GROW GREAT

December 2023

NUTRITIONAL STATUS OF CHILDREN UNDER FIVE

DESCRIPTIVE PROFILE OF SEVEN FOOD VULNERABLE COMMUNITIES IN SEVEN SOUTH AFRICAN PROVINCES

ACKNOWLEDGEMENTS

The Grow Great Campaign would like to thank ikapadata for partnering with the campaign on this research. Specifically, Jan Schenk and Elzeth Zastrau for coordinating the data collection, analysis and initial report. In addition, thanks go to Gabrielle Wills, Ronelle Burger, Kate Rich and Anna-Marie Muller for support in data curation and quality assurance. Special thanks go to members of the Grow Great Champions team for their input and logistical support, including Kopano Matlwa Mabaso, Nicola Stofberg, Bernadette Robertson, Phiwe Dawu, Jabulile Madimabe and Masedi Menyatsoe.

The Grow Great Campaign extends its heartfelt thanks to the seven district municipalities in each province where surveys were conducted, including Thabo Mofutsanyane (Free State), West Rand (Gauteng), uMgungundlovu (KwaZulu-Natal), Mopani (Limpopo), Ehlanzeni (Mpumalanga), ZF Mgcawu (Northern Cape) and Bojanala (North West). Lastly, we also thank the participants for whom this study is intended to have the greatest impact.

The Grow Great Community Stunting Surveys were generously funded by the DG Murray Trust, ELMA Philanthropies, the Allan Gray Orbis Foundation, and Yellow Woods Foundation.

REFERENCE

Grow Great Campaign. 2023. Nutritional status of children under five: Descriptive profile of seven food vulnerable communities in seven South African Provinces. Johannesburg, South Africa. Edited by Amanda Edwards.

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ABBREVIATIONS

CDC	Centre for Disease Control
CI	Confidence Interval
CSG	Child Support Grant
DBE	Department of Basic Education's
DDS	Dietary Diversity Score
DHS	Demographic Health Survey
EA	Enumeration Areas
FS	Free State
FSG	Foster Care Grant
GP	Gauteng Province
HAZ	Height for Age
IYCF	Infant and Young Child Feeding
KZN	KwaZulu-Natal Province
LAZ	Length for Age
LMIC	Low- and Middle-Income Countries
LP	Limpopo Province
MAM	Moderate Acute Malnutrition
MP	Mpumalanga Province
MUAC	Middle Upper Arm Circumference
NC	Northern Cape Province
NW	North West Province
OR	Odds Ratio
PT	Portable Toilet
SADHS	South African Demographic and Health Survey
SAL	Small Area Layer
SAM	Severe Acute Malnutrition
SDG	Sustainable Development Goals
SD	Standard Deviation
SASSA	South African Social Security Agency
STATS SA	Statistics South Africa
UNICEF	United Nations International Children's Emergency Fund
VPL	Ventilated Pit Latrine
WASH	Water, Sanitation and Hygiene
WAZ	Weight for Age
WHO	World Health Organisation
ZAR	South African Rand (currency)

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EXECUTIVE SUMMARY

Stunting affects the development of more than a quarter of South African children under five years of age. Defined by the World Health Organisations (WHO) as low height-for-age Z-score, stunting is a result of prolonged malnutrition undernutrition leading to unreached physical and cognitive growth and development potential. Stunting is associated with poverty, poor maternal health and nutrition, frequent illness, inadequate feeding and care in the early phase of a child's life. The consequences of stunting are lifelong. Children who are stunted are more likely to drop out of school, face poorer health and economic outcomes and have stunted children themselves. This creates intergenerational cycles of poverty that undermines South Africa's economic growth and development potential.

BACKGROUND

In South Africa, **national stunting prevalence was last recorded in the 2016 South Africa Demographic and Health Survey (SADHS) at 27%**. According to WHO prevalence thresholds, this is far higher than countries with similar Human Development Indices, including Gabon, Libya and Egypt. The impact of the COVID-19 pandemic and resulting hunger crisis is expected to exacerbate the risk of stunting in young children nationally, increasing the need for critical nutritional support services, especially in food vulnerable areas. **Unless there is accelerated action to address stunting now, it is estimated that South Africa will have 1.7 million stunted children by 2025.**

The first five years of a child's life are critical for development and present a window of opportunity to counter the physical, social and economic drivers of stunting. However, in the absence of current local data, tracking progress remains a challenge. National surveys are infrequent and hampered by diverse methodologies that make comparison difficult. Additionally, stunting data is not included in routine data collection systems at primary health care levels, limiting availability of community-level data to inform local, provincial and national decision-making and masking disparities between geographically diverse communities. **The availability of current, locally relevant, quality stunting data has the potential to inform responsive, early interventions that tackle the unique causes of malnutrition, while also empowering vulnerable communities with data to hold leaders accountable for actions that reduce stunting.**

Recognising this gap, Grow Great – a national campaign that seeks to mobilise South Africa towards achieving zero stunting by 2030 – embarked on a series of community stunting surveys in partnership with ikapadata across seven food vulnerable districts in South Africa. These surveys aim to develop district-specific nutritional profiles for children under the age of five, providing locally relevant stunting data that empowers local communities, civil society and government leaders towards data-driven action that will reduce stunting by 2030.

METHOD

The study implemented a descriptive cross-sectional stratified multistage clustered household survey across 7 districts in seven South African provinces. Districts were identified based on their inclusion in the list of 32 most food-vulnerable districts in South Africa according to the National Food and Nutrition Security Plan 2018-2023. Districts included:

- **Thabo Mofutsanyane District Municipality (FS)**
- **West Rand District Municipality (GP)**
- **uMgungundlovu District Municipality (KZN)**
- **Mopani District Municipality (LP)**
- **Ehlanzeni District Municipality (MP)**
- **ZF Mgcawu District Municipality (NC)**
- **Bojanala Platinum District Municipality (NW)***

In each district, 25 enumeration areas (EA) from the 2011 South African Census' Small Area Layer (SAL) were randomly selected. The selection of EAs was stratified by geographical type (urban/rural) and weighted proportionally to population size. At least 16 children were sampled in each EA using a random walk method. Only children between 0-59 months and with consenting caregivers (aged 18 years or older) were able to participate in the study.

Data collection took place over a seven-week period between February and May 2022 using 35 trained fieldworkers. Data was captured digitally using SurveyCTO, a mobile data collection tool that allows collection and review of real-time data in the field.

Data cleaning and analysis was done in STATA (version 14.0). Stunting levels and other related anthropometric data were based on standardised WHO growth measurements. Descriptive and bivariate analytical statistics on trimmed data were used to report key findings. Differences in average characteristics of stunted versus not stunted children were assessed using pairwise t-tests, with a significance level set at $p<0.05$. To enhance validity and reliability, results were reanalysed and quality assured by external researchers specialised in the field of nutritional research in South Africa. Ethics approval was obtained from the University of Cape Town Ethics Committee (REF: REC 2020/01/011).

KEY RESULTS

A total of 3 211 surveys were included in the final analyses. Mean age of children in the study was 28,6 months and evenly split between male (52%) and female (48%) children. **Overall stunting prevalence across districts stands at 18% (95% CI: 17,20)**, ranging from 13% in Mopani (LP) and 25% in ZF Mgcawu (NC). When compared to WHO

** The Western Cape and Eastern Cape provinces were excluded from this study as Grow Great had conducted earlier stunting surveys in these provinces in 2019 and 2020, respectively.*

standards, this sample showed significantly lower height-for-age Z-scores and therefore higher stunting rates than expected for children under five years of age.

When viewed by age and gender, stunting rates were higher in children under 24 months (20% vs 17%) and in male children (21% vs 15%), highlighting the importance of disaggregating stunting data to identify particularly vulnerable sub-groups.

Review of additional anthropometric measures indicated overall low rates of acute malnutrition (measured by MUAC) at 1%, underweight and severely underweight at 4% and 1% respectively, and wasting at 3%. Concerningly, overweight and obesity was high across districts at 11% with the highest rates reflected in Thabo Mofutsanyane (FS) (15%) and Ehlanzeni (MP) (14%). **High rates of both obesity and stunting reflect a double burden of malnutrition for children under 5 in these districts.**

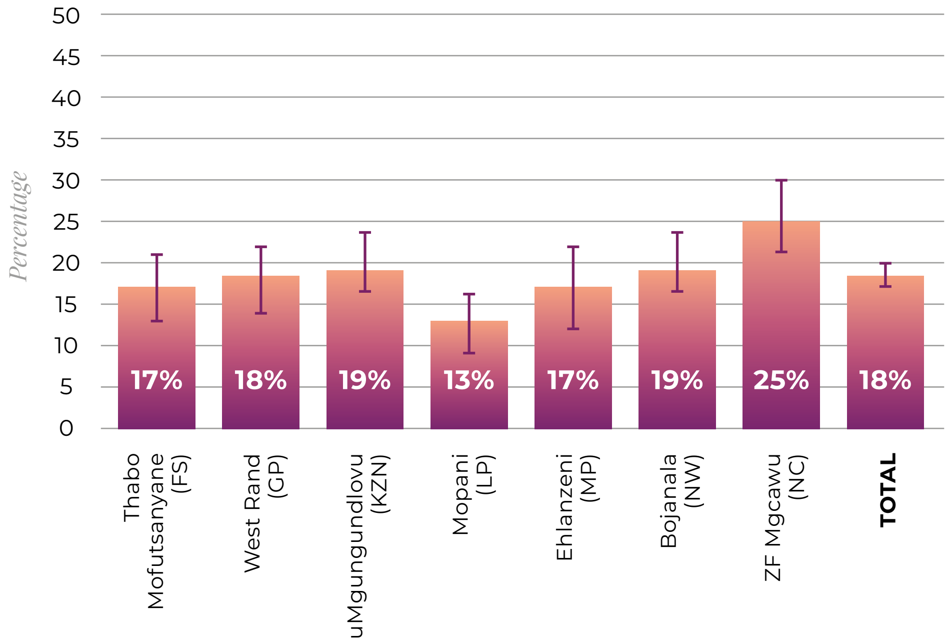
Using bivariate statistics, this study sought to describe the socio-demographic, economic, household, child health and nutrition-related characteristics, providing detailed insights into the differences in these characteristics for stunted and not-stunted children under five. Across districts, stunted children were statistically significantly **more likely to be male** (60% vs. 50%) and have **shorter mothers** compared to not-stunted children (157cm, $p<0.000$). Households with stunted children had a **lower average household income** (R3244.88/month) and were also **less likely to have mothers who had passed matric** (43% vs 50%), although matric pass rates remained low overall at 49%.

In terms of access to basic services, not-stunted children were significantly more likely to be **enrolled in early learning programmes** regardless of their age (25% vs. 18%, respectively). This gap increased noticeably for children three years and above where 15% more not-stunted children were enrolled in early learning programmes compared to stunted children, highlighting the potentially protective nature of early learning programmes for young children. **Adequate sanitation remained low across districts**, with only one in every two children (54%) accessing either a flush toilet or ventilated pit latrine, increasing exposure to disease. Across districts, access to the **Child Support Grant was lower in children younger than 12 months** compared to older children (68% vs. 84%, respectively) highlighting critical access gaps to social support in the earliest days of life.

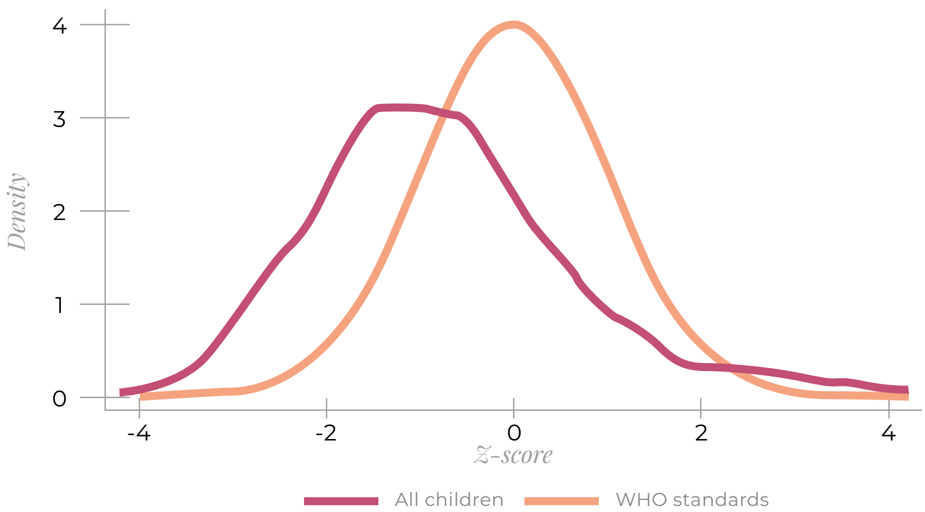
When compared by different child health and nutrition characteristics, stunted children were significantly more likely to have had **low birth weight** (24% vs 13%), be **exclusively breastfed** between 0-6 months of age (60% vs 51%) and **eat carbohydrate dense foods**, including grains, roots and tubers (95% vs 92%). These children were also **less likely to eat fruits and vegetables** (32% vs 37%), and **less likely to be on track with vitamin A** (52% vs 60%) and **deworming** (54% vs 60%) schedules placing their nutrition and gut health at risk.

Variations in prevalence rates between districts and households with stunted versus not-stunted children underline the **deeply contextual nature of stunting and its risk factors**. A number of identified risk factors were shown to be statistically more likely for stunted children in certain districts but not others. For example, reduced child age (Bojanala, NW), rural versus urban location (Thabo Mofutsanyane, FS and Bojanala, NW), household head employment status (ZF Mgcawu, NC) and consumption of vitamin A rich fruit and vegetables (West Rand, GP and uMgungundlovu, KZN). Two additional risk factors, inadequate sanitation and poor dietary diversity were shown to be high overall (46%

STUNTING PREVALENCE ACROSS DISTRICTS



CHILD STUNTING PREVALENCE COMPARED TO WHO STANDARDS



kernel = epanechnikov, bandwidth = 0.2232 and 83% respectively). However, were only correlated significantly with stunted children in Ehlanzeni (MP) and Bojanala (NW). These variations emphasise the **need for localised responses that target the unique stunting profiles in food vulnerable communities** to reduce known risk factors.

RECOMMENDATIONS

Although cross-study comparison should be done with caution,* stunting rates reflect **a general decline in prevalence** when compared to 2016 national and provincial records, but **remain high** for a middle-income country like South Africa. Actions to reduce stunting will require a **whole-of-society, life-course approach that leverages intersectoral actions in health, education, economic development and social protection from the earliest phase of life**. Targeted recommendations to reduce the risk factors of stunting in these seven food vulnerable districts are summarised opposite. Together with district-level stunting data, these recommendations aim to **equip local and national researchers, policy-makers and the public with up-to-date localised evidence that can drive contextualised decision-making and action** towards stunting reduction across South Africa.

STUDY STRENGTHS AND LIMITATIONS

The Grow Great community stunting survey provides a rich source of local stunting data in some of South Africa's most food vulnerable districts. The relatively high sample size explores a wide range of variables associated with child health and growth measures that can be disaggregated by age and district. Although largely descriptive, the study highlights district-specific stunting profiles correlating these to known stunting risk factors and providing useful data for community-level decision making.

Some study limitations include the cross-sectional study design, limiting the potential to identify clear causal relationships between stunting and specific risk factors in each district. The study also relied strongly on recall of events, such as exclusive breastfeeding, which could potentially lead to recall and social desirability bias for certain measures. Lastly, given the complex and diverse nature of stunting causes, it is likely that some measures were excluded or potentially interact in certain ways with measured variables to influence findings. These potential interaction affects support recent studies that use composite measurements to capture the complexity of stunting causes.

CONCLUSION

South Africa continues to suffer the preventable social and economic consequences from high levels of stunting. By describing district-level stunting prevalence rates and exploring early indicators of stunting risk factors, the study provides local-level data to inform policy and programmes that address child malnutrition from the earliest stage of a child's life. A whole-of-society approach is needed to target the underlying social, economic, demographic, health and nutrition related factors that drive stunting in South Africa. Without it, South Africa's high stunting prevalence will continue to undermine investments in education, economic development and public health.

** Proper methodological comparison is needed between different study datasets to ensure stunting prevalence rates are truly comparative.*

RECOMMENDED AREAS FOR IMPROVEMENT ACROSS ALL DISTRICTS
THAT COULD REDUCE RISK FACTORS OF STUNTING

POLICYMAKERS

- Prioritise **poverty alleviation strategies** that include **maternal education** and **economic productivity**
- Improve access to **adequate sanitation** to prevent the spread of disease
- Expand access to **quality early learning programmes** for young children that includes nutrition support and increased subsidisation by government
- Close the social protection access gap for eligible young children by **extending the Child Support Grant into pregnancy through a Maternal Support Grant** that supports vulnerable pregnant women and children from the earliest stage of life
- Support primary healthcare initiatives that target **supportive quality antenatal and postnatal care**
- **Strengthen primary healthcare service through Community Health Worker programmes** that bridge access to care
- Promote initiatives that keep children on track with **Vitamin A and deworming schedules**
- Support policies that **promote breastfeeding for young children** and exclusive breastfeeding in children under 6 months
- Target access to an **affordable nutritious food basket** that boosts dietary diversity for young children
- Include **stunting** measures as part of **routine national datasets**

RESEARCHERS

- **Disaggregate stunting data by age and geography** to provide local evidence that can drive action and monitor progress
- Align stunting measures with global **standards** to ensure rigor and comparability
- **Explore gender discrepancies** in stunting prevalence rates to ascertain underlying protective/risk factors between female and male children
- **Conduct metanalyses of stunting data** to understand national and local stunting trends

PUBLIC

- Foster **community networks of care for young women to complete school**
- **Leverage data to mobilise community action** that supports access to adequate sanitation, healthcare and early learning opportunities
- Promote **consumption of a diverse diet for all children** that includes more fruit and vegetables, especially those rich in Vitamin A, eggs, dairy products, legumes and nuts

1.
INTRODUCTION

Stunting affects the development of more than a quarter of South African children under five years of age[1]. Defined by the World Health Organisations (WHO) as low height-for-age, stunting is a result of prolonged malnutrition leading to unreached physical and cognitive growth and development potential[2]. It is associated with poverty, poor maternal health and nutrition, frequent illness, inadequate feeding and care in the early phase of a child's life. The consequences of stunting are lifelong. Children who are stunted are more likely to drop out of school, face poorer health and economic outcomes and have stunted children themselves[3], creating intergenerational cycles of poverty that undermine South Africa's potential (see Figure 1).

Over the past decade, stunting has received increased attention from the global health and development community. Clear targets to reduce global stunting rates and improve childhood nutrition were established by the World Health Assembly in 2012 and are a key component of the 2030 Sustainable Development Goals (SDG). However, progress towards these targets remains slow and few countries are on track to achieve the SDG target of 50% reduction in stunting prevalence for children under five by 2030[4].

In South Africa, where national stunting prevalence was last recorded in the 2016 South Africa Demographic and Health Survey (SADHS), stunting rates have remained stubbornly high at 27%[1]. According to WHO prevalence thresholds, this is worryingly high[5] – far higher than other countries with similar Human Development Indices, including Gabon, Libya and Egypt[6]. The impact of the COVID-19 pandemic and resulting hunger crisis is expected to exacerbate the risk of stunting in young children nationally, increasing the need for critical nutritional support services, especially in food vulnerable areas[4,7]. Unless there is accelerated action to address stunting now, it is estimated that South Africa will have 1.7 million stunted children by 2025[6].

Figure 1

ECONOMIC COST OF STUNTING AND MALNUTRITION

GLOBAL NUTRITION REPORTS SHOW THE ECONOMIC IMPACT OF MALNUTRITION

SCHOOL PERFORMANCE AND SCHOOL ATTAINMENT

Improving linear growth for children under the age of 2 by 1 standard deviation adds about half a grade to school attainment.

PRODUCTIVITY

Prevention of undernutrition in early childhood leads to hourly earnings that are 20% higher and wage rates that are 48% higher. It is estimated that stunted children earn 20% less as adults compared to non- stunted individuals.

NATIONAL GROWTH

South Africa's high burden of stunting is estimated to place an economic penalty of 9% on Gross Domestic Product (GDP) per capita.

SOURCE: *National Food and Nutrition Security Plan 2018-2023; Galasso, et al. (2019). "The aggregate income losses from childhood stunting and the returns to a nutrition intervention aimed at reducing stunting," Economics & Human Biology, Elsevier, vol. 34(C), pages 225-238.*

The first five years of a child's life are critical for development and present a window of opportunity to counter the physical, social and economic drivers of stunting. The WHO conceptual framework on the Context, Causes and Consequences of Childhood Stunting highlights individual, household and community level factors that contribute to stunted development and growth, including poor quality and quantity of complementary feeding, inadequate breastfeeding, inadequate care and stimulation, infections and poor access to water and sanitation[3].

A 2020 systematic review of global stunting trends and determinants identified immediate, underlying and basic causes of stunting, including socioeconomic factors such as household wealth, paternal education and access to social support programmes[8]. Access to care and health services, including individual vaccination status and vitamin supplementation were further highlighted as determinants, alongside feeding practices, food security and dietary diversity. More recently, a 2022 report examining the implications of international evidence on stunting reduction for South African policymakers outlined four main drivers of stunting, including inadequate quantity or quality of diet, repeated infections, poor social and cognitive stimulation and air pollution[9]. Little is known about the latter cause, especially in Low- and Middle-Income Countries (LMICs). However, it is clear from these sources that stunting drivers remain uniquely complex and specific to country and community contexts[8].

Access to regular, updated, reliable information on the nutritional status of children under five across South Africa's diverse provinces and communities remains a challenge. National surveys are infrequent and hampered by diverse methodologies that make it difficult to compare stunting rates and causes between studies over time[1,10]. Additionally, stunting data is not part of current routine data collection systems at primary health care levels, limiting the availability of community-level data to inform local, provincial and national decision-making. This is further hampered by national and provincial aggregates of stunting rates that mask internal disparities between geographically diverse communities[10]. The availability of current, locally relevant, quality stunting data has the potential to inform responsive, early interventions that tackle the unique causes of malnutrition, while also empowering vulnerable communities with data to hold governments accountable for actions that reduce stunting[11].

Recognising this need, Grow Great – a national campaign that seeks to mobilise South Africa towards achieving zero stunting by 2030 – embarked on a series of community stunting surveys in partnership with ikapadata across seven food vulnerable districts in South Africa. These surveys aim to develop district-specific nutritional profiles for children under the age of five, providing locally relevant stunting data that empowers local communities, civil society and government leaders towards data-driven action that will reduce stunting by 2030.

2. METHODOLOGY

2.1. STUDY AIM

The aim of this study was to profile the nutritional status of children under the age of five across seven food vulnerable districts in South Africa.

2.2. STUDY OBJECTIVES

The objectives of this study were to:

a. Determine the prevalence of stunting in children under five in these seven districts

b. Describe the drivers of stunting in children under five for these seven districts

c. Develop national and district-specific stunting scorecards based on the above findings that can support action, policy and programmes that address child stunting within these selected districts.

2.3. STUDY DESIGN

This study implemented a descriptive cross-sectional stratified multistage clustered household survey across seven districts in seven South African provinces.

2.4. POPULATION

The population of interest included young children between the ages of 0-59 months and their caregivers in selected districts.

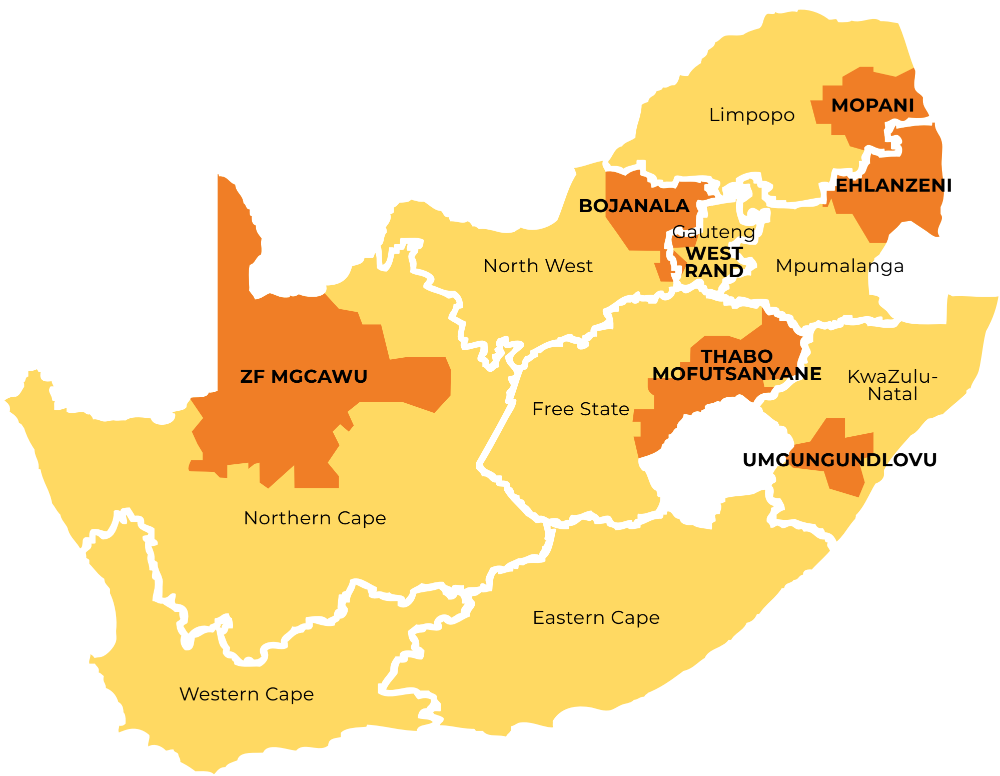
2.5. STUDY SETTING

The survey took place across seven district municipalities, each in a different province *(see Figure 2)*. Districts included*: Thabo Mofutsanyane District Municipality (Free State), West Rand District Municipality (Gauteng), uMgungundlovu District Municipality (KwaZulu-Natal), Mopani District Municipality (Limpopo), Ehlanzeni District Municipality (Mpumalanga), ZF Mgcawu District Municipality (Northern Cape) and Bojanala Platinum District Municipality (North West). Districts were identified based on their inclusion in the list of 32 most food-vulnerable districts in South Africa according to the National Food and Nutrition Security Plan 2018-2023.[12]

** The Western Cape and Eastern Cape provinces were excluded from this study as Grow Great had conducted earlier stunting surveys in these provinces in 2019 and 2020, respectively.*

Figure 2

MAP OF SURVEYED DISTRICTS



2.6. SAMPLING

The goal was to measure a minimum of 400 children per district to achieve a confidence interval (CI or "margin of error") of no more than five percentage points at the 95% confidence level. In each district, 25 enumeration areas (EA) from the 2011 South African Census' Small Area Layer (SAL) were randomly selected (see appendix A for a full list of included EAs). The selection of EAs was stratified by geographical type (urban/rural) and weighted proportionally to population size *(see Figure 4)*. This required at least 16 children to be assessed in each EA which were sampled using a random walk method. Only children between 0-59 months and with consenting caregivers (aged 18 years or older) were able to participate in the study. *Figure 3* shows the population and sample sizes for each district.

2.7. DATA COLLECTION

2.7.1. RECRUITMENT AND TRAINING

Fieldwork was originally scheduled for early 2020 with a first round of fieldworkers trained in late 2019. However, due to the COVID-19 pandemic and resulting national lockdown, the study was put on hold until 2022.

Training was repeated in early 2022 in Gauteng with 42 potential fieldworkers recruited from targeted communities and surrounding areas. Preference was given to fieldworkers with experience in taking anthropometric measurements of young children, a nursing background, those who had worked with ikapadata before and/or had attended the first round of fieldworker training in 2019. A 20% surplus of fieldworkers were invited to participate in the training, allowing for greater flexibility to (a) hire the strongest candidates and (b) have a contingent of readily trained fieldworkers ready for substitution in case of fieldworkers dropping out over the course of data collection.

Fieldworker training occurred over 4 days. Ikapadata led the training on fieldwork protocols, including data collection techniques, device handling, random walk method, the survey questionnaire, research ethics and communication. The Grow Great team conducted training on all anthropometric measures. Both organisations provided supervision in ensuring anthropometric measurements were conducted accurately and standard operating procedures adhered to. The last two training days functioned as pilot days where fieldworkers were evaluated in the field based on their knowledge of the project, their capacity to conduct measurements correctly, as well as technical factors in conducting fieldwork according to training protocols.

A final group of 35 fieldworkers were selected based on their performance during training. Background checks and police clearances were completed for all fieldworkers before they were allowed to begin data collection.

Figure 3

POPULATION AND SAMPLE SIZES PER STUDY DISTRICT

DISTRICT	HOUSEHOLDS (N)	CAREGIVERS (N)	CHILDREN (N)
THABO MOFUTSANYANE (FS)	455	455	455
WEST RAND (GP)	483	483	483
UMGUNGUNDLOVU (KZN)	452	452	452
MOPANI (LP)	453	453	453
EHLANZENI (MP)	429	429	429
BOJANALA (NW)	484	484	484
ZF MGCAWU (NC)	465	465	465
TOTAL	**3221**	**3221**	**3221**

Figure 4

WEIGHTING OF STUNTING SURVEY SAMPLE

PROBABILITY WEIGHTS WERE CALCULATED USING THE FOLLOWING FORMULA

$$w = \frac{1}{p_{ea} * p_{hh}} = \frac{1}{\frac{n_{ea}}{N_{ea}} * \frac{n_{hh}}{N_{hh}}}$$

n_{ea} : *Number of sampled EAs in strata (sampled proportional to population)*

N_{ea} : *Total eligible EAs in district/geotype stratum*

n_{hh}: *Number of sampled households in EA*

N_{hh}: *Total eligible households in EA*

Weight calculations correspond to the multistage stratified sampling design. As such, weights were calculated as being the inverse of the probability of EA selection p_ea multiplied by the inverse of the probability of household selection p_hh. The missing element for the weight calculation was the number of eligible households (households with young children). This could not be extracted from the publicly available census data which only reports frequencies of ages at the small area level (SAL). To bridge this gap, survey results for the average number of young children per household combined with the census number of young children per EA were used to determine an estimate of households with young children per EA and district.

2.7.2. FIELDWORK

Field teams consisted of five members per district, including one ikapadata team leader and two pairs of trained fieldworkers. Data collection took place over a seven-week period between February and May 2022. The last week of fieldwork consisted of data quality checks in the field to ensure the integrity of the data collected. During data collection, two height and weight measurements were taken, and if these differed by more than a small amount a third measurement was taken. The final height and weight variables were constructed from the average of the two most similar measurements.

Data was captured digitally on a tablet through SurveyCTO, a mobile data collection tool that allows the collection and review of real-time data in the field. ikapadata developed a data workflow (from data collection to quality control and reporting) that leveraged the advantages of mobile data collection with data quality automations and GIS. This form of data collection and data management allowed for real-time communication and reporting between ikapadata's quality control staff and each fieldwork team through the use of online dashboards that maximised fieldwork efficiency and data quality.

2.8. DATA ANALYSIS

Study data was transferred from SurveyCTO to STATA (version 14.0) for data cleaning and analysis. Analysis of stunting levels and other related anthropometric data was based on WHO standard growth measurements[13]. *Figure 5* shows how the anthropometric calculations are applied based on WHO growth standards and cut off scores. During the data cleaning phase, out of range data for all growth standards was defined as any measure below or above 4 Standard Deviations (SD) from the median Z-scores.

The statistical analysis for this report included descriptive and bivariate analytical statistics to report key findings. Frequencies and percentages are presented and compared across the seven districts for all key stunting variables, including socio-demographics, health and nutrition and anthropometric measures. For each variable, mean values are reported, except where continuous variables have exhibited a skewed distribution where median values have been included. All descriptive statistics in this report have been weighted and are representative at the district level (but not at provincial or national level).

An extensive series of checks was conducted to ensure data analysis quality. During this process 43 observations were found to have very large probability (sampling) weights. Extreme probability weights arose where a small number of households or enumeration areas (EAs) were visited, or a combination of both. In cases with the most extreme weights, only one or two households were visited per EA. Extreme weights increase the variance of estimates, resulting in excessively wide confidence intervals. The median probability weight was 22.75, while the maximum probability weight was 1072 – a child with the maximum probability weight receives a weight 47 times that of the median child. This means that children with extreme weights have a large influence on estimates.

Figure 5

WHO GROWTH STANDARDS AND CUT OFF VALUES

Z-SCORE	CLASSIFICATION
LENGTH/HEIGHT-FOR-AGE (LAZ/HAZ)	
<-2 Z-score	Stunted
<-3 Z-score	Severely Stunted
WEIGHT-FOR-AGE (WAZ)	
<2 Z-score	Underweight
<-3 Z-score	Severely underweight
WEIGHT-FOR-LENGTH/HEIGHT (WLZ/WHZ)	
>3 Z-score	Obese
>2 Z-score	Overweight
<-2 Z-SCORE	Wasted
<-3 Z-SCORE	Severely wasted

To address this, probability weights were trimmed – that is, weights above a certain cut-off value were replaced with the cut-off value. Survey weights are commonly trimmed to prevent a small number of observations from having a large influence on estimates[14]. Trimming weights may introduce small bias to estimates, but reduces confidence intervals[14]. Various methods exist for trimming extreme weights, but trimming at the median plus four or five times the interquartile range is a relatively simple method that has been found to perform reasonably well[15,16,17]. Weights were trimmed at the median plus four times the interquartile range, which resulted in a cut-off value and maximum trimmed weight of 94. This value corresponded with roughly the 99th percentile of probability weights.*

Bivariate statistics and figures were then produced using both the original untrimmed and trimmed weights. A total of 43 children had probability weights above the cut-off. Children with extreme probability weights above the cut-off value were found in Thabo Mofutsanyane (Free State) (n=2), Bojanala (North West) (n=19), West Rand (Gauteng) (n=1), Ehlanzeni (Mpumalanga) (n=19) and Mopani (Limpopo) (n=2). The most extreme weights were found in Mpumalanga and Limpopo, and accordingly, estimates using trimmed weights differ most from those using untrimmed weights in these two provinces.

Graphs showing household and child characteristics by district (province) were produced using the full sample of trimmed data for children under 5 years.** Where possible, graphs include 95% confidence intervals. Bivariate tables show differences in average household and child characteristics between stunted and not stunted children, as well as the average characteristics for all children. Bivariate tables were produced for all districts combined as well as for each district (province) separately for children who had non-missing height-for-age Z-scores.*** Differences in average characteristics of stunted versus not stunted children were assessed using pairwise t-tests. A p-value lower than 0.05 indicates that the difference is statistically significant at the 5% level. Standard errors are displayed in parentheses, and significant differences are indicated for $p<0.05$.

Further analyses of data using logistic regression models that adjust for potential confounders is underway to determine specific stunting drivers for this sample. These analyses will be included in a follow up report.

2.9. ETHICS APPROVAL

Ethics approval was obtained from the University of Cape Town Ethics Committee (REF: REC 2020/01/011). Due to COVID-19 and the national lockdown, the approval period was extended to the 23rd of January 2023. Voluntary written consent was obtained from all study participants and access to communities facilitated and approved by local municipalities. Enumerators were trained to refer children identified as acutely unwell and in need of assistance to the relevant health and/or social support services within the area. Questionnaires were stored securely on ikapadata servers, and personal identifiers were anonymised in the dataset used for analysis. Participating households were compensated with R10 airtime vouchers in appreciation of their time.

*Trimming at the median + 4*IQR yields a similar cut-off value to trimming at the median multiplied by 4, another popular trimming method, which yields a cut-off value of 91. However, values of 3*median and the median + 5*IQR are also commonly used. The choice of weight trimming procedure is a complicated issue, but for the sake of simplicity a single relatively simple method was chosen.*

*** The figures (and the 'Total' column in the bivariate tables) should not be interpreted as indicating average characteristics for all households in each district, but rather averages for households with children under 5. The characteristics of households with children under 5 may differ from those of other households.*

**** Because of this the sample size (N) is slightly lower than that for the full sample, as 10 children were missing Z-scores.*

3.
RESULTS

COMMUNITY PROFILES OF HOUSEHOLDS WITH CHILDREN UNDER 5

A total of 3221 surveys were conducted by fieldwork teams across the seven districts. All households included children under 5 years of age, a completed consent form and household, care-giver and child measurement form. In some instances, the mother was unavailable for measurements, which did not exclude the household from the dataset so long as a primary caregiver responsible for the child was present. During data cleaning, 10 households showed missing height-for-age Z-scores for children and were excluded from bivariate analyses. Because of this, the sample size (N=3211) is slightly lower than that for the full sample. All results reflect trimmed weights and reflect the descriptive community profiles for children under 5 in each district.

3.1. DEMOGRAPHIC CHARACTERISTICS OF CHILDREN UNDER 5

3.1.1. CHILD AGE

Mean age of children in the study was 28,6 months and ranged from 0 months (newborn) to 59 months. The total sample was slightly weighted towards older children, with children 24-59 months making up 57% and children 0-23 months making up 43% of the sample. Ehlanzeni district (Mpumalanga) had the youngest mean age at 25,6 months with ZF Mgcawu (Northern Cape) and Thabo Mofutsanyane (Free State) showing the highest mean age at 29,9 months and 29,8 months respectively. *Figure 6* highlights the mean ages and distributions for children below and above 24 months across each district.

Figure 6

AVERAGE CHILD AGES AND DISTRIBUTIONS ACROSS DISTRICTS

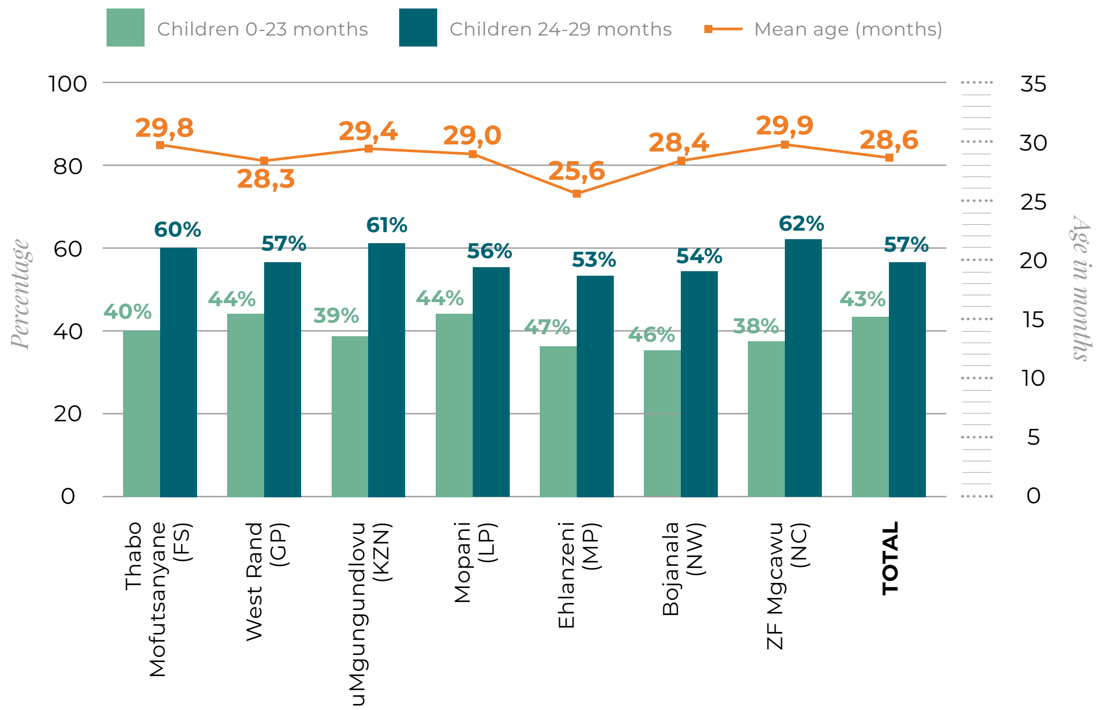


Figure 7

PERCENTAGE OF MALE VERSUS FEMALE CHILDREN ACROSS DISTRICTS

3.1.2. CHILD GENDER

Overall, gender was evenly distributed across districts with a total of 52% male and 48% female children included in the study. Mopani district (Limpopo) had the largest number of female children at 53%. *Figure 7* highlights the gender distribution for the total sample across all districts.

3.2. ANTHROPOMETRIC INDICATORS OF CHILDREN UNDER 5

A summary of anthropometric indicators across districts is provided in *Figure 8*. Detailed review of each measure is provided in the following sections.

3.2.1. STUNTING (HEIGHT-FOR-AGE)

Stunting prevalence for children under five years across the seven food insecure districts stands at 18% (95% CI: 17,20). Stunting rates are highest in ZF Mgcawu (Northern Cape) at 25% (95% CI: 21,30) and lowest in Mopani (Limpopo) at 13% (95% CI: 9,16). *Figure 9* highlights the different prevalence rates across districts. Overall, when compared to WHO standards, this sample showed significantly lower height-for-age Z-scores and therefore higher stunting rates than expected for children under five years *(see Figure 10)*.

When viewed across different age categories, stunting is higher among children aged 12-23 months than children under 12 months or between 24-59 months *(see Figure 11)*. Severe stunting (HAZ% < -3SD) was also more prevalent (4%) in children between 12-36 months, highlighting a particularly vulnerable period for children during the first 1000 days of life.*

When viewed by district, stunting rates were consistently higher in children under 24 months, except in Thabo Mofutsanyane (Free State) and ZF Mgcawu (Northern Cape) where older children were more likely to be stunted. *Figure 13* highlights the stunting prevalence for children 0-23 months and 24 months and above by district.

When viewed by gender, stunting rates were higher among boys (21%) compared to girls (15%) under five *(see Figure 12)*.

** The first 1 000 Days is the period from conception until a child's 2nd birthday*

Figure 8

ANTHROPOMETRIC PROFILE OF CHILDREN UNDER 5 YEARS OF AGE ACROSS DISTRICTS

DISTRICT	STUNTED (HAZ <-2SD)		ACUTE MALNUTRITION (MUAC)			UNDERWEIGHT (WAZ<-2SD)			WASTING (WHZ <-2SD)		OVER WEIGHT OBESE (WHZ>2SD)	
	N	% (CI)	N	MAM % (CI)	SAM % (CI)	N	UNDER WEIGHT % (CI)	SEVERELY UNDER WEIGHT % (CI)	N	% (CI)	N	% (CI)
THABO MOFUTSANYANE (FS)	454	17% (13%-20%)	414	1% (0%-2%)	0% (0%-1%)	454	3% (2%-6%)	1% (0%-2%)	440	6% (4%-8%)	440	15% (11%-18%)
WEST RAND (GP)	482	18% (14%-22%)	432	0% (0%-1%)	0% (0%-0%)	482	4% (2%-7%)	0% (0%-1%)	481	2% (1%-3%)	481	10% (7%-14%)
UMGUNGUNDLOVU (KZN)	449	19% (15%-23%)	408	2% (1%-4%)	0% (0%-0%)	448	3% (2%-5%)	0% (0%-2%)	443	1% (1%-3%)	443	12% (9%-16%)
MOPANI (LP)	453	13% (9%-16%)	411	0% (0%-2%)	0% (0%-0%)	453	2% (1%-4%)	0% (0%-3%)	443	2% (1%-4%)	443	8% (6%-11%)
EHLANZENI (MP)	426	17% (12%-22%)	387	1% (0%-2%)	0% (0%-0%)	424	3% (2%-6%)	1% (0%-4%)	425	2% (1%-5%)	425	14% (11%-19%)
BOJANALA (NW)	483	19% (16%-23%)	451	1% (1%-3%)	0% (0%-0%)	482	6% (4%-9%)	0% (0%-1%)	475	2% (1%-4%)	475	6% (4%-9%)
ZF MGCAWU (NC)	464	25% (21-30%)	426	2% (1%-3%)	0% (0%-0%)	463	11% (9%-15%)	2% (1%-3%)	460	5% (3%-8%)	460	7% (5%-10%)
TOTAL	**3211**	**18% (17-20%)**	**2929**	**1% (1%-2%)**	**0% (0%-0%)**	**3206**	**4% (4%-5%)**	**1% (0%-1%)**	**3167**	**3% (2%-3%)**	**3167**	**11% (9%-12%)**

HAZ = height-for-age Z-score
MUAC = mid-upper arm circumference
MAM = moderate acute malnutrition
SAM = severe acute malnutrition
WAZ = weight-for-age Z-score
WHZ = weight-for-height Z-score

Figure 9

STUNTING PREVALENCE ACROSS DISTRICTS

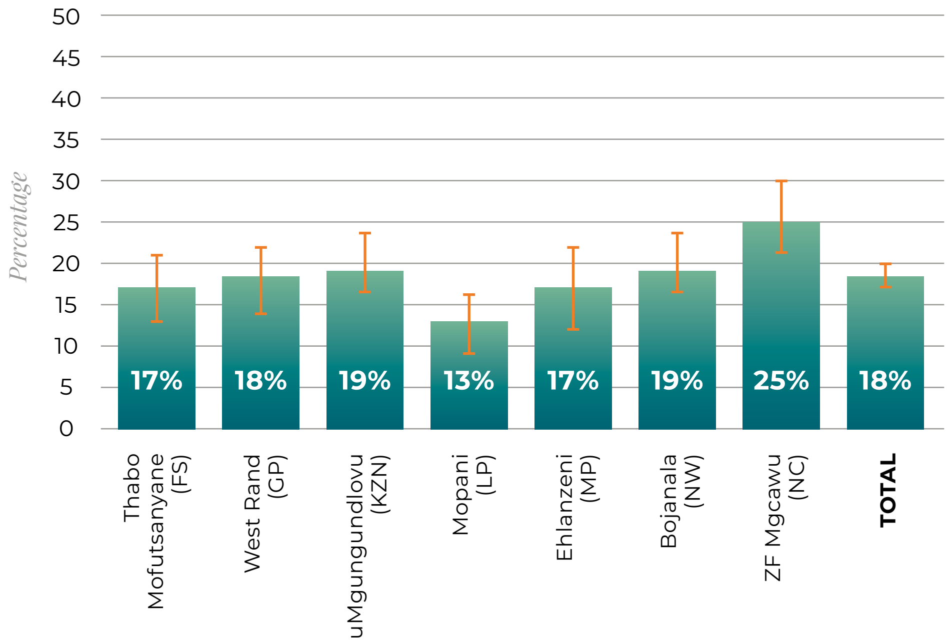
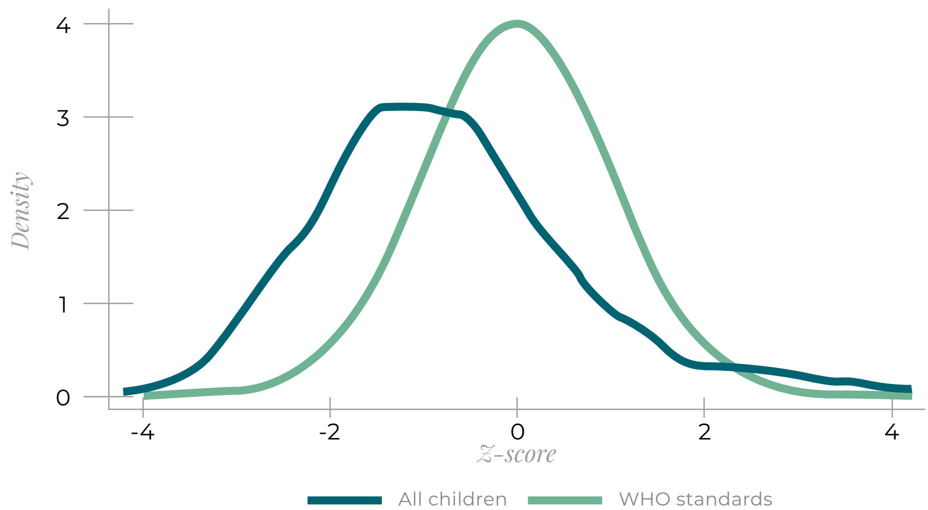


Figure 10

CHILD STUNTING PREVALENCE COMPARED TO WHO STANDARDS



kernel = epanechnikov, bandwidth = 0.2232

Figure 11

MODERATE AND SEVERE STUNTING ACROSS AGE CATEGORIES

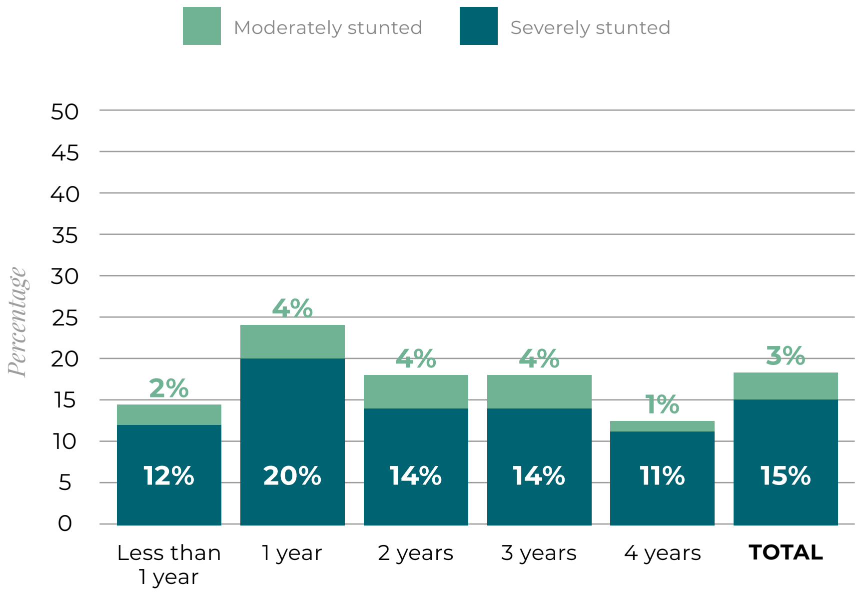


Figure 12

STUNTING PREVALENCE BY GENDER AMONG CHILDREN UNDER FIVE (ALL DISTRICTS)

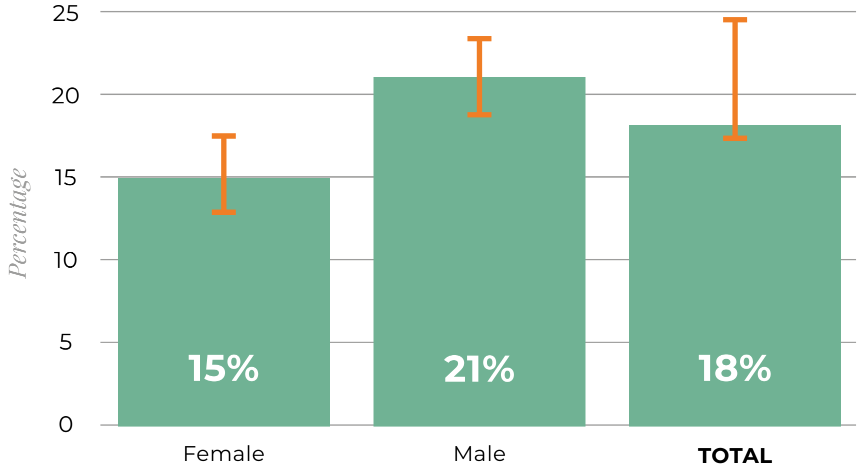
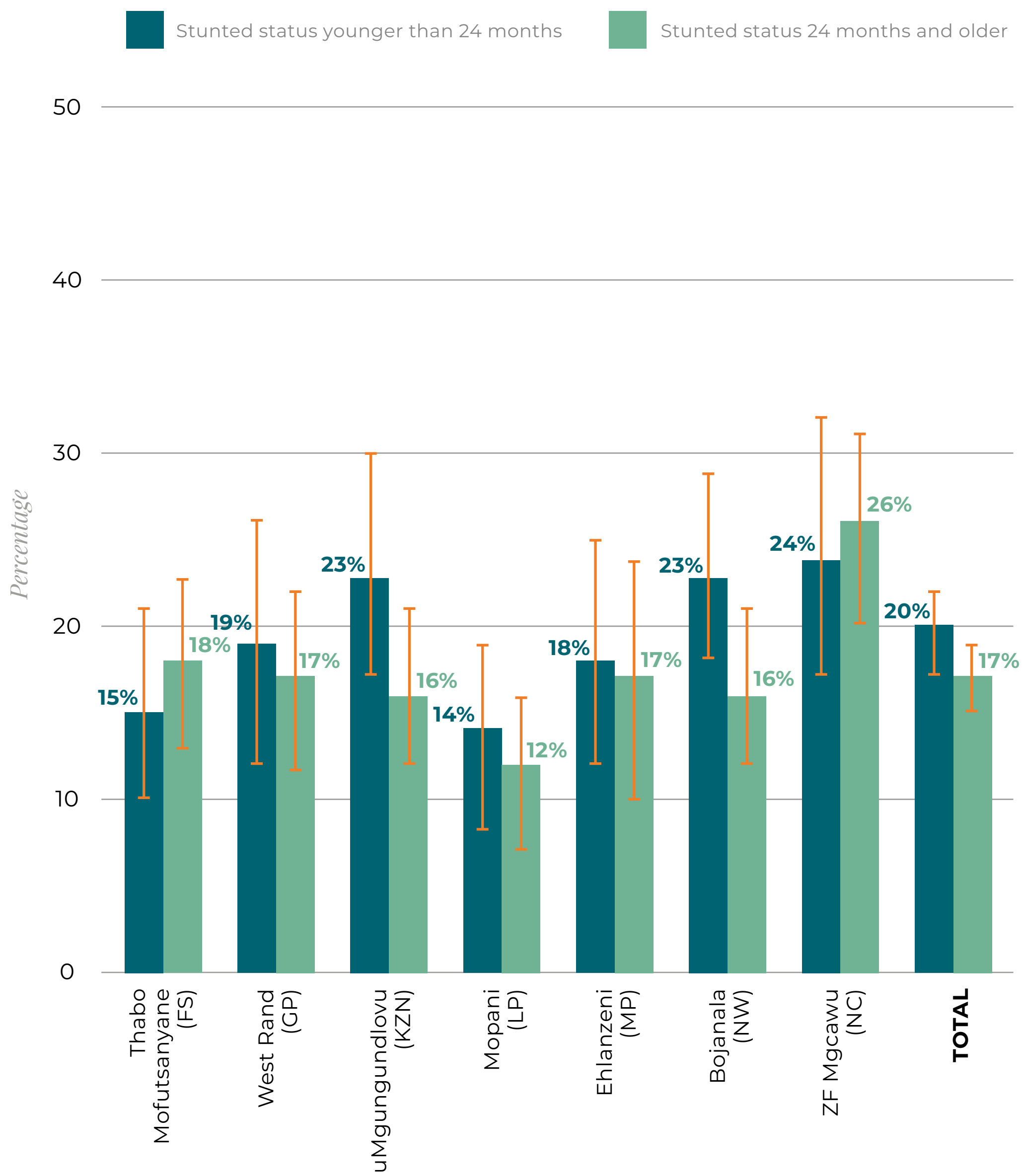


Figure 13

CHILD STUNTING PREVALENCE 0-23 MONTHS AND 24 MONTHS AND ABOVE BY DISTRICT



3.2.2. ACUTE MALNUTRITION

Acute malnutrition is a nutritional deficiency resulting from either inadequate energy or protein intake. In this study, definitions of moderate acute malnutrition (MAM) and severe acute malnutrition (SAM) are based on mid-upper arm circumference (MUAC) measurements and the age of the child[18]. Anything below 2 SD from the mean is classified as MAM and anything below 3 SD from the mean is classified as SAM. Across districts, a small minority (1%) of children suffered from acute malnutrition at the time of the study, whether moderate or severe *(see Figure 8)*.

3.2.3. UNDERWEIGHT (WEIGHT-FOR-AGE)

Underweight or weight-for-age is a composite indicator that refers to a child's body weight relative to their age. It takes into account both acute and chronic undernutrition. A child is classified as underweight or severely underweight based on WHO growth standards *(see Figure 5)*. Across districts, only 4% (95% CI:4,5%) of children were classified as underweight and 1% (95% CI: 0,1) as severely underweight. Underweight children were most prevalent in ZF Mgcawu (Northern Cape) at 11% (95% CI: 9,15), followed by Bojanala (North West) at 6% (95% CI: 4,9) *(see Figure 8).*

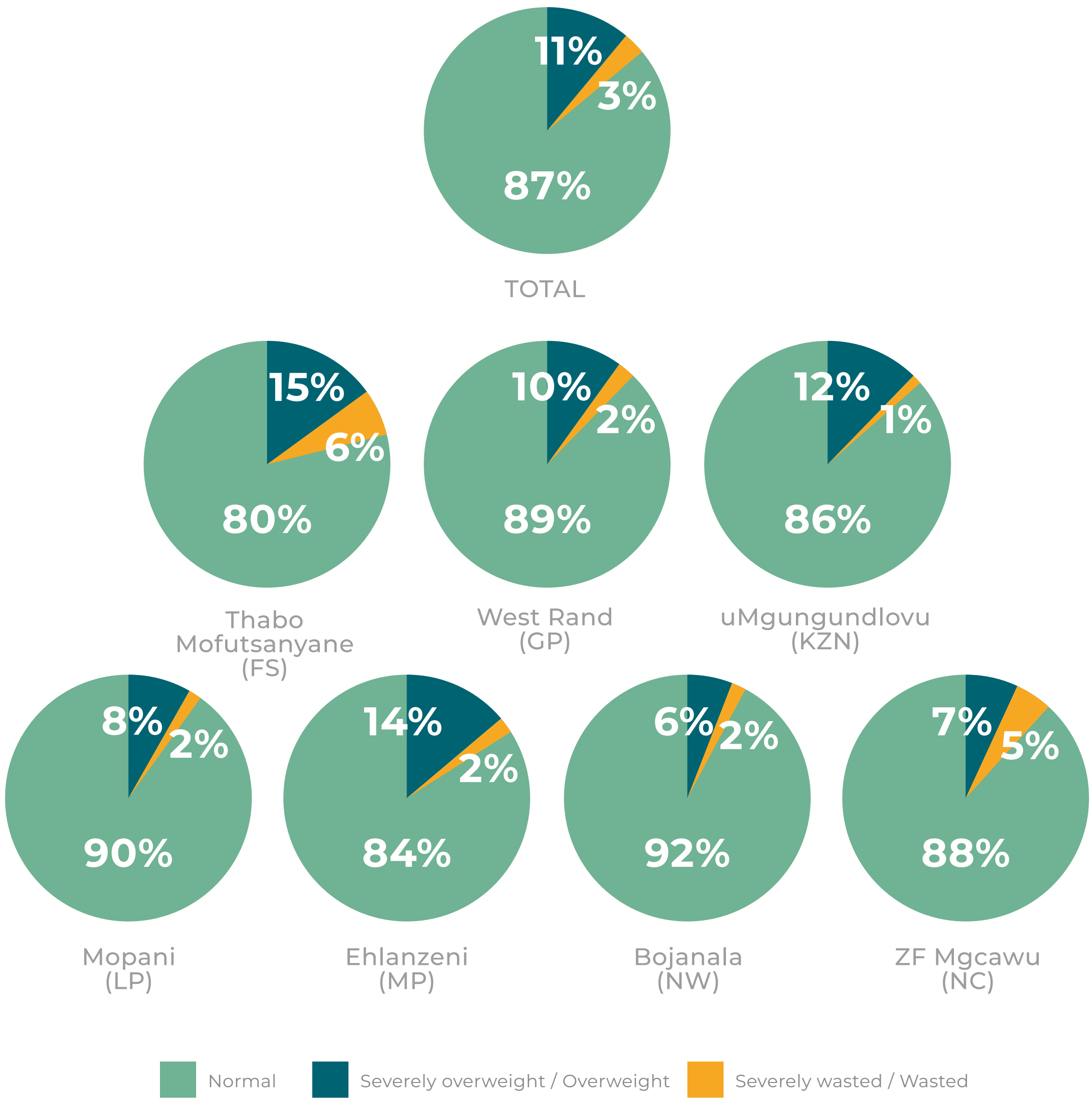
3.2.4. WASTING, OVERWEIGHT AND OBESITY (WEIGHT-FOR-HEIGHT)

Weight-for-height refers to a child's body weight in proportion to their length/height. The indicator helps to identify children with low weight-for-height who may be wasted or severely wasted and/or overweight or obese based on WHO growth standards *(see Figure 5)*. Overall, the majority of children in the sample (87%) were classified as normal weight-for-height. Wasting was limited to 3% of the total population and highest in Thabo Mofutsanyane (Free State) at 6% (CI:4,8).

Concerningly, 11% (CI: 9,12) of children in the study were classified as overweight or obese, with rates highest in Thabo Mofutsanyane (Free State) at 15%, followed by Ehlanzeni (Mpumalanga) at 14%. All districts showed overweight and obesity rates higher than 5% indicating a double burden of malnutrition *(see Figure 14).*

Figure 14

WASTING, OVERWEIGHT AND OBESITY ACROSS DISTRICTS*



** Errors in summing 100% are linked to rounding at district level*

3.3. SOCIO-DEMOGRAPHIC AND ECONOMIC CHARACTERISTICS OF HOUSEHOLDS AND CAREGIVERS WITH CHILDREN UNDER 5

3.3.1. MOTHER'S AGE AND HEIGHT

Across all districts, the mean age for mothers in this sample was 30 years old with the oldest mother recorded at 50 years of age and the youngest at 16 years (lower quartile= 24; upper quartile= 34). Mother's height also remained relatively stable across districts with an average of 159cm. *Figure 15* highlights the mean age and height for mothers in this sample.

3.3.2. CAREGIVER/MOTHER'S EDUCATION LEVEL

Caregiver's/Mother's education levels were categorized as less than matric (<12 years of formal schooling), matric (12 years schooling passed), tertiary (>12 years of formal education)*. Overall, more than half (51%) of caregivers/mothers do not have a matric level of education. Mothers showed higher levels of education in Ehlanzeni (52% matric, 10% tertiary) and Thabo Mofutsanyane (45% matric, 12 tertiary) *(see Figure 16)*.

3.3.3. URBAN-RURAL DIVIDE

Urban-rural divide in this study is defined in terms of the StatsSA geography type classification, where rural means "farm" or "traditional area." Overall, 57% of the sample was based in urban areas *(see Figure 17)*. This varied across districts due to differing levels of urbanization in each province, with the largest urban samples taken from West Rand (Gauteng) at 92% and ZF Mgcawu (Northern Cape) at 97%. Conversely, this is likely linked to the large urban density in the Gauteng province and the sparsely populated rural areas in the Northern Cape.

3.3.4. HOUSEHOLD SIZE

Overall, there was an average of five people per household across districts. The smallest average household size was 3,7 people per household in Thabo Mofutsanyane (Free State) and ZF Mgcawu (Northern Cape) and highest in Bojanala (North West) at 5,1 people and uMgungundlovu (KZN) at 4,8 people. *Figure 18* outlines the mean household size for all districts.

3.3.5. HOUSEHOLD INCOME AND EMPLOYMENT STATUS

Mean household monthly income (after tax) across districts for households with children under five years was R3 909 (ZAR). Mean income ranged from R2 791 in Thabo Mofutsanyane District (Free State) to R4 651 in ZF Mgcawu District (Northern Cape). Household employment status (measured as household head employed) also varied significantly, but remained low with less than half of household heads employed overall (41%). Ehlanzeni (Mpumalanga) was the only district to show employment status above 50%. Conversely, the lowest employment rate was in ZF Mgcawu (34%), where average income was highest. *Figure 19* shows average income and employment status for all districts.

** Matric is equivalent to the completion of 12 grades or years of schooling and is currently the minimum level of formal certified education in South Africa.*

Figure 15

MOTHERS MEAN AGE AND HEIGHT

	AGE (YEARS)		MEAN HEIGHT (CM)	
DISTRICT	N	MEAN (95% CI)	N	MEAN (95% CI)
THABO MOFUTSANYANE (FS)	428	30 (29-31)	405	160 (159-162)
WEST RAND (GP)	442	30 (29-31)	426	158 (157-159)
UMGUNGUNDLOVU (KZN)	359	29(28-30)	339	158 (158-159)
MOPANI (LP)	363	30 (30-31)	355	162 (161-162)
EHLANZENI (MP)	381	29 (28-30)	365	160 (159-161)
BOJANALA (NW)	398	29 (29-30)	360	159 (158-160)
ZF MGCAWU (NC)	407	29 (28-30)	397	158 (157-158)
TOTAL	**2778**	**30 (29-30)**	**2647**	**159 (159-160)**

Figure 16

CAREGIVERS'/MOTHERS' EDUCATION LEVELS ACROSS DISTRICT

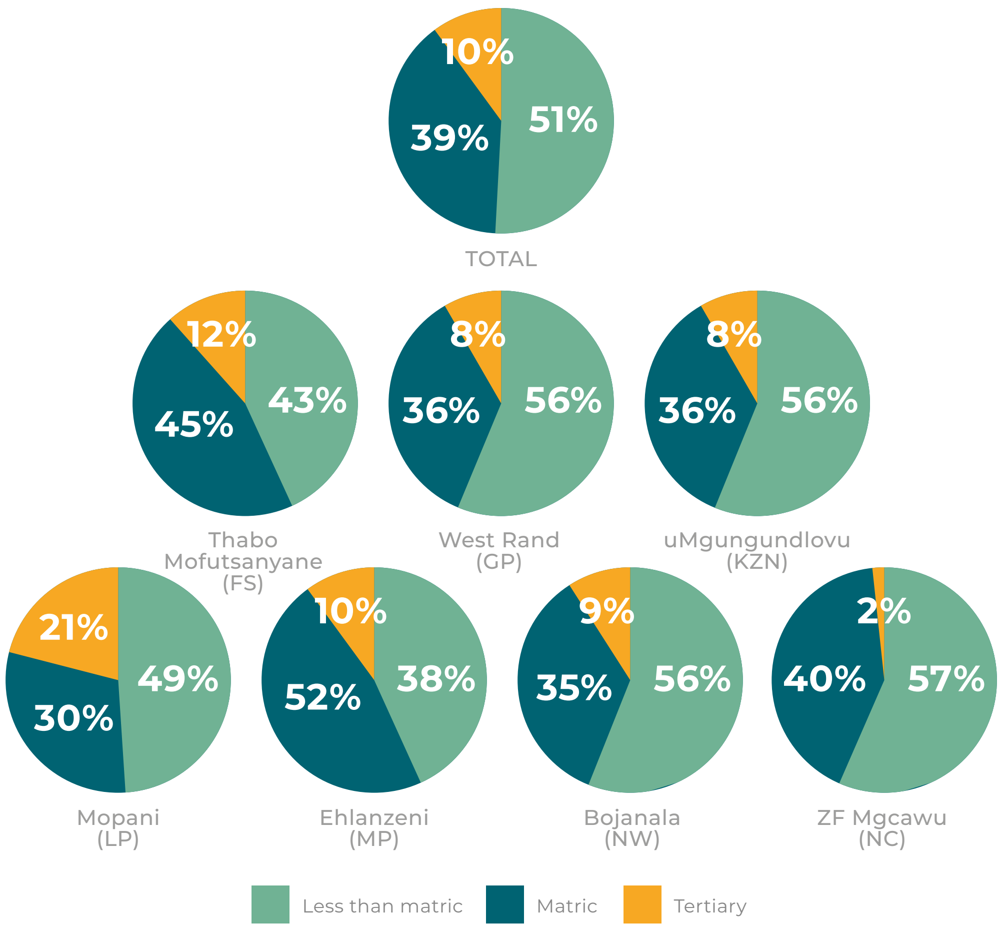


Figure 17

URBAN VERSUS RURAL SPLIT ACROSS PROVINCES

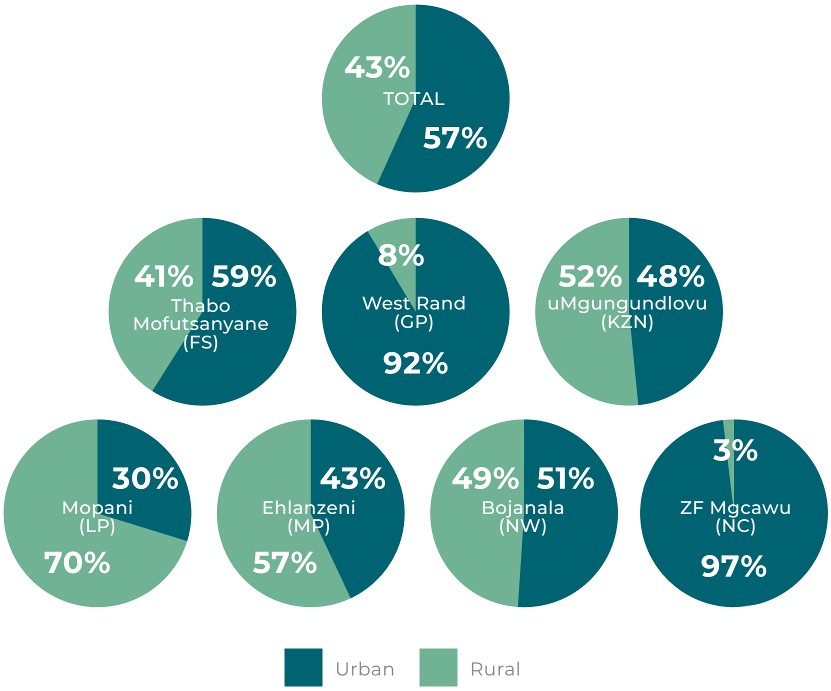


Figure 18

MEAN HOUSEHOLD SIZE ACROSS DISTRICTS

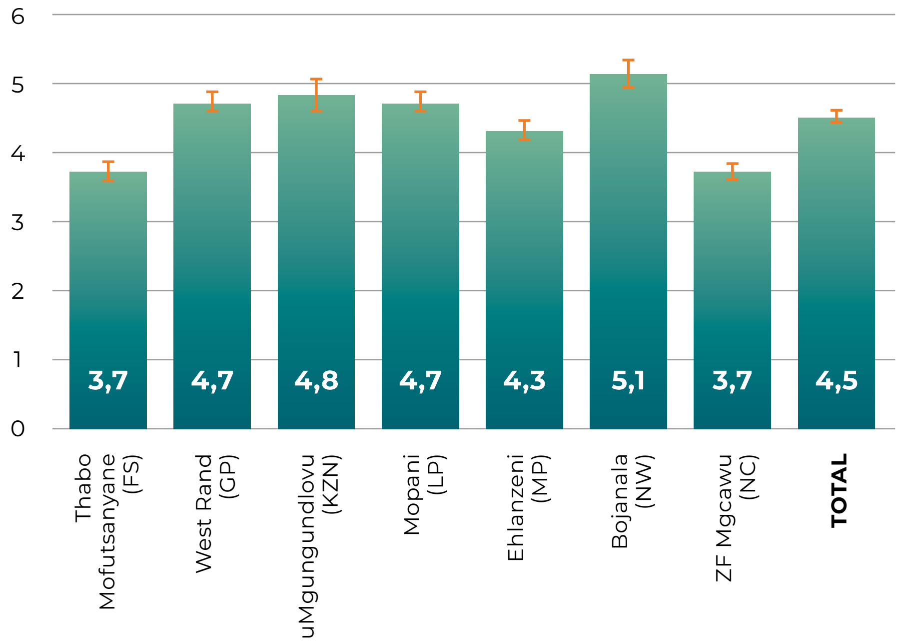


Figure 19

AVERAGE INCOME AND EMPLOYMENT STATUS FOR HOUSEHOLDS WITH CHILDREN UNDER FIVE

	MEAN HH INCOME		EMPLOYMENT STATUS	
DISTRICT	N	ZAR (95% CI)	N	% (95% CI)
THABO MOFUTSANYANE (FS)	395	R2 791,35 (R2570-R3013)	454	36% (31%-41%)
WEST RAND (GP)	452	R3 763,21 (R3160-R4366)	481	49% (43%-54%)
UMGUNGUNDLOVU (KZN)	399	R3 635,15 (R3271-R3999)	449	38% (33%-43%)
MOPANI (LP)	442	R4 034,90 (R3439-R4631)	451	40% (35%-46%)
EHLANZENI (MP)	379	R4 400,45 (R3518-R5283)	425	51% (45%-57%)
BOJANALA (NW)	335	R4 468,31 (R3303-R5634)	483	42% (37%-47%)
ZF MGCAWU (NC)	427	R4 650,57 (R4177-R5124)	464	34% (29%-38%)
TOTAL	**2829**	**R3 909,38 (R3654-R4165)**	**3207**	**41% (39%-43%)**

3.4. ACCESS TO BASIC SERVICES

3.4.1. ADEQUATE DRINKING WATER

In this study, tapped water inside the home, tapped water outside the home in the yard and the use of a public tap are classified as 'adequate' sources of drinking water. This is based on the Centre for Disease Control's (CDC) improved water classifications[19]. Sources of water classified as 'inadequate' include boreholes, rivers, water tankers, JoJo tanks (water storage solution for water rainfall or from the municipal water supply), tanker trucks and no drinking water. Most (94%) children under five in the sample have access to adequate drinking water, except in Ehlanzeni where only 80% of children have access *(see Figure 20)*. Drinking water sources varied widely across and within districts with most households accessing water from a tap outside the house (46%). ZF Mgcawu (NC) had the highest number of households with access to a tap inside the house (67%) while uMgungundlovu had the lowest (9%). In Mopani (LP) most households (41%) accessed water from a public tap meaning more than a third had to transport water to and from their homes. According to the above water classification, children in Ehlanzeni (MP) are more likely than other districts to rely on inadequate water sources such as boreholes and water tankers (21%) followed by children in Mopani District (LP) (9%).

3.4.2. ADEQUATE SANITATION

Adequate sanitation in this report refers to a flush toilet and ventilated pit latrine (VPL). This is in line with the Statistics South Africa (STATS SA) categorisation, referring to improved sanitation facilities such as a flush toilet connected to a public sewer system or a pit toilet with a ventilated pipe[20]. The use of portable toilets (PT), buckets and other sanitation facilities have been grouped as a single 'other' category due to the minimal representation of these sanitation types across districts. Only one of every two children under 5 across the districts have access to adequate sanitation (54%). West Rand (Gauteng) showed the highest access at 92% followed by ZF Mgcawu (Northern Cape) at 85% and Thabo Mofutsanyane (Free State) at 82%. Districts with less than half of households accessing adequate sanitation facilities include uMgungundlovu (KZN) at 23%, Mopani (Limpopo) at 36% and Ehlanzeni (Mpumalanga) at 44%.

Access to different sanitation types varied widely between districts *(see Figure 21)*. Access to flush toilets was highest in West Rand (82%) and ZF Mgcawu (84%) which overlaps clearly with the proportion of urban respondents in this sample. Use of an unventilated pit latrine was highest in the rural districts of uMgungundlovu (77%), Mopani (63%) and Ehlanzeni (53%), while Bojanala showed slightly lower access to a flush toilet (42%) compared to an unventilated pit latrine (47%).

3.4.3. ACCESS TO EARLY LEARNING OPPORTUNITIES

Across the sample, there was limited access to early learning opportunities through attendance at early childhood development centers, preschools or Grade R *(see Figure 22)*.* Access increased for children three years of age and above, but remained less than half for four out of the seven districts. Overall, only one in five children (48%) over the age of three access any form of early learning centre. Access was highest in Mopani (Limpopo) at 74%, compared to ZF Mgcawu (Northern Cape) where access was lowest at 13%.

** Grade R is the official preschool year before attending formal school in South Africa.*

Figure 20

DRINKING WATER SOURCE BY DISTRICT IN HOUSEHOLDS WITH CHILDREN UNDER 5

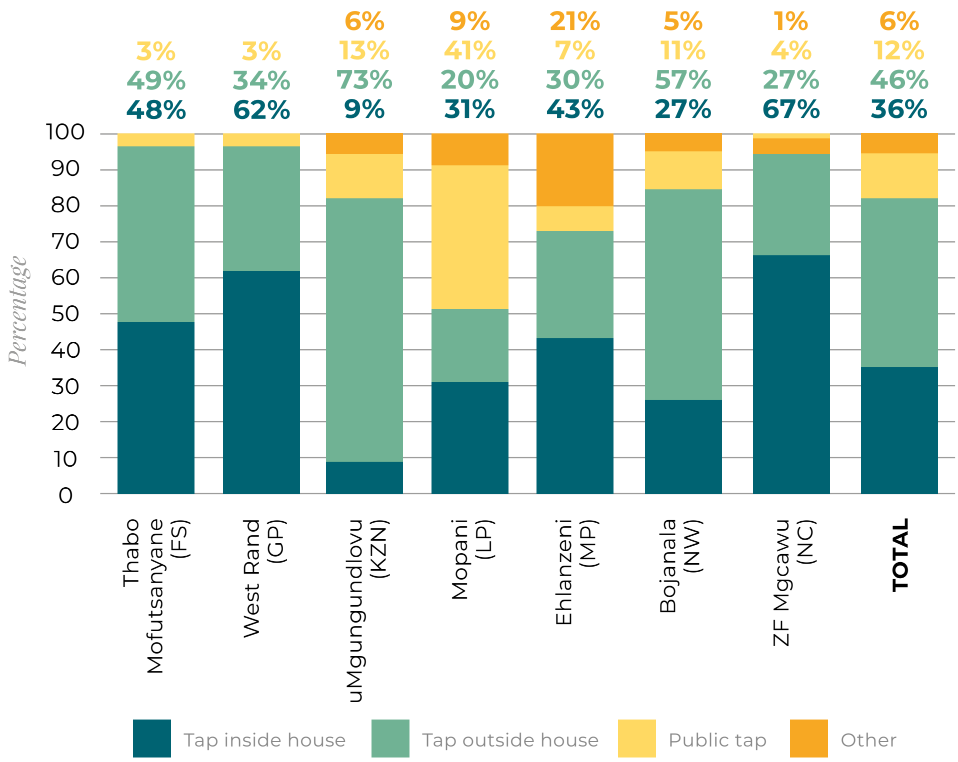


Figure 21

SANITATION TYPES BY DISTRICT IN HOUSEHOLDS WITH CHILDREN UNDER 5

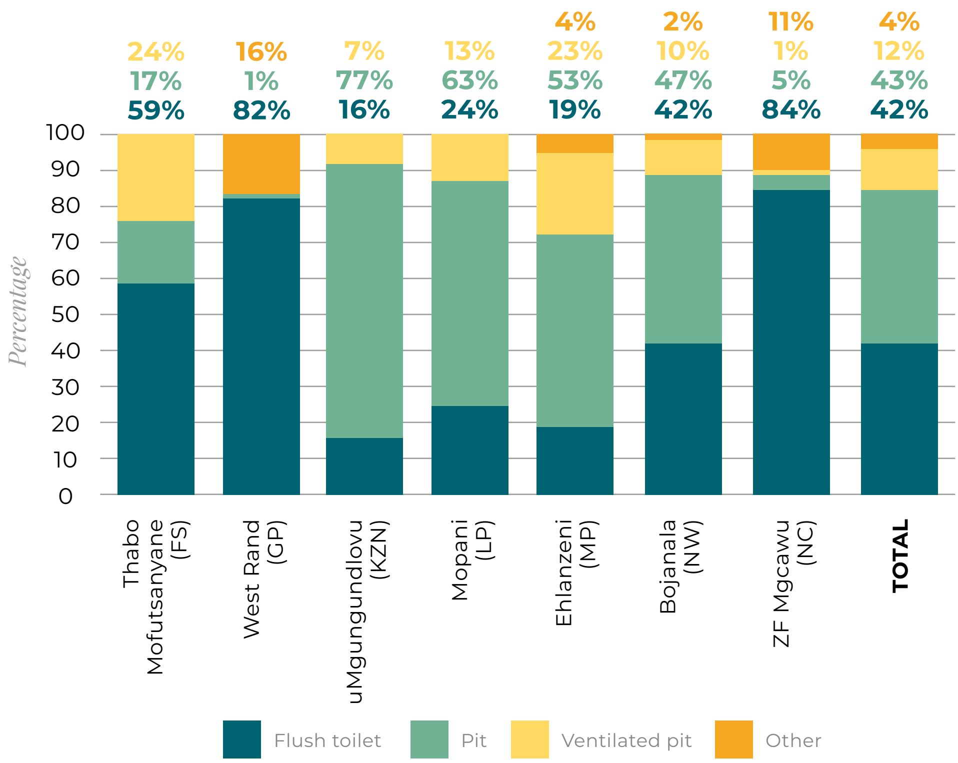
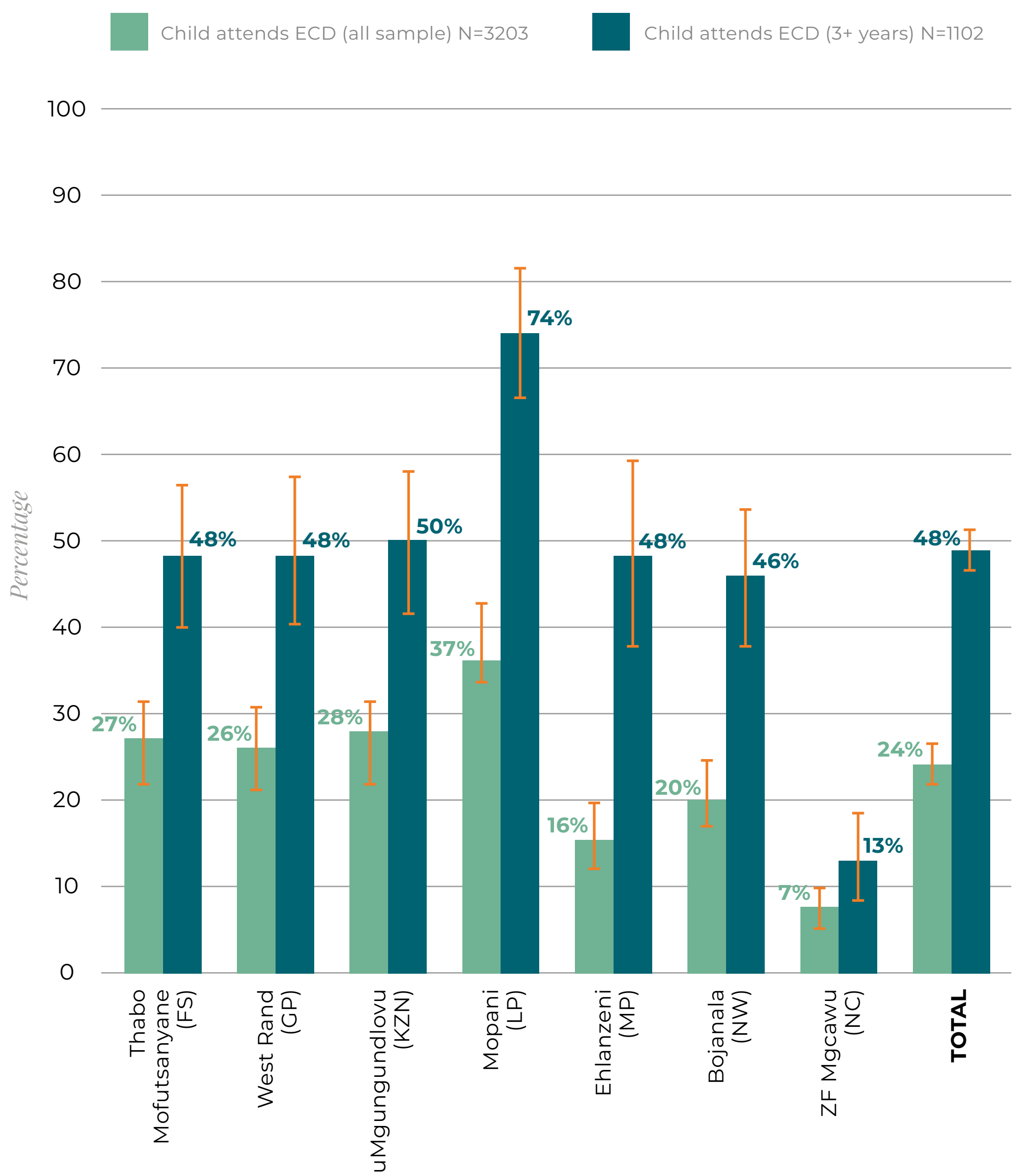


Figure 22

ACCESS TO EARLY CHILDHOOD DEVELOPMENT CENTRE/
PRESCHOOL/GRADE R ACROSS DISTRICTS



3.5. CHILD HEALTH AND NUTRITION

3.5.1. LOW BIRTH WEIGHT

Children weighing less than 2.5 kilograms at birth are identified as having low birth weight[21]. A total of 15% of children in this sample were reported to have had low birth weight *(see Figure 23)*. Prevalence ranges from 13% in Thabo Mofutsanyane, West Rand and Ehlanzeni to 23% in ZF Mgcawu.

3.5.2. EXCLUSIVE BREASTFEEDING (0-6 MONTHS)

Just over half (51%) of children in this sample were exclusively breastfed from 0-6 months of age. This means that a large proportion of children are receiving other food types before 6 months of age. These foods are typically low in nutritional value and, while they make a child feel full, they do not necessarily help their bodies or brains grow well. Particularly low incidence of exclusive breastfeeding was observed in Ehlanzeni (Mpumalanga) at 23% *(see Figure 24)*.

3.5.3. DIETARY DIVERSITY AND NUTRITION AMONG COMPLEMENTARY FEEDING AGE (6-23 MONTHS)

Dietary diversity scores (DDS) for children between 6-23 months are based on the WHO infant and IYCF practice[22, 23]. Food types are divided into eight food categories: breast milk, grains, roots and tubers, legumes and nuts, dairy products, flesh food, eggs, Vitamin A-rich fruits and vegetables, and other fruits and vegetables. DDS is calculated by counting the number of food groups consumed by a child in the past 24 hours. A child that consumes a minimum of five different food groups in 24 hours is considered to have an 'adequate' DDS.

The majority of children aged 6-23 months in the sample are not receiving a balanced diet. Just 17% of children in this age group consumed more than five food groups in the past 24 hours. Dietary diversity was particularly low in the West Rand (GP) at 3%, Ehlanzeni (MP) at 7% and Mopani (LP) at 9%. *Figure 25* highlights the proportion of children who consumed more than five food groups in the past 24 hours by district.

Overwhelmingly, grains such as maize meal were the highest consumed food group across districts at 98%, followed by dairy products at 65%. Across all districts, only 1 in 3 children aged 6-23 months is breastfed. In particular, there is very little consumption of legumes and nuts, eggs and fruits and vegetables, including those rich in Vitamin A. *Figure 26* shows the distribution of foods consumed across districts for children aged 6-23 months.

Figure 23

PREVALENCE OF LOW BIRTH WEIGHT
FOR CHILDREN UNDER FIVE ACROSS DISTRICTS

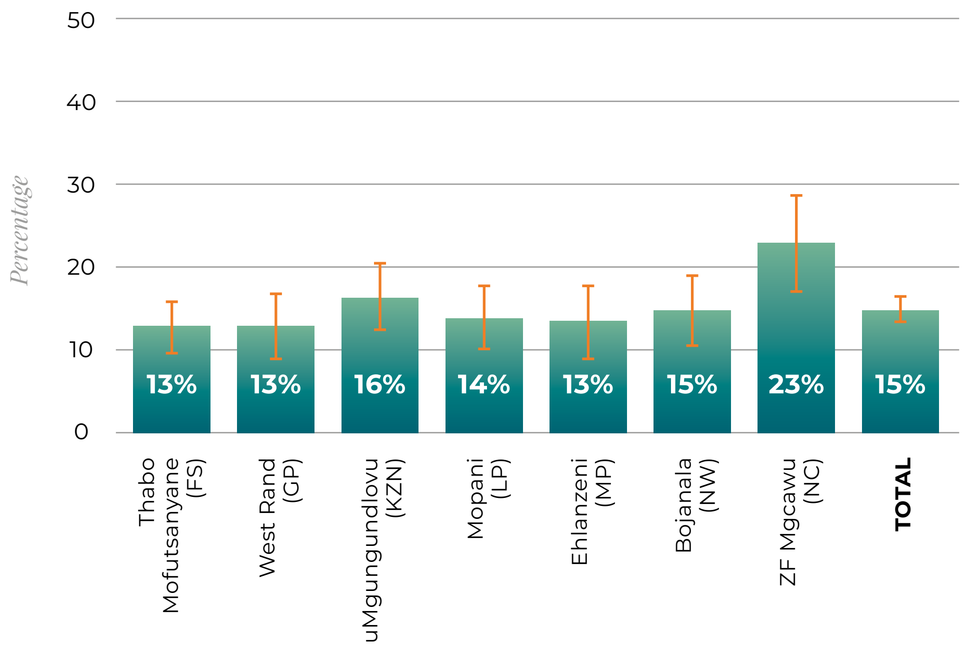


Figure 24

PROPORTION OF CHILDREN EXCLUSIVELY BREASTFED BETWEEN 0-6MONTHS OF AGE

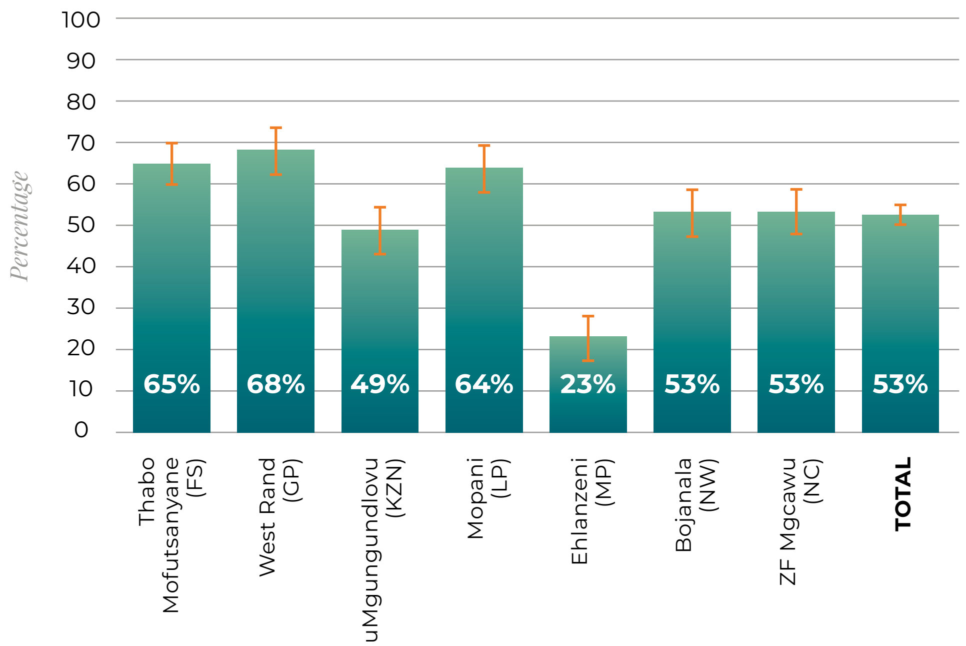


Figure 25

CHILDREN AGED 6-23 MONTHS WHO CONSUMED MORE THAN FIVE FOOD GROUPS IN THE PAST 24 HOURS

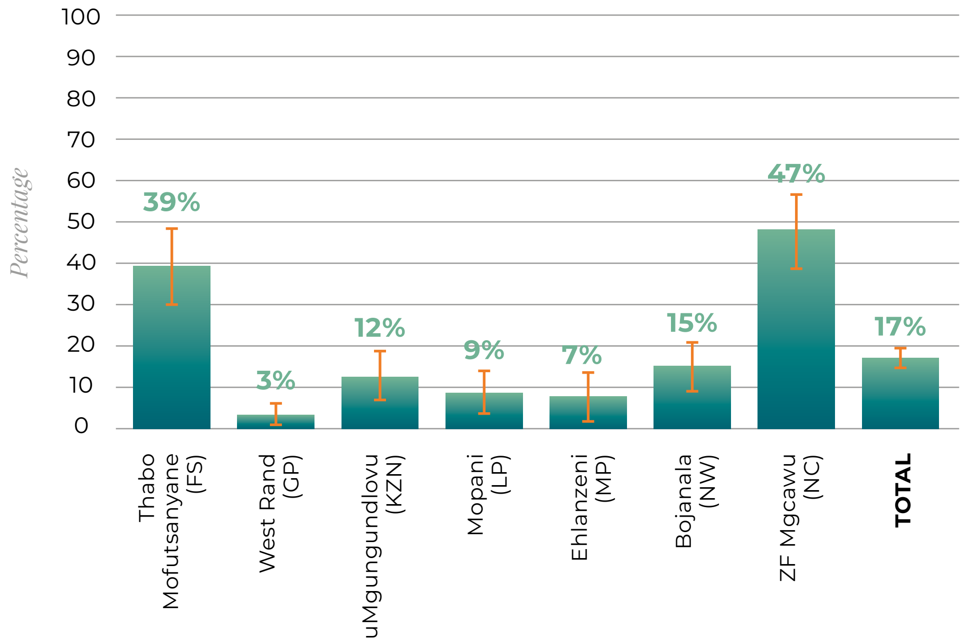
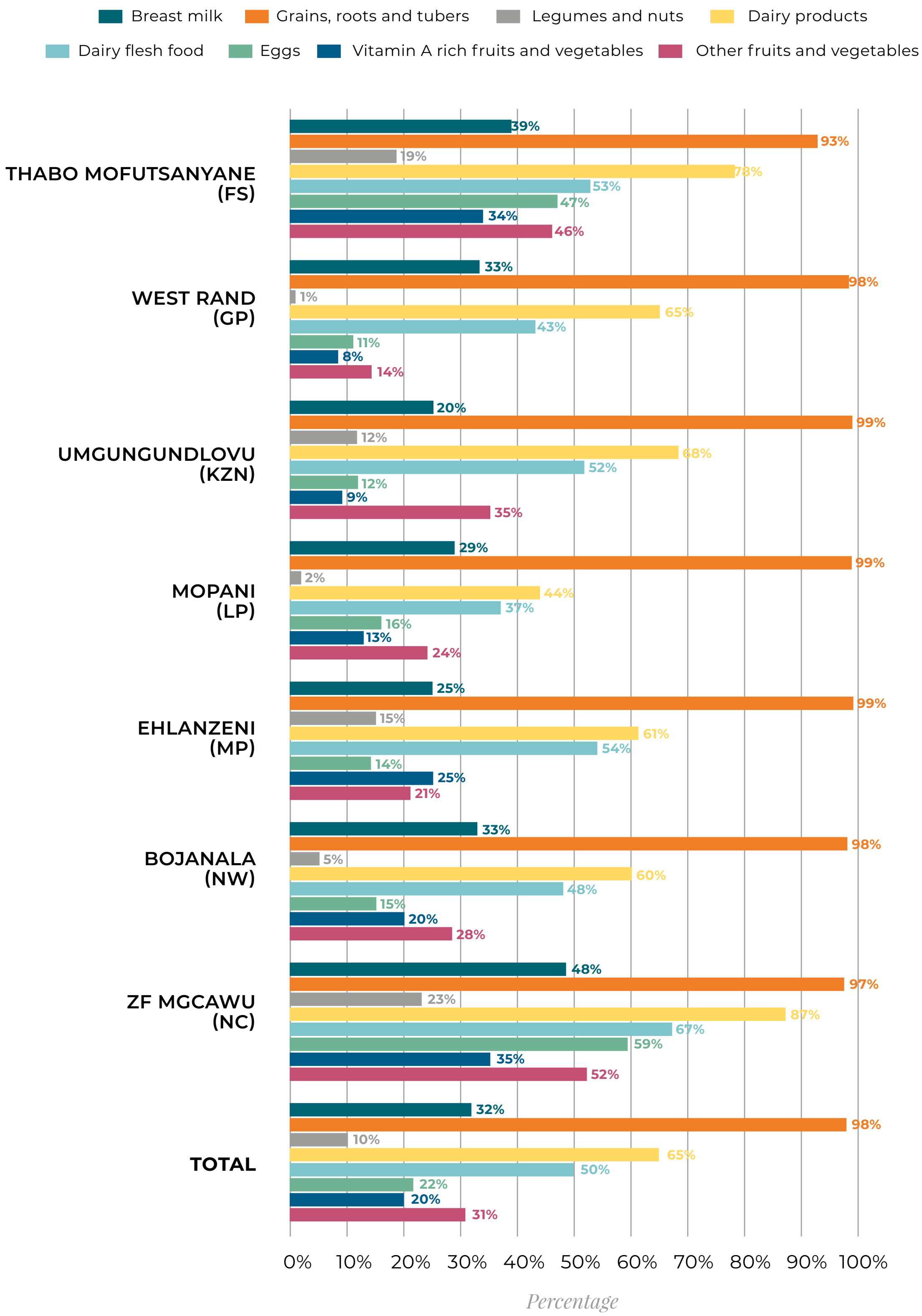


Figure 26

FOOD GROUPS CONSUMED BY CHILDREN AGED 6-23 MONTHS IN THE PAST 24 HOURS BY DISTRICT



3.5.4. VITAMIN A SUPPLEMENTATION

Children are required to receive their first Vitamin A dose at six months, followed by doses at six-month intervals until the age of five years. Adequate Vitamin A supplementation refers to children who have received the required number of doses for their age group.* *Figure 27* shows over half (59%, CI: 56,61) of children across districts are track with complete Vitamin A doses for their age. West Rand (Gauteng) showed the highest levels of adequate Vitamin A supplementation at 65% (CI: 60,71), while ZF Mgcawu (Northern Cape) showed the lowest at 42% (CI:36,48).

3.5.5. DEWORMING

Mebendazole deworming medication is administered to children from the age of one year and is repeated every six months until a child reaches five years of age. Routine deworming ensures children absorb the nutrients they need from their food and improves stomach or gut health which reduces children's risk of stunting. *Figure 28* indicates the proportion of children aged one year and older who received the required Mebendazole dosage for their age. On average, 59% (CI: 57,61) of children are up to date with deworming requirements for their age. West Rand (Gauteng) and Ehlanzeni (Mpumalanga) have the largest proportions of children on track with deworming at 66% compared to other districts.

3.6. SOCIAL PROTECTION

3.6.1. BIRTH CERTIFICATES

Most (91%) but not all children in the sample had a registered birth certificate *(see Figure 29)*. Coverage ranged from 84% in Bojanala (North West) to 100% in ZF Mgcawu (Northern Cape). Access to a birth certificate can facilitate access to social support services, including the Child Support Grant.

3.6.2. ACCESS TO THE CHILD SUPPORT GRANT (CSG)

The CSG is a cash grant administered by the South African Social Security Agency (SASSA). A household qualifies for the CSG if a single caregiver earns less than R52,800 per year or a married couple earns a combined income of less than R105,600 per year[24]. At the time of the study, the CSG was set at R480 per month.

Findings across districts revealed consistently lower access to the CSG for children under 12 months of age. Overall, 84% of children in the sample aged 12 months and older accessed the CSG compared to 68% in children under 12 months of age. *Figure 30* shows the uptake of the CSG across districts for children below and above 12 months of age. There is a need to accelerate access to the CSG for younger children, particularly in West Rand (49%), uMgungundlovu (60%) and Bojanala (62%).

** For example, to meet the required dosage for age, a one-year-old child is expected to have received two Vitamin A doses, whereas a four-year-old child is required to have received eight doses.*

Figure 27

CHILDREN WHO RECEIVED THE COMPLETE VITAMIN A DOSAGE FOR THEIR AGE

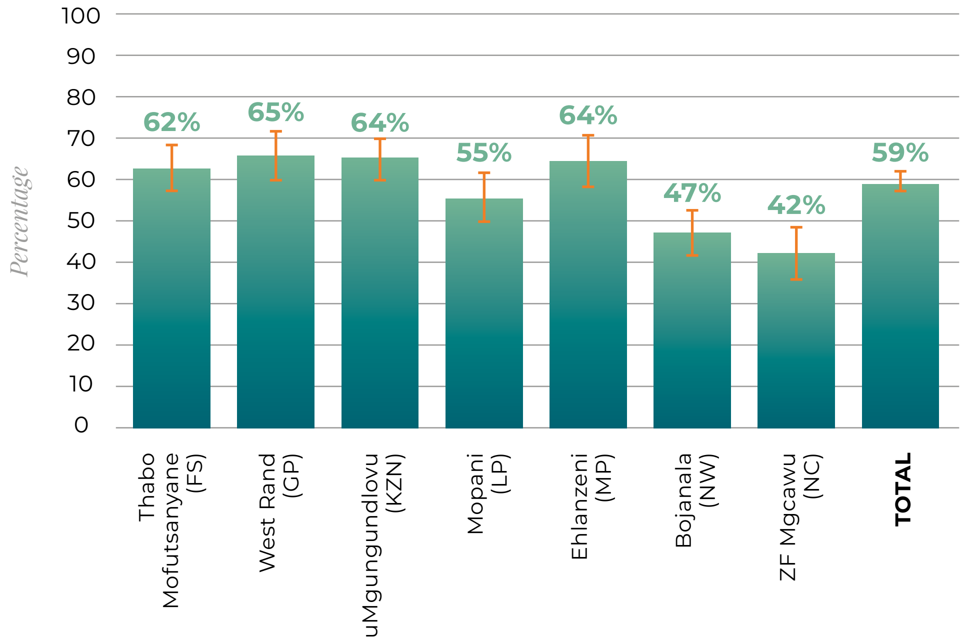


Figure 28

PROPORTION OF CHILDREN WHO RECEIVED REQUIRED DEWORMING FOR AGE ACROSS DISTRICT

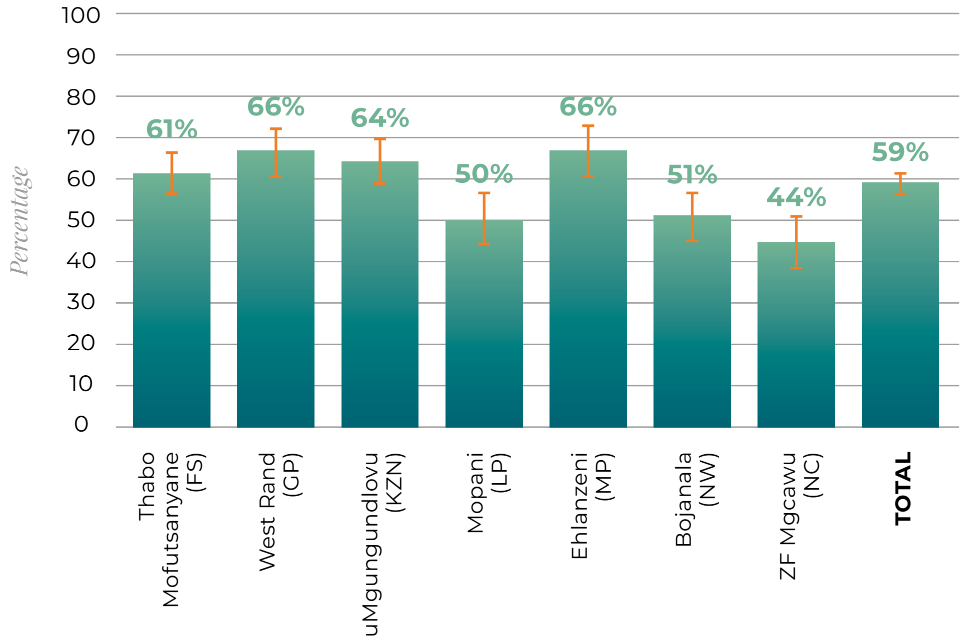


Figure 29

PROPORTION OF CHILDREN WITH A REGISTERED BIRTH CERTIFICATE

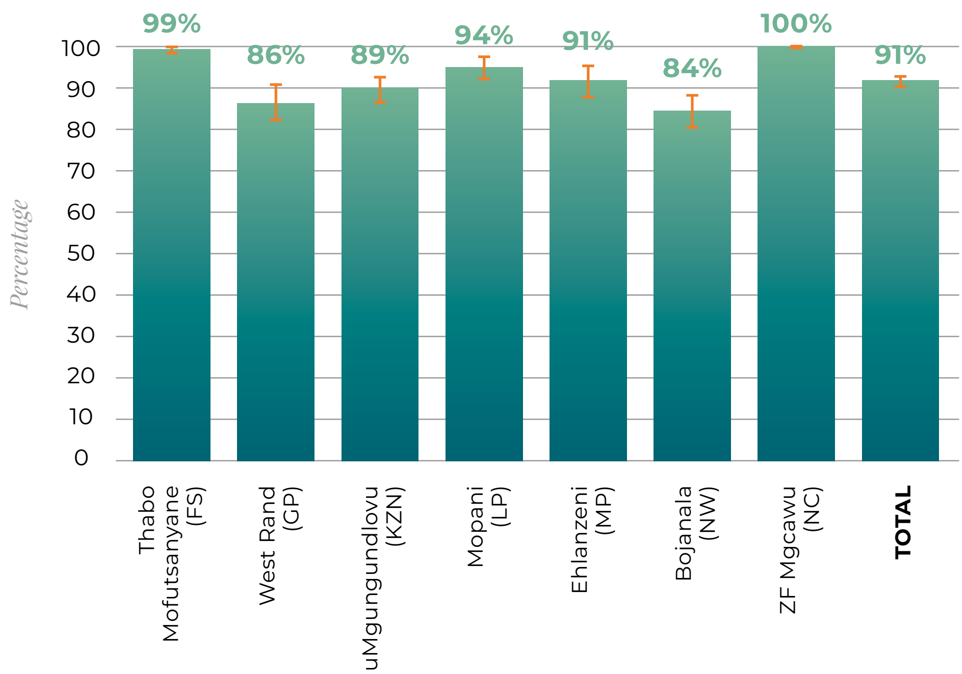
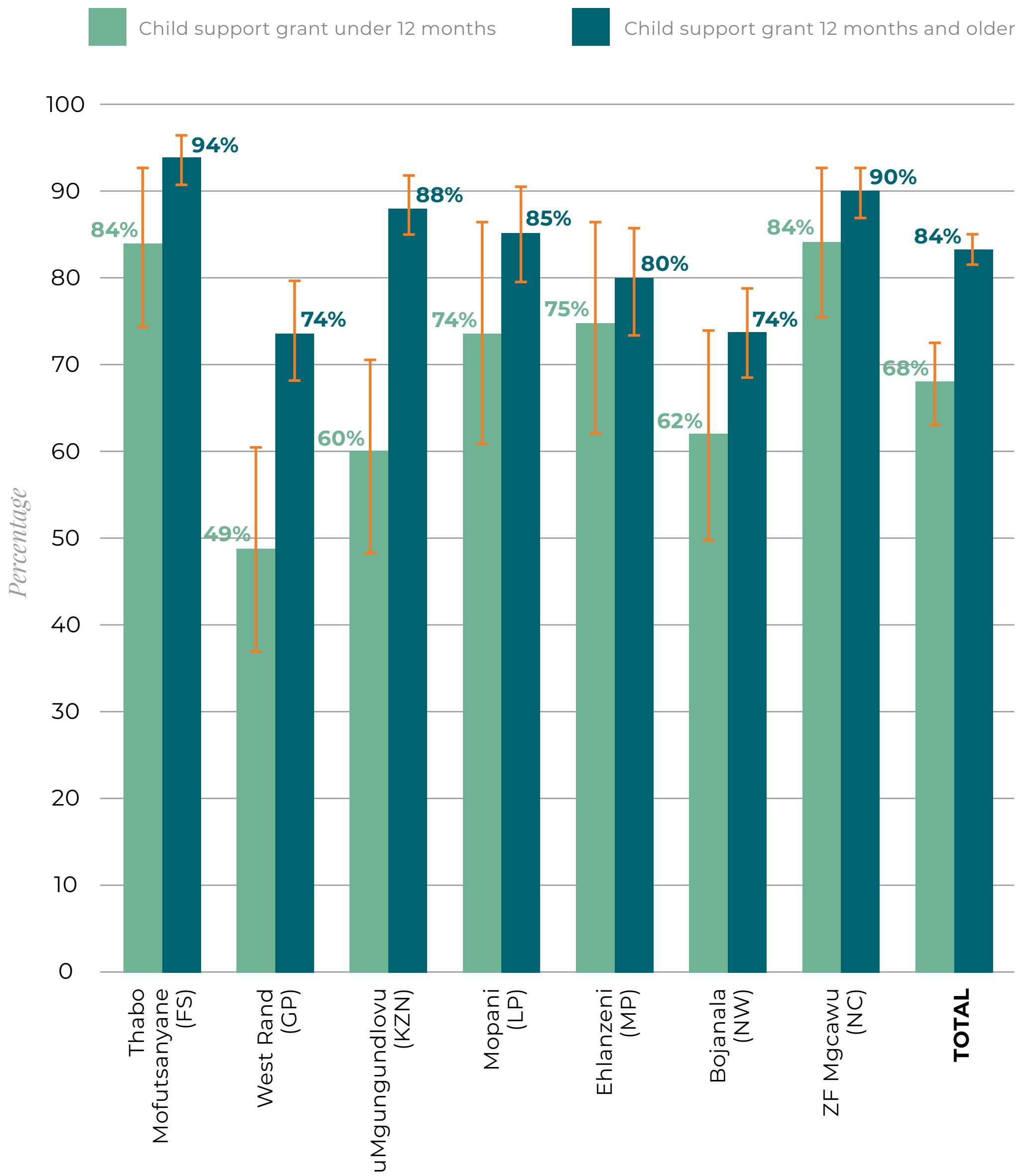


Figure 30

CHILD SUPPORT GRANT UPTAKE BELOW AND ABOVE 12 MONTHS BY DISTRICT



4. RESULTS

EXPLORING POTENTIAL STUNTING DRIVERS ACROSS DISTRICTS

*District-level descriptive statistics provide important contextual information for understanding the typical characteristics of communities vulnerable to stunting. However, deeper analyses are needed to identify potential drivers of stunting. This section compares the lives and households of stunted and not-stunted children across select variables using bivariate statistics to understand why and how stunted children differ from their not-stunted counterparts. Bivariate tables provided and in Appendix B show these differences, as well as the average characteristics for all children. The "mean" column shows the proportion of stunted/not stunted children with that characteristic. Statistically significant correlations are indicated for p-values <0.05.**

** It is important to note that a statistically significant difference does not imply a causal association between the characteristic and child stunting. Further statistical analysis is underway to explore causal attribution between these variables and the likelihood of stunting through logistic regressions.*

4.1. ALL DISTRICTS

Overall, 18% of the children under 5 in this study were identified as stunted. *Figure 31* highlights the characteristics of stunted versus not-stunted children under 5 across all districts. Stunted children were significantly more likely to be male (60% vs. 50%) and have shorter mothers compared to not-stunted children ($p<0.000$). Households with stunted children were also less likely to have mothers who had passed matric (43% vs 50%), although these rates remained low overall, and had a lower average household income (R3 244.88/month). In terms of access to basic services, not-stunted children were significantly more likely to be enrolled in early learning programmes regardless of their age (25% vs. 18%, respectively). This gap increased significantly for children 3 years and above, where 15% more not-stunted children were enrolled in early learning programmes compared to stunted children.

When compared against different child health and nutrition characteristics, stunted children (24%) were statistically significantly more likely to have had low birth weight, be exclusively breastfed between 0-6 months of age (60%) and eat foods that include grains, roots & tubers (95%). These children were also less likely to eat fruits and vegetables, and less likely to be on track with vitamin A (52%) and deworming (54%) schedules placing their nutrition and gut health at risk.


Skate
Boarding

Figure 31

CHARACTERISTICS OF STUNTED VERSUS NOT-STUNTED CHILDREN UNDER 5 ACROSS ALL DISTRICTS

DEMOGRAPHICS OF CHILDREN <5 YEARS

VARIABLE	(1) TOTAL SAMPLE		(2) NOT STUNTED		(3) STUNTED		(2)-(3) PAIRWISE T-TEST
	N	MEAN(SE)	N	MEAN(SE)	N	MEAN(SE)	**P-VALUE**
Child age (months)	3211	28.609 (0.327)	2612	28.758 (0.370)	599	27.941 (0.676)	**0.289**
Child aged 2 or older	3211	0.574 (0.010)	2612	0.582 (0.011)	599	0.536 (0.024)	**0.078**
Male	3211	0.518 (0.010)	2612	0.501 (0.011)	599	0.595 (0.023)	**0.000***

SOCIODEMOGRAPHIC AND ECONOMIC CHARACTERISTICS OF HOUSEHOLDS AND CAREGIVERS WITH CHILDREN UNDER 5

VARIABLE	(1) TOTAL SAMPLE		(2) NOT STUNTED		(3) STUNTED		(2)-(3) PAIRWISE T-TEST
	N	MEAN(SE)	N	MEAN(SE)	N	MEAN(SE)	**P-VALUE**
Mother's Age	2778	29.590 (0.149)	2258	29.711 (0.165)	520	29.049 (0.350)	**0.088**
Mother's Height	2647	159.247 (0.186)	2143	159.672 (0.207)	504	157.363 (0.409)	**0.000***
Mother has less than matric	3206	0.511 (0.010)	2609	0.499 (0.011)	597	0.566 (0.024)	**0.011***
Mother has matric	3206	0.390 (0.010)	2609	0.395 (0.011)	597	0.369 (0.023)	**0.298**
Mother has tertiary	3206	0.098 (0.006)	2609	0.106 (0.007)	597	0.066 (0.012)	**0.004***
Urban	3211	0.567 (0.010)	2612	0.575 (0.011)	599	0.529 (0.024)	**0.077**
Household size	3211	4.511 (0.041)	2612	4.490 (0.045)	599	4.607 (0.098)	**0.281**
Mean household income	2829	3909.375 (130.396)	2296	4061.103 (156.744)	533	3244.882 (135.865)	**0.000***
Household head employed	3207	0.412 (0.010)	2608	0.417 (0.011)	599	0.392 (0.024)	**0.344**

* Significance: p<=0.05

ACCESS TO BASIC SERVICES

VARIABLE	(1) TOTAL SAMPLE		(2) NOT STUNTED		(3) STUNTED		(2)-(3) PAIRWISE T-TEST
	N	MEAN(SE)	N	MEAN(SE)	N	MEAN(SE)	P-VALUE
Adequate water	3211	0.937 (0.006)	2612	0.939 (0.006)	599	0.927 (0.014)	**0.418**
Adequate sanitation	3211	0.545 (0.010)	2612	0.554 (0.011)	599	0.506 (0.024)	**0.075**
Child attends ECD/ preschool/Gr R	3203	0.237 (0.009)	2605	0.250 (0.010)	598	0.182 (0.019)	**0.001***
ECD/preschool/Gr R attendance among children 2 and older	1846	0.361 (0.013)	1519	0.377 (0.015)	327	0.282 (0.029)	**0.004***
ECD/preschool/Gr R attendance among children 3 and older	1102	0.478 (0.018)	918	0.501 (0.019)	184	0.355 (0.042)	**0.002***
Child has Road to Health book	3211	0.828 (0.008)	2612	0.828 (0.009)	599	0.828 (0.017)	**0.985**

SOCIAL PROTECTION

VARIABLE	(1) TOTAL SAMPLE		(2) NOT STUNTED		(3) STUNTED		(2)-(3) PAIRWISE T-TEST
	N	MEAN(SE)	N	MEAN(SE)	N	MEAN(SE)	P-VALUE
Child has birth certificate	3211	0.913 (0.007)	2612	0.915 (0.007)	599	0.905 (0.017)	**0.605**
Child support grant	3208	0.809 (0.009)	2609	0.807 (0.010)	599	0.816 (0.021)	**0.685**

* Significance: p<=0.05

CHILD HEALTH AND NUTRITION

VARIABLE	(1) TOTAL SAMPLE		(2) NOT STUNTED		(3) STUNTED		(2)-(3) PAIRWISE T-TEST
	N	MEAN(SE)	N	MEAN(SE)	N	MEAN(SE)	**P-VALUE**
Low birth weight	2657	0.146 (0.008)	2172	0.126 (0.008)	485	0.237 (0.022)	**0.000***
Exclusively breastfed 0-6 months	2592	0.525 (0.012)	2100	0.510 (0.013)	492	0.595 (0.026)	**0.003***
Average number of food groups consumed (Dietary Diversity)	3210	3.340 (0.030)	2611	3.342 (0.034)	599	3.332 (0.070)	**0.896**
Adequate dietary diversity for children 6-23 months	1075	0.169 (0.013)	831	0.173 (0.015)	244	0.153 (0.025)	**0.504**
Breastmilk	3210	0.189 (0.008)	2611	0.188 (0.009)	599	0.193 (0.019)	**0.792**
Grains, roots, and tubers	3210	0.927 (0.005)	2611	0.920 (0.006)	599	0.954 (0.010)	**0.005***
Legumes and nuts	3210	0.143 (0.007)	2611	0.142 (0.008)	599	0.146 (0.016)	**0.829**
Dairy products	3210	0.602 (0.010)	2611	0.604 (0.011)	599	0.591 (0.024)	**0.621**
Dairy Flesh foods	3210	0.597 (0.010)	2611	0.597 (0.011)	599	0.594 (0.024)	**0.892**
Eggs	3210	0.264 (0.009)	2611	0.259 (0.010)	599	0.289 (0.021)	**0.189**
Vitamin A rich fruits and vegetables	3210	0.260 (0.009)	2611	0.263 (0.010)	599	0.248 (0.021)	**0.515**
Other fruits and vegetables	3210	0.359 (0.010)	2611	0.369 (0.011)	599	0.317 (0.022)	**0.033***
On Track: Vitamin A	2676	0.584 (0.011)	2186	0.599 (0.012)	490	0.519 (0.027)	**0.006***
On Track: Deworming	2713	0.588 (0.011)	2215	0.599 (0.012)	498	0.538 (0.026)	**0.036***

4.2. THABO MOFUTSANYANE (FREE STATE)

One in five (17%) children under 5 were shown to be stunted in Thabo Mofutsanyane District. Limited statistically significant differences were found between households with stunted versus not-stunted children in this district. Stunted children were more likely to come from rural areas (52%; p=0,041). Although just over the p<0.05 cut-off, stunted children were also less likely to be on track with deworming (51%) compared to not-stunted children (63%) and more likely to live in larger households of at least 4 people. Appendix B outlines the district-specific comparisons between stunted and stunted children.

4.3. WEST RAND (GAUTENG)

Stunting prevalence in West Rand District ranked the third highest across districts at 18%. Similar to Thabo Mofutsanyane District, when viewed at the district level, characteristics of stunted and not-stunted children do not differ much. Stunted children were more likely to have older mothers (32 years) compared to not-stunted children (30 years) and less likely to eat Vitamin A rich fruits and vegetables than not-stunted children (3% vs 12%, respectively).

4.4. UMGUNGUNDLOVU (KWA-ZULU NATAL)

Stunting prevalence in uMgungundlovu District ranked the second highest across districts at 19%. There are various ways in which the home and background characteristics of stunted and not-stunted children differ in uMgungundlovu. Mothers of stunted children in this district are shorter at 157cm than mothers of non-stunted children (159cm). Stunted children are also more likely to have had low birth weight (26%) compared to not-stunted children (14%). On average, not-stunted children in this district eat a more diverse diet that includes higher levels of vitamin A rich fruits and vegetables (24% compared to 13% for stunted children). Other characteristics close to the p<0.05 cut-off include gender and household income. Stunted children are more likely to be male (65%) and live in households with lower average monthly income (R3062).

4.5. MOPANI (LIMPOPO)

Stunting prevalence in Mopani District ranked the lowest across districts at 13%. Access to early learning programmes differed significantly between stunted and not-stunted children, regardless of age, with only 20% of stunted children enrolled in an ECD centre, preschool or Grade R class compared to 40% of not-stunted children. This 20% gap increases to 35% for children 3 years and older, with only 43% of stunted children accessing early learning programmes versus 78% of not-stunted children. Although not statistically significant at p<0.05, other characteristics that showed differences between stunted and not-stunted children include male gender (58% vs 45%), mother's height (160cm vs 162cm), mother's tertiary education (12% vs 22%) and access to adequate sanitation (25% vs 38%). Appendix B shows these comparisons in detail.

4.6. EHLANZENI (MPUMALANGA)

One in five (17%) children under 5 were shown to be stunted in Ehlanzeni District. A number of characteristics differed significantly between stunted and not-stunted children in this district, including mother's height, access to adequate sanitation, the Road to Health Booklet, low birth weight, egg consumption and up-to-date vitamin A and deworming schedules. Similar to other districts, stunted children were more likely to have shorter mothers (157cm), have less access to adequate sanitation (32%) and report low birth weights (25%). Vitamin A (48%) and deworming schedules (51%) were also found to be lower for stunted children. Contrary to expectations, stunted children were more likely to have a Road to Health book (96%) and more likely to eat eggs (34%). Reasons underlying these unexpected findings are unclear and will require further investigation.

4.7. BOJANALA (NORTH WEST)

Stunting prevalence in Bojanala District ranked second highest across districts at 19%. A number of socio-demographic and nutrition-related factors differed significantly between stunted and not-stunted children in Bojanala. On average, stunted children in Bojanala were more likely to be younger (25 months) compared to not-stunted children (29 months). This is the only district where child age was identified as significant. Similar to other districts, stunted children were also more likely to have shorter mothers (156cm), less likely to live in urban areas (37%) and less likely to access early learning programmes (8%). Low birth weight was also consistently higher among stunted children in this district (25%), while adequate dietary diversity was significantly lower (5%) than not-stunted children (18%). On average, children in Bojanala consumed food from only three different food groups per day. Interestingly, stunted children were more likely to access the Child Support Grant (82%) compared to not-stunted children (70%). This highlights both gaps in access for children under 5 in this district and the complex interaction between child poverty and stunting in this context.

4.8. ZF MGCAWU (NORTHERN CAPE)

Stunting prevalence in ZF Mgcawu District ranked highest across districts at 25%. There were a few observed socio-demographic and household-related factors that differed significantly between stunted and not-stunted children in this district. Similar to other districts, mother's height and education level were shown to be lower for stunted children, with mothers of stunted children more likely to have less than a matric qualification (66%). Households with stunted children were also likely to have lower average household income (R3221 vs. R5130) and lower employment levels (24% vs. 37%) compared to not-stunted children. Stunted children were less likely to be enrolled in early learning programmes (3%), although this remained extremely low for all children at only 7%. Comparing child health and nutrition characteristics highlighted low birth weight as a risk factor for stunted children (35%). Stunted children showed a higher consumption of grains (98%) and lower consumption of dairy products (78%). Similar to Bojanala District, access to the Child Support Grant appeared to be higher for stunted children (94%).

5. DISCUSSION AND RECOMMENDATIONS

This study aimed to describe the nutritional status of children under five in seven food vulnerable districts. Stunting prevalence was recorded at 18% for children under five with 15% of children reported as moderately stunted and 3% as severely stunted. Although cross-study comparison should be done with caution, these rates reflect a general decline in stunting prevalence when compared to previous national and provincial stunting rates reported in the 2016 Demographic Health Survey[1] and, more recently, in the 2021-2023 National Food and Nutrition Security Survey[25]. However, overall stunting prevalence remains high for a middle-income country like South Africa.*

When disaggregated by age, stunting prevalence across districts was higher among children aged 12-23 months than among children under 12 months or between 24-59 months. This reflects a particularly vulnerable period in the first 1000 days of life as children transition from breast feeding to complementary feeding and full reliance on foods available in the home. There is an urgent need to **bridge the food gap** during this critical age period to reduce the impact of stunting and malnutrition on childhood development. Additionally, variations in stunting prevalence between the ages of zero to five highlight the importance of **disaggregating stunting data** across different ages to identify the most vulnerable periods of stunting for children, something few national stunting surveys have considered to date[1, 26, 27].

Variations in prevalence between districts further underline the **deeply contextual nature of stunting and its underlying causes**, emphasizing the need for localised responses[8, 9, 28]. This study sought to describe the socio-demographic, economic, household, child health and nutrition-related

** Proper methodological comparison is needed between different study datasets to ensure stunting prevalence rates are truly comparative.*

characteristics for children under five, providing detailed insights into the differences in these characteristics for stunted and not-stunted children.

In terms of socio-demographics and economics, gender, mother's height, mother's education level and household income show statistically significant differences between stunted and not-stunted children. Across districts, **stunted children were more likely to be male**, a similar finding across sub-Saharan Africa[29]. Reasons behind this gender disparity have been linked to low socio-economic status[30] and increased susceptibility to infectious diseases for boys[31], although this remains poorly understood in the South African context. Contrastingly, mother's height is a well-known correlate with stunting[32, 33, 34] with stunted children **more likely to have mothers who are shorter in stature**. This has been linked to constrained foetal growth space and the intergenerational impact of stunting and malnutrition[35, 36].

Both **maternal education and household income** have been identified as strong predictors of stunting[37-39], stressing the importance of underlying socio-economic conditions in communities where stunting is high. Similarly, stunted children in this study were more likely to have mothers who did not complete school and, on average, live in households with lower household income. Initiatives seeking to reduce stunting should explore novel opportunities that address these socioeconomic conditions. For example, targeting school dropout, especially in young women, can **promote maternal education and increase the economic earning potential of South Africa's youth**. The Department of Basic Education's (DBE) National Policy on the Prevention and Management of Learner Pregnancy in Schools[40] is one such policy initiative that, if implemented successfully, could have a positive, although unintended impact on reducing stunting.

Interestingly, urban-rural divides in stunted versus not-stunted children was only identified in two of the seven districts surveyed: Thabo Mofutsanyane (Free State) and Bojanala (North West). In both districts, children were less likely to be stunted if they lived in urban areas, highlighting **potentially unique relationships with stunting and levels of urbanisation** in these districts. Disparities in stunting between urban and non-urban areas are found throughout Sub-Saharan Africa[41], linking higher risk to limited health services access and inadequate service delivery in more rural areas. **Evidence-based nutrition packages, home visits and support groups for young mothers** are some of the targeted intervention types highlighted in the literature to address the geographical disparities in stunting[42].

Access to basic services, including clean water, hygiene and adequate sanitation (WASH) are leading correlates with stunting[43]. In this study, nine out of 10 ten children across the districts had access to clean water with no difference detected between stunted and not stunted children. However, access to adequate sanitation was poor across districts, with only 55% of children under five using a toilet or ventilated pit latrine. Adequate sanitation prevents exposure to diseases through contamination that can lead to diarrhoea and environmental enteric dysfunction, which in turn are significant risk factors for stunting[44, 45]. Urgent **intersectoral action is needed to improve sanitatio**n across these food vulnerable districts and reduce the impact of infectious diseases and poor hygiene on stunting.

Similarly, **access to early learning opportunities** from a young age can protect children from the risk of stunting through provision of school meals and cognitive stimulation[26]. Regardless of age, stunted children in this study were significantly less likely to be enrolled in early learning programmes.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A GREAT START.
5 MONTHS.

Enrollment across districts remained low for both stunted and not-stunted children (24%), dropping as low as 7% in ZF Mgcawu District. Low enrollment in early learning programmes reflects a missed opportunity to support young children in vulnerable communities, placing them at even greater risk for not developing the necessary cognitive, physical, social and emotional skills needed to reach their full potential. Significant work is needed to **strengthen the Early Childhood Development (ECD) sector** to enhance catch up, reduce stunting and prepare children for formal schooling opportunities. Specifically, **universal access to quality nutrition support** for all eligible children who attend early learning programmes and **increased subsidization** of these programmes pose exciting opportunities for policymakers seeking to improve the nutrition status of South Africa's most vulnerable children.

The impact of **social protection mechanisms**, such as the Child Support Grant, is receiving increased attention by researchers and policymakers as a way to reduce child poverty, malnutrition and stunting[46, 47]. According to a recent review, 87% of eligible children in South Africa receive the CSG[48]. Despite this high coverage, seven million children remain below the food poverty line. **Younger children, especially those under two years, are at greatest risk for exclusion from social protection provided by the CSG**, a finding confirmed in this study and others[46]. Urgent action is needed to **close the CSG access gap** for young children in South Africa and ensure social protection mechanisms reach children when they are most at risk. While the above review recommends **increasing the CSG amount to at least the food poverty line** of R663 per person per month, Grow Great also advocates for **extension of the CSG into pregnancy through a maternal support grant**. This has high potential to close the CSG access gap for young children while also supporting vulnerable pregnant women and children during the earliest stage of life.

Lastly, factors related to **adequate child health and nutrition**, including low birthweight (LBW), exclusive breastfeeding, dietary diversity, vitamin A and deworming play a significant role in the healthy growth and development of children under five in this study. Across districts, stunted children were significantly more likely to have had LBW compared to not-stunted children. **LBW is a well-established predictor of stunting globally** and an important contributor to child health outcomes[37, 49, 50]. In South Africa, its contribution to stunting is exacerbated by high rates of maternal HIV exposure and placental insufficiency[51]. Support to vulnerable pregnant women through access to **quality primary healthcare services that include antenatal support, nutritional supplementation, HIV testing and treatment** should be prioritized to reduce the risk of LBW and its contribution to stunting.

Following birth, **exclusive breastfeeding in the first 6 months of life boosts a child's immune system, lowers the risk of repeated infections, improves nutrition and reduces the risk of stunting**[52, 53]. The Infant and Young Child feeding policy states that exclusive breastfeeding should be practiced during the first six months of life and breast feeding should continue up to two years of age or beyond[22]. Just one of every two children in this study was exclusively breastfed from 0-6 months of age, while only one in three children were breastfed from 6-23 months. While this meets the WHO target of 50% for exclusive breastfeeding[54], this means that **nearly half the children across districts are not accessing important nutrients from breastmilk to grow well**. Unexpectedly, stunted children in this study were more likely to have been exclusively breastfed than not-stunted children. While this stands counter to established evidence on the benefits of exclusive breastfeeding, the findings are not unprecedented.

For example, Burundi exhibits some of the highest rates of exclusive breastfeeding in Africa, but concurrently has the highest prevalence of stunting on the continent[55]. In economically disadvantaged settings, exclusive breastfeeding may become a necessity for some mothers and is not merely a health-oriented choice[56]. Moreover, there is also a strong potential for recall bias when reporting exclusive breastfeeding over time and in older children[57].

The **introduction of diverse complementary foods from 6 months of age onwards** is essential to meet the growing nutritional needs of a young child and essential to maintain the physical growth benefits of exclusive breastfeeding[53]. The majority of children aged 6-23 months in the sample are not receiving a diverse balanced diet with just 17% consuming more than five food groups in the past 24 hours. In particular, there is very little consumption of legumes, nuts, eggs, fruits and vegetables, especially those rich in Vitamin A. While high levels of carbohydrate-dense grain consumption is prevalent across districts. This lack of dietary diversity together with high rates of obesity across districts, indicate that children under five are suffering from a **double burden of under and overnutrition** where both the quantity and quality of food are affected. It is essential that **diverse nutritious food is made both affordable and accessible** to fill critical nutrient gaps in young children's diets and prevent the health, educational and economic consequences of malnutrition[58].

To ensure children absorb the necessary nutrients from their food to grow well, **routine vitamin A and deworming schedules** are prescribed by the South African Road to Health booklet[59]. However, in this study, only three of every five children have received the required vitamin A and deworming dosages for their age. This places a large proportion of young children at risk for poor gut health, nutrient depletion and consequent stunting. Targeted localised efforts that include **bridging access to healthcare through primary healthcare workers** and **supplementing dietary intake of Vitamin A** are needed to ensure all children remain on track with vitamin A and deworming schedules[60, 61].

Based on these survey findings, it is clear that actions to reduce stunting will require a **whole-of-society, life-course approach that leverages intersectoral actions in health, education, economic development and social protection from the earliest phase of life**. Targeted recommendations to reduce the risk factors of stunting in these seven food vulnerable districts are summarized in *Figure 32*. Together with district-level stunting data, these recommendations aim to **equip local and national researchers, policymakers and the public with up-to-date localised evidence that can drive contextualised decision-making and action** towards stunting reduction across South Africa.

Figure 32

AREAS FOR IMPROVEMENT ACROSS ALL DISTRICTS THAT COULD REDUCE RISK FACTORS OF STUNTING

POLICYMAKERS

- Prioritise **poverty alleviation strategies** that include **maternal education** and **economic productivity**
- Improve access to **adequate sanitation** to prevent the spread of disease
- Expand access to **quality early learning programmes** for young children that includes nutrition support and increased subsidization by government
- Close the social protection access gap for eligible young children by **extending the Child Support Grant into pregnancy through a Maternal Support Grant** that supports vulnerable pregnant women and children from the earliest stage of life
- Support primary healthcare initiatives that target **supportive quality antenatal and postnatal care**
- **Strengthen primary healthcare service through Community Health Worker programmes** that bridge access to care
- Promote initiatives that keep children on track with **Vitamin A and deworming schedules**
- Support policies that **promote breastfeeding for young children** and exclusive breastfeeding in children under 6 months
- Target access to an **affordable nutritious food basket** that boosts dietary diversity for young children
- Include **stunting** measures as part of **routine national datasets**

RESEARCHERS

- **Disaggregate stunting data by age and geography** to provide local evidence that can drive action and monitor progress
- Align stunting measures with global **standards** to ensure rigor and comparability
- **Explore gender discrepancies** in stunting prevalence rates to ascertain underlying protective/risk factors between female and male children
- **Conduct metanalyses of stunting data** to understand national and local stunting trends

PUBLIC

- Foster **community networks of care for young women to complete school**
- **Leverage data to mobilise community action** that supports access to adequate sanitation, healthcare and early learning opportunities
- Promote **consumption of a diverse diet for all children** that includes more fruit and vegetables, especially those rich in Vitamin A, eggs, dairy products, legumes and nuts

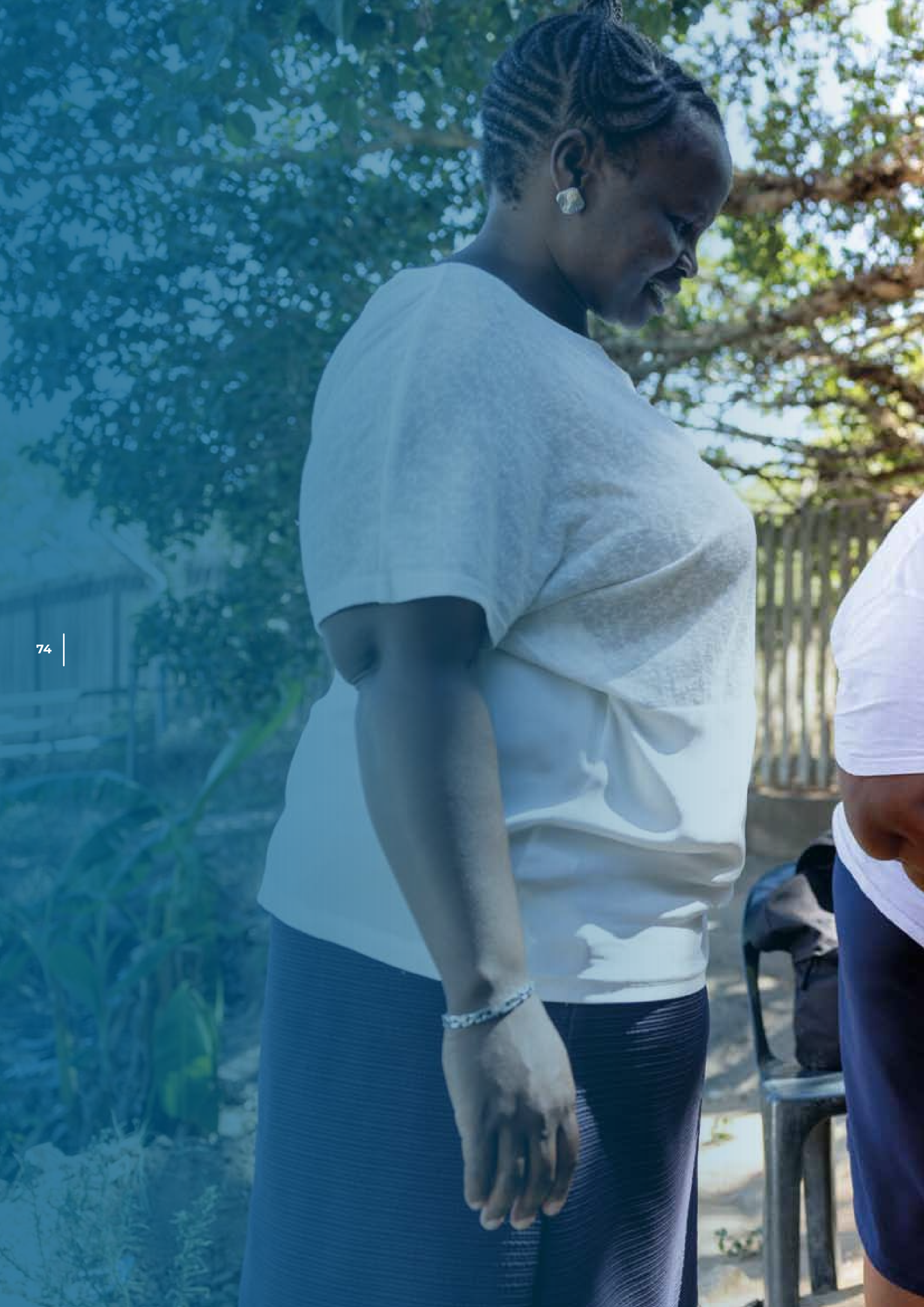
6.
STRENGTHS AND LIMITATIONS

The Grow Great community stunting survey provides a rich source of local stunting data in some of South Africa's most food vulnerable districts. The relatively high sample size explores a wide range of variables associated with child health and growth measures that can be disaggregated by age and district. Although largely descriptive, the study highlights district-specific stunting profiles correlating these to known stunting risk factors and providing useful data for community-level decision making.

However, there are limitations to the study which should be noted. Firstly, bivariate associations between specific risk factors and stunting serve only as correlates. Further analysis that controls for confounding variables is underway to identify potential causal relationships between these specific risk factors and stunting. Secondly, this study relied strongly on mothers' and caregivers recall of certain events (e.g. exclusive breastfeeding, alcohol use during pregnancy, etc.) rather than direct measurement, which could potentially have led to recall and social desirability bias for certain measures. Lastly, given the complex and diverse nature of stunting causes, it is likely that some measures were excluded or potentially interact in certain ways with measured variables to influence findings. These potential interaction affects support recent studies that use composite measurements to capture the complexity of stunting causes[26].

7. CONCLUSION

South Africa continues to suffer the preventable social and economic consequences from high levels of stunting. This study aimed to profile the nutritional status of children under the age of five across seven food vulnerable districts in South Africa. By describing district-level stunting prevalence rates and exploring early indicators of stunting risk factors, the study provides local-level data to inform policy and programmes that address child malnutrition from the earliest stage of a child's life. A whole-of-society approach is needed to target the underlying social, economic, demographic, health and nutrition related factors that drive stunting in South Africa. Without it, South Africa's high stunting prevalence will continue to undermine investments in education, economic development and public health.



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APPENDICES

APPENDIX A
RANDOMLY SELECTED ENUMERATION AREAS INCLUDED IN THE STUDY

THABO MOFUTSANYANE (FS)

ENUMERATION AREA	MUNICIPALITY	SUB-PLACE
MALUTI A PHOFUNG	Ntshehele Phuthaditjhaba Tebang Sebokeng Ha-Sethunya	*Phamong* *Makhalaneng* *Harrismith* *Tshiame* *Ha-Sethunya*
DIHLABENG	Bohlokong	*Mashaeng*
NKETOANA	Petsana	*Mamafubedu*
PHUMELELA	Thembalihle	*Thembalihle*
SETSOTO	Matwabeng	*Hlohlolwane*
MANTSOPA	Manyatseng	*Mahlatswetsa*

WEST RAND (GP)

ENUMERATION AREA	MUNICIPALITY	SUB-PLACE
WESTONARIA	Bekkersdal Simunye	*Ghana Section* *Simunye SP*
MOGALE CITY	Kagiso	*Kagiso Ext 9*

UMGUNGUNDLOVU (KZN)

ENUMERATION AREA	MUNICIPALITY	SUB-PLACE
THE MSUNDUZI	Edendale	*Edendale SP* *Edendale H SP* *Edendale AA SP* *Edendale EE SP*
	eZibomvini	*eZibomvini SP*
	KwaMgwagwa	*KwaMgwagwa SP*
	KwaMnyandu	*KwaMnyandu SP*
	KwaShange	*KwaShange SP*
	Pietermaritzburg	*Slangspruit* *Pietermaritzburg SP* *Ambleton*
	Wilgefontein	*Wilgefontein SP*
	Zayeka	*Zayeka SP*
RICHMOND	Kupholeni	*Kupholeni SP*
	KwaCebelele	*KwaCebelele SP*
	KwaNkukhu	*KwaNkukhu SP*
MKHAMBATHINI	Mbila	*Mbila SP*
	Oqweqweni	*Oqweqweni SP*
UMNGENI	Lidgetton West	*Lidgetton West SP*
MPOFANA	Thendele	*Thendele SP*
UMSHWATHI	Trust Feed A	*Trust Feed A SP*

MOPANI (LP)

ENUMERATION AREA	MUNICIPALITY	SUB-PLACE
BA-PHALABORWA	Ben Farm	*Ben Farm A(2)* *Ben Farm A(1)*
	Namakgale	*Namakgale A*
GREATER TZANEEN	Botludi	*Botludi SP*
	Burgersdorp	*Burgersdorp SP*
	Dan	*Dan SP*
	Khujwana	*Khujwana SP*
	Mohlaba	*KaXikwambana*
	Nkowakowa	*Nkowakowa SP1*
	Nwamitwa	*Nwamitwa SP*
	Rhulane	*Rhulane SP*
MARULENG	Hlohlokwe	*Hlohlokwe SP*
GREATER GIYANI	KaHhlaneki	*KaHhlaneki SP*
	KaHomu	*KaHomu SP*
	KaMininginisi	*KaMininginisi SP2* *KaMininginisi SP1*
	KaSiandana	*KaSiandana SP*
	KaTomu	*KaTomu SP*
	Mageva	*Mageva SP*
	Sekhiming	*Sekhiming SP*
GREATER LETABA	Mamokgadi	*Mamokgadi SP*
	Matshwi	*Ithlabeleng* *GaMahulana B*
	Medingeng	*Mapaana*
	Mokgoba	*Mokgoba SP*
	Tshamahansi	*Tshamahansi SP*
	Motsemokola	*Motsemokola SP*

EHLANZENI (MP)

ENUMERATION AREA	MUNICIPALITY	SUB-PLACE
BUSHBUCKRIDGE	Buyisonto	*Buyisonto SP*
	Godide	*Godide SP*
	Landela A	*Landela A SP*
	Marite	*Marite SP*
	Motlamogale	*Motlamogale SP*
	Rooiboklaagte B	*Rooiboklaagte B SP*
	Xikhusese	*Xikhusese A*
NKOMAZI	Emtfuntini	*Emtfuntini SP*
	Kamaqhekeza	*Kamaqhekeza SP*
	Kamhlushwa	*Kamhlushwa SP*
	KwaMandulu	*KwaMandulu SP*
	Magudu	*Magudu SP*
	Masibekela	*Masibekela SP*
	Ngwenyeni A	*Ngwenyeni A SP*
	Sibayeni	*Sibayeni SP*
MBOMBELA	Daantjie	*Daantjie SP 3* *Daantjie SP 1*
	Kabokweni	*Kabokweni-Ia*
	Mahushu	*Mahushu SP*
	Matsulu	*Matsulu B*
	Mbombela	*Matafeni* *Kamagugu*
	Mhwayi	*Mhwayi SP*
	Nyamazaneni	*Nyamazaneni SP*
	Phola	*Phola SP*

BOJANALA (NW)

ENUMERATION AREA	MUNICIPALITY	SUB-PLACE
RUSTENBURG	Boitekong	*Boitekong Ext 2*
	Hartbeestfontein A	*Hartbeestfontein A SP*
	Marikana	*Marikana SP*
	Monakato	*Monakato SP*
	Phatsima B	*Phatsima B SP*
	Phokeng	*Masosobane*
	Robega	*Robega SP*
	Rustenburg	*Rustenburg North*
	Waterkloof	*Waterkloof SP*
MOSES KOTANE	Bojating	*Bojating SP*
	Makweleng	*Makweleng SP*
	Moubane	*Moubane SP*
	Ratsegae	*Ratsegae SP*
	Sefikile	*Sefikile*
	Renosterspruit	*Mmorogong*
MADIBENG	Hartebeespoort	*Hartebeespoort SP*
	Kgabalatsane	*Kgabalatsane SP*
	Klipgat	*Klipgat SP*
	Klipgat	*Makanyaneng*
	Klipgat	*Klipgat A*
	Letlhabile	*Lethlabile C*
	Modderspruit	*Modderspruit SP*
MORETELE	Mmotla	*Mmotla SP*
	Mogohlwaneng	*Mogohlwaneng SP*

ZF MGCAWU (NC)

ENUMERATION AREA	MUNICIPALITY	SUB-PLACE
KATELOPELE	Danielskuil	*Kuilsville*
!KHEIS	Groblershoop	*Stutterheim*
KAI GARIB	Kai !Garib NU	*Kai !Garib NU*
	Kakamas	*Langverwaght*
	Keimoes	*Wahlsig*
	Lutzburg	*Lutzburg SP*
	Marchand	*Korea-Eiland*
//KHARA HAIS	Paballelo	*Paballelo SP*
	Raaswater	*Raaswater SP*
	Upington	*Vaalkroek* *Progress* *Rosedale Ext 1* *Upington SP1*
	Swartkop	*Swartkop SP*
TSANTSABANE	Postmasburg	*Marenteng* *Boitshoko* *New Town*

APPENDIX B

BIVARIATE TABLES PER DISTRICT *Significance: *p<=0.05*

THABO M (FS)

DEMOGRAPHICS OF CHILDREN <5 YEARS

VARIABLE	(1) TOTAL SAMPLE		(2) NOT STUNTED		(3) STUNTED		(2)-(3) PAIRWISE T-TEST
	N	MEAN(SE)	N	MEAN(SE)	N	MEAN(SE)	P-VALUE
Child age (months)	454	29.819 (0.844)	377	29.814 (0.946)	77	29.845 (1.833)	**0.988**
Child aged 2 or older	454	0.601 (0.025)	377	0.593 (0.027)	77	0.637 (0.059)	**0.504**
Male	454	0.526 (0.025)	377	0.530 (0.027)	77	0.506 (0.061)	**0.725**

SOCIODEMOGRAPHIC AND ECONOMIC CHARACTERISTICS OF HOUSEHOLDS AND CAREGIVERS WITH CHILDREN UNDER 5

VARIABLE	(1) TOTAL SAMPLE		(2) NOT STUNTED		(3) STUNTED		(2)-(3) PAIRWISE T-TEST
	N	MEAN(SE)	N	MEAN(SE)	N	MEAN(SE)	P-VALUE
Mother's Age	428	29.984 (0.361)	357	30.081 (0.398)	71	29.488 (0.854)	**0.527**
Mother's Height	405	160.259 (0.728)	339	160.208 (0.774)	66	160.523 (2.042)	**0.885**
Mother has less than matric	454	0.432 (0.025)	377	0.434 (0.027)	77	0.423 (0.061)	**0.875**
Mother has matric	454	0.452 (0.025)	377	0.448 (0.027)	77	0.471 (0.061)	**0.728**
Mother has tertiary	454	0.116 (0.017)	377	0.118 (0.019)	77	0.106 (0.041)	**0.777**
Urban	454	0.594 (0.026)	377	0.617 (0.029)	77	0.480 (0.061)	**0.041***
Household size	454	3.724 (0.077)	377	3.658 (0.083)	77	4.052 (0.195)	**0.064**
Mean household income	395	2791.346 (112.849)	330	2811.578 (123.050)	65	2687.948 (286.128)	**0.690**
Household head employed	454	0.358 (0.024)	377	0.364 (0.027)	77	0.325 (0.058)	**0.534**

ACCESS TO BASIC SERVICES

VARIABLE	(1) TOTAL SAMPLE		(2) NOT STUNTED		(3) STUNTED		(2)-(3) PAIRWISE T-TEST
	N	MEAN(SE)	N	MEAN(SE)	N	MEAN(SE)	**P-VALUE**
Adequate water	454	1.000 (0.000)	377	1.000 (0.000)	77	1.000 (0.000)	**.n**
Adequate sanitation	454	0.823 (0.020)	377	0.833 (0.022)	77	0.773 (0.051)	**0.275**
Child attends ECD/ preschool/Gr R	454	0.273 (0.022)	377	0.269 (0.024)	77	0.297 (0.057)	**0.638**
ECD/preschool/Gr R attendance among children 2 and older	275	0.367 (0.031)	226	0.364 (0.034)	49	0.378 (0.075)	**0.865**
ECD/preschool/Gr R attendance among children 3 and older	165	0.483 (0.041)	139	0.487 (0.045)	26	0.460 (0.106)	**0.814**
Child has Road to Health book	454	0.973 (0.009)	377	0.979 (0.008)	77	0.941 (0.030)	**0.211**

SOCIAL PROTECTION

VARIABLE	(1) TOTAL SAMPLE		(2) NOT STUNTED		(3) STUNTED		(2)-(3) PAIRWISE T-TEST
	N	MEAN(SE)	N	MEAN(SE)	N	MEAN(SE)	**P-VALUE**
Child has birth certificate	454	0.990 (0.004)	377	0.988 (0.005)	77	1.000 (0.000)	**0.032***
Child support grant	454	0.922 (0.015)	377	0.931 (0.016)	77	0.875 (0.042)	**0.203**

THABO M (FS) *continued*

CHILD HEALTH AND NUTRITION

VARIABLE	(1) TOTAL SAMPLE		(2) NOT STUNTED		(3) STUNTED		(2)-(3) PAIRWISE T-TEST
	N	MEAN(SE)	N	MEAN(SE)	N	MEAN(SE)	**P-VALUE**
Low birth weight	443	0.126 (0.016)	371	0.119 (0.017)	72	0.162 (0.043)	**0.343**
Exclusively breastfed 0-6 months	409	0.648 (0.026)	343	0.647 (0.028)	66	0.649 (0.063)	**0.986**
Average number of food groups consumed (Dietary Diversity)	454	4.441 (0.096)	377	4.444 (0.104)	7	4.427 (0.257)	**0.952**
Adequate dietary diversity for children 6-23 months	139	0.389 (0.046)	115	0.387 (0.051)	24	0.400 (0.109)	**0.914**
Breastmilk	454	0.201 (0.020)	377	0.206 (0.022)	77	0.175 (0.047)	**0.551**
Grains, roots, and tubers	454	0.905 (0.015)	377	0.904 (0.016)	77	0.906 (0.037)	**0.966**
Legumes and nuts	454	0.305 (0.023)	377	0.301 (0.025)	77	0.325 (0.058)	**0.703**
Dairy products	454	0.816 (0.019)	377	0.817 (0.020)	77	0.813 (0.050)	**0.936**
Dairy Flesh foods	454	0.662 (0.024)	377	0.646 (0.026)	77	0.743 (0.055)	**0.108**
Eggs	454	0.555 (0.025)	377	0.555 (0.027)	77	0.557 (0.061)	**0.971**
Vitamin A rich fruits and vegetables	454	0.442 (0.025)	377	0.445 (0.027)	77	0.426 (0.061)	**0.783**
Other fruits and vegetables	454	0.555 (0.025)	377	0.570 (0.027)	77	0.481 (0.062)	**0.185**
On Track: Vitamin A	442	0.623 (0.025)	369	0.634 (0.028)	73	0.566 (0.063)	**0.324**
On Track: Deworming	441	0.613 (0.025)	368	0.634 (0.028)	73	0.505 (0.063)	**0.062**

WEST RAND (GP)

DEMOGRAPHICS OF CHILDREN <5 YEARS

VARIABLE	(1) TOTAL SAMPLE		(2) NOT STUNTED		(3) STUNTED		(2)-(3) PAIRWISE T-TEST
	N	MEAN(SE)	N	MEAN(SE)	N	MEAN(SE)	P-VALUE
Child age (months)	482	28.269 (0.900)	394	28.334 (1.021)	88	27.963 (1.833)	**0.859**
Child aged 2 or older	482	0.565 (0.027)	394	0.570 (0.030)	88	0.539 (0.065)	**0.669**
Male	482	0.532 (0.027)	394	0.516 (0.030)	88	0.608 (0.065)	**0.203**

SOCIODEMOGRAPHIC AND ECONOMIC CHARACTERISTICS OF HOUSEHOLDS AND CAREGIVERS WITH CHILDREN UNDER 5

VARIABLE	(1) TOTAL SAMPLE		(2) NOT STUNTED		(3) STUNTED		(2)-(3) PAIRWISE T-TEST
	N	MEAN(SE)	N	MEAN(SE)	N	MEAN(SE)	P-VALUE
Mother's Age	442	29.978 (0.389)	362	29.653 (0.437)	80	31.527 (0.773)	**0.035***
Mother's Height	426	157.945 (0.393)	347	158.015 (0.426)	79	157.617 (1.024)	**0.719**
Mother has less than matric	481	0.566 (0.027)	393	0.561 (0.030)	88	0.592 (0.066)	**0.668**
Mother has matric	481	0.357 (0.026)	393	0.356 (0.029)	88	0.357 (0.064)	**0.990**
Mother has tertiary	481	0.077 (0.015)	393	0.083 (0.017)	88	0.051 (0.034)	**0.403**
Urban	482	0.924 (0.010)	394	0.930 (0.011)	88	0.894 (0.029)	**0.244**
Household size	482	4.705 (0.088)	394	4.677 (0.096)	88	4.836 (0.227)	**0.520**
Mean household income	452	3763.206 (307.553)	369	3840.069 (370.184)	83	3421.311 (310.189)	**0.386**
Household head employed	481	0.485 (0.028)	393	0.484 (0.030)	88	0.490 (0.066)	**0.934**

WEST RAND (GP) *continued*

ACCESS TO BASIC SERVICES

VARIABLE	(1) TOTAL SAMPLE		(2) NOT STUNTED		(3) STUNTED		(2)-(3) PAIRWISE T-TEST
	N	MEAN(SE)	N	MEAN(SE)	N	MEAN(SE)	P-VALUE
Adequate water	482	0.998 (0.002)	394	0.998 (0.002)	88	1.000 (0.000)	**0.319**
Adequate sanitation	482	0.918 (0.020)	394	0.912 (0.023)	88	0.943 (0.040)	**0.512**
Child attends ECD/ preschool/Gr R	475	0.260 (0.024)	388	0.269 (0.026)	87	0.216 (0.056)	**0.390**
ECD/preschool/Gr R attendance among children 2 and older	271	0.404 (0.035)	222	0.422 (0.039)	49	0.314 (0.084)	**0.240**
ECD/preschool/Gr R attendance among children 3 and older	165	0.484 (0.046)	140	0.504 (0.050)	25	0.365 (0.130)	**0.317**
Child has Road to Health book	482	0.841 (0.020)	394	0.850 (0.021)	88	0.798 (0.054)	**0.378**

SOCIAL PROTECTION

VARIABLE	(1) TOTAL SAMPLE		(2) NOT STUNTED		(3) STUNTED		(2)-(3) PAIRWISE T-TEST
	N	MEAN(SE)	N	MEAN(SE)	N	MEAN(SE)	P-VALUE
Child has birth certificate	482	0.859 (0.022)	394	0.860 (0.025)	88	0.856 (0.047)	**0.934**
Child support grant	482	0.688 (0.027)	394	0.690 (0.030)	88	0.682 (0.067)	**0.917**

CHILD HEALTH AND NUTRITION

VARIABLE	(1) TOTAL SAMPLE		(2) NOT STUNTED		(3) STUNTED		(2)-(3) PAIRWISE T-TEST
	N	MEAN(SE)	N	MEAN(SE)	N	MEAN(SE)	**P-VALUE**
Low birth weight	405	0.129 (0.020)	335	0.115 (0.021)	70	0.202 (0.061)	**0.173**
Exclusively breastfed 0-6 months	395	0.681 (0.029)	323	0.675 (0.032)	72	0.710 (0.070)	**0.654**
Average number of food groups consumed (Dietary Diversity)	481	2.692 (0.056)	393	2.688 (0.064)	88	2.707 (0.105)	**0.878**
Adequate dietary diversity for children 6-23 months	157	0.031 (0.014)	124	0.034 (0.017)	33	0.019 (0.020)	**0.570**
Breastmilk	481	0.206 (0.023)	393	0.217 (0.026)	88	0.158 (0.040)	**0.219**
Grains, roots, and tubers	481	0.905 (0.017)	393	0.904 (0.019)	88	0.912 (0.043)	**0.862**
Legumes and nuts	481	0.015 (0.005)	393	0.014 (0.006)	88	0.017 (0.012)	**0.865**
Dairy products	481	0.550 (0.027)	393	0.533 (0.030)	88	0.628 (0.063)	**0.174**
Dairy Flesh foods	481	0.542 (0.027)	393	0.527 (0.030)	88	0.613 (0.058)	**0.193**
Eggs	481	0.119 (0.017)	393	0.123 (0.018)	88	0.101 (0.042)	**0.640**
Vitamin A rich fruits and vegetables	481	0.100 (0.017)	393	0.115 (0.020)	88	0.031 (0.016)	**0.001***
Other fruits and vegetables	481	0.255 (0.025)	393	0.256 (0.027)	88	0.248 (0.064)	**0.906**
On Track: Vitamin A	408	0.653 (0.029)	337	0.649 (0.032)	71	0.675 (0.073)	**0.740**
On Track: Deworming	412	0.661 (0.029)	340	0.662 (0.032)	72	0.656 (0.072)	**0.940**

UMGUNGUNDLOVU (KZN)

DEMOGRAPHICS OF CHILDREN <5 YEARS

VARIABLE	(1) TOTAL SAMPLE		(2) NOT STUNTED		(3) STUNTED		(2)-(3) PAIRWISE T-TEST
	N	MEAN(SE)	N	MEAN(SE)	N	MEAN(SE)	P-VALUE
Child age (months)	449	29.383 (0.800)	367	29.908 (0.908)	82	27.160 (1.648)	**0.144**
Child aged 2 or older	449	0.606 (0.024)	367	0.627 (0.027)	82	.518 (0.059)	**0.091**
Male	449	0.550 (0.025)	367	0.527 (0.028)	82	0.647 (0.055)	**0.054**

SOCIODEMOGRAPHIC AND ECONOMIC CHARACTERISTICS OF HOUSEHOLDS AND CAREGIVERS WITH CHILDREN UNDER 5

VARIABLE	(1) TOTAL SAMPLE		(2) NOT STUNTED		(3) STUNTED		(2)-(3) PAIRWISE T-TEST
	N	MEAN(SE)	N	MEAN(SE)	N	MEAN(SE)	P-VALUE
Mother's Age	359	29.026 (0.375)	294	29.286 (0.416)	65	27.921 (0.850)	**0.148**
Mother's Height	339	158.356 (0.398)	274	158.701 (0.474)	65	156.980 (0.575)	**0.021***
Mother has less than matric	449	0.564 (0.025)	367	0.545 (0.028)	82	0.644 (0.056)	**0.108**
Mother has matric	449	0.361 (0.024)	367	0.377 (0.027)	82	0.295 (0.053)	**0.162**
Mother has tertiary	449	0.075 (0.013)	367	0.078 (0.015)	82	0.061 (0.028)	**0.586**
Urban	449	0.481 (0.025)	367	0.500 (0.028)	82	0.401 (0.057)	**0.117**
Household size	449	4.828 (0.114)	367	4.742 (0.122)	82	5.194 (0.293)	**0.154**
Mean household income	399	3635.151 (185.637)	326	3772.354 (218.707)	73	3061.875 (290.789)	**0.051**
Household head employed	449	0.382 (0.024)	367	0.374 (0.027)	82	0.415 (0.058)	**0.524**

ACCESS TO BASIC SERVICES

VARIABLE	(1) TOTAL SAMPLE		(2) NOT STUNTED		(3) STUNTED		(2)-(3) PAIRWISE T-TEST
	N	MEAN(SE)	N	MEAN(SE)	N	MEAN(SE)	P-VALUE
Adequate water	449	0.942 (0.012)	367	0.944 (0.013)	82	0.930 (0.028)	**0.646**
Adequate sanitation	449	0.225 (0.021)	367	0.234 (0.024)	82	0.188 (0.044)	**0.359**
Child attends ECD/ preschool/Gr R	449	0.281 (0.023)	367	0.284 (0.025)	82	0.266 (0.053)	**0.758**
ECD/preschool/Gr R attendance among children 2 and older	267	0.399 (0.032)	226	0.403 (0.035)	41	0.379 (0.081)	**0.786**
ECD/preschool/Gr R attendance among children 3 and older	160	0.503 (0.042)	141	0.515 (0.045)	19	0.422 (0.123)	**0.471**
Child has Road to Health book	449	0.819 (0.019)	367	0.806 (0.021)	82	0.873 (0.038)	**0.123**

SOCIAL PROTECTION

VARIABLE	(1) TOTAL SAMPLE		(2) NOT STUNTED		(3) STUNTED		(2)-(3) PAIRWISE T-TEST
	N	MEAN(SE)	N	MEAN(SE)	N	MEAN(SE)	P-VALUE
Child has birth certificate	449	0.899 (0.016)	367	0.912 (0.017)	82	0.842 (0.044)	**0.135**
Child support grant	449	0.837 (0.019)	367	0.849 (0.020)	82	0.787 (0.048)	**0.232**

UMGUNGUNDLOVU (KZN) *continued*

CHILD HEALTH AND NUTRITION

VARIABLE	(1) TOTAL SAMPLE		(2) NOT STUNTED		(3) STUNTED		(2)-(3) PAIRWISE T-TEST
	N	MEAN(SE)	N	MEAN(SE)	N	MEAN(SE)	P-VALUE
Low birth weight	362	0.160 (0.020)	292	0.135 (0.021)	70	0.260 (0.055)	**0.034***
Exclusively breastfed 0-6 months	321	0.488 (0.030)	260	0.461 (0.033)	61	0.595 (0.068)	**0.076**
Average number of food groups consumed (Dietary Diversity)	449	3.086 (0.060)	367	3.112 (0.067)	82	2.979 (0.132)	**0.368**
Adequate dietary diversity for children 6-23 months	140	0.125 (0.030)	101	0.106 (0.031)	39	0.173 (0.068)	**0.369**
Breastmilk	449	0.142 (0.017)	367	0.124 (0.017)	82	0.220 (0.050)	**0.067**
Grains, roots, and tubers	449	0.923 (0.013)	367	0.914 (0.015)	82	0.962 (0.019)	**0.053**
Legumes and nuts	449	0.151 (0.018)	367	0.161 (0.020)	82	0.111 (0.035)	**0.218**
Dairy products	449	0.565 (0.025)	367	0.560 (0.028)	82	0.582 (0.059)	**0.738**
Dairy Flesh foods	449	0.587 (0.025)	367	0.589 (0.027)	82	0.579 (0.058)	**0.871**
Eggs	449	0.128 (0.017)	367	0.131 (0.019)	82	0.119 (0.038)	**0.781**
Vitamin A rich fruits and vegetables	449	0.219 (0.021)	367	0.240 (0.024)	82	0.133 (0.040)	**0.022***
Other fruits and vegetables	449	0.370 (0.024)	367	0.393 (0.027)	82	0.274 (0.051)	**0.039***
On Track: Vitamin A	368	0.643 (0.027)	297	0.658 (0.029)	71	0.583 (0.063)	**0.276**
On Track: Deworming	373	0.638 (0.027)	300	0.650 (0.029)	73	0.593 (0.061)	**0.400**

MOPANI (LP)

DEMOGRAPHICS OF CHILDREN <5 YEARS

VARIABLE	(1) TOTAL SAMPLE		(2) NOT STUNTED		(3) STUNTED		(2)-(3) PAIRWISE T-TEST
	N	MEAN(SE)	N	MEAN(SE)	N	MEAN(SE)	P-VALUE
Child age (months)	453	29.009 (0.885)	391	29.256 (0.972)	62	27.303 (1.981)	**0.374**
Child aged 2 or older	453	0.560 (0.027)	391	0.567 (0.030)	62	0.511 (0.071)	**0.468**
Male	453	0.465 (0.028)	391	0.449 (0.030)	62	0.578 (0.069)	**0.086**

SOCIODEMOGRAPHIC AND ECONOMIC CHARACTERISTICS OF HOUSEHOLDS AND CAREGIVERS WITH CHILDREN UNDER 5

VARIABLE	(1) TOTAL SAMPLE		(2) NOT STUNTED		(3) STUNTED		(2)-(3) PAIRWISE T-TEST
	N	MEAN(SE)	N	MEAN(SE)	N	MEAN(SE)	P-VALUE
Mother's Age	363	30.477 (0.389)	310	30.672 (0.413)	53	29.313 (1.113)	**0.250**
Mother's Height	355	161.610 (0.434)	303	161.883 (0.481)	52	159.985 (0.919)	**0.067**
Mother has less than matric	452	0.491 (0.028)	390	0.490 (0.030)	62	0.496 (0.071)	**0.936**
Mother has matric	452	0.300 (0.024)	390	0.288 (0.026)	62	0.384 (0.070)	**0.196**
Mother has tertiary	452	0.209 (0.025)	390	0.222 (0.027)	62	0.120 (0.053)	**0.086**
Urban	453	0.298 (0.031)	391	0.309 (0.034)	62	0.229 (0.077)	**0.344**
Household size	453	4.679 (0.104)	391	4.678 (0.112)	62	4.686 (0.271)	**0.979**
Mean household income	442	4034.896 (304.199)	380	4142.454 (339.625)	62	3313.596 (517.307)	**0.179**
Household head employed	451	0.401 (0.028)	389	0.395 (0.030)	62	0.447 (0.073)	**0.507**

MOPANI (LP) *continued*

ACCESS TO BASIC SERVICES

VARIABLE	(1) TOTAL SAMPLE		(2) NOT STUNTED		(3) STUNTED		(2)-(3) PAIRWISE T-TEST
	N	MEAN(SE)	N	MEAN(SE)	N	MEAN(SE)	P-VALUE
Adequate water	453	0.913 (0.012)	391	0.920 (0.013)	62	0.863 (0.043)	**0.203**
Adequate sanitation	453	0.365 (0.028)	391	0.381 (0.031)	62	0.253 (0.065)	**0.074**
Child attends ECD/ preschool/Gr R	453	0.370 (0.027)	391	0.395 (0.030)	62	0.196 (0.049)	**0.001***
ECD/preschool/Gr R attendance among children 2 and older	253	0.583 (0.036)	221	0.612 (0.038)	32	0.359 (0.089)	**0.009***
ECD/preschool/Gr R attendance among children 3 and older	156	0.742 (0.040)	141	0.780 (0.038)	15	0.426 (0.142)	**0.014***
Child has Road to Health book	453	0.794 (0.025)	391	0.790 (0.027)	62	0.820 (0.060)	**0.652**

SOCIAL PROTECTION

VARIABLE	(1) TOTAL SAMPLE		(2) NOT STUNTED		(3) STUNTED		(2)-(3) PAIRWISE T-TEST
	N	MEAN(SE)	N	MEAN(SE)	N	MEAN(SE)	P-VALUE
Child has birth certificate	453	0.945 (0.015)	391	0.942 (0.016)	62	0.962 (0.037)	**0.617**
Child support grant	453	0.833 (0.025)	391	0.836 (0.027)	62	0.814 (0.070)	**0.773**

CHILD HEALTH AND NUTRITION

VARIABLE	(1) TOTAL SAMPLE		(2) NOT STUNTED		(3) STUNTED		(2)-(3) PAIRWISE T-TEST
	N	MEAN(SE)	N	MEAN(SE)	N	MEAN(SE)	**P-VALUE**
Low birth weight	379	0.140 (0.019)	326	0.136 (0.021)	53	0.163 (0.059)	**0.668**
Exclusively breastfed 0-6 months	356	0.636 (0.029)	304	0.609 (0.032)	52	0.795 (0.054)	**0.003***
Average number of food groups consumed (Dietary Diversity)	453	2.802 (0.075)	391	2.803 (0.083)	62	2.800 (0.165)	**0.990**
Adequate dietary diversity for children 6-23 months	160	0.085 (0.026)	133	0.072 (0.028)	27	0.153 (0.074)	**0.305**
Breastmilk	453	0.164 (0.020)	391	0.159 (0.021)	62	0.193 (0.059)	**0.594**
Grains, roots, and tubers	453	0.944 (0.011)	391	0.940 (0.012)	62	0.975 (0.018)	**0.097**
Legumes and nuts	453	0.028 (0.009)	391	0.024 (0.009)	62	0.060 (0.030)	**0.259**
Dairy products	453	0.423 (0.027)	391	0.431 (0.030)	62	0.368 (0.067)	**0.387**
Dairy Flesh foods	453	0.476 (0.028)	391	0.482 (0.030)	62	0.438 (0.069)	**0.559**
Eggs	453	0.231 (0.024)	391	0.224 (0.026)	62	0.283 (0.063)	**0.377**
Vitamin A rich fruits and vegetables	453	0.180 (0.022)	391	0.183 (0.024)	62	0.165 (0.058)	**0.780**
Other fruits and vegetables	453	0.355 (0.027)	391	0.361 (0.030)	62	0.318 (0.065)	**0.550**
On Track: Vitamin A	383	0.554 (0.029)	329	0.564 (0.032)	54	0.488 (0.076)	**0.352**
On Track: Deworming	387	0.504 (0.029)	333	0.512 (0.032)	54	0.456 (0.076)	**0.496**

EHLANZENI (MP)

DEMOGRAPHICS OF CHILDREN <5 YEARS

VARIABLE	(1) TOTAL SAMPLE		(2) NOT STUNTED		(3) STUNTED		(2)-(3) PAIRWISE T-TEST
	N	MEAN(SE)	N	MEAN(SE)	N	MEAN(SE)	P-VALUE
Child age (months)	426	25.586 (0.865)	358	25.048 (0.926)	68	28.172 (2.243)	**0.197**
Child aged 2 or older	426	0.527 (0.031)	358	0.531 (0.034)	68	0.508 (0.078)	**0.792**
Male	426	0.507 (0.031)	358	0.481 (0.034)	68	0.634 (0.076)	**0.064**

SOCIODEMOGRAPHIC AND ECONOMIC CHARACTERISTICS OF HOUSEHOLDS AND CAREGIVERS WITH CHILDREN UNDER 5

VARIABLE	(1) TOTAL SAMPLE		(2) NOT STUNTED		(3) STUNTED		(2)-(3) PAIRWISE T-TEST
	N	MEAN(SE)	N	MEAN(SE)	N	MEAN(SE)	P-VALUE
Mother’s Age	381	29.338 (0.430)	321	29.456 (0.465)	60	28.722 (1.122)	**0.544**
Mother’s Height	365	160.051 (0.506)	306	160.724 (0.535)	59	156.553 (1.260)	**0.002***
Mother has less than matric	426	0.380 (0.030)	358	0.355 (0.032)	68	0.499 (0.078)	**0.090**
Mother has matric	426	0.521 (0.031)	358	0.538 (0.034)	68	0.437 (0.077)	**0.230**
Mother has tertiary	426	0.099 (0.019)	358	0.107 (0.022)	68	0.064 (0.026)	**0.210**
Urban	426	0.433 (0.033)	358	0.418 (0.037)	68	0.503 (0.078)	**0.320**
Household size	426	4.279 (0.100)	358	4.344 (0.113)	68	3.970 (0.201)	**0.105**
Mean household income	379	4400.449 (450.288)	316	4511.939 (536.356)	63	3897.160 (532.636)	**0.416**
Household head employed	425	0.507 (0.031)	357	0.503 (0.034)	68	0.524 (0.078)	**0.801**

ACCESS TO BASIC SERVICES

VARIABLE	(1) TOTAL SAMPLE		(2) NOT STUNTED		(3) STUNTED		(2)-(3) PAIRWISE T-TEST
	N	MEAN(SE)	N	MEAN(SE)	N	MEAN(SE)	**P-VALUE**
Adequate water	426	0.793 (0.027)	358	0.808 (0.028)	68	0.725 (0.076)	**0.306**
Adequate sanitation	426	0.447 (0.031)	358	0.474 (0.034)	68	0.316 (0.066)	**0.033***
Child attends ECD/ preschool/Gr R	426	0.162 (0.021)	358	0.161 (0.023)	68	0.168 (0.052)	**0.910**
ECD/preschool/Gr R attendance among children 2 and older	225	0.272 (0.036)	193	0.264 (0.038)	32	0.312 (0.098)	**0.644**
ECD/preschool/Gr R attendance among children 3 and older	112	0.476 (0.058)	93	0.463 (0.062)	19	0.527 (0.152)	**0.690**
Child has Road to Health book	426	0.904 (0.020)	358	0.894 (0.024)	68	0.956 (0.020)	**0.047***

SOCIAL PROTECTION

VARIABLE	(1) TOTAL SAMPLE		(2) NOT STUNTED		(3) STUNTED		(2)-(3) PAIRWISE T-TEST
	N	MEAN(SE)	N	MEAN(SE)	N	MEAN(SE)	**P-VALUE**
Child has birth certificate	426	0.911 (0.019)	358	0.914 (0.020)	68	0.895 (0.053)	**0.734**
Child support grant	426	0.786 (0.028)	358	0.783 (0.030)	68	0.801 (0.069)	**0.810**

EHLANZENI (MP) *continued*

CHILD HEALTH AND NUTRITION

VARIABLE	(1) TOTAL SAMPLE		(2) NOT STUNTED		(3) STUNTED		(2)-(3) PAIRWISE T-TEST
	N	MEAN(SE)	N	MEAN(SE)	N	MEAN(SE)	**P-VALUE**
Low birth weight	396	0.126 (0.021)	333	0.099 (0.020)	63	0.248 (0.068)	0.036*
Exclusively breastfed 0-6 months	361	0.223 (0.028)	301	0.195 (0.028)	60	0.356 (0.085)	**0.071**
Average number of food groups consumed (Dietary Diversity)	426	2.992 (0.071)	358	2.996 (0.079)	68	2.969 (0.152)	**0.875**
Adequate dietary diversity for children 6-23 months	160	0.075 (0.029)	128	0.083 (0.035)	32	0.041 (0.030)	**0.360**
Breastmilk	426	0.162 (0.023)	358	0.169 (0.026)	68	0.130 (0.046)	**0.461**
Grains, roots, and tubers	426	0.923 (0.017)	358	0.915 (0.019)	68	0.962 (0.038)	**0.269**
Legumes and nuts	426	0.130 (0.022)	358	0.127 (0.024)	68	0.146 (0.056)	**0.755**
Dairy products	426	0.585 (0.031)	358	0.591 (0.033)	68	0.555 (0.077)	**0.668**
Dairy Flesh foods	426	0.562 (0.031)	358	0.577 (0.033)	68	0.492 (0.078)	**0.321**
Eggs	426	0.195 (0.024)	358	0.166 (0.025)	68	0.335 (0.074)	0.029*
Vitamin A rich fruits and vegetables	426	0.262 (0.028)	358	0.263 (0.030)	68	0.254 (0.070)	**0.900**
Other fruits and vegetables	426	0.172 (0.023)	358	0.188 (0.026)	68	0.095 (0.045)	**0.075**
On Track: Vitamin A	397	0.637 (0.031)	334	0.672 (0.033)	63	0.482 (0.081)	0.030*
On Track: Deworming	402	0.661 (0.030)	338	0.696 (0.032)	64	0.505 (0.081)	0.028*

BOJANALA (NW)

DEMOGRAPHICS OF CHILDREN <5 YEARS

VARIABLE	(1) TOTAL SAMPLE		(2) NOT STUNTED		(3) STUNTED		(2)-(3) PAIRWISE T-TEST
	N	MEAN(SE)	N	MEAN(SE)	N	MEAN(SE)	P-VALUE
Child age (months)	483	28.404 (0.780)	378	29.127 (0.909)	105	25.385 (1.342)	0.021*
Child aged 2 or older	483	0.542 (0.025)	378	0.564 (0.028)	105	0.450 (0.053)	**0.056**
Male	483	0.514 (0.025)	378	0.493 (0.029)	105	0.599 (0.052)	**0.075**

SOCIODEMOGRAPHIC AND ECONOMIC CHARACTERISTICS OF HOUSEHOLDS AND CAREGIVERS WITH CHILDREN UNDER 5

VARIABLE	(1) TOTAL SAMPLE		(2) NOT STUNTED		(3) STUNTED		(2)-(3) PAIRWISE T-TEST
	N	MEAN(SE)	N	MEAN(SE)	N	MEAN(SE)	P-VALUE
Mother's Age	398	29.493 (0.373)	310	29.649 (0.414)	88	28.853 (0.855)	**0.402**
Mother's Height	360	158.991 (0.326)	280	159.728 (0.364)	80	155.983 (0.605)	0.000*
Mother has less than matric	482	0.565 (0.025)	377	0.563 (0.028)	105	0.573 (0.052)	**0.865**
Mother has matric	482	0.349 (0.024)	377	0.345 (0.027)	105	0.366 (0.050)	**0.701**
Mother has tertiary	482	0.087 (0.014)	377	0.093 (0.016)	105	0.061 (0.024)	**0.273**
Urban	483	0.509 (0.025)	378	0.543 (0.028)	105	0.369 (0.055)	0.005*
Household size	483	5.116 (0.114)	378	5.131 (0.130)	105	5.054 (0.225)	**0.765**
Mean household income	335	4468.313 (594.563)	255	4798.031 (748.001)	80	3242.721 (310.056)	**0.056**
Household head employed	483	0.418 (0.025)	378	0.438 (0.029)	105	0.335 (0.053)	**0.086**

BOJANALA (NW) *continued*

ACCESS TO BASIC SERVICES

VARIABLE	(1) TOTAL SAMPLE		(2) NOT STUNTED		(3) STUNTED		(2)-(3) PAIRWISE T-TEST
	N	MEAN(SE)	N	MEAN(SE)	N	MEAN(SE)	**P-VALUE**
Adequate water	483	0.948 (0.011)	378	0.944 (0.014)	105	0.962 (0.017)	**0.417**
Adequate sanitation	483	0.520 (0.025)	378	0.533 (0.029)	105	0.466 (0.053)	**0.262**
Child attends ECD/ preschool/Gr R	482	0.196 (0.020)	377	0.223 (0.024)	105	0.084 (0.028)	**0.000***
ECD/preschool/Gr R attendance among children 2 and older	269	0.342 (0.033)	222	0.371 (0.037)	47	0.187 (0.060)	**0.009***
ECD/preschool/Gr R attendance among children 3 and older	167	0.455 (0.043)	139	0.476 (0.048)	28	0.331 (0.095)	**0.172**
Child has Road to Health book	483	0.744 (0.022)	378	0.758 (0.024)	105	0.688 (0.050)	**0.212**

SOCIAL PROTECTION

VARIABLE	(1) TOTAL SAMPLE		(2) NOT STUNTED		(3) STUNTED		(2)-(3) PAIRWISE T-TEST
	N	MEAN(SE)	N	MEAN(SE)	N	MEAN(SE)	**P-VALUE**
Child has birth certificate	483	483	378	0.834 (0.024)	105	0.862 (0.047)	**0.595**
Child support grant	480	480	375	0.695 (0.028)	105	0.817 (0.049)	**0.031***

CHILD HEALTH AND NUTRITION

VARIABLE	(1) TOTAL SAMPLE		(2) NOT STUNTED		(3) STUNTED		(2)-(3) PAIRWISE T-TEST
	N	MEAN(SE)	N	MEAN(SE)	N	MEAN(SE)	**P-VALUE**
Low birth weight	358	0.149 (0.021)	283	0.128 (0.023)	75	0.246 (0.052)	**0.038***
Exclusively breastfed 0-6 months	356	0.529 (0.029)	277	0.512 (0.033)	79	0.602 (0.059)	**0.186**
Average number of food groups consumed (Dietary Diversity)	483	3.046 (0.063)	378	3.101 (0.071)	105	2.815 (0.129)	**0.052**
Adequate dietary diversity for children 6-23 months	180	0.147 (0.030)	128	0.178 (0.039)	52	0.053 (0.031)	**0.012***
Breastmilk	483	0.197 (0.021)	378	0.203 (0.024)	105	0.171 (0.042)	**0.512**
Grains, roots, and tubers	483	0.949 (0.010)	378	0.943 (0.012)	105	0.972 (0.017)	**0.166**
Legumes and nuts	483	0.077 (0.014)	378	0.086 (0.017)	105	0.036 (0.018)	**0.045***
Dairy products	483	0.508 (0.025)	378	0.526 (0.028)	105	0.430 (0.052)	**0.102**
Dairy Flesh foods	483	0.605 (0.025)	378	0.625 (0.028)	105	0.522 (0.053)	**0.085**
Eggs	483	0.160 (0.020)	378	0.165 (0.023)	105	0.137 (0.037)	**0.519**
Vitamin A rich fruits and vegetables	483	0.257 (0.022)	378	0.246 (0.024)	105	0.300 (0.053)	**0.354**
Other fruits and vegetables	483	0.294 (0.023)	378	0.306 (0.026)	105	0.246 (0.045)	**0.252**
On Track: Vitamin A	361	0.468 (0.029)	285	0.469 (0.033)	76	0.465 (0.062)	**0.959**
On Track: Deworming	376	0.505 (0.029)	297	0.486 (0.032)	79	0.588 (0.059)	**0.130**

ZF MGCAWU (NC)

DEMOGRAPHICS OF CHILDREN <5 YEARS

VARIABLE	(1) TOTAL SAMPLE		(2) NOT STUNTED		(3) STUNTED		(2)-(3) PAIRWISE T-TEST
	N	MEAN(SE)	N	MEAN(SE)	N	MEAN(SE)	P-VALUE
Child age (months)	464	29.901 (0.856)	347	29.397 (1.020)	117	31.387 (1.573)	**0.288**
Child aged 2 or older	464	0.620 (0.025)	347	0.615 (0.029)	117	0.632 (0.051)	**0.771**
Male	464	0.510 (0.026)	347	0.497 (0.030)	117	0.548 (0.051)	**0.388**

SOCIODEMOGRAPHIC AND ECONOMIC CHARACTERISTICS OF HOUSEHOLDS AND CAREGIVERS WITH CHILDREN UNDER 5

VARIABLE	(1) TOTAL SAMPLE		(2) NOT STUNTED		(3) STUNTED		(2)-(3) PAIRWISE T-TEST
	N	MEAN(SE)	N	MEAN(SE)	N	MEAN(SE)	P-VALUE
Mother's Age	407	29.165 (0.387)	304	29.355 (0.452)	103	28.614 (0.744)	**0.395**
Mother's Height	397	157.559 (0.459)	294	158.296 (0.559)	103	155.445 (0.698)	**0.002***
Mother has less than matric	462	0.573 (0.025)	347	0.543 (0.030)	115	0.662 (0.048)	**0.036***
Mother has matric	462	0.402 (0.025)	347	0.429 (0.030)	115	0.322 (0.047)	**0.055**
Mother has tertiary	462	0.025 (0.007)	347	0.027 (0.008)	115	0.016 (0.011)	**0.414**
Urban	464	0.972 (0.006)	347	0.974 (0.007)	117	0.967 (0.014)	**0.649**
Household size	464	3.694 (0.067)	347	3.629 (0.075)	117	3.885 (0.142)	**0.112**
Mean household income	427	4650.568 (241.619)	320	5129.953 (302.480)	107	3221.765 (275.644)	**0.000***
Household head employed	464	0.335 (0.024)	347	0.367 (0.029)	117	0.242 (0.040)	**0.012***

ACCESS TO BASIC SERVICES

VARIABLE	(1) TOTAL SAMPLE		(2) NOT STUNTED		(3) STUNTED		(2)-(3) PAIRWISE T-TEST
	N	MEAN(SE)	N	MEAN(SE)	N	MEAN(SE)	**P-VALUE**
Adequate water	464	0.986 (0.005)	347	0.987 (0.006)	117	0.984 (0.011)	**0.849**
Adequate sanitation	464	0.848 (0.018)	347	0.847 (0.021)	117	0.853 (0.034)	**0.885**
Child attends ECD/ preschool/Gr R	464	0.069 (0.012)	347	0.082 (0.015)	117	0.032 (0.015)	**0.020***
ECD/preschool/Gr R attendance among children 2 and older	286	0.094 (0.017)	209	0.111 (0.022)	77	0.045 (0.023)	**0.038***
ECD/preschool/Gr R attendance among children 3 and older	177	0.133 (0.025)	125	0.159 (0.033)	52	0.067 (0.034)	**0.051**
Child has Road to Health book	464	0.695 (0.023)	347	0.681 (0.028)	117	0.736 (0.042)	**0.272**

SOCIAL PROTECTION

VARIABLE	(1) TOTAL SAMPLE		(2) NOT STUNTED		(3) STUNTED		(2)-(3) PAIRWISE T-TEST
	N	MEAN(SE)	N	MEAN(SE)	N	MEAN(SE)	**P-VALUE**
Child has birth certificate	464	0.996 (0.003)	347	0.995 (0.003)	117	1.000 (0.000)	**0.160**
Child support grant	464	0.892 (0.015)	347	0.875 (0.018)	117	0.941 (0.021)	**0.017***

ZF MGCAWU (NC) *continued*

CHILD HEALTH AND NUTRITION

VARIABLE	(1) TOTAL SAMPLE		(2) NOT STUNTED		(3) STUNTED		(2)-(3) PAIRWISE T-TEST
	N	MEAN(SE)	N	MEAN(SE)	N	MEAN(SE)	P-VALUE
Low birth weight	314	0.227 (0.030)	232	0.182 (0.035)	82	0.349 (0.058)	0.014*
Exclusively breastfed 0-6 months	394	0.533 (0.028)	292	0.527 (0.033)	102	0.550 (0.055)	**0.716**
Average number of food groups consumed (Dietary Diversity)	464	4.869 (0.094)	347	4.861 (0.108)	117	4.893 (0.192)	**0.882**
Adequate dietary diversity for children 6-23 months	139	0.475 (0.047)	102	0.515 (0.055)	37	0.379 (0.088)	**0.191**
Breastmilk	464	0.319 (0.025)	347	0.326 (0.029)	117	0.297 (0.046)	**0.589**
Grains, roots, and tubers	464	0.933 (0.014)	347	0.919 (0.018)	117	0.977 (0.013)	0.010*
Legumes and nuts	464	0.329 (0.023)	347	0.320 (0.027)	117	0.357 (0.047)	**0.489**
Dairy products	464	0.870 (0.017)	347	0.902 (0.016)	117	0.776 (0.046)	0.011*
Dairy Flesh foods	464	0.782 (0.021)	347	0.787 (0.024)	117	0.768 (0.042)	**0.698**
Eggs	464	0.668 (0.024)	347	0.670 (0.027)	117	0.662 (0.047)	**0.882**
Vitamin A rich fruits and vegetables	464	0.385 (0.025)	347	0.370 (0.028)	117	0.429 (0.050)	**0.300**
Other fruits and vegetables	464	0.583 (0.026)	347	0.568 (0.031)	117	0.627 (0.051)	**0.316**
On Track: Vitamin A	317	0.417 (0.030)	235	0.450 (0.036)	82	0.324 (0.056)	**0.060**
On Track: Deworming	322	0.443 (0.031)	239	0.463 (0.036)	83	0.387 (0.059)	**0.270**

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