Deprivation and Under-five Health and Nutrition in the Greater Kampala Metropolitan area

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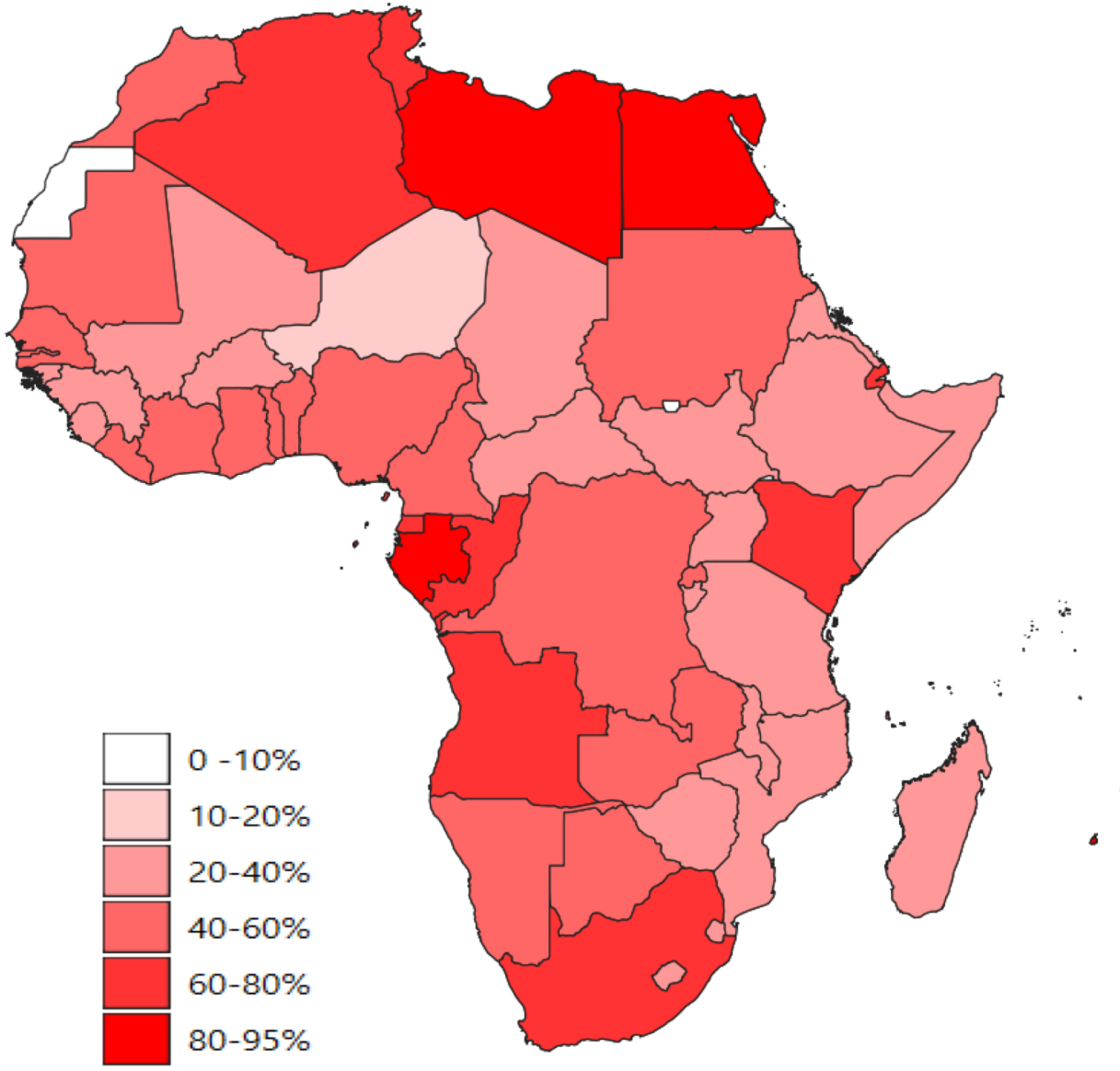
Countdown to 2030
Women's Children's & Adolescent's Health

Introduction

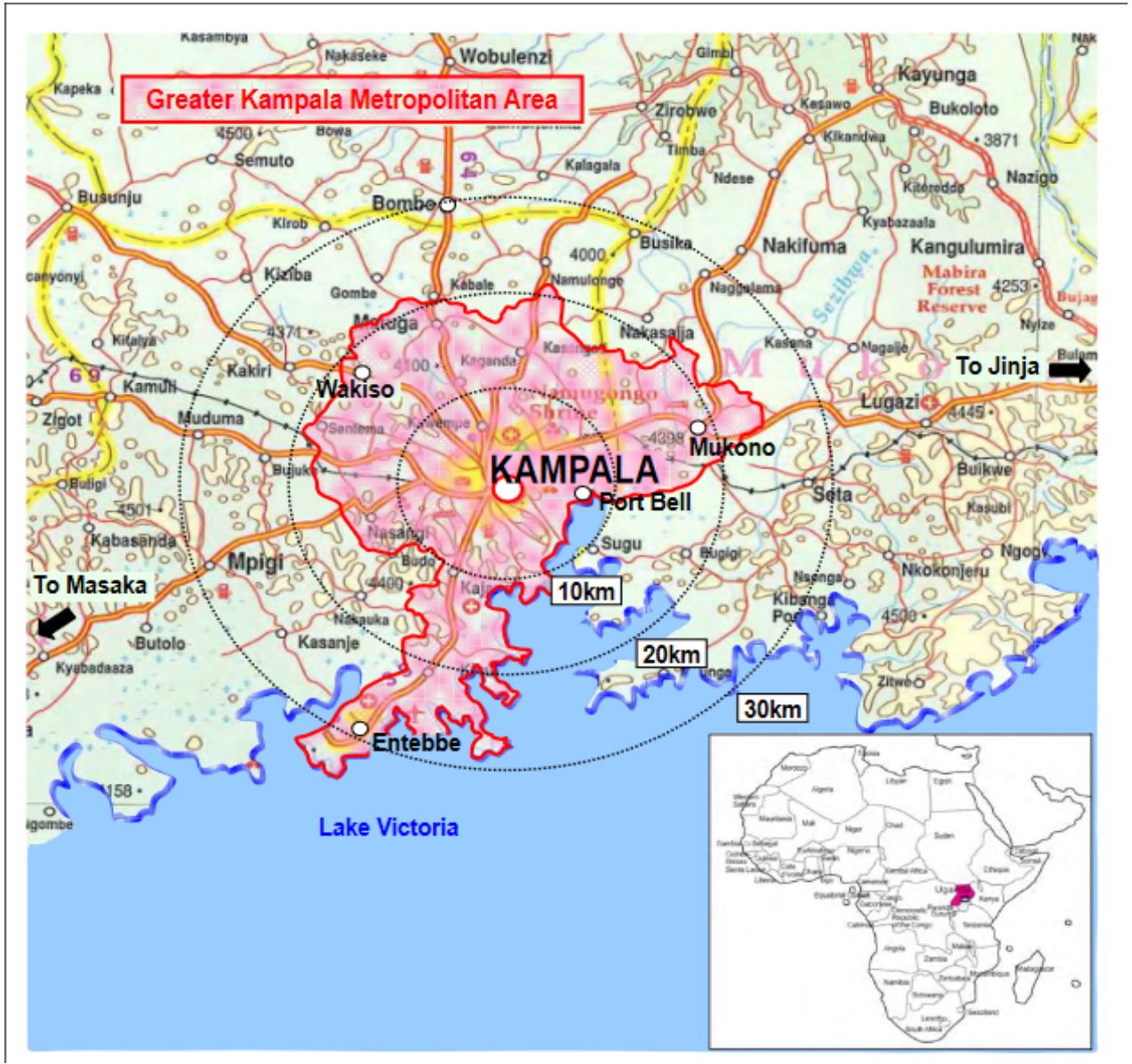
- At least **50% of population** in SSA projected to live urban areas
- Social services such as water and sanitation facilities **not matching urbanization**
- Yet high **population density** is associated with **poor sanitation** that could lead to the **spread of diseases and reinfection**.
- "**urban penalty" concept**
  - cities **concentrate poor people**, and expose **residents to unhealthy environments**, leading to a **disproportionate burden of poor health**
- An estimate of **60% of the sub-Saharan** live in slums – **could be underestimated**
  - **unreliable data**
  - **differences in the definitions**.
    - Slum areas
    - Informal settlement

Level of urbanization in Africa



Study area and aim

- We uses Uganda Demographic Health Surveys (**DHS**) data collected between **2006-2016**
  - ***to analyze urban deprivation and its association with under-five child health in Greater Kampala metropolitan.***
- Greater Kampala Metropolitan:
  - **Kampala city**
  - **Kampala urban outskirt of Mpigi, Mukono, and Wakiso**.
    - Demarcation seem to only consider urban outskirts within 20 Km
    - 30 Km not considered but this were daily commuters also reside
- Nonetheless, we selected urban areas as reported in UDHS data
- We **defined deprivation** as **a standard of living or quality of life** below **that of the majority in a particular society**



Methods

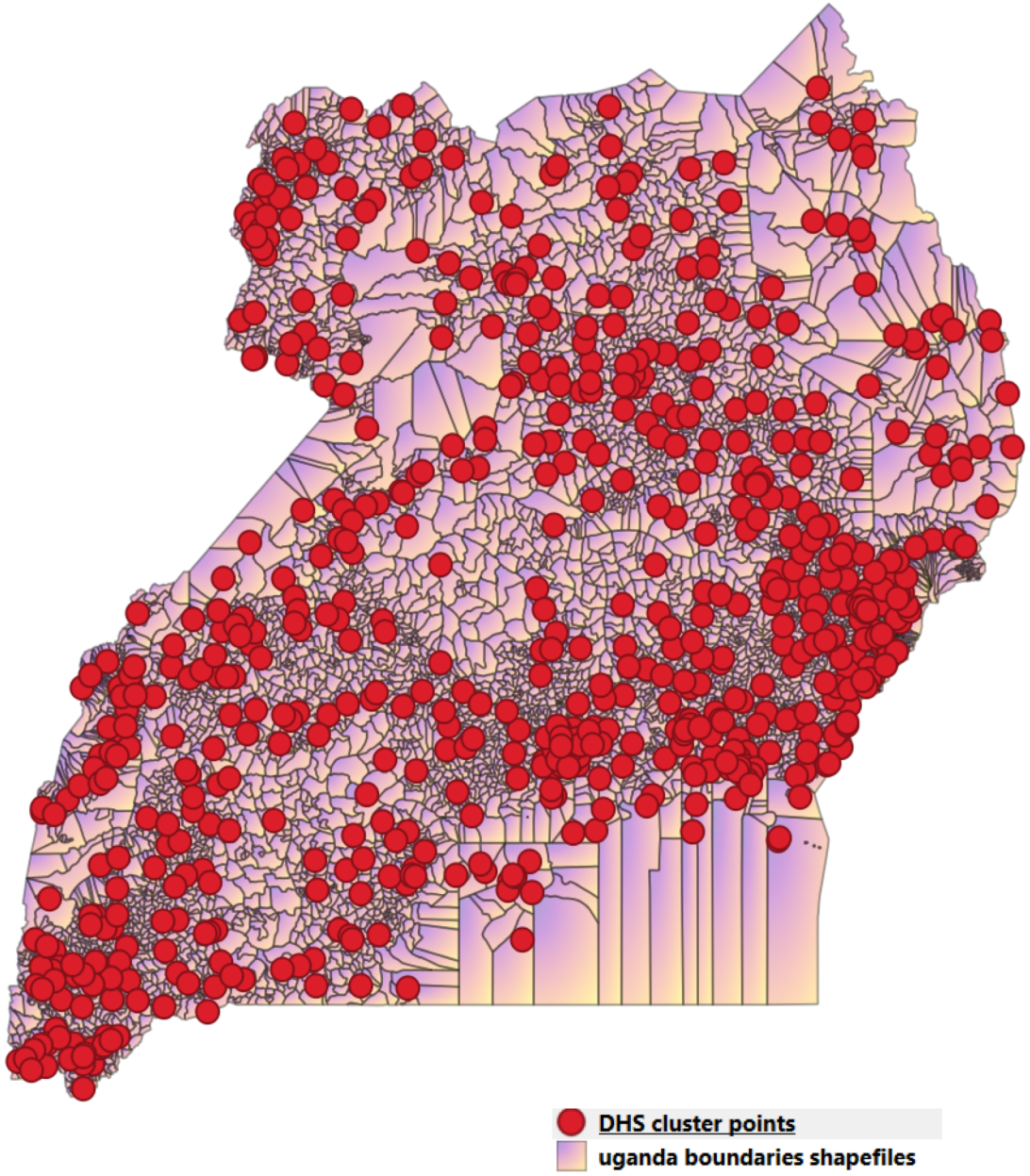
- **2006-2016 UDHS data**
- 2006 and 2011 UDHS data did not have district name – **reconstructed** using **DHS GIS points and national GIS administrative boundary data.**

District sample size before and after clusters' reconstruction through GIS

	Before merging					After merging				
	2000	2006	2011	2016	Total	2000	2006	2011	2016	Total
Kampala	NA	485	606	686	1777	143	485	600	697	1925
Mpigi	NA	NA	NA	NA	NA	0	14	55	53	122
Mukono	NA	NA	NA	NA	NA	186	99	125	236	646
Wakiso	NA	NA	NA	NA	NA	22	90	171	404	687
Total	NA	485	606	686	1777	351	688	951	1390	3380

Note: NA – Not available

- Data liked to other datasets for further analysis



Methods

- **Household data** for – household characteristics that are used to measure the living standards of the slum residents
  - *Water accessibility*
  - *Type of toilet*
  - *Substandard household structure*
  - *Overcrowding – household residents per number rooms*
  - *Number of rooms*
- **Child dataset** for child morbidity and slum-like relationship
  - *Common morbidities – fever, diarrhea*
    - *if the mother reported that the child experienced either of these conditions within the two weeks preceding the interview.*
  - *Nutrition indicators*
    - *Stunting:* height-for-age z-scores that were below 2 standard deviations.
    - *Anemia:* moderate and severe cases
  - *Access to medical treatment*
- **Women and Men data** for assessing the demographic and socio-economics characteristics of people living in slum-like household conditions
  - *Education level*
  - *Employment type*
  - *Age*
  - *Marital status*
- **All datasets pooled together** using household identifier

Data analysis

- **Step 1:** Factor analysis
- **Step 2:** The deprivation composite score is calculated

$$c_j = \sum_{k=1}^{n} w_{dik}^{*} I_{kd}$$

$\boldsymbol{c_j}$ is individual's $\boldsymbol{j}$ deprivation score,

$\boldsymbol{w_{di}^{*}}$ Weight for indicator $\boldsymbol{i}$ in domain $\boldsymbol{d}$. $\boldsymbol{I_k = 1}$

$\boldsymbol{I_{kd}}$ is the arithmetic mean of **k** indicators/items within domain **d**

Step 3: Slum index z-scores

$$Z_{ct} = \frac{c_{tj} - \mu_{ct}}{\sigma_{ct}}$$

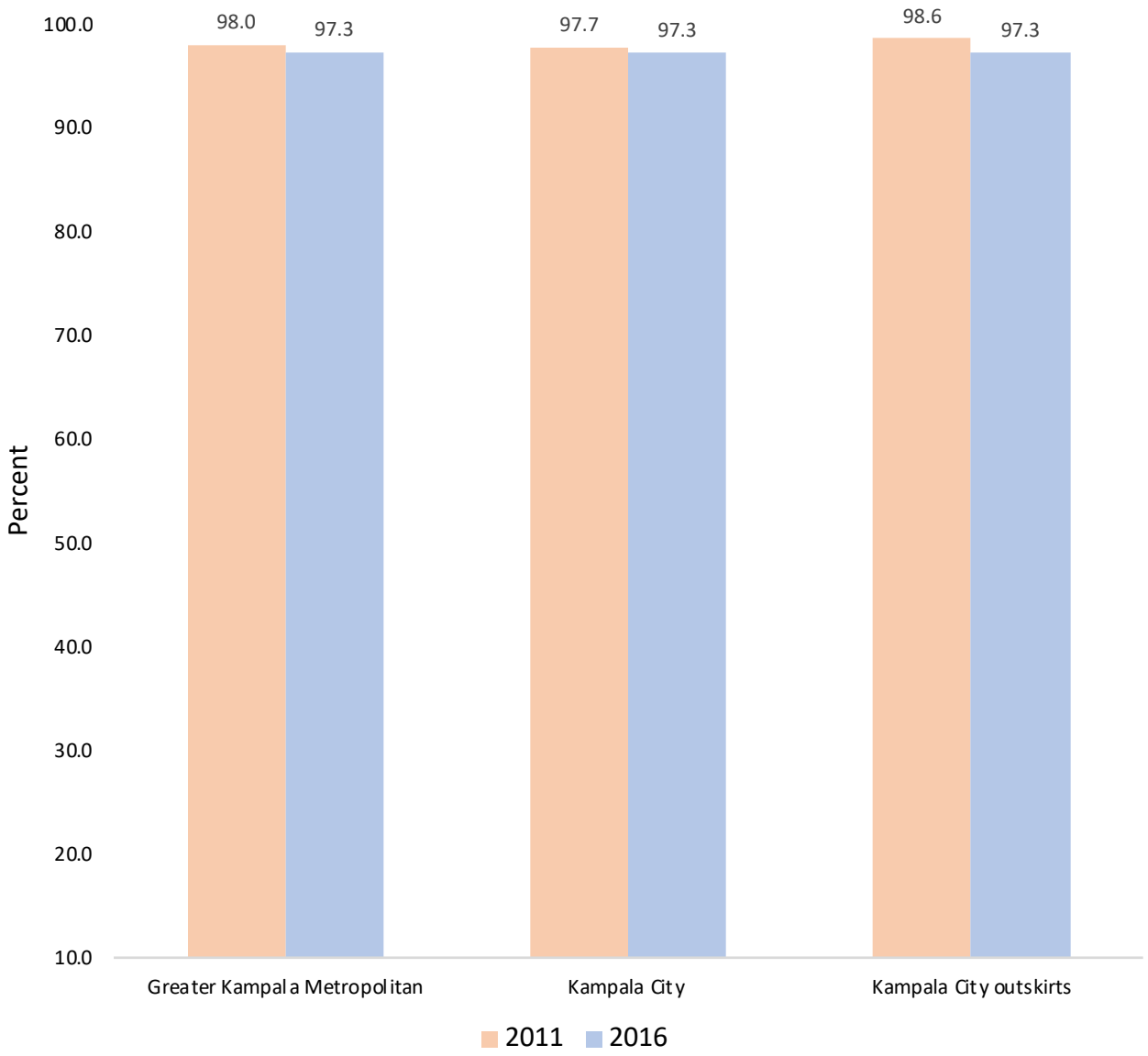
- **Z** <0 less slum-like; =0 moderate (average living conditions) slum-like living conditions; and **>0 severely slum-like living conditions**

Step 4: investigated the association between the Slum-like Severity Index and child health outcomes and nutritional indicators

- Logistic or modified Poisson regression
- child indicators as dependent variables
- Slum like index and place of residence as covariates
- Considered the interaction between slum-like index and the place of residence

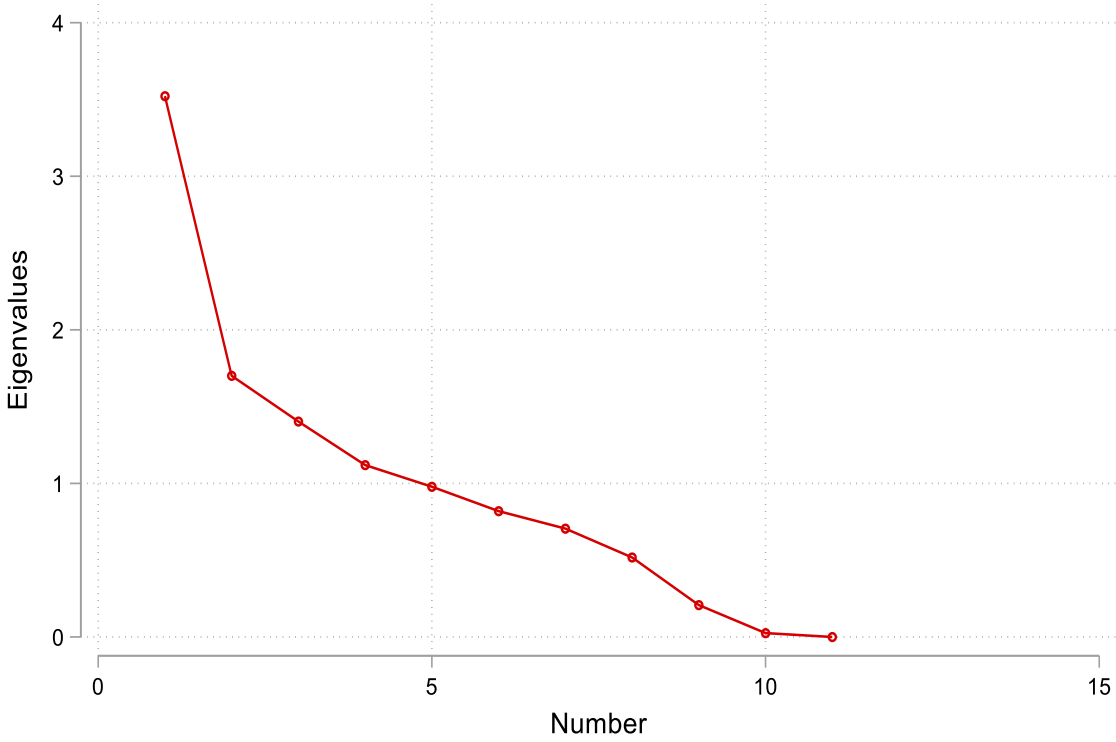
Results

- In line with the UN-habitat of slum conditions, **at least 97% live in household** characterized by **at least one of the slum-like condition**.
- The UN-habitat definition may categorize most of the residents as slum areas.
- Recognizing that living standards vary greatly both within and between urban suburbs
- UN-habitat definition may lead to challenges of capturing modest improvements in living conditions
- We consider **the concept of deprivation** as **standard of living below** that of the **majority in a specific context**



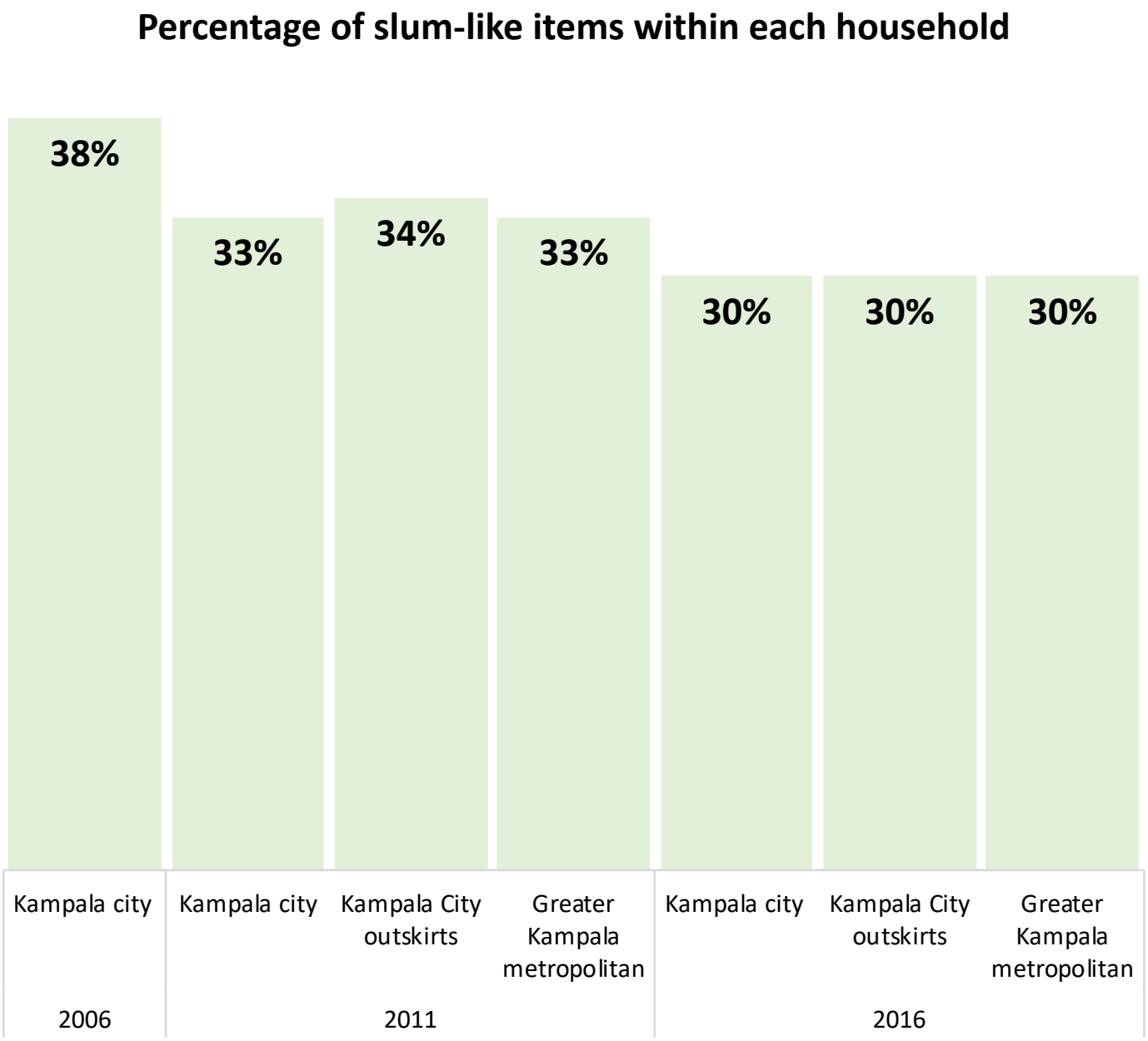
Identification of slum-like measures

Scree plot for selection of factors - 5 factors selected



Kaiser-Meyer-Olkin Measure of Sampling Adequacy	**0.688**

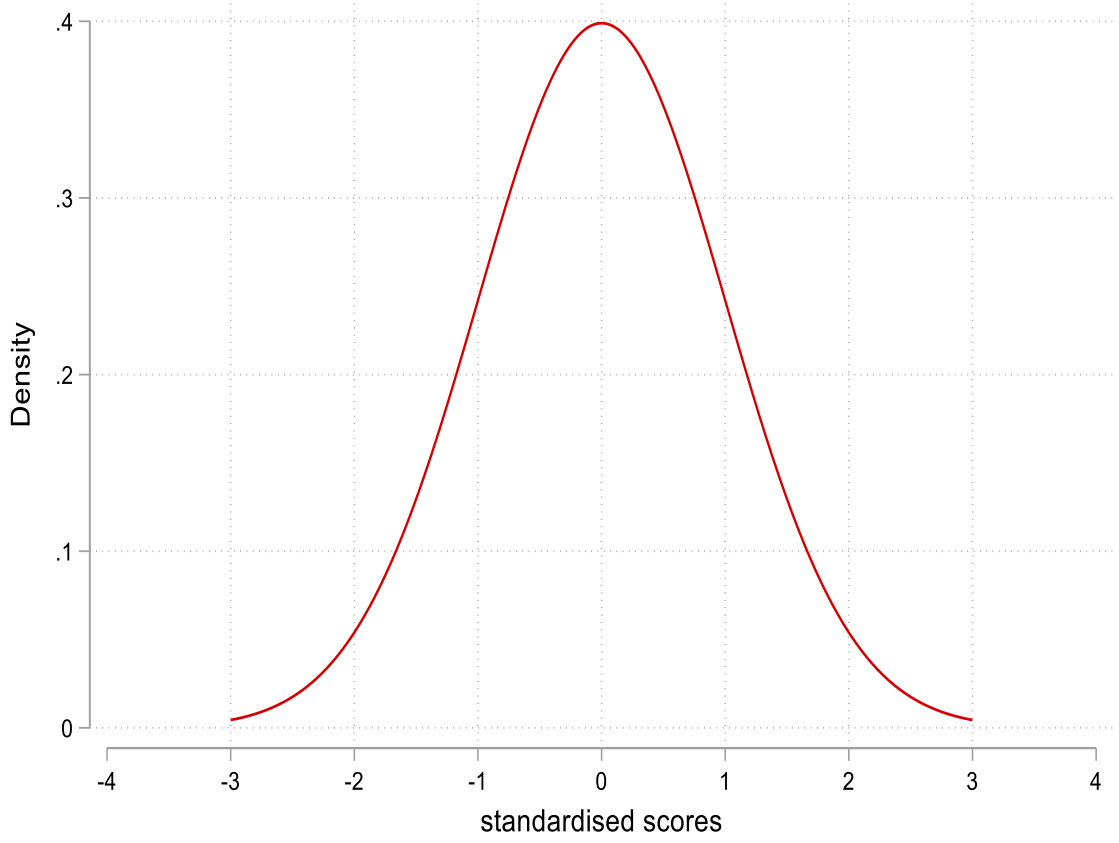
Variable	Substandard housing conditions and hygiene	Limited water access	Overcrowding	Cooking with wood-excluding charcoal	Limited access to toilet
Unimproved toilet	0.574				
At least 5 households share a toilet					0.912
Time to get water takes at least 30 minutes		0.965			
Water not within the premises		0.905			
Substandard roof	0.867				
Substandard wall	0.699				
Substandard floor	0.832				
Unclean fuels for cooking				0.946	
At least 5 people per sleeping room			0.933		
Single room			0.559		



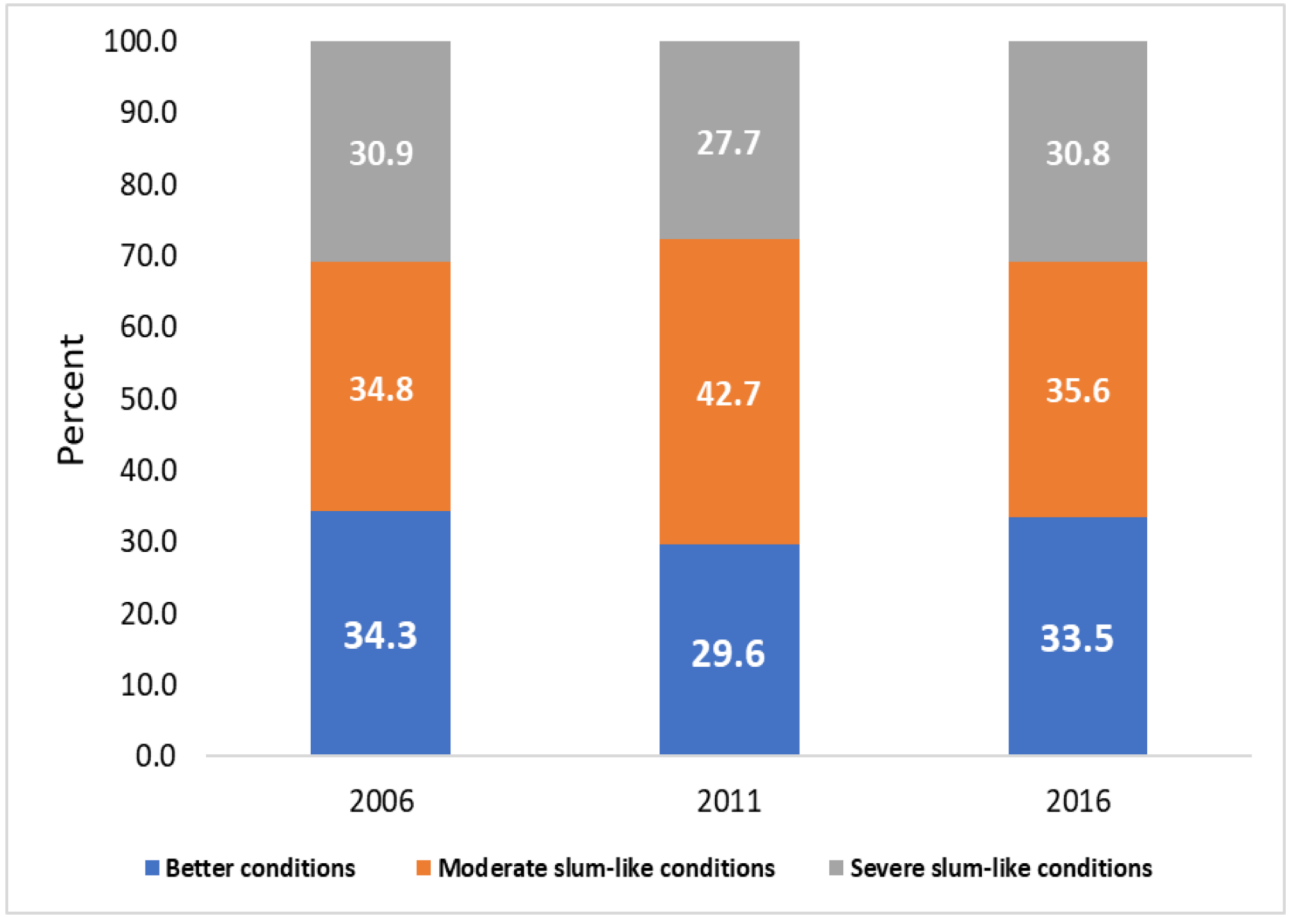
- Overall, households in GKM areas had an average slum-like score of **30%**
- No significant changes observed over the years
- No significant differences between Kampala city and neighboring outskirts

- **Close to 30%** of the household experienced severe slum-like conditions
- As of 2016, 67% household in GKM were **living in slum-like conditions**, with no significant changes observed over a decade (**66% in 2006 and 70% in 2011**).

Z-score (standardized mean) distribution



Slum-like condition categories – based on z-score



Limited access to toilet:

Limited access to water:

Overcrowding:

Substandard living conditions:

Contribution of each domain

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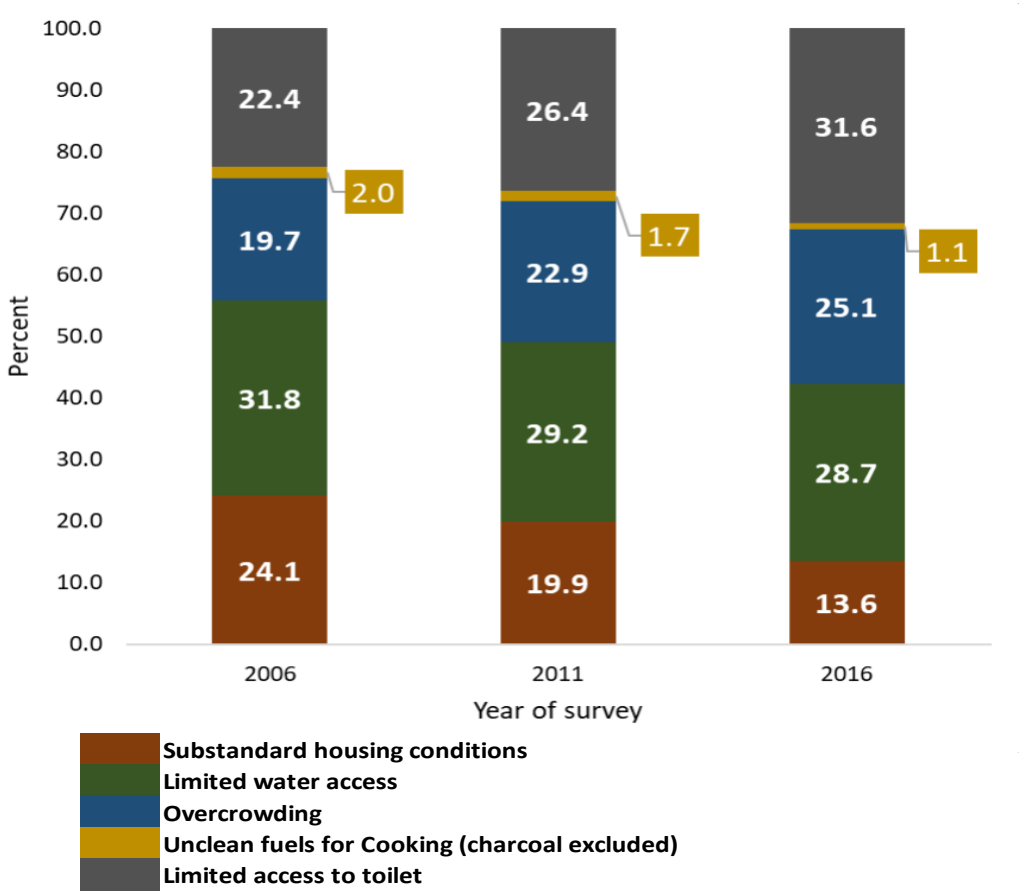
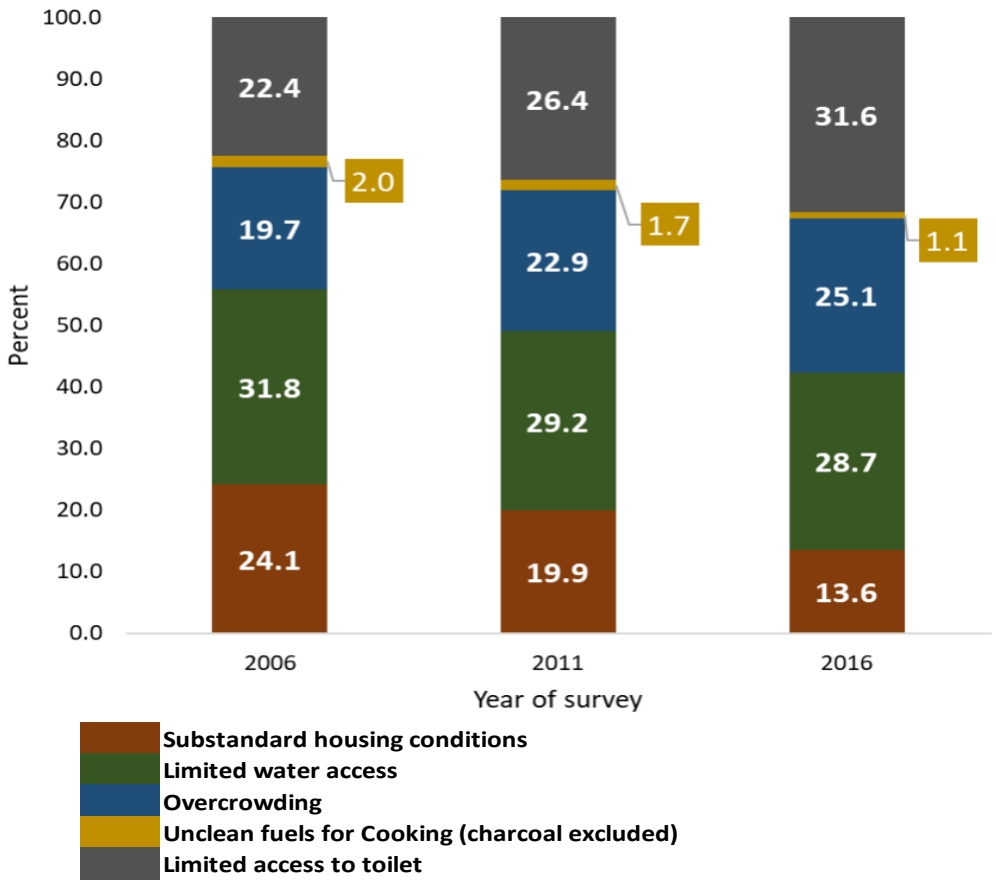


Limited access to toilet:	Sharing of toilet with at least 4 households
Limited access to water:	Having no water within the premise
Overcrowding:	Household with one room
Substandard living conditions:	Unimproved toilet, household floor, and wall structures

Contribution of each domain



Contribution of different items to slum-like living conditions

Limited access to toilet:	**Sharing of toilet with at least 4 households**
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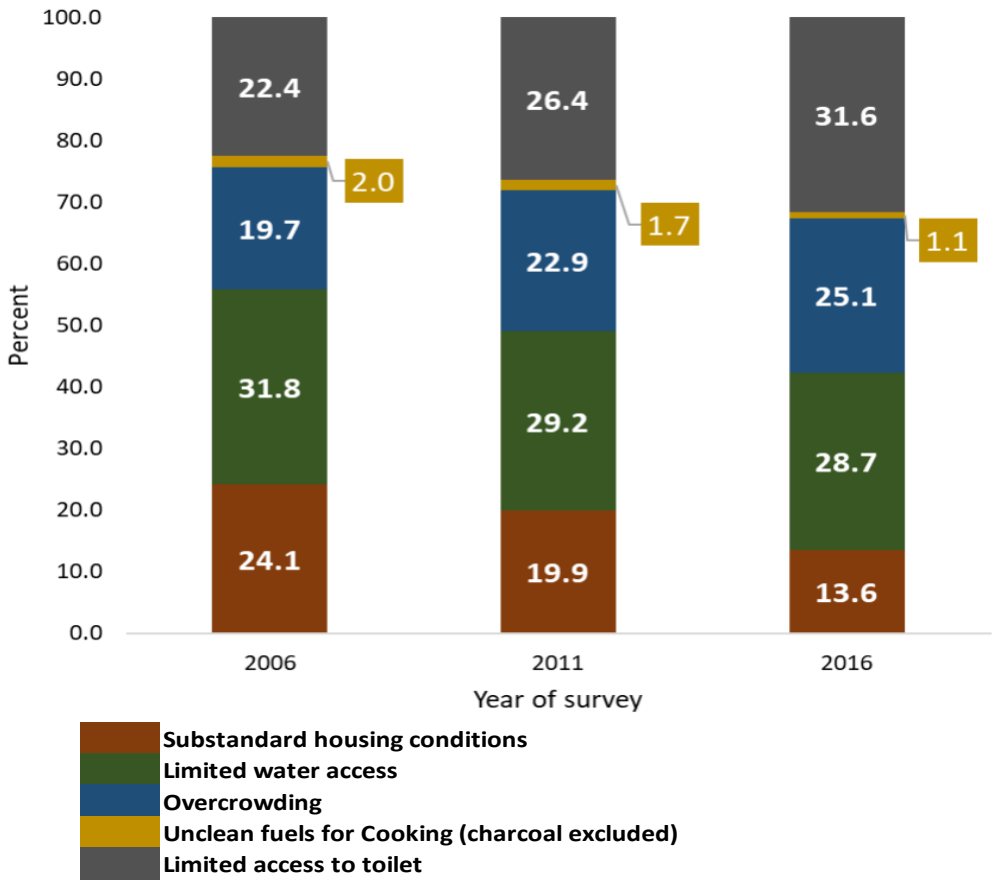

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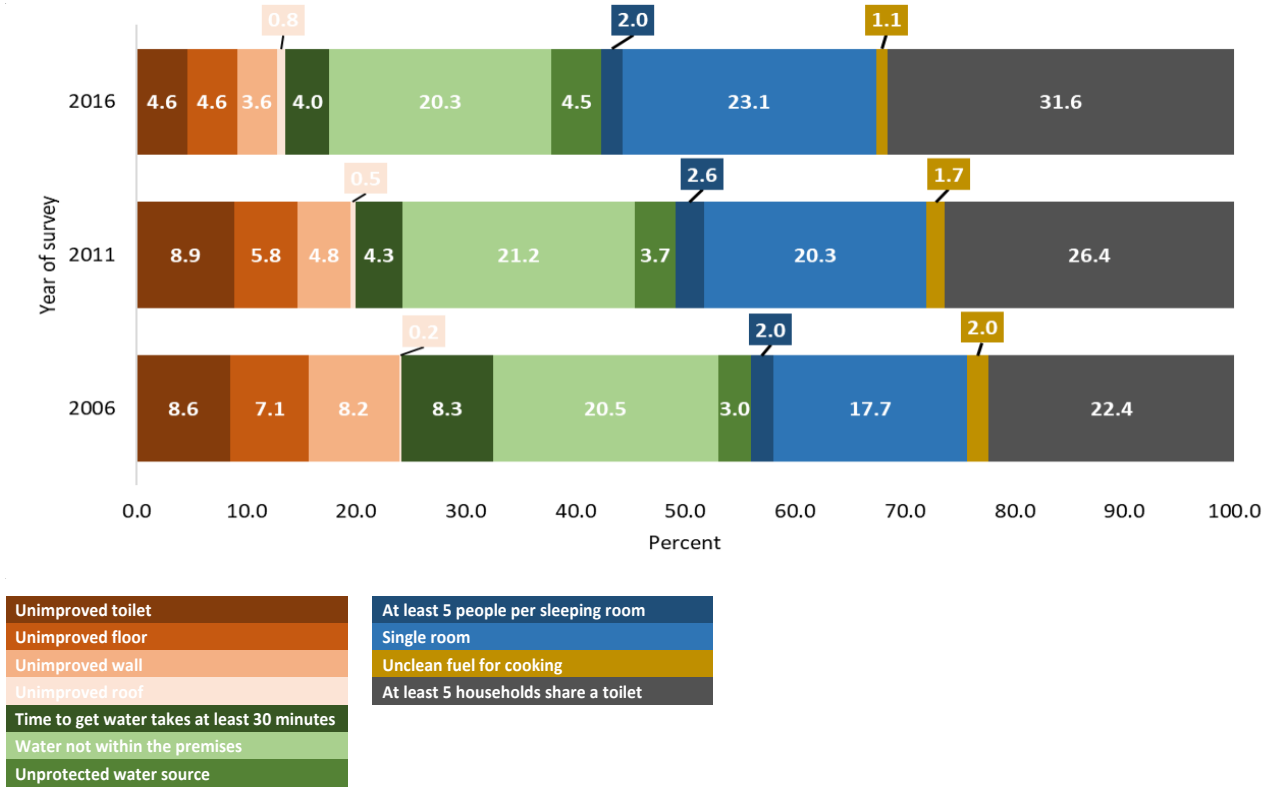

Compared to children residing in less slum-like (better) condition:

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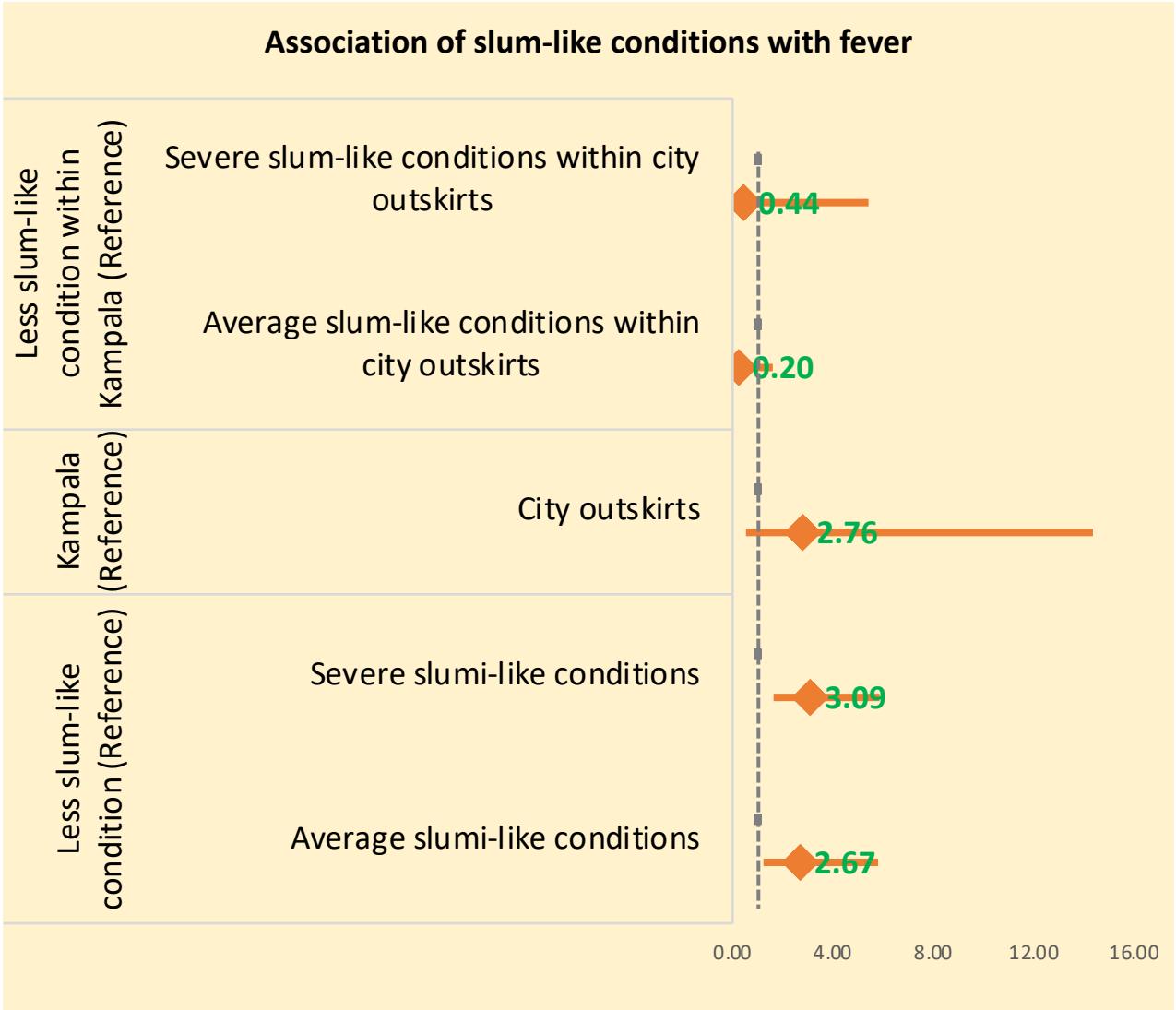
- **Residing in Slum-like conditions increased the likelihood of fever(moderate: OR=2.67** and **severe: OR=3.09**)



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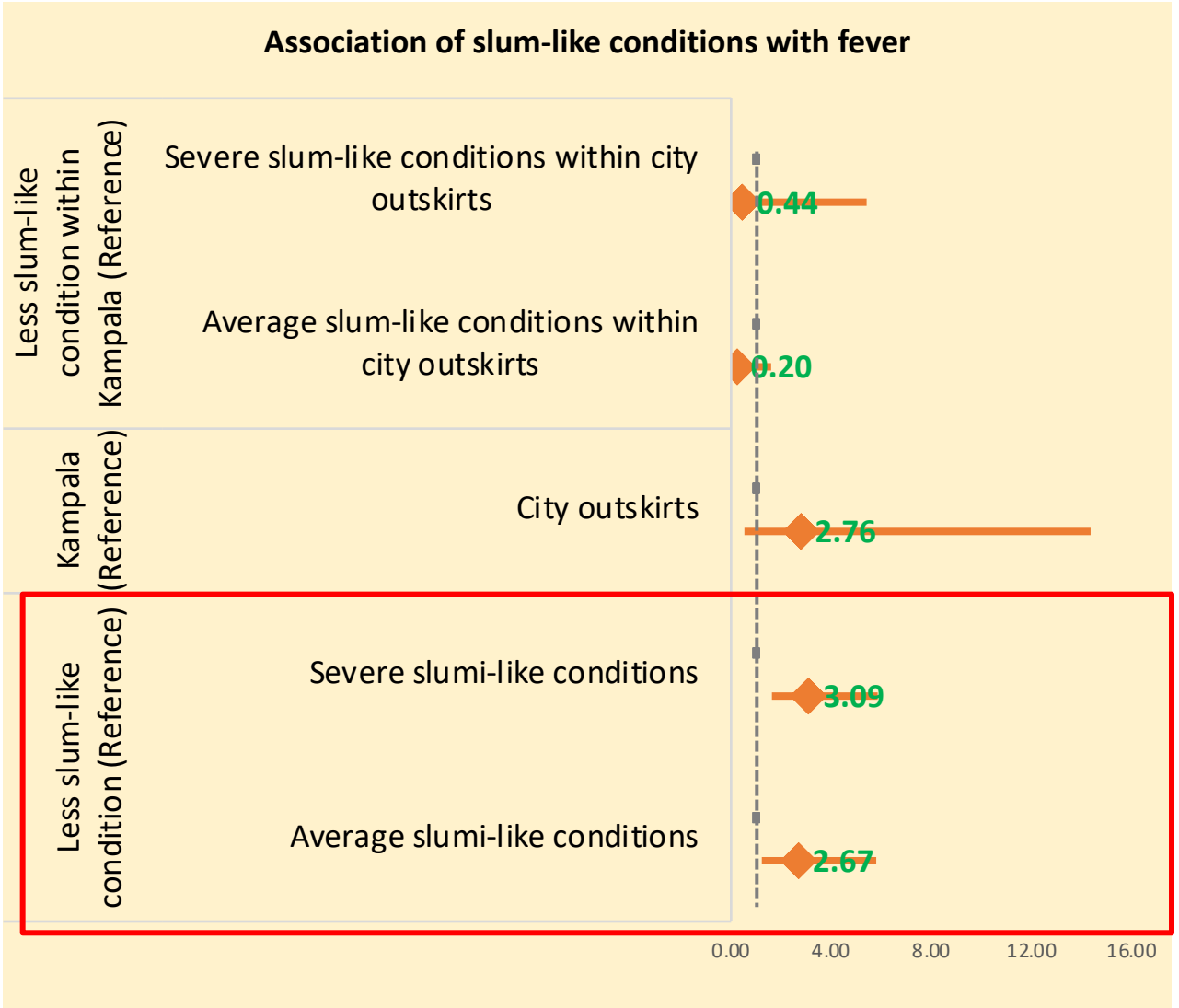

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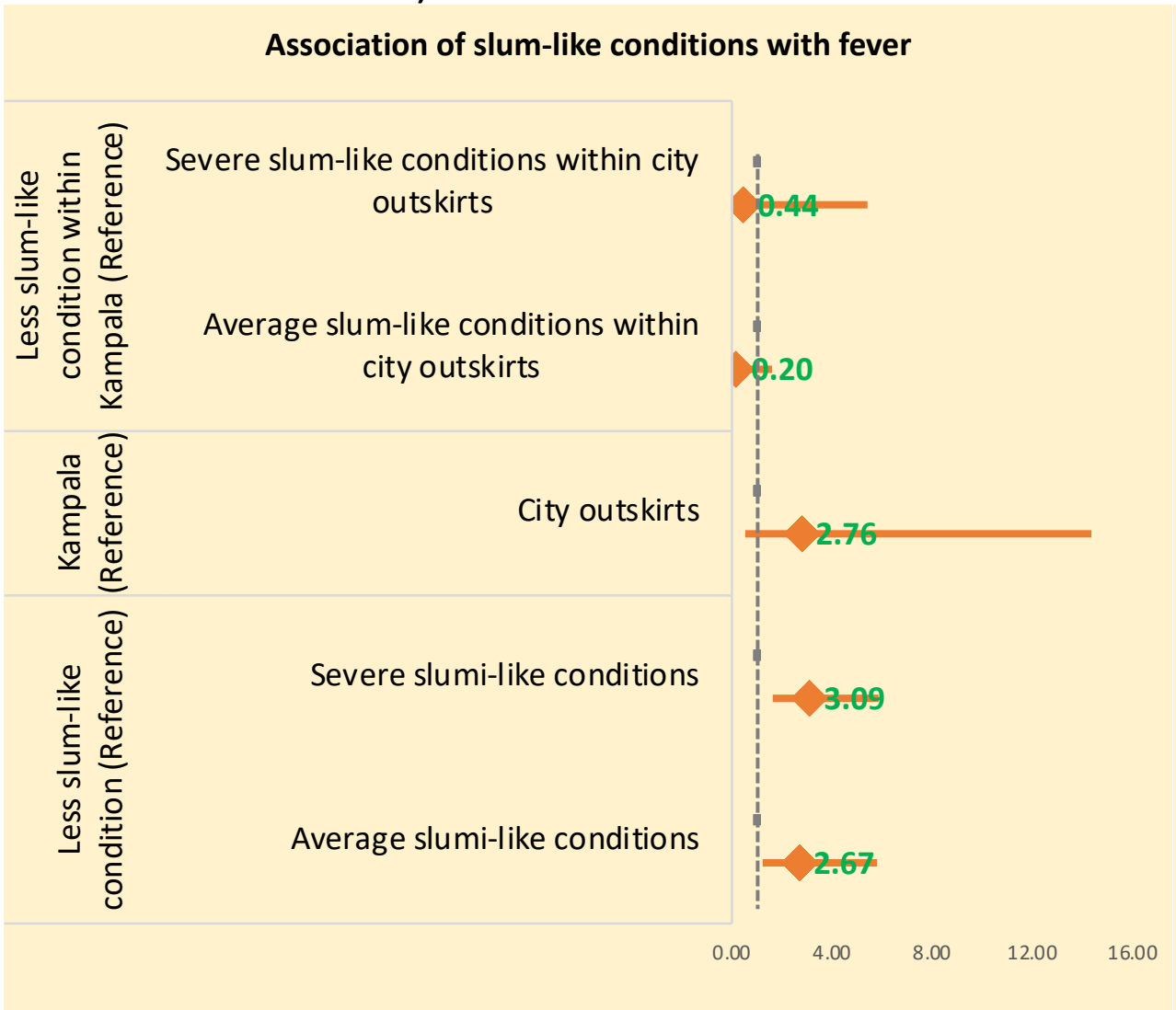

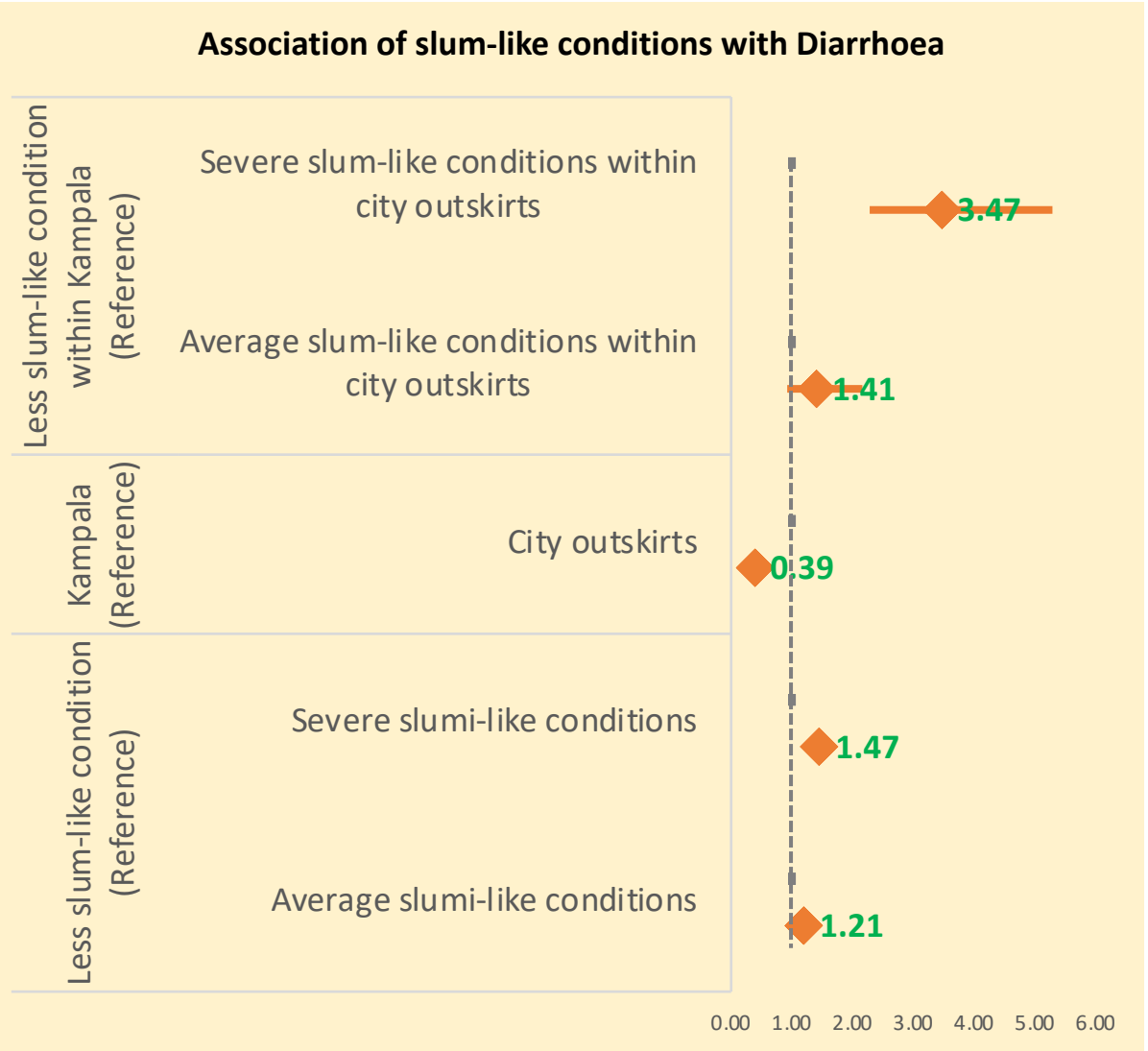

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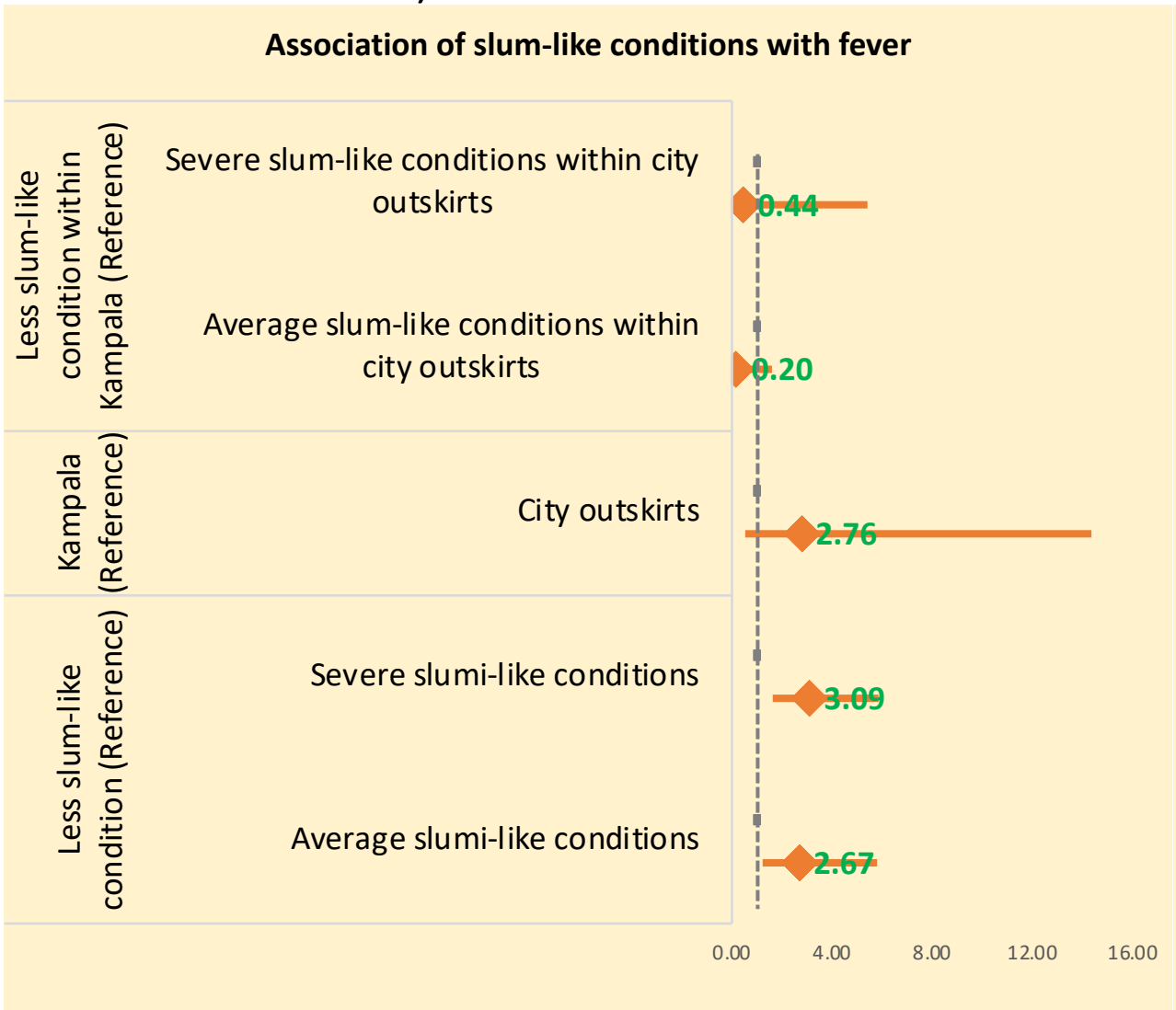

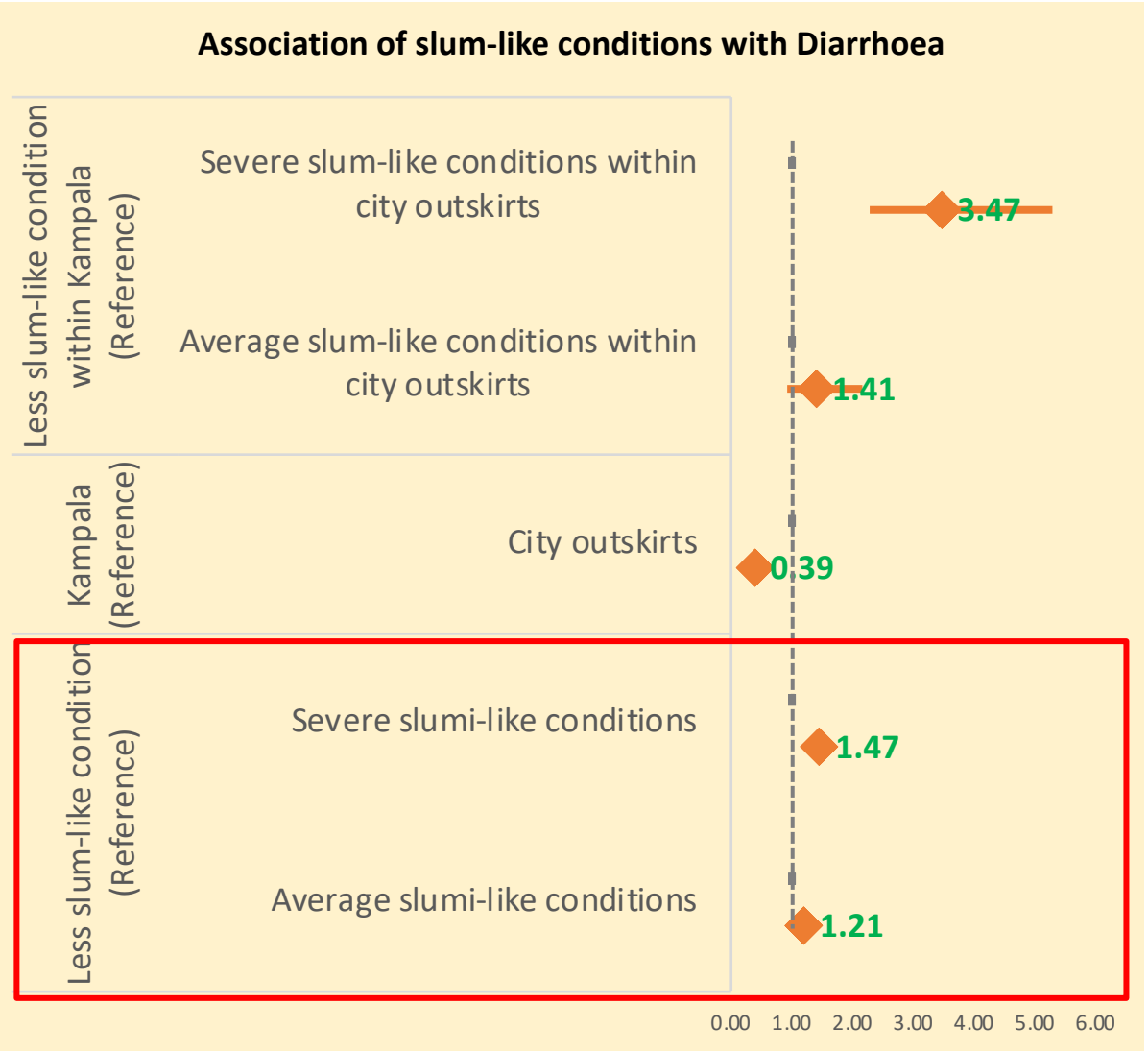

Compared to children residing in less slum-like (better) condition, within Kampala City:

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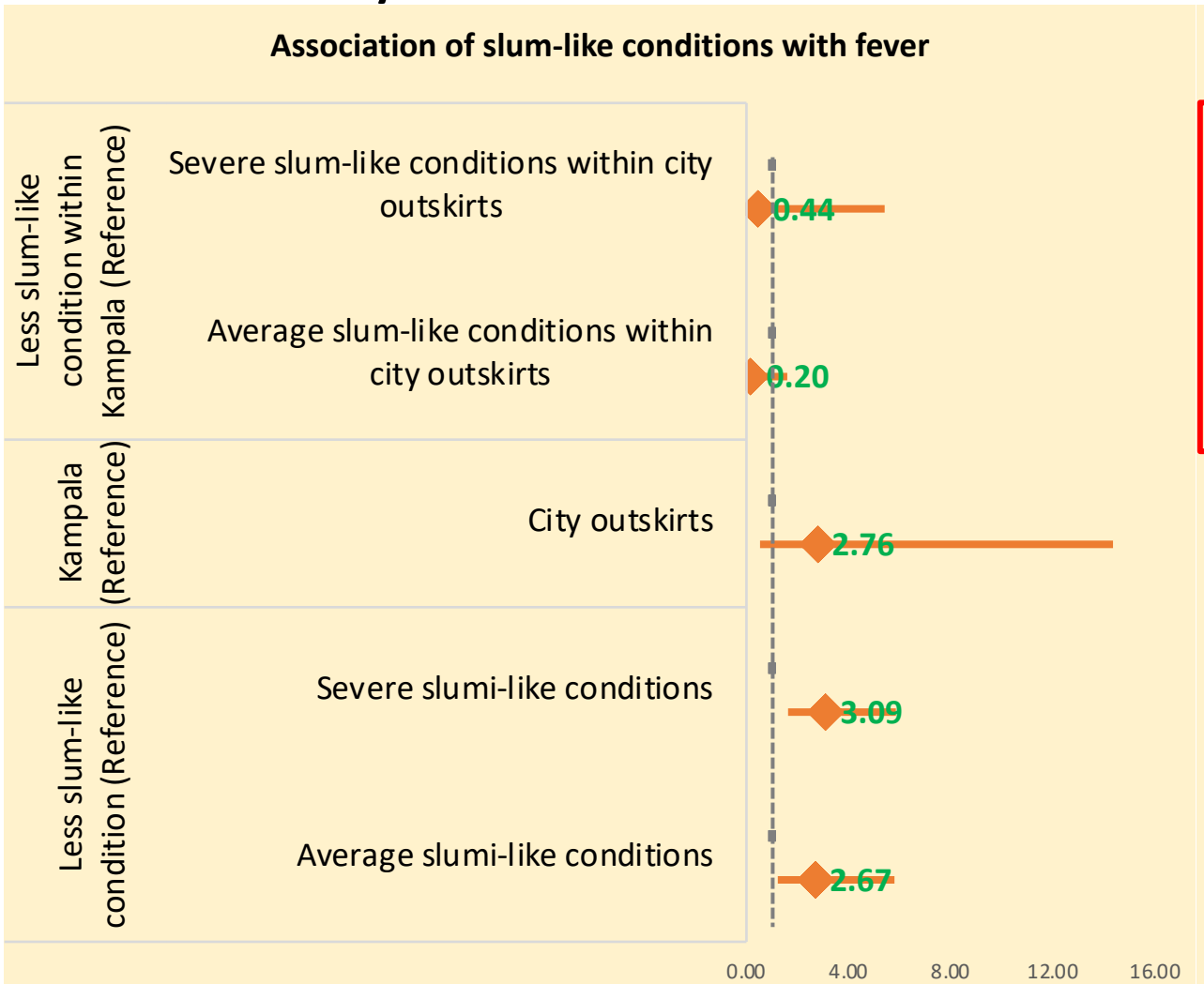
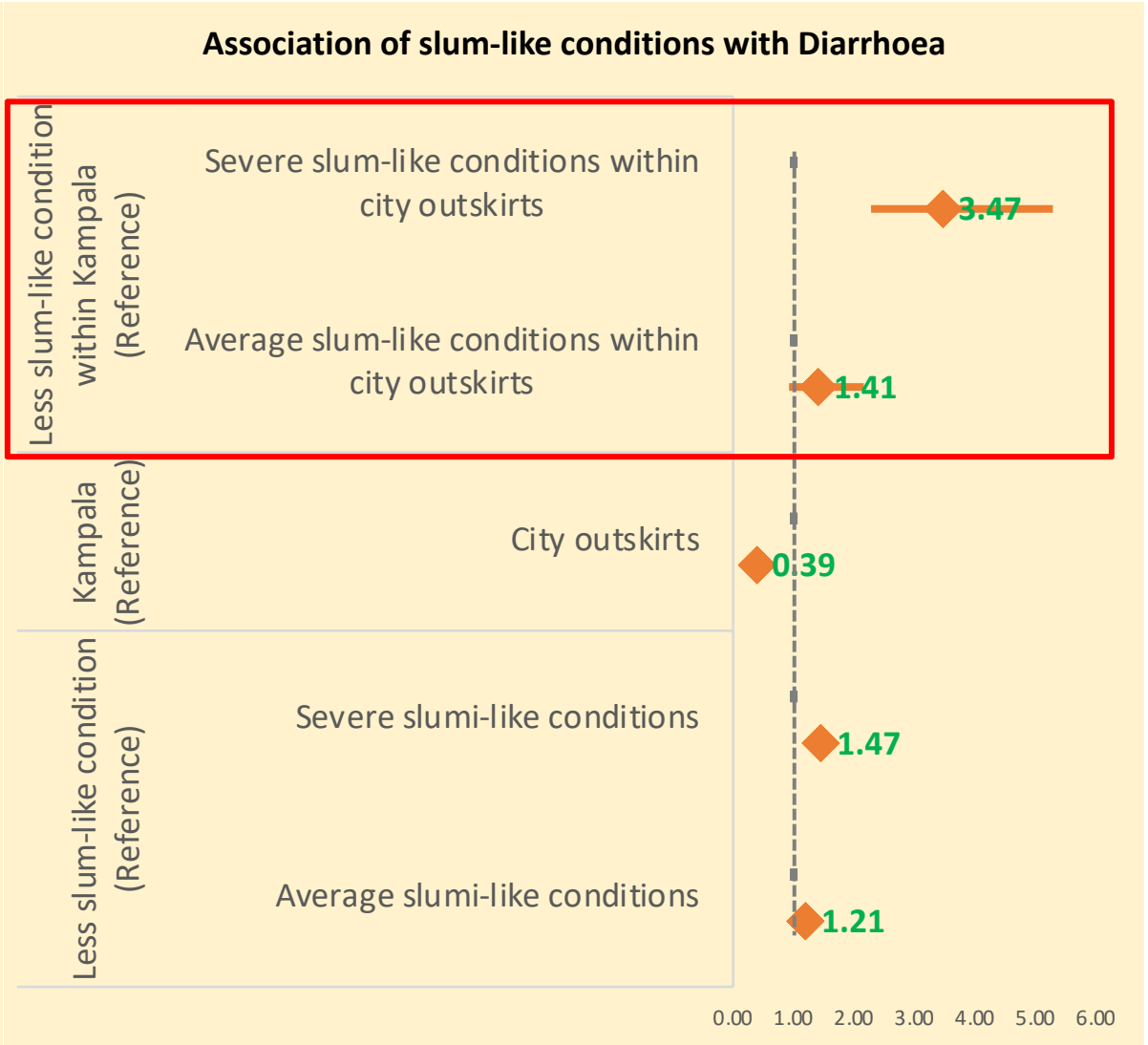
- The risk of diarrhoea **was high among those residing** in severe and moderate **slum-like conditions within the city outskirts**





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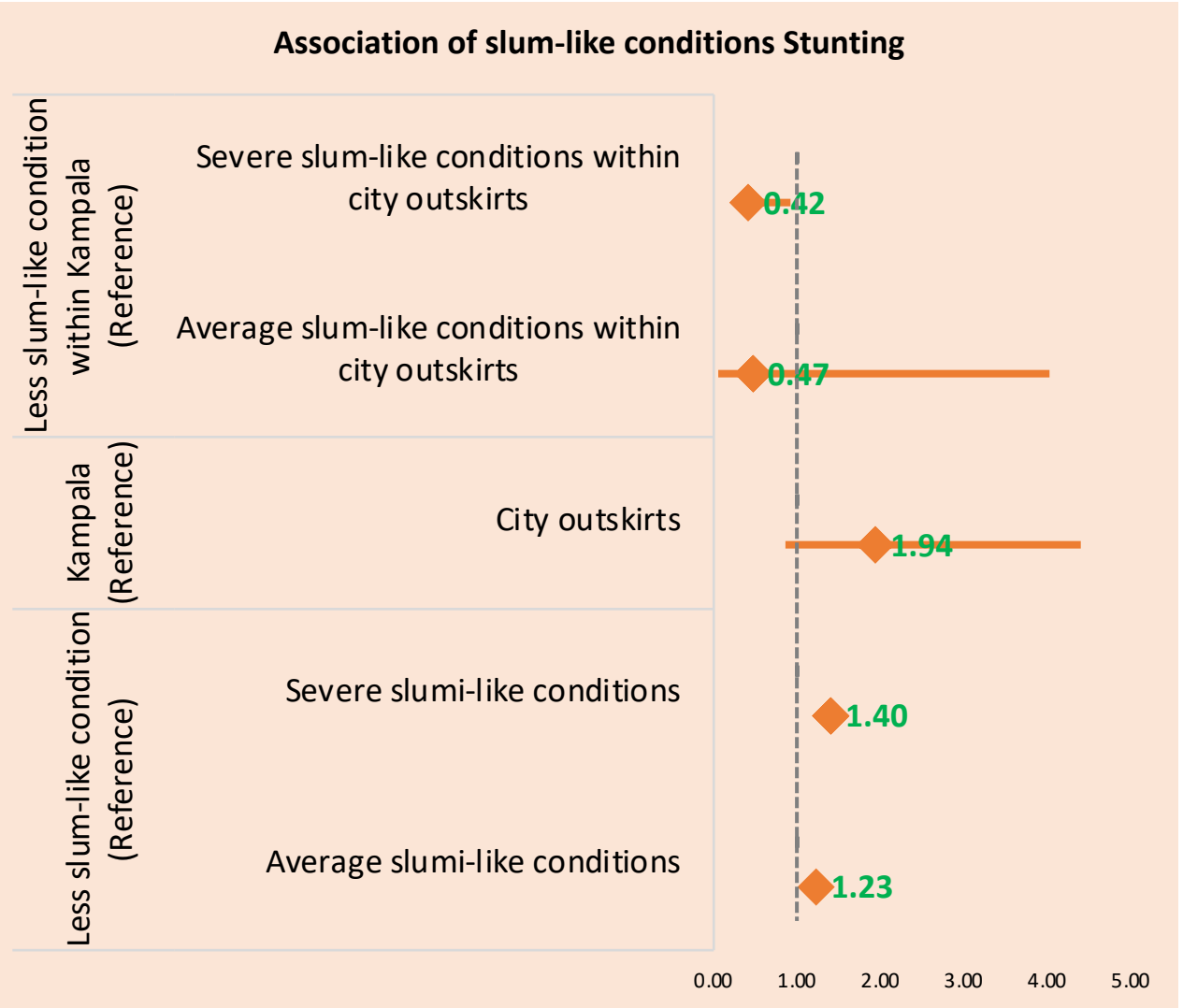

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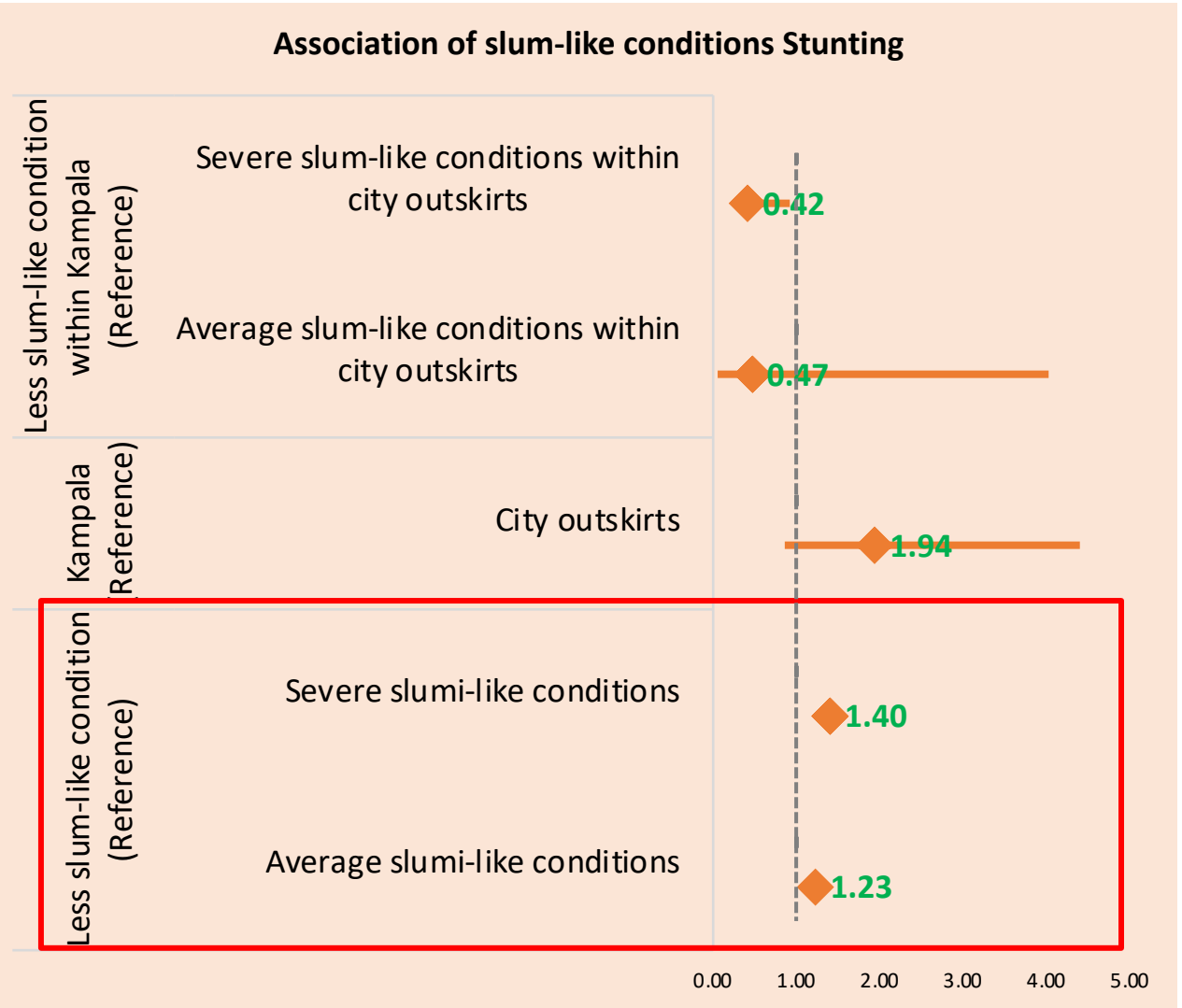

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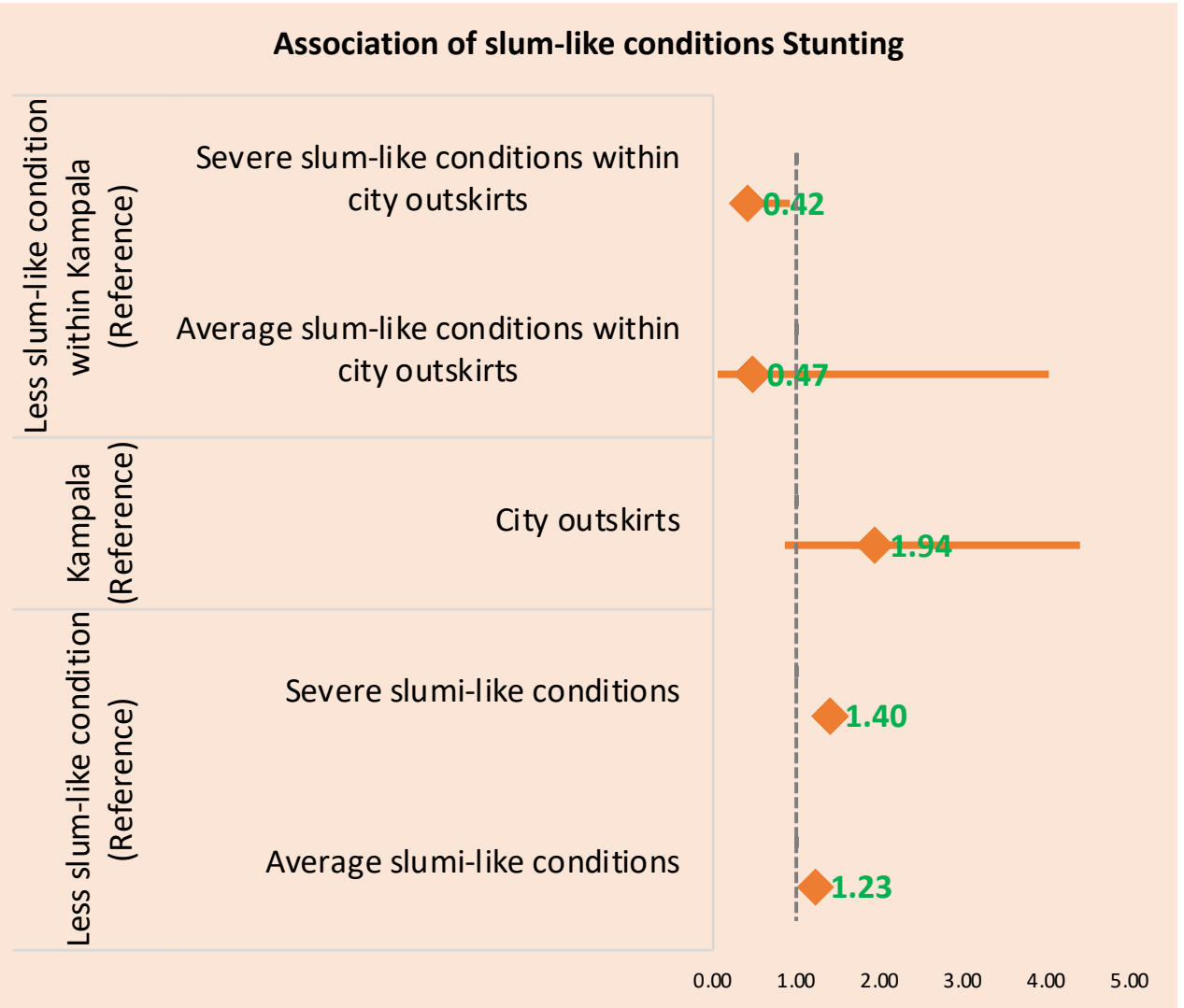
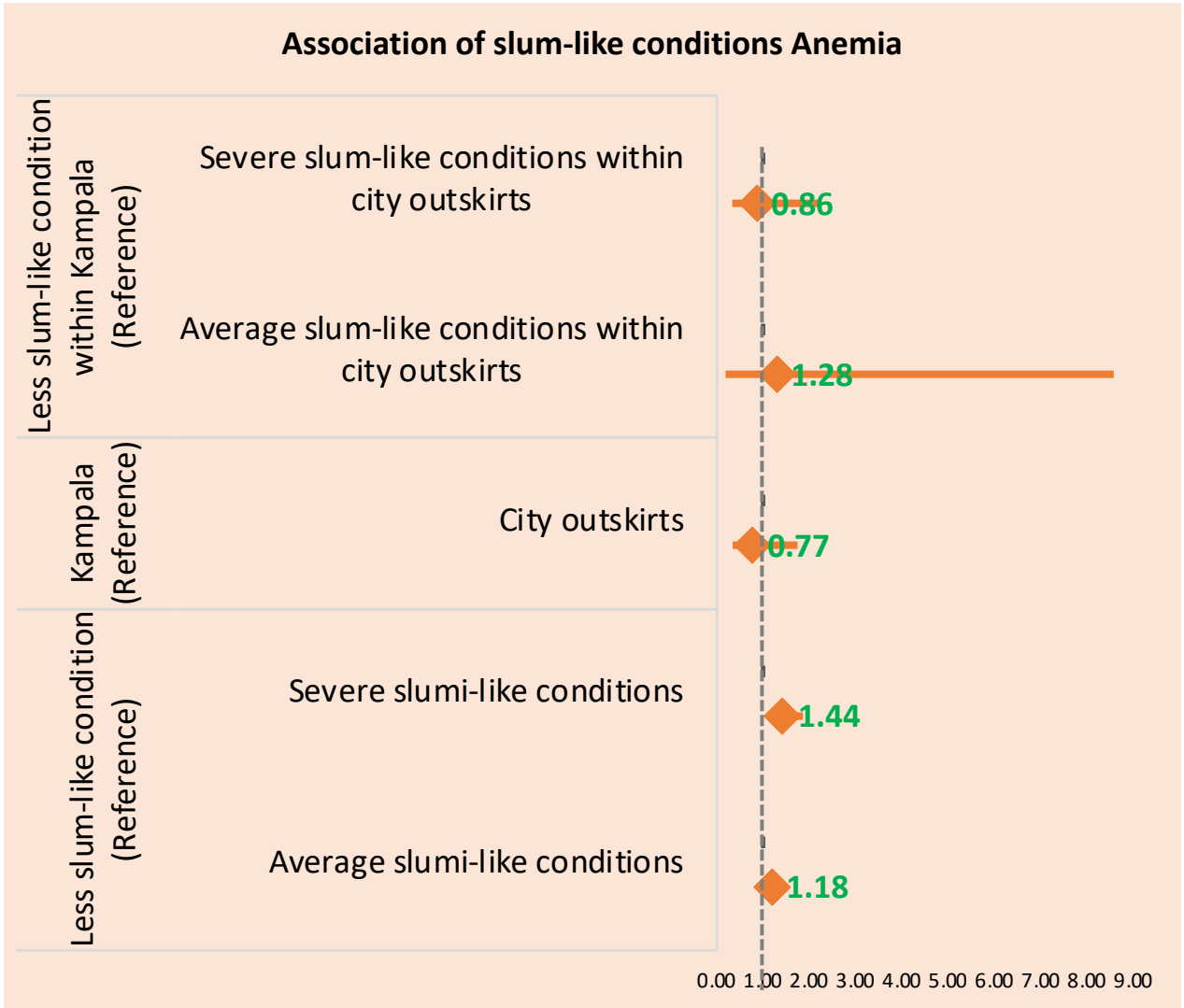
- **Residing in Slum-like conditions increased the likelihood of** anemia (moderate: OR=1.18, severe: OR=1.44)





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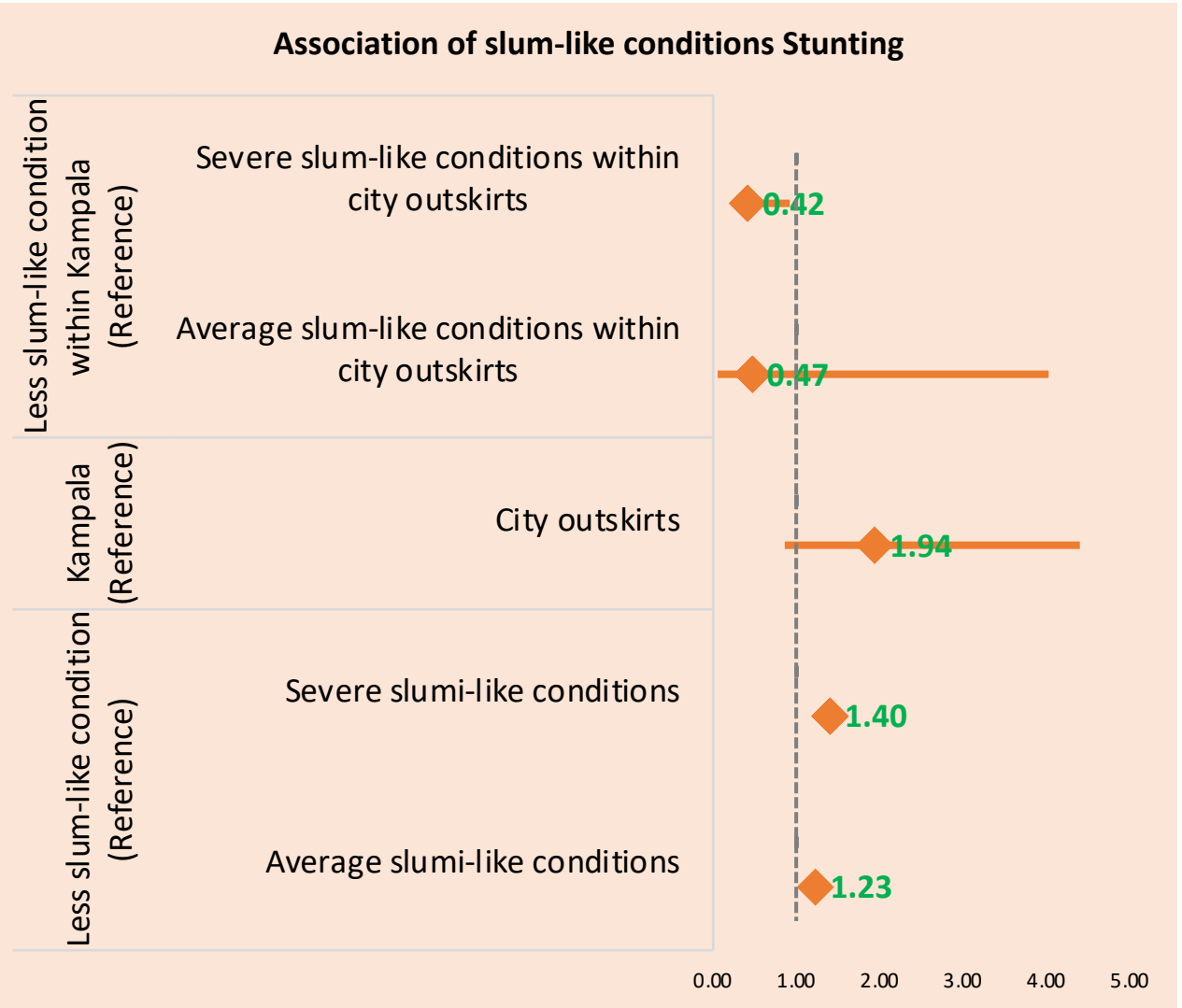

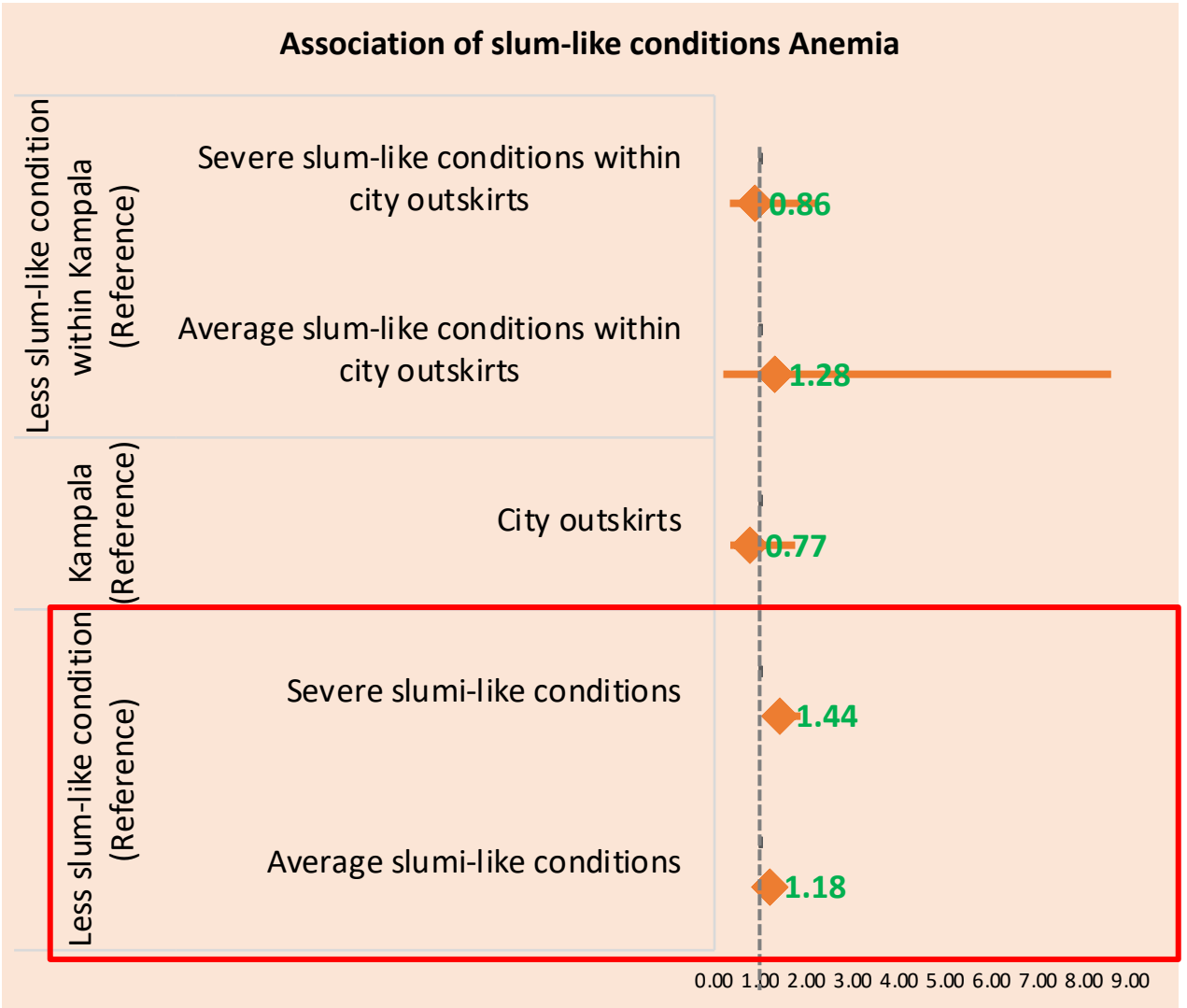

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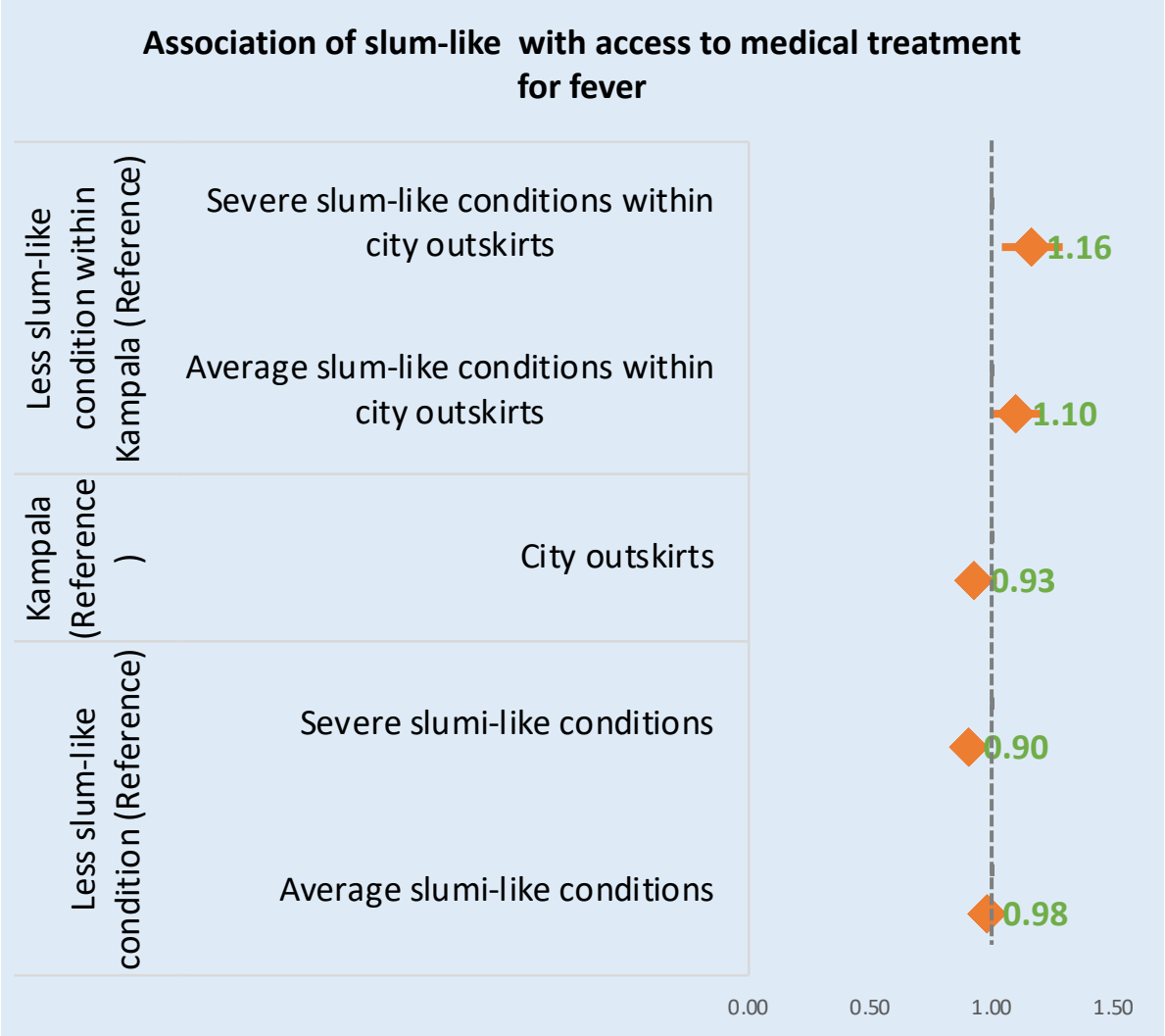

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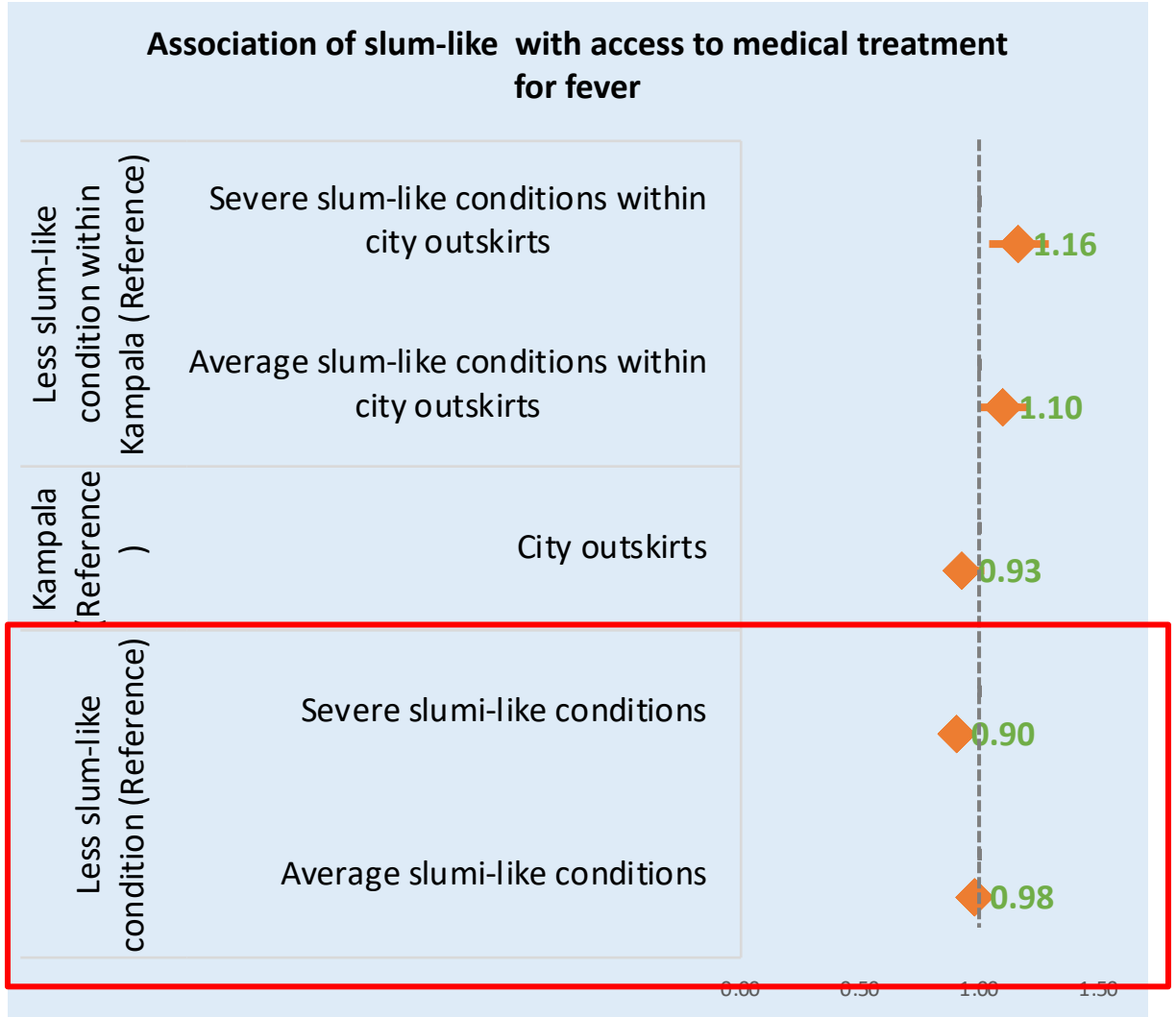
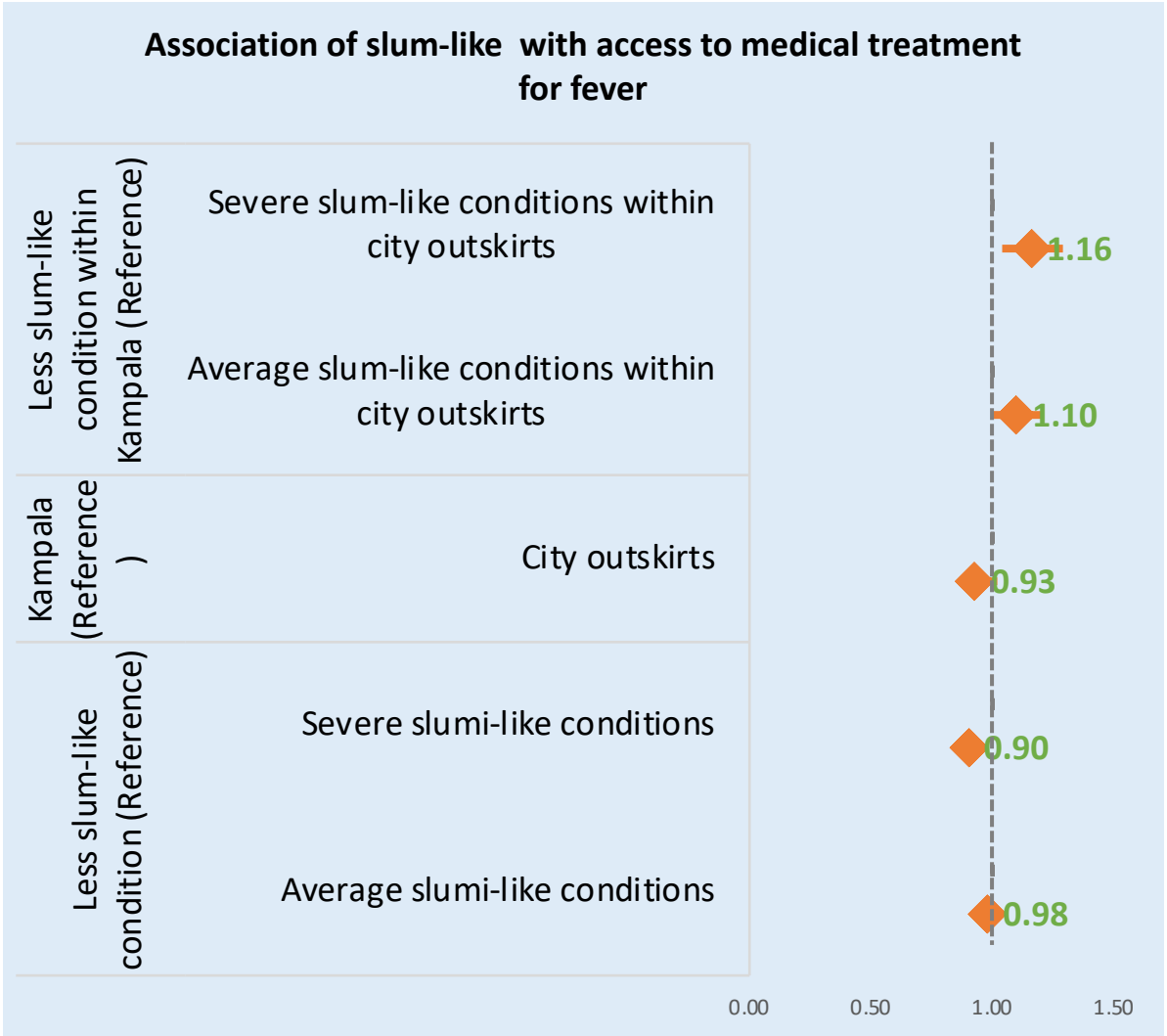
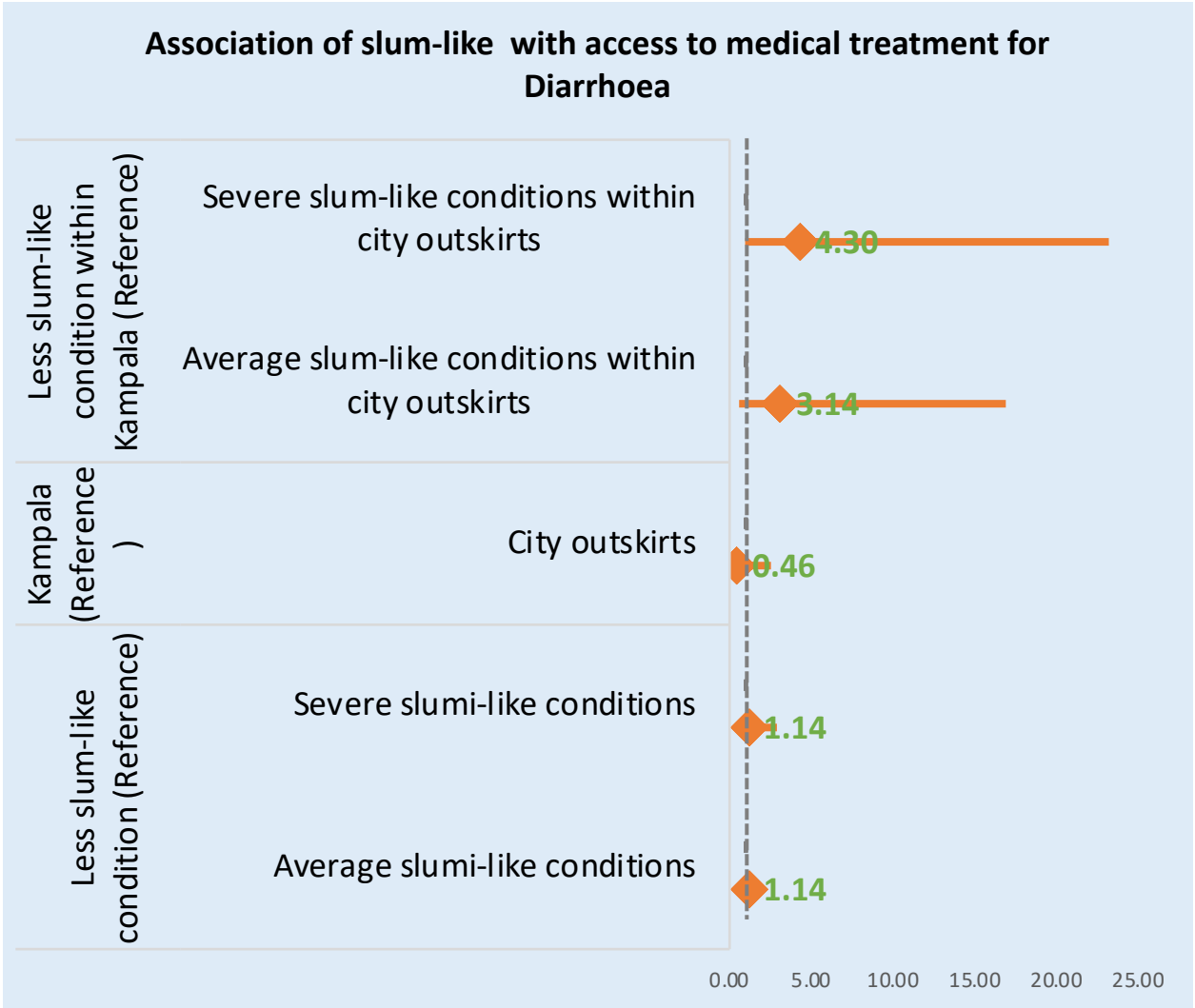


Compared to children residing in less slum-like (better) condition:

- Seeking treatment for fever was less likely in slum-like households
- Association of slum-like households' conditions with diarrhea was insignificant.





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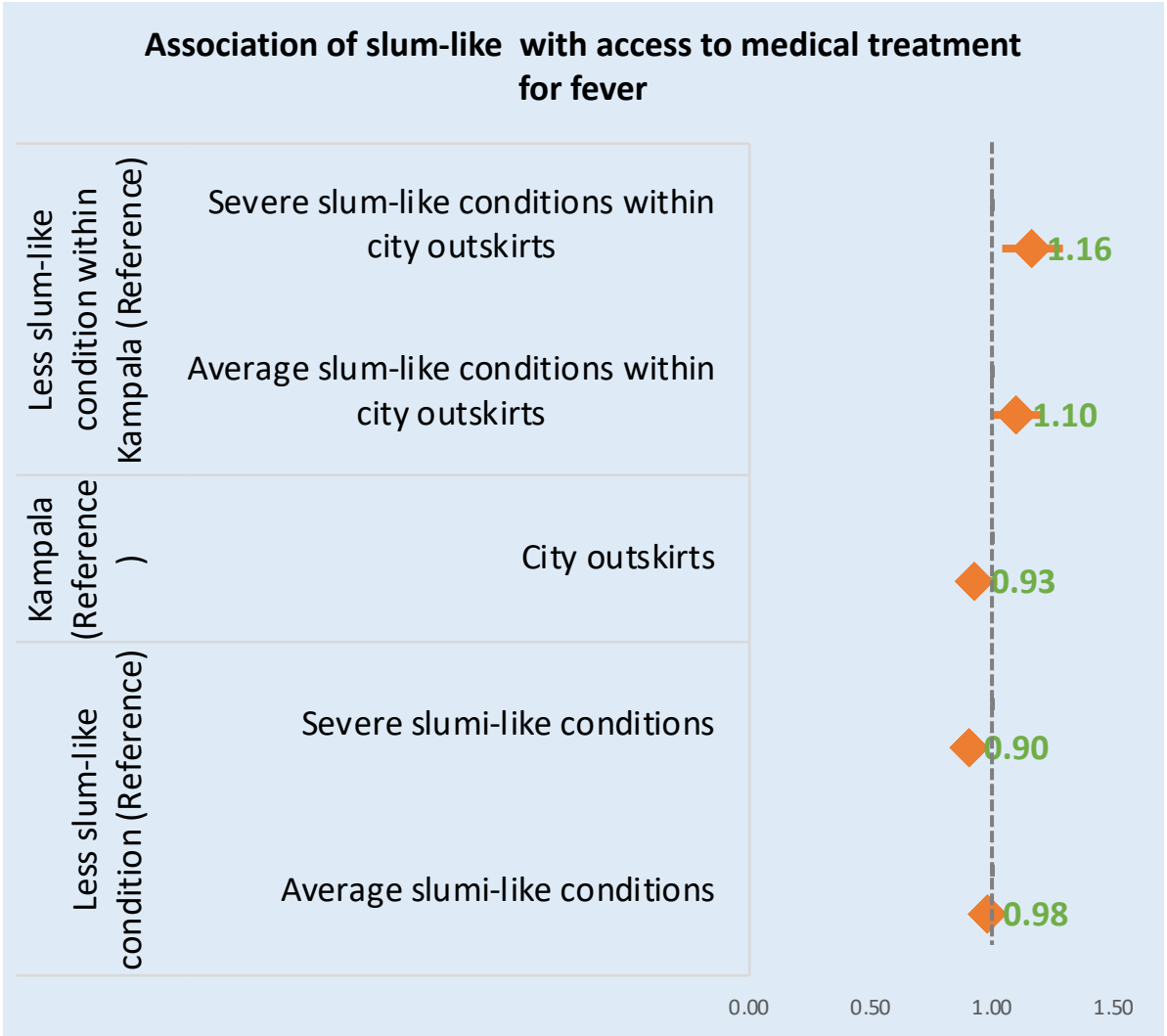

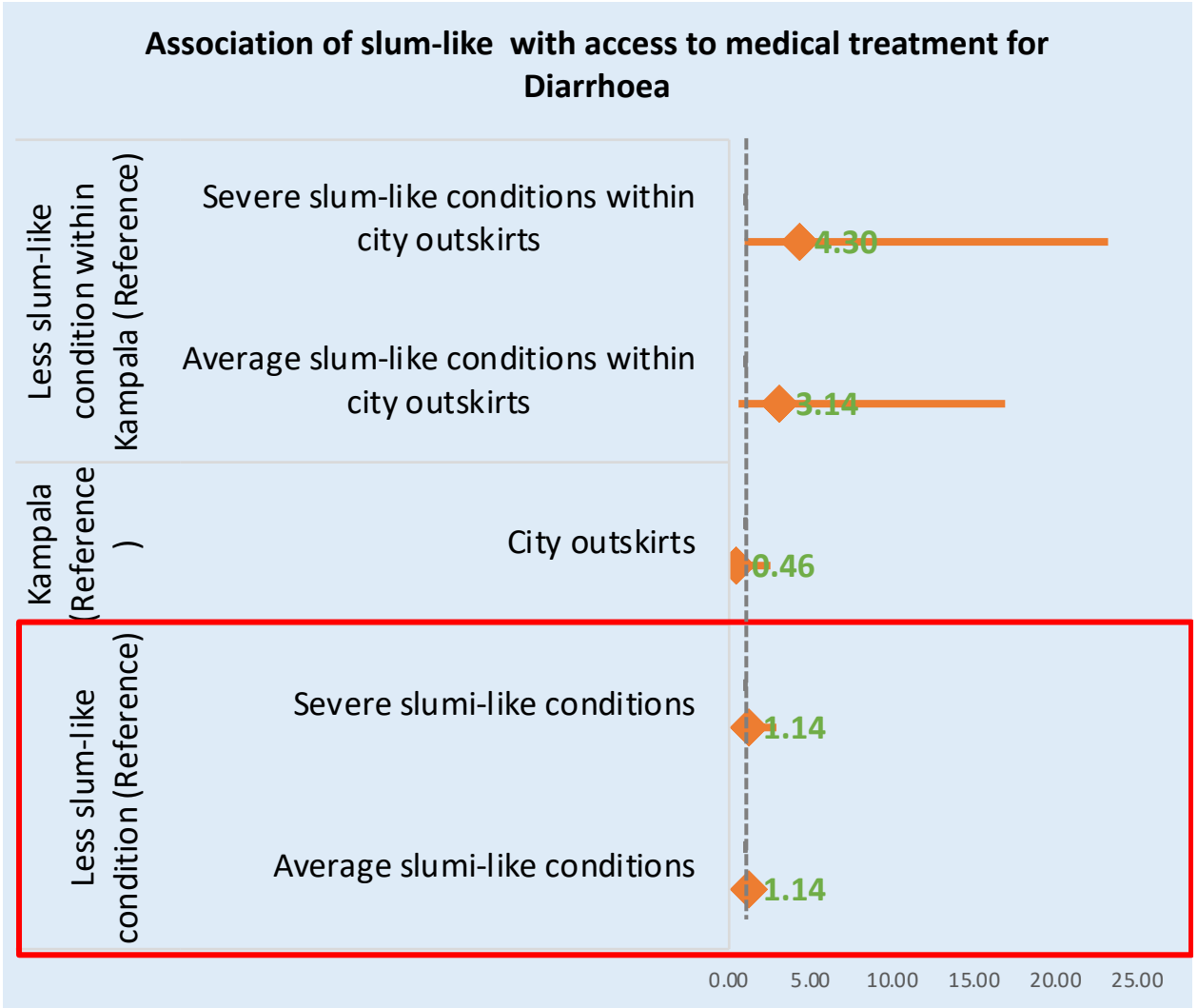

Who are the children parents/caretakers residing in slum-like conditions

Relative to the residents of less slum-like conditions:

- Individuals in the **age group of 20–39 years**, both men and women, were more **likely to reside in slum-like household conditions**
  - *20-24: RRR[95%CI] = 2.69[1.55-4.66]*
  - *25-29: RRR[95%CI] = 2.55 [1.48-4.41]*
  - *30-34: RRR[95%CI] = 1.81[1.03-3.16]*
  - *35-39: RRR[95%CI] = 1.84[1.03-3.28]*
- **Married individuals were** associated with a **higher risk of living** in households slum-like conditions (RRR[95%CI] = 1.33[1.1-1.6])

Relative to the residents of less slum-like conditions:

- Residing slum-like conditions **decreased with higher levels of education**
  - *tertiary or university level: RRR[95%CI] = 0.16[0.12-0.21]*
  - *secondary level: RRR[95%CI] = 0.52[0.44-0.62]*
- Individuals in **professional occupations had a lower likelihood of living** in severe slum-like conditions (RRR[95%CI] = 0.63[0.47-0.83]).
- Engaging in **manual work and service occupations** was linked to a **higher risk of residing in households** with severe slum-like conditions
  - *manual work: RRR[95%CI] = 1.29[1.03-1.61]*
  - *service work: RRR[95%CI] = 1.39[1.12-1.72]).*

Conclusion

- **A considerable number of households of the people** living in GKM have slum-like household conditions, **with no significant changes** observed over a decade (2006-2016).
- The identified slum-like **household conditions** and **the determinants** of individual living in slum-like household conditions are **key social determinants of health**.
  - ***health services should be tailored to address the social determinants of health in urban settings.***
- With the **limited information for slum reliable estimates**, our **approach of categorizing the individual** living in slum-like household conditions could be used in the **identification and estimation of slum dwellers** in developing countries.

Limitations

- The lack of other **community context items** such as **population**, **uncollected garbage**, **contaminated water, open sewers**, and **poor drainage** in the datasets that **are clear measures of slum areas affect the estimates**.
- **DHS** dataset is not **powered to provide better estimates** for **slum and non-slum dwellers.**
- **Reporting of fever and diarrhoea** in the **DHS relies on self-reporting** that involves **recalling the events**

Next step

- **Further granulized analysis**
  - **Delineation of urbanicity**: Considerations of urbanicity datasets based on global human settlement datasets
  - **Delineation of slums**: Linking DHS datasets to other geospatial/satellite datasets including population, built-up space, light intensity, fossil, foot-print
  - **Mapping various categories of slums within an urban setting**

Thank You!

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