions enshrined within the strategic plans.



CHAPTER 4: Discussion and Recommendations

The aim of this analysis was to estimate national and provincial RMNCAH trends and inequalities, with a focus on comparing coverage and child mortality by province, wealth, education, and urban-rural residence. The findings of the equity analysis show that the under-five mortality rate (among live births ten years preceding the survey) has declined substantially in Zambia, although the national target was not yet met. The coverage of RMNCH interventions within the CCI has also substantially improved. For both, the improvements in the indicators have especially been observed in the rural areas, as well as predominantly poor socio-economic and less educated groups. However, there seemed to be a general lag in urban populations, concentrated specifically among women and children in poorer groups for selected indicators.

A closer look at whether faster increases in the CCI was accompanied by declines in mortality in the past two decades until the 2018 ZDHS shows that there was an inverse pattern between U5MR and CCI, but no distinct correlation, at provincial-level. Absolute reductions in U5MR (10 years preceding) were also correlated with absolute increases in CCI between wealth, education and residence groups between ZDHS 2001/2 and 2018, which suggests that the greatest improvements were experienced for the more vulnerable groups, including women in the lower two wealth quintiles (and the middle 20%, with greater gains in mortality than CCI), those with none or primary education, and those living in rural areas. Zambia achieved one of the fastest reductions in U5MR inequalities in its region. For CCI, Zambia had made more average improvements overall and between wealth quintiles. Further analysis of how policies, programmes and contextual factors may have contributed to greater improvements in mortality and RMNCH intervention coverage among those living in rural areas and with less education or wealth, than for richer, more educated and urban-dwelling groups, was done to help understand these observed equity trends in Zambia in the last two decades. The findings from the policy and health systems analysis show that since 2000, Zambia has been implementing health sector reforms at macro, health system and RMNCH specific levels, with the consistent vision to “provide equity of access to cost-effective, quality health care as close to the family as possible”.

Considering the findings of the analyses in this report in light of other research also suggests that improvements in child health indicators could be attributed to Zambia’s explicit and consistent policies and budget for the health sector, and the increasing focus on equity and RMNCAH. Some other studies have examined how health policy and system changes in Zambia may have contributed to improvements in more equitable provision and outcomes of RMNCAH interventions in rural and poorer populations. One factor that was identified has been a strong political commitment to equitable improvement in health and RMNCAH. Other research has indicated that high-level political support, committed leadership and governance for health sector reform led to sustained prioritization and investment for mother’s and children’s survival that is equitable and needs-based (16-18).

This included the consecutive health sector reforms and policies since the 1990s that prioritized equitable access to services, such as recommitment to primary health care since 2008, construction of more rural health centres, training of nurses, increased pay for doctors, drug supply management reforms, and removal of user fees (9, 16-18). These studies also noted the role of supportive legal and policy frameworks focusing on long term, annual planning, and a sustained budget for health at around 15% (16). The financial data we analysed also showed increases in the domestic public investment and external funding, and declines in private and out of pocket expenditures.

One study noted how Zambia's success stemmed from taking a triple planning approach, to address short term needs, longer term goals for sustainment and scale-up, and adaptation as needed. The latter was based on improved accountability mechanisms from stronger monitoring and evaluation, HMIS, disease surveillance and response, and encouraging regular feedback from stakeholders (17). Another factor that could have contributed to equity in RMNCAH indicators that our policy analysis and other studies identified was the decentralization of decision-making and implementation to subnational levels since the 1990s. The aim of this was to improve ownership and uptake of health services particularly in rural or remote communities (9, 18, 20). One approach was annual action plan budgets at facility and district levels for needs-based disbursement of finances (18, 19). Another possible factor was the development of the Interagency Coordinating Committee and technical working groups to identify gaps, remove bottlenecks, mobilize resources, improve efficiency (17). Equitable improvements in RMNCH may have also been improved by the intentional coordination between ministries and with international partners that supported multisectoral approaches to improve health alongside other human development goals (WaSH, nutrition, education etc.) (17).

In addition, some policies and guidelines that were developed, reviewed and updated over time have aimed at strengthening the health system specifically to improve the manner in which RMNCAH services were delivered to ensure equitable access. For instance, the National Health Strategy was developed and updated over the years with a focus on delivering quality health services as close to the family as possible across the continuum of care including RMNCAH. These health system strategies were intended to improve availability, accessibility and quality of both community- and facility-based services, and the linkages between them, to improve RMNCAH intervention coverage for child survival.

Some evidence shows that community-based interventions through the CHAs and SMAGs have contributed to improving coverage of malaria prevention, immunization, counselling on antenatal, delivery and postnatal care interventions for remote and poorer families. This was attributed in part to their roles in improving the acceptability and related utilization of services within the community or at primary health centres (18, 21, 22). Still, some literature showed gaps in retention, recruitment, training and supervision for CHWs or CHAs, especially early in the pilot stages (18, 21-24).

Some studies have analyzed facility-based health system outputs to assess whether improvements in quality, accessibility or availability have also been equitable for rural and poorer populations. One previous study found that health service availability and quality were more important in influencing maternal health care utilization than acceptability and affordability in Zambia between 2010-14 (25). Regarding availability, researchers found that while gaps remain in rural and remote areas, there had been increases in rural health posts closer to families similar to this study's findings (9, 26). For quality of RMNCH services, they also found no notable difference between facilities in richer and poorer districts. Women in urban areas delivered more in referral facilities, while women in rural areas delivered more in primary health centres. While the former was found to have higher competence of care, another study showed care in primary facilities had higher acceptability among rural groups than higher level facilities (25, 26).

In terms of affordability, evidence was not completely consistent about whether user fee removal was a major factor in reducing inequities. Some felt that this was less important, as richer families also received them, while others cited evidence that user fee removal had reduced out of pocket expenditure by up to 90% (19, 20). In one study, health subsidies seemed to benefit richer more than poorer groups relative to their levels of need for outpatient services, but inpatient services (which includes delivery care) at public district hospitals, public health centres, and mission health facilities were found to be pro-poor between 2010-15 (20). This study indicated out of pocket expenditure reduced, indicating the role of user fee removal that would have particularly helped the poorest groups in accessing RMNCH services. Still, there was evidence of remaining gaps in supply chain, few specialists for EMOC, and deployment in the most remote areas, which may underlie some of the provincials variations (9, 16).

Overall, Zambia's major improvements in equity for under-five mortality and coverage of family planning, antenatal, delivery, postnatal and child health interventions can be linked to the wide range of policies, strategies and investments in the health sectors, both at the community and facility levels, as well as broader multisectoral efforts. Further improvements will require addressing the health care burden in increasingly urbanized areas. Specifically, there is a need to re-adjust and reshape interventions to contextually target women and children in poorer groups for selected indicators in urban populations. Further, balanced and efficient budgeting for both primary and higher levels of care is needed, including for infrastructure and supplies, especially as linkages to skilled care is increasingly required to address the growing burden of perinatal and neonatal causes of child mortality. It would also be valuable to sustain and scale-up implementation of RMNCH interventions that can be provided in more rural and remote communities, through continued support, engagement and training of community-based health cadres and organizations. Continued investment in RMNCH within multisectoral programmes that improve water and sanitation, nutrition, education and other development priorities that concurrently address issues contributing to child mortality including malaria, diarrhea and malnutrition remains crucial. Finally, partnerships with committed donors should continue to align with Zambia's goals to provide equitable access to cost-effective, quality health care as close to the family as possible.



CHAPTER 5: Conclusion

Overall, the results of this report show that Zambia experienced a major decline in under-five mortality during the 2001 to 2018 period, at a pace of nearly 6.6% per year, much faster than the average for sub-Saharan Africa. Improvements in under-five mortality and RMNCH indicators have been significant, especially in the rural areas, as well as predominantly poor socio-economic and less educated groups. Evidence from this and other studies suggest that improvements in child health indicators could be attributed to health policy and system changes in Zambia through a more targeted, equitable provision and outcomes of RMNCH interventions in rural and poorer populations. However, a general lag observed in urban populations concentrated specifically among women and children in poorer groups for selected indicators suggests a need to re-adjust and reshape interventions to contextually target this group. Furthermore, the general improvements observed in historically hard to reach poor social and rural groups further suggest a need to sustain the health programs and interventions through continued investment in comprehensive primary health care and a holistic, multisectoral approach.

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APPENDICES

Table 1: Under-five Mortality Rates by different equity stratifiers - Five years preceding the survey

	ZDHS 2001/2			ZDHS 2007			ZDHS 2013/4			ZDHS 2018		
Equity Stratifier	U5MR	95% CI lb	95% CI ub	U5MR	95% CI lb	95% CI ub	U5MR	95% CI lb	95% CI ub	U5MR	95% CI lb	95% CI ub
Residence												
Rural	176.06	165.01	187.11	113.58	103.48	123.69	76.66	70.49	82.84	58.27	52.25	64.3
Urban	151.69	134.51	168.87	130.98	113.63	148.32	70.85	61.47	80.23	64.48	51.33	77.64
Residence (alternate)												
Capital	162.84	126.60	199.08	127.13	89.99	164.28	67.79	47.08	88.51	69.43	46.50	92.36
Other urban	148.78	129.49	168.07	114.91	95.22	134.59	74.69	62.29	87.09	52.32	39.09	65.56
Rural (alternate)	183.47	169.36	197.59	119.97	106.57	133.37	83.32	75.05	91.59	59.63	51.80	67.47
Province												
Central	199.38	171.68	227.07	107.94	82.34	133.51	67.33	51.90	82.77	47.23	33.81	60.65
Copper- belt	151.25	124.73	177.77	110.00	83.72	136.29	69.35	53.35	85.35	49.67	32.30	67.04
Eastern	153.28	129.00	177.57	129.71	106.80	152.61	109.77	93.00	126.54	52.09	38.80	65.38
Luapula	253.85	219.02	288.69	114.62	90.00	139.25	95.74	79.78	111.70	99.05	80.30	117.81
Lusaka	152.11	124.62	179.59	135.05	105.64	164.47	68.32	52.36	84.27	63.86	46.83	80.90
Muchinga	NA	NA	NA	NA	NA	NA	71.03	54.56	87.50	71.94	54.74	89.15
Northern	176.69	154.13	199.24	144.16	118.84	169.97	74.72	59.96	89.47	60.58	44.76	76.40
North Western	124.05	102.10	145.99	91.36	68.57	114.15	57.35	44.15	70.56	32.65	17.15	48.16
Southern	136.09	109.84	162.34	92.30	70.92	113.67	58.21	45.05	71.36	63.91	36.72	91.09
Western	180.55	149.97	211.12	109.37	84.09	134.65	61.54	44.77	78.31	57.12	41.51	72.74
Wealth (Overall)												
Q1	174.08	155.18	192.98	110.87	93.12	128.61	84.67	73.98	95.35	62.86	53.47	72.26
Q2	174.46	154.63	194.60	115.96	98.13	133.78	77.43	67.07	87.79	56.94	46.95	66.93

	ZDHS 2001/2			ZDHS 2007			ZDHS 2013/4			ZDHS 2018		
Equity Statifier	U5MR	95% CI lb	95% CI ub	U5MR	95% CI lb	95% CI ub	U5MR	95% CI lb	95% CI ub	U5MR	95% CI lb	95% CI ub
Q3	197.03	176.45	217.61	118.74	100.20	137.28	70.65	60.76	80.55	52.80	41.74	63.86
Q4	179.24	156.12	202.36	137.56	116.13	158.98	75.87	61.62	90.13	71.93	50.28	93.58
Q5	98.29	77.16	119.43	110.82	86.28	135.35	59.79	45.97	73.61	57.31	42.13	72.50
Wealth (rural)												
Q1 - rural	190.39	165.83	214.96	86.69	66.35	107.04	90.55	76.50	104.60	65.47	53.51	77.44
Q2 - rural	157.96	133.62	182.30	133.90	109.33	158.48	78.10	64.27	91.92	63.06	50.37	75.76
Q3 - rural	164.33	141.29	187.36	117.07	94.48	139.66	75.63	62.17	89.09	50.69	38.46	62.91
Q4 - rural	186.90	161.93	211.87	126.19	102.51	149.86	79.66	65.32	93.99	62.45	46.66	78.23
Q5 - rural	177.53	151.21	203.85	104.68	83.12	126.25	56.47	43.27	69.67	44.49	28.92	60.06
Wealth (Urban)												
Q1 - ur- ban	198.68	158.36	238.99	157.41	119.81	195.02	71.92	57.49	86.35	48.23	34.19	62.27
Q2 - ur- ban	205.52	164.60	246.43	163.95	123.05	204.84	71.64	50.47	92.81	89.79	46.71	132.86
Q3 - ur- ban	162.25	120.58	204.36	124.51	86.14	162.88	89.05	62.44	115.65	63.62	39.57	87.67
Q4 - ur- ban	96.47	63.73	129.22	98.09	59.54	136.63	53.94	34.10	73.78	48.06	26.75	69.38
Q5 - ur- ban	89.22	55.49	122.95	105.50	66.71	144.29	68.29	46.55	90.02	69.39	40.12	98.65
Mother's Education												
No educa- tion	189.47	164.58	214.36	114.98	92.45	137.52	86.85	71.46	102.23	60.06	45.87	74.26
Primary	177.36	165.53	189.18	124.03	112.75	135.30	75.28	68.38	82.19	60.97	51.88	70.06
Secondary	127.50	108.09	146.92	101.92	84.07	119.77	70.67	60.97	80.36	60.50	50.35	70.65
Higher	130.66	55.41	205.92	139.91	70.97	20.88	45.24	21.59	68.89	48.06	23.53	72.59
National	168.20	158.89	177.51	118.74	109.97	127.51	74.61	69.44	79.79	60.50	54.40	66.60

Table 2: Under-five Mortality Rates (per 1000 live births) by different equity stratifiers -Ten years preceding the survey

	ZDHS 2001/2			ZDHS 2007			ZDHS 2013/14			ZDHS 2018		
Equity Statifier	U5MR	95% CI lb	95% CI ub	U5MR	95% CI lb	95% CI ub	U5MR	95% CI lb	95% CI ub	U5MR	95% CI lb	95% CI ub
Residence												
Rural	182.26	173.84	190.69	138.87	130.66	147.09	85.06	80.28	89.85	61.90	57.44	66.36
Urban	140.03	128.07	151.99	132.20	119.34	145.07	72.27	65.56	78.98	68.46	58.26	78.66
Residence (alternate)												
Capital	139.04	113.83	164.25	127.11	100.50	153.72	62.57	48.24	76.91	71.11	52.72	89.51
Other urban	143.34	129.51	157.17	124.41	109.33	139.49	80.11	71.08	89.14	53.88	43.96	63.80
Rural (alternate)	189.38	178.55	200.20	142.18	131.27	153.08	90.47	84.14	96.80	66.14	60.20	72.09
Province												
Central	192.06	171.65	212.48	117.55	97.82	137.29	79.90	67.56	92.24	47.14	37.35	56.92
Copper- belt	133.68	115.57	151.78	133.08	112.54	153.62	63.19	52.52	73.87	49.57	38.06	61.08
Eastern	166.13	147.33	184.94	151.02	132.57	169.47	114.53	102.19	126.87	63.96	53.47	74.45
Luapula	248.47	222.42	274.52	156.96	136.12	177.81	97.63	85.95	109.31	110.28	96.31	124.25
Lusaka	137.04	117.65	156.42	135.04	113.79	156.29	68.50	56.77	80.22	63.92	51.90	75.93
Muchinga	NA	NA	NA	NA	NA	NA	88.32	75.13	101.51	74.91	62.40	87.42
Northern	187.17	170.09	204.25	159.41	138.88	179.93	86.11	74.43	97.80	65.54	53.64	77.43
North Western	129.95	113.25	146.66	107.87	89.51	126.22	66.14	55.49	76.78	26.08	16.70	35.46
Southern	147.55	127.01	168.09	102.97	86.09	119.86	68.11	57.46	78.76	70.18	47.47	92.89
Western	201.10	176.89	225.31	139.47	117.91	161.02	72.68	58.81	86.54	57.38	45.47	69.29
Wealth (Overall)												
Q1	191.67	176.88	206.46	123.76	109.74	137.78	99.53	90.89	108.18	66.56	59.36	73.76
Q2	182.54	167.06	198.03	147.74	133.13	162.35	84.58	76.69	92.48	66.88	58.88	74.88
Q3	196.08	180.80	211.37	155.46	139.97	170.94	78.92	71.04	86.80	52.64	45.07	60.20
Q4	163.22	146.84	179.60	140.22	124.04	156.39	72.98	63.22	82.73	76.23	59.79	92.68
Q5	92.44	77.89	106.99	110.21	92.30	128.11	57.86	48.18	67.54	57.41	45.24	69.57

	ZDHS 2001/2			ZDHS 2007			ZDHS 2013/14			ZDHS 2018		
Equity Statifier	U5MR	95% CI lb	95% CI ub	U5MR	95% CI lb	95% CI ub	U5MR	95% CI lb	95% CI ub	U5MR	95% CI lb	95% CI ub
Wealth (rural)												
Q1 - rural	207.84	188.69	226.98	107.78	90.84	124.71	105.70	94.33	117.08	67.22	58.17	76.28
Q2 - rural	175.16	156.08	194.25	146.47	127.56	165.39	89.09	78.33	99.85	67.05	57.29	76.82
Q3 - rural	174.73	156.50	192.96	148.47	129.89	167.05	81.30	70.96	91.64	63.95	53.64	74.26
Q4 - rural	185.80	167.22	204.38	159.32	139.64	178.99	83.24	72.44	94.04	61.39	50.83	71.95
Q5 - rural	164.86	145.87	183.85	132.80	115.23	150.36	63.56	53.58	73.54	45.29	35.02	55.55
Wealth (Urban)												
Q1 - ur- ban	198.84	169.52	228.15	172.48	143.72	201.23	91.15	78.48	103.81	56.90	45.41	68.40
Q2 - ur- ban	179.06	150.27	207.85	160.69	129.77	191.62	78.64	62.58	94.71	92.28	58.64	12.59
Q3 - ur- ban	143.37	114.89	171.84	118.48	90.61	146.36	71.22	54.37	88.08	74.97	52.87	97.08
Q4 - ur- ban	95.59	72.11	119.08	94.60	68.27	120.92	57.18	42.70	71.66	50.34	35.20	65.49
Q5 - ur- ban	88.89	65.74	112.04	112.79	83.39	142.19	61.75	46.96	76.54	62.78	43.92	81.64
Mother's Education												
No educa- tion	197.76	179.12	216.41	143.87	125.53	162.21	108.98	96.56	121.41	69.22	58.33	80.10
Primary	177.21	168.41	186.01	145.89	136.95	154.83	82.15	77.05	87.24	65.54	59.14	71.94
Secondary	122.98	108.79	137.16	104.66	90.92	118.40	66.75	59.52	73.98	61.71	52.55	70.87
Higher	102.03	56.42	147.65	109.00	65.87	152.13	42.81	26.32	59.30	46.50	28.69	64.31
National	167.94	161.04	174.84	136.85	129.92	143.77	80.63	76.73	84.53	64.27	59.60	68.94

Table 3: Under-five Mortality Rates (per 1000 live births) by different equity stratifiers -Ten years preceding the survey

	ZDHS 2001/2			ZDHS 2007			ZDHS 2013/14			ZDHS 2018		
Equity Stratifier	NMR	95% CI lb	95% CI ub	NMR	95% CI lb	95% CI ub	NMR	95% CI lb	95% CI ub	NMR	95% CI lb	95% CI ub
Residence												
Rural	36.01	30.67	41.36	33.07	27.46	38.69	24.67	21.01	28.33	26.11	21.93	30.29
Urban	38.41	29.09	47.72	37.49	27.53	47.45	23.27	17.85	28.69	29.86	20.95	38.77
Residence (alternate)												
Capital	47.19	25.95	68.43	35.43	14.85	56.02	25.73	12.52	38.94	23.17	10.97	35.37
Other urban	31.10	21.43	40.77	28.60	18.29	38.90	25.00	17.83	32.16	22.71	14.64	30.77
Rural (alternate)	36.76	29.96	43.56	35.10	27.58	42.63	28.79	23.61	33.97	28.93	23.25	34.62
Province												
Central	34.87	22.17	47.57	30.69	16.75	44.63	22.30	13.24	31.37	22.41	13.03	31.79
Copper- belt	32.21	18.64	45.78	31.76	16.68	46.84	23.79	15.15	32.42	19.84	10.21	29.47
Eastern	28.26	17.27	39.25	42.38	28.45	56.32	31.83	22.39	41.27	26.28	16.80	35.76
Luapula	33.86	19.84	47.88	18.37	8.20	28.57	21.08	13.38	28.78	29.09	19.18	39.00
Lusaka	37.44	22.72	52.16	40.67	23.89	57.45	25.72	15.74	35.70	33.90	21.42	46.38
Muchinga	NA	NA	NA	NA	NA	NA	26.27	15.97	36.58	35.46	23.46	47.45
Northern	39.6	28.24	50.95	37.40	23.90	50.90	23.31	14.86	31.76	29.82	18.00	41.64
North Western	23.74	13.70	33.79	25.44	13.14	37.74	19.62	10.83	28.40	12.54	3.00	22.08
Southern	35.74	21.68	49.80	35.49	21.57	49.41	20.18	11.74	28.61	31.82	12.56	51.08
Western	63.85	44.68	83.02	35.80	20.60	50.99	24.55	13.61	35.48	25.51	15.02	36.00
Wealth (Overall)												
Q1	42.23	32.14	52.31	32.71	22.84	42.58	24.35	18.52	30.19	28.20	21.87	34.54
Q2	29.79	21.14	38.44	34.51	24.45	44.58	24.95	18.95	30.95	19.52	13.27	25.78
Q3	40.99	30.87	51.12	30.76	20.99	40.54	20.45	15.08	25.82	28.69	20.58	36.80
Q4	36.56	25.23	47.89	41.46	28.84	54.07	25.31	16.68	33.94	32.36	17.52	47.19

	ZDHS 2001/2			ZDHS 2007			ZDHS 2013/14			ZDHS 2018		
Equity Stratifier	NMR	95% CI lb	95% CI ub	NMR	95% CI lb	95% CI ub	NMR	95% CI lb	95% CI ub	NMR	95% CI lb	95% CI ub
Q5	31.61	18.99	44.23	32.63	18.66	46.42	26.57	17.43	35.70	29.94	19.18	40.71
Wealth (rural)												
Q1 - rural	50.91	37.18	64.64	25.82	14.62	37.01	25.83	18.19	33.47	25.59	18.11	33.08
Q2 - rural	28.44	17.53	39.35	38.27	24.72	51.83	25.78	17.72	33.84	32.43	23.29	41.57
Q3 - rural	29.87	19.63	40.12	37.35	24.03	50.66	22.20	14.86	29.55	14.97	8.13	21.81
Q4 - rural	26.53	16.74	36.31	33.66	20.92	46.40	28.34	19.59	37.10	28.18	17.51	38.84
Q5 - rural	42.70	28.66	56.73	30.45	18.54	42.35	20.68	11.29	30.07	30.19	16.27	44.11
Wealth (Urban)												
Q1 - urban	45.86	24.37	67.34	29.97	13.37	46.56	16.63	10.06	23.21	20.51	10.63	30.40
Q2 - urban	41.11	21.47	60.74	45.91	22.49	69.34	23.73	11.08	36.38	25.84	-1.37	53.05
Q3 - urban	45.12	21.37	68.88	40.22	16.87	63.56	23.54	10.23	36.85	42.51	21.93	63.08
Q4 - urban	32.17	12.63	51.71	34.47	10.10	58.84	19.03	7.37	30.68	31.74	13.55	49.93
Q5 - urban	25.95	6.47	45.43	35.34	12.40	58.27	33.53	18.40	48.66	30.04	13.04	47.05
Mother's Education												
No education	39.97	27.41	52.53	32.38	20.09	44.67	25.00	16.31	33.68	23.09	13.90	32.26
Primary	36.98	31.18	42.77	36.33	29.96	42.70	23.52	19.47	27.57	25.00	19.08	30.92
Secondary	32.60	22.25	42.94	26.25	16.81	35.69	25.09	19.33	30.86	31.96	24.57	39.35
Higher	51.10	1.15	101.04	63.78	14.73	113.83	23.27	7.55	38.99	30.00	9.54	50.47
National	36.75	32.07	41.43	34.37	29.44	39.30	24.19	21.15	27.23	27.44	23.28	31.60

Table 4: Neonatal Mortality Rates (per 1000 live births) by different equity stratifiers - Ten years preceding the survey

	ZDHS 2001/2			ZDHS 2007			ZDHS 2013/14			ZDHS 2018		
Equity Stratifier	NMR	95% CI lb	95% CI ub	NMR	95% CI lb	95% CI ub	NMR	95% CI lb	95% CI ub	NMR	95% CI lb	95% CI ub
Residence												
Rural	34.58	30.72	38.45	37.37	33.05	41.70	26.89	24.06	29.72	23.20	20.42	25.99
Urban	30.72	24.85	36.59	34.02	27.22	40.82	21.79	18.11	25.48	28.16	21.47	34.84
Residence (alternate)												
Capital	35.27	22.14	48.40	29.39	158.66	42.92	23.91	14.89	32.93	28.35	14.32	42.37
Other urban	25.25	19.27	31.23	30.57	23.02	38.13	23.16	18.39	27.93	21.18	15.73	26.63
Rural (alternate)	34.89	29.93	39.86	40.55	34.59	46.51	30.26	26.31	34.21	25.43	21.68	29.18
Province												
Central	34.66	25.39	43.92	33.26	22.63	43.89	24.99	18.00	31.97	16.21	10.41	22.01
Copper- belt	24.26	16.08	32.45	29.68	19.46	39.89	20.16	14.48	25.84	19.49	12.99	25.98
Eastern	28.91	20.67	37.15	44.09	33.70	54.49	34.57	27.53	41.61	24.89	18.28	31.49
Luapula	36.00	25.03	46.97	33.25	23.13	43.37	22.77	17.16	28.37	32.34	24.61	40.06
Lusaka	29.23	19.82	38.65	38.89	27.16	50.64	22.65	15.85	29.44	27.11	19.16	35.06
Muchinga	NA	NA	NA	NA	NA	NA	27.64	20.23	35.05	32.54	24.40	40.68
Northern	38.65	30.39	46.9	34.41	24.71	44.10	25.26	19.02	31.50	22.08	15.08	29.08
North western	24.71	17.21	32.21	28.20	18.65	37.75	19.60	13.34	25.86	8.92	3.66	14.17
Southern	29.35	19.86	38.84	36.52	26.09	46.96	22.87	15.78	29.96	32.99	17.67	48.31
Western	60.29	46.36	74.23	47.72	34.78	60.67	31.66	22.24	41.08	25.18	16.96	33.40
Wealth (Overall)												
Q1	43.01	35.46	50.56	30.23	23.25	37.21	30.81	25.87	35.74	25.84	21.35	30.33
Q2	29.77	23.31	36.23	42.26	34.28	50.25	25.96	21.51	30.40	19.53	15.14	23.92
Q3	35.82	28.96	42.67	42.08	33.82	50.35	22.27	17.95	26.60	21.70	16.89	26.51
Q4	28.84	21.55	36.12	37.02	28.40	45.63	23.05	17.22	28.88	33.05	21.38	44.71

	ZDHS 2001/2			ZDHS 2007			ZDHS 2013/14			ZDHS 2018		
Equity Stratifier	NMR	95% CI lb	95% CI ub	NMR	95% CI lb	95% CI ub	NMR	95% CI lb	95% CI ub	NMR	95% CI lb	95% CI ub
Q5	26.43	18.50	34.36	27.83	18.51	37.16	21.67	15.73	27.60	25.60	18.85	32.35
Wealth (rural)												
Q1 - rural	50.38	40.17	60.59	25.99	17.83	34.14	33.80	27.11	40.50	22.32	17.31	27.34
Q2 - rural	33.97	25.14	42.80	35.52	25.90	45.15	27.78	21.77	33.80	30.20	23.47	36.92
Q3 - rural	27.89	20.42	35.35	48.92	38.04	59.80	24.39	18.57	30.21	17.25	11.91	22.58
Q4 - rural	27.51	20.03	34.99	37.48	27.59	47.36	26.01	19.50	32.53	20.19	14.09	26.28
Q5 - rural	32.04	23.40	40.68	39.28	29.61	48.95	21.37	14.86	27.87	26.50	17.93	35.06
Wealth (Urban)												
Q1 - ur- ban	36.67	23.30	50.04	32.85	20.14	45.56	22.25	16.46	28.03	18.25	12.27	24.24
Q2 - ur- ban	34.72	21.36	48.08	46.07	28.83	63.30	21.87	13.51	30.23	30.50	7.11	53.87
Q3 - ur- ban	32.63	18.27	46.99	33.80	18.63	48.97	20.79	11.67	29.91	38.37	24.64	52.09
Q4 - ur- ban	22.74	11.23	34.25	23.89	9.80	37.98	15.05	7.66	22.43	24.95	14.47	35.43
Q5 - ur- ban	27.23	14.05	40.04	32.17	15.95	48.39	28.78	18.69	38.87	29.34	17.48	41.19
Mother's Education												
No educa- tion	38.58	29.54	47.62	39.31	29.66	48.96	28.83	22.12	35.54	20.79	14.74	26.85
Primary	34.35	30.28	38.43	38.41	33.68	43.13	25.99	22.97	29.01	23.74	19.66	27.83
Secondary	26.38	19.65	33.12	26.49	19.47	33.51	22.46	18.30	26.63	27.82	21.96	33.68
Higher	30.63	5.41	55.85	44.73	16.97	72.59	16.61	7.25	25.97	31.12	15.61	46.63
National	33.30	30.06	36.53	36.38	32.73	40.03	25.13	22.88	27.38	24.99	21.99	27.99

Table 4: Composite Coverage Index (%) for RMNCH interventions

	ZDHS 2001/2		ZDHS 2007		ZDHS 2013/4		ZDHS 2018	
Equity stratifier	CCI	95% CI	CCI	95% CI	CCI	95% CI	CCI	95% CI
Area								
Rural	55.42	53.77 - 57.06	58.77	56.53 - 1.01	65.92	64.65 - 67.18	74.15	72.49 - 75.82
Urban	73.10	70.71 - 75.49	71.45	69.93 - 72.96	77.39	76.26 - 78.51	79.04	77.65 - 80.42
Area (alternate)								
Capital	75.09	72.32 - 77.85	74.18	71.40 - 76.96	77.75	74.43 - 81.08	80.46	78.02 - 82.90
Other urban	69.87	67.43 - 72.30	69.36	67.30 - 71.41	74.12	72.33 - 75.90	78.51	76.78 - 80.24
Rural - alternate)	55.05	53.28 - 56.81	59.02	56.79 - 61.26	66.89	64.97 - 68.82	74.49	72.93 - 76.06
Mother's education								
No education	47.19	43.98 - 50.39	54.03	49.51 - 58.54	59.74	56.88 - 62.59	68.12	64.78 - 71.46
Primary	59.59	57.72 - 61.45	61.03	59.23 - 62.83	68.25	67.08 - 69.42	74.39	72.20 - 75.87
Secondary	74.29	72.22 - 76.37	70.82	68.64 - 73.00	75.61	74.24 - 76.97	79.73	78.49 - 80.96
Higher	81.35	74.74 - 87.97	78.78	73.41 - 84.15	83.25	80.38 - 86.11	82.50	79.66 - 85.35
Province								
Central	56.94	51.93 - 61.95	59.71	52.13 - 67.30	64.44	61.16 - 67.72	76.18	72.61 - 79.74
Copperbelt	71.16	67.99 - 74.33	69.26	66.17 - 72.34	76.86	74.45 - 79.27	77.41	75.39 - 79.44
Eastern	60.54	57.08 - 74.00	70.37	67.28 - 73.47	71.96	69.78 - 74.14	78.78	76.99 - 80.58
Luapula	56.33	52.12 - 60.54	51.59	47.97 - 55.20	67.18	64.38 - 69.98	74.22	71.98 - 76.46
Lusaka	73.66	71.21-76.10	71.04	68.22 - 73.86	77.77	75.88 - 79.67	80.23	77.17 - 83.28
Muchinga					62.73	59.34 - 66.12	74.35	67.70 - 81.01
Northern	50.35	45.26-55.45	48.40	44.13 - 52.68	61.36	57.52 - 65.19	71.04	66.39 - 75.69
North western	62.06	56.16-67.97	58.69	53.54 - 63.83	71.18	68.72 - 73.64	76.16	72.03 - 80.30
Southern	60.28	55.95-64.60	67.96	64.32 - 71.61	69.38	65.91 - 72.85	73.37	70.47 - 76.27
Western	53.04	47.70-58.37	64.54	59.10 - 69.98	65.51	60.75 - 70.26	69.49	64.88 - 74.09
Wealth quintile								
Q1	50.00	47.56-52.45	59.00	55.55 - 62.45	61.81	59.52 - 64.11	71.44	69.56 - 73.32

	ZDHS 2001/2	ZDHS 2007	ZDHS 2013/4	ZDHS 2018				
Equity stratifier	CCI	95% CI	CCI	95% CI	CCI	95% CI	CCI	95% CI
Q2	53.47	51.24 - 55.70	56.31	53.65 - 58.98	66.50	64.63 - 68.36	74.19	72.25 - 76.13
Q3	57.42	55.44 - 59.41	56.85	53.45 - 60.25	68.81	66.82 - 70.80	76.74	74.74 - 78.75
Q4	70.39	68.55 - 72.22	68.95	66.55 - 71.34	75.59	73.44 - 77.73	78.41	76.23 - 80.60
Q5	77.69	75.02 - 80.36	75.76	72.49 - 79.04	80.84	79.19 - 82.50	81.08	79.25 - 82.90
Wealth quintile (rural)								
Q1	48.85	45.69 - 52.02	58.91	54.92 - 62.89	61.46	59.16 - 63.75	68.97	66.26 - 71.68
Q2	51.03	47.97 - 54.08	57.86	54.72 - 61.01	63.00	60.56 - 65.44	75.31	73.34 - 77.27
Q3	55.26	52.49 - 58.03	56.38	53.06 - 59.69	66.52	64.45 - 68.60	73.99	71.74 - 76.23
Q4	55.27	52.33 - 58.20	56.89	53.80 - 59.98	67.19	65.19 - 69.20	76.18	74.15 - 78.22
Q5	65.81	63.01 - 68.60	63.93	59.68 - 68.17	70.98	68.74 - 73.21	77.89	75.32 - 80.46
Wealth quintile (urban)								
Q1	61.11	57.71 - 64.51	64.36	61.68 - 67.04	72.13	70.19 - 74.06	74.86	71.85 - 77.88
Q2	70.96	68.06 - 73.86	67.47	63.05 - 71.89	75.53	73.10 - 77.95	80.79	78.14 - 83.43
Q3	77.19	73.02 - 81.37	73.93	69.62 - 78.23	78.16	74.92 - 81.40	77.65	74.24 - 81.06
Q4	75.20	70.32 - 80.08	75.85	70.72 - 80.98	80.69	77.64 - 83.74	81.73	79.58 - 83.88
Q5	80.85	77.89 - 83.80	75.07	70.49 - 79.65	81.74	78.61 - 84.88	80.06	77.10 - 83.01
National	61.87	60.71 - 63.03	63.02	61.22 - 64.81	70.33	69.18 - 71.48	76.11	74.86 - 77.37

Table 5: Proportion living in urban areas by province, ZDHS 2001-2018

Province	Proportion of the sample in urban areas (%)			
	2001	2007	2013/14	2018
Central	27.8	29.9	28.3	32.3
Copperbelt	81.6	84.4	83.2	86.4
Eastern	9.4	11.7	14.6	13.2
Luapula	16.9	17.4	21.5	23.5
Lusaka	86.1	86.4	88.0	87.4
Muchinga	-	-	21.7	19.8
Northern	17.4	20.9	20.9	20.2
North-western	16.7	19.2	28.1	24.5
Southern	22.5	26.1	26.7	33.2
Western	10.1	13.6	21.7	22.9
Zambia total	40.1	42.1	46.2	46.6

Table 6: Under-five mortality rates (per 1000 live births) by province and rural/urban residence – Ten years preceding the survey

Province	Resi- dence	ZDHS 2001/2			ZDHS 2007			ZDHS 2013/14			ZDHS 2018		
		U5MR	95% CI lb	95% CI ub	U5MR	95% CI lb	95% CI ub	U5MR	95% CI lb	95% CI ub	U5MR	95% CI lb	95% CI ub
Central	Rural	195.34	172.3	218.37	122.00	98.65	145.34	83.15	68.43	97.87	48.78	37.54	60.02
	Urban	179.85	135.47	224.22	101.22	68.13	134.3	67.72	48.61	86.82	41.38	21.54	61.23
Copper- belt	Rural	200.08	153.39	246.78	146.72	113.65	179.8	81.46	63.66	99.27	54.04	36.82	71.26
	Urban	115.87	96.73	135.01	128.77	103.87	153.67	57.24	44.35	70.13	48.55	34.92	62.17

Province	Resi- dence	ZDHS 2001/2			ZDHS 2007			ZDHS 2013/14			ZDHS 2018		
		U5MR	95% CI lb	95% CI ub	U5MR	95% CI lb	95% CI ub	U5MR	95% CI lb	95% CI ub	U5MR	95% CI lb	95% CI ub
Eastern	Rural	169.07	149.25	188.89	153.47	133.7	173.25	114.63	101.22	128.03	62.01	50.84	73.17
	Urban	136.34	76.51	196.16	120.91	87.27	154.56	113.56	89.85	137.26	85.08	57.3	112.85
Luapula	Rural	259.20	230.34	288.06	152.45	129.45	175.45	98.08	84.55	111.61	110.03	94.32	126.28
	Urban	192.31	133.04	251.59	189.42	147.08	231.76	95.58	76.24	114.91	110.72	83.79	137.64
Lusaka	Rural	146.89	100.92	192.86	110.94	82.83	139.05	50.82	35.21	66.43	45.34	27.34	63.34
	Urban	134.68	113.3	156.07	140.86	115.23	166.5	71.22	57.9	84.55	67.61	53.66	81.55
Muchin- ga	Rural	NA	NA	NA	NA	NA	NA	91.19	75.83	106.56	73.47	59.67	87.26
	Urban	NA	NA	NA	NA	NA	NA	73.32	55.84	90.81	84.1	55.70	112.5
Northern	Rural	188.42	169.92	206.91	161.44	138.11	184.77	87.44	73.9	100.97	65.26	51.71	78.81
	Urban	180.28	135.37	225.19	148.77	112.96	184.59	79.36	62.42	96.31	67.40	44.57	90.22
North Western	Rural	119.33	101.98	136.68	111.10	90.40	131.81	63.15	50.61	75.68	27.05	16.26	37.93
	Urban	196.75	143.29	250.21	87.82	57.32	118.33	77.46	58.65	96.27	22.12	5.47	38.78
Southern	Rural	134.25	112.51	155.98	97.09	77.91	116.27	61.8	49.67	73.93	47.04	34.58	59.50
	Urban	211.34	154.3	268.38	128.94	94.02	163.85	94.68	72.92	116.45	123.62	55.57	191.66
Western	Rural	202.99	177.94	228.03	144.32	120.86	167.77	70.93	55.2	86.65	57.82	44.49	70.96
	Urban	169.96	74.97	264.95	90.67	56.97	124.39	83.16	59.87	106.46	55.58	28.65	82.52



**Ministry of Health, Zambia In
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