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INSIGHTS ON CHILD VULNERABILITY IN KENYA

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Acknowledgements

This report is the product of a collaborative effort between the Kenya National Bureau of Statistics (KNBS), the United Nations Children's Fund (UNICEF), and UN Women. We extend our sincere appreciation to all the teams and individuals whose invaluable contributions made this work possible.

I acknowledge the KNBS for their leadership and technical support throughout the development of this report. We applaud the KNBS Directors, notably Mr. Benjamin Avusevwa, Mr. Collins Omondi, Mr. Robert Nderitu, and Mr. Abdulkadir Awes for their dedicated leadership in validation of the findings of the study as well as for their technical guidance and encouragement throughout the entire report preparation process. We also wish to recognize and thank the KNBS technical team comprising of Mr. Paul Samoei, Ms. Vivianne Nyarunda, Ms. Rosemary Bowen, Mr. Benjamin Muchiri, Mr. James Ng'ang'a, Mr. Silas Mulwa, Mr. Andrew Imbwaga, Mr. Zachary Ochola, Ms. Sarah Omache, Ms. Tabitha Mwangi, Ms. Caroline Gatwiri, and Mr. Pius Ng'ang'a and not forgetting the copy and design layout by Ms. Jacqueline Dama.

From UNICEF, I extend special thanks to Godfrey Ndenge, Vivian Nyakangi, Jacob Joseph Ochieng Ouko, Ana Gabriela Guerrero Serdan, the Research and Evaluation Committee, and the Social Policy Team from the UNICEF Kenya Country Office. The report also greatly benefited from the peer review process conducted by the UNICEF Office of Research – Innocenti, with appreciation to Richard De Groot for his insightful feedback.

I am also grateful to Ms. Antonia Ngabala-Sodonon (UN Women-Kenya Country Representative) for the overall leadership and support and to the core technical team comprising Joshua Musyimi, Caneble Oganga, and Maureen Nyagah (UN Women - Kenya Country Office). The process also benefited immensely from the technical guidance provided by Isabella Schmidt (UN Women - Eastern and Southern Africa Regional Office); and Papa Seck, Jessamyn Encarnacion and Aurelie Acoca (UN Women - Headquarters).

The Government of Kenya played a critical role in validating the methodology and results of the study. We are grateful for the support received from various departments, including the National Treasury and Economic Planning, Ministry of Education, Ministry of Health, State Department for Gender and Affirmative Action, the State Department for Social Protection and Senior Citizen Affairs, the National Gender and Equality Commission (NGEC) and the Academia (University of Nairobi and Kenyatta University).

I am thankful to the technical team from the Social Policy Research Institute (SPRI), Nesha Ramful, Liên Boon, Julia Karpati, Mariam Sène, Chloé Van Damme, and Chris de Neubourg for their rigorous analytical work, responsiveness to technical queries, and timely inputs throughout the process.

I gratefully acknowledge the financial support provided by UNICEF and UN Women, made possible through grants from the Swedish International Development Cooperation Agency (SIDA) and Bill and Melinda Gates Foundation (BMGF).

Foreword

The Kenya National Bureau of Statistics (KNBS) is pleased to present *Brighter Tomorrows: Breaking Cycles of Poverty for Kenya's Children*, developed in close collaboration with UNICEF Kenya and UN Women. This report is a timely and critical contribution to our national efforts to understand and address the multiple and overlapping vulnerabilities facing children across the country.

As the principal agency for official statistics in Kenya, KNBS remains committed to generating and availing high quality data that informs policy, planning, and development programming. This report draws on the latest Kenya Demographic and Health Survey (2022) and applies UNICEF's Multiple Overlapping Deprivation Analysis (MODA) to provide a comprehensive picture of child vulnerability in Kenya today.

The findings paint a complex picture, while notable gains have been made in child survival, education, and protection, a significant proportion of Kenya's children continue to face poverty, undernutrition, inadequate access to basic services, and other risks that threaten their wellbeing.

More than half (55%) of Kenyan children are multidimensionally poor, experiencing deprivation in at least three dimensions of their wellbeing simultaneously. The disparities are stark. Children in rural areas are more than twice as likely to be multidimensionally poor compared with their urban counterparts (66% vs. 28% respectively). Regional inequalities persist, with counties such as Mandera, Turkana, Samburu, and Wajir reporting deprivation rates exceeding 90%. Meanwhile, Nairobi, Kiambu, and Nyeri have the lowest rates, highlighting the urgent need for targeted, equity-driven interventions.

Importantly, the report underscores that not all vulnerable children are poor, and not all poor children are vulnerable. Vulnerability is shaped by a complex interplay of factors, including household wealth, education, disability, orphanhood, maternal empowerment, and exposure to climate and economic shocks. This calls for a multidimensional, life-cycle approach to child wellbeing, one that goes beyond income-based measures and addresses the full spectrum of risks which children face.

Despite these challenges, there is hope. Kenya has made significant strides in reducing child mortality, improving school attendance, and expanding social protection. The findings of this report offer a roadmap for building on these gains, through inclusive policies, strengthened data systems, and coordinated action across sectors.

As we look to the future, let this report serve as both a mirror and a mandate: a mirror reflecting the lived realities of millions of children, and a mandate to act boldly and compassionately to break the cycles of poverty and vulnerability. Every child in Kenya deserves the opportunity to grow up safe, healthy, educated, and empowered.

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List of Abbreviations

CEDAW	Convention on the Elimination of All Forms of Discrimination Against Women
CO	Country Office
CT-OVC	Cash Transfer for Orphans and Vulnerable Children
DRM	Disaster Risk Management
EFA	Exploratory factor analyses
FAO	Food and Agriculture Organization
FGD	Focus Group Discussion
FGM	Female Genital Mutilation
GBV	Gender-based violence
GDP	Gross Domestic Product
ILO	International Labor Organization
KAIS	Kenya Aids Indicator Survey
KII	Key-Informant Interview
KDHS	Kenya Demographic and Health Survey
KIHBS	Kenya Integrated Household Budget Survey
KNBS	Kenya National Bureau of Statistics
KPHC	Kenya Population and Housing Census
MODA	Multiple Overlapping Deprivation Analysis
MICS	Multiple Indicator Cluster Survey
NGO	Non-governmental organization
OECD	Organisation for Economic Co-operation and Development
OPHI	Oxford Poverty and Human Development Initiative
OVC	Orphans and Vulnerable Children
SDG	Sustainable Development Goal
SP	Social Protection
SRM	Social Risk Management
SRPF	Sexual Relationship Power Scale
SRSP	Shock Responsive Social Protection
SWPER	Survey-based women's empowerment index
ToR	Terms of Reference
UNCRC	United Nations Convention on the Rights of the Child
UN-DESA	United Nations Department of Economic and Social Affairs
UN ESCWA	United Nations Economic and Social Commission for Western Asia
UNDP	United Nations Development Programme
UNFPA	United Nations Population Fund
UNICEF	United Nations Children's Fund
UN Women	United Nations Entity for Gender Equality and the Empowerment of women
UXO	Unexploded explosive ordnance
WB	World Bank
WE	Women's Empowerment
WEI	Women Empowerment Index

WFP	World Food Programme
WHO	World Health Organization

Executive summary

1) Introduction

As a signatory to the United Nations Convention on the Rights of the Child (UNCRC) and the Convention on the Elimination of All Forms of Discrimination Against Women (CEDAW), Kenya has integrated long-term development goals that address the needs and rights of all individuals, particularly women and children. However, the vulnerability of children and the persistent lack of women's empowerment continue to pose significant challenges in the country. In 2019, nearly half of children in the country were multidimensionally poor, and by 2022, over 42 per cent were monetarily poor, with many also facing food insecurity, undernutrition, and limited access to basic needs. Despite these challenges, progress has been made in child survival, protection, and education. Research highlights the importance of addressing children's needs and vulnerabilities early in life, as timely interventions not only enhance positive outcomes but also significantly reduce potential risks. This report presents a study on child vulnerability (Volume I) and women's empowerment (Volume II) in Kenya, commissioned by the Kenya National Bureau of Statistics (KNBS) in collaboration with UNICEF Kenya's Country Office and UN Women. The study's primary objective is to generate evidence on child vulnerability and women's empowerment, updating previously carried out analyses on these topics. This report, Volume I, focuses on the analysis of child vulnerability, touching upon its relationship to Women's Empowerment as part of the core analysis.

The overall objectives of this report are to i) analyse child vulnerability in Kenya, ii) assess the relationship between child vulnerability and women's empowerment, and iii) formulate evidence-based recommendations for policy and programme development towards improving the well-being of children and women. The findings and recommendations of this report shall support efforts to shape national and county development plans and budgets to better address the needs of children and women in Kenya.

2) Methodology

Conceptually, the study is based on the UNICEF framework for measuring child vulnerability and UNICEF's MODA framework for assessing multidimensional child poverty, complemented by qualitative triangulation and monetary poverty measures. The study employs both desk review and descriptive analysis using the most recent nationally representative data sources in Kenya. The Kenya Demographic and Health Survey (KDHS) 2022 serves as the primary source for quantitative analysis, including regression and deprivation modelling. Logistic regression identifies statistically significant vulnerability markers, such as age, sex, household wealth, and maternal empowerment and their associations with child outcomes, though not implying causality. The analysis also integrates findings from the Women's Empowerment Index to explore how maternal empowerment affects child well-being.

3) Key Findings

Overall, household wealth consistently emerged as a protective factor across the various markers of child vulnerability, being significantly associated with a reduced likelihood of adverse child outcomes. This finding underscores the importance of poverty reduction strategies in mitigating child vulnerability and improving child well-being. The education level of the household head was also found to influence child outcomes, though the association was less consistent across all outcomes. This variability may be attributed to underlying factors such as the quality of education, regional disparities, or broader socio-economic conditions that were not considered in the current analysis, but which may moderate the influence of educational attainment.

Other characteristics, such as co-residence with a person with disability, orphan status, and maternal empowerment, showed more mixed and context-dependent associations with child vulnerability outcomes. The influence of these variables may be shaped by underlying structural factors such as social support systems, service availability, and prevailing cultural norms. Moreover, the magnitude and direction of these associations varied across population subgroups, particularly between rural and urban areas, and across different wealth quintiles. These findings point to the need for context-specific policy responses that are sensitive to the heterogeneity of vulnerabilities experienced by different demographic groups.

i. Multidimensional child poverty affects around 55 per cent of Kenyan children. According to the MODA analysis, the majority of children in Kenya are deprived in 2, 3 or 4 dimensions of their well-being at the same time (24 per cent, 27 per cent and 19 per cent). A larger proportion of children living in rural areas suffer from 3 or more deprivations. On average, multidimensionally deprived children (0-17 years) in Kenya, suffer from 3.7 dimensions of their well-being, representing 71 per cent of the total number of dimensions analysed. At the county level, Nairobi presents the lowest multidimensional deprivation rate of 13.5 per cent, followed by Kiambu, Nyeri and Mugang'a (21 per cent, 30 per cent, and 31.5 per cent respectively). On the other hand, children living in Mandera, Turkana, Samburu, Wajir, and Tana River are worse off, with around nine in ten children facing deprivation in three or more dimensions of their well-being.

ii. In addition to poverty, children in Kenya face various cross-cutting vulnerabilities across their life-cycle, including macroeconomic instability, climate-related risks and threats, health challenges, and social inequities. Rising poverty and unemployment, coupled with widening inequality, have strained access to essential services like healthcare, education, and nutrition, especially under fiscal austerity. Climate change intensifies these challenges, with over 12 million children exposed to medium to high risks, particularly in areas with fragile infrastructure. Health concerns persist, notably in HIV care, where children lag behind adults in diagnosis, treatment, and viral suppression. Urbanization and disability further compound exclusion, as over a million people in informal settlements and children with disabilities face limited access to basic services and education.

4) Conclusion and recommendations

This study highlights the complex and interconnected nature of child vulnerability in Kenya, driven primarily by poverty, which limits access to essential services such as education, healthcare, and nutrition. Despite progress, significant disparities persist across regions, wealth quintiles, and marginalized groups, with rural and underserved areas facing the greatest challenges. Vulnerabilities span multiple dimensions, including health, nutrition, education, and protection, and are compounded by systemic issues like climate change, and socio-economic inequities. The findings underscore the need for holistic, multisectoral interventions and improved data systems to address overlapping deprivations and promote inclusive, evidence-based policies. A multidimensional understanding of vulnerability is essential to designing effective strategies that reflect the diverse realities of children across Kenya.

1. Introduction

As a signatory to the United Nations Convention on the Rights of the Child (UNCRC) and the Convention on the Elimination of All Forms of Discrimination Against Women (CEDAW), Kenya has integrated long-term development goals that address the needs and rights of all individuals, particularly women and children. However, the vulnerability of children and the persistent lack of women's empowerment continue to pose significant challenges in the country.

Kenya has a rapidly growing young population, with 23.5 million children accounting for nearly half of the country's total population.[1] Many of these children face significant hardships, with 48 per cent considered multidimensionally poor[2], according to 2019 data, and 42 per cent monetarily poor[3] in 2022, living below the national poverty line[4]. Food poverty is also present among many Kenyan children: 47 per cent are living in moderate food poverty, while 16 per cent are living in severe food poverty[5]. Moreover, 18 per cent of children under five are undernourished, leading to stunted growth.[6] Children also face limited access to basic necessities such as clean drinking water, safe and adequate housing or energy. Approximately 20 per cent of households lack access to safe drinking water[7], while 84 per cent of the total population live in inadequate housing.[8] Based on the Violence Against Children Survey of 2019, nearly half of women (46 per cent) and more than half of men (56 per cent) aged 18-24 years experienced violence during their childhood.[9] In addition, 15 per cent of women aged 15-19 years have been pregnant, while 9 per cent are circumcised.[10]

On the other hand, considerable progress has been made in areas such as child survival, child protection, and education. Both infant and under-five mortality have decreased significantly in the past decades, while neonatal mortality rates decreased at a much slower rate.[11] Furthermore, the proportion of children engaged in economic activities, considered as child labour, has decreased from 35 per cent in 2009 to 8 per cent in 2019.[12] The prevalence of female genital mutilation (FGM) among women aged 15-49 years declined from 32 per cent in 2003 to 15 per cent in 2022.[13] In terms of education, there has been a noticeable improvement in both school attendance and delay in schooling in 2019 compared to 2009. School attendance among children aged 14 to 17 increased from 79 per

[1] KNBS 2022.
[2] KNBS 2023a.
[3] KNBS 2023b.
[4] Kenya National Bureau of Statistics 2024.
[5] UNICEF 2024.
[6] KNBS and ICF 2023.
[7] Kenya National Bureau of Statistics, Ministry of Health, and The DHS Program ICF 2023.
[8] KNBS 2023a.
[9] Ministry of Labour and Social Protection of Kenya 2019.
[10] KNBS and ICF 2023.
[11] Infant mortality dropped from 74 deaths per 1000 live births in 1998 to 32 in 2022, while under-five mortality declined from 90 deaths per 1000 live births in 1998 to 41 by 2022. On the other hand, neonatal mortality stood at 28 deaths per 1000 live births in 1998 and decreased to 21 in 2021. See Ibid.
[12] KNBS 2023a.
[13] KNBS and ICF 2023.

cent in 2009 to 86 per cent in 2019, while the percentage of children who are delayed in their schooling has dropped from 36 per cent to 18 per cent over this period. [14]

Research highlights the importance of addressing children's needs and vulnerabilities early in life, as timely interventions not only enhance positive outcomes but also significantly reduce potential risks (e.g. developmental delays, long-term health issues, and exploitation and abuse). For example, in low- and middle-income countries, an estimated 43 per cent children under the age of five are at risk of poor development due to factors like extreme poverty and stunted growth.[15] Being vulnerable does not necessarily mean that a child will experience harm; rather, it indicates a heightened risk of adverse outcomes.

The presence of effective social protection systems plays a crucial role in mitigating these risks by providing the necessary support to prevent potential harm, thereby allowing vulnerable children to thrive despite their challenging circumstances. However, based on a 2018 study, Kenya's social security cash transfers currently reach only an estimated 7.5 per cent of the total child population, with orphans being more likely to be covered than their non-orphaned peers[16].[17] Despite progress in expanding coverage, Kenya's cash transfer programmes still fail to reach the vast majority of children in the poorest wealth quintiles, and coverage of young children and children with disabilities remains particularly low.[18] This coverage gap is problematic, as it contravenes the principle of child-sensitive social protection, which emphasizes the importance of early intervention to prevent irreversible harm, to ensure that families struggling to support their children are identified and referred to appropriate social services, and thereby guarantee the fulfilment of children's basic rights.

Equally important to the well-being of children is the empowerment of women. In Kenya, however, women are disproportionately disadvantaged across multiple well-being indicators compared to men. Women are more likely to live in poverty, face disadvantages in the labour market, and experience higher levels of insecurity and violence. In 2022, 68 per cent of Kenyan women were engaged in vulnerable employment, compared to 52 per cent of men.[19] Adult literacy rates also show a gender gap, with 80 per cent of women being literate compared to 86 per cent of men.[20] Additionally, 38 per cent of women in Kenya have experienced intimate partner violence, a rate significantly higher than the global average of 27 per cent.[21] The recently developed Women's Empowerment Index (WEI) also revealed that only 29 per cent of women aged 15-49 in Kenya are considered empowered.[22] Latest analyses on inequality in Kenya revealed that women and children disproportionately experience

[14] KNBS 2023a.

[15] The Lancet 2016.

[16] Importantly, this implies that orphaned children may not be any more vulnerable than their non-orphaned peers in terms of their social protection coverage; however, this is not an assessment of their differential levels of vulnerability based on other determinants of vulnerability.

[17] National Social Protection Secretariat, WFP Kenya, and UNICEF Kenya 2018.

[18] According to latest available data, only 10.1 per cent of the population in Kenya is covered by at least one social protection benefit. The effective coverage for children was limited to 3.6 per cent, with 30.2 per cent of effective coverage for maternity benefits affecting mothers with children. See ILO 2023; ILO 2021.

[19] World Bank 2022.

[20] Ibid.

[21] Ibid. Note: Statistics dating from 2018 only concerning women between the age of 15 and 49.

[22] KNBS, UNICEF, and UN Women 2020.

higher levels of deprivation across various dimensions of well-being.[23] This emphasizes the critical importance of investing in both child welfare and protection and women's empowerment as key strategies for sustainable economic development and poverty reduction.

This report presents findings from a two-volume study on child vulnerability (Volume I) and women's empowerment (Volume II) in Kenya. The study was commissioned by UNICEF Kenya Country Office and UN Women, in collaboration with the Kenya National Bureau of Statistics (KNBS). Its primary objective is to generate updated evidence on child vulnerability and women's empowerment, building on previous analyses conducted in the country.

Volume I focuses on the analysis of child vulnerability, including its intersection with women's empowerment. It utilises the most recent data from the 2022 Kenya Demographic and Health Survey (KDHS) to provide an updated assessment of child vulnerability and multidimensional deprivation. This analysis builds on earlier work published by UNICEF and KNBS in 2017 and 2018, which was based on the 2014 KDHS.[24] Volume II presents an in-depth analysis of the revised and updated Women's Empowerment Index (WEI), using the latest available data from 2022. It updates the previous analysis published in 2020, which was also based on the 2014 KDHS.[25]

The overarching objectives of this report are to:

i) Analyse the current status and trends in child vulnerability in Kenya;

ii) Assess women's empowerment and its relationship with child vulnerability; and

iii) Provide evidence-based policy and programme recommendations to enhance the well-being of children and women.

The findings and recommendations are intended to inform national and county-level development planning and budgeting processes, with the aim of addressing the needs of children and women more effectively.

The structure of this report is organized to provide a comprehensive analysis of child vulnerability in Kenya, integrating conceptual frameworks, methodologies, and empirical findings.

- The Introduction sets the stage by outlining the report's objectives and scope.
- Chapter 2 presents a Conceptual Framework for analysing child vulnerability, explaining its theoretical foundations.
- Chapter 3 describes the methodology employed, including secondary data analysis, determinants of vulnerability, and multidimensional child poverty.
- Chapter 4 delves into Child Vulnerability in Kenya, exploring monetary poverty, health, nutrition, education, and protection-related vulnerabilities, alongside cross-cutting risks such as macroeconomic shocks, climate risks, and inequities in HIV/AIDS, gender, and ethnicity. The chapter also includes an in-depth examination of multidimensional child deprivation, providing insights into its distribution, severity, and overlapping deprivations, as well as its determinants.

[23] KNBS 2023a.

[24] Kenya National Bureau of Statistics and UNICEF 2017; National Social Protection Secretariat, WFP Kenya, and UNICEF Kenya 2018.

[25] KNBS, UNICEF, and UN Women 2020.

- Chapter 5 concludes the report with Policy Recommendations, linking findings to actionable strategies aimed at addressing child vulnerability.
- Following the list of references, a series of annexes offer detailed supplementary materials. Annex I describes differences in coding for MODA analysis (differences in data availability and coding between the 2014 and 2022 Demographic Health Surveys (DHS) for the Kenya MODA update). Annex II presents the MODA methodology. Subsequently, Annexes III, IV and V describe additional analyses on single deprivations, trends, and overlaps. Annex VI contains a detailed desk review of conceptual frameworks and previous research on child vulnerability, providing contextual depth to the main findings and justification and context for the general approach of the applied framework and methodology. Annexes VII, VIII and IX provide details on the model specifications used in the multivariate logistic regression analysis on child vulnerability outcomes and their determinants.

2. A Conceptual Framework for Analysing Child Vulnerability in Kenya

This section outlines the conceptual framework adopted for analysing child vulnerability in Kenya, drawing from both international literature and previous applications within the Kenyan context. A comprehensive desk review of globally validated frameworks and prior national research is provided in Annex V.

Child vulnerability is a multidimensional construct that encompasses a range of risk factors and adverse outcomes. In Kenya, where socioeconomic disparities, health challenges, and environmental risks are prevalent, understanding child vulnerability requires an integrated approach. This framework incorporates economic, social, and environmental dimensions to reflect the complex realities affecting children's well-being.

Broadly, child vulnerability refers to the condition of children who are exposed to multiple, overlapping risk factors that compromise their development, well-being, and future opportunities. These children are more likely than their peers to experience negative outcomes due to the cumulative and intersecting nature of these risks. The factors contributing to vulnerability are diverse and include, but are not limited to, economic instability, health shocks, environmental hazards, and social exclusion.

2.1 Child Vulnerability defined within the framework of Orphans and Vulnerable Children in Kenya

Kenya, like many countries in sub-Saharan Africa, faces significant challenges in protecting its most vulnerable children. A review of the literature highlights that child vulnerability in Kenya is closely linked to various factors that impact or determine their vulnerability. In the early 2000s, Kenya's social protection sector defined child vulnerability primarily in response to the AIDS pandemic, leading to the development of the National Plan of Action for Orphans and Vulnerable Children (OVC) and the launch of the Kenya Cash Transfer for Orphans and Vulnerable Children (CT-OVC) in 2004.[26] This programme aimed to provide regular cash transfers to poor families with children identified as OVCs—those with at least one deceased parent, a chronically ill parent, or a chronically ill caregiver.[27] This definition focused on the increased risk these children face due to the health status of household members, which impacts their overall well-being and development.

While this definition was appropriate in the context of the HIV/AIDS crisis, recent research and global perspectives have raised concerns about its narrow focus. Studies have shown that orphanhood and co-residence with a chronically ill adult, while important indicators, do not capture the full range of factors that contribute to child vulnerability.[28] Research on OVC in Kenya highlights that vulnerability among children is multidimensional, encompassing not only the loss of one or both parents but also

[26] National Social Protection Secretariat, WFP Kenya, and UNICEF Kenya 2018; USAID, UNICEF, and SIDA 1999; Lee et al. 2014.

[27] USAID, UNICEF, and SIDA 1999; Lee et al. 2014.

[28] National Social Protection Secretariat, WFP Kenya, and UNICEF Kenya 2018; Children's Commissioner 2017; OECD 2019; UNICEF 2014; UNICEF 2021a.

the socioeconomic conditions of the household, including poverty, food insecurity, and access to services.[29]

Given the multifaceted nature of vulnerability, which includes individual, familial but also economic, social, and environmental factors, using a comprehensive definition of vulnerability is particularly important. Otherwise, many equally or more vulnerable children, such as those affected by poverty, disability, displacement, abuse, and lack of parental care (1 in 10 children in Kenya do not live with their biological parents, although they are alive[30]) may be excluded from critical social protection programmes. In response to these concerns, there has been a growing recognition of the need to broaden the criteria for identifying vulnerable children, ensuring that social protection programs are more inclusive and better aligned with the diverse realities of children's lives.

Building on the insights from international frameworks and prior research (see Annex V), the framework for this study integrates multiple perspectives to provide a comprehensive understanding of child vulnerability tailored to Kenya's unique socio-economic and environmental context.

2.2 Conceptual Framework Foundations

As highlighted in Annex V, various conceptual frameworks have been developed to understand child vulnerability, each offering distinct perspectives. These include frameworks focused on orphans and vulnerable children (OVCs), monetary poverty, multidimensional deprivation, and the life-cycle approach. While each framework provides valuable insights into specific dimensions of vulnerability, none alone fully captures the complex and evolving risks faced by children in Kenya.

Given the dynamic nature of challenges such as poverty, health crises, and environmental shocks, there is a clear need for a comprehensive and integrative framework. Such an approach enables a more holistic understanding of the multiple, overlapping risks and deprivations that affect children's well-being. By synthesising elements from diverse frameworks, this study adopts a multidimensional lens that reflects the realities of child vulnerability in Kenya's socio-economic and environmental context.

The framework for this study expands on the 2014 UNICEF conceptual framework[31], offering a robust foundation for analysing child vulnerability by considering key vulnerability markers such as household wealth, living arrangements, orphanhood status, and education levels. This framework has previously been applied in Kenya, particularly in the 2018 study on Child Vulnerability and Social Protection in Kenya.[32]

[29] Lee et al. 2014.

[30] KNBS and ICF 2023.

[31] UNICEF 2014.

[32] This framework identified key determinants of vulnerability among children, particularly in the context of HIV and AIDS. These determinants, or 'vulnerability markers' included household wealth, living arrangements, education level of adults in the household, orphanhood status, and the presence of chronic illness among adults in the household, as they found that they were often associated with key health and social outcomes for children. For more details on the 2018 application of this framework in Kenya, see Annex VI. National Social Protection Secretariat, WFP Kenya, and UNICEF Kenya 2018.

Recognising that children's well-being is influenced by a range of factors, including economic, social, and health-related variables,[33] this framework identifies key determinants of child vulnerability, particularly in the context of Kenya's socio-economic and health landscape. The framework is designed to analyse how different vulnerability markers (independent variables) influence various vulnerability outcome variables (dependent variables), providing a comprehensive view of the factors that shape child outcomes.

Vulnerability markers (referred to interchangeably as determinants or independent analytical variables) reflect individual, household, and community-level characteristics that are hypothesised to influence child outcomes. As detailed in Table 1, these include:

- **Demographic factors:** Sex and age of the child, orphanhood status, living arrangements, and age of the mother at first birth.
- **Household characteristics:** Household wealth status, the highest education level of the head of household, sex of the household head, and the presence of persons with disabilities (PWD) or chronically ill adults in the household.
- **Environmental and contextual factors:** Place of residence (urban/rural), county (as a fixed effect), exposure to harmful practices (e.g., FGM), child labour, and access to social protection.

These markers have been selected based on their relevance in the Kenyan context and evidence from prior studies, including the **2014 UNICEF framework for measuring child vulnerability**[34] and its 2018 application in Kenya[35]. They reflect both structural and immediate factors that can influence child health, education, and protection, "vulnerability outcomes".

The vulnerability outcomes, also outlined in Table 1, represent key indicators of child well-being and vulnerability across different age groups, and include:

- **Health-related outcomes:** Incomplete immunisation, stunting, non-exclusive breastfeeding, non-receipt of vitamin A supplementation, and non-use of insecticide-treated nets (ITNs).
- **Educational outcomes:** Non-attendance at school in the past year.
- **Protection outcomes:** Lack of birth registration, early sexual debut, early marriage

These outcomes capture the multifaceted nature of child vulnerability, encompassing health, nutrition, education, and protection domains.

The framework is designed to analyse how different vulnerability markers (independent variables) influence various vulnerability outcome variables (dependent variables), providing a comprehensive view of the factors that shape child outcomes (Table 1).

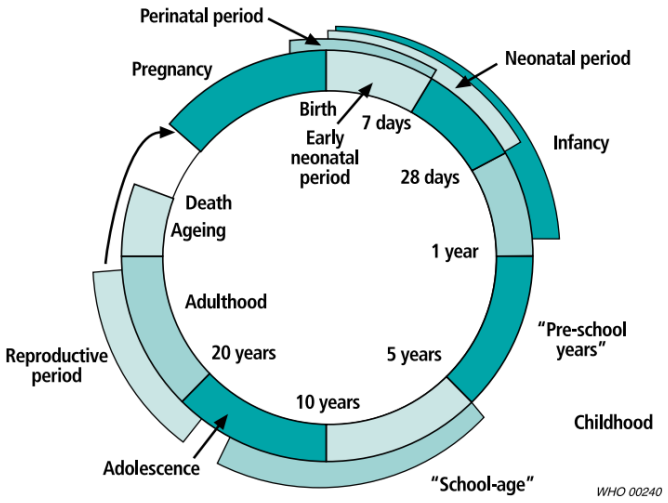
[33] UNICEF 2014.

[34] Ibid.

[35] Ibid.

In addition, the foundational framework underlying the study in this current report is expanded by elements from the OECD[36], UNICEF and the World Bank[37] (see Annex V), building on previous research conducted in Kenya, as well as other conceptual frameworks reviewed. This report particularly emphasises the importance of assessing child vulnerability using a life-cycle approach while taking into account various individual risks (for example, other cross-cutting factors such as macroeconomic situation) (see Figure 1, Table 1, and Figure 2). This allows for analysis of the relationship between key indicators of childhood wellbeing (for example, health, educational attainment) and outcome variables, different categories of the CT-OVC criteria (for example, orphanhood, caregiver with chronic illness, wealth), and vulnerability markers. In essence, the goal is to understand how well these categories help to explain critical child outcomes.

Figure 1 Life-Cycle Approach



Source: Claeson and Waldman (2000)

Note: This diagram presents the key stages in the life cycle, starting from pregnancy to death, using different colours to highlight each period for visual clarity.

The vulnerability outcome variables and analytical variables to be analysed in this current study are described in Table 1. In summary, the final selection of variables – both the vulnerability outcomes and markers – are based on 1) the 2014 UNICEF framework for measuring and analysing the key determinants of child vulnerability in countries with varying HIV prevalence levels and geographic areas[38]; 2) the first application of the 2014 UNICEF framework in the 2018 study on Child Vulnerability and Social Protection in Kenya[39]; and 3) further contextualisation of the vulnerability outcomes and determinants for Kenya based on literature review and stakeholder consultations, which includes the addition of multidimensional deprivation as an outcome variable, as well as the inclusion of the status of maternal empowerment as an analytical variable. Adaptations from the 2014 UNICEF framework and its 2018 application are respectively marked with footnotes in the table.

[36] OECD 2019.

[37] World Bank 2004.

[38] UNICEF 2014.

[39] Ibid.

Table 1: Framework for the selection of child vulnerability outcomes and vulnerability markers (analytical variables) to be analysed in the determinant analysis component of this study using KDHS 2022

Age Group	Child Outcome	Analytical Variables
0-4 years	- **No Birth registration**: child's birth is not registered. - **No full immunisation:** Child is not fully immunised[1] - **Stunting**: child's height for age is below two standard deviations from the mean of healthy children using the WHO Child Growth Standard reference population. - **Not sleeping under insecticide-treated nets (ITNs**): child did not sleep under an ITN the night before the survey. - **No Vitamin A supplementation:** Child did not receive Vitamin A supplementation[1] **- Non-exclusive breastfeeding:** Child was not exclusively breastfed[1] **- No Minimum acceptable diet:** Child did not meet minimum standards for dietary frequency and diversity[1]	- Sex of the child - Age of the child - Orphanhood status - Living arrangements - Place of residence - Household wealth status - Highest education of the head of household - Counties as fixed effects - Sex of household head[1] - Disability (of child, presence of PWD in the household) [1] - Access to social protection - Co-residence with a chronically ill adult or HIV-positive adult [2] - Exposure to GBV - Child Labour (15-17) [2] - Harmful practices (FGM; status and/or age at circumcision) [2] - Age of the mother at first birth - Women's Empowerment Index or mother's education[1]
5-17 years	- **No attendance at school in the past year:** child did not attend school in the past year.	
0-17	**- Multidimensionally poor:** Child is deprived in at least 3 dimensions* based on MODA Analysis using KDHS2022 [1]	

[1]*Reflects an expansion or adaptation to the 2014 UNICEF framework for determinants of child vulnerability as well as its application in the 2018 study in Kenya. These adaptations resulted from consultations with UNICEF and KNBS on the variables best reflecting the child vulnerability context in Kenya.*

[2] *Reflects variables that were initially included but later excluded from majority of the analyses due to low numbers of observations or inapplicability of the available data.*

Furthermore, the framework has been expanded to incorporate the concept of childhood multidimensional deprivation as a central component of child vulnerability. This reflects the recognition that child vulnerability is both multidimensional and cumulative. The interaction between deprivation and vulnerability is particularly critical, as deprivation in one domain often intensifies risks in others. This approach is especially relevant in the Kenyan context, where many children experience

overlapping deprivations, including monetary poverty, limited access to healthcare, inadequate nutrition, and constrained educational opportunities, which together heighten their susceptibility to adverse outcomes.

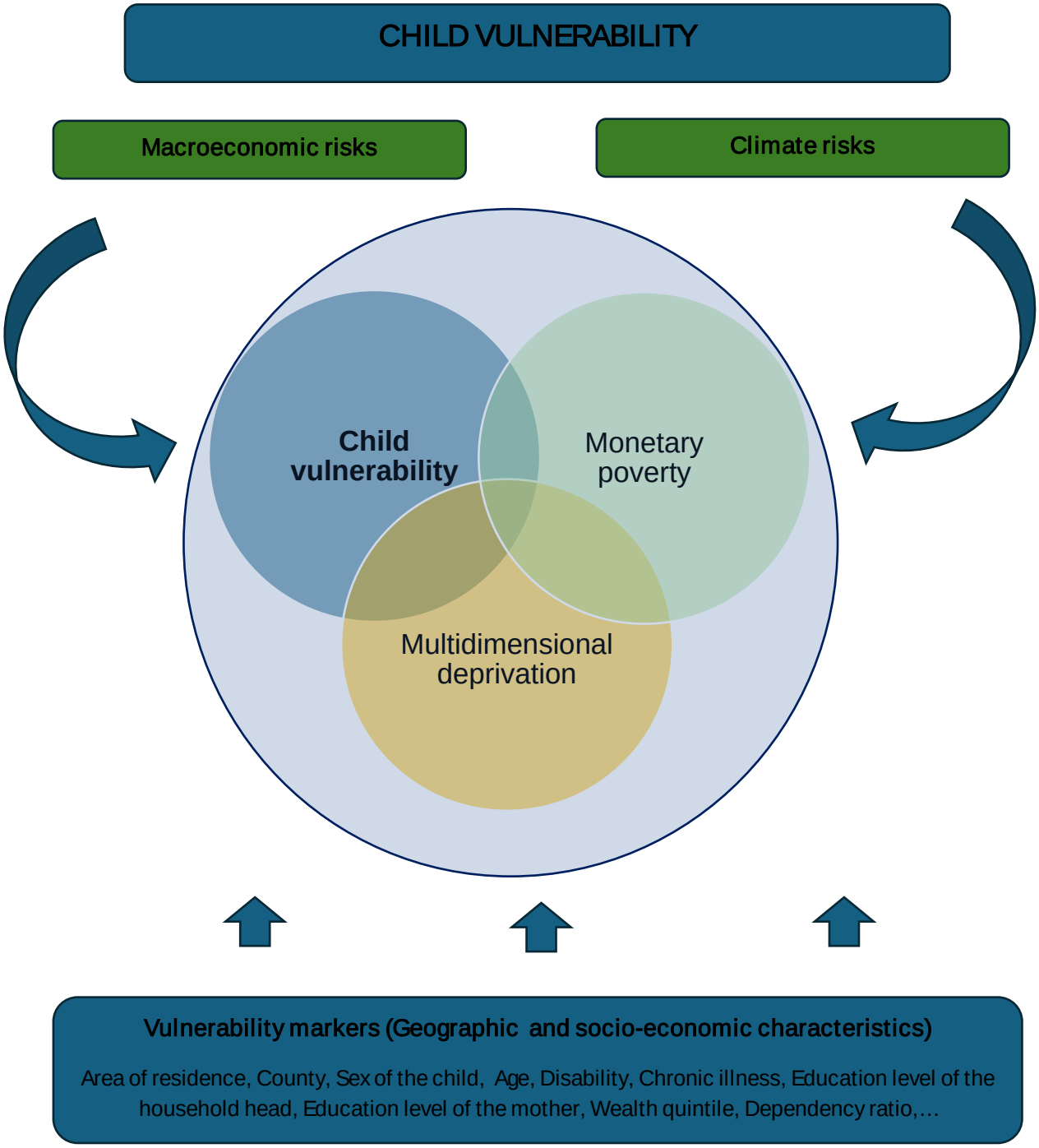
The framework also acknowledges that child vulnerability is dynamic and context-specific, with risks evolving and influenced by factors such as age, household structure, geographic location, and prevailing social or economic conditions. These patterns underscore the importance of implementing targeted, age-appropriate interventions throughout the child's life cycle, in line with the life-course approach. Further elaboration on the theoretical underpinnings for situating multidimensional child deprivation within the broader framework of child vulnerability is provided in Annex VI.

Error! Reference source not found. illustrates the dynamic relationship between child vulnerability, monetary poverty, and multidimensional deprivation. Where child vulnerability (as conceptualised in Table 1), encompasses a broad range of risks that children may face, influenced by both individual circumstances (e.g., orphanhood, disability) and external factors (e.g., macroeconomic instability, climate risks), monetary poverty refers specifically to income-based measures of poverty. This is often assessed through wealth quintiles, and multidimensional captures deprivations across various domains, such as health, education, and living conditions, as measured in this study by the MODA framework. The overlapping and non-overlapping areas of the Venn-diagram highlight that:

- Some children experience both poverty and vulnerability, and these are often the most at-risk groups;
- Not all poor children are vulnerable, as some may have protective factors (e.g., strong family support, access to quality services) that mitigate risks.
- Conversely, not all vulnerable children are poor or deprived. For example, a child from a wealthier household may still face vulnerabilities due to factors like parental absence, disability, or exposure to violence.

These distinctions are critical, as they underscore the need for policies that go beyond poverty reduction to address the broader spectrum of risks children face.

Figure 2: Conceptual framework for child vulnerability and its interactions with other forms of poverty and deprivation, as well as external risk factors



Finally, the framework is grounded in the principles of child rights and equity, emphasising that all children have the right to a safe, healthy, and fulfilling life, regardless of their socio-economic background or circumstances. This approach will ensure that the study is aligned with broader goals of social protection and equity, prioritising the most vulnerable children and addressing the specific barriers they face. The inclusion of protective factors and resilience, such as strong family support and access to social protection, ensures that the framework not only focuses on risks but also highlights

opportunities for children to thrive despite their vulnerabilities. By adopting this expanded framework, which takes into account multidimensional deprivation, lifecycle risks, and socio-economic factors, this child vulnerability study in Kenya will be able to provide a more nuanced and comprehensive understanding of the factors contributing to child vulnerability. This will enable policymakers to better assess the complex and interrelated factors contributing to child vulnerability and inform more inclusive and effective social protection interventions, particularly in the context of the revised eligibility criteria for cash transfers.

In summary, the study uses the **2014 UNICEF study framework, previously applied in Kenya in 2018,** as a foundation. Building on this framework and its application in this previous study, and as explained in 2.2, we will incorporate the following additional elements:

- **New variables of interest in terms of vulnerability outcomes and vulnerability markers relevant for Kenya based on updated data**, and stakeholder consultations.
- **Linkages to multidimensional poverty analysis** using the **UNICEF rights-based framework**.
- **Additional descriptive analysis** of administrative and monitoring data for any missing variables that are not covered in the 2022 KDHS but are relevant (though these were analysed outside of the regression due to different datasets, and only within a limited scope).
- **New hypothesis testing** in the regression analysis, specifically to assess whether the proposed CT-OVC eligibility criteria revisions are strong predictors of selected vulnerability outcomes.
- **Desk review on sector-specific and cross-cutting vulnerabilities, such as macroeconomic and fiscal vulnerabilities**, based on additional sources of secondary data, including analytical reports of recent population surveys and administrative data.

The overall approach is therefore an update of 2018 Child Vulnerability Study[40] analysis on vulnerability outcomes and determinants, based on the same set of indicators, adding new variables from desk review and from the CT-OVC criteria, and adding a component on multidimensional child deprivation as a form of (cumulative) vulnerability. These separate components are described in the below sub-sections.

[40] National Social Protection Secretariat, WFP Kenya, and UNICEF Kenya 2018.

3. Methodology

3.1 General approach

3.1.1 Desk review and descriptive analysis of secondary data

We begin by carrying out a desk review, resulting in analysis of the key indicators and variables identifying children's vulnerabilities in Kenya, based on the latest available data for Kenya, as derived from the Kenya Demographic and Health Survey (2022) and survey reports such as the Support Needs Assessment Support Needs Assessment for Persons with Disabilities and their Primary Caregivers 2022, and the 2019 Kenya Population and Housing Census, among other sources (See also 3.1.2). The main source of data for quantitative analysis of descriptive statistics, regression analysis (3.1.2), and deprivation analysis (3.1.3) is the Kenya Demographic and Health Survey (2022).

3.1.2 Analysis of the main determinants of childhood vulnerability

The subsections in 3.1.1 and 3.1.2 as well as 3.2 lay the foundation for the Child Vulnerability Analysis. Drawing on the approach used in the 2018 report on child vulnerability and social protection in Kenya (2018)[41], which itself was based on a global study by UNICEF[42], the analysis incorporates bivariate and multivariate logistic regression techniques. The 2018 report employed logistic regressions with selected outcome measures reflecting age-specific vulnerabilities across a child's developmental life cycle, including variables such as birth registration, fever treatment, DPT3, stunting, sleeping under ITN, school attendance, early sexual debut, and early marriage. The explanatory variables, or potential markers of vulnerability, included the child's sex and age, orphanhood status, living arrangements, household wealth status, and the highest education level of any adult in the household.
In our current study, we build on this by updating the methodology to include additional variables, such as disability status, maternal age at first birth, and proximity to social, economic, and/or environmental/climatic risk factors (as provided by external data sources matchable at the county level). The final selection of outcome and analytical variables is further refined based on a correlation matrix and ANOVA analysis. For this analysis, to ensure consistency of the available variables with previous research, we use KDHS 2022 data.

Analytical Strategy

This analysis uses regression models to investigate various outcome variables related to child vulnerability, running separate regressions for each outcome across different population groups and model specifications. The list of outcome variables (dependent variables) is presented below, and further information on the analytical (independent) variables and regression model specifications can be found in Annex VI.

Outcome Variables

The following outcome variables are each analysed through their own separate regression:

- No birth registration (age <5)
- Not fully immunized (age <5)

[41] Ibid.

[42] UNICEF 2014.

- Stunting (Child is stunted) (age <5)
- Child did not sleep under insecticide-treated net (ITN) (age <5)
- Not attended school in the past year (age 7-17)
- MODA poor (deprived in at least 3 dimensions)
- Child did not receive Vitamin A supplementation (age <5)
- Infant and young child feeding (does not meet standards in terms of frequency and diversity) (6-59 months)

Population Groups

For each outcome variable, regressions are conducted across four population groups:

1. National (with urban/rural as an analytical variable)
2. Poor (annex)
3. Urban (annex)
4. Rural (annex)

Integration of multidimensional child poverty in the expanded conceptual framework for child vulnerability in Kenya

To bridge the gap between the child vulnerability framework and the multidimensional deprivation analysis, and as described in the table above, we conduct regression analyses on child vulnerability outcomes using the latest available data in Kenya, identifying children who are deprived in at least three dimensions (Regression VIII). This approach is designed to explore the relationships between various markers of vulnerability and key child outcomes. While the Multidimensional Overlapping Deprivation Analysis (MODA) for children in Kenya (explained in the next section, 3.3.3) focuses on specific dimensions of deprivation, it is crucial to understand that these deprivations are just one aspect of the broader spectrum of vulnerabilities faced by children, as described in the conceptual framework section.

We therefore introduce a MODA-derived variable that assesses whether a child is deprived in at least *k* dimensions, with the threshold k being determined during the MODA analysis, as one of the dependent variables in the regression analysing the relationship between vulnerability outcomes and determining factors. This captures the relationship between the Vulnerability Analysis and Multidimensional Child Deprivation Analysis, conceiving multidimensional (multiple) deprivation as a form of vulnerability outcome and cumulative vulnerabilities, in line with the conceptual framework.

The model used for this analysis includes in turn the different outcome (dependent) measures, the independent variables as markers of vulnerability and additional variables to control for children's individual and household characteristics, including factors like area of residence, region, and other relevant socioeconomic, security, and environmental risks. This allows for a nuanced understanding of inequalities in poverty and deprivation among children with disabilities compared to their peers.

Logistic regression analysis of key vulnerability outcomes and markers

The logistic regression model for models I-XI is generally expressed as follows:

$$\log\left(\frac{P(Y=1)}{1-P(Y=1)}\right) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \ldots + \beta_k X_k + \epsilon$$

Where:

- **Y** is the binary dependent variable indicating whether the child is deprived in specific dimensions (e.g., birth registration, full immunisation, stunting, sleeping under ITN, school attendance, early sexual debut, and early marriage but also the multidimensional poverty intensity of 3-6 dimensions based on the MODA outcome).
- **P(Y=1)** is the probability of the event that Y=1 (i.e., the child is deprived in single or multiple dimensions).
- **β0** is the intercept.
- **β1, β2, …, βk** are the coefficients for the independent variables (for example, sex and age, orphanhood status, living arrangements, wealth status, education level of adults).
- **X1, X2, … Xk** are the independent variables (i.e. the potential markers of vulnerability).
- **εi** is the error term.

To interpret the results, we calculate the average marginal effects, which measure the average change in the predicted probability of Yi=1Yi=1 with a one-unit change in an independent variable, holding other covariates constant. More specifically, the average marginal effects (AME) indicate the probability of each child or household characteristic (for example, age, sex, dependency ratio, etc.) on the probability of the outcome occurring (for example, being stunted, not attending school, etc.). Each AME shows the difference in probability compared to the reference group. Positive values indicate an increase in vulnerability likelihood, while negative values suggest a decrease, holding everything else constant.[43] When AME are consistently positive across several regressions, we conclude that the outcome variable indeed is a marker of vulnerability.

Overall, the purpose of the regressions is two-fold: firstly, they allow us to rightfully identify the markers of vulnerability that have a significant relationship with the different outcome variables that capture children's age-specific vulnerabilities across their life-cycle. And secondly, they measure the relationship between child vulnerability and child multidimensional poverty, hence allowing for a comprehensive analysis of the intricate challenges faced by children in Kenya.

The regressions accounted for county differences. Deviation coding was used to compare each county's mean outcome to the overall mean across all counties rather than to a single reference county, as in dummy coding. This approach allows for a more meaningful comparison by showing how each county deviates from the national average rather than from an arbitrarily chosen county. To implement it, one county must be omitted to ensure the sum of all deviations equals zero. The omitted county's effect is inferred as balancing the deviations of the included counties. In this case, Mandera

[43] For example, for a binary outcome such as child stunting, where 0 represents the child not being stunted and 1 represents the child being stunted, the logistic regression analysis shows how a one-unit change in a predictor variable (e.g., living in an urban area compared to living in a rural area, which serves as the reference group) influences the probability of stunting. For instance, if the AME for living in an **urban area** (compared to a **rural area**, which serves as the reference group) is **-0.12** and statistically significant at the **5% level ($p < 0.05$)**, this indicates that, on average, children living in urban areas are **12 per centage points less likely** to be stunted than those living in rural areas, holding all other factors constant.

was chosen because it is closest to the national average based on key socio-economic indicators, ensuring a more representative baseline for interpretation.

3.1.3 Multidimensional Child Deprivation Poverty

The Multidimensional Child Deprivation (Poverty) Analysis is a sub-component of the Child Vulnerability Analysis, conceptualising multidimensional deprivation as a form of child vulnerability. In addition, this analysis serves as an update to the 2017 study based on the Kenya Demographic and Health Survey (KDHS) 2014.

UNICEF's Multiple Overlapping Deprivation Analysis (MODA) will be employed (see Annex II), providing a comprehensive approach to the multiple aspects of (child) poverty and deprivation.[44] MODA, in combination with other methodologies (such as qualitative research triangulation, and FGT for monetary poverty measurement[45]) has been the most common approach for analysing child poverty, deprivation and vulnerability in Kenya, as detailed in 3.1.2. As such, the MODA approach has been thoroughly validated as a suitable and contextually relevant measure for assessing child vulnerability and poverty in Kenya, in combination with other analyses, and for monitoring the situation of children over time.

We present below in Table 2 the selection of analysis parameters for the MODA calculations (indicators, dimensions, deprivation thresholds, age groups), which are based on those selected for the 2017 child poverty study, validated and contextualised through a thorough, national consultative process involving UNICEF, KNBS, and other key stakeholders, using KDHS 2014 and now KDHS 2022.[46]

Analysis parameters, trend analysis, and analytical caveats

Retaining a similar set of analysis parameters would allow for comparison with the 2017 baseline measures. However, following the initial review of the Kenya Demographic and Health Survey 2022, it was observed that the health-related knowledge variable is no longer available (see highlighted in red in Table 6 below). In addition, the data on vaccination coverage is available for children aged 0-35 months instead of 0-59 months. Moreover, during stakeholder consultations, it was decided to add new indicators relating to water, sanitation and housing. Thus, it is not possible to directly compare the multidimensional deprivation rate over time. It is not unusual that definitions of poverty, deprivation and vulnerability measurement change over time to best represent the contextualised and socially relevant situation at the time of data collection/analysis. Our observations of the data differences between DHS 2014 and DHS 2022 and other limitations are detailed in Annex I. Details of the analytical process for the MODA analysis are presented in Annex III.

Table 2: Selection of analysis parameters: age groups, dimensions and indicators

Dimension	Indicator	0 years	1-4 years	5-14 years	15-17 years
Development (Stunting)	Stunting: child's height-for-age is below -2 sd from ref. population	X	X		

[44] Detailed information on the MODA methodology can be found in the step-by-step guidelines to MODA (De Neubourg et al., 2014) and www.unicef-irc.org/MODA.

[45] Kenya National Bureau of Statistics and UNICEF 2017.

[46] Ibid.

Health	Vaccinations: child did not receive basic antigens (BCG, 3 doses of DPT; 3 doses of Polio and 1 dose of Measles-Rubella) on time	X	X (12-3 months)		
	Birth attendance: Delivered without skilled birth attendant/provider	X			
Health-related knowledge	Health-related knowledge: mother has no knowledge of ORS and Zinc for diarrhoea treatment [although included in 2017, due to data limitations, this indicator was not included in this analysis]		X		
Nutrition	Underweight and/or wasting: child's weight for age and/or weight for height < -2 sd	X	X		
	Vitamin A supplement: no vitamin A supplement in last 6 months	X	X		
Education	School attendance: child not attending school			X	X
	Grade-for-age: child of primary school age (8-14) has two or more years of delay; child of secondary school age (15-17) has three or more years of delay according to grade-for-age			X	X
	Illiteracy: child cannot read a full sentence				X
Health-related knowledge	Knowledge about HIV/AIDS: child age 5-14 lives in a household where no member knows about HIV/AIDS prevention and transmission; child age 15-17 has no knowledge of HIV prevention and transmission[47]			X	X
	Knowledge about diarrhoea treatment: child lives in a household where no female knows about ORS for treating diarrhoea [although included in 2017, due to data limitations, this indicator was not included in this analysis]			X	
Information	Information devices: no information device in household			X	X
	Exposure to mass media: child age 5-14 lives in a			X	X

[47] When individual-level information is not available, household level information is used.

	household where its members have no or limited exposure to mass media; child age 15- 17 has no or limited exposure to media[48]				
Water	Water source: household members use unimproved drinking water source	X	X	X	X
	Distance to water source: it takes more than 30 minutes to go, get water, and come back	X	X	X	X
	Water quantity: household did not have sufficient water quantities in the last month prior to the survey	X	X	X	X
Sanitation	Toilet facility: household members use an unimproved toilet facility	X	X	X	X
	Sharing toilet facilities: household shares toilet facilities with at least one other household	X	X	X	X
	Handwashing: household has no handwashing facility with water and soap available	X	X	X	X
Housing	Dwelling material: Floor and exterior walls of dwelling are made of natural material	X	X	X	X
	Indoor air pollution: child lives in a household at risk of indoor air pollution from solid cooking fuel with no separate room used for cooking	X	X	X	X
	Access to electricity: household has no access to electricity	X	X	X	X

3.2 Study limitations

Availability of variables in the KDHS 2022

A significant limitation of this analysis is that it was restricted to the variables available in the KDHS 2022 dataset. While this provided robust data on many dimensions of child vulnerability, it excluded key child protection-related variables of interest, in particular indicators related to child labour, abuse, violence, or exposure to harmful practices. As a result, these important aspects of vulnerability could not be analysed further within the determinants framework, limiting the comprehensiveness of the analysis in addressing all dimensions of child vulnerability. Furthermore, variables such as FGM, early sexual debut, and early marriage were not included in the regression analyses due to low prevalence

[48] When individual-level information is not available, household level information is used.

among children in Kenya. The variable fever treatment was not included in the final analysis due to selection bias in the construction of the fever status indicator in the dataset, which only considered those who were ill in the last two weeks prior to the survey.

Specialised frameworks required for specific vulnerable groups of children

While the discussion thus far has focused primarily on general frameworks for child vulnerability, it is important to recognize that there are also specific frameworks designed to address the unique vulnerabilities of groups such as children with disabilities, children in institutional care, and adolescents. These groups experience distinct challenges that may not be fully captured by broad conceptual models. For instance, children with disabilities often face compounded risks due to their physical or cognitive impairments, which not only limit their access to essential services such as education and healthcare but also place additional burdens on their caregivers. Similarly, children in institutional care, including those in orphanages or alternative care systems, are exposed to vulnerabilities related to the lack of individual care, social integration, and the stability offered by family environments. In contrast, adolescents face specific risks associated with mental health, sexual exploitation, and educational disengagement as they transition through a critical developmental stage. Frameworks that address these micro and meso system levels would be additionally essential for understanding the full scope of vulnerabilities affecting these groups in Kenya.

Other conceptual frameworks

During the initial consultation, several key points were raised regarding the conceptual framework and methodological approach. Stakeholders queried why the broader frameworks were not applied and expressed interest in expanding beyond the 2018 study. Specifically, they referenced the INFORM model and broader frameworks. However, the decision to maintain continuity with the previous study and to ensure methodological consistency was based on discussions in the kick-off meeting. While there was interest in broadening the methodology beyond the 2018 study, feasibility constraints related to time and existing research limit the possibility of including elements like climate risks and macroeconomic risks in the analysis. These risks have already been analysed at a national level in the ESA study[49], combining macroeconomic models with the INFORM framework. Expanding beyond this would require significant time and resources that are beyond the scope of this project.

Selection bias in capturing orphans

A key limitation of the analysis stems from the reliance on household survey data, such as the Demographic and Health Survey (DHS), which only captures data on orphans living within households. This means that the analysis excludes orphans living in institutional settings, such as orphanages or group homes. As a result, the orphans included in the study may represent a more advantaged group: those who have been adopted or fostered by families with sufficient resources to provide care. Conversely, orphans who could be more vulnerable, such as those in institutional care or living on the streets, are not captured in the data. This exclusion likely underestimates the overall vulnerability of orphans and limits the study's ability to fully capture the spectrum of orphanhood-related vulnerabilities.

[49] Cummins 2023.

Urban-Rural Associations Absorbed by County Effects

Another methodological limitation is the potential masking of urban-rural effects due to the inclusion of county fixed effects in the regression model. Counties are highly heterogeneous, often containing both urban and rural areas with distinct socio-economic dynamics. By accounting for counties as fixed effects, the model effectively controls for county-level characteristics but, in doing so, likely absorbs the variation that might otherwise be attributed to urban-rural differences. This can make it difficult to disentangle and interpret the specific impact of urban versus rural residence on child vulnerability, as any observed changes in likelihoods are conflated with broader county-level patterns. As a result, the nuanced relationship between urban-rural residence and child outcomes may be understated or overlooked in the analysis. This challenge was overcome by running separate regression models for children living in urban and rural areas, in addition to the national-level population.

Ambiguous relationships between variables

As shown in the regression results, some variables may have ambiguous directions, sometimes being positively correlated to the vulnerability outcomes, and other times being negatively correlated. Hence, interpretation of results across different vulnerability outcomes and/or subpopulations should be approached with caution, as statistical relationships between variables may vary depending on the sample composition. Differences in estimated average marginal effects between the overall population and disaggregated groups are not necessarily inconsistencies but rather reflect underlying heterogeneity in socioeconomic conditions, behavioural patterns, or unobserved factors that influence outcomes differently across subgroups. Additionally, some variation may stem from statistical factors such as sample size limitations in specific strata. While we strive to provide a comprehensive interpretation of key findings, it is important to acknowledge that not all differences can be fully explained, and results should be understood in the broader context of these complexities.

4. Child Vulnerability in Kenya

4.1 Children living in monetarily poor households

Research suggests that monetary poverty is a central determinant of material deprivation and child vulnerability globally and specifically in Kenya, as households with limited financial resources struggle to meet their children's basic needs, leading to adverse outcomes such as malnutrition, poor educational attainment, and inadequate access to healthcare.[50] Within other conceptual frameworks on childhood vulnerability, monetary poverty frequently features as a determinant of vulnerability or a factor underlying material deprivation, which contributes to vulnerability or is conceptualised as one form of vulnerability.[51]

The 2018 UNICEF-WFP study on child vulnerability in Kenya highlighted household wealth as the most reliable and consistent predictor of childhood vulnerability, positing that children living in poorer households were more likely to experience adverse outcomes across various dimensions such as health, education, and nutrition, but also that this offered the most effective entry point for social protection such as cash transfers targeting children.[52]

Child poverty in monetary terms has been measured frequently in the Kenyan context. The aforementioned 2018 study found that, based on 2005/06 data of the Kenya Integrated Household Budget Survey (KIHBS), one in two children (51 per cent) were found to have lived in households below the official poverty line, with significant geographical disparities, ranging from 26 per cent of children living in poor households in Nairobi, compared to 76 per cent in the North Eastern region.[53] Ten years later, calculations based on the KIHBS 2015-16 datasets and national poverty lines[54] suggested that 42 per cent of Kenyan children under age 18 years were monetarily poor, making up the largest share of the monetarily poor population (36 per cent, or 15.9 million, out of 44.2 million Kenyans), higher than youths aged 18-24 years (29 per cent), and persons aged 60 years and over (38 per cent).[55] Among the poor population, children made up the largest share, at 55 per cent. In a separate study using microsimulation and Kenya Population and Housing Census (KPHC) 2009 and KPHC 2019 data[56], the

[50] UNICEF 2007; Salmeron Gomez et al. 2023; KNBS 2023a; UNICEF Kenya and Kenya National Bureau of Statistics 2020.

[51] Skinner et al. 2006; OECD 2019; Bagattini 2019.

[52] National Social Protection Secretariat, WFP Kenya, and UNICEF Kenya 2018.

[53] Ibid.

[54] KShs 3,252 monthly per adult equivalent in rural and peri-urban areas, and KShs 5,995 monthly per adult equivalent in urban areas.

[55] UNICEF Kenya and Kenya National Bureau of Statistics 2020.

[56] In this study, given the absence of consumption data in the KPHC of 2009 and 2019, microsimulation using consumption models from the KIHBS 2005-06 and KIHBS 2015-16 datasets was used to simulate welfare in the KPHC 2009 and 2019 datasets, respectively. See KNBS 2023a.

share of monetarily poor[57] children dropped from 47 per cent in 2009 to 35 per cent in 2019.[58] Most recently, the 2022 Kenya Poverty Report identified 42 per cent of the children aged 0-17 years as monetarily poor. [59]

While monetary poverty among children has appeared to decrease over the previous two decades, these figures emphasise that monetary poverty in Kenya disproportionately impacts children, and children tend to be overrepresented among households living in the lowest wealth quintiles. Poor households also tend to have more children. Without more recent data, it remains unclear how these trends may have shifted since 2022, particularly considering rising vulnerabilities and crises such as climate change (for example droughts and floods), the COVID-19 pandemic, and other socio-economic challenges that have likely impacted the conditions faced by vulnerable children in Kenya.[60]

4.2 Health-related vulnerabilities and their determinants

Vaccination

Immunisation through vaccination is a critical public health intervention for reducing child morbidity and mortality. Vaccination cards serve as an essential tool to ensure that children receive all recommended vaccines per the national immunisation schedule.

In Kenya, nearly all children aged 12–35 months have had a vaccination card at some point. Among children aged 12–23 months, approximately three-quarters were able to present their vaccination card at the time of the survey. For children aged 24–35 months, more than six in ten were able to do so.

According to Kenya's national immunisation schedule, children are expected to receive the following vaccinations

- One dose of BCG vaccine
- Oral polio vaccine (OPV, birth dose)
- Three doses of OPV and one dose of inactivated polio vaccine (IPV)
- Three doses of DPT-HepB-Hib
- Three doses of pneumococcal conjugate vaccine (PCV)
- Two doses of Rotavirus vaccine (RV)
- One dose of measles rubella (MR)
- A second dose of measles rubella (MR) (for children aged 24-35 months)

Approximately 55 per cent of children are fully vaccinated as per the national standards, while two out of four received all basic antigens[61]. Full vaccination coverage is lower for children with non-educated

[57] Poverty lines in this study were defined as follows: "An individual was considered monetarily poor if s/he lived in a household with monthly adult equivalent consumption below the overall poverty line. In 2019, the overall poverty lines in monthly adult equivalent terms for KIHBS 2015-16 were KSh 3,252 and KSh 5,995 in rural and urban areas, respectively. In 2009, the overall poverty line in rural areas was KSh 1,562 and in urban areas KSh 2,913 monthly per adult equivalent." See Ibid.

[58] Ibid.

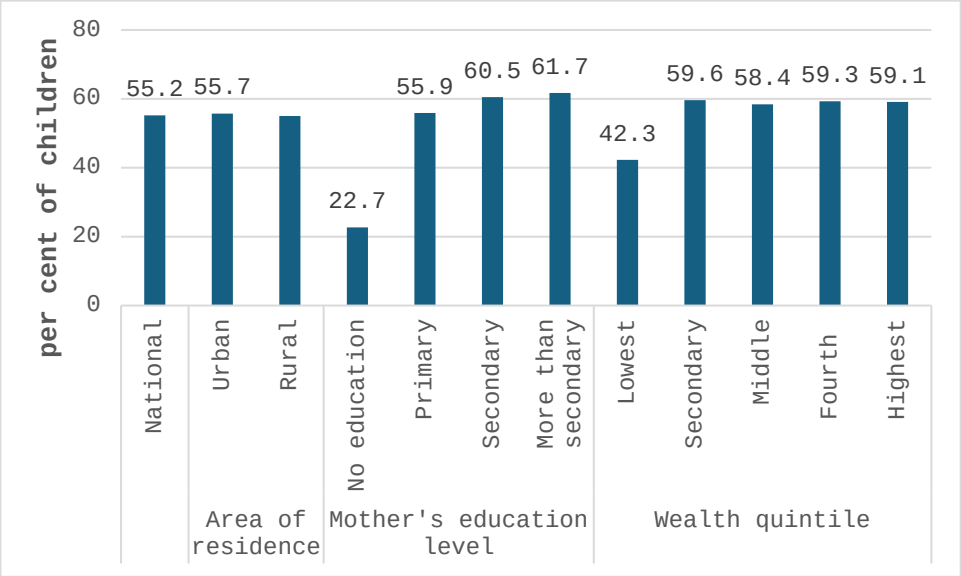
[59] Kenya National Bureau of Statistics 2024.

[60] KNBS 2023b.

[61] Basic antigens include: one dose of BCG vaccine, which protects against tuberculosis, three doses of polio vaccine given as oral polio vaccine (OPV), inactivated polio vaccine (IPV), or a combination of OPV

mothers and children belonging to the lowest wealth quintile (see Figure 3). Indeed, 23 per cent of children of non-educated mothers are fully vaccinated compared to 56 per cent of children of mothers with primary education levels. Differences based on area of residence are minimal (58 per cent in urban areas versus 55 per cent in rural areas).

Figure 3: Proportion of children (12-35 months) fully vaccinated according to the national schedule



Source: KDHS 2022

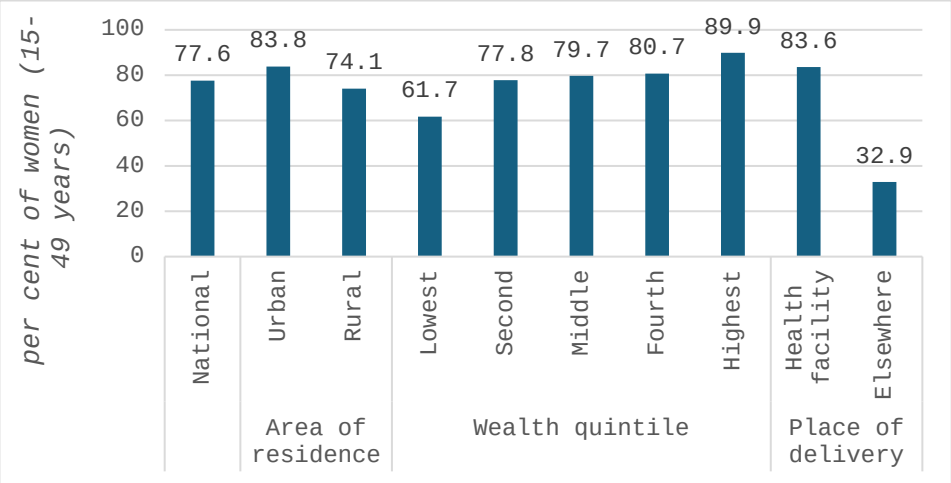
Antenatal and Postnatal Care Coverage

In Kenya, almost all women (98 per cent) received antenatal care (ANC) from a skilled health provider. Approximately 2 per cent of women who had a birth in the two years prior to the survey did not receive any ANC. Adequate prenatal care, including pregnancy monitoring, can significantly reduce health risks to mothers and newborns. In particular, coverage is lower in Madera, Garissa, and Wajir, and among women with no education. Two out of three women received at least four ANC visits during their last pregnancy. For most, the first consultation took place in the fourth to fifth month of pregnancy. In addition, nearly eight out of ten women with a live birth in the 2 years before the survey received postnatal care (PNC) during the first 2 days after birth, compared to 64 per cent of women with a stillbirth. Approximately one in four women underwent three check-ups (e.g. blood pressure measurement, discussions about vaginal bleeding and discussions about family planning). The postnatal care coverage is significantly lower among women who did not give birth in a health facility, women living in rural areas, in Wajir, Marsabit, and Garissa, and women belonging to the lowest wealth quintile (see Figure 4).[62]

and IPV, three doses of DPT-containing vaccine, which protects against diphtheria, pertussis (whooping cough), and tetanus, and one dose of measles-containing vaccine given as measles-rubella (MR).

[62] Kenya National Bureau of Statistics, Ministry of Health, and The DHS Program ICF 2023.

Figure 4: Percentage of women with a postnatal check during the first 2 days after birth



Source: KDHS 2022

Symptoms of acute respiratory infection (ARI) and fever treatment

About 2 per cent of children under five showed symptoms of an acute respiratory infection (ARI) in the 2 weeks prior to the survey. Among them, more than eight out of ten sought advice or treatment, with the percentage of care-seeking behaviour being higher in urban areas than in rural areas (90 per cent versus 87 per cent). The majority of children sought treatment from the public medical sector (63 per cent) and the private medical sector (38 per cent).

In addition, 17 per cent of children under five were reported to have had a fever in the 2 weeks before the survey. Treatment or advice was sought for seven out of ten of these children who reported symptoms, with 42 per cent seeking care the same day or the next day. As acute respiratory infections and fever are the leading causes of death in young children in Kenya, efforts must be strengthened to improve equitable access to health care.[63]

Chronic illness

In Kenya, a child living with a chronically ill adult may be more vulnerable because the household's limited resources are often diverted to healthcare costs, reducing the child's access to essential needs such as education, nutrition, and protection. About 4 per cent of children (0-17 years) live with a chronically ill adult.

The prevalence of high blood pressure (hypertension) among women is 9 per cent compared to 3 per cent of men. More than three out of ten women and men (15-49 years) are currently receiving treatment to address these issues. Furthermore, around one per cent of women and men (15-49 years) were diagnosed with high blood sugar (diabetes), heart disease, or a chronic heart condition or lung disease or a chronic lung condition. Arthritis affects 3 per cent of women and 1 per cent of men, while 4 per cent of women and 3 per cent of men have been diagnosed with depression or anxiety. [64]

[63] Ibid.

[64] Ibid.

In addition, 45 per cent of women are aware of the possibility of self-examination for breast lumps and cancer, whereas only 14 per cent of women have actually been examined or tested for breast cancer. Another 17 per cent have been tested for cervical cancer. Less than 1 per cent of men have received the diagnosis of prostate cancer, while 14 per cent are undergoing treatment.[65]

4.2.1 Determinants

The analysis of health-related vulnerabilities focused on two key indicators: incomplete immunisation and failure to sleep under an insecticide-treated net (ITN). Initially, fever treatment was also considered as an outcome variable. However, it was excluded due to selection bias in the construction of the fever status indicator, which only included children reported to have been ill in the two weeks preceding the survey. Furthermore, regression analysis revealed no statistically significant associations between fever treatment and the selected vulnerability markers. The adjusted R-squared value was also notably low, suggesting that the determinants of fever treatment extend beyond the scope of the vulnerability markers included in this study.

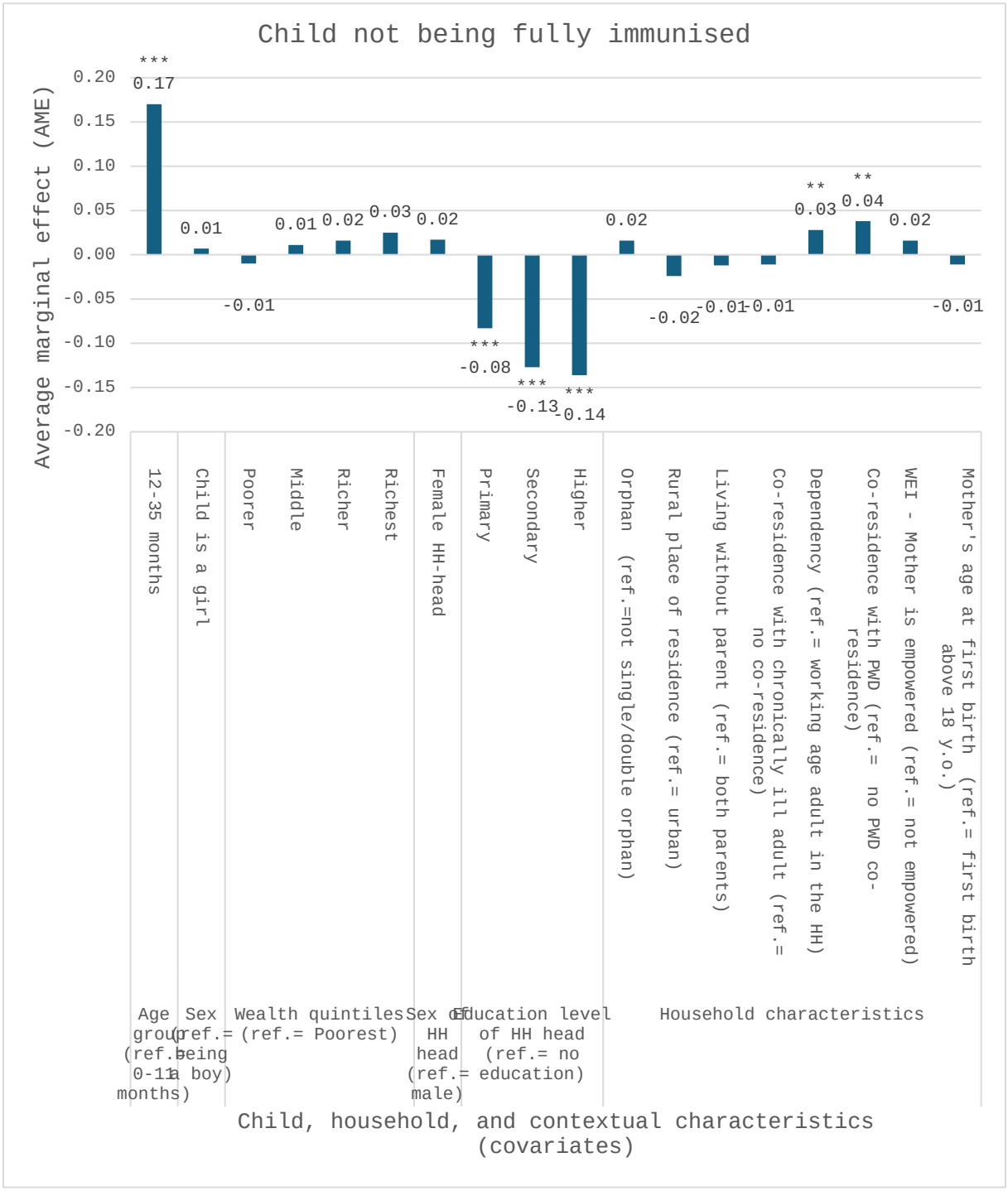
For the immunisation indicator, the analysis included a sample of 10,650 children. After applying sample weights, 23 per cent of children had either missed at least one required vaccine or had not received it within the recommended timeframe.

Regarding ITN usage, a weighted average of 84 per cent of households had at least one child under the age of five who did not sleep under an ITN. Additionally, 41 per cent of children under five were found to be living in such households. However, this figure should not be interpreted to mean that 41 per cent of all children under five lacked access to a mosquito net or ITN. In households with multiple children under five, some may have slept under a net while others did not. Therefore, this statistic reflects household-level access to ITNs rather than individual-level usage.

Determinants of immunisation:

Figure 5: Results from logistic regression analysis: Average marginal effects of vulnerability markers (covariates) on the probability of child not being fully immunised

[65] Ibid.



Source: Author's calculations based on KDHS 2022[66]

Note: Significance levels are indicated by asterisks: p < 0.01 (***), p < 0.05 (**), and p < 0.1 (*).

[66] The asterisks indicate the significance level of each AME: one asterisk (*) denotes significance at the 10 per cent level, two asterisks (**) at the 5 per cent level, and three asterisks (***) at the 1 per cent level. This notation is used consistently throughout the paper.

Figure 5 presents the average marginal effects (AMEs) of selected child and household characteristics on the likelihood of a child not being fully immunised, a key indicator of vulnerability. Positive AMEs indicate a higher probability of incomplete immunisation, while negative values suggest a lower probability, holding all other factors constant. Higher positive values are therefore associated with increased vulnerability.

The analysis reveals significant variation across several determinants. Children aged 12–35 months are 17 percentage points more likely to be incompletely immunised compared to those under 12 months, all else being equal. Household characteristics also play a critical role. Children in households where the head has attained primary, secondary, or higher education are respectively 8, 13, and 14 percentage points less likely to be incompletely immunised compared to those in households with no formal education. This underscores the protective effect of higher educational attainment on child health outcomes.

Conversely, children living with a person with a disability are 4 percentage points more likely to have missed at least one vaccination. Similarly, children in households with a high dependency ratio and those whose mothers are classified as empowered are each 2 percentage points more likely to be incompletely immunised. However, the association with maternal empowerment is not statistically significant.

No statistically significant differences were observed based on the child's sex, orphan status, parental co-residence, wealth quintile, sex of the household head, maternal age at first birth, or rural residence. Notably, the effect of rural residence appears to be absorbed by county-level fixed effects. When county controls are excluded, children in rural areas are found to be less likely to miss vaccinations, all else held constant.

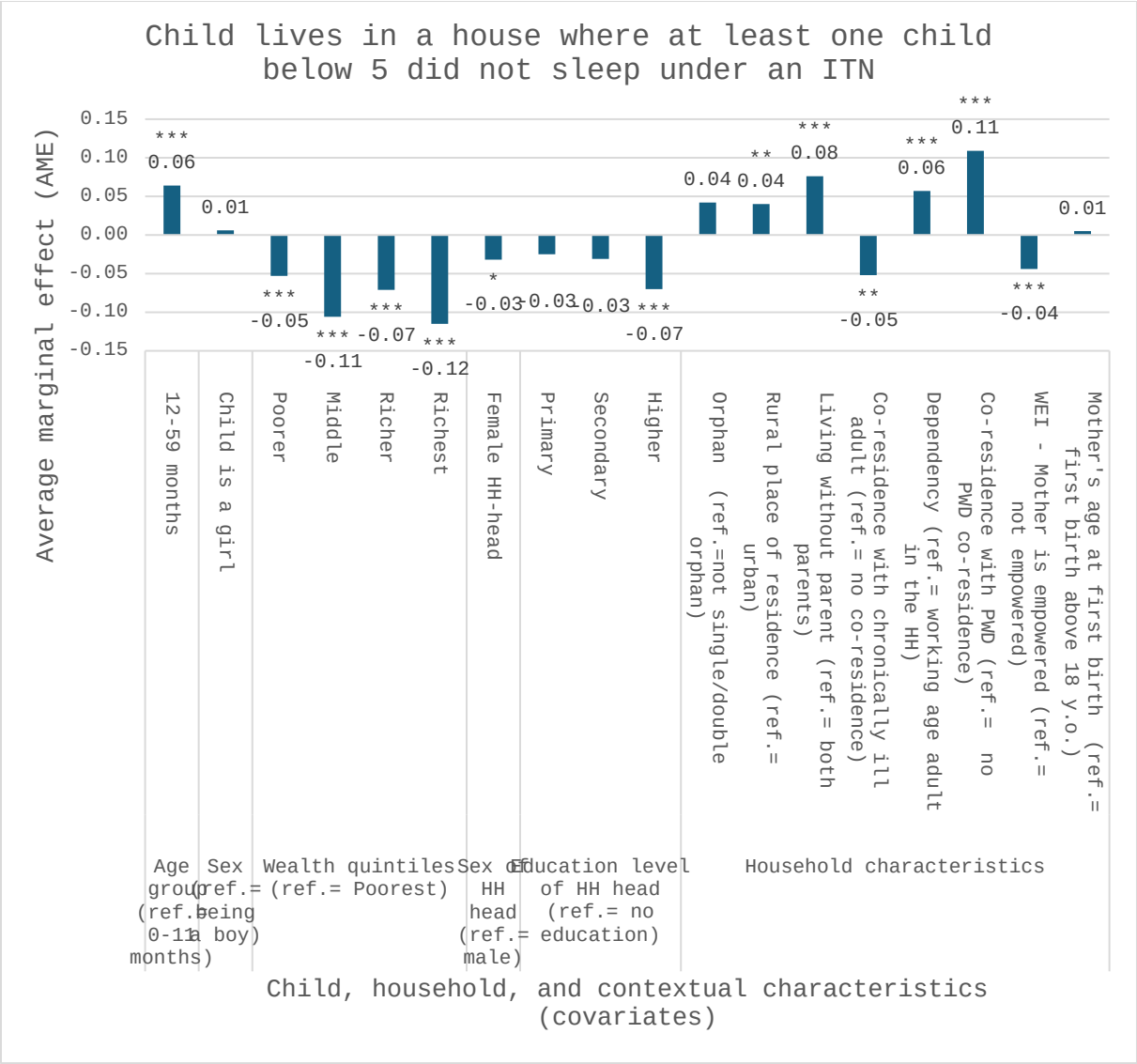
Regional disparities, modelled using deviation coding, are substantial. For example, children in Taita Taveta are 4 percentage points less likely to be incompletely immunised compared to the national average. In contrast, children in Garissa are 28 percentage points more likely to be incompletely immunised, the highest observed disparity. Other significant deviations include Nakuru (15 percentage points less likely) and Bungoma (15 percentage points less likely).

These findings highlight the importance of child age, education level of the household head, co-residence with a person with a disability, household dependency ratio, and regional disparities as key determinants of incomplete immunisation.

However, running separate regressions for the rural and urban places of residence sheds light on some differences across areas. For instance, the sex of the child was a statistically insignificant factor in the main regression, but becomes significant in rural areas, where girls are 2 percentage points more likely to miss at least one vaccine as compared to boys. Additionally, the relationship between education and immunisation is lower in rural areas compared to urban areas.

Determinants of use of:

Figure 6. Average marginal effects on living in a house where at least one child under 5 does not sleep under an ITN



Source: Author's calculations based on KDHS 2022

Note: Significance levels are indicated by asterisks: p < 0.01 (***), p < 0.05 (**), and p < 0.1 (*).

Holding everything else constant, children aged 12-59 months are 6 percentage points more likely to live in a household where at least one child below 5 does not sleep under an insecticide-treated mosquito net, compared to children below 12 months. Wealth is significantly associated with mosquito net usage. Compared to the poorest quintile, children in the second wealth quintile are 5 percentage points less likely to live in a household where at least one child under 5 does not sleep under a mosquito net. Similarly, children in the third wealth quintile are 11 percentage points less likely, those in the fourth wealth quintile are 7 percentage points less likely, and children in the richest households are 12 percentage points less likely to live in a household where at least one child under 5 does not sleep under a mosquito net. Households headed by women are associated with a 3 percentage point reduction in likelihood, while the education level of the household shows mixed results: primary education and secondary education are not significant, but higher education is associated with a 7 percentage point decrease in the likelihood of not using a mosquito net.

Living in rural areas increases the likelihood of ITN non-usage by 4 percentage points, and children living without a parent are 8 percentage points more likely not to sleep under an ITN as compared to those living with both parents, holding everything else equal. Additionally, household dependency is positively associated with ITN non-usage, with a one-unit increase leading to an increase in the likelihood by 6 percentage points. Households with a disabled member are significantly associated with an 11 percentage point increase in likelihood. Finally, households in which the mother is empowered are 4 percentage points less likely not to use ITN. Among regional deviations, several counties show significant differences, including Nyandarua, where children are 56 percentage points more likely, and Busia, where they are 32 percentage points less likely to not sleep under ITNs.

Overall, significant predictors include wealth, rural residence, parental presence, chronic illness, disability, dependency ratio, and regional variations, while some variables, like sex, orphan status, and lower education levels, were not significant. When running separate regressions for rural and urban areas, the relation between education and ITN usage becomes insignificant in urban areas.

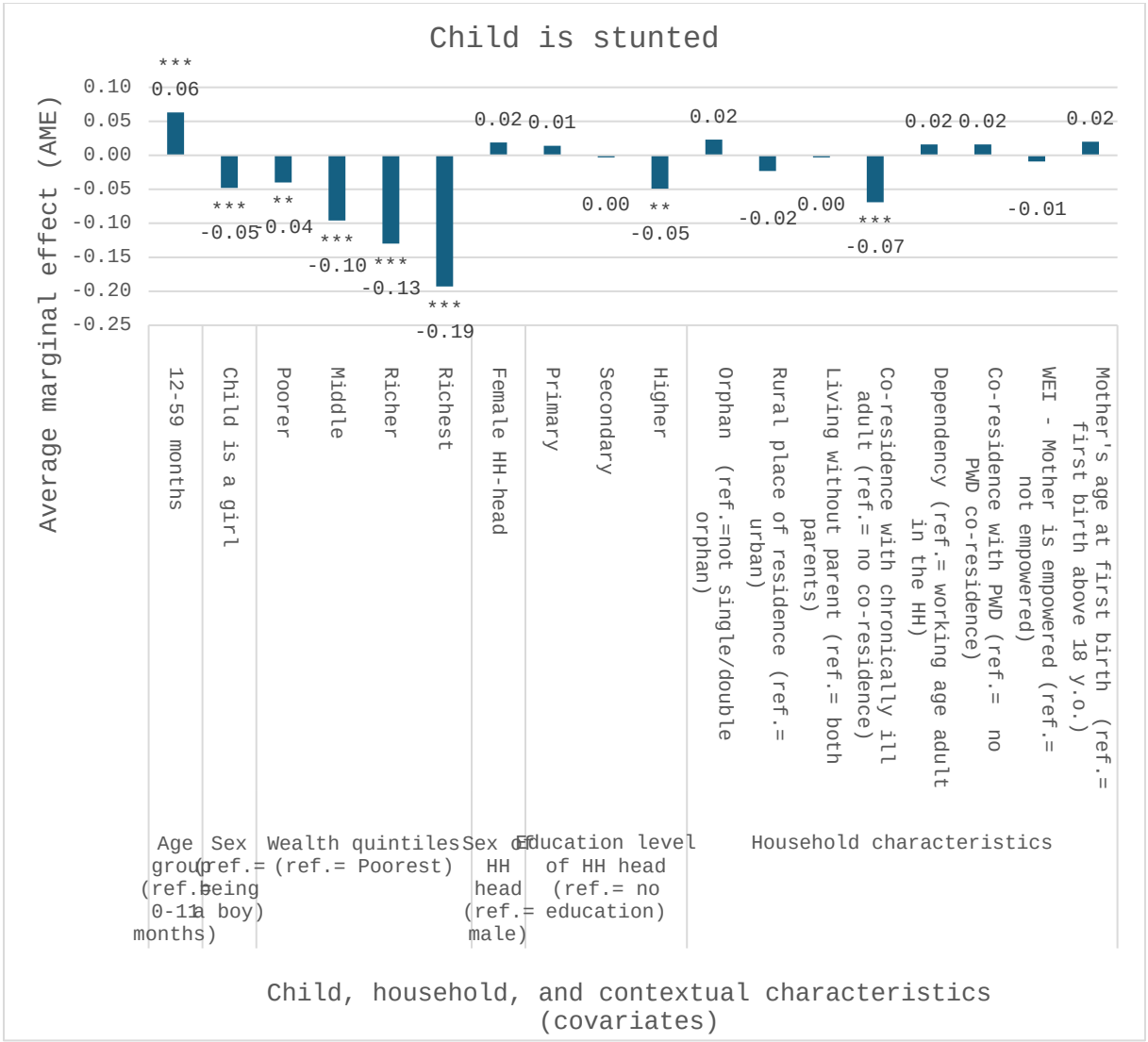
4.3 Nutrition-related vulnerabilities and their determinants

4.3.1 Determinants

The vulnerabilities related to children's nutrition include stunting, not receiving vitamin A supplement, and not having received an adequate diet, meaning that the child either was not exclusively breastfed until and including the age of 5 months, or did not receive the Minimum Acceptable Diet between the age of 6 to 22 months. With regards to i, 19,319 children were represented in the sample, and a weighted average of 18 per cent were stunted. For the lack of vitamin A supplementation, 15,179 children were included in the sample, and a weighted average of 37 per cent did not receive vitamin A supplements. And finally, with regard to the diet, 6,343 infants and young children were included in the sample, and a weighted average of 78 per cent did not receive an adequate diet.

Determinants of stunting (among children under five):

Figure 7. Results from logistic regression analysis: Average marginal effects of vulnerability markers (covariates) on the probability of child stunting



Source: KDHS 2022

Note: Significance levels are indicated by asterisks: p < 0.01 (***), p < 0.05 (**), and p < 0.1 (*).

As depicted in Figure 7, children aged 12-59 months are 6 percentage points more likely to be stunted compared to those under 12 months, holding everything else equal. Boys are 5 percentage points less likely to be stunted compared to girls. Wealth significantly reduces the likelihood of stunting: compared to the poorest quintile, poorer households have 4 percentage points lower likelihood, middle-income households 10 percentage points lower, richer households 13 percentage points lower, and richest households 19 percentage points lower. Again, education levels of the head of household show mixed results: higher education is associated with a 5 percentage point reduction in stunting compared to no education, while primary and secondary education are not significant. Living with a person with chronic illness reduces stunting likelihood by 7 percentage points.[67] This could potentially

[67] It's important to note that the definition of chronic illness is based on the data available in the KDHS 2022, including the following: High blood pressure (hypertension), High blood sugar (diabetes), Heart disease or chronic heart condition, Lung disease and chronic lung conditions, Depression and anxiety, Arthritis, Breast and cervical cancer examinations (women), and Cancer of the prostate (men). This definition may

be explained by increased exposure to healthcare and greater health-conscious decisions. Maternal age under 18 at the child's birth is associated with a 2 percentage point increase in stunting likelihood.

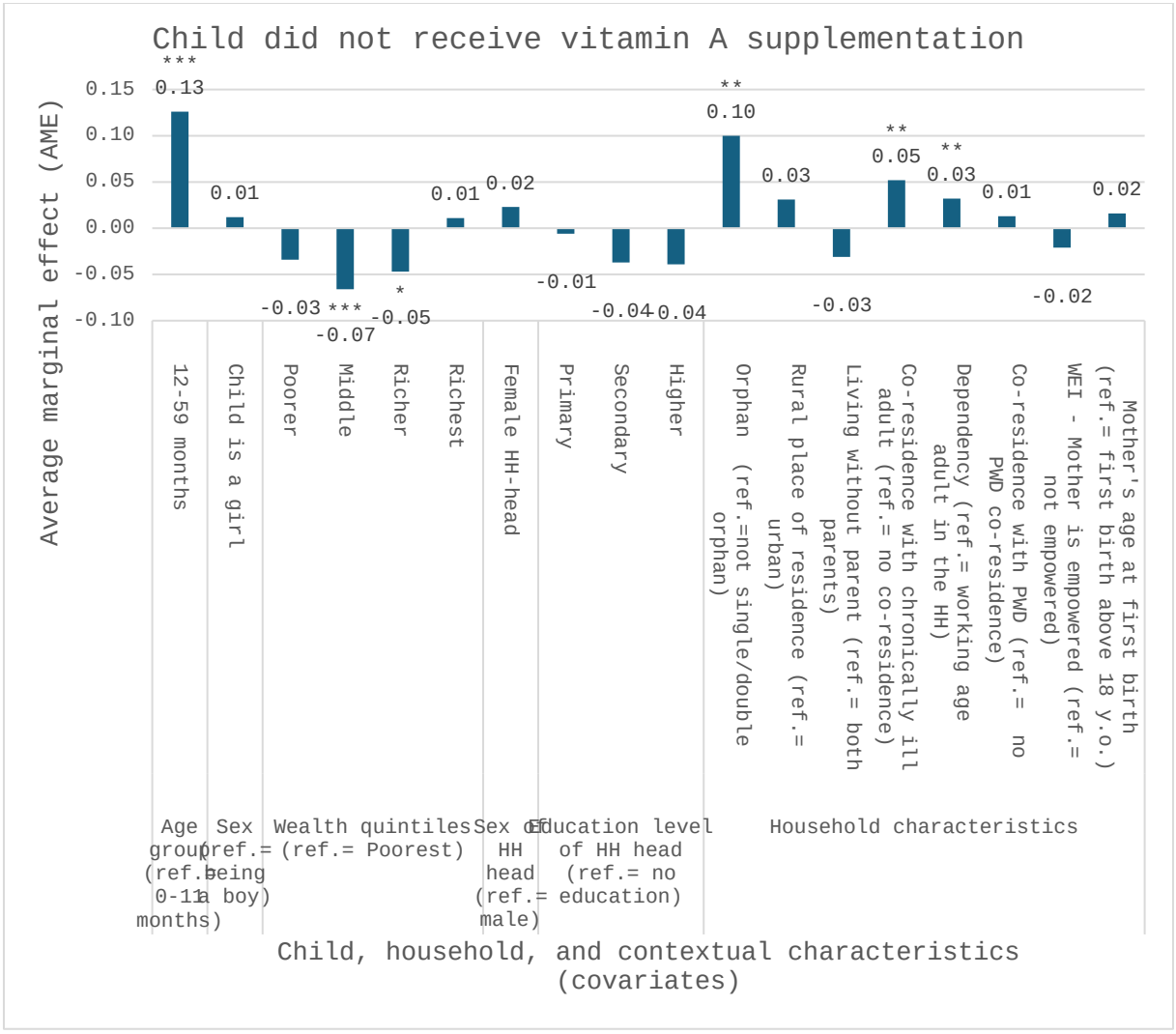
For regional variations, Kilifi shows a 13 percentage point difference in stunting likelihood, while Garissa, Murang'a and Kisumu show significant negative difference of 9, 15, and 9 percentage points, respectively. Kiambu, Nakuru, Kericho and West Pokot also show significant increases in likelihood of stunting, with changes ranging from 6 to 9 percentage points. Several counties exhibit no significant differences compared to the average across all counties.

Key variables associated with stunting include: wealth, higher education, chronic illness, maternal age at birth, and specific regional factors. Other variables like household head gender, being an orphan, living without a parent, the dependency ratio, co-residence with a person with disability, the mother being empowered, and living in a rural area are not significantly associated with stunting. However, when replacing the mother's empowerment index by the mother's education, the latter was positively related to the child being stunted.

Determinants of not having received vitamin A supplements:

Figure 8. Results from logistic regression analysis: Average marginal effects of vulnerability markers (covariates) on the probability of a child aged 6-59 months not having received vitamin A supplementation

differ from definitions and outcomes from other research and cannot be compared. Additional research should be conducted to explore the driving forces behind these results.



Source: KDHS 2022

Note: Significance levels are indicated by asterisks: p < 0.01 (***), p < 0.05 (**), and p < 0.1 (*).

Holding other variables constant, children aged 12–59 months were 13 percentage points more likely not to have received vitamin A supplementation compared to those aged 6–12 months. Household wealth was associated with a reduced likelihood of non-receipt of vitamin A. Specifically, children from poorer households were 3 percentage points less likely, those from middle-income households were 7 percentage points less likely, and those from richer households were 5 percentage points less likely to have missed vitamin A supplementation, compared to children from the poorest wealth quintile.

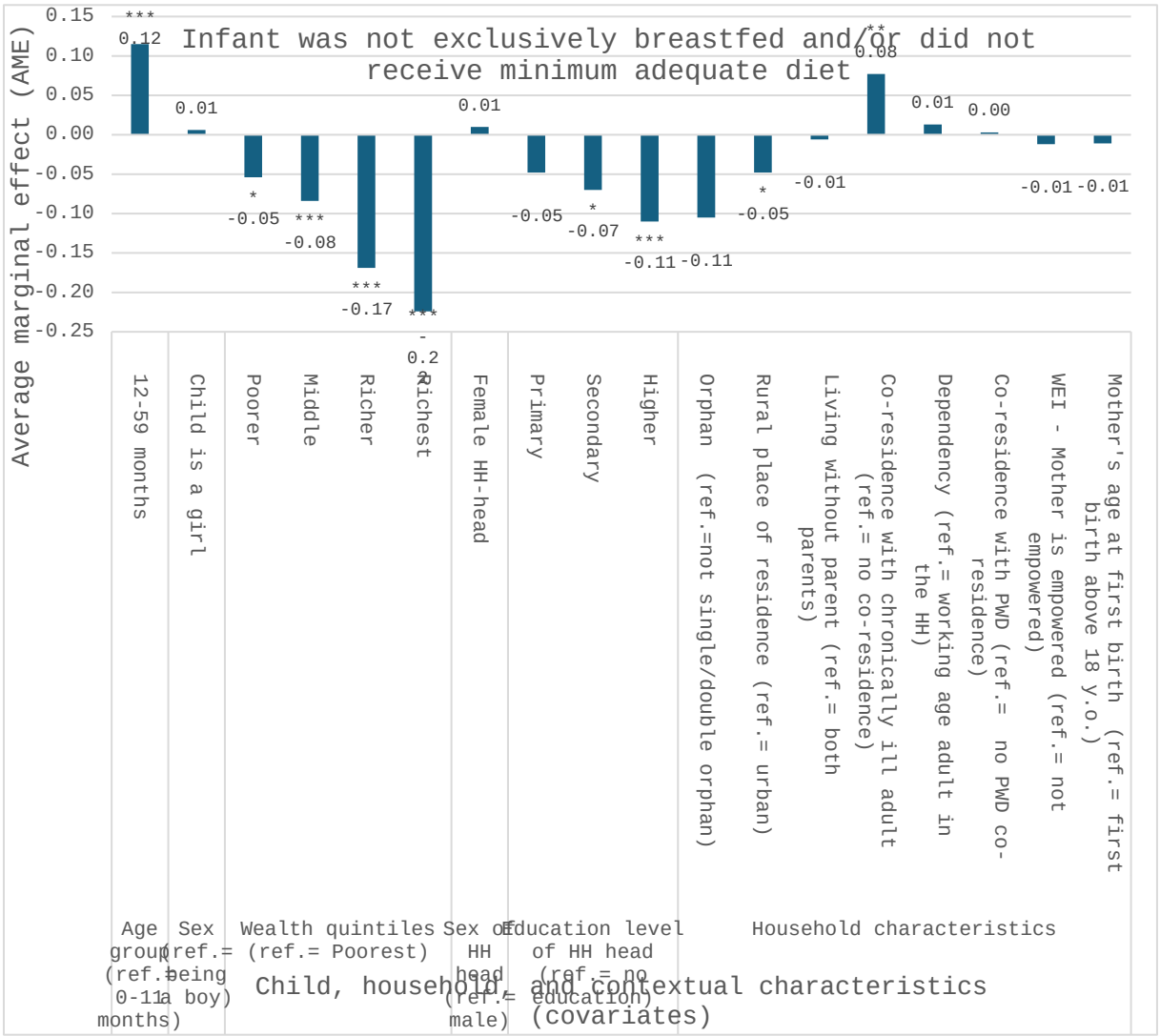
Orphaned children are 10 percentage points more likely not to have received vitamin A, while living in rural areas increases the likelihood by 3 percentage points. Chronic illness in the household increases the likelihood of not receiving vitamin A by 5 percentage points, and a higher dependency ratio increases it by 3 percentage points.

For regional differences, significant increases in the likelihood of not receiving vitamin A are observed in counties such as Makueni, Narok, Garissa, and Wajir, with average marginal effects ranging from 13 to 25 percentage points. Conversely, counties including Kakamega, Embu, Trans Nzoia and Kwale show significant reductions, with changes ranging from 17 to 24 percentage points. Other counties exhibit mixed or non-significant associations.

Key factors influencing the likelihood of not receiving vitamin A include age, wealth, chronic illness, dependency ratio, and specific regional differences. On the other hand, the sex of the child and the sex of the household head do not significantly influence vitamin A receipt. Education levels, maternal age at the child's birth, disability in the household, and the sex of the household head also show no significant associations.

Determinants of not having received an adequate diet:

Figure 9. Results from logistic regression analysis: Average marginal effects of vulnerability markers (covariates) on probability of infant not exclusively breastfed and/or did not receive minimum adequate diet



Source: KDHS 2022

Note: Significance levels are indicated by asterisks: p < 0.01 (***), p < 0.05 (**), and p < 0.1 (*).

Children aged 12–59 months are 12 percentage points more likely not to have received an adequate diet compared to those under 12 months, holding everything else constant. Wealth was associated with a significantly negative likelihood of not receiving an adequate diet: poorer households are 5 percentage points less likely, middle households 8 percentage points less likely, richer households 17

percentage points less likely, and richest households 22 percentage points less likely of not providing adequate diets for their children. The education level of head of household also shows a significant relationship: children from households with secondary education are 7 percentage points less likely not to receive an adequate diet, and those from households with higher education are 11 percentage points less likely, compared to those living in a household where the head has no education. Chronic illness in the household was associated with a higher likelihood of not receiving an adequate diet by 8 percentage points.

Regional variations show significant differences: Murang'a, Meru, Kirinyaga, Kiambu and Embu have significant reductions in the likelihood of not receiving an adequate diet, with decreases ranging from 13 to 25 percentage points. Kakamega, Siaya, Kisumu, Garissa, Kisii, and Kitui (21) show significant increases in likelihood, with changes ranging from 9 to 21 percentage points.

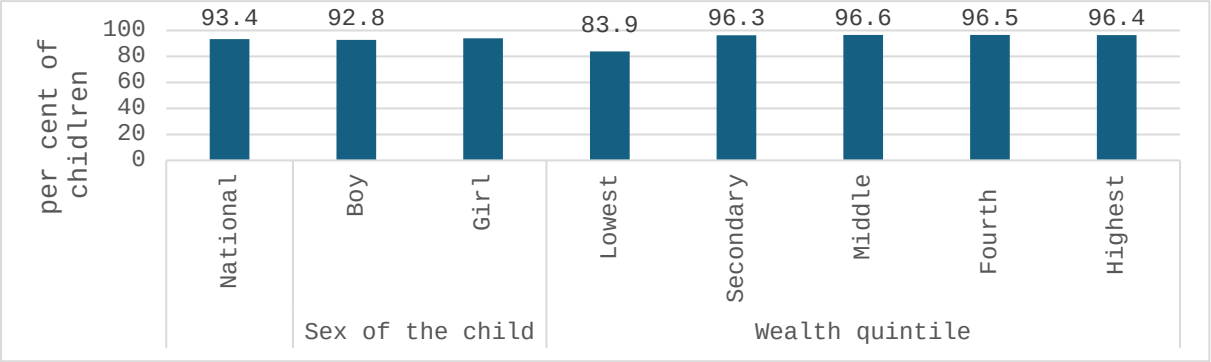
Other factors such as sex, household head gender, living in rural areas, living without a parent, and dependency ratio are not significantly associated with the likelihood of not receiving an adequate diet.

4.4 Education-related vulnerabilities and their determinants

School attendance

During the school year of 2021 (July 2021-April 2022), more than nine out of ten children aged 5-17 years attended school or a learning institution (see Figure 10). The proportion of boys out of school is slightly higher than the percentage of girls (7 per cent versus 6 per cent). Furthermore, 16 per cent of children belonging to the lowest wealth quintile are not attending school, compared to 4 per cent of children belonging to the highest wealth quintile.

Figure 10. Proportion of children (5-17 years) attending school during the 2021 school year



Source: KDHS 2022

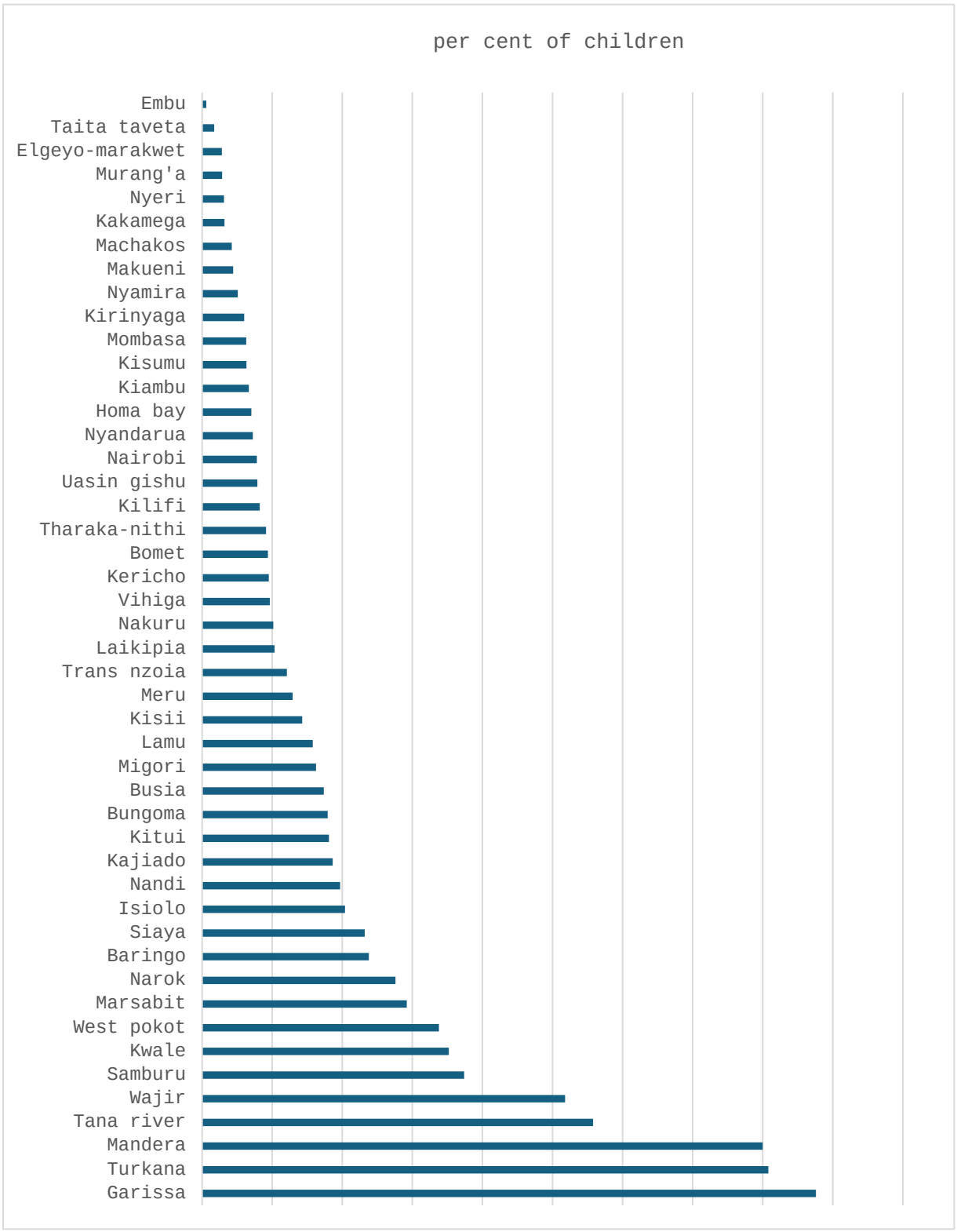
Grade-for-age

Of the children aged 8 to 17 years attending school, more than one in four are at least two years behind in their education. Similar to school attendance, a higher percentage of boys aged 8-17 years fall behind in school compared to girls (31 per cent versus 24 per cent). The proportion of children behind in their education increases significantly for older children (15-17 years) (40 per cent).

Literacy

In Kenya, 7 per cent of children (15-17 years) are illiterate, meaning they are unable to read a full sentence. Large regional discrepancies are observed, with illiteracy rates ranging from 0.3 per cent in Embu to 40 per cent, 41 per cent, and 44 per cent in Mandera, Turkana, and Garissa, respectively (see Figure 11). No differences are observed in illiteracy rates based on sex.

Figure 11. Illiteracy rates of children (15-17 years) by county



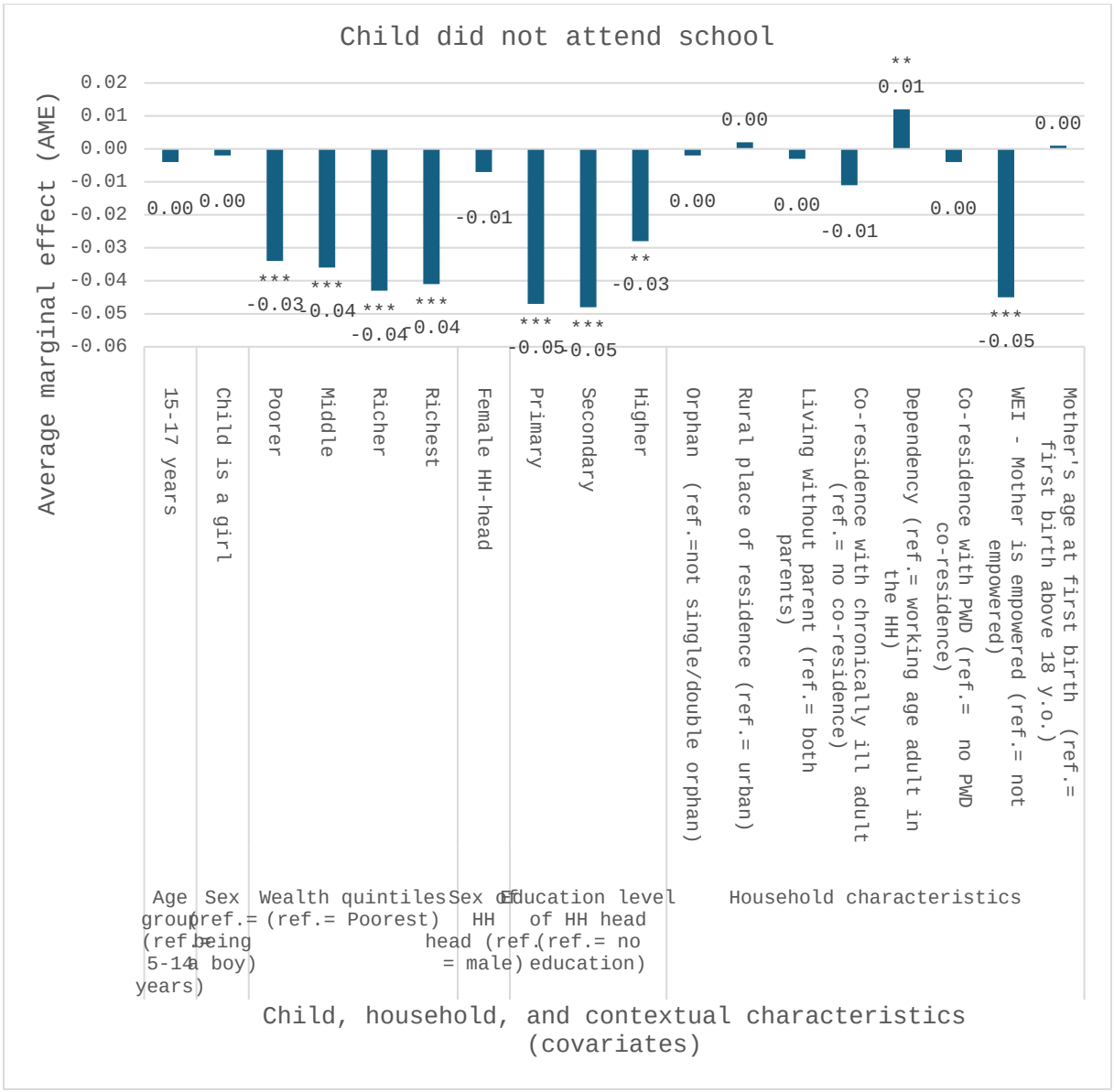
Source: KDHS 2022

4.4.1 Determinants

The education-related outcome variable assessed whether a child had attended school in the 12 months preceding the survey. The analysis was based on a sample of 58,785 children, with results indicating that 9 per cent, on a weighted basis, had not attended school during the reference period.

Determinants of child attendance:

Figure 12. Results from logistic regression analysis: Average marginal effects of vulnerability markers (covariates) on the probability of a child aged 4-17 not attending school



Source: KDHS 2022

Note: Significance levels are indicated by asterisks: p < 0.01 (***), p < 0.05 (**), and p < 0.1 (*).

Wealth quintiles have a strong negative association with not attending school, with those in the poorer, middle, richer, and richest categories more likely by 4 percentage points to attend school as compared to the reference group. Education level of the household head is a significant factor in school attendance, with primary and secondary education strongly associated with a 5 per cent higher

likelihood of not missing school, and higher education showing a smaller but still significant difference of 3 percentage points. The child having a disability, on the other hand, has a significant difference, indicating that children with disabilities were more likely to not attend school. The mother's empowerment, later referred to as the women empowerment index (WEI) was also associated with a significant negative difference, meaning that having an empowered mother was associated with a negative probability that her child will not attend school. Certain regional variables show varying deviations, with counties such as West Pokot, Samburu, Turkana, Marsabit, Tana River, Wajir, and Garissa exhibiting positive relations with lack of school attendance, suggesting that children of these counties were more likely to not attend school.

The sex of the household head, the orphan status, rural location, and chronic illness do not significantly affect school attendance.

4.5 Protection-related vulnerabilities and their determinants

Children living with old caregivers and acting as head of the household

One in three households have a dependency ratio of more than 2. This ratio reflects the total number of children (0-17 years) and elderly (60+ years) divided by the number of working adults (18-59 years) in the household. Furthermore, 3 per cent of children live without working-age adults, with only elderly persons in the household.[68] In addition, according to the 2019 Kenya Population and Housing Census, 0.5 per cent of children are heads of households.[69] Child-headed households refer to living arrangements where no adult is present, and children reside without parental or prime-aged adult support, often facing harsher living conditions compared to those in multi-generational households.[70]

Children living on the streets, in institutions and in detention

Children living on the streets, in institutions, or in detention face heightened vulnerability due to limited access to adequate nutrition, diverse diets, social services, and essential WASH (water, sanitation, and hygiene) facilities, in addition to lacking adequate protection mechanisms. According to the 2018 National Census of Street Families, a total of 46,639 individuals were reported to be living on the streets. Of these, 13.5 per cent were children under the age of 15, while 29 per cent were youth aged between 15 and 24 years. The proportion of males living on the streets was significantly higher than that of females. Among children under the age of five, the most commonly cited reasons for street residence included being born on the streets, separation from family or guardians, or living with parents who themselves reside on the streets.[71]

In addition, Kenya had 902 Charitable Children Institutions (CCIs) in 2024, compared to 854 CCIs in 2017. These institutions provide shelter to a total of approximately 44,070 children, of whom 23,570 are boys, 20,483 are girls, and 17 are intersex. About 5 per cent of children in institutions have a

[68] Kenya National Bureau of Statistics, Ministry of Health, and The DHS Program ICF 2023.

[69] KNBS 2022.

[70] Ministry of Labour and Social Protection 2023a.

[71] Ministry of Labour and Social Protection 2018.

disability, requiring specialised assistance. The highest number of CCIs is located in Nairobi (121), Kiambu (88), and Kajiado (73).[72]

The government's Probation and Aftercare Service (PACS) department handled a total of 39,848 cases in the financial year of 2019-20, of which 22 per cent (8,665) involved child and youth offenders.[73]

Refugee children

As per UNHCR latest figures of July 2024, Kenya registered over 782,000 refugees and asylum-seekers, of which 53 per cent are children (0-17 years).[74] Migration and displacement pose many challenges, especially for children, such as forced child labour, early marriage and exposure to abuse and other risks of violence. In addition, refugee children are likely to be out of school, have more difficulty obtaining adequate health care and may suffer from mental health problems.[75]

Children experiencing physical, sexual and emotional abuse

The data highlights widespread physical, sexual, and emotional abuse experienced by children in Kenya.[76] Nearly half of females (46 per cent) and more than half of males (56 per cent) aged 18–24 reported experiencing childhood violence. Among them, sexual violence had a particularly high prevalence, with nearly two-thirds (63 per cent) experiencing multiple incidents before turning 18. Physical violence was the most common type of violence, affecting 39 per cent of females and 52 per cent of males. According to the 2019 Kenya Violence Against Children Survey (VACS), girls aged 13–17 who witnessed violence at home were more likely to experience sexual or physical violence within the past 12 months compared to those who did not witness violence (71 per cent versus 26 per cent). Similarly, boys in the same age bracket who witnessed violence were 70 per cent more likely to experience violence compared to 25 per cent of those who did not. Food insecurity also played a significant role; young women aged 18–24 facing food insecurity were nearly twice as likely (40 per cent) to experience sexual and physical violence as those with food security (26 per cent). For males, this likelihood rose from 20 per cent for the food-secure to 41 per cent for those experiencing food insecurity.

The majority of victims do not report incidents or seek help, highlighting systemic barriers and societal stigmas. The consequences of childhood violence are far-reaching. Females exposed to such abuse were significantly more likely to engage in sexual risk-taking behaviours. Mental health problems were prevalent, with 77 per cent reporting emotional distress and 41 per cent experiencing suicidal ideation. Furthermore, victims of physical violence in childhood were more likely to perpetrate violence themselves in adulthood, creating a cycle of abuse.

Children in worst forms of child labour as defined by ILO

In Kenya, 12 per cent of children aged 5 to 14 are employed, the majority in the agricultural and service sectors. Nearly all children combine work with education. However, still some children are exposed to the worst forms of child labour, including commercial sexual exploitation, sometimes as a result of

[72] Ministry of Labour and Social Protection 2024.

[73] Probation and After Care Service 2021.

[74] UNHCR n.d.

[75] UNICEF United Kingdom 2017.

[76] Ministry of Labour and Social Protection of Kenya 2019.

human trafficking, and forced domestic servitude. For example, from 2016 to 2020, 165 cases of use and recruitment of child soldiers were reported.[77]

Among adolescents and youth (15-24 years), 18 per cent are not in education, employment, or training (NEET).[78]

Teenage pregnancy

Early childbearing is associated with a range of adverse outcomes for both the mother and child. These include increased risks of maternal and infant mortality, pregnancy-related complications, and low birth weight. It often interrupts education, thereby limiting future economic opportunities and reinforcing intergenerational cycles of poverty. In addition, adolescent mothers face heightened vulnerability to social stigma, gender-based violence, and reduced decision-making autonomy, which further exacerbates inequality and undermines their overall well-being.

According to the KDHS, in 2022, the median age at first birth among women aged 25 to 49 is 20.6 years.[79] In addition, nearly 5 per cent of girls aged 15-17 years are currently pregnant, while one in ten have ever had a terminated pregnancy. However, it is important to note that the sample size of girls this age is relatively small.

According to the 2019 KHPC, 10 per cent of adolescents aged 15-19 years had given birth to one or more children, with Samburu, Migori, Narok, and Mandera having among the highest percentages of these adolescents, at over 16 per cent.[80] In particular, 50 per cent of girls this age living in Samburu have ever been pregnant.[81] In 2019, 3.9 and 4.2 per cent of males in the respective age groups of 10-14 and 14-19 years were married, compared to a respective 3.9 and 10.8 per cent for females.

Reporting the birth of a child to the appropriate national authority is key to providing all children with a legal identity, allowing them to access public services as well as protecting their rights. According to the KDHS, in 2022, roughly 3 out of 4 children under the age of 5 were registered with the civil registration authority[82]. However, only 34 per cent of children whose births are registered have a birth certificate. In addition, some discrepancies perpetuate some existing societal imbalances. Indeed, as depicted in Figure 13, the proportion of children under the age of 5 not having a certificate in the rural areas is 20 percentage points higher than its urban counterpart. Additionally, a striking 86 per cent of children living in the lowest wealth quintile do not have a birth certificate, while three-thirds of children in the second poorest wealth quintile do not have a certificate. These children without a birth certificate will face heightened vulnerabilities across their life cycle, as they may face administrative barriers to access government services such as education, healthcare, social protection, etc.

Figure 13: Proportion of children below 5 years old without a birth certificate

[77] Unites States Department of Labor (USDOL) 2022.

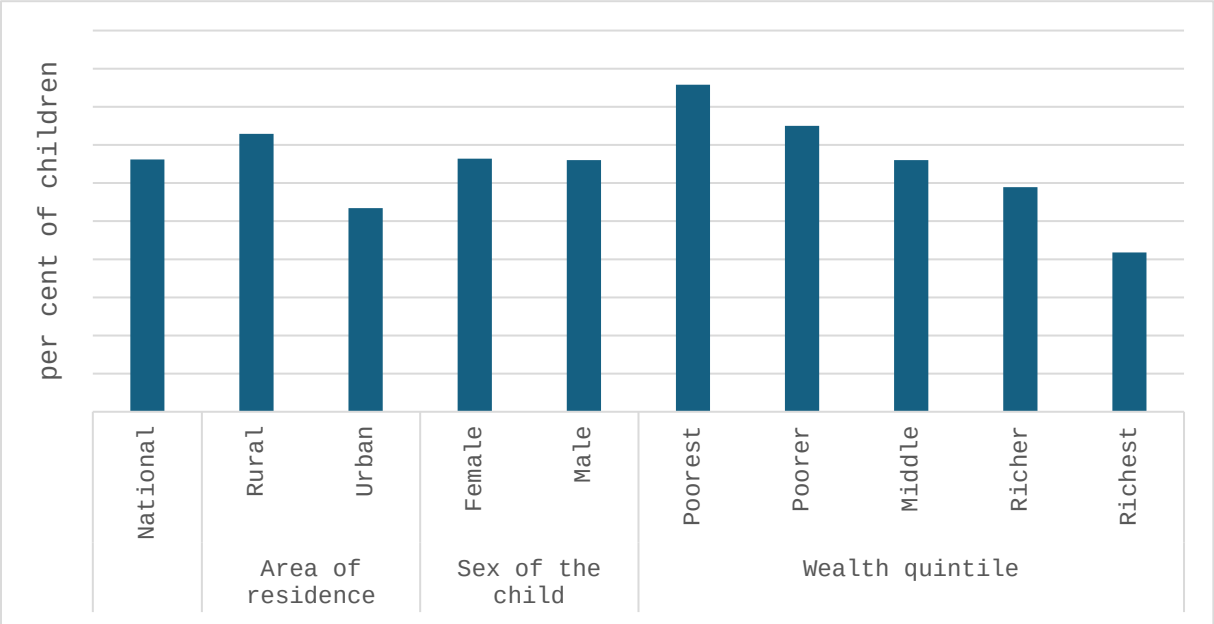
[78] Kenya National Bureau of Statistics 2022.

[79] Kenya National Bureau of Statistics, Ministry of Health, and The DHS Program ICF 2023.

[80] KNBS 2022.

[81] Kenya National Bureau of Statistics, Ministry of Health, and The DHS Program ICF 2023.

[82] KNBS and ICF 2023.

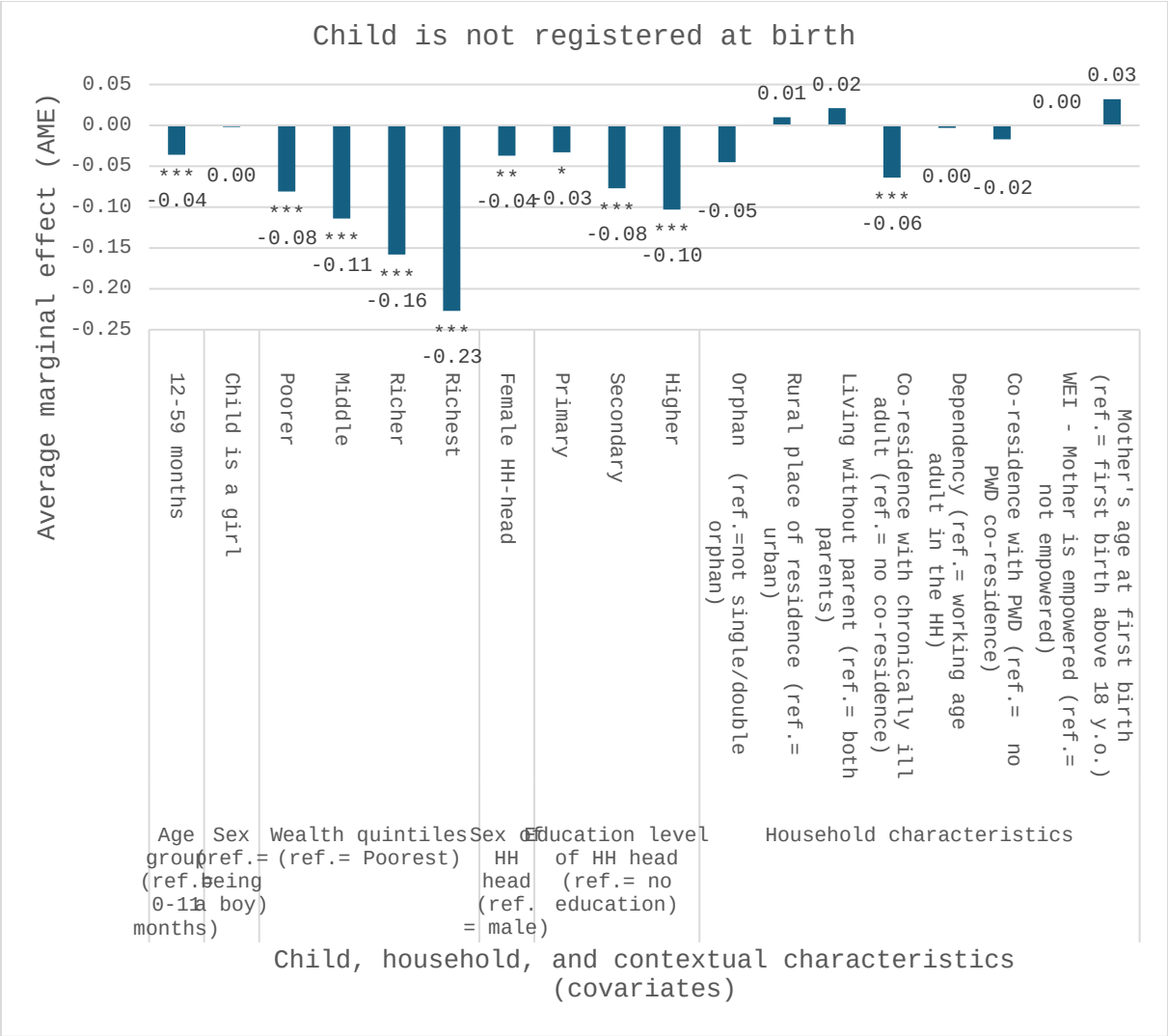


Source: KDHS 2022

4.5.1 Determinants

Determinants of birth registration:

Figure 14. Results from logistic regression analysis: Average marginal effects of vulnerability markers (covariates) on the probability of a child not being registered at birth



Source: KDHS 2022

Note: Significance levels are indicated by asterisks: p < 0.01 (***), p < 0.05 (**), and p < 0.1 (*).

For the age group 12-59 months, children are 4 percentage points less likely to not be registered compared to the reference group. Wealth quintiles also have a negative correlation with lacking birth registration, with those in the poorer, middle, richer, and richest categories less likely to not be registered as the wealth increases. The richest wealth quintile shows the strongest negative association. In addition, the sex of the household head has a significant negative average marginal effect, indicating that children from households with female heads are 4 percentage points less likely to not be registered. Education level significantly affects birth registration, with higher education levels associated with a lower likelihood of missing birth registration.

Certain household characteristics are significantly associated with a higher likelihood of birth registration. Specifically, children residing in female-headed households or with an adult who has a chronic illness are more likely to have their births registered. Holding other factors constant, children living with chronically ill adults are 6 percentage points less likely to have unregistered births. These findings suggest that such household characteristics may enhance engagement with formal institutions or reflect greater awareness of administrative processes.

Regional variation also plays a notable role in birth registration. Counties such as Nairobi, Nakuru, and Isiolo show a higher likelihood of children lacking birth registration, while in contrast, counties including Mombasa, Tharaka-Nithi, Nyandarua and Vihiga exhibit lower probabilities of unregistered births. These patterns may reflect differences in local governance, service accessibility, or public awareness campaigns.

Other variables, such as orphan status, rural residence, living without a parent, household dependency ratio, and co-residence with a person with a disability, do not exhibit a statistically significant association with birth registration status.

4.6 Water, Sanitation, and Hygiene (WASH) related vulnerabilities

Access to safe drinking water, improved sanitation and adequate handwashing facilities are fundamental rights of children, which can significantly reduce the risk of disease transmission. In Kenya, 71 per cent of children (0-17 years) live in a household with access to an improved drinking water source[83], while 62 per cent use improved sanitation facilities[84] (see Table 3). In addition, more than half of the children have a handwashing facility with water and soap available at their household. Large differences are observed based on the area of residence, the education level of the household head, and the household wealth quintile. For example, the proportion of children living in urban areas with access to improved sanitation is 41 percentage points higher than in rural areas (91 per cent versus 50 per cent). In addition, 56 per cent of children with non-educated household heads have access to improved drinking water sources, compared to 88 per cent of children with household heads who have achieved higher education. Finally, children belonging to the lowest wealth quintile have significantly less access to adequate water, sanitation, and handwashing facilities. Less than three out of ten children belonging to the poorest wealth quintile have access to a handwashing facility with water and soap as opposed to 77 per cent of children belonging to the highest wealth quintile.

Table 3. Proportion of children (0-17 years) with access to improved drinking water sources, sanitation and handwashing facilities with water and soap

		WATER	SANITATION	HYGIENE
		Access to improved drinking water sources	**Access to improved sanitation facilities**	**Access to handwashing facility with water and soap**
National	*National*	71	62	54
Area of residence	*Urban*	88	91	63
	Rural	64	50	40
Education level of household head	*No education*	56	38	29
	Primary	67	54	42
	Secondary	79	73	54

[83] An improved water source is defined as: Piped into dwelling; Piped to yard/plot; Public tap/standpipe; Public tap/standpipe; Tube well or borehole; Protected well; Protected spring; Rainwater; and Bottled water.

[84] An improved sanitation facility is defined as follows: Flush to piped sewer system; Flush to septic tank, Flush to pit latrine; Flush, don't know where; Ventilated improved pit latrine; Pit latrine with a slab; and Composting toilet.

	Higher	88	92	68
Wealth index quintile	*Poorest*	48	21	28
	Second	64	47	41
	Middle	75	73	45
	Fourth	86	90	52
	Richest	94	97	77

Source: KDHS 2022

4.7 Women's empowerment and mothers' education

Across multiple child-related vulnerabilities, the coefficients of the variables 1) denoting the women's empowerment, as determined by the women's empowerment index (WEI)[85] and 2) maternal education level, vary substantially in magnitude and significance depending on the outcome in question and the population subgroup. The significant associations of the WEI and of the mother's education with the different vulnerability outcomes are described below.

a. No Full Immunisation

Neither women's empowerment nor maternal education shows a significant association with the likelihood of a child not being fully immunised. This finding holds consistently across the different subgroups, namely within urban, rural, and the poorest quintile subgroups.

b. No ITN Usage

In the full sample, empowered mothers are associated with a lower likelihood of children not using ITNs, indicating reduced vulnerability. Maternal education, on the other hand, is largely non-significant, except at the primary level, which surprisingly shows a positive association with non-usage of ITN, indicating increased risk relative to mothers with no education.

In urban areas, this pattern is magnified: WEI retains its negative coefficient, while maternal education remains significant with a positive association that diminishes as education levels increase. In rural areas, neither WEI nor maternal education has a significant association with ITN non-usage. Among the poorest quintile, the negative association of WEI persists, while maternal education remains non-significant.

c. Stunting

The Women's Empowerment Index (WEI) does not show a statistically significant association with child stunting in the full sample. However, maternal education at the primary and secondary levels is unexpectedly associated with higher likelihoods of stunting. This counterintuitive pattern may reflect underlying confounding factors or non-linear relationships not fully captured in the model. The same

[85] As previously described, the WEI variable used in this regression analysis relies on a binary variable denoting "1" if the woman (or mother) is empowered according to the Women's Empowerment Index explicated in the companion report, and "0" if the mother is not empowered.

trend persists in urban areas, while in rural areas, only primary education retains a significant and positive marginal effect. Among households in the poorest wealth quintile, WEI remains non-significant, and maternal education demonstrates weak significance (at the 10 per cent level) for both primary and higher education, with the positive associations persisting. These findings suggest that the relationship between maternal education and child nutrition outcomes may be more complex than anticipated, potentially influenced by contextual or unmeasured household factors.

d. Not Receiving Vitamin A

In the full sample, WEI is non-significant. However, secondary and higher education levels of the mother are associated with a lower likelihood of a child missing Vitamin A. In urban areas, only higher education remains significant and negative. In rural areas, both WEI and secondary education show negative likelihoods.

For the poorest quintile, neither WEI nor maternal education is significantly associated with this outcome.

e. Inadequate Diet

Both WEI and maternal education show non-significant relations with inadequate child diet in the full sample, as well as within both urban and rural subgroups. In the poorest quintile, however, WEI is significantly associated with a decreased likelihood of dietary inadequacy, though maternal education remains non-significant.

f. Non-Attendance (School)

In the full sample, both WEI and maternal education are negatively associated with school non-attendance, and the association of maternal education intensifies (becomes more negative) with higher levels of education. In urban settings, WEI remains significant and negative, while maternal education is mostly non-significant except at the higher education level, which is associated with reduced non-attendance. In rural areas, WEI is non-significant, but primary and secondary education both show negative associations, reducing the likelihood of non-attendance. Among the poorest quintile, WEI is non-significant, and the pattern for maternal education is less consistent, with no clear trend.

g. No Birth Registration

In the overall sample, WEI does not significantly relate to birth registration. However, primary and secondary maternal education are unexpectedly both **positively associated** with lack of birth registration. This same pattern persists in urban areas. In contrast, in rural areas, WEI becomes significant with a negative likelihood of non-registration, and secondary education of the mother also shows a negative association, reducing the likelihood of lacking birth registration. Among the poorest, WEI is non-significant, and only primary education is significantly negatively associated with lack of registration.

h. Multidimensional Poverty

In the full sample, both the Women's Empowerment Index (WEI) and maternal education are significantly and negatively associated with the likelihood that a child is multidimensionally poor, indicating that increased maternal empowerment and higher education levels are protective against multidimensional poverty. The marginal effects of maternal education become progressively stronger (more negative) at higher levels of attainment. Disaggregated analysis shows that in urban areas, maternal education, particularly at higher levels, is strongly associated with reduced multidimensional poverty, whereas WEI is not statistically significant. In rural areas, maternal empowerment is significantly associated with lower levels of child multidimensional poverty, and maternal education continues to exhibit a gradient effect. Among the poorest wealth quintile, both WEI and maternal education retain significant negative associations with multidimensional poverty, further reinforcing their role as protective factors, particularly in the most disadvantaged households.

Overall, the findings indicate that maternal empowerment (as measured by WEI) and maternal education are not uniformly associated with child vulnerability outcomes, but rather display outcome-specific and context-dependent relationships. WEI is significantly linked to reduced vulnerability in specific domains, such as insecticide-treated net (ITN) usage, school attendance, and multidimensional poverty, particularly within rural and low-income populations. Maternal education, on the other hand, shows broader and more consistent associations across several child outcomes, with stronger effects observed at higher education levels. These include reduced risks of multidimensional poverty, school non-attendance, and non-receipt of Vitamin A. However, some unexpected associations, such as the positive relationship between maternal education and child stunting, or the lack of association with birth registration, suggest the presence of unobserved confounding factors or non-linear interactions that merit further investigation. Subgroup analyses further reveal that the impact of these factors is not consistent across urban, rural, or poorest populations, underscoring the importance of context-specific and disaggregated policy responses to address child vulnerability effectively.

Summary

This section provided insights into the regressions used to assess child vulnerability and presented the determinants associated with a selection of childhood vulnerability outcomes. In order to identify the different factors correlated with child vulnerability in Kenya, we ran logistic regressions with a set of dependent (outcome) variables reflecting deprivations and challenges that impede children's wellbeing, as well as child-specific and household-level analytical variables that serve as potential markers of vulnerability. Table 6 summarises the average marginal effects of the different markers of vulnerability that were statistically significantly related to the different outcome variables analysed. Significance levels are indicated by asterisks: $p < 0.01$ (***), $p < 0.05$ (**), and $p < 0.1$ (*).

Table 4: Summary of regressions results

	Vulnerability Outcome Variables						
	Not fully immunized (age<5)	Non-usage of ITN	Stunting (age<5)	Did not receive vitamin A (age 7-59 months)	Non-exclusive breastfeeding or no Minimum acceptable diet (0-23 months)	Not attended school in the past year	No Birth registration
Analytical vars./Vulnerability Markers							
Child characteristics							
Sex (being a girl) (ref.= being a boy)	0.01	0.01	-0.05***	0.01	0.01	0.00	0.00
Age group (ref.=0-11 months, for school attendance ref.=4-14 years)							
12-59 months	0.17***	0.06***	0.06***	0.13***	0.12***		-0.04***
5-14 years							
15-17 years						0.00	
Household characteristics							
Wealth quintile (ref.= Poorest)							
Poorer	-0.01	-0.05***	-0.04***	-0.03	-0.05*	-0.03***	-0.08***
Middle	0.01	-0.11***	-0.10***	-0.07***	-0.08***	-0.04***	-0.11***
Richer	0.02	-0.07***	-0.13***	-0.05*	-0.17***	-0.04***	-0.16***
Richest	0.03	-0.12***	-0.19***	0.01	-0.22***	-0.04***	-0.23***
Household head is female (ref.=male)	0.02	-0.03*	0.02	0.02	0.01	-0.01	-0.04**
Education of head of Household (ref.= no education)							
Primary	-0.08***	-0.03	0.01	0.01	-0.05	-0.05***	-0.03*
Secondary	-0.13***	-0.03	-0.01	-0.04	-0.07*	-0.05***	-0.08***
Tertiary	-0.13***	-0.07***	-0.05**	-0.04	-0.11***	-0.03**	-0.10***
Orphan (ref.=not single/double orphan)	0.02	0.04	0.02	0.10**	-0.11	0.00	-0.05
Co-residence with PWD (ref.= household with no PWD)	0.04**	0.11***	0.02	0.01	0.00	0.00	-0.02
Rural place of residence (ref.= urban)	-0.02	0.04**	-0.02	0.03	-0.05*	0.00	0.01
Living without parent(s) (ref.=living with both parents)	-0.01	0.08***	0.00	-0.03	-0.01	0.00	0.02
Co-residence with a chronically ill/HIV adult	-0.01	-0.05**	-0.07***	0.05**	0.08**	-0.011	-0.06***
Household dependency ratio (ref.= working age adult in the HH)	0.03**	0.06***	0.02	0.03**	0.01	0.01**	0.00
WEI (ref=. Mother is not empowered).	0.02	-0.04***	0.01	-0.02	0.01	-0.05***	0.00
Age at first birth of mother (ref.= first birth above 18 y.o.)	-0.01	0.01	0.02	0.02	-0.01	0.00	0.03***
Sample size	5.525	9.030	8.867	7.936	3.794	18.353	8.988

Source: KDHS 2022

Note: Significance levels are indicated by asterisks: p < 0.01 (***), p < 0.05 (**), and p < 0.1 (*).

Overall, the analysis indicates that household wealth is consistently associated with a lower likelihood of children experiencing vulnerability across multiple outcome indicators. This underscores the protective role of economic status in shaping child well-being and reinforces the importance of poverty reduction strategies in mitigating adverse outcomes.

While similar protective effects are observed for the education level of the head of household, the associations are less consistent. This variability suggests that other mediating factors, such as the quality of education, access to services, or broader socio-economic conditions may influence the extent to which education translates into improved child outcomes.

These findings highlight the need for integrated policy approaches that address both economic and educational disparities to effectively reduce child vulnerability in Kenya.

Other potential markers of vulnerability seem to have more ambiguous, inconsistent associations with the outcome variables, suggesting that their influence may be context-dependent or intertwined with

other structural factors. Furthermore, our findings indicate that the magnitude of these associations varies across different subpopulations, such as rural versus urban households or the poorest quintile, underscoring the importance of tailoring policy interventions to the specific needs of different demographic groups. These results are presented in Annex VII.

The consistent association of household wealth with reduced child vulnerability across multiple outcomes underscores the urgent need for robust poverty reduction strategies in Kenya. Social protection programmes, such as cash transfers, are critical to mitigating both the direct and indirect effects of poverty on children's health, nutrition, education, and protection. However, the analysis also reveals that vulnerability is not confined to poor households. Children in non-poor households may still experience adverse outcomes due to factors such as co-residence with a chronically ill adult or a person with a disability, orphanhood, or maternal disempowerment. These findings reinforce the need for multisectoral approaches that extend beyond poverty alleviation to address structural and family-level vulnerabilities.

The identification of specific risk factors, such as the association between orphan status and missed vitamin A supplementation, or between co-residence with a person with a disability and school non-attendance, can support more effective targeting of interventions. Programmes such as the CT-OVC (Cash Transfer for Orphans and Vulnerable Children) could benefit from such evidence to ensure that assistance reaches children most at risk.

The observed links between household wealth, education, and reduced multidimensional child deprivation point to the importance of integrated policy responses. Addressing child vulnerability requires coordinated investments across health, education, nutrition, and social protection sectors. While household head education, particularly maternal education, shows a generally positive association with child outcomes, its effects vary by indicator and context. This suggests that education alone is insufficient unless accompanied by improvements in education quality and socio-economic conditions. Policies should therefore not only enhance access to education but also ensure quality and relevance, particularly in disadvantaged regions.

Finally, the mixed associations found with maternal empowerment suggest the influence of unmeasured contextual factors, such as social norms, service quality, and informal support systems. These gaps highlight the need for complementary qualitative and quantitative research to deepen understanding of child vulnerability and inform the design of more inclusive, equitable, and effective child-focused policies and programmes in Kenya.

4.8 Cross-Cutting Risks and vulnerabilities across the lifecycle of children

4.8.1 Macroeconomic risks

Kenya's economy expanded by 5.6 per cent in 2023, up from 4.9 per cent in 2022.[86] Although growth is increasing, it is still lower than its 10 per cent target average annual growth rate in Vision 2030. This has resulted in low poverty reduction and employment creation. Poverty levels rose from 34 per cent in 2019 to 40 per cent in 2022[87], and unemployment edged up from 13.3 per cent in 2021 to 13.9 per

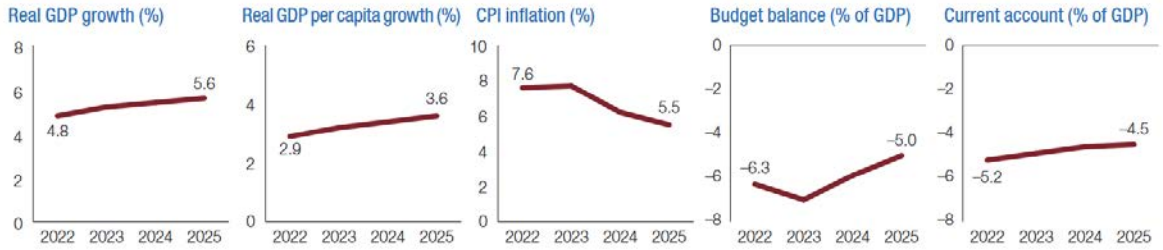
[86] Kenya National Bureau of Statistics (KNBS). 2024.

[87] Kenya National Bureau of Statistics 2024.

cent in 2022. Income inequality also increased, with the Gini coefficient moving from 0.36 in 2020 to 0.39 in 2021. The COVID-19 pandemic and associated countermeasures may have heavily influenced these figures. GDP growth is forecasted to reach 5.4 per cent in 2024 and 5.6 per cent in 2025, driven by services and household spending. Inflation is expected to decline to 6.2 per cent in 2024 and 5.5 per cent in 2025, as food and global price pressures ease. However, oil and food prices remain high due to ongoing global supply chain disruptions. Monetary policy is anticipated to remain supportive with stable inflation and exchange rates.[88]

The fiscal deficit is projected to reduce to 6 per cent of GDP in 2024 and 5 per cent in 2025 due to a revenue-focused consolidation programme. Similarly, the current account deficit is expected to narrow to 4.6 per cent of GDP in 2024 and 4.5 per cent in 2025, aided by a recovery in global trade.[89] However, Kenya still faces financing challenges in the global financial environment and is considering at least seven categories of fiscal austerity measures, including reductions in subsidies and tax adjustments. Given these factors, the IMF assesses Kenya's economic risk as medium, its fiscal risk as very high, and its overall macroeconomic risk as high.[90] In 2023, the debt-to-GDP ratio stood at 32 per cent.[91] Coupled with fiscal austerity and external financing challenges, this raises concerns about the overall capacity to sustainably invest in children's wellbeing, as limited fiscal space may constrain funding for essential, child-relevant programmes.

Figure 15: Macroeconomic indicators in Kenya (2022-2025)



Source: Data are as of April 2024 and are from domestic authorities; figures for 2023 are estimates and figures for 2024 and 2025 are projections by the African Economic Outlook team. Data on the budget balance correspond to Kenya's fiscal year, which runs from July 1 to June 30.

Children are particularly vulnerable to macroeconomic shocks, as economic downturns and fiscal constraints directly undermine their well-being. Slow economic growth, high inflation, and constrained public budgets reduce household purchasing power and limit access to essential goods and services. High unemployment and dependence on informal employment exacerbate multidimensional child poverty, with adverse effects on education, protection, mental health, and overall development. Fiscal austerity measures further weaken social safety nets by reducing public investment in critical sectors such as health, education, and social welfare. Cuts to spending and subsidies can make essential services, such as healthcare, water, fuel, and education unaffordable for vulnerable households, especially during crises. This is compounded by rising food and fuel prices, which further strain household budgets and reduce access to nutritious food and basic transport. Additionally, the public

[88] African Development Bank Group 2024.
[89] Ibid.
[90] Cummins 2023.
[91] The National Treasury and Economic Planning 2024.

sector workforce, which plays a key role in identifying and responding to child vulnerabilities, is often not expanded or replenished, limiting the state's capacity to respond effectively to children's needs.[92]

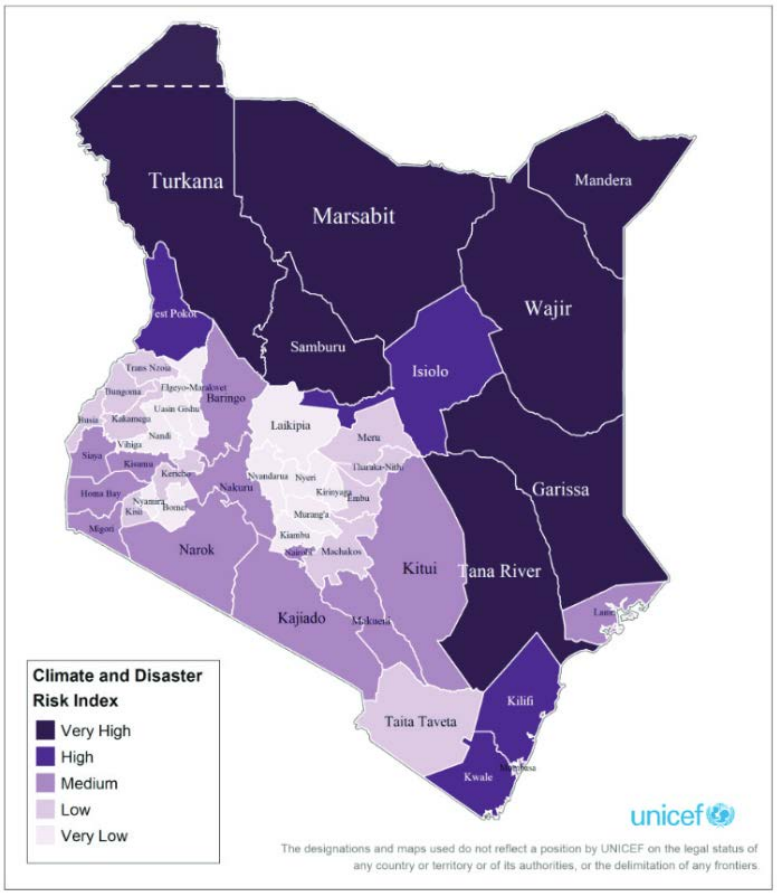
4.8.2 Climate risks

In addition to macroeconomic volatility, Kenya faces significant vulnerability to climate-related events, with a high exposure to natural hazards such as floods and droughts. Across all emissions scenarios, temperatures in Kenya are projected to continue rising. While precipitation patterns are expected to remain highly variable and uncertain, average rainfall is anticipated to increase by mid-century, particularly during the "short rains" between October and December. The frequency, duration, and intensity of extreme rainfall events are also likely to rise, leading to an increased proportion of rainfall occurring in heavy downpours.[93] Children are uniquely vulnerable to the impacts of climate change, such as air pollution, extreme heat, malnutrition due to crop failures, and educational disruptions from frequent droughts and floods. These climate-related challenges threaten health, food security, education, protection, and essential services, pushing vulnerable children deeper into poverty.[94]

Kenya's Children's Climate and Disaster Risk Model (CCDRM) is a localised adaptation of the Children's Climate Risk Index (CCRI) methodology, tailored to reflect Kenya's specific contexts. This model provides a county-level assessment of climate and disaster risks faced by children, highlighting their unique vulnerabilities to climate-related and environmental shocks across all 47 counties (see Figure 16). The model identifies seven counties where over 2.4 million children face exceptionally high risks due to significant exposure and extreme vulnerability to climate and environmental shocks. In these counties, critical services that support children's development and growth, such as livelihood systems, child health and nutrition services, education, water, sanitation and hygiene services, and child protection systems, are poor or have limited capacity. At the national level, around 12 million children in Kenya face at least medium-level climate and disaster risks, with specific vulnerabilities: nine million are exposed to drought and water scarcity, 1.3 million to flood risks, and over 10 million to malaria. These numbers are likely to rise as climate change threatens to make the situation worse. The CCDRM can be used to inform strategic interventions in every county to enhance climate change adaptation strategies, enhance the resilience of children in their communities, and develop support systems for them.[95]

[92] Cummins 2023.
[93] World Bank Group 2021.
[94] UNICEF 2021b.
[95] UNICEF Kenya 2024.

Figure 16: Children's Climate and Disaster Risk Index in Kenya



Source: UNICEF Kenya, 2024

4.8.3 HIV/AIDS

Kenya's health sector priorities, aligned to the Vision 2030, underscore the need to end AIDS as a public health threat by the year 2030. The government therefore focuses on key actions, including those of diagnosis, linking to care and treatment, including addressing coexisting conditions. UNAIDS set targets by 2030 to ensure they reach 95-95-95; the focus aims to ensure saturation of those who are living with HIV up to 95 per cent (PLHIV), 95 per cent of those identified receive care with a plan to attain a 95 per cent suppression rate.[96] Between 2020 and 2022, Kenya attained 99 per cent of the estimated people living with HIV (PLHIV) nationally (the first 95, aiming to have at least 95% of PLHIV identified), although the performance fell for children and adolescents under age 15 years (CALHIV) from 100 per cent in 2022 to 88 per cent in 2022, compared to 99 per cent for individuals aged 15 years and over. 94 per cent of PLHIV were on life-saving antiretroviral therapy in 2022, though again exhibiting lower rates for CALHIV at 85 per cent than for adults, at 94 per cent. Nationally, Kenya achieved an 89 per cent viral suppression rate, though this rate was lower among children under age 15 years, at 76 per cent, compared to individuals aged 15 years and older at 90 per cent. [97]

[96] National Syndemic Diseases Control Council 2023.
[97] Ibid.

According to HIV estimates[98]; 71,433 children of 0-14 are living with HIV in Kenya. Similar data shows that 84,868 children aged 10-19 are living with the virus. Among the top five counties with the highest absolute numbers of children living with HIV are Kisumu, Homabay, Migori, Siaya, and Nakuru. HIV estimates have shown a trend of fluctuating, with steady enrolment of children into antiretroviral therapy.

Efforts have been made to ensure HIV care is expanded, and as a result, there has been a 47 per cent reduction in HIV related deaths among children under 19 years of age between 2021 and 2024.[99] Following Kenya's commitment to attain 95 per cent viral suppression among all age groups by 2025, KASF II reported an increase of 15 per cent from 61 per cent in 2022 to 76 per cent.

According to the Kenya AIDS Strategic Framework II 2020/21- 2024/25 Mid Term Review Report (2023), there has been a significant reduction of new HIV infections among children aged 0-14 at 34 per cent.[100] The same report showed a significant reduction of mother-to-child to child transmission to below 5 per cent. According to the World AIDS Day report 2022, there is disproportionate access and provision for HIV treatment among children aged 0-14, with the counties of Busia, Embu Isiolo, Kitui, Homabay, Vihiga, Marsabit, Makueni and Machakos among those with 70 per cent coverage.[101] There was a reduction of proportion of PMTCT of 4.5 per cent from 2019 and 2023. Prevention of mother-to-child transmission (PMTCT) coverage was 94 per cent nationally as of 2020.[102]

According to the World AIDS day report 2022, there is disproportionate access and provision for HIV treatment among children aged 0-14, with the counties of Busia, Embu Isiolo, Kitui, Homabay, Vihiga, Marsabit, Makueni and Machakos among those with 70 per cent coverage.[103]

There was a reduction of proportion of PMTCT of 4.5 per cent from 2019 and 2023. Prevention of mother-to-child transmission (PMTCT) coverage was 94 per cent nationally as of 2020.[104]

Funding analysis in HIV funding reports showed a multisectoral contribution, including government investment of 8 per cent, United States Government (USG) support at 57 per cent, global funds of 20 per cent, and international, non-state actors and foundations contributing 13 per cent of the overall investment.[105] These gains, however, risk being undermined by recent and projected funding cuts. As only 8 per cent of current HIV financing comes from domestic sources, Kenya's HIV response remains heavily donor-dependent. Any reduction in external support, especially from key actors like the US Government and Global Fund, could jeopardise service continuity. This is especially concerning for CALHIV, where viral suppression rates and treatment coverage already lag behind those of adult populations. Counties with weaker health system capacity and already low coverage are likely to be hardest hit, potentially deepening existing geographic and age-related disparities. A pullback in donor support could also disrupt community-based services for orphans and vulnerable children, many of which address the broader vulnerabilities, such as poverty, caregiver health, and educational access,

[98] National Syndemic Diseases Control Council 2024.
[99] National Syndemic Diseases Control Council 2023.
[100] Ibid.
[101] National AIDS Control Council, Ministry of Health, and UNAIDS 2022.
[102] Elizabeth Glaser Pediatric AIDS Foundation 2021.
[103] National AIDS Control Council, Ministry of Health, and UNAIDS 2022.
[104] Elizabeth Glaser Pediatric AIDS Foundation 2021.
[105] National AIDS Control Council, Ministry of Health, and UNAIDS 2022.

that, all together, shape children's long-term outcomes beyond HIV. These risks point to an urgent need to plan for sustainable financing and service integration, ensuring that recent progress does not stall or reverse.

According to UNICEF, Orphans and Vulnerable Children are children below 18 years, either partially or fully orphaned, and facing multiple levels of vulnerabilities, including those associated with caregivers, household economics, HIV prevalence, and other social determinants of health, including access to education.[106]

4.8.4 Urbanisation, Disability, and other Equity Concerns

Children in urban slums and informal settlements

Children in urban slums and informal settlements in Kenya face heightened vulnerability due to poor access to essential services like education, healthcare, and sanitation, often leading to cycles of poverty, increased exposure to diseases, malnutrition, and reduced opportunities for upward mobility. According to the 2019 KPHC[107], 1,016,913 people, accounting for 7 per cent of the total urban population, reside in informal settlements across 19 urban centres in Kenya. Nairobi City alone accounts for a staggering 80 per cent of this population, highlighting its disproportionate burden compared to other cities like Kisumu (8 per cent) and Mombasa (3 per cent). Moreover, the population living in urban settlements in Kenya has increased from approximately 350,000 in 1962 to over 4 million in 2019.[108] These areas are more likely to lack adequate infrastructure and services, including healthcare, housing, electricity, water and sanitation, protection, and public safety and security, creating difficult conditions for families and children. The widespread use of substandard construction materials reflects the poor living conditions in many urban settlements, with more than two-thirds of households residing in structures lacking durable wall materials. Children living in these environments face heightened educational disparities, as 57 per cent of the population aged three years and above has attained only primary education or less. This limited educational attainment restricts opportunities for upward mobility and reinforces intergenerational poverty. Moreover, children in urban informal settlements are more exposed to risks such as natural disasters, forced evictions due to insecure land tenure, and heightened economic vulnerability.[109]

Disability

The 2022 Kenya Demographic and Health Survey (KDHS) includes a module in line with the Washington Group on Disability Statistics (WG) questions. Individuals are classified based on various domains of disability, including difficulty seeing, hearing, communicating using usual language, remembering or concentrating, working or climbing stairs, and/or washing all over or dressing. Approximately nine in ten children (5-14 years) and adolescents (15-49 years) in the country experience no difficulties (see Table 5). However, 7-9 per cent of children and adolescents face some difficulty in at least one domain, while 2 per cent encounter a lot of difficulty. Less than one per cent cannot perform one of the

[106] UNICEF 2014.
[107] KNBS 2022.
[108] Karuga et al. 2023.
[109] UN-Habitat 2007.

aforementioned functions at all. About 9 per cent of children live in a household with at least one member with a disability.[110]

Table 5. Proportion of children with a disability, by the degree of difficulty in functioning

	5-9 years	10-14 years	15-19 years
No difficulty in any domain	90.1	89.5	88.1
Some difficulty	7.3	7.8	9.2
A lot of difficulty	1.6	2.2	2.3
Cannot do at all	0.9	0.4	0.4
Don't know	0.0	0.1	0.1

Source: KDHS 2022

According to the 2023 Support Needs Assessment published by the Ministry of Labour and Social Protection, more than half of primary school-age children (6-13 years) with disabilities did not attend school due to severe difficulties. The majority experienced problems in communication, cognition, self-care, and mobility. In addition, one-fifth of children this age with disabilities indicated financial constraints and the lack of special schools as reasons for not going to school. The percentage of children with a disability card remains low, especially among children with a cognitive disability, due to the lack of support.[111] These findings highlight the significant barriers faced by children with disabilities in Kenya, underscoring the urgent need for targeted interventions to improve access to education, specialised support services, and financial assistance to ensure their inclusion and well-being.

4.9 Children who are multidimensionally deprived

Childhood vulnerability is not a static condition but a dynamic and evolving state shaped by a range of interrelated factors. In the Kenyan context, where socio-economic challenges are pronounced, understanding child vulnerability requires a framework that reflects the country's specific circumstances. Children's vulnerability is frequently driven by the intersection of economic hardship, social instability, health-related shocks, and environmental risks. These factors are not isolated but often interact in ways that intensify their effects, compounding risks and increasing the likelihood of negative outcomes for children. Recognising and addressing these interconnected drivers is essential for designing effective and context-sensitive interventions.

The reviewed international frameworks (see 2, Section 12, Annex VI) highlight that child vulnerability stems from different sources and is multidimensional. According to the OECD, for example, child vulnerability is "the outcome of the interaction of a range of individual and environmental factors that compound dynamically over time," where individual factors refer to cognitive, emotional, and physical capabilities or personal circumstances, and environmental factors include issues at both family and community levels.[112] Along these lines, most frameworks take into account a combination of both individual and environmental factors when conceptualising child vulnerability.

[110] Kenya National Bureau of Statistics, Ministry of Health, and The DHS Program ICF 2023.
[111] Ministry of Labour and Social Protection 2023b.
[112] OECD 2019.

Multidimensional child poverty in Kenya has been extensively studied, with estimates ranging between 45 per cent and 53 per cent, based on different methodologies and datasets.[113] While these figures are not directly comparable due to variations in approach and data sources (see Annexes I and II for details and references), they highlight the significant challenges faced by children across the country.

Kenya's first Child Poverty Report, using the 2014 KDHS data, found that 45 per cent of children aged 0-17 years (approximately 9.5 million) were multidimensionally deprived, experiencing deprivation in at least three of six well-being dimensions. Rural areas and counties like Turkana, Mandera and Wajir reported the highest deprivation rates (76 per cent - 85 per cent), while sanitation, housing, and education were the most affected dimensions. For example, over half of the children lived in homes with unimproved toilet facilities, and 29 per cent of children aged 12-24 months had not received full vaccination. Kenya's Comprehensive Poverty Report, based on the 2015-16 Kenya Integrated Household Budget Survey (KIHBS), estimated that 53 per cent of children under 18 (approximately 11 million) faced multidimensional deprivation, with an average of 4.1 deprivations per child across the seven analysed dimensions. This report also found that 42 per cent of children under 18 were monetarily poor, with significant overlap between monetary poverty and multidimensional deprivation. Rural areas remained the most affected, with counties such as Turkana, Marsabit, and Samburu reporting the highest levels of deprivation.

A more recent study, using census data from 2009 and 2019, analysed trends in inequality and multidimensional deprivation.[114] While progress was observed in education outcomes, particularly for secondary school-aged children, disparities persisted, with rural areas and marginalised counties like Garissa and Tana River showing the highest levels of deprivation. This study also introduced new indicators, such as teenage pregnancy and child marriage, further highlighting the complex dimensions of child vulnerability in Kenya. These studies underscore the persistent and multidimensional nature of child poverty in Kenya, emphasising the need for targeted interventions to address overlapping deprivations in health, education, housing, and nutrition.

Sections 4.9.1 to 4.9.4 present updated analyses of multidimensional child deprivation using the most recent data from the 2022 Kenya Demographic and Health Survey (KDHS). These sections provide a comprehensive overview of the current extent and distribution of multidimensional deprivation among children across Kenya.

The analysis examines key dimensions of child well-being, including development, health, education and nutrition, and water, sanitation and hygiene (WASH). It also explores the intensity and severity of deprivation, identifies patterns of overlap among multiple deprivations, and assesses the main determinants influencing these outcomes. This is done in alignment with the conceptual framework on child vulnerability outlined at the beginning of this report.

This updated analysis offers critical insights into the evolving nature of child vulnerability in Kenya and serves as an evidence-based foundation for informing policy and programme interventions aimed at improving child well-being.

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[113] Kenya National Bureau of Statistics and UNICEF 2017; UNICEF Kenya and Kenya National Bureau of Statistics 2020.

[114] KNBS 2023a.

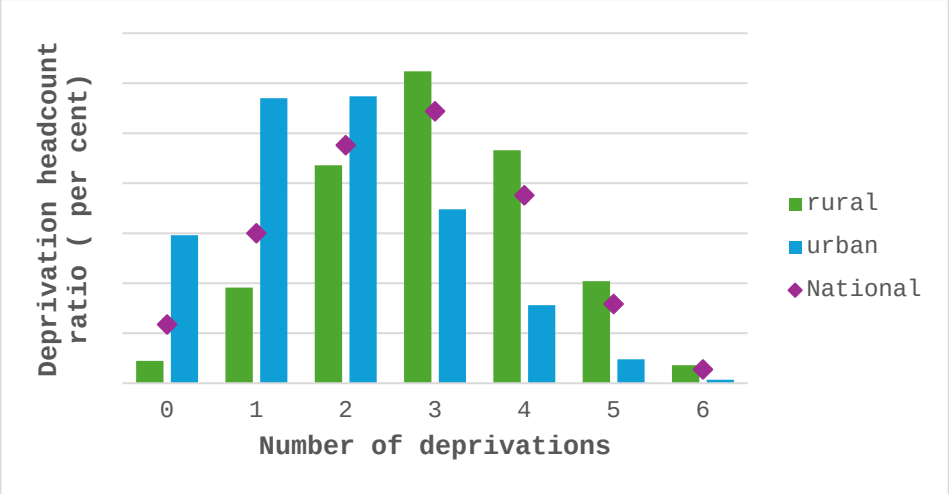
4.9.1 Multiple deprivation analysis

The following section presents the multidimensional deprivation rates among children (0-17 years) in Kenya. The results of the single sector analysis of the analysed indicators and dimensions can be found in Annex III.

4.9.2 Deprivation distribution

The deprivation distribution presents the proportion of children deprived in exactly 0,1,2 and so on dimensions. As shown in Figure 17, the majority of children are deprived in 2, 3 or 4 dimensions of their well-being at the same time (24 per cent, 27 per cent and 19 per cent). Large discrepancies are observed by area of residence. A larger proportion of children living in rural areas suffer from 3 or more deprivations simultaneously, while more than four in ten children living in urban areas are deprived in 0 or 1 dimension.

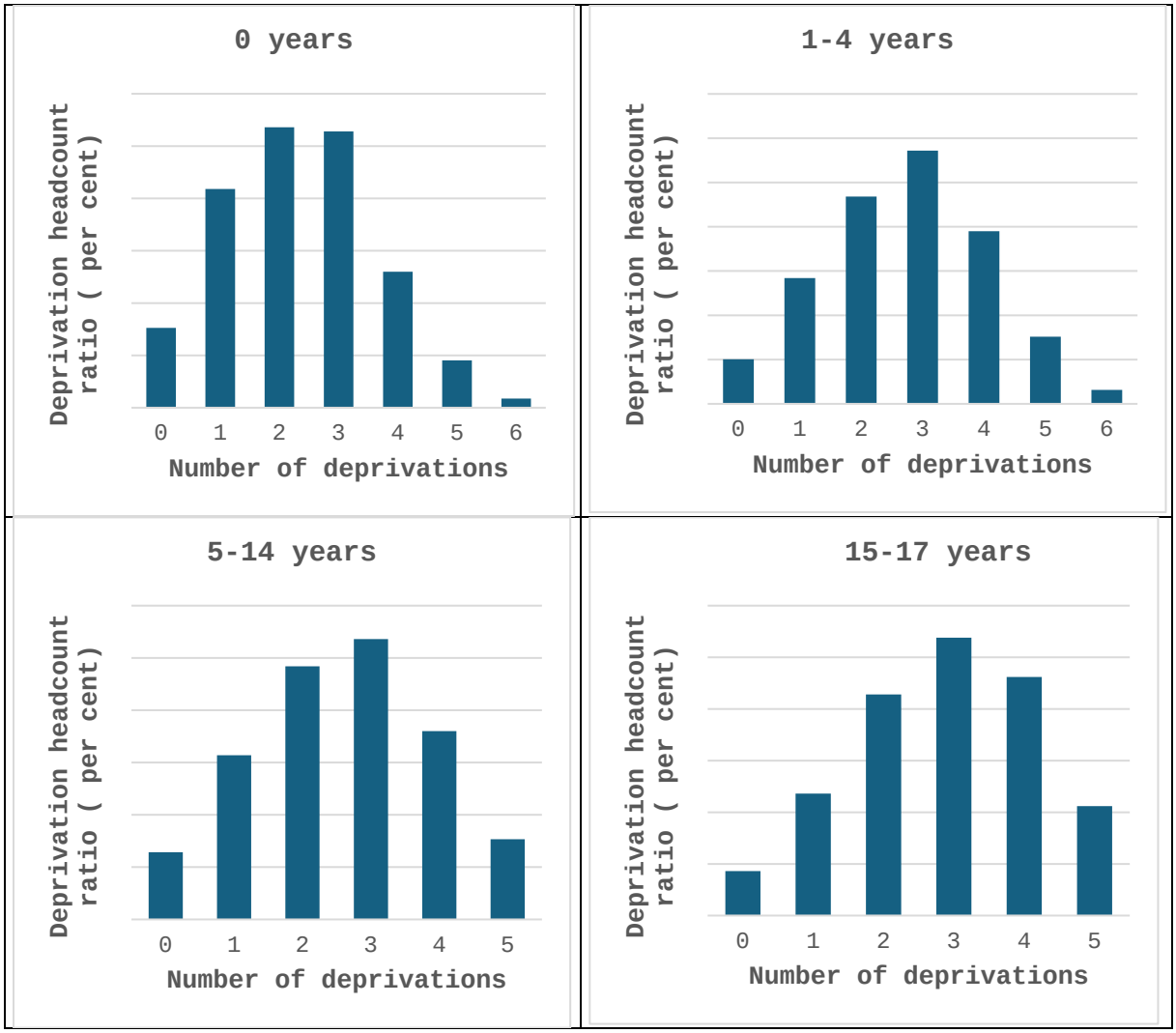
Figure 17. Deprivation distribution at the national level and by area of residence, 0-17 years



Source: Authors' calculation using KDHS 2022

The deprivation distribution for children aged 0 years is skewed to the right, with more than one in four deprived in 0 or 1 dimension (7.6 per cent is deprived in 0 dimensions and 20.9 per cent is deprived in 1 dimension) (see Figure 18). However, a larger proportion of children from older age groups experience multiple deprivations at the same time. For example, 28.6 per cent of children aged 1-4 years and 26.8 per cent of children aged 5-14 years are simultaneously deprived in three dimensions of their well-being. In addition, 23.1 per cent of children aged 15-17 years face deprivation in four dimensions.

Figure 18. Deprivation distribution, by age group



Source: Authors' calculation using KDHS 2022

4.9.3 Multidimensional Poverty Headcount, Intensity and Severity Index

The multidimensional deprivation indices provide insight into the incidence and severity of deprivation experienced by children (see Table 6). First, the multidimensional deprivation headcount rate (H) (per cent) presents the proportion of multidimensionally deprived children. In Kenya, 55.3 per cent of children face at least three deprivations simultaneously. Among children aged 0 years, 44.7 per cent are considered multidimensionally deprived. The multidimensional deprivation headcount rate increases for older age groups, with 62.5 per cent of children aged 15-17 years deprived in at least three dimensions at the same time.

Table 6. Multidimensional deprivation indices (H, A and M0), by age group

K=3	Multidimensional deprivation headcount (H)*, per cent	Average no. of deprivations among the deprived (A), per cent	Adjusted multidimensional deprivation headcount (M_0)

0 years	44.7	3.55	0.265
1-4 years	57.3	3.69	0.352
5-15 years	53.7	3.69	0.396
15-17 years	62.5	3.80	0.475
0-17 years	55.3	3.70	0.391

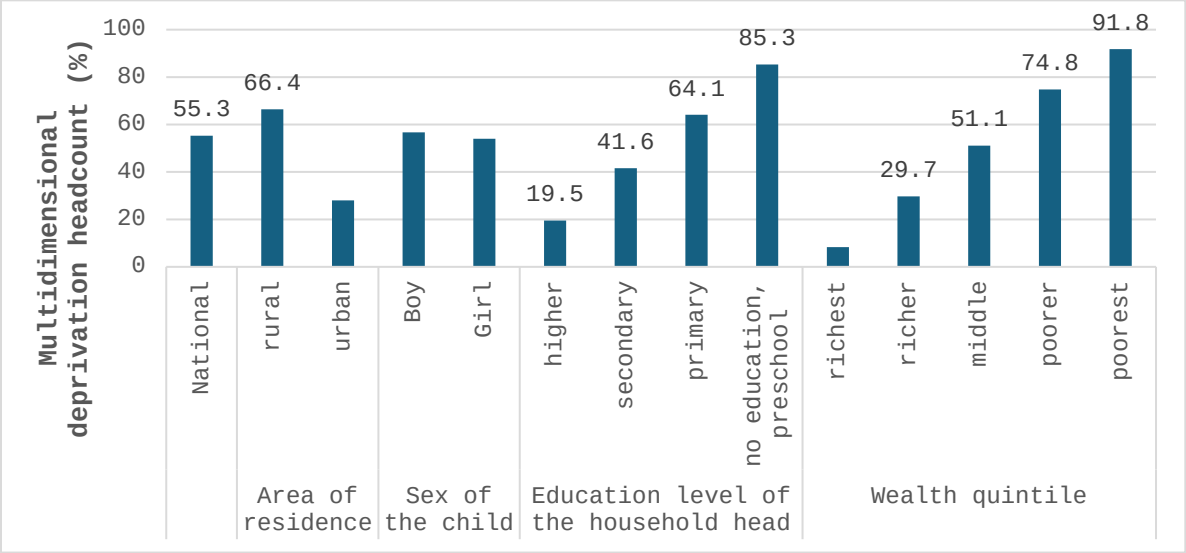
Source: Authors' calculation using KDHS 2022

Secondly, the average number of deprivations experienced by multidimensionally deprived children reflects the severity of their deprivation. In Kenya, children aged 0–17 years who are identified as multidimensionally deprived experience an average of 3.7 deprivations across key well-being dimensions. This intensity of deprivation is consistent across age groups. It is important to note that the total number of dimensions considered varies by age: six dimensions for children aged 0 and 1–4 years, and five dimensions for those aged 5–14 and 15–17 years. The adjusted multidimensional deprivation headcount (M0) combines both the incidence and intensity of deprivation into a single index, ranging from 0 to 1. Although M0 cannot be interpreted in isolation, it provides a useful basis for comparing the extent of multidimensional deprivation across different socio-economic and geographical population groups. A higher M0 value indicates a greater burden of deprivation in terms of both the number of children affected and the depth of their deprivation.

Profile of the multidimensionally deprived children

Figure 19 disaggregates the multidimensional deprivation rate by area of residence, sex of the child, education level of the household head and wealth quintile. All differences observed are statistically significant using a threshold of $p<0.05$ in a Chi-squared test of independence. The proportion of multidimensionally deprived children is more than twice as high in rural areas as in urban areas (66 per cent versus 28 per cent). Furthermore, girls are slightly better off than boys in terms of the level of multidimensional deprivation.

Figure 19. Multidimensional deprivation rate (%) using a threshold of k=3 by various characteristics, 0-17 years

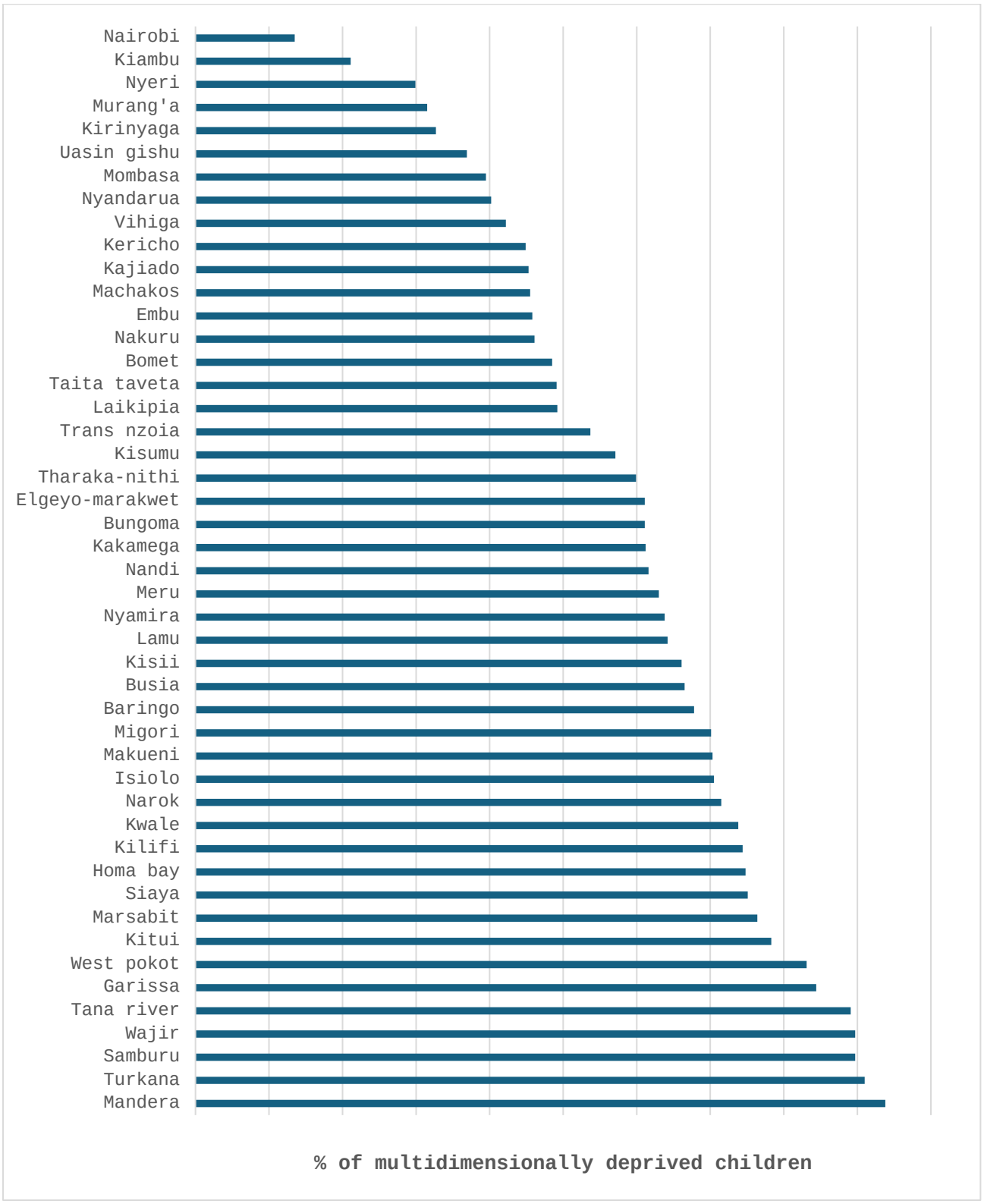


Source: Authors' calculation using KDHS 2022

The higher the education level of the household head, the lower the share of multidimensionally deprived children. Multidimensional child deprivation is closely associated with household characteristics, particularly education and income status**.** Among children living in households where the head has a higher level of education, 19.5 per cent experience three or more simultaneous deprivations. This contrasts sharply with 85.3 per cent among children in households headed by individuals with no formal education. Similarly, multidimensional deprivation is most prevalent among children from the poorest wealth quintile, with 91.8 per cent experiencing multiple deprivations.

At the country level, Nairobi presents the lowest multidimensional deprivation rate of 13.5 per cent, followed by Kiambu, Nyeri and Murang'a (21.1 per cent, 29.9 per cent, and 31.5 per cent, respectively) (see Figure 20). On the other hand, children living in Mandera, Turkana, Samburu, Wajir, and Tana River are worst off, with around nine in ten children facing deprivation in three or more dimensions of their well-being.

Figure 20. Multidimensional deprivation rate (% per cent) using a threshold of k=3 by county, 0-17 years



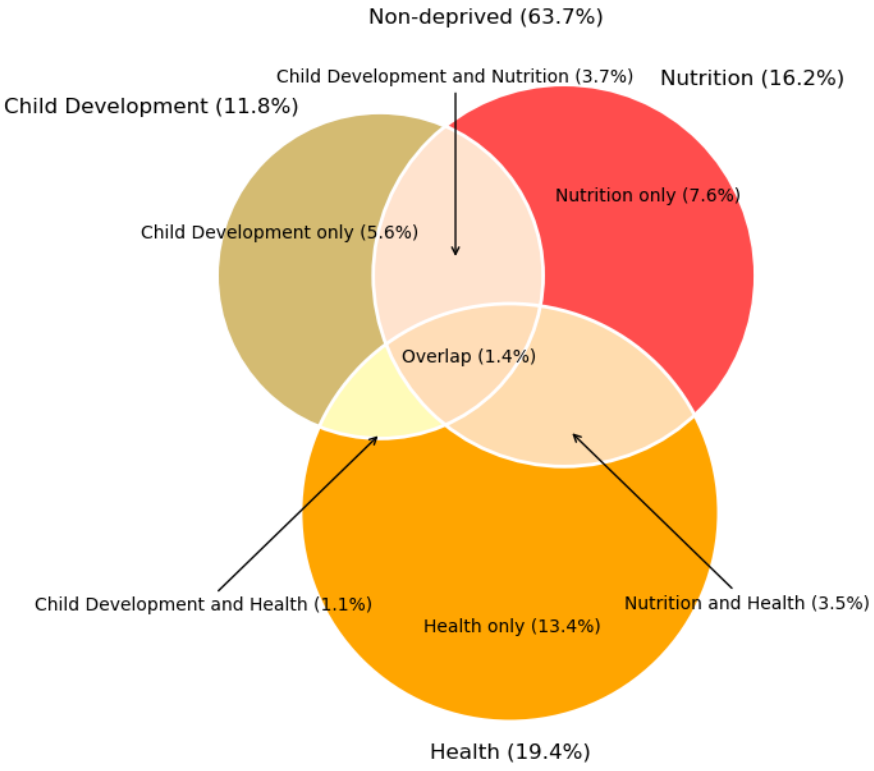
Source: Authors' calculation using KDHS 2022

4.9.4 Overlap analysis

The overlap analysis identifies the extent to which dimensions overlap. In this report, one example is shown for each age group, based on the level of overlap and relevance of the analysed dimensions. The results are displayed in a Venn diagram, showing the proportion of children deprived in all three dimensions, in two dimensions, in one dimension only, and the percentage of children not deprived in any of the three dimensions analysed. All possible combinations between three dimensions are presented in Annex V. This type of analysis is useful for identifying children experiencing compounded vulnerabilities, which provides a deeper understanding of the interconnections between deprivations and helps target interventions more effectively.

Among children aged 0 years, 1.4 per cent experience deprivation in the dimensions Child development, Nutrition, and Health at the same time (see Figure 21). In contrast, 13.4 per cent of children are deprived in Health only. Moreover, more than six out of ten children are not deprived in any of the dimensions analysed. This implies that there is little overlap between the dimensions of Child Development, Nutrition, and Health for children of the youngest age group. Further research needs to be conducted to better understand the underlying drivers of these deprivation and their interrelationships.

Figure 21. Three-way overlap between the dimensions Child Development, Nutrition, and Health, 0 years

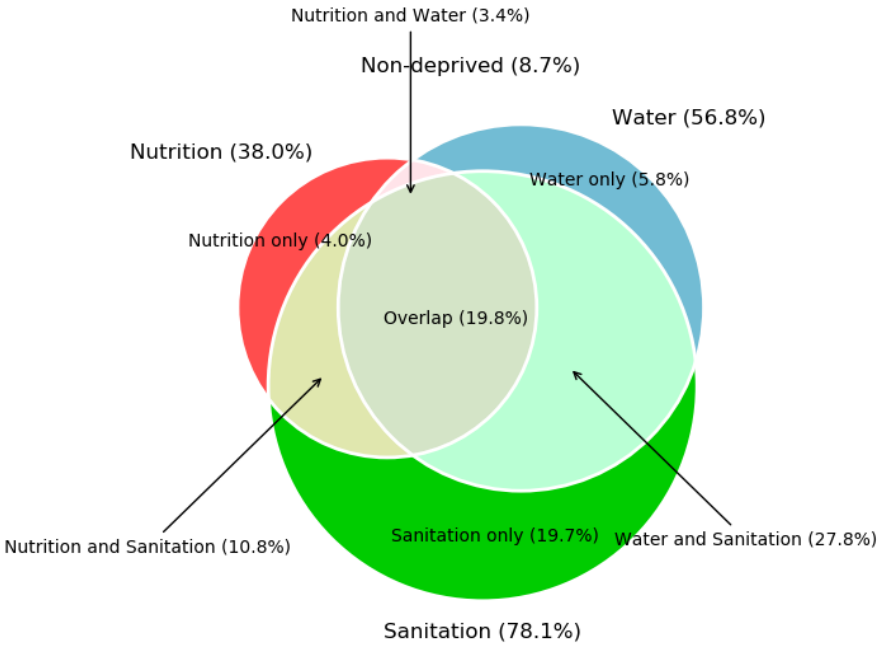


Source: Authors' calculation using KDHS 2022

The combination of overlapping deprivations between the Nutrition, Water, and Sanitation is analysed for children aged 1-4 year (see Figure 22). Nearly one in five children this age are deprived in all three dimensions at the same time (19.8 per cent). Furthermore, 27.8 per cent of children face deprivation

in Water and Sanitation, but not in the Nutrition dimension. Around 8.7 per cent of children are not deprived in any of the dimensions studied.

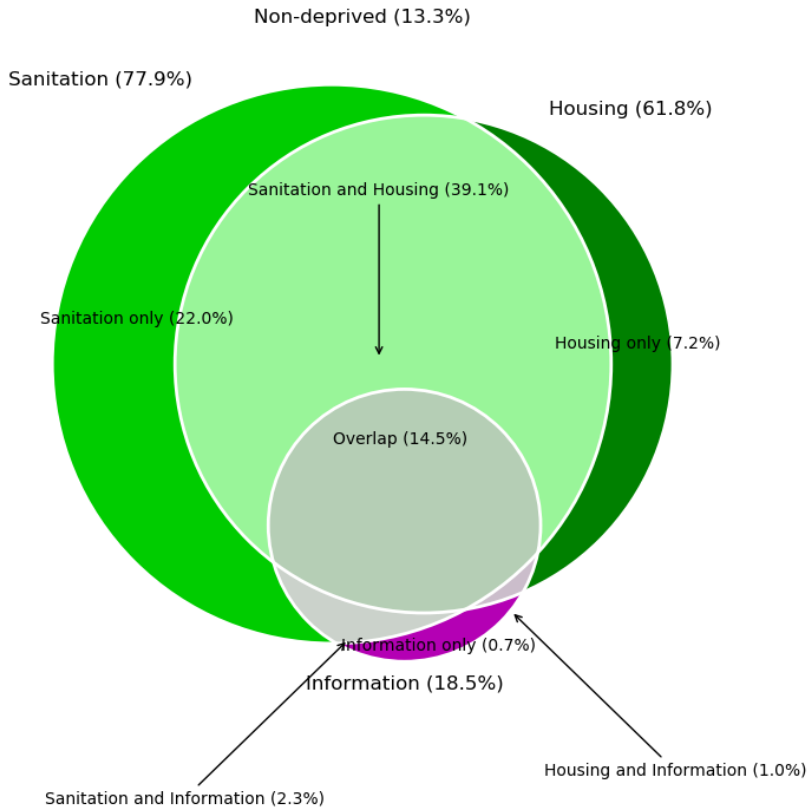
Figure 22. Three-way overlap between the dimensions Nutrition, Water, and Sanitation, 1-4 years



Source: Authors' calculation using KDHS 2022

Figure 23 shows the overlap between the dimensions Sanitation, Housing, and Information for children aged 5-14 years. It is observed that 14.5 per cent suffer from simultaneous deprivation in all three dimensions. In particular, the overlap between the dimensions Sanitation and Housing is considerably high, with 39.1 per cent deprived in both dimensions, but not in Information. It is therefore fundamental to promote a multi-sectoral strategy to address sanitation and housing deprivation among children in Kenya.

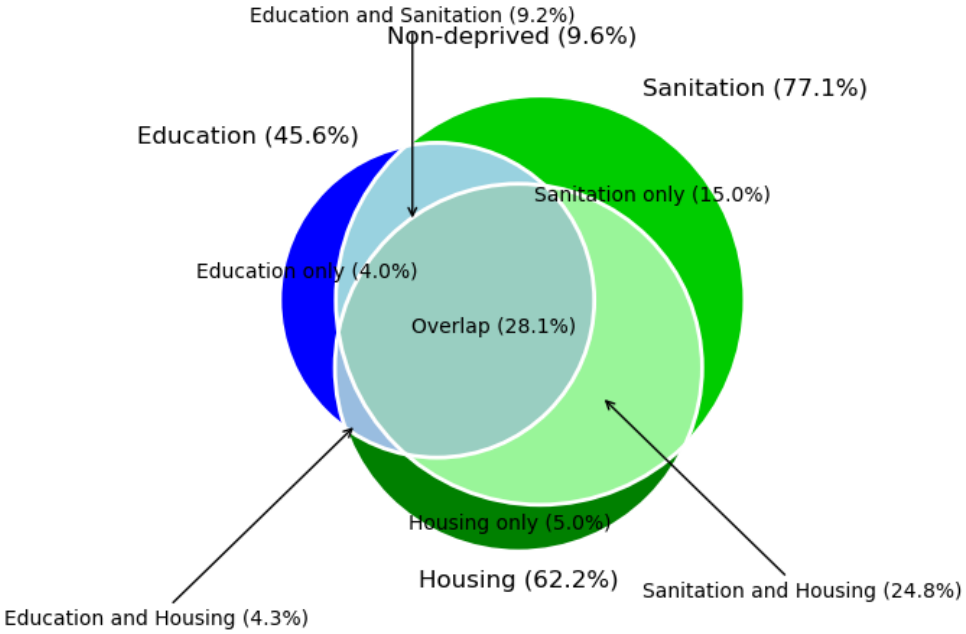
Figure 23. Three-way overlap between the dimensions Sanitation, Housing, and Information, 5-14 years



Source: Authors' calculation using KDHS 2022

Finally, nearly three in ten children aged 15-17 years face deprivation in the dimensions Education, Sanitation, and Housing at the same time (28.1 per cent) (see Figure 24). Similar to the previous age group, there is a relatively high overlap between the dimensions of Sanitation and Housing. Indeed, one in four children aged 15-17 years is deprived in the Sanitation and Housing dimensions, but not in Education. Around one in ten children is not deprived in any of the three dimensions analysed.

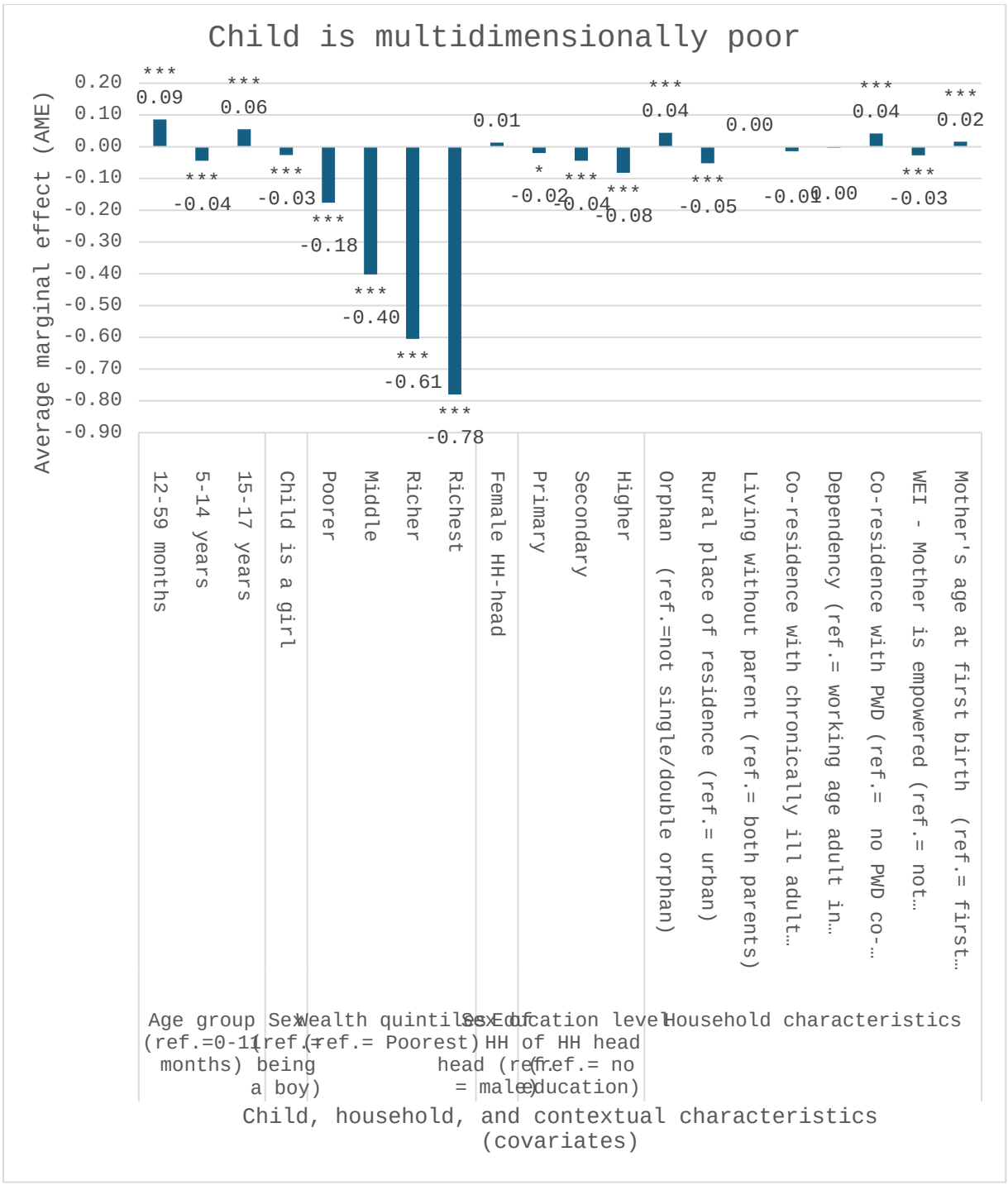
Figure 24. Three-way overlap between the dimensions Education, Sanitation, and Housing, 15-17 years

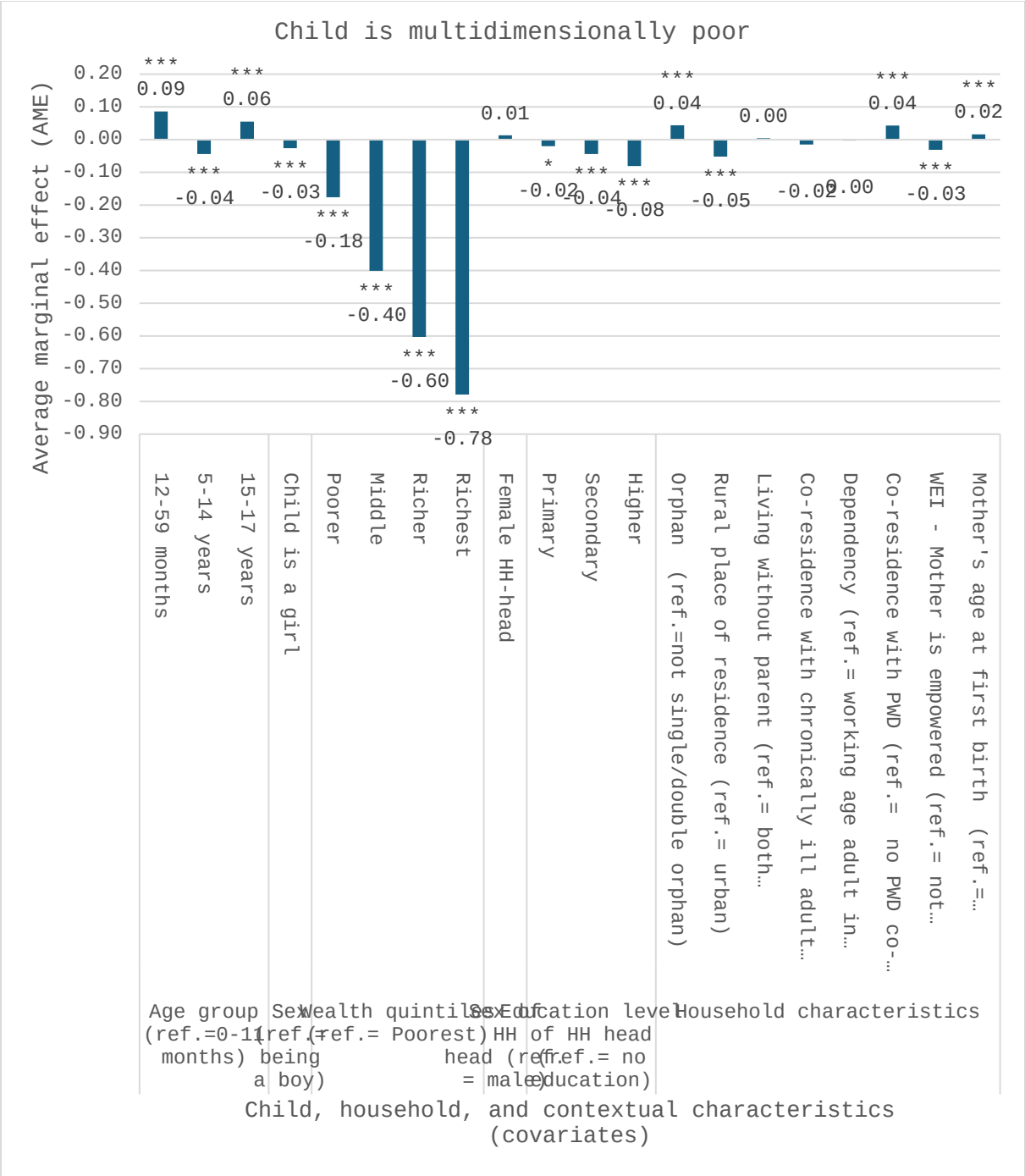


Source: Authors' calculation using KDHS 2022

4.10 Determinants of multidimensional deprivations in Kenya

Figure 25. Average marginal effects on the probability of child multidimensional poverty


Child is multidimensionally poor
Average marginal effect (AME)
0.20
0.10
0.00
-0.10
-0.20
-0.30
-0.40
-0.50
-0.60
-0.70
-0.80
-0.90
*** 0.09
*** -0.04
*** 0.06
*** -0.03
*** -0.18
*** -0.40
*** -0.61
*** -0.78
0.01
* -0.02
*** -0.04
*** -0.08
*** 0.04
*** -0.05
0.00
-0.01
0.00
*** 0.04
*** -0.03
*** 0.02
12-59 months
5-14 years
15-17 years
Child is a girl
Poorer
Middle
Richer
Richest
Female HH-head
Primary
Secondary
Higher
Orphan (ref.=not single/double orphan)
Rural place of residence (ref.= urban)
Living without parent (ref.= both parents)
Co-residence with chronically ill adult…
Dependency (ref.= working age adult in…
Co-residence with PWD (ref.= no PWD co-…
WEI - Mother is empowered (ref.= not…
Mother's age at first birth (ref.= first…
Age group (ref.=0-11 months)
Sex (ref.= being a boy)
Wealth quintiles (ref.= Poorest)
Sex of HH head (ref.= male)
Education level of HH head (ref.= no education)
Household characteristics
Child, household, and contextual characteristics (covariates)



Source: KDHS 2022

Note: Significance levels are indicated by asterisks: p < 0.01 (***), p < 0.05 (**), and p < 0.1 (*).

The results of the logistic regression identified several significant vulnerability markers associated with multidimensional poverty (Child is multidimensionally poor). Among child characteristics, being a girl reduces the likelihood of being multidimensionally poor by 3 percentage points compared to boys, while children aged 15–17 years are 10 percentage points more likely to be deprived compared to infants aged 0–11 months. Household wealth emerges as a strong protective factor, with the probability of multidimensional poverty decreasing progressively as the level of wealth increases: children in the richest households are 78 percentage points less likely to be multidimensionally poor compared to those in the poorest households. Similarly, higher levels of education of the household

head reduce the likelihood of poverty, with tertiary education offering an 8-percentage point reduction compared to no education. Being an orphan is associated with a 4-percentage point higher probability of being multidimensionally poor, while living in rural areas decreases the likelihood by 5 percentage points. Additionally, the presence of a person with a disability (PWD) in the household raises the probability of poverty by 4 percentage points, and children of younger mothers (age at first birth) experience slightly higher deprivation, with a 2-percentage point increase in likelihood. Children's multidimensional deprivation is also influenced by maternal empowerment**.** Maternal empowerment is inversely associated with child multidimensional poverty. Children whose mothers are empowered are less likely to experience multidimensional deprivation, highlighting the significant influence of maternal agency on child well-being. These findings reinforce the importance of addressing individual, household, and broader contextual factors when formulating policies aimed at reducing child poverty.

5. Conclusion and Policy Recommendations

This study underscores the multifaceted and interconnected nature of child vulnerability in Kenya. Monetary poverty remains a central determinant, with over 40 per cent of children living in financially constrained households. This economic limitation significantly hinders access to essential services such as education, healthcare, and adequate nutrition. Despite notable improvements in recent years, disparities persist across regions and wealth quintiles, with rural areas and marginalised counties experiencing the highest levels of deprivation.

Health-related vulnerabilities reveal critical inequities in access to immunisation services, highlighting the need for targeted interventions to reach underserved children and their caregivers. Nutritional challenges, including stunting and inadequate dietary intake continue to affect a substantial proportion of children. These outcomes are influenced by household wealth, the education level of caregivers, and the presence of chronic illness within the household.

Education-related vulnerabilities also remain prominent. Barriers to school attendance and literacy are particularly acute among children from poor and rural households, as well as those living with disabilities. These findings point to the urgent need for inclusive and equitable education policies that address structural and socio-economic barriers.

Protection-related vulnerabilities, such as exposure to violence, early childbearing, and lack of birth registration further exacerbate existing inequalities, leaving many children without the foundational safety nets necessary for their development and well-being. Structural and systemic barriers are particularly acute for children living in vulnerable settings, including those on the streets, in urban informal settlements, institutional care, or refugee camps. These groups require targeted attention and increased resource allocation to ensure their rights and needs are adequately addressed.

The findings also underscore the significance of multidimensional child poverty. Over half of all children in Kenya experience deprivation in at least three dimensions simultaneously. This highlights the compounded risks faced by children living in poverty and reinforces the need for holistic, multisectoral interventions. Addressing overlapping deprivations across health, nutrition, education, and protection is essential to improving child well-being and reducing long-term vulnerability.

Finally, cross-cutting risks such as macroeconomic challenges, climate-related vulnerabilities, and inequities in disability and ethnicity further complicate efforts to reduce child vulnerability. These

systemic factors require integrated policies and interventions that are sensitive to Kenya's diverse socio-economic and geographical contexts.

While wealth quintiles and education of the household head remain consistent and powerful predictors of child vulnerability in Kenya, this study adds important nuance to the conversation. Our findings show that other variables showing ambiguous or inconsistent effects, such as co-residence with a PWD, orphanhood, or the sex of the child, still carry significant weight in understanding vulnerability. The analysis of mothers' empowerment status as a potential determinant of children's vulnerability further expands our understanding of the complex interaction of women's empowerment (and the various factors constituting it as a composite index) with the well-being of their children. These factors, even when their direction of influence is not always clear-cut, deserve greater attention in both research and policy. In particular, qualitative approaches could help provide more insights into some of the markers of vulnerability that are complex and hard to capture through quantitative data collection. Moreover, our results highlight the importance of embracing a multidimensional approach to vulnerability. Rigid or overly simplistic definitions risk overlooking the diverse and intersecting challenges children face. Vulnerability does not manifest uniformly, but it takes different forms depending on the context and indicator used. Rather than downplaying the role of indicators that have shown ambiguous associations with the different vulnerability outcomes, we suggest that future research delve deeper into the specific interactions between factors to better understand how different forms of vulnerability are produced and sustained. In doing so, we can move toward more inclusive, context-sensitive interventions that reflect the complex realities on the ground.

Moving forward, the findings call for strengthened data collection, improved targeting of social protection programmes, and a coordinated approach across sectors to mitigate the risks and enhance the resilience of Kenya's children and their families. This report serves as a resource for informing evidence-based policy and programmatic interventions to promote the rights, well-being, and development of every child in Kenya.

5.1 Policy Recommendations

Based on the findings of this study on child vulnerability in Kenya, the following policy recommendations are proposed to address the multifaceted and overlapping challenges faced by children, with an emphasis on equity, inclusivity, and sustainability:

Strengthen inclusive social protection for all children

Considering the critical role of wealth in directly and indirectly driving many of the deprivations studied, there should be a transformative shift in the expansion of access to child benefits for families with children to ensure no vulnerable child is left behind. Programmes such as CT-OVC have shown wide-ranging positive impacts (e.g. increasing school enrolment, reducing early marriage and pregnancy, improving child health and productive impacts at the household level).

- The 2021-2022 UCB pilot targeting children aged 0–36 months in Kajiado, Embu and Kisumu Counties[115] showcased the potential of universal cash transfers to improve child well-being, enhance nutrition, and foster positive parenting practices. The delivery through mobile payments like M-Pesa proved efficient and scalable, despite

[115] UNICEF Innocenti – Global Office of Research and Foresight 2024.

initial challenges with registration and data management. These lessons can inform the design of a national programme.

- While targeted programmes like CT-OVC have been impactful, the breadth of vulnerabilities identified in this study, ranging from multidimensional poverty, malnutrition, and education deprivation to climate and economic shocks, demonstrates the need for a more inclusive approach. A universal programme would reduce exclusion errors and stigmatisation, ensuring every child benefits, regardless of specific vulnerability categories. The "cash plus" model from the UCB pilot, which integrated nutrition training, positive parenting education, and support for children with disabilities, should be expanded to maximise the impact of cash transfers. The new Persons with Disabilities Act 2025 reinforces this by mandating strong social protection measures for persons with disabilities, which should include disability-inclusive child grants or top-ups.
    - This integrated approach addresses the complex interplay of vulnerabilities while fostering community and social cohesion. To manage fiscal constraints, the programme could begin with universal coverage of young children (e.g., under five years) and progressively expand to cover all children as fiscal space and institutional capacity grow. This phased approach aligns with global best practices in universal cash transfer implementation. Given the significant investment required, a detailed fiscal space analysis should be undertaken to assess affordability, identify potential funding sources, and support phased expansion, planning sustainably and realistically.

Expand access to health, nutrition, and WASH services

Health and Nutrition

- Expand vaccination coverage by prioritising outreach to children in households with limited access to health facilities to achieve universal immunisation coverage.
- Scale up nutrition programmes to ensure that all children receive an adequate diet, particularly through food supplementation programmes and improved nutrition education for caregivers.
- Provide targeted health subsidies and caregiver support for households with chronic illness, to reduce the diversion of resources from children's needs.
- Integrate WASH with health and education initiatives to attain multiple benefits.

Education

- Address regional and wealth disparities in educational access and quality, and invest in infrastructure and teacher training in underserved regions, particularly in counties with low literacy rates and high dropout rates. Provide education-specific incentives, such as cash-plus support or school-based support, as part of or complementary to a UCB, and directly address barriers to school attendance, to help keep children in school, especially in rural areas and among lower wealth quintiles.

- Expand access to education for children with disabilities by increasing the number of specialised schools and ensuring existing schools are equipped to accommodate diverse needs. The new Persons with Disabilities Act (2025) guarantees the right to inclusive education.
- Enhance school feeding programmes in food-insecure areas, which include the ASALs, informal settlements, and refugee camps, as a strategy to improve enrolment and retention.
- Incorporating sustainable farming practices, school gardens contribute to long-term food security and empower students to become future changemakers in agriculture.
- Integrate sustainable school gardens into poverty and vulnerability reduction strategies. These gardens equip students with practical agricultural skills, improve nutrition through school meal supplementation, and reduce household food insecurity. By fostering self-reliance and environmental stewardship from an early age, school gardens can break cycles of poverty and build resilience in vulnerable communities.

Strengthen child protection systems and family care

- Improve birth registration rates by deploying mobile and digital civil registration units in remote and rural areas to close the urban-rural gap in birth registration. Eliminate or reduce financial barriers to birth registration for households in the lowest wealth quintiles and incentivise birth registration by expanding community awareness on the importance of birth registration and its link to access to public services.
- Conduct public awareness campaigns to highlight the need for child registration at birth and the linkages with accessing education, healthcare etc.
- Provide financial and psychosocial support for elderly caregivers and children in child-headed households to reduce dependency ratios and ensure basic needs are met.
- Develop reintegration programmes for street-connected children and children in institutions, focusing on family reunification, community-based care, and access to education.
- Strengthen enforcement of labour laws and increase community-level monitoring to address the worst forms of child labour and commercial exploitation.

Build climate resilience to protect children from shocks

- Mainstream child centred climate resilience in government policies. Roll out climate education in the education system in Kenya.
- Strengthen children's climate resilience through investments in disaster preparedness, water and sanitation infrastructure, and child-focused climate adaptation programmes.
- Expand adaptive social protection by integrating macroeconomic and climate risk assessments into social protection strategies to ensure timely support for households during economic downturns, and climatic shocks such as droughts and floods.

Mitigate Macroeconomic Risks

- Increase investments in child-sensitive social programmes by mobilising domestic and international funding to counter the effects of fiscal austerity.

- Medium- to long-term mitigation strategies for Kenya should focus on strengthening fiscal and external reserves, such as foreign exchange, enhancing disaster preparedness, and advancing structural reforms. To shield children from the combined risks of macroeconomic volatility and climate impacts, Kenya should incorporate both macroeconomic and climate indicators into regular risk assessments, enabling early and targeted interventions.[116] The CCDRM offers a solid foundation for county-level actions that prioritise climate adaptation and resilience for children, working alongside strategic frameworks such as the National Climate Action Plans, County Integrated Development Plans, annual plans, and county-specific climate adaptation plans.[117]
- Define and implement a set of attainable macroeconomic targets, such as inclusive GDP growth, controlled inflation, and employment generation, with the overarching goal of maintaining macroeconomic stability. Align fiscal, monetary, and exchange rate policies with child deprivation reduction targets by prioritising public investments in health, education, nutrition, and social protection. This integrated approach ensures that macroeconomic gains translate into tangible improvements in the well-being of vulnerable children, breaking intergenerational cycles of poverty and deprivation.

Data collection and future research

- Address data gaps in child protection variables, particularly regarding children in institutional care, children affected by gender-based violence, and children with disabilities.
- Establish long-term studies to track the impacts of vulnerabilities over the life cycle and evaluate the effectiveness of policy interventions.
- Conduct additional research to better understand the impact of specific vulnerability markers of interest (for example, gender, disability), as well as intersectional vulnerabilities.
- Explore the interaction between different vulnerabilities, such as the challenges faced by children in urban informal settlements, and issues like poor nutrition or limited access to healthcare. This will require additional data availability for correctly identifying children in urban informal settlements.
- Disaggregate the data geographically to compare ASAL (Arid and Semi-Arid Lands; 23 counties) versus non-ASAL areas; 24 counties.
- Invest in Citizen-Generated Data (CGD) to complement official statistics and address critical data gaps, particularly in areas where official data is unavailable, outdated, or unreliable. CGD offers localised, real-time insights into community needs and experiences, especially those of marginalised populations, including children, enabling more responsive and inclusive policy-making. Institutionalising CGD within national data systems can

[116] Cummins 2023.

[117] UNICEF Kenya 2024.

enhance accountability, improve service delivery, and ensure that no vulnerable group is left unseen or uncounted.

Multi-Sectoral collaboration

- Coordinate efforts across education, health, social protection, and justice sectors to address overlapping vulnerabilities comprehensively.
- Strengthen partnerships with community-based organisations to ensure locally relevant and sustainable solutions.
- Promote caregiver empowerment programmes that address financial literacy, parenting skills, and access to resources, particularly for mothers and guardians in vulnerable households.
- Promote cross-sectoral collaboration by pooling resources, expertise, and information to enhance the impact of interventions and ensure efficient, integrated service delivery, especially for vulnerable populations. Complex issues like child vulnerability, poverty, or health disparities often span multiple sectors (for example, education, health, social protection). Collaboration ensures that interventions address root causes, not just symptoms.

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7. Annex I: Differences in Coding between DHS 2014 and DHS 2022 for the Kenya MODA update

The following observations were made when reviewing the coding for the previous MODA analysis based on the DHS 2014.

Household Level Indicators

In the previous MODA analysis, only natural materials were considered deprivation. Rudimentary and permanent materials, on the other hand, were defined as non-deprivation.

When it comes to cooking fuel, the variable **hv226** is present in both datasets. However, an inconsistency was noted in the 2022 dataset, where the specific question related to solid cooking fuel could not be located in the questionnaire. Instead, new variables (**hv222** and **hv223**) with regards to cooking fuel were observed. Additional discussions with the national statistical office would be necessary to clarify which variables should be used.

Moreover, based on the 2014 DHS, households that do not cook food in the house were automatically considered as non-deprived, a practice that might overlook certain nuances in the data.

Female and Male Indicators

With regards to the indicator on HIV/AIDS knowledge, the handling of "Don't know" responses has evolved. In the DHS 2014 data, these responses, coded as "8," were treated as missing values. This treatment affects the overall analysis, as missing values can lead to different interpretations of the data. In more recent multidimensional deprivation measurements, the “Don’t know” values are often considered as deprived, as the respondent is not aware of the correct information.

Another important observation is made for all indicators at the men/women’s level (15-49 years) (e.g. HIV/AIDS knowledge, Media exposure, Literacy). For example, the 2022 DHS media exposure data showed a considerable proportion, about 10-12 per cent, of missing values after inputting the data at the household level. The data from the men’s questionnaire is collected in 1 out of 2 households only. Especially for boys from the oldest age group (15-17 years old), this might lead to a high per centage of missing values at the individual level. Further reviews are needed to assess the extent of the issue.

Children Under Five Indicators

The infant and young child feeding practices saw the introduction of new variables in the 2022 dataset. These variables include:

- **v410a**: Whether the child was given tea or coffee.

- **v413a**: Whether the child was given yogurt as a drink.

- **v413c**: Whether the child was given chocolate-flavoured drinks.

- **v413d**: Whether the child was given sodas, malt drinks, sports drinks, or energy drinks.

- **v414a**: Whether the child was given other vegetables.

- **v414b**: Whether the child was given processed meats like sausages, hot dogs, bacon, or canned food.

- **v414c**: Whether the child was given nuts or seeds.

- **v414d**: Whether the child was given insects.

- **v414r**: Whether the child was given chocolates, sweets, candies, pastries, etc.

- **v414t**: Whether the child was given chips, crisps, French fries, fried dough, or instant noodles.

These new variables reflect an expanded understanding of child nutrition and allow for more detailed analysis. However, certain variables from the 2014 dataset, such as **v412a** (which captured whether the child was given fortified baby food like Cerelac), were not included in the 2022 survey. Additionally, cheese products were included under the “No. of times gave milk products” variable in the analysis based on the DHS 2014.

For exclusive breastfeeding, the 2014 data was based solely on the variable **m4** (duration of breastfeeding). Notably, the variable **v404** (currently breastfeeding) was excluded in the 2014 analysis. Furthermore, if a child did not respond to any drink or food intake questions, the exclusive breastfeeding variable in 2014 was recoded to missing values.

With regards to the vaccination indicator, data were based solely on observations from vaccination cards for children aged 0-59 months using the 2014 DHS. However, the current analysis, may include additional variables (day/month/year of vaccination) to create the overall indicator. Moreover, data collection in 2022 was limited to children aged 0-35 months.

Data on stunting, wasting, and underweight children were extracted from the PR dataset in 2014. In 2022, data is also available in the KR dataset, which is specifically designed to understand the nutritional and health status of children under five.

Merging Data and Profiling Variables

For merging parents' data starting from the PR/individual level file, the 2014 dataset used a many-to-many (m:m) merging approach. It is recommended to switch to a many-to-one (m:1) merging strategy for better data integrity.

Regarding profiling variables, the age of household members was created using the PR dataset in 2014. It seems preferable to use the **hv105** variable, which directly indicates the age of household members, to ensure consistency and accuracy.

Lastly, the geographic division by provinces is not applicable in the 2022 dataset. However, the disaggregation by county is available.

This sub-chapter has highlighted the critical differences between the DHS 2014 and DHS 2022 datasets and analyses in Kenya. Understanding these variations is essential for researchers aiming to conduct comparative studies or track progress over time.

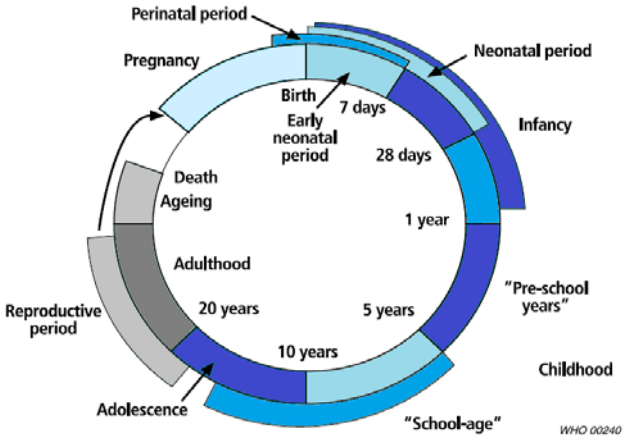
8. Annex II: MODA methodology

The MODA methodology builds on existing approaches of multidimensional poverty measurement such as the UNICEF's Global Study on Child Poverty and Disparities and Oxford Poverty and Human Development Initiative's (OPHI) Multidimensional Poverty Index.[118] MODA has five main characteristics that can be distinguished from existing studies in the field of child poverty and deprivation measurement:

1. It is **child-centred**. The child is the unit of analysis rather than the household since children experience deprivations and poverty differently from adults, especially with regards to developmental needs. The multidimensional deprivation analysis complements monetary/consumption-based measures of poverty to provide a more comprehensive picture of child well-being.
2. MODA takes into account a **rights-based approach**, in line with the UN Convention on the Rights of the Child, as well as with the Constitution of Kenya (2010).
3. It adopts a **life-cycle approach** (Figure 2) analysing separate age groups to reflect the fact that children's needs are not homogenous across their childhood, as children have different needs during early childhood, primary childhood, and adolescence, for example.
4. MODA recognises that a **child's experience of deprivation is multi-faceted and interrelated**, It enhances knowledge of sector-by-sector approaches with an **overlapping deprivation analysis**. This analysis indicates which of the multiple facets of child poverty are experienced simultaneously and highlights the various severity levels of deprivation. The "holistic approach" to children's needs emphasises that children's well-being cannot be compartmentalised into sectors (e.g. health, nutrition, and education) and that the multiple aspects of children's lives need to be placed simultaneously at the centre of any deprivation analysis.
5. It applies a whole-child oriented approach by measuring the **prevalence and the depth of deprivations** each child experiences simultaneously, identifying the most vulnerable children (with higher number of deprivations) and to understand the relationship between different deprivations. Thus, it supports the focus on equity because it allows one to concentrate on highly deprived groups in the society, and to create profiles including their geographical and socio-economic position.

Figure 26 Life-Cycle Approach

[118] UNICEF 2007; Alkire and Foster 2011; Alkire and Santos 2010, vol. 38.



Source: Claeson and Waldman (2000)

UNICEF's MODA is a flexible methodology that adapts to different input factors. The N-MODA is a specific application of the MODA methodology fitting the national context and using recent and high-quality survey data with customised choices of age groups, dimensions and thresholds. N-MODA aims to: (i) capture national values and objectives concerning child development; (ii) explore the profile of deprived children, to locate them both geographically and socially;[119] (iii) improve the understanding of how the different deprivations by sector overlap to inform which deprivations may need to be addressed simultaneously; (iv) inform equity-based public policy responses to child deprivation; and (v) indicate deprivation coincidences that need further theoretical and empirical elaboration.

9. Annex III: MODA: Analytical process

The MODA methodology will analyse risk factors and vulnerabilities, including vulnerability indices at the individual child, household, and community levels, with the child as the unit of analysis.

For each age set of selected parameters, based on international standards and national context, the following analyses are carried out. The analysis formulae for each component follow those described in the Step-by-Step methodology of de Neubourg et al. (2013)[120], and are as follows:

a. **Single indicator and dimension deprivation incidence**. The percentage of children deprived in each dimension and each dimension's constituting indicators will be estimated to provide an insight on child-relevant sectors. These indicators show which deprivations are particularly relevant for children of different age groups.
b. **The distribution of the number of dimensions children are deprived in**. Deprivations experienced per child will be counted to give an overview of the distribution of deprivations for all possible cut-offs (thresholds) among different age groups. The deprivation count enables analysing the depth of multidimensional deprivation. Results from this component of the analysis will also be used to i) define moderately and severely deprived children and ii) examine the differences between them.
c. **Multidimensional deprivation overlap analysis** looks at the different deprivations that are usually experienced simultaneously. Combinations of deprivations will be highlighted and the number of

[119] Profiling is the basis for the equity analysis, showing differences between geographical regions, area of residence, parents' socio-economic situation, wealth and other variables.

[120] De Neubourg, C., Chai, J., de Milliano, M., & Plavgo, I. (2013). *Step-by-step guidelines to the multiple overlapping deprivation analysis (MODA).*

children suffering from one to six (or less/more) deprivations at the same time will be estimated. This component will also shed light on the inequality in distribution of dimension deprivations experienced by each child. On a policy level, the overlap analysis can also provide evidence to advocate for specific synergistic efforts required across service sectors to holistically address children's deprivations.

d. **Multidimensional deprivation indices:** Several multidimensional deprivation indices will be calculated to provide summary statistics: (i) the headcount ratio (*H*) to look at the incidence of children deprived in multiple dimensions; (ii) the average intensity of deprivations among the deprived (*A*) to look at the number of deprivations a deprived child experiences as a share of the total number of possible deprivations; and (iii) the adjusted deprivation headcount (M_0) will be calculated to capture both the incidence and depth of deprivation in a single measure.

e. **The adjusted deprivation headcount (M_0)** will be decomposed by area of residence, region, and dimensions (and/or other sub-profiles) to show the contribution of each to the overall multidimensional child deprivation in the country. This would allow, for example, for a ranking of counties by the number of poor children based on a specific child poverty threshold.

f. **Profiling.** Each of these components of the analysis will be further decomposed by individual and household characteristics of children[121] including area of residence, region, wealth status, family size, household composition, sex, age, gender, disability status, and educational status of the household head, mother's educational attainment, mother's and father's economic activity, etc. The profiling of different indicators and indices by geographical variables will be given dedicated attention, given that it sheds light into disparities and inequalities in deprivation distribution across the country. For geographic profiling of all analytical components, we will produce ranking maps at the county level, and other sub-national levels as feasible.

10. Annex IV: Single Deprivation Analysis

This section presents the deprivation rates by indicator and dimension for each of the following age groups: 0 years, 1-4 years, 5-14 years and 15-17 years. The results provide a comprehensive understanding of the sectors that require attention to ensure the development of children.

10.1 1.1 Deprivation headcount rates by indicator and dimension

Table 7 shows the proportion of children deprived in each indicator analysed. A child is considered as deprived in a specific dimension, if (s)he suffers from deprivation in at least one of its indicators.

Table 7. Deprivation rates by indicator

Dimensions	Indicators of Deprivation	0 years	1-4 years	5-14 years	15-17 years	Reference age
Development	*Stunting*	**12.4**	**19.1**	-	-	0-4 y.o.
Nutrition	*Wasting*	**8.9**	**12.6**	-	-	0-4 y.o.

[121] What are the characteristics of deprived children/disaggregation by profiling variables wherever relevant such as type of residence, region, wealth status, family size, household composition, gender, age, educational status of the head of the household or the mother, mother's or father's occupation, etc.

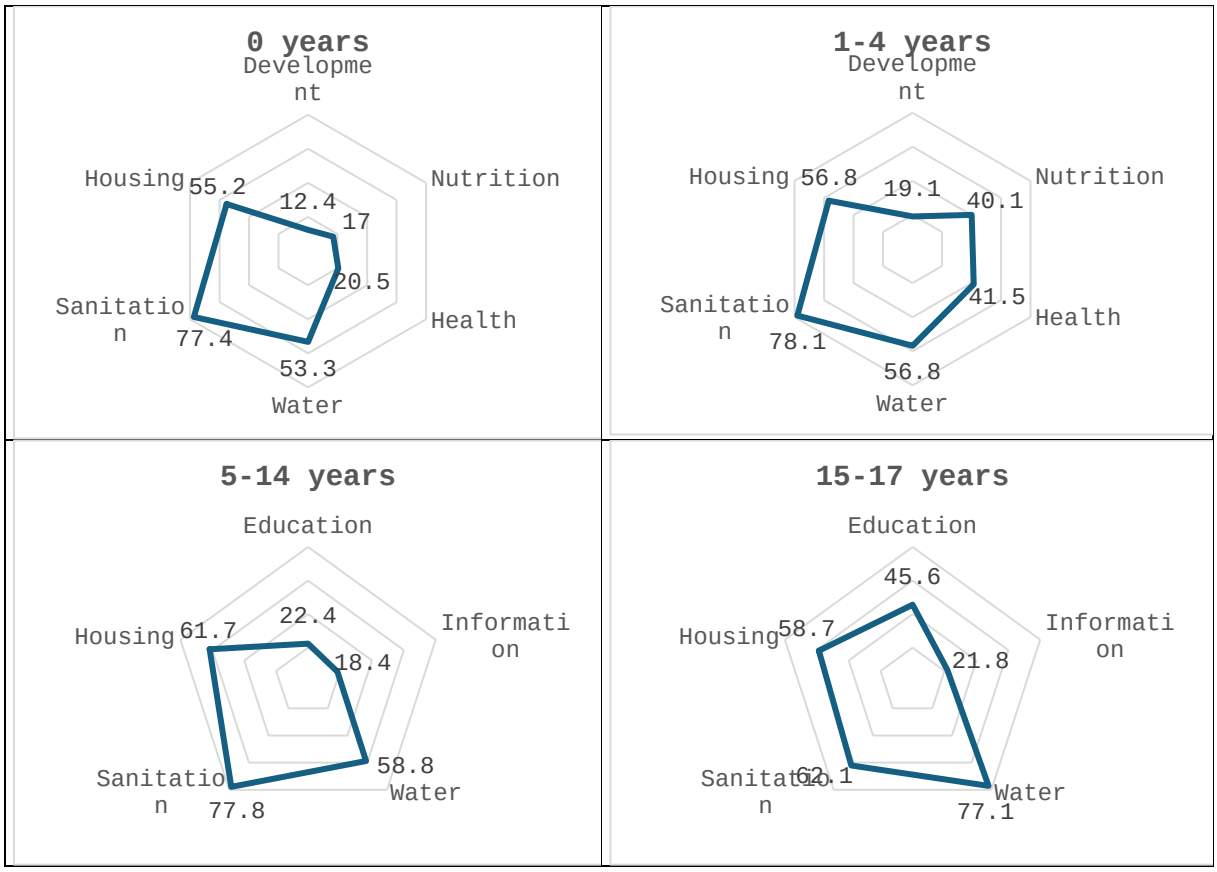
	Vitamin A supplement	**22.6**	**38.4**	-	-	0-4 y.o.
Health	*Vaccinations (0-35 months)*	**12.5**	**29.4**	-	-	0-35 m.o.
	Unskilled birth attendance	**10.7**	-	-	-	0-11 m.o.
Education	*School attendance*	-	-	**6.6**	**6.9**	5-17 y.o.
	Grade-for-age	-	-	**23.2**	**40.3**	8–17 y.o.
	Illiteracy	-	-	-	**6.8**	15-17 y.o.
Information	*Internet devices*	-	-	**4.0**	**3.1**	5-17 y.o.
	Exposure to mass media	-	-	**18.4**	**22.3**	5-17 y.o.
Water	*Water source*	**25.7**	**27.7**	**29.6**	**28.8**	0-17 y.o.
	Distance to water source	**16.7**	**19.3**	**21.4**	**20.1**	0-17 y.o.
	Water quantity	**33.4**	**35.8**	**35.9**	**35.9**	0-17 y.o.
Sanitation	*Toilet facility*	**33.3**	**35.8**	**39.5**	**38.2**	0-17 y.o.
	Shared toilet facilities	**43.6**	**40.9**	**33.4**	**29.6**	0-17 y.o.
	Handwashing	**51.2**	**52.7**	**53.7**	**54.3**	0-17 y.o.
Housing	*Floors and walls*	**13.0**	**14.3**	**16.3**	**15.1**	0-17 y.o.
	Indoor air pollution	**11.1**	**10.2**	**8.7**	**7.1**	0-17 y.o.
	Access to electricity	**48.9**	**50.7**	**56.2**	**56.6**	0-17 y.o.

Source: Authors' calculation using KDHS 2022

Note: m.o. = months old, y.o. = years old

The deprivation rates by dimension are displayed in Figure 27. A child is considered deprived in a particular dimension if (s)he faces deprivation in at least one of its indicators. In Kenya, for example, deprivation in the Housing dimension is determined by the indicators "*Dwelling material*", "*Indoor air pollution*", or "Access to electricity".

Figure 27. Deprivation rates by dimension



Source: Authors' calculation using KDHS 2022

Development

The developmental dimension consists of the indictor "*Stunting*" and is calculated for children under five years of age. Around 12.4 per cent of children aged 0 years and 19.1 per cent of children aged 1-4 years experience deprivation, with deprivation increasing slightly as children get older. Stunting can have significant long-term effects on the mental and physical development of children.[122] Therefore, it is crucial to provide adequate resources to the families of vulnerable children to reduce the prevalence of stunting in Kenya.

Nutrition

Of children aged 0 years, 9 per cent suffer from wasting, compared to 13 per cent of children aged 1-4 years. In addition, more than two in ten children from the youngest age group and 38 per cent of children aged 1-4 years did not receive Vitamin A supplements six months prior to the survey. Consequently, 17 per cent of children aged 0 years and 40 per cent of children aged 1-4 years are deprived in the Nutrition dimension.

Health

The Health dimension is included for children of the youngest two age groups (age 0 years and 1-4 years) and is measured using the indicators "*Vaccinations (0-35 months)*" and "*Birth attendance*". Approximately 11 per cent of children aged 0 years did not receive skilled birth attendance at birth. Furthermore, the proportion of children aged 12-35 months who are deprived in "*Vaccinations (0-35*

[122] Author(s) and UNICEF Kenya 2018.

months)" is more than double proportion of children aged 0-11 months (29 per cent versus 13 per cent respectively). Around four in ten children aged 1-4 years face deprivation in the Health dimension compared to 21 per cent of children aged 0 year.

Education

Education is analysed for the two oldest age groups (5-14 years and 15-17 years) based on the indicators "*School attendance*", "*Grade-for-Age*" and "*Illiteracy*". The vast majority of children in Kenya attend school, with a deprivation rate of 6.6 per cent for children aged 5-14 years and 6.9 per cent for children 15-17 years. Moreover, 23 per cent of children aged 5-14 years are at least two years behind in their schooling opposed to 40 per cent of older children (15-17 years). Less than 7 per cent of children aged 15-17 years cannot read a full sentence. At a dimensional level, around two in ten children aged 5-14 years and almost half of children aged 15-17 years are deprived in Education (22 per cent and 46 per cent).

Information

The deprivation rate for the Information dimension stands at 18 per cent for children aged 5-14 years and at 22 per cent for children aged 15-17 years. The dimension is comprised of the indicators "*Internet devices*" and "*Exposure to mass media*". Major differences can be observed between the indicators. About 4 per cent and 3 per cent of children aged 5-14 years and 15-17 years do not have access to internet devices in their household. Deprivation rates in terms of exposure to mass media, on the other hand, reach 18 per cent and 22 per cent of children of the same age groups.

Water

Approximately 26-30 per cent of children in Kenya live in households without access to an improved water source, while 17-21 per cent take more than 30 minutes to go, get water, and come back. In addition, one third of children live in households that had insufficient water quantities in the month prior to the survey. Deprivation rates are lower among younger children. Indeed, 53 per cent of children aged 0 years and 57 per cent of children aged 1-4 years are deprived in the Water dimension, while 59 per cent of children age 5-14 years suffer from deprivation. Of children aged 15-17 years, more than seven out of ten experience deprivation in the Water dimension (77 per cent).

Sanitation

The Sanitation dimension, consisting of the '*Toilet type'*, "*Shared toilet facilities*", and "*Handwashing*" indicators, is included for all age groups, with deprivation rates ranging from 62 per cent (15-17 years) to 78 per cent (1-4 years). Around 33-40 per cent of children live in households without access to an improved toilet facility, while more than half do not have a handwashing facility with water and soap available at home. Furthermore, 30-44 per cent of children share toilet facilities with other households, with deprivation rates being higher for children under five.

Housing

Finally, around 13-16 per cent of children are living in households with natural materials used for the floor and exterior walls. Indoor air pollution affects approximately 7-11 per cent, with deprivation rates slightly lower among older children (7 per cent for children aged 5-14 years and 59 per cent for children 15-17 years respectively). Access to electricity is a concern for about half of children in Kenya, with deprivation rates ranging from 49 per cent (0 years) to 57 per cent (15-17 years). Subsequently, nearly six in ten of children face deprivation in the Housing dimension.

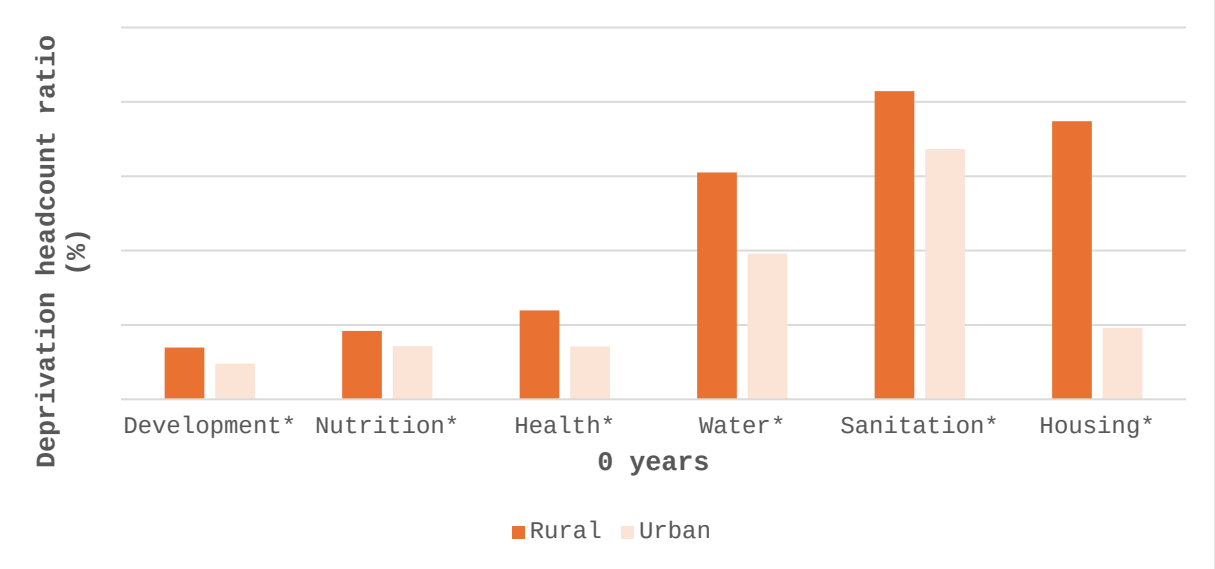
10.2 1.2 Dimension headcount rates by various characteristics

Furthermore, the results are disaggregated by the following selection of geographic, individual and household characteristics: area of residence, sex of the child, education level of the household head and wealth quintile. The key findings are shown in Figures 28-31, while all results by age group are presented in Tables 10-13.

Area of residence

All identified differences between rural and urban areas for all age groups are statistically significant. Figure 28/Table 8 shows the deprivation rates by dimension and area of residence for the youngest age group (0 years). More than seven in ten children living in rural areas experience deprivation in the Housing dimension (75 per cent), compared to only 19 per cent of children living in urban areas. In addition, 61 per cent of children in rural areas are deprived in the Water dimension, opposed to 39 per cent of children in urban areas. Similar results are observed for older age groups.

Figure 28. Deprivation rates by dimension and area of residence, 0 years



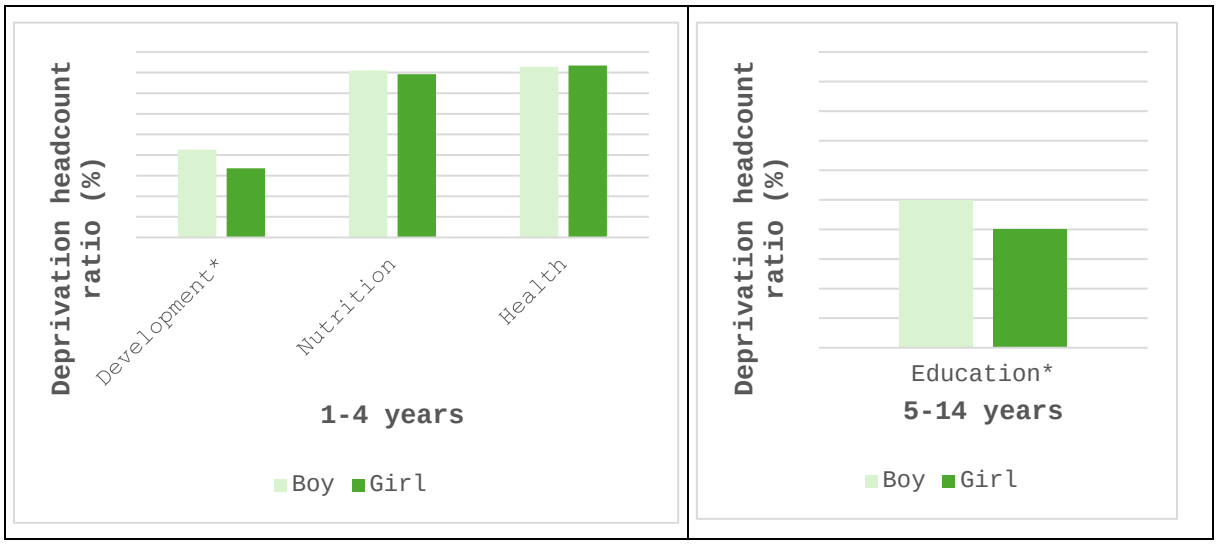
Source: Authors' calculation using KDHS 2022

Note: p<0.05 in Chi-squared test of independence.

Sex of the child

The sex of the child displays some differences in terms of deprivation levels among children in Kenya, in favour of girls. With regards to the dimensions measured at the individual level, both Development and Education indicate statistically significant disparities for children under five years of age and children aged 5 to 17 years respectively. As shown in Figure 29/Table 9, 21 per cent of boys aged 1-4 years suffer from deprivation in the Development dimension as opposed to 17 per cent of girls this age. In addition, among children aged 5-14 years, boys present higher deprivation rates for Education than girls (25 per cent versus 20 per cent).

Figure 29. Deprivation rates by dimension and sex of the child, 1-4 years and 5-14 years



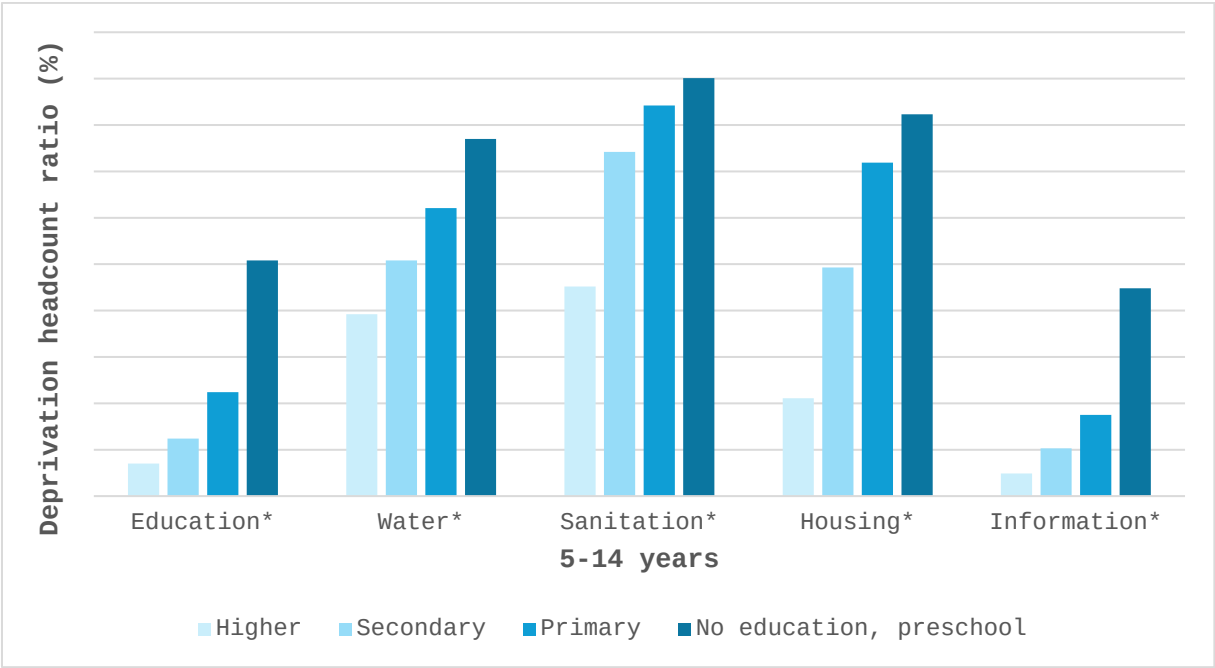
Source: Authors' calculation using KDHS 2022

Note: p<0.05 in Chi-squared test of independence.

Education level of the household head

The education level of the head of the household is related to the level of deprivation experienced by children. Children living with higher educated household heads are less likely to face deprivation in all dimensions of child-wellbeing analysed. In particular, 21 per cent of children aged 5-14 years with a higher educated household head are deprived in the Housing dimension compared to 82 per cent of children living with a household head who attained no education or preschool only.

Figure 30. Deprivation rates by dimension and education level of the household head, 5-14 years



Source: Authors' calculation using KDHS 2022

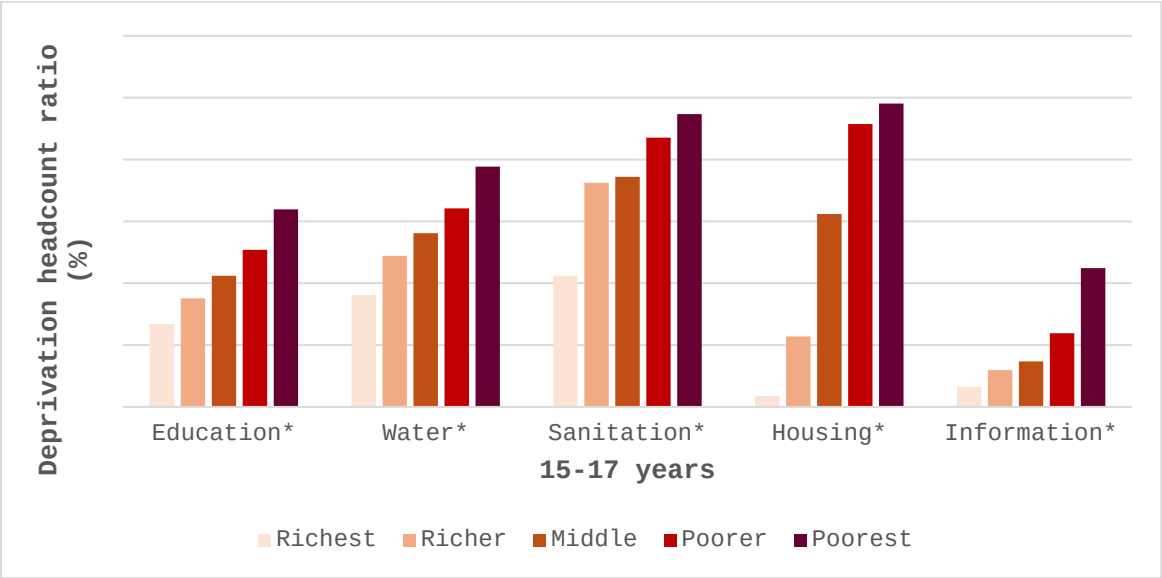
Note: p<0.05 in Chi-squared test of independence.

Wealth quintile

Children living in households belonging to the poorest wealth quintiles are worst off when it comes to deprivation (see Figure 31/Table 10). For example, the proportion of children aged 15-17 years living

in the poorest households who are deprived in Education is twice as high as children belonging to the richest wealth quintile (63.9 per cent versus 26.8 per cent). The discrepancies are also particularly large in the Housing and Sanitation dimensions.

Figure 31. Deprivation rates by dimension and wealth quintile, 15-17 years



Source: Authors' calculation using KDHS 2022

Note: p<0.05 in Chi-squared test of independence.

Table 8. Deprivation rates by dimension and various characteristics, 0 years

0 years		Development	Nutrition	Health	Water	Sanitation	Housing
	National	12.4	17.0	20.5	53.3	77.4	55.2
Area of residence	*Rural*	13.9*	18.4*	23.9*	61.0*	82.9*	74.8*
	Urban	9.6*	14.3*	14.2*	39.2*	67.3*	19.2*
Sex of the child	*Boy*	13.9*	18.2	20.7	53.3	78.5	55.1
	Girl	10.8*	15.8	20.3	53.2	76.2	55.2
Education level of the household head	*Higher*	7.1*	13.4*	11.4*	37.6*	54.1*	24.1*
	Secondary	11.7*	14.1*	12.3*	48.0*	77.0*	45.4*
	Primary	14.5*	17.2*	21.6*	58.0*	85.5*	70.4*
	No education, preschool	15.6*	28.4*	53.3*	79.9*	93.8*	86.9*
Wealth quintile	*Richest*	7.6*	10.6*	11.3*	30.2*	44.1*	2.2*
	Richer	8.2*	16.5*	12.2*	44.5*	82.5*	23.6*

	Middle	13.1*	14.5*	16.6*	52.0*	74.4*	62.1*
	Poorer	15.9*	15.4*	18.5*	61.1*	87.9*	91.7*
	Poorest	17.0*	26.4*	41.3*	77.5*	96.9*	98.1*

Source: Authors' calculation using KDHS 2022

Note: p<0.05 in Chi-squared test of independence.

Table 9. Deprivation rates by dimension and various characteristics, 1-4 years

1-4 years		Development	Nutrition	Health	Water	Sanitation	Housing
	National	19.1	40.1	41.5	56.8	78.1	56.8*
Area of residence	*Rural*	22.0*	42.6*	43.5*	63.5*	84.2*	76.0*
	Urban	13.1*	35.0*	37.4*	43.8*	66.3*	19.5*
Sex of the child	*Boy*	21.3*	40.5	41.4	57.1	78.2	57.0*
	Girl	16.8*	39.6	41.6	56.4	78.0	56.5*
Education level of the household head	*Higher*	9.3*	33.1*	30.6*	37.5*	51.5*	20.7*
	Secondary	16.1*	35.0*	34.7*	50.5*	77.3*	46.0*
	Primary	22.9*	41.5*	43.2*	62.0*	85.8*	69.8*
	No education, preschool	25.8*	55.5*	62.7*	79.6*	90.6*	85.0*
Wealth quintile	*Richest*	9.4*	31.9*	33.6*	31.4*	43.9*	2.1*
	Richer	12.8*	34.9*	38.1*	49.9*	81.6*	22.9*
	Middle	16.9*	36.5*	42.4*	55.5*	77.9*	60.9*
	Poorer	22.8*	39.4*	43.5*	62.7*	87.3*	90.6*
	Poorest	30.3*	53.9*	47.6*	79.2*	96.3*	97.9*

Source: Authors' calculation using KDHS 2022

Note: p<0.05 in Chi-squared test of independence.

Table 10. Deprivation rates by dimension and various characteristics, 5-14 years

5-14 years		Education	Water	Sanitation	Housing	Information
	National	22.4	58.8	77.8	61.7	18.4
Area of residence	*Rural*	25.3*	63.3*	82.8*	76.9*	21.0*
	Urban	14.9*	46.8*	64.6*	21.4*	11.4*
Sex of the child	*Boy*	24.9*	58.8	78.4	62.4	18.7
	Girl	20.0*	58.7	77.3	61.1	18.0
Education level of the	*Higher*	7.0*	39.2*	45.2*	21.1*	4.9*
	Secondary	12.4*	50.8*	74.2*	49.3*	10.3*

household head	*Primary*	22.4*	62.1*	84.2*	71.9*	17.5*
	No education, preschool	50.8*	77.0*	90.1*	82.3*	44.8*
Wealth quintile	*Richest*	8.2*	34.1*	41.5*	2.6*	3.5*
	Richer	12.6*	49.7*	75.1*	23.5*	7.6*
	Middle	16.9*	55.8*	76.5*	61.0*	10.2*
	Poorer	22.0*	63.2*	86.6*	91.0*	15.5*
	Poorest	42.4*	78.4*	95.5*	98.2*	43.6*

Source: Authors' calculation using KDHS 2022

Note: p<0.05 in Chi-squared test of independence.

Table 11. Deprivation rates by dimension and various characteristics, 15-17 years

15-17 years		Education	Water	Sanitation	Housing	Information
	National	45.6	58.7	77.1	62.1	21.8
Area of residence	*Rural*	48.6*	62.3*	81.0*	75.1*	23.7*
	Urban	36.4*	47.9*	65.2*	22.9*	15.8*
Sex of the child	*Boy*	49.3*	59.3	77.4	63.1	20.4*
	Girl	41.7*	58.1	76.7	61.1	23.2*
Education level of the household head	*Higher*	27.4*	40.6*	45.2*	23.6*	10.6*
	Secondary	34.2*	53.6*	73.4*	49.7*	14.1*
	Primary	50.4*	61.1*	83.2*	72.3*	22.2*
	No education, preschool	62.1*	73.9*	85.3*	76.6*	42.7*
Wealth quintile	*Richest*	26.8*	36.2*	42.4*	3.6*	6.5*
	Richer	35.1*	48.9*	72.5*	22.8*	11.9*
	Middle	42.4*	56.2*	74.4*	62.4*	14.7*
	Poorer	50.8*	64.2%*	87.1*	91.5*	23.8*
	Poorest	63.9*	77.7*	94.7*	98.1*	44.9*

Source: Authors' calculation using KDHS 2022

Note: p<0.05 in Chi-squared test of independence.

10.3 1.3 Trend analysis

Table 12 presents the trend analysis between 2014 and 2022 based on the indicators available in both datasets. Deprivation rates decreased significantly for the indicators "*Water source*", "*Toilet type*", "*Floors and walls*" and "*Indoor air pollution*" across all age groups. Moreover, deprivation in terms of stunting decreased from 29 per cent in 2014 to 19 per cent for children aged 0 years. A decline in deprivation is also observed for children aged 0 years with regards to the indicators "*Vaccinations*" and "*Unskilled birth attendance*". In 2014, 20 per cent of children (0 years) did not receive all basic

vaccinations compared to 13 per cent in 2022. Furthermore, 33 per cent of children faced deprivation did not receive skilled attendance during birth in 2014 as opposed to only 11 per cent in 2022.

Table 12. Trend analysis of indicator deprivations between 2014 and 2022

Dimensions	Indicators of Deprivation	2014				2022			
		0 years	1-4 years	5-14 years	15-17 years	0 years	1-4 years	5-14 years	15-17 years
Development	*Stunting*	12.2	28.9	-	-	12.4	19.1	-	-
Nutrition	*Wasting*	8.6	13.1	-	-	8.9	12.6	-	-
	Vitamin A supplement	23.0	28.2	-	-	22.6	38.4	-	-
Health	*Vaccinations (0-35 months)*	20.4	29.3	-	-	12.5	29.4	-	-
	Unskilled birth attendance	32.7		-	-	10.7	-	-	-
Education	*School attendance*	-	-	5.6	11.6	-	-	6.6	6.9
	Grade-for-age	-	-	25.1	28.2	-	-	23.2	40.3
	Illiteracy	-	-		7.7	-	-	-	6.8
Information	*Information devices*	-	-	10.6	8.6	-	-	4.0	3.1
	Exposure to mass media	-	-	22.2	23.7	-	-	18.4	21.8
Water	*Water source*	35.3	35.1	37.7	34.7	25.7	27.7	29.6	28.8
	Distance to water	20.2	19.7	21.6	20.7	16.7	19.3	21.4	20.1
Sanitation	*Toilet type*	54.4	54.3	57.9	56.3	33.3	35.8	39.5	38.2
Housing	*Floors and walls*	41.9	41.9	43.7	39.9	13.0	14.3	16.3	15.1
	Indoor air pollution	20.8	20.5	16.1	12.4	11.1	10.2	8.7	7.1

Source: Authors' calculation using KDHS 2022

On the other hand, an increase in deprivation is observed for the indicator '*Vitamin A supplement*" for children aged 1-4 years, from 28 per cent in 2014 to 38 per cent in 2022. This deterioration of the situation was confirmed by 2022 the Demographic and Health Survey report. In addition, 28 per cent of children aged 15-17 years were at least two years behind in their schooling in 2014, compared to 40 per cent of children the same age in 2022.

11. Annex V: Three-way deprivation overlap analysis at the national level, by age group

Table 13. Three-way overlap analyses for children aged 0 years (KDHS 2022)

Combination of three dimensions	Overlap between all dimensions	Overlap between first two dimensions	Overlap between first and third dimensions	Overlap between second and third dimensions	Deprivation in only first dimension	Deprivation in only second dimension	Deprivation in only third dimension	Deprived in none of the three dimensions
Water, Sanitation, Housing	31.9%	12.4%	4.0%	16.1%	4.9%	16.9%	3.1%	10.6%
Health, Sanitation, Housing	12.8%	3.4%	1.3%	35.2%	1.9%	25.9%	5.8%	13.6%
Health, Water, Housing	10.8%	2.4%	3.3%	25.1%	2.9%	14.9%	15.9%	24.6%
Health, Water, Sanitation	11.9%	1.4%	4.4%	32.5%	1.8%	7.6%	28.7%	11.9%
Nutrition, Sanitation, Housing	9.5%	4.1%	1.1%	38.5%	1.5%	25.3%	6.0%	14.0%
Nutrition, Water, Housing	7.3%	2.2%	3.4%	28.7%	3.4%	15.2%	15.8%	24.1%
Nutrition, Water, Sanitation	8.2%	1.3%	5.4%	36.1%	1.4%	7.7%	27.6%	12.3%
Nutrition, Health, Housing	4.1%	0.8%	6.6%	10.0%	4.7%	4.5%	34.5%	34.8%
Nutrition, Health, Sanitation	4.5%	0.4%	9.1%	11.7%	2.2%	2.8%	52.1%	17.2%
Nutrition, Health, Water	3.8%	1.1%	5.7%	9.5%	5.6%	5.0%	34.4%	34.9%
Development, Sanitation, Housing	6.7%	3.2%	0.9%	41.3%	1.1%	26.2%	6.3%	14.4%
Development, Water, Housing	5.2%	1.3%	2.4%	30.8%	2.9%	16.1%	16.8%	24.6%
Development, Water, Sanitation	5.6%	0.8%	4.3%	38.7%	1.1%	8.2%	28.8%	12.5%
Development, Health, Housing	2.0%	0.5%	5.6%	12.1%	3.7%	4.8%	35.5%	35.8%

Development, Health, Sanitation	2.2%	0.3%	7.7%	14.1%	1.6%	2.8%	53.4%	17.9%
Development, Health, Water	1.9%	0.6%	4.5%	11.3%	4.8%	5.6%	35.6%	35.7%
Development, Nutrition, Housing	3.7%	1.4%	3.9%	7.0%	2.8%	4.1%	40.6%	36.5%
Development, Nutrition, Sanitation	4.5%	0.6%	5.4%	9.1%	1.3%	2.0%	58.4%	18.7%
Development, Nutrition, Water	2.9%	2.2%	3.5%	6.5%	3.2%	4.6%	40.4%	36.7%
Development, Nutrition, Health	1.4%	3.7%	1.1%	3.5%	5.6%	7.6%	13.4%	63.7%

Table 14. Three-way overlap analyses for children aged 1-4 years (KDHS 2022)

Combination of three dimensions	Overlap between all dimensions	Overlap between first two dimensions	Overlap between first and third dimensions	Overlap between second and third dimensions	Deprivation in only first dimension	Deprivation in only second dimension	Deprivation in only third dimension	Deprived in none of the three dimensions
Water, Sanitation, Housing	33.6%	14.0%	4.3%	16.3%	4.9%	14.3%	2.6%	10.1%
Health, Sanitation, Housing	13.7%	6.2%	1.9%	36.1%	3.1%	22.1%	5.0%	11.9%
Health, Water, Housing	10.9%	4.2%	4.7%	26.9%	5.1%	14.7%	14.2%	19.2%
Health, Water, Sanitation	12.9%	2.2%	7.0%	34.7%	2.8%	7.0%	23.5%	9.9%
Nutrition, Sanitation, Housing	21.2%	9.4%	2.8%	28.7%	4.6%	18.9%	4.2%	10.3%
Nutrition, Water, Housing	16.7%	6.4%	7.2%	21.2%	7.6%	12.5%	11.7%	16.7%
Nutrition, Water, Sanitation	19.8%	3.4%	10.8%	27.8%	4.0%	5.8%	19.7%	8.7%
Nutrition, Health, Housing	5.2%	2.0%	18.7%	10.4%	12.0%	7.2%	22.4%	22.0%
Nutrition, Health, Sanitation	6.2%	1.1%	24.4%	13.7%	6.3%	3.9%	33.9%	10.5%

Nutrition, Health, Water	5.2%	2.1%	18.0%	9.9%	12.7%	7.8%	23.7%	20.7%
Development, Sanitation, Housing	11.4%	3.9%	1.4%	38.4%	1.2%	24.4%	5.5%	13.8%
Development, Water, Housing	8.8%	2.3%	4.0%	29.1%	2.8%	16.6%	14.9%	21.6%
Development, Water, Sanitation	9.8%	1.3%	5.5%	37.8%	1.3%	7.9%	25.0%	11.5%
Development, Health, Housing	3.8%	1.3%	9.0%	11.8%	3.8%	8.0%	32.1%	30.2%
Development, Health, Sanitation	4.4%	0.8%	10.9%	15.5%	1.8%	4.3%	47.3%	15.0%
Development, Health, Water	3.4%	1.8%	7.8%	11.7%	5.0%	8.1%	33.9%	28.4%
Development, Nutrition, Housing	8.0%	2.8%	4.9%	16.0%	2.3%	11.2%	28.0%	26.9%
Development, Nutrition, Sanitation	9.4%	1.4%	6.0%	21.2%	1.2%	6.0%	41.6%	13.3%
Development, Nutrition, Water	7.1%	3.7%	4.0%	16.1%	3.1%	11.2%	29.6%	25.3%
Development, Nutrition, Health	2.9%	7.9%	2.3%	4.4%	4.9%	22.8%	15.4%	39.5%

Table 15. Three-way overlap analyses for children aged 5-14 years (KDHS 2022)

Combination of three dimensions	Overlap between all dimensions	Overlap between first two dimensions	Overlap between first and third dimensions	Overlap between second and third dimensions	Deprivation in only first dimension	Deprivation in only second dimension	Deprivation in only third dimension	Deprived in none of the three dimensions
Sanitation, Housing, Information	14.5%	39.1%	2.3%	1.0%	22.0%	7.2%	0.7%	13.3%

Water, Housing, Information	11.3%	30.0%	1.6%	4.2%	15.9%	16.2%	1.3%	19.5%
Water, Sanitation, Information	12.0%	36.8%	0.9%	4.8%	9.1%	24.3%	0.7%	11.4%
Water, Sanitation, Housing	36.3%	12.5%	5.1%	17.3%	4.9%	11.8%	3.1%	9.0%
Education, Housing, Information	6.4%	11.2%	0.8%	9.0%	4.0%	35.1%	2.1%	31.4%
Education, Sanitation, Information	6.8%	12.8%	0.4%	9.9%	2.4%	48.4%	1.2%	18.1%
Education, Sanitation, Housing	16.2%	3.4%	1.5%	37.4%	1.4%	20.9%	6.7%	12.6%
Education, Water, Information	5.7%	9.7%	1.5%	7.2%	5.5%	36.2%	4.0%	30.2%
Education, Water, Housing	12.8%	2.5%	4.8%	28.5%	2.2%	14.9%	15.6%	18.6%
Education, Water, Sanitation	13.9%	1.5%	5.7%	34.9%	1.4%	8.5%	23.4%	10.8%

Table 16. Three-way overlap analyses for children aged 5-14 years (KDHS 2022)

Combination of three dimensions	Overlap between all dimensions	Overlap between first two dimensions	Overlap between first and third dimensions	Overlap between second and third dimensions	Deprivation in only first dimension	Deprivation in only second dimension	Deprivation in only third dimension	Deprived in none of the three dimensions
Sanitation, Housing, Information	15.4%	37.4%	3.5%	1.7%	20.7%	7.6%	1.1%	12.5%
Water, Housing, Information	11.5%	29.0%	2.6%	5.6%	15.6%	16.1%	2.1%	17.6%
Water, Sanitation, Information	12.6%	35.5%	1.5%	6.3%	9.1%	22.7%	1.3%	10.9%
Water, Sanitation, Housing	34.8%	13.3%	5.7%	18.0%	5.0%	11.0%	3.6%	8.6%
Education, Housing, Information	10.4%	22.0%	2.3%	6.7%	10.9%	23.0%	2.4%	22.3%

Education, Sanitation, Information	11.4%	25.9%	1.2%	7.5%	7.1%	32.3%	1.6%	13.0%
Education, Sanitation, Housing	28.1%	9.2%	4.3%	24.8%	4.0%	15.0%	5.0%	9.6%
Education, Water, Information	8.7%	19.8%	4.0%	5.4%	13.1%	24.8%	3.7%	20.5%
Education, Water, Housing	21.8%	6.8%	10.6%	18.7%	6.5%	11.5%	11.0%	13.2%
Education, Water, Sanitation	24.6%	4.0%	12.7%	23.5%	4.3%	6.6%	16.3%	8.0%

12. Annex VI: Desk Review on Conceptual Frameworks on Child Vulnerability and Related Research

12.1 Conceptual Frameworks on Child Vulnerability

While child vulnerability is frequently referred to in studies on child poverty and deprivation, as well as within research on child development, and has been specifically recognised by the UN Convention on the Rights of the Child[123], there have been many disjointed attempts to conceptualise and analyse it.[124] Many frameworks have been developed by experts in different fields to define, describe and measure vulnerabilities faced by children. This desk review expands on that provided in section 3.1.1 to provide an overview of different conceptual frameworks of child vulnerability as well as the indicators used to assess it. This chapter explores the conceptual frameworks that have been developed to define and address child vulnerability, with a specific focus on their application in the Kenyan context.

The Role of Monetary Poverty in Child Vulnerability

Research suggests that monetary poverty is a central determinant of material deprivation and child vulnerability globally and specifically in Kenya, as households with limited financial resources struggle to meet their children's basic needs, leading to adverse outcomes such as malnutrition, poor educational attainment, and inadequate access to healthcare.[125] Within other conceptual frameworks on childhood vulnerability, monetary poverty frequently features as a determinant of vulnerability or a factor underlying material deprivation, which contributes to vulnerability or is conceptualised as one form of vulnerability.[126]

The 2018 UNICEF-WFP study on child vulnerability in Kenya highlighted household wealth as the most reliable and consistent predictor of childhood vulnerability, positing that children living in poorer households were more likely to experience adverse outcomes across various dimensions such as health, education, and nutrition, but also that this offered the most effective entry point for social protection such as cash transfers targeting children.[127]

However, monetary poverty is only one aspect of a broader spectrum of vulnerabilities. As emphasized by international bodies and frameworks purported by the United Nations CRC, UNICEF, World Vision, the OECD and the World Bank, child vulnerability is also shaped by deprivation and violations of basic and human rights, such as lack of access to quality education, health services, and social protection.

Multidimensional and lifecycle-sensitive frameworks for conceptualising childhood vulnerability

The **OECD's conceptual framework for defining childhood vulnerability** posits that child vulnerability stems from the interaction of various factors that accumulate over time, with the types and degrees

[123] UN General Assembly 1989.

[124] Arora et al. 2015; Skinner et al. 2006; Minujin et al. 2016; Bagattini 2019; Etzel 2020; Herring 2023; Lee et al. 2014; UNICEF 2014; OECD 2019; USAID, UNICEF, and SIDA 1999; Qi and Wu 2020; Schweiger and Graf 2017; World Bank 2004.

[125] UNICEF 2007; Salmeron Gomez et al. 2023; KNBS 2023a; UNICEF Kenya and Kenya National Bureau of Statistics 2020.

[126] Skinner et al. 2006; OECD 2019; Bagattini 2019.

[127] National Social Protection Secretariat, WFP Kenya, and UNICEF Kenya 2018.

of vulnerability evolving as these factors change.[128] According to this framework, age plays a crucial role in shaping children's needs and exposing them to new risks. For instance, infants, who are entirely dependent on caregivers, are particularly sensitive to parental health and material deprivation. Young children under three are especially affected by family stress and deprivation due to rapid brain development. In contrast, older adolescents face risks and opportunities within their communities, making the presence of supportive adults and access to quality education and economic opportunities critical for their well-being. Factors contributing to child vulnerability were defined as individual factors (i.e. disability, mental health, immigrant background), and environmental factors (i.e. income poverty and material deprivation, parental influence, intimate partner violence (IPV), family stress, neighbourhoods and schools). The OECD framework also highlights the importance of building resilience by enhancing protective factors such as access to education, healthcare, and supportive family environments, to mitigate the risks associated with these vulnerabilities.

In developing a definition of OVC**, Skinner et al.** (2006) developed a framework to define vulnerable children as those who do not have certain basic rights fulfilled. Aside from orphanhood being a major determinant of vulnerability, the definition is centred around the three fundamental aspects of dependence: "1) Material aspects — money, food, clothing, shelter, health care and education; 2) Emotional aspects — care, love, support, space to grieve and containment of emotions; 3) Social aspects — absence of a supportive peer group, of role models to follow, or of guidance in difficult situations, and risks in the immediate environment."[129]

The **World Bank "Orphans and vulnerable children (OVC)**" toolkit defines vulnerability as "the group of children that experience negative outcomes, such as the loss of their education, morbidity, and malnutrition, at higher rates than do their peers".[130] Specific groups of vulnerable children[131] are singled out based on desk review of existing data and reports on child vulnerability, particularly in Africa. These identified groups included: orphans, particularly those affected by HIV/AIDS; children associated with armed conflict; street children; children involved in the worst forms of child labour; and children living with disabilities.

Building on this, the World Bank's **Social Risk Management (SRM) framework** illustrates that child vulnerability also depends on a household's ability to manage risks, with vulnerability defined as "the likelihood of being harmed by unforeseen events or as susceptibility to exogenous shocks".[132] In Kenya, where many families face not only economic uncertainty but also health risks (e.g., the high prevalence of stunting and HIV/AIDS) and environmental challenges (e.g., droughts and floods), the inability to manage these risks can lead to severe and enduring vulnerabilities for children. The SRM framework highlights that child vulnerability is not an absolute state but a relative one, meaning that a child's risk of experiencing negative outcomes is higher compared to peers in the same environment. The concept

[128] OECD 2019.

[129] Skinner et al. 2006.

[130] World Bank 2004.

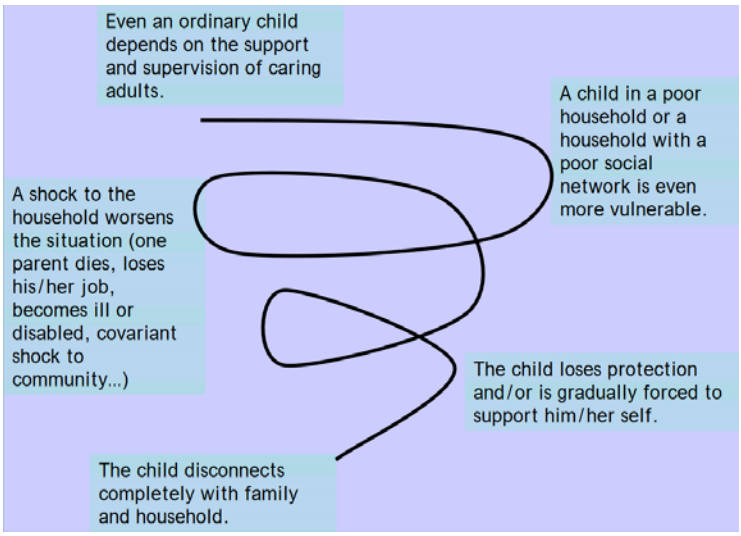
[131] The authors highlight that OVC are children who typically face a higher risk relative to their peers of: mortality; low immunization and low access to health services; high malnutrition and burden of disease; low school enrolment rates; high repetition rates; poor school performance; intra-household neglect; family and community abuse and maltreatment; economic and sexual exploitation due to lack of care and protection.

[132] World Bank 2004.

emphasises that not all children are equally vulnerable, and that vulnerability can worsen over time due to cumulative adverse events. Vulnerability is defined by the likelihood of harm from unforeseen events or exogenous shocks (economic, social health). [133]

Relatedly, the World Bank introduces the framework of the **"downward spiral"**, referring to the progressive worsening of a child's situation as they experience cumulative shocks. This model illustrates how initial vulnerabilities can lead to more severe outcomes if not addressed early. Children from poorer households or those with weaker social networks are particularly susceptible to this spiral, which can lead to progressively worse outcomes, such as disconnection from family, involvement in child labour, or homelessness. Vulnerability indicators are defined along the lines of economic vulnerability (household income levels, employment status of caregivers, and access to basic needs like food and shelter); health vulnerability (prevalence of HIV/AIDS among children, access to healthcare services, immunisation rates, and nutritional status); social vulnerability (orphan status, living arrangements, access to education, and exposure to violence or exploitation, the impact of war or natural disasters, displacement, and the availability of social support networks). In Kenya and other countries, these conditions are exacerbated by specific vulnerability factors, such as orphanhood, household composition, caregiver education, and exposure to violence or environmental hazards, leading to a downward spiral that entrenches children further in cycles of poverty, deprivation, and vulnerability.[134]

Figure 32 The Downward Spiral of Child Vulnerability[135]



Another approach for conceptualising vulnerability was described by UNICEF, adopting a multidimensional approach to vulnerability, recognising that children's well-being is influenced by a range of factors, including economic, social, and health-related variables.[136] The study identified key determinants of vulnerability among children, particularly in the context of HIV and AIDS. These

[133] Ibid.

[134] Bagattini 2019; UNICEF 2021a; UN General Assembly 1989; UNICEF 2014; World Vision 2019; World Vision 2024; National Social Protection Secretariat, WFP Kenya, and UNICEF Kenya 2018; Kenya National Bureau of Statistics and UNICEF 2017; World Bank 2004; Herring 2023; OECD 2019.

[135] World Bank 2004.

[136] UNICEF 2014.

determinants included household wealth, living arrangements, education level of adults in the household, orphanhood status, and the presence of chronic illness among adults in the household, as they found that they were often associated with key health and social outcomes for children. The study used a combination of indicators to assess vulnerability: children living in the bottom two wealth quintiles; children not living with either parent; orphans; and children living in households with adults with no education, among other analytical variables. The study employed multivariate logistic regression models to analyse the associations between child vulnerability indicators and developmental outcomes. The analysis controlled for various background characteristics, including household wealth, education levels, and living arrangements. The outcome variables as well as the analytical variables which were used in the study differed depending on the age of the child, and are listed in Table 1.

Table 17 Analytical parameters of UNICEF (2014) approach to measuring and defining key determinants of childhood vulnerability

Age group	Outcome variable	Analytical variables
0-4 years	• DPT3 vaccination • Fever treatment • Slept under ITNs • Stunting • Birth registration	• Sex • Age • Wealth quintile • Adult sick in household for more than three months in the past year • HIV-positive adult in the household • Sex of the household-head • Highest education of adult in household • Household dependency ratio • Number of adults over age 64 years old and under 15 years: number of adults 15-64 years. • Orphan status • Living arrangement • Place of residence
5-17 years	• School attendance • Child Labour	
15-17 years	• Early Sexual Debut • Early Marriage	

World Vision International, based on global research, have also proposed a **multidimensional definition of vulnerability,** categorising it into four key dimensions: abusive/exploitative relationships; extreme deprivation; vulnerability to catastrophe or disaster; and serious discrimination.[137] Each dimension is measured by specific markers such as malnutrition, school attendance, and exposure to natural disasters. The indicators used in this framework as applied in Lao PDR[138] are detailed in Table 18. In this study, children from poorer households or those affected by natural disasters and unexploded explosive ordnance (UXO) contamination are more vulnerable. This impacts their access to education, healthcare, and overall wellbeing.

Table 18 Analytical parameters of WVI approach to measuring and defining childhood vulnerability in Lao PDR

Dimension of Vulnerability	Vulnerability Markers
Abusive or Exploitative Relationships	• **Experiencing physical & emotional abuse**: Mother's reaction to her child's wrong behaviour. • **Children involved in childcare roles**: Children working >21 hours/week.

[137] World Vision 2019; World Vision 2024.

[138] World Vision 2019.

	• **Young mothers**: Mothers aged 14-17.
Extreme Deprivation	• **Severely malnourished children <5**: Weight for height, Z score < -3 SD. • **Moderately malnourished children <5**: Weight for height, Z score < -2 SD. • **Children whose household are designated poor**: Household poverty estimates. • **Children whose household have poor access to clean water and sanitation**: Household's type of toilet, water source, and distance. • **Limited access to healthcare**: Village has a hospital. • **Road accessibility in rural areas**: Village has road access.
Vulnerability to Catastrophe or Disaster	• **Areas contaminated with unexploded ordnance**: Village has uncleared UXO. • **Children living with a disabled caregiver**: Household with <3 adults/disabled adult. • **Children living with old caregivers**: No adults aged 19-59 in household. • **Areas highly prone to natural disasters**: Village had a flood or drought in the past 12 months.
Serious Discrimination	• **Children who do not attend school**: Children aged 6-12 not attending school. • **Children with disabilities and learning difficulties**: Household has a disabled child. • **Children disadvantaged due to ethnicity and/or gender**: Sex ratio of out-of-school children. • **Children without birth certificates**: Household has a child <5 without a birth certificate.

Focusing more on vulnerability to climate and environmental hazards**,** UNICEF's Children's Climate Risk Index applies a multidimensional framework of vulnerability, recognising that children's vulnerability to climate change is shaped by both their exposure to environmental hazards and their lack of access to essential services.[139] This conceptual framework emphasises the compounding effects of multiple vulnerabilities, where the absence of basic needs such as clean water, adequate nutrition, and education intensifies the impact of climate-related shocks. The report also draws on the principles of child rights, as outlined in the United Nations Convention on the Rights of the Child (UNCRC), asserting that climate change is a child rights crisis that threatens the survival and well-being of children worldwide.

The CCRI measures a range of indicators that contribute to child vulnerability, including:

1. **Exposure to Climate Hazards**: Indicators such as heatwaves, water scarcity, flooding, and exposure to vector-borne diseases are assessed to determine the environmental risks children face.
2. **Access to Essential Services**: The availability and quality of healthcare, education, sanitation, and social protection are critical indicators of children's vulnerability. The report highlights that children with limited access to these services are at greater risk of suffering the worst impacts of climate change.
3. **Compounding Vulnerabilities**: Overlapping hazards and vulnerabilities—such as poverty, displacement, and inadequate infrastructure—compound the risks to children, creating a cycle of deprivation and increased susceptibility to harm.

Children's vulnerability to large-scale crises like environmental hazards, climate volatility, and socio-economic shocks are also addressed in the conceptualisation of child vulnerability risks in Eastern and Southern Africa, alongside macroeconomic volatility and the INFORM Risk Model.[140] The authors highlight that children in this region are particularly vulnerable to economic shocks, with the

[139] UNICEF 2021a.

[140] Cummins 2023.

compounded effects of political instability, climate events, and health emergencies exacerbating these challenges. The report employs a macroeconomic risk framework to assess the vulnerability of children in ESA. This framework includes indicators of economic growth, unemployment, inflation, and fiscal balances, which are analysed to understand their potential impact on child well-being. The framework also considers the additional risks posed by political instability, climate events, and health emergencies. Macroeconomic variables such as economic growth, job markets, price levels, and fiscal balances directly affect households and children through income, cost of living, and access to social services. The INFORM risk assessment framework proposes a methodology for assessing child vulnerability risks throughout the region, combining traditional macroeconomic risk frameworks with humanitarian risk ratings to identify vulnerabilities among children. It incorporates the "risk of what" (events) and the "risk to what" (the population). Overall, it includes three dimensions of risk: (i) hazards and exposure (natural and human events); (ii) vulnerability (the strength of individuals and households); and (iii) coping capacity (institutional and infrastructure strength)."[141] The concept of multidimensional poverty is central to the analysis and conceptual framework, recognising that children's vulnerability is not just a function of income but also involves access to essential services such as education, healthcare, and nutrition. The report emphasises that nearly all children in the region face multidimensional poverty, with a significant proportion experiencing extreme well-being risks.

Situating multidimensional child deprivation within child vulnerability

Based on the literature review, the concepts of child vulnerability and multidimensional child deprivation are increasingly recognised as interrelated frameworks essential for understanding and addressing the challenges faced by children in various contexts, particularly in low- and middle-income countries.

Child vulnerability refers to the susceptibility of children to adverse outcomes due to a variety of factors, including poverty, social exclusion, poor health, and inadequate access to education. Vulnerability is not a static condition but a dynamic one that can change over time as different risk factors interact and compound.[142] The United Nations Convention on the Rights of the Child (UNCRC) and other authors underscores the need to extend special care and protection to vulnerable children, recognising that their physical and mental immaturity makes them particularly susceptible to harm.[143] Research in this area has expanded to include a wide range of factors that contribute to vulnerability, including household composition, parental education levels, exposure to violence, and environmental risks.[144]

Multidimensional child deprivation (often interchangeably referred to as multidimensional poverty) refers to the lack of access to multiple basic needs and rights, such as education, health, nutrition, water, and sanitation.[145] Tools like UNICEF's Multiple Overlapping Deprivation Analysis (MODA) have

[141] Ibid.

[142] OECD 2019.

[143] UN General Assembly 1989; Etzel 2020.

[144] World Bank 2004; World Vision 2024; Children's Commissioner 2017; Arora et al. 2015; UNICEF 2014; Schweiger and Graf 2017.

[145] Alkire 2007, vol. 88.

been developed specifically to assess and quantify these deprivations, providing a comprehensive picture of the challenges faced by children.[146] Studies applying this and similar toolboxes have highlighted that children who are deprived in multiple dimensions are more likely to experience long-term negative outcomes, making them among the most vulnerable populations.[147] The concept of multidimensional deprivation acknowledges that poverty and deprivation are not limited to income but encompass a broader spectrum of well-being indicators.[148]

The linkage between child vulnerability and multidimensional child deprivation is evident in how these frameworks inform and complement each other. Multidimensional deprivation can be viewed as a key component of child vulnerability, as children who lack access to multiple basic needs are inherently more vulnerable to adverse outcomes. As aforementioned, research has shown that early measures of vulnerability, such as orphanhood, do not capture the full extent of a child's risk when deprivation across various dimensions is considered.[149] This insight has led to a broader understanding of vulnerability that includes multidimensional deprivation as a critical factor, as touched upon in previous sections. While multidimensional deprivation studies tend to be context-specific, they often include analysis parameters which directly link to the aspects of material deprivation, or access to essential services, rights violations, and vulnerability outcomes which have been applied in conceptual frameworks for childhood vulnerability as aforementioned in section 3.1.1.

Moreover, the cumulative effects of deprivation and vulnerability often create a "downward spiral," where lack of access to one essential service leads to further vulnerabilities in other areas.[150] Children who are deprived of essential nutritional inputs in early childhood are more likely to suffer from poor health and limited educational and economic opportunities later in life, exacerbating their vulnerability. This interrelationship underscores the importance of addressing both vulnerability and deprivation in a holistic manner.

Vulnerability refers to the potential for harm and incorporates factors that influence the risk of becoming deprived in the future, while multidimensional poverty (deprivation) is about the circumstances of the child at the time of measurement and indicates a lack of essential resources or capabilities. In this sense, studies on vulnerability are broader than studies on child multidimensional poverty alone, and child multidimensional deprivation studies are a component of vulnerability studies. In policy and programme design, it is crucial to address both concepts: reducing vulnerability by enhancing protective measures and resilience, and alleviating deprivation by providing resources or services to meet basic needs.

[146] de Milliano and Plavgo 2014; de Neubourg, de Milliano, and Plavgo 2014; de Neubourg et al. 2013.

[147] Kenya National Bureau of Statistics and UNICEF 2017; UNICEF Kenya and Kenya National Bureau of Statistics 2020; Minujin et al. 2016; UNICEF 2020b; UNICEF 2020c; UNICEF 2020a.

[148] Alkire 2007, vol. 88; Gordon and Nandy 2012; UNICEF 2020a; UNICEF 2007; de Neubourg et al. 2013.

[149] Akwara et al. 2010; UNICEF 2014; National Social Protection Secretariat, WFP Kenya, and UNICEF Kenya 2018.

[150] World Bank 2004.

12.2 Previous research and applications of vulnerability concepts in Kenya

As this current study is a follow-up to previous research on child vulnerability and multidimensional child poverty in Kenya, we describe here the previous relevant research carried out in Kenya. We give particular attention to the 2018 study on *Child Vulnerability and Social Protection in Kenya*, as the current study is a direct follow-up to this study.

12.2.1 2018 Child Vulnerability in Kenya Study

The 2018 study on *Child Vulnerability and Social Protection in Kenya*, published by WFP, UNICEF Kenya, and the National Social Protection Secretariat aimed to expand the discussion and research on vulnerable children beyond OVC. The study explored child vulnerability along several approaches: 1) Children living in poor and income-secure families; 2) Children exposed to lifecycle risks and vulnerabilities; 3) Children whose outcomes are determined by various vulnerability markers. As the first of these has been referenced in 3.1.1., we elaborate more on the second and third components in this section.

In this study, lifecycle risks were identified as risks affecting children with the potential for both short and long-term consequences (Table 19). This is in line with a lifecycle approach to conceptualising vulnerability, recognising that risks and vulnerabilities vary across different stages of childhood, as also considered in the OECD, World Bank, and UNICEF frameworks.[151] Early childhood is identified across the reviewed literature as a critical period where interventions can have the most significant impact, especially in preventing long-term developmental issues.[152]

Table 19 Summary of age-related risks and vulnerabilities for children identified in Child Vulnerability and Social Protection in Kenya Study[153]

Lifecycle stage	Main challenges
In utero and at birth	- Exposure to maternal health risks, nutritional deficiencies, and environmental toxins, potentially leading to severe developmental damage. - Lack of birth registration, causing exclusion from essential services.
Early childhood	- Poor maternal and child nutrition resulting in stunted growth and long-term negative impacts on health and development. - Lack of early cognitive stimulation, risking poor cognitive development. - High vulnerability to disease and infections due to poor access to healthcare. - Exposure to unsafe environments related to inadequate housing and parents' work conditions. - Risk of loss of a caregiver, leading to high dependency. - Potential disability from lack of early intervention.
Primary school-age	- Risk of not attending school, dropout, or low educational quality due to lack of income or pressure to earn income - Insufficient food or poor diets increasing illness, affecting education - Challenges for households with children with disabilities

[151] Harper, Marcus, and Moore 2003; Children's Commissioner 2017; de Milliano and Plavgo 2014; Kenya National Bureau of Statistics and UNICEF 2017; de Neubourg, de Milliano, and Plavgo 2014.

[152] Heckman 2006; Heckman, Pinto, and Savelyev 2013; Tanner J C, Candland T, and Odden W S 2015.

[153] National Social Protection Secretariat, WFP Kenya, and UNICEF Kenya 2018.

Secondary school-age	- Inadequate access to education - Vulnerability to early school withdrawal (especially girls) - Risks from early marriage and child-bearing - Challenges for children with disabilities - Lack of access to training/formal employment leading to risky employment - Increasing vulnerability of girls due to gender-based violence

In the 2018 study, child outcomes reflecting age-specific vulnerabilities across a child's developmental lifecycle were analysed to better understand determining factors (vulnerability markers), following the framework and approach adopted by UNICEF[154] for analysing the determinants of childhood vulnerability. These outcome measures and their determining factors, selected for Kenya to reflect the most pertinent vulnerabilities, are summarised in Table 20.

The study methodology included both bivariate and multivariate logistic regression analyses to explore the relationship between the listed vulnerability indicators and child outcomes. Among other findings, the study found that:

- Orphan status of children was not consistently associated with worse outcomes compared to non-orphaned children, except for slightly lower odds in school attendance and ITN use;
- Children living with caregivers other than their parents are identified as having higher risks for adverse outcomes, particularly in terms of school attendance and early marriage. Living arrangements strongly affected older children, particularly girls, with non-parental living situations leading to poorer outcomes.
- Education of adults in the household significantly impacts birth registration, vaccination, ITN use, and school attendance.
- Children in wealthiest households had 70 per cent lower odds of being stunted, and boys are 50 per cent more likely to be stunted than girls.
- Household wealth was the most consistent predictor across various child outcomes, with higher wealth generally correlating with better outcomes (e.g., higher school attendance, better health, lower stunting, delayed sexual debut, and reduced early marriage);

The study further identified other at-risk groups, not covered by the KDHS 2014 data:

- Children with disabilities face higher poverty rates, lower school attendance, and less access to basic services.
- Child labour remains prevalent, especially in informal sectors.
- Children living on the streets, in institutions, or accompanying imprisoned mothers are other vulnerable groups, but data on these populations is limited.
- Refugee children make up a significant portion of Kenya's child population, facing unique vulnerabilities.

[154] UNICEF 2014.

Table 20 Variables used for studying child vulnerability outcomes and their determinates in 2018 study on Child Vulnerability in Kenya[155]

Age Group	Child Outcome	Analytical Variables
0-4 years	- Birth registration: child's birth is registered. - Fever treatment: child who had a fever in the two weeks prior to the survey was treated at a health facility. - DPT3 vaccination: child between the ages of 12–59 months who received DPT3 vaccination (against diphtheria, pertussis (whooping cough), and tetanus). - Stunting: child's height for age is below two standard deviations from the mean of healthy children using the WHO Child Growth Standard reference population. - Sleeping under insecticide-treated nets (ITNs): child slept under an ITN the night before the survey.	- Sex of the child - Age of the child - Orphanhood status - Living arrangements - Household wealth status - Highest education of any adult in the household
7-17 years	- School attendance: child attended school in the past year.	
15-17 years	- Early sexual debut: sexual debut among female adolescents occurred before age 15. - Early marriage: marriage or union occurred before age 18.	

12.2.2 Studies on Child Poverty and Deprivation

Child multidimensional deprivation (or poverty) has also been researched extensively in Kenya, applying UNICEF's Multiple Overlapping Deprivation Analysis tool. It is crucial to note, however, that these findings cannot be compared directly between studies due to differences in the applied methodologies and datasets. Kenya's first ever Child Poverty Report[156] was among the first studies to triangulate quantitative findings with qualitative research among caregivers and service providers in Turkana, Kakamega, and Kitui Counties. This analysis also included factor analysis to distinguish determining factors of poverty/vulnerability and the extent to which deprivations were correlated with household asset wealth.

Based on the Demographic and Health Survey 2014 dataset, 45 per cent of children (0-17 years) in Kenya were considered multidimensionally deprived, facing deprivation in at least three out of six dimensions[157] of their well-being, equivalent to approximately 9.5 million children. Between 2008-09 and 2014, a decline of 10 percentage points was observed in the level of multidimensional deprivation. In terms of identifying the most vulnerable, children

[155] National Social Protection Secretariat, WFP Kenya, and UNICEF Kenya 2018.

[156] Kenya National Bureau of Statistics and UNICEF 2017.

[157] The dimensions included for different age group were Nutrition, Physical development, Health, Health-related knowledge, Education, Water, Sanitation, Housing, and Access to information.

living in rural areas presented higher multidimensional deprivation rates than children living in urban areas (56 per cent versus 19 per cent). At the county level, rates ranged from 76 per cent to 85 per cent in Turkana, West Pokot, Wajir, Tana River, Samburu and Mandera, while Bungoma and Kakamega reported the largest number of poor children: 661,660 and 515,842, respectively. In addition, children living in households where the head and/or mother has low education levels demonstrated higher multidimensional deprivation figures compared to children living with higher educated heads/mothers.[158]

The sectoral analysis showed that more than half of the children experienced deprivation in the Sanitation and Housing dimensions. Sanitation was measured by access to an improved toilet facility and Housing consisted of the "Floor and wall materials" and "Solid cooking fuel" indicators. Among children aged 12-24 months, 29 per cent of children did not get fully vaccinated, while 29 per cent suffered from stunting. Furthermore, 22 per cent and 37 per cent of children aged 5-14 years and 15-17 years respectively were deprived in the Education dimension.[159]

Complementing this study, Kenya's first Comprehensive Poverty Report[160], assessed multidimensional and monetary poverty for children (under 5 years, 5-17 years), youths (18-34 years), adults (men and women, 35-59 years), and elderly (60+ years). This analysis included analyses of poverty overlap between monetary and multidimensional poverty incidence for all age groups, as well as an analysis of multivariate regressions identifying factors associated with both types of poverty. However, because different databases were used, a comparison with the 2017 multidimensional poverty analysis was not possible. In addition, the following indicators were added: engagement in household chores, and lighting source.[161]

The results indicated that approximately 42 per cent of children under the age of 18 (8.7 million) were monetarily poor and more than half faced multidimensional deprivation (53 per cent or 11.1 million), with an average of 4.1 deprivations out of the 7 dimensions[162] analysed. In particular, 74 per cent of children under 6 months old were not exclusively breastfeeding, while 45 per cent-48 per cent of all children lived in food insecure households.[163]

More recently, a study on trends and drivers of inequality in well-being in Kenya,[164] based on the 2009 and 2019 Kenya Population and Housing Census, analysed inequality in non-monetary wellbeing outcomes, for single and multidimensional deprivation analysis for children and households. This study provided evidence to policymakers on Kenya's progress in reducing poverty and inequality, aligned with SDGs, through a decade-long trend analysis

[158] Kenya National Bureau of Statistics and UNICEF 2017.

[159] Ibid.

[160] UNICEF Kenya and Kenya National Bureau of Statistics 2020.

[161] Ibid.

[162] The dimensions studied for children under five were physical development, nutrition, health, education, water, sanitation and housing. For children aged 5-17 years, the analysis included the dimensions of nutrition, education, child protection, information, water, sanitation and housing.

[163] UNICEF Kenya and Kenya National Bureau of Statistics 2020.

[164] KNBS 2023a.

(2009-2019) of national and county-level inequality, as well as urban-rural disparities using KPHC data. It aimed to enhance understanding and monitoring of inequalities across various sectors, contributing to achieving SDGs related to poverty, children, and gender equality by offering a foundation for inequality assessment and reporting. New indicators with regards to child well-being included teenage pregnancy, child marriage and child labour. Between 2009 and 2019, Kenya made significant progress in education outcomes, especially among secondary school aged children and youth. Inequalities remained geographically widespread with deprivation and poverty rates significantly higher in rural areas and in Garissa, Turkana, Wajir, Mandera, Marsabit, West Pokot, Samburu, and Tana River.[165]

13. Annex VII: Details on model specifications and variables used in the multivariate logistic regression analysis on child vulnerability outcomes and their determinants

Model Specifications

Based on each regression and population (numbered 1-4), each regression was run using two variants of model specifications:

Model 1-3 (for National and Annex groups):

a. WEI as an analytical variable.

b. Maternal education as an analytical variable instead of WEI.

Model 4:

4.a. Women's Empowerment Index (WEI) as an analytical variable and "not received cash transfer" as an additional analytical variable.

4.b. Maternal education as an analytical variable instead of WEI, with "not received cash transfer" as an additional analytical variable.

This setup results in a total of 8 models for each outcome variable across the four population groups and two model specifications. In total, there were 64 regression models.

For each outcome variable, the regression models will include a standard set of analytical variables representing **child characteristics** and **household characteristics**. These variables are used as predictors to examine their association with each outcome variable, and they may be included or excluded depending on their contribution to the model's explanatory power (as measured by R-squared). These characteristic variables, their sub-categories (in case of categorical variables with more than 2 categories), and reference groups, are described below and summarised in Table 21.

Child Characteristics

Sex (reference: boy)

[165] Ibid.

Being a girl

Age Group (reference: 0-11 months)

12-59 months

5-14 years

15-17 years

Household Characteristics

Wealth Quintile (reference: Poorest)

Poorer

Middle

Richer

Richest

Household Head is Female (reference: Male)

Education of the head of Household (reference: No education)

Primary

Secondary

Tertiary

Orphan Status (reference: Not single/double orphan)

Disability Status (reference: Not a person with disabilities, PWD)

Rural Place of Residence (reference: Urban)

Living Arrangement (reference: Living with both parents)

With only one parent

Without both parents

Co-residence with a Chronically Ill/HIV Adult

Household Dependency Ratio (reference: Working-age adult in the household)

Presence of PWD in Household (reference: No PWD)

Women's Empowerment Index (WEI) (reference: Mother is not empowered)

Maternal Education level (reference: Mother has no education)

Age at First Birth of Mother <18 (reference: Mother's age at first birth >=18)

Deviation coding was applied for the inclusion of counties in the logistic regression analysis to allow for the assessment of county-level effects relative to the overall mean rather than a single reference category.

For each outcome variable, additional variables will be evaluated for inclusion to improve model specification. These variables may add explanatory power (via additional environmental or socioeconomic factors that may impact child vulnerability) by capturing factors specific to each outcome. The final inclusion will depend on whether they improve model fit. The variables which were explored are described in the last column in Table 21.

Table 21 Summary of regression models, populations, specifications, and analytical variables

Reg. #	**Outcome Variable**	**Background analytical variables**	**Additional theory-dependent analytical variables**
I	No birth registration (age <5)	Child Characteristics Sex (reference: boy) Being a girl Age Group (reference: 0-11 months) 12-59 months 5-14 years 15-17 years Household Characteristics Wealth Quintile (reference: Poorest) Poorer Middle Richer Richest Household Head is Female (reference: Male) Education of Mother, Father, or HH-Head (reference: No education) Primary Secondary Tertiary Orphan Status (reference: Not single/double orphan) Disability Status (reference: Not a person with disabilities, PWD) Rural Place of Residence (reference: Urban) Living Arrangement (reference: Living with both parents) With only one parent Without both parents Co-residence with a Chronically Ill/HIV Adult Household Dependency Ratio (reference: Working-age adult in the household) Presence of PWD in Household (reference: No PWD) Women's Empowerment Index (WEI) (reference: Mother is not empowered) Age at First Birth of Mother Maternal education Counties (add/remove based on	Distance to health centre (from DHS), MODA dimensions/indicators, household size, birth attendance (unskilled attendance could correlate with lack of birth registration), information devices (lacking these might affect awareness of registration)
II	Fully immunised (age <5)		Distance to health centre (from DHS), MODA dimensions/indicators, household size, birth attendance (unskilled attendance could correlate with lack of birth registration)
III	Fever treatment		Distance to health centre (from DHS), MODA dimensions/indicators, household size
IV	Stunting (age <5)		MODA dimensions (excluding development), household size, underweight, wasting, water source / distance to water, sanitation facilities, low maternal height, low birth weight, maternal anaemia or BMI
V	Slept under ITN (age <5)		Overcrowding, housing/accommodation variables, housing materials, household size, information (exposure)
VI	Not attended school in the past year (5-17)		Distance to school, household size, information devices
VII	Multidimensionally poor (deprived in at least 3 dimensions)		Household size
VIII	Did not receive Vitamin A supplementation		Distance to health centre (from DHS), MODA dimensions/indicators, household size
IX	Infant and Young child Feeding (does not Meet Standards) [made up of Non-Exclusive Breastfeeding (<6 months) and Did not receive Minimum Acceptable Diet (MAD)]		Distance to health centre (from DHS), MODA dimensions/indicators, household size

		significance for statistical efficiency if stepwise adding/removing yields little difference and/or not theoretically relevant)	

Note: All models are calculated separately for the following population groups: 1. National 2. Urban (see Annex) 3. Rural (see Annex) 4. Children living in poor households. Due to the inclusion of maternal education in the women's empowerment index (WEI) and to avoid overlap between the analytical variables of each model, two different regression analyses were calculated for each population group, one with the inclusion of maternal education and one with the inclusion of the WEI (a binary variable denoting 0 = mother is not empowered and 1 = mother is empowered). WEI and women's education were never included in the same regressions, to avoid multicollinearity issues. For the models related to the population group of children living in poor households, the variable denoting the receipt of a cash transfer is added as an analytical variable.

Table 22 Variables used in multivariate logistic regression analysis in the 2018 Study on Child Vulnerability, based on UNICEF 2014 framework for determining child vulnerabilities, and added variables based on conceptual framework for expanded analysis

Outcome Variables (Dependent Variables) based on 2014 UNICEF Child Vulnerbality framework and following up on 2018 study on child vulnerability in Kenya	
Birth Registration	Whether a child has been officially registered at birth, reflecting access to legal identity and associated rights.
Vaccination Status	Whether a child has received necessary vaccinations (e.g., DPT3), measuring access to essential healthcare services.
Stunting	Whether a child is stunted, indicating long-term health and nutritional status.
Fever Treatment (Age <5)	Whether a child under five received treatment for a fever, reflecting access to healthcare for common childhood illnesses.
Slept under ITN (Age <5)	Whether a child under five slept under an insecticide-treated net (ITN), indicating preventive measures against malaria.
School Attendance (Age 7-17)	Whether a child attended school at any time in the past year, reflecting educational engagement and access.
Sex before Age 15 (Age 15-17)	Whether an adolescent had sexual intercourse before the age of 15, indicating exposure to early sexual activity and associated risks.
Married or in Union before Age 18 (Age 15-17)	Whether an adolescent was married or in a union before the age of 18, reflecting early marriage and associated vulnerabilities.
Orphanhood	Child is single or double orphan.
Analytical Variables (Independent Variables or "Markers of Vulnerability")	

Sex	The child's gender (male or female), a key demographic marker influencing vulnerability.
Age	The age of the child, categorised into relevant age groups for analysis, used to control for age-related differences in vulnerability.
Wealth quintile	The household's wealth index, divided into quintiles (poorest to wealthiest), a significant predictor of child outcomes.
Sex of Household Head	The gender of the household head (male or female), which may influence household dynamics and access to resources.
Education of Any Adult in the Household	The highest level of education attained by any adult in the household, influencing the household's capacity to support child development.
Maternal education	The highest level of education attained by the child's mother.
Household Dependency Ratio	The ratio of dependents (children and elderly) to working-age adults in the household, reflecting the economic burden on the household.
Living Arrangement	The type of household in which the child resides (e.g., living with both parents, one parent, relatives), influencing the child's care and support structure.
Place of Residence	The geographical location of the household (urban or rural), reflecting access to services and infrastructure.
Added analytical or outcome variables (TBD) expanding on the previous analysis	
Child is multidimensionally poor	Child is deprived in at least 3 dimensions based on the MODA analysis (see 3.3.3).
Sex of the household head	The gender of the household head (male or female), which can affect household decision-making dynamics, access to resources, and the overall vulnerability of children. Households headed by females may face more challenges due to gendered economic disparities and social roles.
Disability of the child	Whether the child has any form of disability, which may increase their vulnerability by limiting access to education, healthcare, and social inclusion. Children with disabilities often face multiple barriers in society that exacerbate their risk of deprivation and poor outcomes.
Presence of a person with disabilities (PWD) in the household	Indicates whether there is a person with a disability living in the household, which may influence the household's overall vulnerability due to caregiving responsibilities, increased financial strain, or reduced access to services.
Access to social protection	Whether the household or child is benefiting from any form of social protection, such as cash transfers, health insurance, or food aid. This variable helps assess the impact of social safety nets in

	mitigating child vulnerability and supporting household well-being.
Co-residence with a chronically ill adult or HIV-positive adult	Whether the child lives with an adult who is chronically ill or HIV-positive, which may increase the child's vulnerability due to the household's caregiving burden, reduced income, or social stigma. This situation can lead to adverse outcomes for children, including increased economic and emotional stress.
Exposure to gender-based violence	Whether the child aged 15-17 years has experienced physical or sexual violence. Exposure to violence can severely impact a child's mental and physical well-being, social development, and safety.
Child labour (15-17 years)	Whether the child is engaged in economic activity or excessive household chores that meet the ILO definitions of child labour. This variable reflects vulnerabilities related to early entry into the labour force, often at the expense of education and healthy development.
Harmful practices (FGM; status and/or age at circumcision)	Whether the child (aged 15-17 years) has been subjected to Female Genital Mutilation (FGM) or the age at which circumcision occurred, which are indicators of exposure to harmful traditional practices. These practices often violate children's rights and can have long-lasting physical and psychological consequences.
Residence in a climate-vulnerable county based on the CCRI for Children in Kenya	Whether the child lives in an area identified as vulnerable to climate-related risks, such as droughts, floods, or extreme weather, based on the Children's Climate Risk Index (CCRI). Climate vulnerability affects access to food, water, education, and healthcare, increasing overall child vulnerability.
Proposed added outcome variables based on the revised CT-OVC criteria for children in Kenya [a]	
A child living permanently in an extremely poor household	The closest approximation of this category using the KDHS 2022 is the child belonging to a household which falls into the poorest asset-wealth quintile.
A poor household with an orphaned child who has lost one or both of his/ her parents (or has lost a person that was formally conferred with parental responsibilities by law) through death	The closest approximation of this category using KDHS 2022 is "Child is a single or double orphan who is also living in the poorest asset-wealth quintile".
A poor household with a child living off the streets, who begs or works in the streets but returns home	This category cannot be directly measured using KDHS 2022 but we suggest to approximate it as child is living in a poor household (living in the poorest asset-wealth quintile) AND is engaged in child labour as per ILO definitions of excessive hours of economic activity and household chores.
A poor household with a child who is chronically ill, or a caregiver that is chronically ill and unable to perform his/ her duties	This category will be approximated in KDHS 2022 as a child living in the poorest asset-wealth quintile AND in a household with a chronically ill adult or chronically ill caregiver.
A poor household with a child or a caregiver with a disability	See above.
A poor household with a child placed into any form of family-based or community-based care	This category cannot be directly measured or approximated with the KDHS 2022 due to lack of corresponding data.

A household not benefiting from any social assistance programme with exception of a household having OP-CT beneficiary; and	This category can be approximated as far as the KDHS 2022 allows. The survey collects data on households' receipt of cash transfers or social assistance from various sources, including the national government, county government, NGOs, religious organizations, and friends or relatives. It also asks about the reasons for receiving social assistance, with categories such as assistance for orphans, the elderly, individuals with severe disabilities, urban food subsidies, and programs like food/cash for work, school feeding, and COVID-19 relief. The data provides insights into the coverage and sources of social protection programmes in Kenya.
A household whose members have been residents in a particular location for more than a year.	This category cannot be approximated with the KDHS 2022.

[a] Source: Internal Document (UNICEF, 2024)

14. Annex VIII: Complementary logistic regression analysis with alternative model specifications

This Annex presents the results of the complementary logistic regressions assessing the potential markers of vulnerability for each outcome variable, across different populations, namely rural and urban populations, as well as the poorest quintile of the population. Again, the average marginal effects are presented.

[The Annex is included in an additional document due to its extensive size]

15. Annex VIII: Correlation matrix for the Multiple Overlapping Deprivation Analysis (MODA) in Kenya

15.1 Age group 1 : 0-23 months

	Stunting	Wasting	Vitamin A suppmnt	Vaccination	Birth attendance	Water source	Water distanc e	Water quantity	Toilet facility
Stunting	1.0000								
Wasting	0.3492*	1.0000							
Vitamin A supplement	0.0563*	0.0895*	1.0000						
Vaccination	0.0240	0.0667*	0.1256*	1.0000					
Birth attendance	0.0342*	0.1000*	0.2106*	0.2187*	1.0000				
Water source	0.0377*	0.0358*	0.1186*	0.1191*	0.1923*	1.0000			
Water distance	0.0473*	0.0628*	0.1434*	0.1153*	0.2202*	0.3095*	1.0000		
Water quantity	-0.0028	0.0524*	0.0628*	0.0911*	0.1034*	0.0433*	0.1899*	1.0000	
Toilet facility	0.0584	0.0880*	0.1384*	0.1156*	0.2670*	0.2373*	0.2872*	0.0642*	1.0000
Sharing toilet facilities	-0.0143*	0.0153	-0.0117	0.0102	0.0075	-0.0365*	-0.0508*	0.0645*	-0.0936*
Handwashing	0.0193	0.0731*	0.0839*	0.1024*	0.1490*	0.1132*	0.1174*	0.1420*	0.2082*
Dwelling material (Floor and exterior walls)	0.0444*	0.0382*	0.1296*	0.1027*	0.2115*	0.1516*	0.1631*	0.0354*	0.3044*
Indoor air pollution	0.0235	0.0442*	0.0520*	0.0832*	0.0925*	0.0533*	0.0636*	0.0258	0.1047*
Access to electricity	0.0850*	0.0883*	0.1578*	0.1397*	0.2901*	0.2926*	0.3130*	0.0604*	0.4845*

	Sharing toilet facilities	Handwashing	Dwelling material (Floor and exterior walls)	Indoor air pollution	Access to electricity
Sharing toilet facilities	1.0000				
Handwashing	0.0853*	1.0000			
Dwelling material (Floor and exterior walls)	-0.0406*	0.0853*	1.0000		
Indoor air pollution	0.2268*	0.0676*	0.0614*	1.0000	
Access to electricity	-0.0773*	0.1835*	0.3136*	0.0627*	1.0000

15.2 Age group 2: 24-59 months

	Stunting	Wasting	Vitamin A supplement	Vaccination	Water source	Water distance	Water quantity	Toilet facility
Stunting	1.0000							
Wasting	0.4236*	1.0000						
Vitamin A supplement	0.0043	0.0660*	1.0000					
Vaccination	0.0168	0.0643*	0.1411*	1.0000				
Water source	0.0745*	0.0882*	0.0982*	0.0679*	1.0000			
Water distance	0.0680*	0.1136*	0.0776*	0.0842*	0.2859*	1.0000		
Water quantity	-0.0119	0.0706*	0.0534*	0.0860*	0.0524*	0.1835*	1.0000	

Toilet facility	0.1258*	0.1485*	0.0781*	0.0507*	0.2279*	0.2450*	0.0618*	1.0000
Sharing toilet facilities	0.0009	0.0047	0.0039	0.0381*	-0.0115	-0.0199*	0.0765*	-0.0930*
Handwashing	0.0547*	0.0884*	0.0472*	0.0706*	0.0870*	0.1320*	0.1096*	0.2009*
Dwelling material (Floor and exterior walls)	0.0830*	0.1182*	0.0889*	0.0732*	0.1166*	0.1456*	0.0029	0.2988*
Indoor air pollution	0.0646*	0.0517*	0.0205*	0.0310*	0.0684*	0.0696*	0.0191*	0.1052*
Access to electricity	0.1415*	0.1576*	0.1211*	0.0562*	0.2785*	0.3074*	0.0723*	0.4599*

	Sharing toilet facilities	Handwashing	Dwelling material (Floor and exterior walls)	Indoor air pollution	Access to electricity
Sharing toilet facilities	1.0000				
Handwashing	0.0845*	1.0000			
Dwelling material (Floor and exterior walls)	-0.0446*	0.1066*	1.0000		
Indoor air pollution	0.2197*	0.0701*	0.0402*	1.0000	
Access to electricity	-0.0567*	0.1768*	0.3059*	0.0582*	1.0000

15.3 Age group 3 : 5-14 years

	School attendance	Grade-for-age	Water source	Water distance	Water quantity	Toilet facility	Sharing toilet facilities	Handwashing
School attendance	1.0000							
Grade-for-age	-	1.0000						
Water source	0.1284*	0.0986*	1.0000					
Water distance	0.1702*	0.0831*	0.2791*	1.0000				
Water quantity	0.1244*	0.0451*	0.0398*	0.1767*	1.0000			
Toilet facility	0.1602*	0.1610*	0.1986*	0.2119*	0.0480*	1.0000		
Sharing toilet facilities	0.0682*	0.0539*	-0.0033	0.0069	0.0823*	-0.0883*	1.0000	
Handwashing	0.1485*	0.1161*	0.0827*	0.1175*	0.1074*	0.1821*	0.0804*	1.0000
Dwelling material (Floor and exterior walls)	0.1442*	0.1121*	0.0930*	0.1192*	-0.0072	0.2607*	-0.0476*	0.0995*
Indoor air pollution	0.0819*	0.0697*	0.0483*	0.0731*	0.0082	0.0952*	0.2038*	0.0738*
Access to electricity	0.1676*	0.1787*	0.2530*	0.2728*	0.0411*	0.4133*	-0.0389*	0.1681*
Information devices	0.1589*	0.0953*	0.0655*	0.0969*	0.0289*	0.1815*	0.0417*	0.1021*
Exposure to mass media	0.3192*	0.1709*	0.1396*	0.1731*	0.1208*	0.2126*	0.0975*	0.1848*

	Dwelling material (Floor	Indoor air pollution	Access to electricity	Information devices	Exposure to mass media

	and exterior walls)				
Dwelling material (Floor and exterior walls)	1.0000				
Indoor air pollution	0.0409*	1.0000			
Access to electricity	0.2753*	0.0514*	1.0000		
Information devices	0.1380*	0.1280*	0.1642*	1.0000	
Exposure to mass media	0.1877*	0.0875*	0.2486*	0.2273*	1.0000

15.4 Age group 4: 15-17 years

	School attendance	Grade-for-age	Literacy	Water source	Water distance	Water quantity	Toilet facility	Sharing toilet facilities	Handwashing
School attendance	1.0000								
Grade-for-age	-	1.0000							
Literacy	0.4639*	0.1567*	1.0000						
Water source	0.0827*	0.0838*	0.0966*	1.0000					
Water distance	0.1111*	0.0596*	0.1093*	0.2725*	1.0000				
Water quantity	0.0626*	0.0217*	0.0585*	0.0453*	0.1394*	1.0000			
Toilet facility	0.1024*	0.1260*	0.1217*	0.1902*	0.1749*	0.0246*	1.0000		
Sharing toilet facilities	0.0946*	0.0353*	0.0496*	0.0150	-0.0012	0.0763*	-0.0682*	1.0000	
Handwashing	0.1009*	0.0750*	0.0989*	0.0748*	0.0874*	0.0988*	0.1347*	0.0777*	1.0000
Dwelling material (Floor and exterior walls)	0.0784*	0.0783*	0.0934*	0.0747*	0.1060*	-0.0150	0.2315*	-0.0467*	0.0675*
Indoor air pollution	0.1178*	0.0419*	0.0534*	0.0387*	0.0444*	0.0178	0.0756*	0.1933*	0.0468*
Access to electricity	0.1169*	0.1353*	0.1180*	0.2333*	0.2425*	0.0176	0.3691*	-0.0140	0.1418*
Information devices	0.1306*	0.0681*	0.1450*	0.0544*	0.0617*	0.0156	0.1514*	0.0377*	0.0757*
Exposure to mass media	0.1838*	0.1135*	0.2379*	0.1131*	0.1103*	0.0917*	0.1433*	0.0571*	0.1613*

	Dwelling material (Floor and exterior walls)	Indoor air pollution	Access to electricity	Information devices	Exposure to mass media
Dwelling material (Floor and exterior walls)	1.0000				
Indoor air pollution	0.0391*	1.0000			
Access to electricity	0.2347*	0.0442*	1.0000		
Information devices	0.1120*	0.1149*	0.1350*	1.0000	
Exposure to mass media	0.1282*	0.0886*	0.1896*	0.1480*	1.0000

16. Annex IX: Pairwise Correlations for the Vulnerability Determinant Analysis

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
(1) Age group	1.000															
(2) Sex	-0.002	1.000														
	(0.645)															
(3) Wealth quintiles	-0.010	0.011	1.000													
	(0.006)	(0.002)														
(4) Female HH head	0.065	0.011	-0.051	1.000												
	(0.000)	(0.003)	(0.000)													
(5) HH heads' education	-0.053	0.004	0.581	-0.141	1.000											
	(0.000)	(0.284)	(0.000)	(0.000)												
(6) Orphan	0.150	0.005	-0.061	0.243	-0.081	1.000										
	(0.000)	(0.217)	(0.000)	(0.000)	(0.000)											
(7) Disability	0.012	-0.023	-0.019	0.025	-0.002	0.017	1.000									
	(0.041)	(0.000)	(0.001)	(0.000)	(0.705)	(0.004)										
(8) Rural	0.040	-0.010	-0.582	0.005	-0.233	0.023	0.025	1.000								
	(0.000)	(0.005)	(0.000)	(0.180)	(0.000)	(0.000)	(0.000)									
(9) Live without a parent	0.117	0.008	-0.017	0.659	-0.074	0.347	0.025	0.027	1.000							
	(0.000)	(0.025)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)								
(10) Live without parents	0.140	0.019	-0.012	0.141	-0.055	0.187	0.022	0.056	0.457	1.000						

	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)							
(11) Chronic illness	0.019	-0.003	0.063	-0.019	0.050	-0.016	0.015	-0.027	-0.027	-0.037	1.000					
	(0.000)	(0.414)	(0.000)	(0.000)	(0.000)	(0.000)	(0.009)	(0.000)	(0.000)	(0.000)						
(12) Dependency ratio	0.075	0.007	-0.273	0.109	-0.249	0.043	0.002	0.155	0.103	0.048	-0.018	1.000				
	(0.000)	(0.047)	(0.000)	(0.000)	(0.000)	(0.000)	(0.681)	(0.000)	(0.000)	(0.000)	(0.000)					
(13) Disability_HH	0.074	0.002	-0.095	0.053	-0.107	0.056	0.332	0.072	0.100	0.143	0.005	0.064	1.000			
	(0.000)	(0.714)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.325)	(0.000)				
(14) WEI	-0.024	-0.002	0.484	0.006	0.479	-0.028	-0.012	-0.247	0.087		0.037	-0.202	-0.056	1.000		
	(0.000)	(0.730)	(0.000)	(0.000)	(0.000)	(0.000)	(0.094)	(0.000)	(0.000)	(.)	(0.000)	(0.000)	(0.000)			
(15) First birth below 18	0.060	0.008	-0.174	-0.012	-0.170	0.026	0.015	0.091	0.000		0.005	0.092	0.037	-0.162	1.000	
	(0.000)	(0.070)	(0.000)	(0.008)	(0.000)	(0.000)	(0.038)	(0.000)	(0.969)	(.)	(0.230)	(0.000)	(0.000)	(0.000)		
(16) Mother's education	-0.091	0.003	0.578	0.003	0.748	-0.061	-0.004	-0.203	0.063		0.035	-0.299	-0.074	0.575	-0.207	1.000
	(0.000)	(0.444)	(0.000)	(0.549)	(0.000)	(0.000)	(0.593)	(0.000)	(0.000)	(.)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	



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