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SOCIO-ECONOMIC-DRIVEN DISPARITIES IN CHRONIC ILLNESS AND DISABILITY AMONG THE SOUTH AFRICAN CHILDREN: EXPLORING VARIATIONS WITHIN THE URBAN AND RURAL AREAS

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ABSTRACT

Existing literature on health inequalities often overlooks the nuanced dynamics, particularly among vulnerable children with chronic diseases and disabilities and fails to consider regional disparities within countries like South Africa. This paper asserts the necessity for a more granular analysis in South Africa, recognizing the varied health outcomes for children across different economic segments and geographical settings. Specifically, the health trajectories for children differ markedly between rural formal areas, regions under traditional authorities, formal urban areas, and informal urban settlements. Addressing the generalizations common in prior research, this study takes a precise, regionally focused approach to socio-economic-driven disparities in chronic illness or disability. It distinguishes between rural formal areas, traditional authority areas, formal urban areas, and informal urban areas, unveiling the intricate layers of health disparities. Using data from the National Income Dynamics Study, concentration indices, and the Oaxaca-Blinder Decomposition method, the paper analyzed health inequality trends from 2008 to 2017. The results uncover significant inequalities, with alarming trends, particularly among children with chronic illnesses and disabilities in traditional authority regions and informal urban environments. The paper's evidence shows that rural formal areas have experienced a decline in health disparities as opposed to the deepening divide in traditional authority-led regions. The urban analysis reveals a split: while formal urban settings often favour the wealthier, informal urban areas indicate a shift towards lower socioeconomic brackets. The decomposition analysis highlights the evolving socioeconomic elements influencing each region over time. These insights emphasize the urgent necessity for geographically tailored policy interventions. By understanding the distinct socioeconomic landscapes across various regions, we can formulate policies that resonate with each area's specific realities and challenges. Such targeted strategies are essential in reducing health inequalities and enhancing the life quality of children with chronic health conditions and disabilities, playing a critical role in South Africa's journey toward comprehensive health equity.

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INTRODUCTION

Globally, persistent health concerns and disabilities, including HIV and AIDS, respiratory ailments, undernourishment, and mental health issues, present considerable public health obstacles for children. A striking United Nations Children's Fund report reveals that nearly 240 million children worldwide, or approximately 10%, live with disabilities. These health challenges don't merely pose an immediate risk; they carry long-term ramifications for lifelong health, welfare, educational attendance, and academic success (UNICEF, 2023).

In the context of South Africa, the situation becomes even more acute. For instance, nearly 27% of children under five experience chronic malnutrition, potentially leading to enduring health complications and disabilities (Govender et al., 2021). This highlights the necessity of addressing the fundamental causes of these persistent health problems associated with social health determinants such as resource availability, infrastructure, and economic conditions (Kelly, 2019).

Parental socioeconomic status (SES) can significantly impact the child's standard of living (Redfern et al., 2016). On the one hand, parents with a higher SES typically live in urban regions with better access to specialized healthcare and support services, enhancing their children's ability to cope with chronic diseases or disabilities. Conversely, low SES parents in underdeveloped areas typically live in rural areas. They may encounter significant barriers in accessing such resources, resulting in a socioeconomic divide in chronic illness and disability prevalence across these two areas.

To further illustrate the effect of this socioeconomic divide, various studies have explored regional health disparities in chronic diseases and disabilities among South African children. Most use cross-country, country-level, urban-rural, or provincial units of analysis to comprehend the factors contributing to these inequalities. For example, at the national level, Obuaku-Igwe (2015) compared key empirical studies investigating social inequalities in health between South Africa and those in Europe and other parts of the world. The author noted that, compared to other countries, South African children from low-income families were more prone to chronic health issues. More recently, Ohonba et al. (2019) suggested maternal education can significantly reduce children's health inequalities in South Africa. Nicholas et al. (2016) found that public health expenditure is inversely and significantly related to infant and under-five mortality in sub-Saharan African countries.

Building on these broader insights, researchers have examined health disparities among South African children at a more detailed level through urban and rural comparisons. Robertson (2006) reported that rural children generally had worse health outcomes than urban children, attributing this to limited access to healthcare and lower SES among rural families. Ameye and De Weerdt (2020) confirmed that children in rural areas have worse health outcomes and found that the highest child stunting rate was recorded in rural settings.

Provincial analysis has also revealed regional disparities. Zere and McIntyre (2003) found that children living in economically disadvantaged provinces like the Eastern Cape and Northern Cape were more likely to suffer from stunting since these provinces have the highest concentration of poverty. Similarly, Redfern et al. (2016) showed that children in provinces with higher SES, such as Gauteng and the Western Cape, had better access to healthcare and improved overall health outcomes.

Nonetheless, existing research has its limitations. One constraint is the reliance on cross-sectional data sources, which limits the establishment of causal

relationships and the identification of temporal trends (Wooldridge, 2010). Furthermore, the geographical classifications employed often lack necessary details, potentially oversimplifying health inequalities among South African children (Altman and Bland, 1997). This study adds to the existing literature by employing panel data to investigate regional socio-economic-driven disparities in chronic diseases and disabilities among South African children from various geographical types: formal rural areas, areas that fall under traditional authorities, formal urban areas, and informal urban areas. Adopting this finer unit of analysis enables consideration of diverse conditions relating to governance, infrastructure, access to resources, and socioeconomic conditions across regions.

Rural areas that fall under traditional authorities and are governed by customary law have limited infrastructure and resources, resulting in limited access to healthcare, education, and economic opportunities (King, 2005). Formal rural areas that local governments manage continue to face challenges relating to healthcare, education, and economic opportunities compared to urban areas with well-developed infrastructure, access to public and private services, and overall higher quality of life (Statistics South Africa [Stats S.A.], 2023). However, informal urban characterized by informal settlements have limited access to essential services, leading to significant health disparities (Richards et al., 2007). By utilizing these classifications that transcend traditional country-level, urban, rural, or provincial ones, the study sought to provide a more comprehensive understanding of health disparities among South African children and their determining factors in finer units of analysis.

THEORETICAL ANALYSIS AND HYPOTHESES

The Social Determinants of Health (SDH) concept provides an all-encompassing structure to examine the development of health disparities among children with chronic diseases and disabilities across South Africa's diverse regions. This concept posits that factors at the individual level, such as birth, development, everyday life, and work, interact with broader social, political, and economic policies, impacting health outcomes (Cockerham et al., 2017; World Health Organization, 2021).

Apartheid's lasting impact has significantly influenced the social determinants of health among South African children with chronic illnesses and disabilities. Persistent inequalities affect children across formal rural areas, areas under traditional authorities, and formal and informal urban areas due to poverty, insufficient critical infrastructure and services, and limited economic opportunities (Von Fintel, 2018). Although these challenges vary by region, they disproportionately burden poor children with chronic illnesses and disabilities, intensifying region-specific socioeconomic health disparities (Robertson, 2006).

For instance, rural regions typically have elevated poverty levels, restricted access to healthcare and education, and inadequate transportation infrastructure compared to urban areas (Robertson, 2006). Children with chronic diseases and disabilities in rural regions confront numerous difficulties in obtaining essential resources and services. Conversely, urban areas may offer more healthcare and education opportunities but are plagued by disparities based on income and race. Furthermore, overcrowding and substandard living conditions in informal settlements significantly affect children with chronic diseases (Jayathilaka et al., 2020).

The areas falling under traditional authorities present distinct challenges regarding health inequalities for children with chronic diseases and disabilities. In these areas, traditional healers play a vital role in addressing family dynamics and disputes and providing medical assistance where needed. However, they often lack the necessary

resources and training to manage chronic conditions and disabilities effectively (King, 2005). Cultural barriers to using Western healthcare may also exist in these areas, further exacerbating health disparities among children (King, 2005).

Factors such as migration patterns and economic growth further intensify disparities between regions. As families move from formal rural regions and areas under traditional authorities to urban areas in search of better job opportunities and healthcare, urbanization stresses already overburdened resources in urban areas (Tomlinson, 2017). Richards et al. (2007) suggest that competition for resources and the instability of informal settlements worsen health disparities among children with chronic conditions and disabilities in these urban settings.

In light of this, the present study seeks to embed its hypotheses within this theoretical background, drawing upon the SDH framework's insights and the contextual specificity of South Africa's regional disparities. Therefore, we propose:

H1: The rise in socio-economic-related inequalities in chronic diseases and disabilities among children between 2008 and 2017 is more prevalent in informal urban and formal rural areas than in other geographical types. This hypothesis assumes that informal urban and formal rural areas face unique challenges regarding access to healthcare and socioeconomic resources, which may exacerbate existing disparities.

H2: Factors such as children's age, maternal education, receipt of social grants, and medical aid coverage are the most influential determinants in the changes of socioeconomic inequalities in chronic diseases and disabilities among South African children over time. These factors were selected based on their well-established relationship with child health outcomes in the existing literature and their potential to offer insights into the mechanisms driving disparities in health outcomes across different geographical contexts.

In synthesizing a thorough theoretical analysis with these carefully construed hypotheses, this investigation provides a comprehensive and intricate examination of the persisting health disparities affecting children within the diverse terrains of South Africa. The findings aim to guide the development of health policies and interventions that are more attuned to each region's specific needs, thereby seeking to create long-lasting improvements in health equity and outcomes for these vulnerable populations.

METHODOLOGY

Data

The study employed the panel component of the NIDS datasets to investigate the evolution of socio-economic-related inequalities in chronic illnesses and disabilities among children and the underlying social factors across different geographical regions of South Africa. The scarcity of panel data makes the NIDS a valuable research resource. The South African Labour and Development Research Unit at the University of Cape Town collected the NIDS dataset in multiple waves. Data from Waves 1 (2008) and 5 (2017) were used to address the study's objectives.

The primary goal of the NIDS dataset is to assess the livelihoods and health of individuals and households over time, making it well-suited to explore changes in socio-economic-related disparities in chronic illnesses and disabilities among children in different regions of South Africa. The dataset provides a wealth of information, including fertility and disability rates and the health and education details of the sampled children over time. Table 1, displayed below, presents the essential variables, along with their descriptions, employed in the study.

TABLE 1. DESCRIPTION OF VARIABLES USED IN THE STUDY

Variable	Description	Categories/Values
Chronic illnesses and disabilities	Presence or absence of disability or chronic illness	1: Presence, 0: Absence
Age	Age group of children at the time of data collection	0-5, 6-10, 11-15
Race	Racial identification of children	African, Non-African (including Indian, Coloured, and White children).
Gender	Gender of children	Male, Female
Mother's education	Level of mother's education	No education, Incomplete primary, Completed primary, Incomplete secondary, Complete secondary, More than secondary education
Religious affiliation	Religious identity of the family	Religious, Non-religious
Parental marital status	Marital status of parents	Married, Unmarried (including living together, widowed, divorced, and never married)
Medical aid coverage	Presence or absence of medical aid coverage	Covered, Uncovered
Social grant recipient status	Whether the child receives social grant or not	Recipient, Non-recipient
Geographical type	Area types based on the 2001 census NIDS indicators	Traditional authority areas, Rural formal, Urban formal, Informal urban areas
Household income per capita	Ratio of monthly household income to the number of family members.	Computed value

Empirical Methods of Estimation

To fulfil the study's objectives and validate the hypotheses outlined above, this study expanded on the methodology used by Wagstaff et al. (2007) by employing four unique specifications. This advancement was achieved by integrating sophisticated econometric methods, including concentration curves, indices, and decomposition techniques, each explained in subsequent sections. These methods collectively allowed for a comprehensive examination of socio-economic-driven disparities in chronic diseases and disabilities among South African children across different geographical contexts, harnessing panel data for a more robust and time-sensitive analysis.

The Concentration Curve

The initial specification employed concentration curves to estimate the population sample distribution based on SES and the dependent variable within each geographical type for each period. The concentration curve displays the cumulative percentage of the population sample, ranked by SES on the X-axis and the cumulative percentage of the dependent variable on the Y-axis, as outlined by Wagstaff et al. (1991).

This approach was the first step in evaluating the extent of disparities in the outcome variable. Two variables served as anchors for this measure: the health variable and a measure of the standard of living (Ataguba et al., 2011). Household income per capita is the socioeconomic measure used to estimate the concentration curves (and indices in the next section). This variable is divided into quintiles on the concentration curve, with children ranked from the lowest to the highest income levels.

The deviation of the concentration curve from the line of equity (a 45-degree line) indicates the magnitude of inequality in the distribution of chronic illnesses and disabilities among children of different socioeconomic circumstances. Conversely, if the concentration curve coincides with the equity line, it suggests that the burden of chronic illnesses and disabilities is evenly distributed across children of different socioeconomic circumstances (Keeton, 2014).

The Concentration Index

The second specification calculates each geographical region's concentration index (CI) for 2008 and 2017. Wagstaff et al. (1991) defined that the CI represents twice the area between the equity line and the concentration curve. Formally, a standard CI can be derived by computing twice the covariance between a health variable (H) and a living standard measure (r), as specified by Wagstaff et al. (2007). This concept can be expressed mathematically using Equation (1):

$$C = \frac{2}{\mu} cov\,(H, r) \qquad (1)$$

The CI varies between negative (-1) and positive (+1). A negative value indicates that the burden of a certain outcome, such as chronic illnesses and disabilities, is concentrated among children whose parents have relatively lower incomes (Keeton, 2014). A positive CI value signifies that the burden of the outcome variable is concentrated among children with parents with relatively higher incomes (Keeton, 2014).

Despite this, to enable statistical analysis, this study utilized the regression-based CI described mathematically by O'Donnell et al. (2010), which is expressed in the following Equation:

$$2\sigma^2\left(\frac{H_i}{\mu}\right) = \alpha + \beta\, r_i + \sum \varphi_j\, x_{ji} + \varepsilon_i \qquad (2)$$

In Equation (2), σ^2 is the variance of the rank variable; μ is the mean of the health outcome; α represents the intercept; the parameter β is an estimation of the CI; r is used as the ranking variable, which is the household income per capita in the context of the paper; φ_j represents the parameter vectors of the determinant variables X_{ji} (these covariates were discussed in Section 3.2),and ε_i denotes the random stochastic error.

The estimation of this variation of the CI is conducted using the linear probability model (LPM) for each year and geographical region individually. Nevertheless, since the LPM is characterized by heteroscedasticity, the third specification addresses this statistical issue by employing robust standard errors in Equation (2). This estimation forms the basis for examining the change in the CI technique, which is presented in the subsequent section.

The Decomposition of the Change in the Concentration Index

The fourth specification dissects the CI for each geographical region from 2008 to 2017 to enable the decomposition of the socioeconomic factors contributing to inequalities in children's chronic illnesses and disabilities over time (O'Donnell et al., 2010). In simpler terms, this specification analyses how each variable contributed to the increase or decrease in overall inequalities in the outcome variable.
However, before outlining the methods for the decomposition of the change in CI, the paper reviews the methods for the cross-sectional decomposition of the CI as presented by Wagstaff et al. (2007). This is represented by Equation (3):

$$C = \sum_k (\frac{\beta_k \bar{\bar{X}}_k}{\mu}) C_k + \frac{GC_\varepsilon}{\mu} \qquad (3)$$

In the Equation above, $\bar{\bar{X}}_k$ is the mean of each determinant, and C_k is the CI for the k determinant. The CI for the individual determinants is calculated similarly to C. In addition, $G.C._\varepsilon$ is the generalized CI for the error term. Importantly, Equation (3) comprises two parts: explained and unexplained components. The explained part is the sum of the C.I.s of the k regressors, and the weight of these is the elasticity of H with

respect to $X_k (\eta_k = \beta_k \frac{\bar{\bar{X}}_k}{\mu})$.

The final term captures the unexplained part, $\frac{G.C._\varepsilon}{\mu}$, which is the socio-economic-related inequalities in the outcome variable that cannot be explained by systemic variation in the regressors by SES. However, the final term is anticipated to converge towards zero in a well-defined model. In contrast to the cross-sectional decomposition of the CI discussed previously, the study examined the evolution of socio-economic-related disparities in chronic illnesses and disabilities among children by applying the decomposition of the change in the CI to Equation (3), which produces the following Equation:

$$\Delta C = \sum_k \eta_{kt} (C_{kt} - C_{kt-1}) + \sum_k C_{kt-1} (\eta_{kt} - \eta_{kt-1}) + \Delta (\frac{GC_\varepsilon}{\mu}) \qquad (4)$$

In Equation (4), Δ indicates the first difference, and *t* denotes the period under investigation, which is the difference between 2017 and 2008. Moreover, in the above Equation, the change in the decomposition of the CI is weighted by the second-period elasticity, η_{kt} and the differences in elasticities by the first-period CI, C_{kt-1}. An alternative to Equation (4) is to weigh the differences in the C.I.s by the first-period elasticity and the second-period CI as shown in Equation (5)

$$\Delta C = \sum_k \eta_{kt-1} (C_{kt} - C_{kt-1}) + \sum_k C_{kt} (\eta_{kt} - \eta_{kt-1}) + \Delta (\frac{GC_\varepsilon}{\mu}) \qquad (5)$$

In evaluating the outcomes from utilizing Equations 4 and 5, a positive sign suggests that the variable of interest exacerbates disparities in chronic illnesses and disabilities among children in relation to socioeconomic factors over time (Hangoma et al., 2015). Conversely, a negative sign indicates that the variable reduced inequalities between Waves 1 and 5.

RESULTS

Descriptive Statistics

As presented in Table 2, the findings indicate a consistent decrease in the percentage of children with chronic illnesses and disabilities across all geographical regions in South Africa between 2008 and 2017. This trend is marked in informal urban areas, where the percentage of affected black children fell from 9.13% to 3.23%. Similarly, the proportion of non-black children in informal urban areas fell sharply from 12.82% to 1.15%. This suggests that policy interventions or enhanced healthcare access improved health outcomes for children in these areas during this period.

Moreover, the data points to a correlation between health coverage and the prevalence of chronic illnesses and disabilities. In 2008, children with health coverage generally exhibited higher prevalence rates than those without coverage, notably in traditional authority and informal urban areas. However, by 2017, the gap between these two groups had narrowed, with children possessing coverage experiencing a decrease in prevalence in all regions except rural formal areas, where prevalence marginally increased. This trend signifies that broadening health coverage may be crucial in diminishing disparities in chronic illnesses and disabilities among children.

Table 2 further reveals a link between receiving a social grant and the prevalence of chronic illnesses and disabilities. In 2008, children who received social grants typically had higher prevalence rates than those who did not. In 2017, this trend continued in formal rural, traditional authority, and formal urban areas but was reversed in informal urban areas, where children who did not receive a social grant exhibited higher prevalence than those who did. This underscores social grants' potential role in reducing socioeconomic disparities and enhancing health outcomes for children with chronic illnesses and disabilities.

Table 2 indicates that demographic characteristics are critical to understanding the distribution of chronic illnesses and disabilities among children in different regions. However, factors like parental education can contribute to socioeconomic disparities in child health outcomes.

TABLE 2. PERCENTAGES OF CHILDREN WITH CHRONIC ILLNESSES AND DISABILITIES ACROSS DIFFERENT REGIONS

	Rural formal areas		Traditional Authority areas		Formal urban areas		Informal urban areas	
	2008	2017	2008	2017	2008	2017	2008	2017
Black	4.68	4.02	4.70	3.49	5.68	4.15	9.13	3.23
Non-black	4.68	1.45	0.12	23.08	8.52	4.60	12.82	1.15
Ages 0-5	2.78	2.50	4.60	3.18	5.06	2.86	6.73	1.50
Ages 6-10	6.42	3.82	4.56	3.47	8.75	6.63	9.29	5.11
Ages 11-15	5.11	3.32	5.03	4.03	7.58	3.35	15.85	2.75
Male	3.70	3.20	4.44	4.07	6.83	5.00	7.78	3.48
Female	4.86	3.15	4.98	2.96	6.57	3.56	10.77	2.46

Covered	4.55	6.67	12.09	6.29	7.97	3.59	19.23	8.47
No coverage	4.26	3.02	4.53	3.36	6.44	4.41	9.19	2.75
Received social grant	4.91	3.10	5.18	3.63	7.20	4.71	8.42	2.90
Did not get a social grant	3.35	3.63	3.26	2.87	5.98	3.20	10.92	3.98

*Note: Computed using Wave 1 (2008) and Wave 5 (2019) of the NIDS dataset.

For example, Table 3 demonstrates how the mother's educational level contributes to the percentage of children with chronic illnesses and disabilities across different regions in South Africa. The data indicates that from 2008 to 2017, there was a general decrease in chronic illnesses and disabilities among children with increasing maternal education, most notably in formal urban areas for mothers with more than secondary education (from 20.00% to 0.94%). However, exceptions such as increased prevalence in informal urban areas for mothers with no education (from 14.29% to 25.00%) highlight the complex interplay between maternal education and region. These differences suggest that policies and interventions should be tailored to specific regional contexts to address children's health disparities.

TABLE 3. CHANGES IN THE PERCENTAGE OF CHILDREN WITH CHRONIC ILLNESSES AND DISABILITIES ACROSS DIFFERENT REGIONS IN SOUTH AFRICA BASED ON MATERNAL EDUCATION LEVELS

	Rural formal areas		**Traditional Authority areas**		**Formal urban areas**		**Informal urban areas**	
	2008	2017	2008	2017	2008	2017	2008	2017
No education	4.67	4.44	2.26	2.56	3.10	4.44	14.29	25.00
Incomplete primary	2.35	1.36	6.81	5.24	5.56	2.94	4.00	3.50
Completed Primary	7.24	2.17	6.68	4.09	8.87	2.07	4.88	4.20
Incomplete Secondary	4.49	4.08	3.10	3.87	5.99	4.66	8.21	2.65
Complete secondary	4.29	1.61	4.79	2.69	5.63	3.78	9.09	0.77
More than secondary	1.20	1.20	10.37	2.01	20.00	0.94	30.00	14.29

*Note: Computed using Wave 1 (2008) and Wave 5 (2019) of the NIDS dataset

Table 3 further reveals that maternal education can significantly impact children's health outcomes, but the dynamics of this effect vary considerably. Notably, in informal urban areas, there's a worrying trend among children whose mothers have no education: the percentage of children with chronic illnesses and disabilities significantly increased from 14.29% in 2008 to 25.00% in 2017. In stark contrast, there were improvements in all the other categories based on maternal education levels.

These findings underscore the importance of investing in education, especially for mothers, to improve children's health and well-being.

Household income also plays a crucial role in determining access to healthcare and children's overall well-being. Table 4 shows the changes in the percentage of children with chronic illnesses and disabilities using the income quantiles they fall under across the different geographical regions.

TABLE 4. VARIATIONS IN THE PORTION OF CHILDREN WITH CHRONIC ILLNESSES AND DISABILITIES BY INCOME QUANTILES ACROSS DISTINCT REGIONAL CATEGORIES

Income levels	Rural formal		Traditional Authority		Formal urban		Informal urban	
	2008	**2017**	**2008**	**2017**	**2008**	**2017**	**2008**	**2017**
Lower	97.18	95.65	96.54	98.07	88.61	89.26	94.12	100.00
Middle	1.41	4.35	0.00	2.22	2.97	6.61	5.88	0.00
High	1.41	0.00	3.46	0.00	8.42	4.13	0.00	0.00

*Note: Computed using Wave 1 (2008) and Wave 5 (2019) of the NIDS dataset.

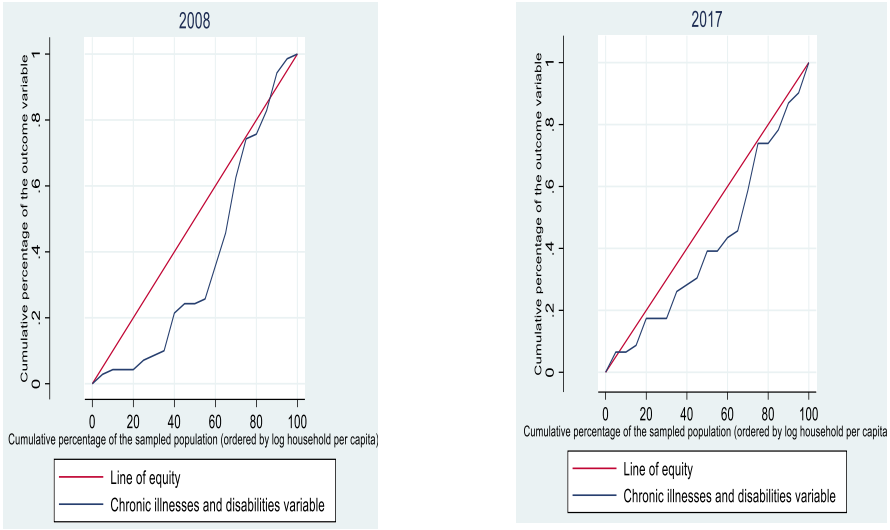
It points to a significant association between being from a low-income household and an elevated prevalence of chronic health conditions and disabilities among children across all geographical categories in the two years examined.

Moreover, the health discrepancies between middle-income households in rural formal and urban formal localities have diminished, whereas the gap between the traditional authority and informal urban sectors has grown. Intriguingly, affluent families witnessed a reduction in the proportion of children suffering from chronic health issues and disabilities in rural formal regions (from 1.41% to 0.00%) and urban formal areas (from 8.42% to 4.13%).

Result of the Concentration Curves for 2008 and 2017

Figure 1 displays the concentration curves for formal rural areas in 2008 and 2017. The 2017 curve is closer to the equity line, signifying decreased socio-economic-related disparities in chronic illnesses and disabilities among children in this region over time. Furthermore, both concentration curves lie below the 45-degree line, indicating that the disadvantages associated with these conditions are primarily concentrated among affluent children in this region.

FIGURE 1. CHANGES IN THE CONCENTRATION CURVES FOR CHILDREN LIVING IN FORMAL RURAL AREAS

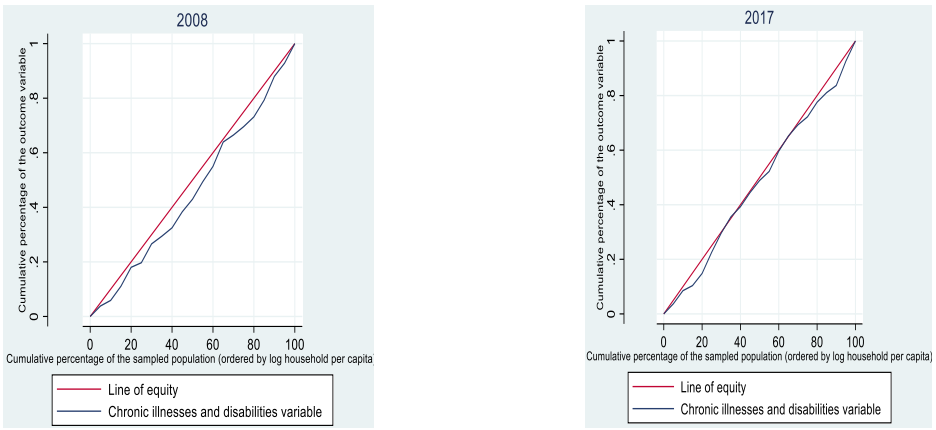


*Note: Computed using Wave 1 (2008) and Wave 5 (2019) of the NIDS dataset.

Figure 2 presents the concentration curves for children with chronic illnesses and disabilities in traditional authority areas in 2008 and 2017. Like formal rural areas, socio-economic-related inequalities gradually diminished among children in traditional authority areas. In both periods, the disadvantages related to these conditions are predominantly concentrated among affluent children in this region.

Figures 1 and 2 show an overall reduction in socio-economic-related health inequalities in chronic illnesses and disabilities among children in rural areas, which was more pronounced in formal rural areas than in traditional authority areas. These trends were anticipated, as we hypothesized that socio-economic-related inequalities in chronic illnesses and disabilities among children from these regions would be lower than those of children from informal urban areas. This could be due to the substantial public funds and resources allocated to policy initiatives such as the expansion of healthcare facilities in rural areas that have improved access to medical care for children with chronic illnesses and disabilities (Burger and Christian, 2020)

FIGURE 2. CHANGES IN THE CONCENTRATION CURVES FOR CHILDREN LIVING IN TRADITIONAL AUTHORITY AREAS

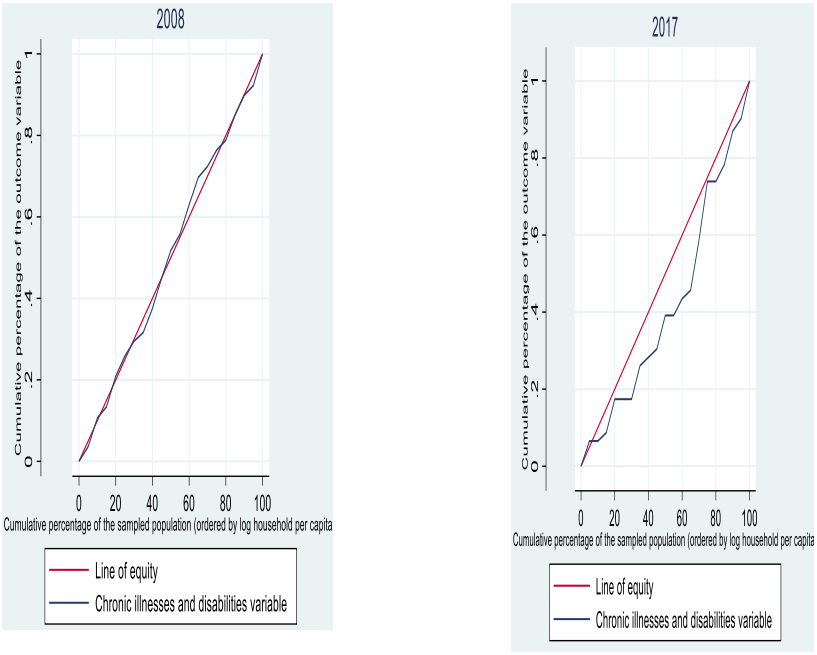


*Note: Computed using Wave 1 (2008) and Wave 5 (2019) of the NIDS dataset.

Figure 3 depicts the concentration curves for children living in formal urban areas in 2008 and 2017. The fact that the 2017 curve is more distant from the 45-degree line than the 2008 curve indicates an increase in socio-economic-related disparities in the outcome variable throughout the survey period. In 2008, the concentration curve closely aligned with the equity line, suggesting that the burden of chronic illnesses and disabilities was evenly distributed among children from diverse socioeconomic backgrounds. However, by 2017, the situation had changed, and the inequalities had intensified, with the burden increasingly affecting children from affluent families.

These findings agree with our hypothesis that inequalities will be the largest in urban settings. Several factors could explain the abrupt shift in the burden of chronic illnesses and disabilities among children in formal urban areas. Kimani-Murage et al. (2010) suggest that increasing affluence in South Africa's urban regions, leading to lifestyle changes, such as sedentary habits and unhealthy dietary choices, may have contributed to the higher prevalence of chronic illnesses among wealthy children. However, this shift might stem from a combination of factors explored in the following section.

FIGURE 3: CHANGES IN THE CONCENTRATION CURVES FOR CHILDREN LIVING IN FORMAL URBAN AREAS



*Note: Computed using Wave 1 (2008) and Wave 5 (2019) of the NIDS dataset.

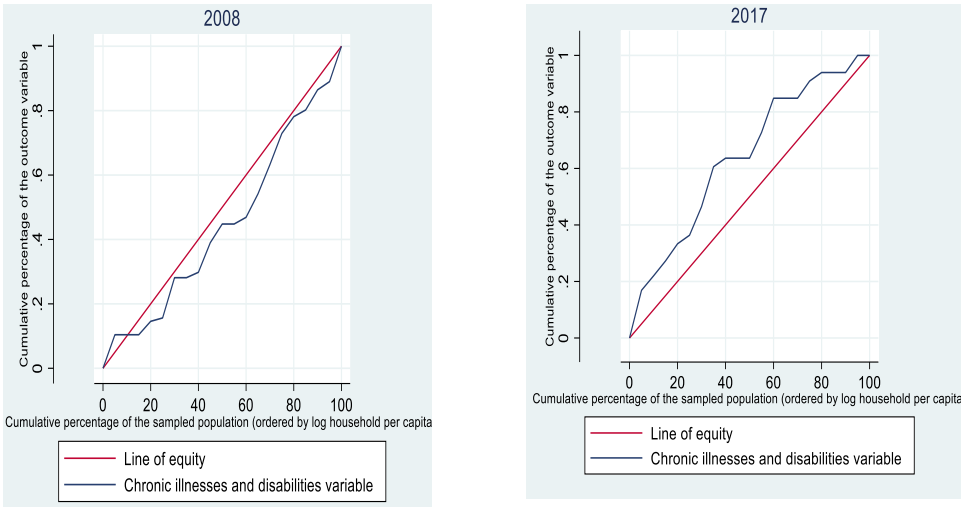
In conclusion, Figure 4 illustrates the concentration curves for children living in informal urban areas from 2008 to 2017. The 2017 concentration curve is further from the line of equity than its 2008 counterpart, signifying an increase in socio-economic-related inequalities about chronic illness and disabilities among children in this region. This supports our hypothesis that the most substantial change in these inequalities would be observed in urban settings.

The growth of informal urban areas in South Africa due to urbanization has given rise to several challenges for families living there. For example, these areas frequently lack adequate healthcare infrastructure, rendering access to healthcare difficult (Melore and Nel, 2020). Consequently, these individuals may not receive timely medical attention or preventive care, increasing their susceptibility to chronic illnesses and disabilities.

The 2017 concentration curve demonstrates this reality for children in informal urban areas, which is the only one that lies above the equity line. This observation underscores that impoverished children in this region disproportionately bear the burden of socio-economic-related disparities in chronic illnesses and disabilities.

Our examination of the differences in chronic illnesses and disabilities in children between 2008 and 2017, which considered socioeconomic factors across various geographic types (including formal rural areas, traditional authority regions, formal urban areas, and informal urban areas), revealed the presence of inequalities in the outcome variable.

FIGURE 4: CHANGES IN THE CONCENTRATION CURVES FOR CHILDREN LIVING IN INFORMAL URBAN AREAS



*Note: Computed using Wave 1 (2008) and Wave 5 (2019) of the NIDS dataset.

To gain deeper insight into this matter, the next section utilizes a regression-based concentration index to study fluctuations in the magnitude of these disparities while accounting for other variables that could affect the relationship among the distinct regional classifications.

Results of the Regression-Based Concentration Index for 2008 and 2017

Table 5 presents an analysis to assess changes in socio-economic-related inequalities in chronic illnesses and disabilities among children in South Africa after controlling for social determinants across formal rural areas, traditional authority areas, formal urban areas, and informal urban areas. As detailed in the methodology section, the study utilized regression-based concentration indices calculated separately for each geographical type.

In formal rural areas, the distribution of socioeconomic disparities in chronic illnesses and disabilities among children shifted significantly between 2008 and 2017. The disparities decreased by 100%, transitioning from being concentrated among the wealthy to being evenly distributed between the rich and poor. In contrast, the traditional authority areas saw increased disparities between 2008 and 2017, with the outcome predominantly observed among affluent children. Formal urban areas experienced a shift from low-income populations in 2008 to high-income populations in 2017, resulting in increased disparities. In informal urban areas, the outcome concentration shifted from the high-income group in 2008 to the low-income group in 2017, reducing disparities, with the largest absolute value index observed in 2017.

The impact of various covariates on chronic illnesses and disabilities among children in different geographical regions reveals that the dependent variable's social factors differ in each area and have undergone significant transformation over time. In formal rural areas, the 2008 study found that male children, those on medical aid, and children with mothers who did not complete primary or secondary education were

more likely to report chronic illnesses and disabilities. By 2017, however, children receiving child support grants, belonging to religious families, having mothers with higher education levels, and having married parents were less likely to report chronic illnesses and disabilities.

In traditional authority areas, the 2008 study indicated that male children aged 6-10 from religious families and with married parents were less likely to report chronic illnesses and disabilities. By 2017, children of African descent, mothers who completed secondary or higher education, and married parents were less likely to report chronic illnesses and disabilities.

In formal urban areas, the 2008 study found that African children had mothers with incomplete or complete primary education, and mothers who completed secondary education were less likely to report chronic illnesses and disabilities. By 2017, children with mothers holding qualifications beyond high school were less likely to report chronic illnesses and disabilities.\

TABLE 5. CHANGES IN THE CONCENTRATION INDICES AND SOCIAL DETERMINANTS OF THE HEALTH VARIABLES IN 2008 AND 2017: CHILDREN FROM DIFFERENT GEOGRAPHICAL TYPES

	Rural formal areas		**Traditional Authority areas**		**Formal urban areas**		**Informal urban areas**	
	2008	2017	2008	2017	2008	2017	2008	2017
CI	0.313*** (0.099)	0.000 (0.099)	0.008 (0.041)	0.088 (0.066)	-0.035 (0.050)	0.136* (0.069)	0.225*** (0.085)	-0.452*** (0.140)
Ages 6-10	0.046 (0.087)	-0.072 (0.083)	-0.015 (0.023)	-0.0057 (0.029)	0.140*** (0.031)	0.131*** (0.044)	-0.114** (0.048)	0.201*** (0.076)
Ages 11-15	0.0061 (0.079)	-0.076 (0.079)	0.024 (0.025)	0.0810** (0.038)	0.079** (0.036)	0.105** (0.044)	0.084 (0.072)	-0.075 (0.073)
Male	-0.018 (0.068)	0.011 (0.058)	-0.009 (0.019)	0.032 (0.028)	0.062** (0.024)	0.109*** (0.038)	-0.033 (0.040)	0.079 (0.070)
African	0.136 (0.090)	0.123** (0.061)	0.068* (0.035)	-0.864 (0.577)	-0.116*** (0.029)	-0.166*** (0.053)	-0.085 (0.111)	0.105** (0.049)

Child grant recipient	0.129** (0.058)	-0.014 (0.087)	0.096*** (0.019)	0.021 (0.050)	0.122*** (0.028)	0.148*** (0.048)	-0.032 (0.049)	0.138 (0.097)
Medical aid coverage	-0.237*** (0.084)	0.246 (0.273)	0.267*** (0.100)	0.126 (0.090)	0.039 (0.033)	0.049 (0.067)	0.535** (0.243)	0.452** (0.181)
Religious	0.083* (0.050)	-0.343 (0.251)	-0.113*** (0.032)	0.007 (0.050)	0.013 (0.030)	0.046 (0.056)	0.040 (0.065)	0.365 (0.232)
Incomplete primary	-0.245*** (0.076)	0.090 (0.205)	0.155*** (0.048)	0.209* (0.110)	-0.058 (0.050)	-0.252** (0.106)	-0.112* (0.064)	-0.815*** (0.285)
Completed primary	0.185 (0.229)	0.145 (0.204)	0.119** (0.053)	0.204 (0.150)	-0.044 (0.050)	-0.259*** (0.077)	0.001 (0.108)	-0.823*** (0.304)
Incomplete secondary	-0.185*** (0.069)	0.292 (0.231)	0.012 (0.034)	0.037 (0.054)	0.018 (0.036)	-0.130** (0.063)	-0.067 (0.089)	-0.612** (0.289)
Completed secondary	-0.246** (0.109)	0.030 (0.207)	0.028 (0.038)	-0.046 (0.055)	-0.048 (0.039)	-0.070 (0.070)	-0.109 (0.089)	-0.711** (0.285)
More than secondary	-0.236** (0.112)	-0.235*** (0.064)	0.215** (0.108)	-0.062 (0.061)	0.202* (0.113)	-0.026 (0.140)	-0.288** (0.113)	-0.262 (0.352)
Married parents	0.112 (0.115)	0.145 (0.127)	-0.004 (0.024)	-0.116*** (0.033)	0.061** (0.030)	0.015 (0.046)	-0.063 (0.052)	-0.081 (0.050)
Constant	-0.122 (0.110)	0.191 (0.134)	0.047 (0.058)	0.943 (0.579)	0.097** (0.047)	0.057 (0.078)	0.218* (0.124)	0.311** (0.126)
R^2	0.0347	0.0289	0.0140	0.0113	0.0293	0.0240	0.0740	0.0757

*Note: Computed using Wave 1 (2008) and Wave 5 (2019) of the NIDS dataset.; Standard errors are in parentheses. *** 1% level of significance; ** 5% level of significance; * 10% level of significance; Estimates are based on Equation (2).

In informal urban areas, the 2008 study showed that male children aged 6-10, African, recipients of child support grants, and with married parents were less likely to report chronic illnesses and disabilities. In 2017, the social factors changed significantly, and children aged 11-15, with mothers having incomplete or complete primary and secondary education, more than a matric qualification, and with married parents, had a lower probability of reporting chronic illnesses and disabilities.
It is crucial to note that the analysis establishes correlations and does not infer causality. An in-depth examination of each factor's contribution to the disparities in chronic illnesses and disabilities is provided in the subsequent section.

Results from Decomposing the Change in the Concentration Index

Table 6 presents a comprehensive overview of the evolution of socio-economic-related disparities in chronic illnesses and disabilities among children from various geographical regions. It illustrates how changes in children's health outcomes over time can be attributed to shifts in the elasticities and inequalities of the social determinants used to forecast the disparities.

TABLE 6. THE OAXACA-TYPE DECOMPOSITION OF THE PERCENTAGE CHANGES IN THE DETERMINANTS OF BAD HEALTH AMONGST CHILDREN FROM THE DIFFERENT GEOGRAPHICAL TYPES BETWEEN 2008 AND 2017

	Rural formal areas		**Traditional Authority areas**		**Formal urban areas**		**Informal urban areas**	
	Total	Percent	Total	Percent	Total	Percent	Total	Percent
Ages 6-10	0.024	-07.67	-0.002	-02.50	0.022	12.87	0.027	-03.99
Ages 11-15	-0.026	08.31	0.026	32.50	0.034	19.88	0.012	-01.77
Male	-0.006	01.92	0.002	02.50	-0.001	-00.59	-0.013	01.92
African	-0.068	21.73	0.009	11.25	0.008	04.68	0.001	-00.15
Child grant recipient	0.151	-48.24	-0.014	-17.50	-0.058	-33.92	-0.037	05.46
Medical aid coverage	0.402	-128.44	0.014	17.50	0.025	14.62	0.111	-16.40
Religious	-0.342	109.27	0.005	06.25	0.004	02.34	0.045	-06.65
Incomplete primary	-	47.28	-0.059	-73.75	0.045	26.32	0.127	-18.76

	0.148							
Completed primary	-0.077	24.60	-0.024	-30.00	0.044	25.73	0.057	-08.42
Incomplete secondary	0.260	-83.07	-0.019	-23.75	0.157	91.81	-0.010	01.48
Completed secondary	0.115	-36.74	-0.099	-123.75	-0.056	-32.75	-0.264	39.00
More than secondary	-0.003	00.96	-0.034	-42.50	0.001	00.59	0.008	-01.18
Married parents	0.215	-68.69	-0.096	-120.00	-0.063	-36.84	-0.010	01.48
Totals	**0.497**	**-158.79**	-0.291	**-363.75**	**0.162**	**94.77**	**0.054**	**-07.98**
Residuals	**-0.810**	**258.79**	0.371	**463.75**	**0.009**	**05.23**	**-0.731**	**107.98**
Differences ($CI_t - CI_{t-1}$)	**-0.313**	**100.00**	**0.080**	**100.00**	**0.171**	**100.00**	**-0.677**	**100.00**

* Note: Estimates are based on Equations (4) and (5). The totals are obtained from Tables 10 (formal rural areas), 11 (traditional authority areas), 12 (formal urban areas), and 13 (informal urban areas) in the appendix.

In formal rural areas, the observed characteristics accounted for a substantial 158.79% of the change in disparities in chronic illnesses and disabilities, while the residual factors made up the remaining 258.79%. Between 2008 and 2017, the largest contributor to reducing these disparities was the decline in inequalities among children with medical aid coverage, accounting for -128.44% of the reduction.

Other factors that played a significant role in reducing inequalities in this region included disparities among children with chronic illnesses and disabilities whose mothers did not complete secondary education (-83.07%), those with married parents (-68.69%), and those receiving the child support grant (-48.28%).

In traditional authority areas, the observed characteristics accounted for -363.75% of the variance in chronic illnesses and disabilities, while residual factors comprised the remaining 463.75%. This region's main driver of socioeconomic inequalities was the increased disparities among children aged 11-15, accounting for 32.50% of the inequality between 2008 and 2017. Other factors contributing to the observed inequalities in this region included disparities in medical aid coverage (17.50%), African ethnicity (11.25%), and religious affiliation (6.25%).

In formal urban areas, observed characteristics accounted for 94.77% of the changes in chronic illnesses and disabilities, while residual factors accounted for the remaining 5.23%. The critical factor driving the increase in overall socioeconomic

inequalities between 2008 and 2017 was the disparities between mothers of children with chronic illnesses and disabilities who had incomplete secondary education, accounting for 91.81% of the increase. Other variables contributing to rising inequalities in this region included disparities between mothers with incomplete (26.32%) or complete (25.73%) primary education, as well as disparities between children aged 11-15 (19.88%).

In informal urban areas, only 7.98% of the variations in chronic illnesses and disabilities among children were due to the observed traits, while the remaining 107.98% could be attributed to unobserved traits. The most significant factor in reducing socio-economic-related inequalities in this region was disparities between mothers with incomplete primary education, accounting for a decline of 18.86%. Other notable contributors included decreasing inequalities among children with medical aid coverage (16.40% reduction), those with mothers who completed primary education (8.42% reduction), and children aged 6-11 with these conditions (3.99% reduction).

DISCUSSIONS

This research uncovered the variations in chronic disease and disability disparities among South Africa's diverse geographical regions and the social determinants contributing to these disparities. Over the past decade, health has been increasingly acknowledged as an intrinsic right, particularly for children with diabetes. Through the nation's constitution and Bill of Rights, South Africa has crafted a comprehensive legislative framework championing the freedom and equality of citizens with chronic illnesses and disabilities. This framework, for instance, steers the provision of complimentary healthcare to people with disabilities, enhances the accessibility of all health-related services, and champions a rights-based approach to disability management, moving away from a purely medical standpoint (ACPF, 2011).

Such progressive shifts in public sentiment and policy have propelled the mobilization of resources and expertise to address health disparities. The synergy between governmental interventions, research endeavours, and community engagement has paved the way for a more equitable healthcare landscape for children across different socioeconomic strata. However, it's noteworthy that certain government bodies have exhibited greater efficacy in their initiatives than others. Conversely, the prevalence of chronic diseases and disabilities among children has risen in both traditional authority areas and formal urban regions. In the former, inadequate access to healthcare and traditional governance contribute to increased socioeconomic inequalities in children's chronic diseases (King, 2005). In the latter, it might result from ongoing urbanization pressures, which overburden local government institutions in delivering sufficient services to the expanding urban populace (Tomlinson, 2017).

CONCLUSIONS AND RECOMMENDATIONS

The study examined the evolution of socioeconomic disparities in chronic illnesses and disabilities among children residing in different geographical regions in South Africa using Waves 1 and 5 of the NIDS datasets. It employed a combination of concentration curves, a regression-based concentration index, and the decomposition of the concentration index technique to analyze changes in the underlying social factors contributing to these disparities. The results showed that disparities in chronic illnesses and disabilities and the social determinants driving these disparities vary across different geographical regions.

The research highlights the necessity of considering the distinct social aspects of different geographic regions when addressing disparities relating to SES in chronic diseases and disabilities among children in South Africa. Investigating these disparities in diverse areas revealed the varying impact of public health policies on health inequalities among children.

Drawing from these insights, it is recommended that local governments consider each region's unique needs when designing new strategies. Specifically, for formal rural and informal urban areas: enhancing healthcare access, upgrading the quality of care, and offering social support to married parents of children with chronic diseases and disabilities are essential. In informal urban settings, it is vital to prioritize improved access to healthcare.

Conversely, in tribal authority areas and formal urban areas, local governments should implement tailored programs. In traditional authority areas, public policies should focus on enhancing access to medical care and improving the quality of care for children aged 11-15 with chronic diseases and disabilities from religious families. In formal urban settings, policymakers should concentrate on improving levels of maternal education and broadening access to public hospitals and clinics, particularly for children aged 11-15 with chronic diseases and disabilities.

To expand on this research further, subsequent studies could investigate specific chronic conditions affecting children to present a more precise portrayal of health disparities across South Africa's distinct geographic regions. Moreover, additional inquiry is required to comprehend the influence of unmeasured factors, such as variations in environmental conditions and the quality of health infrastructure, which were not accounted for in the analysis due to constraints in the NIDS dataset.

Addressing these research gaps could guide the formulation of focused national and regional health policies to reduce health disparities among South African children further. By recognizing the unique characteristics of each geographic area and shifting from a universal approach, policymakers can establish customized interventions that cater to the particular requirements of diverse regions in South Africa, ultimately improving the welfare of children suffering from chronic diseases and disabilities.

In summary, this research highlights the potential of area-specific interventions in decreasing socio-economic-related disparities in chronic diseases and disabilities among South African children. By understanding the distinct challenges children encounter in various geographic regions, policymakers can design and execute targeted public health policies that cater to the specific needs of these communities. In doing so, they can strive to ensure improved health outcomes for all children, irrespective of their socioeconomic standing or residential location. Ultimately, these focused efforts could create a more equitable and healthier future for South Africa's future generation.

Therefore, policymakers and public health practitioners should address the growing inequalities in formal urban and traditional authority areas while improving health equity in formal rural and informal urban areas. To achieve this, they should target social determinants of health such as education, medical aid coverage, and ethnicity, ensuring that children from all socioeconomic backgrounds have equal access to quality healthcare services and opportunities for a healthy life.

APPENDIX

TABLE 7. PRELIMINARY DECOMPOSITION OF THE CONCENTRATION INDEX FOR CHILDHOOD DISABILITY AND CHRONIC ILLNESSES IN FORMAL RURAL AREAS OF SOUTH AFRICA

	2008			2017		
	Elasticities	Concentration indices	Contributions to CI	Elasticities	Concentration indices	Contributions to CI
6-10	0.269	-0.004	-0.001	-0.723	-0.031	0.022
11-15	0.025	-0.127	-0.003	-0.673	0.044	-0.030
Male	-0.170	-0.017	0.003	0.1780	-0.013	-0.002
African	2.061	-0.032	-0.066	3.325	-0.040	-0.132
Grant	1.501	-0.081	-0.121	-0.384	-0.076	0.029
Medical aid	-0.100	0.528	-0.053	0.535	0.654	0.350
Religious	1.092	0.060	0.065	-9.194	0.030	-0.278
Incomplete primary	-0.917	-0.119	0.109	0.242	-0.160	-0.039
Completed Primary	0.299	0.070	0.021	0.240	-0.233	-0.056
Incomplete Secondary	-1.158	0.144	-0.167	4.214	0.022	0.095
Complet	-0.438	0.117	-0.051	0.238	0.267	0.064

ed Secondary						
More than secondary	-0.034	-0.178	0.006	-0.021	-0.110	0.002
Married parents	0.538	0.138	0.074	1.011	0.286	0.289
Total			**-0.184**			**0.314**

*Notes: Calculated utilizing Waves 1 and 5 of the NIDS dataset. These are the individual coefficients forming part of equations (4) or (5). The calculation was performed using Stata, following the syntax outlined by O'Donnell et al. (2010, p. 161).

TABLE 8. PRELIMINARY DECOMPOSITION OF THE CONCENTRATION INDEX FOR CHILDHOOD DISABILITY AND CHRONIC ILLNESSES IN AREAS UNDER TRADITIONAL AUTHORITIES IN SOUTH AFRICA

	2008			**2017**		
	Elasticities	Concentration indices	Contributions to CI	Elasticities	Concentration indices	Contributions to CI
6-10	-0.108	-0.009	0.001	-0.050	0.025	-0.001
11-15	0.145	0.020	0.003	0.614	0.047	0.029
Male	-0.109	-0.015	0.002	0.414	0.009	0.004
African	1.570	0.000	0.000	-22.649	-0.0004	0.009
Grant	1.615	-0.006	-0.010	0.465	-0.052	-0.024
Medical aid	0.161	0.497	0.080	0.159	0.590	0.094
Religious	-1.517	0.000	0.000	0.126	0.035	0.004

Incomplete primary	0.351	-0.010	-0.004	0.254	-0.246	-0.062
Completed Primary	0.181	-0.120	-0.022	0.146	-0.312	-0.046
Incomplete Secondary	0.079	-0.078	-0.006	0.373	-0.067	-0.025
Completed Secondary	0.076	0.257	0.020	-0.316	0.252	-0.080
More than secondary	0.092	0.268	0.025	-0.049	0.179	-0.009
Married parents	-0.021	0.011	0.000	-0.432	0.221	-0.096
Total			**0.089**			**-0.203**

*Notes: Calculated utilizing Waves 1 and 5 of the NIDS dataset. These are the individual coefficients forming part of equations (4) or (5). The calculation was performed using Stata, following the syntax outlined by O'Donnell et al. (2010, p. 161).

TABLE 9. PRELIMINARY DECOMPOSITION OF THE CONCENTRATION INDEX FOR CHILDHOOD DISABILITY AND CHRONIC ILLNESSES IN FORMAL URBAN AREAS OF SOUTH AFRICA

	2008			2017		
	Elasticities	Concentration indices	Contributions to CI	Elasticities	Concentration indices	Contributions to CI
6-10	0.508	-0.054	-0.027	0.819	-0.007	-0.006
11-15	0.246	-0.016	-0.004	0.605	0.049	0.030
Male	0.452	0.002	0.001	1.021	0.000	0.000
African	-1.174	-0.104	0.122	-2.319	-0.056	0.130
Grant	0.783	-0.251	-0.197	1.788	-0.142	-0.254
Medical aid	0.101	0.503	0.051	0.146	0.518	0.075
Religious	0.138	0.043	0.006	0.648	0.015	0.010
Incomplete primary	-0.048	-0.243	0.012	-0.183	-0.309	0.056
Completed Primary	-0.032	-0.233	0.008	-0.154	-0.337	0.052
Incomplete Secondary	0.091	-0.105	-0.010	-0.922	-0.160	0.147
Completed Secondar	-0.196	0.325	-0.064	-0.442	0.270	-0.119

y						
More than secondary	0.019	-0.061	-0.001	-0.007	0.058	0.000
Married parents	0.316	0.244	0.077	0.066	0.223	0.015
Total			**-0.026**			**0.136**

*Notes: Calculated utilizing Waves 1 and 5 of the NIDS dataset. These are the individual coefficients forming part of equations (4) or (5). The calculation was performed using Stata, following the syntax outlined by O'Donnell et al. (2010, p. 161).

TABLE 10. PRELIMINARY DECOMPOSITION OF THE CONCENTRATION INDEX FOR CHILDHOOD DISABILITY AND CHRONIC ILLNESSES IN INFORMAL URBAN AREAS OF SOUTH AFRICA

	2008			**2017**		
	Elasticities	Concentration indices	Contributions to CI	Elasticities	Concentration indices	Contributions to CI
6-10	-0.285	0.033	-0.009	0.603	0.030	0.018
11-15	0.188	-0.010	-0.002	-0.167	-0.059	0.010
Male	-0.169	-0.029	0.005	0.361	-0.022	-0.008
African	-0.890	0.001	-0.001	0.866	0.000	0.000
Grant	-0.207	-0.037	0.008	0.997	-0.029	-0.029
Medical aid	0.172	-0.085	-0.015	0.181	0.531	0.096

Religious	0.260	0.000	0.000	2.229	0.020	0.044
Incomplete primary	-0.113	-0.268	0.030	-0.294	-0.532	0.156
Completed Primary	0.000	-0.153	0.000	-0.196	-0.291	0.057
Incomplete Secondary	-0.259	-0.038	0.010	-2.377	0.000	-0.001
Completed Secondary	-0.221	0.199	-0.044	-1.561	0.197	-0.307
More than secondary	-0.013	0.028	0.000	-0.013	-0.578	0.008
Married parents	-0.097	-0.008	0.001	-0.094	0.096	-0.009
Total			**-0.027**			**0.035**

*Notes: Calculated utilizing Waves 1 and 5 of the NIDS dataset. These are the individual coefficients forming part of equations (4) or (5). The calculation was performed using Stata, following the syntax outlined by O'Donnell et al. (2010, p. 161).

TABLE 11. THE OAXACA-TYPE DECOMPOSITION OF THE CHANGES IN HEALTH FOR CHILDREN IN FORMAL RURAL AREAS BETWEEN 2008 AND 2017

	Equation 6			**Equation 7**		
	Disability			**Disability**		
	$\Delta C.\eta_{kt}$	$\Delta\eta.C_{kt-1}$	**Total**	$\Delta C.\eta_{kt-1}$	$\Delta\eta.C_{kt}$	**Total**
Ages 6-10	0.020	0.004	**0.024**	-0.007	0.031	**0.024**
Ages 11-15	-0.115	0.089	**-0.026**	0.004	-0.030	**-0.026**
Male	0.001	-0.006	**-0.005**	-0.001	-0.005	**-0.006**
African	-0.027	-0.041	**-0.068**	-0.017	-0.051	**-0.068**
Child grant recipient	-0.002	0.153	**0.151**	0.008	0.143	**0.151**
Medical aid coverage	0.067	0.335	**0.402**	-0.013	0.415	**0.402**
Religious	0.276	-0.617	**-0.341**	-0.033	-0.309	**-0.342**
Incomplete primary	-0.010	-0.138	**-0.148**	0.038	-0.185	**-0.147**
Completed primary	-0.073	-0.004	**-0.077**	-0.091	0.014	**-0.077**
Incomplete secondary	-0.514	0.774	**0.260**	0.141	0.118	**0.259**
Completed secondary	0.036	0.079	**0.115**	-0.066	0.181	**0.115**
More than secondary	-0.001	-0.002	**-0.003**	-0.002	-0.001	**-0.003**
Married parents	0.150	0.065	**0.215**	0.080	0.135	**0.215**
Totals	**-0.192**	**0.691**	**0.499**	**0.041**	**0.456**	**0.497**

*Notes: The total is derived from the data presented in Table 7.

TABLE 12. THE OAXACA-TYPE DECOMPOSITION OF THE CHANGES IN HEALTH FOR CHILDREN IN AREAS UNDER TRADITIONAL AUTHORITIES BETWEEN 2008 AND 2017

	Equation 6			**Equation 7**		
	Disability			**Disability**		
	$\Delta C.\eta_{kt}$	$\Delta\eta.C_{kt-1}$	**Total**	$\Delta C.\eta_{kt-1}$	$\Delta\eta.C_{kt}$	**Total**
Ages 6-10	-0.001	-0.001	**-0.002**	-0.004	0.002	**-0.002**
Ages 11-15	0.017	0.009	**0.026**	0.004	0.022	**0.026**
Male	0.010	-0.008	**0.002**	-0.003	0.005	**0.002**
African	0.009	0.000.	**0.009**	-0.001	0.010	**0.009**
Child grant recipient	-0.021	0.007	**-0.014**	-0.074	0.060	**-0.014**
Medical aid coverage	0.015	-0.001	**0.014**	0.015	-0.001	**0.014**
Religious	0.004	0.000	**0.004**	-0.053	0.058	**0.005**
Incomplete primary	-0.060	0.001	**-0.059**	-0.083	0.024	**-0.059**
Completed primary	-0.028	0.004	**-0.024**	-0.034	0.011	**-0.023**
Incomplete secondary	0.004	-0.023	**-0.019**	0.001	-0.020	**-0.019**
Completed secondary	0.002	-0.101	**-0.099**	0.000	-0.099	**-0.099**
More than secondary	0.004	-0.038	**-0.034**	-0.008	-0.025	**-0.033**
Married parents	-0.091	-0.005	**-0.096**	-0.004	-0.091	**-0.095**
Totals	**-0.136**	**-0.156**	**-0.292**	**-0.244**	**-0.044**	**-0.288**

*Notes: The total is derived from the data presented in Table 8.

TABLE 13. THE OAXACA-TYPE DECOMPOSITION OF THE CHANGES IN HEALTH FOR CHILDREN IN FORMAL URBAN AREAS BETWEEN 2008 AND 2017

	Equation 6			Equation 7		
	Disability			Disability		
	$\Delta C.\eta_{kt}$	$\Delta\eta.C_{kt-1}$	Total	$\Delta C.\eta_{kt-1}$	$\Delta\eta.C_{kt}$	Total
Ages 6-10	0.039	-0.017	**0.022**	0.024	-0.002	**0.022**
Ages 11-15	0.039	-0.006	**0.033**	0.016	0.018	**0.034**
Male	-0.002	0.001	**-0.001**	-0.001	0.000	**-0.001**
African	-0.111	0.119	**0.008**	-0.056	0.064	**0.008**
Child grant recipient	0.195	-0.252	**-0.057**	0.085	-0.143	**-0.058**
Medical aid coverage	0.002	0.023	**0.025**	0.002	0.023	**0.025**
Religious	-0.018	0.022	**0.004**	-0.004	0.008	**0.004**
Incomplete primary	0.012	0.033	**0.045**	0.003	0.042	**0.045**
Completed primary	0.016	0.028	**0.044**	0.003	0.041	**0.044**
Incomplete secondary	0.051	0.106	**0.157**	-0.005	0.162	**0.157**
Completed secondary	0.024	-0.080	**-0.056**	0.011	-0.066	**-0.055**
More than secondary	-0.001	0.002	**0.001**	0.002	-0.002	**0.000**
Married parents	-0.001	-0.061	**-0.062**	-0.007	-0.056	**-0.063**
Totals	**0.245**	**-0.082**	**0.163**	**0.073**	**0.089**	**0.162**

*Notes: The total is derived from the data presented in Table 9.

TABLE 14. THE OAXACA-TYPE DECOMPOSITION OF THE CHANGES IN HEALTH FOR CHILDREN IN INFORMAL URBAN AREAS BETWEEN 2008 AND 2017

	Equation 6			**Equation 7**		
	Disability			**Disability**		
	$\Delta C.\eta_{kt}$	$\Delta\eta.C_{kt-1}$	**Total**	$\Delta C.\eta_{kt-1}$	$\Delta\eta.C_{kt}$	**Total**
Ages 6-10	-0.002	0.029	**0.027**	0.000	0.027	**0.027**
Ages 11-15	0.008	0.004	**0.012**	-0.009	0.021	**0.012**
Male	0.002	-0.015	**-0.013**	-0.001	-0.012	**-0.013**
African	-0.001	0.001	**0.000**	0.001	0.000	**0.001**
Child grant recipient	0.008	-0.045	**-0.037**	-0.002	-0.035	**-0.037**
Medical aid coverage	0.112	-0.001	**0.111**	0.106	0.005	**0.111**
Religious	0.045	0.000	**0.045**	0.005	0.039	**0.044**
Incomplete primary	0.078	0.049	**0.127**	0.030	0.096	**0.126**
Completed primary	0.027	0.030	**0.057**	0.000	0.057	**0.057**
Incomplete secondary	-0.090	0.081	**-0.009**	-0.010	0.000	**-0.010**
Completed secondary	0.003	-0.267	**-0.264**	0.000	-0.264	**-0.264**
More than secondary	0.008	0.000	**0.008**	0.008	0.000	**0.008**
Married parents	-0.010	0.000	**-0.010**	-0.010	0.000	**-0.010**
Totals	**0.188**	**-0.134**	**0.054**	**0.118**	**-0.066**	**0.052**

*Notes: The total is derived from the data presented in Table 10.

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