



Electrification and Refrigeration: Associations with Child Nutrition and Vaccination (AS85)

An Analysis Brief from The DHS Program

Why study the relationship between electrification and child health?

SDG target 7.1 aims to ensure universal access to affordable, reliable, and modern energy services by 2030. More than a billion people have gained access to electricity since 2010. Still, nearly 760 million do not have access, most of whom live in sub-Saharan Africa.

Electrification may improve health outcomes through individual-, household-, and community-level pathways. This study explores trends in the relationship of household electricity and refrigeration with underweight and zero-dose children.



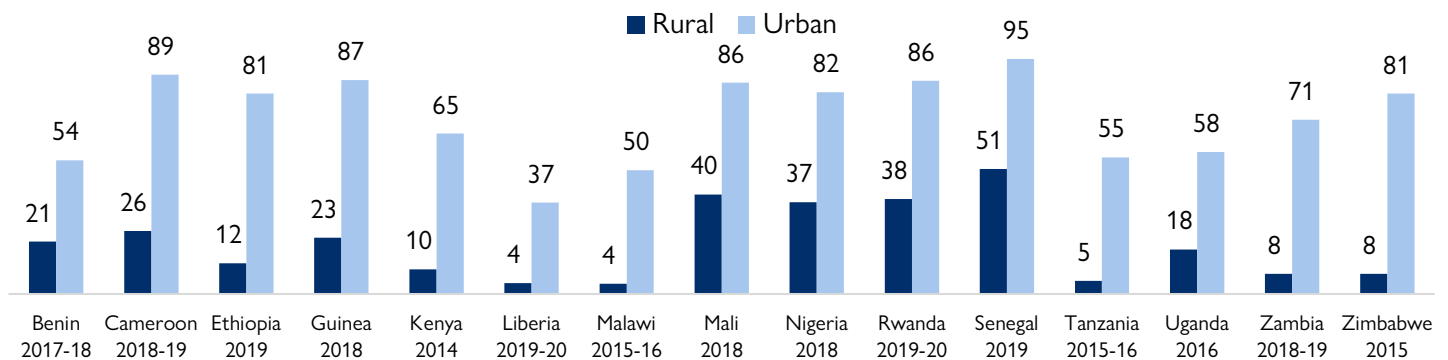
Which countries are included?

This analysis includes data from 54 DHS surveys from 15 sub-Saharan African countries: Benin, Cameroon, Ethiopia, Guinea, Kenya, Liberia, Malawi, Mali, Nigeria, Rwanda, Senegal, Tanzania, Uganda, Zambia, and Zimbabwe.

What methods are used to conduct this analysis?

This study examines trends in access to electricity, refrigerator ownership, underweight children under five, and zero-dose children age 12-23 months who have not received the DPT 1 vaccine by urban/rural residence. Logistic regression analysis was conducted controlling for several child, mother, and household background characteristics.

Figure 1. Percent of household population with access to electricity per most recent survey.

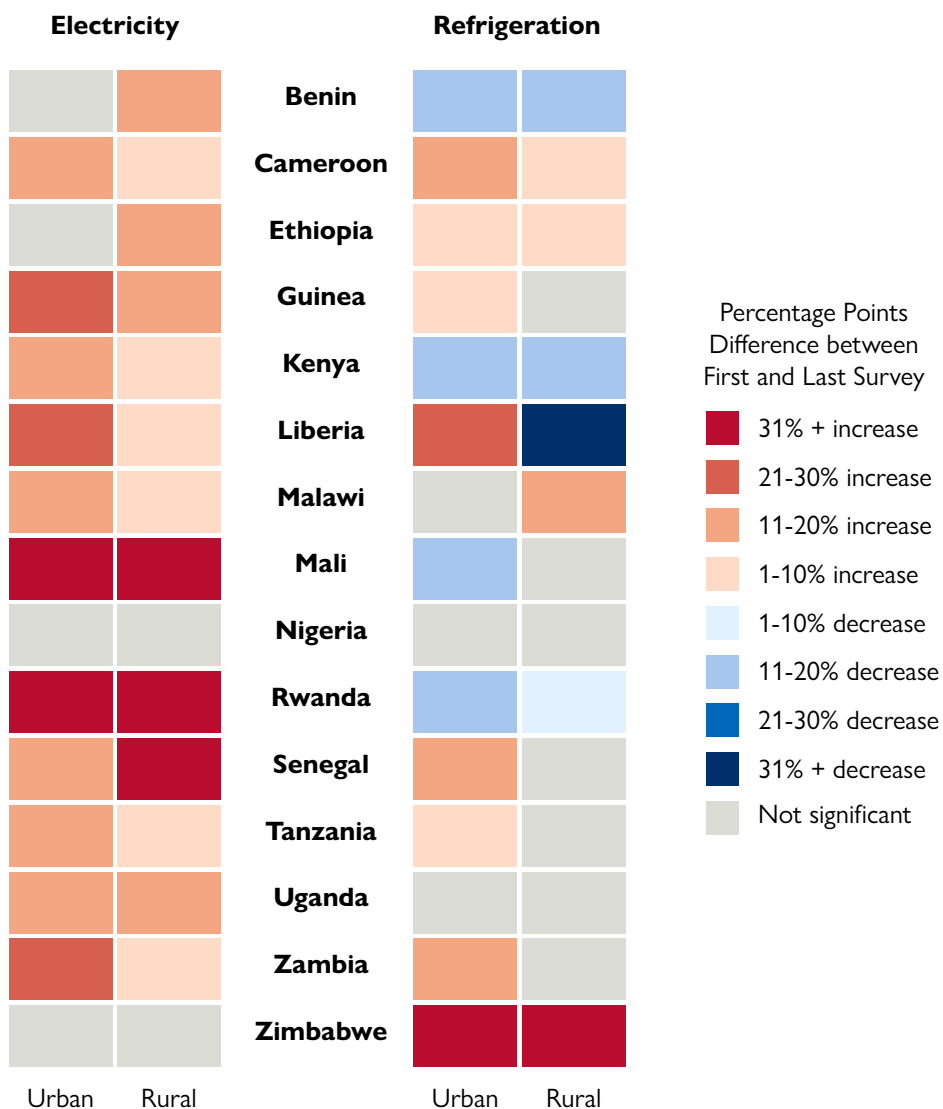


What are the key results?

- **There are large gaps in access to electricity between urban and rural areas** (see Figure 1).
- **Electrification increased over time in most countries.** Access to electricity increased between the first and last survey for both urban and rural populations in 11 countries (see Figure 2). In Benin and Ethiopia electricity access improved among rural populations only. There was no change in access to electricity in Nigeria and Zimbabwe. The largest increases in access to electricity are in Rwanda and Mali. In these two countries, electrification increased by 44 percentage points in urban areas and about 37 percentage points in rural areas.
- **Most countries had no or small improvements in refrigerator ownership over time,** and refrigerator ownership among those with electricity declined in five countries (Benin, Kenya, Liberia, Mali, Rwanda).

Figure 2. Trends of electricity access and refrigerator ownership among those with electricity. Percentage point difference between first and last survey indicated by color.

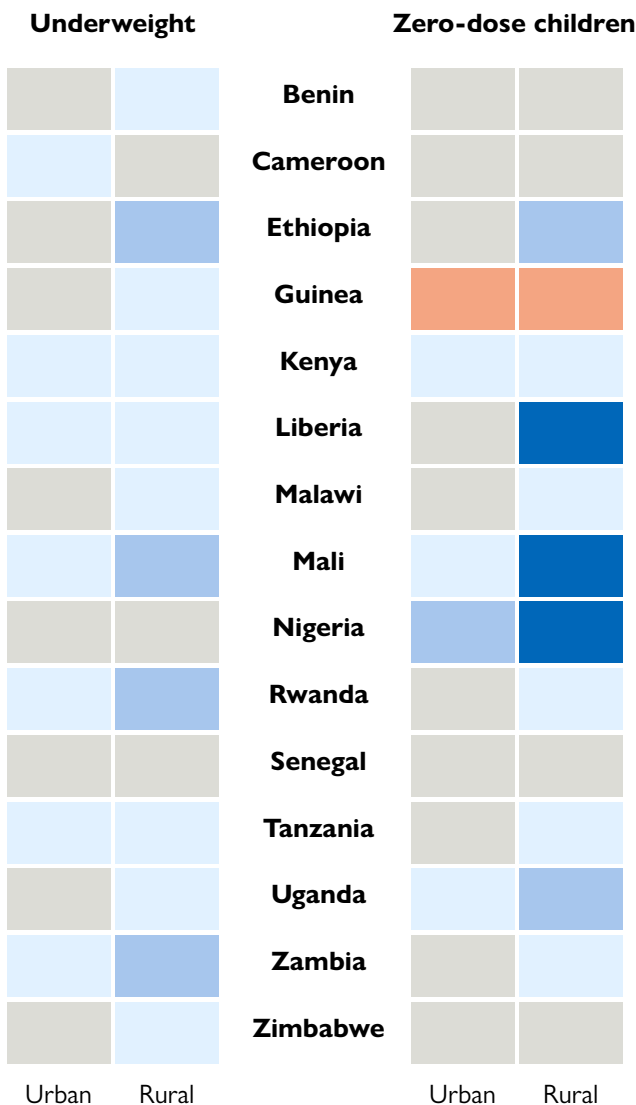
These figures summarize change in the indicators of interest between the first and last survey from each country included in this analysis. Red and peach shaded cells indicate a significant percentage point **increase**, blue shaded cells indicate a significant percentage point **decrease**, and gray cells indicate **no significant change** in that indicator between the first and last survey.





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Figure 3. Trends of underweight and zero-dose children. Percentage point difference between first and last survey indicated by color.



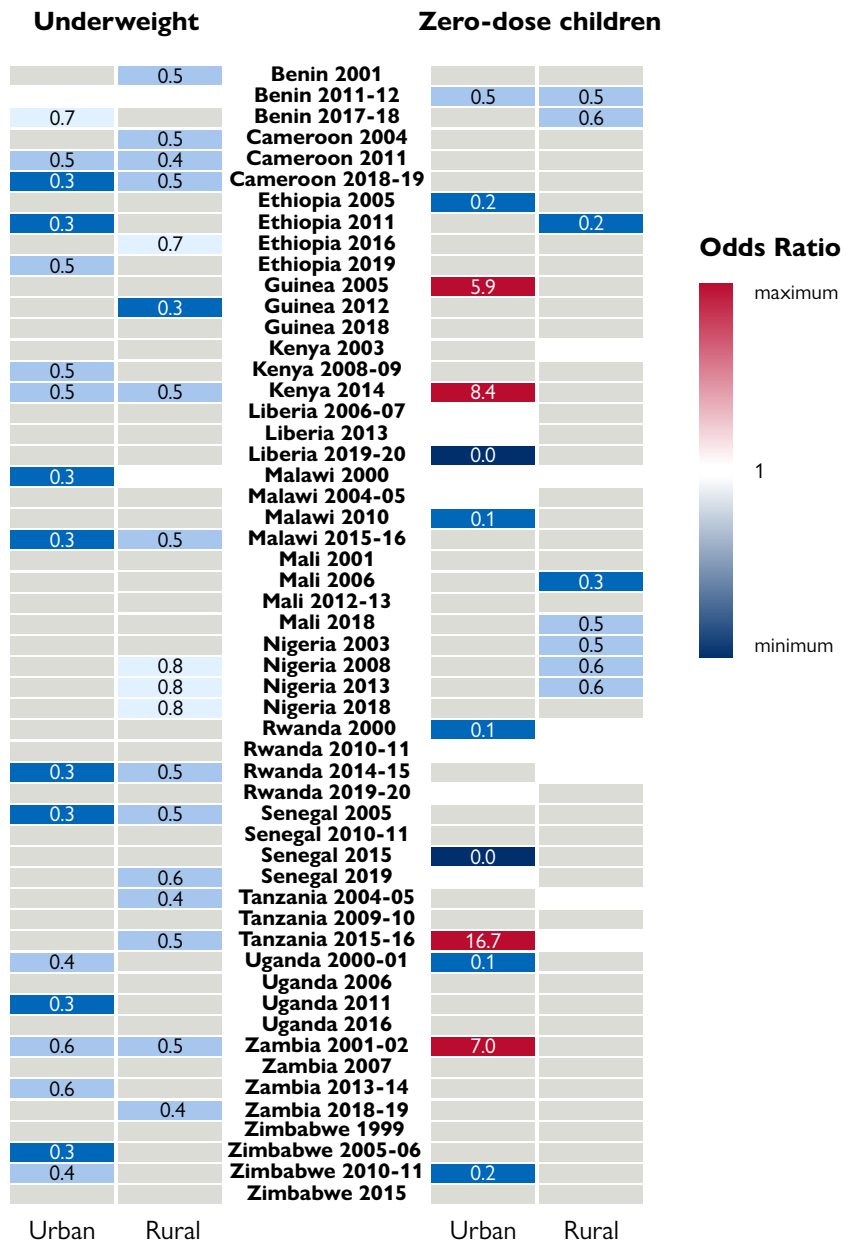
- **Underweight children decreased over time in most countries.** Seven countries saw declines in underweight children in urban areas, and 12 countries saw declines in underweight children in rural areas (see Figure 3).
- **Zero-dose children also declined over time in many countries, but increased in Guinea.** Zero-dose children decreased in urban areas in four countries, and in rural areas in 10 countries. Zero-dose children increased in both urban and rural areas in Guinea.
- **Children with electricity are less likely to be underweight** in at least one survey from 13 of the 15 countries after controlling for child, mother, and household characteristics (see Figure 4). However, this was not always in the most recent survey or in both rural and urban areas. In eight of 15 countries the significant association is found in more than one survey in either urban or rural areas or both.

- **Children with electricity are less likely to be zero-dose children** in 10 out of 15 countries (see Figure 4). However, this was not usually in the most recent survey or in both urban and rural areas. In some countries, unstable models and small numerators show a positive relationship between zero-dose children and electricity.
- **There are fewer significant findings and more instability in refrigeration models** due to low sample sizes and high association between refrigeration and other household variables. Children in households with refrigerators are less likely to be underweight in 10 out of 15 countries. In Malawi and Rwanda refrigerator ownership is positively associated with underweight. There is a significant association between refrigeration and zero-dose children in only four of 15 countries.

What does this mean?

Generally, trends show improvements in access to electricity and refrigerator ownership over time and declines in underweight and zero-dose children. Clear disparities between urban and rural areas highlighted by this study provide evidence of the need for continued expansion of electrification efforts with a focus on rural areas. Future studies should build on this work and explore the impact of source of electricity and its reliability on health outcomes.

Figure 4. Electricity coefficient trends of underweight and zero-dose children in urban and rural areas.



Note: Gray cells indicate a non-significant finding and no cell indicates that there are too few cases or none to fit the model. Figures in the cells are odds ratios, so 0.3 means 70% lower odds of being underweight or zero-dose for children with access to electricity compared to children with no access.