Urban Health in Tanzania: Questioning the Urban Advantage

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Abstract How are health inequalities articulated across urban and rural spaces in Tanzania? This research paper explores the variations, differences, and inequalities, in Tanzania’s health outcomes—to question both the idea of an urban advantage in health and the extent of urban–rural inequalities in health. The three research objectives aim to understand: what are the health differences (morbidity and mortality) between Tanzania’s urban and rural areas; how are health inequalities articulated within Tanzania’s urban and rural areas; and how are health inequalities articulated across age groups for rural–urban Tanzania? By analyzing four national datasets of Tanzania (National Census, Household Budget Survey, Demographic Health Survey, and Health Demographic Surveillance System), this paper reflects on the outcomes of key health indicators across these spaces. The datasets include national surveys conducted from 2009 to 2012. The results presented showcase health outcomes in rural and urban areas vary, and are unequal. The risk of disease, life expectancy, and unhealthy behaviors are not the same for urban and rural areas, and across income groups. Urban areas show a disadvantage in life expectancy, HIV prevalence, maternal mortality, children’s morbidity, and women’s BMI. Although a greater level of access to health facilities and medicine is reported, we raise a general concern of quality and availability in health services; what data sources are

being used to make decisions on urban–rural services, and the wider determinants of urban health outcomes. The results call for a better understanding of the socio-political and economic factors contributing to these inequalities. The urban, and rural, populations are diverse; therefore, we need to look at service quality, and use, in light of inequality: what services are being accessed; by whom; for what reasons?

Keywords Urban health · Inequality · Data · Social determinants

Introduction

Since the introduction of Michael Lipton’s 1977 “urban bias thesis,” the literature, discourse, and development course have cumulatively assumed urban areas are less vulnerable—development and interventions needed to target rural areas. The theory assumed that there remains a class conflict between the rural and urban populations resulting in the systematic under-development of rural areas and thus the persistence of poverty (see [7, 13, 25]). However, several critiques have now arisen. This paper builds upon the need to understand the question of urban–rural inequalities: how advantageous are urban spaces for health? What urban spaces, and who, are able to utilize the advantages of urban space? With urbanization in Tanzania continuing, the concern is: what opportunities are presented with urbanization, for whom, and whether divergences are found between, and within, urban and rural spaces.

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With a total population of 47 million in Tanzania, in 2012 [43], a large majority continue to reside in rural areas. Over 35 million citizens live in rural areas [46]; however, the number of urban dwellers is sharply rising. By 2012, 29–31% of Tanzania's population were urban ([21, 35]¹): see Table 1. Tanzania's largest city, Dar es Salaam, has been quoted as being the fastest growing urban center in Sub-Saharan Africa [1, 35]. The 2012 National Census showed Dar es Salaam accounted for 10% of the total population, with a growth rate of 5.6% per annum [43]. Such figures put Dar es Salaam on track to achieve “mega city” status by 2030, inhabited by over 10 million residents [5]. However, the spread of Tanzania's urbanization goes beyond Dar es Salaam, with new “hot spots” of urban growth highlighted with the rapid growth of cities in the regions of Mbeya, Ruvuma, Rukwa/Katavi, and Kagera/Geita [44]. These regions have a lower percentage of urbanization, in contrast to Dar es Salaam that was classified as 100% urban in 2012; however, such regions have high rates of urban population growth between 2002 and 2012 (*ibid.*). With the changing geography of growth in Tanzania, questions need to be raised on the urban experience: informality is a major component. In Tanzania, the slum population is estimated to account for 66.4% of the urban population [33]. Dar es Salaam's informal settlements are growing faster than planned residences and are increasing in density [28]. Urbanization is largely unplanned with informality prevalent.

In Tanzania, economic growth is unequally distributed. The UNDP (2015²) calculated an economic annual growth rate of 7%, but the public perception is that this development is yet to be felt by a majority of Tanzanians [2]. Poverty remains prevalent. About a quarter (28.2%) of citizens were calculated to live below the minimum resources needed for physical well-being, according to national Household Budget Survey (HBS) data [46]. Furthermore, 68% of the population were living below the international poverty line—living on less than \$1.25USD per day, between 2007 and 2011 [34]. When looking at district level data, Muzzini and Lindeboom [20] found that one third of cities from 12

urban centers analyzed had lower poverty levels than their surrounding rural areas, but zooming into ward level data showed that all the urban cities had higher poverty rates than rural counterparts. Poverty being defined as living below the basic needs—defining poverty by assets and income expenditure (*ibid.*; [12, 17]. This context raises a number of questions. Who is benefiting from urbanization? How are inequalities and inequities across the social sectors reflected in the context of urbanization? What are the intra-urban differences?

This research was conducted to understand more about these gaps, in the context of health outcomes Tanzania. The paper focuses on health inequalities between rural and urban spaces. The paper is structured as follows: the introduction is followed by explanation on the methodology adopted; thirdly, results are presented. Results are sub-divided based on the three paper objectives (highlighted below). Finally, the discussion section provides potential explanations for the inequalities found and is followed by concluding points. This paper builds upon an existing body of knowledge synthesizing findings of urban–rural differences (see [6]), but to our knowledge no study has been conducted comparing the specific urban and rural health indicators used. The synthesis was based on answering three objectives:

1. What are the health differences (morbidity and mortality) between Tanzania's urban and rural areas?
2. How are health inequalities articulated in Tanzania's urban and rural areas? What is the impact of social exclusion, deprivation, and wealth, on health outcomes?
3. How are health inequalities articulated across age groups in Tanzania?

Methodology

Two research scientists from Ifakara Health Institute conducted this research synthesis. Three national datasets were selected to identify the differences between urban and rural health outcomes (Table 2). Indicators of morbidity and mortality are included. The national datasets enable us to synthesis, and subsequently analyze, health across different stages of the life course—from pre-natal to older ages. This synthesis paper therefore focuses on the inequalities of morbidity

¹ Variations are found in reported figures based on the data source used: the data sources use different definitions of what defines urban and rural areas (see [20]). In 2002, the politico-administrative definition states an urbanization rate of 16.8%, whereas the density definition shows 33.5% (*ibid.*).

² <http://www.tz.undp.org/content/tanzania/en/home/countryinfo.html>

Table 1 Urbanization in Tanzania over time, 1967 to 2012

	1967	1978	1988	2002	2012
Mainland urban population (growth rate % p.a.)	685,092	2,257,921 (11.5%)	3,999,882 (5.9%)	7,554,838 (4.7%)	12,701,238 (5.3%)
*Dar es Salaam urban (growth rate % p.a.)	272,821	769,445 (9.9%)	1,205,443 (4.6%)	2,336,055 (4.8%)	4,364,541 (6.5%)
Mainland total population (growth rate % p.a.)	11,975,757	17,036,499 (3.3%)	22,507,047 (2.8%)	33,461,849 (2.9%)	43,625,354 (2.7%)
Urbanization (%)	5.7	13.3	17.8	22.6	29.1

Source: [44]. The figures quoted are based on National Census data, using the NBS statistical definition of urban/rural boundaries

and mortality across Tanzania's rural and urban areas. The focus is placed on who is at risk, where they are, and what risks emerge, as per national data reported. In focusing on morbidity, we differentiate between the outcome of diseases and potential outcome (risk) of diseases—from negative unhealthy behaviors by inquiring datasets on lifestyle choices, and access to care (see Appendix Table 7 for a full list of definitions applied).

The three datasets (Table 2) were selected based on the meeting the following inclusion criteria: (1) Is the dataset collected from national representative survey or specific sites? (2) Does the dataset collect urban and rural health outcomes? (3) Is the data open source? (4) Is the data updated and recently collected—within the last 5 years? (5) The dataset has a wealth index applied? (6) Finally, does the data use the statistical definition of “urban” and “rural” boundaries? In Tanzania, there are three key definitions of “urban”—the first is the statistical perspective used by the National Bureau of Statistics (NBS); the second definition is the politico-administrative definition based on administered boundaries and used by the President's Office-Regional Administration and Local

Government (PO-RALG); and the third is the human settlement definition used by the Ministry of Lands and Human Settlement (MLHSD). Each use a different spatial unit of analysis: enumeration areas; local government authorities politico-administrative boundaries; and settlements, respectively [20]. The definitions influence how resources are allocated. These definition variations in boundaries present challenges in comparing datasets. Therefore to control for this, all national data sets used (Census, DHS, and HBS) use the same definition of urban and rural boundaries to ensure comparability: the statistical definition, based on smaller-scale enumeration areas (EA) (areas composed of 300–900 people). An EA is defined as urban when located in a urban ward or had urban characteristics (exceeded a certain size-density criterion, was occupied by non-agricultural activities and non-domestic buildings), containing 300–500 people, and having access to their own market and social services (ibid., pp. 4–5). The inclusion criteria meant site-specific datasets, such as the Health Demographic Surveillance Survey (HDSS) comparing rural and urban Ifakara, were excluded from the synthesis.

Table 2 National datasets included within the research

Included dataset	Description	Year
National Census (Population and Housing Census)	The National Census is conducted every 10 years The Census collects national data on demographics, health and produce fertility and nuptiality and mortality monograph	2012
Demographic Health Survey (DHS)	Conducted every 5 years, document events occurring 1–10 years prior to the survey Shows urban–rural, zonal and regional disparities, wealth quintiles and other socio-economic factors	2009–2010
Household budget survey (HBS)	Collects data on core health indicators Nationally representative survey Shows urban–rural areas Collect data on income and expenditure, household water and sanitation, proximity to service providers, morbidity-individual reporting illness/injuries and health seeking	2011–2012

Each of the data sources applies a wealth index in generating wealth classes. The index is based on ownership of assets and housing characteristics. Household assets identified in the surveys include possession of a television, bicycle, or car, and information on housing characteristics includes having access to a source of drinking water, the quality of sanitation facilities, and type of materials used for the dwelling construction. Wealth data was used to compare health outcomes across socioeconomic groups.

Fourteen indicators were selected from the three datasets to represent indicators of morbidity and mortality across urban–rural spaces (see Appendix: Table 7). Three categories were made: nutritional status; access to care; and disease outcome. Across the categories, differentiation is found on identifying actual morbidity or mortality, and the potential risk. “Nutritional status” includes the physical manifestation of morbidity, mainly linked to diet and malnourishment. “Disease outcomes” includes a specific focus on the diseases identified and mortality rates. “Access to care” includes indicators of access to care, care that may reduce the risk of morbidity and mortality. This does not take into account the underlying factors and conditions that interplay to influence this. Published data was extracted and compiled for these indicators from the three datasets. Data was compiled in Excel and evaluated based on urban and rural classifications and wealth class. The 14 indicators show health outcome advantage and disadvantage. Advantage is defined by a positive health outcome from reported data; this does not however take into account structural and social factors, issues concerning access or quality. Statistical significances were tested on only eight indicators; NBS provides sampling error estimates on few selected indicators.

Results

This section summarizes the key findings from the synthesis, showcasing health outcomes across the life course within urban and rural areas. The results are provided as per the three mortality-morbidity categories (nutrition; disease; and access to care) and based on the paper objectives.

Results: Nutrition Status Outcome

In terms of the outcome of morbidity diet in rural–urban areas, geographical disparities are found. Nutritional statuses vary across age groups and generations, raising

questions over the diet, and physical activity, of women in urban areas and the availability of food for children in households (Table 3). Findings show a higher prevalence of women being overweight, obese, and anemic in urban areas. More women of reproductive age (15–44 years) in rural areas were of normal weight. However, in terms of nutrition behavior: no difference was found in the proportion of women consuming foods and vegetables rich in vitamin A across rural and urban areas, or across wealth quintiles. Such raises further questions of why more women in urban areas are overweight, obese, and anemic: what dietary, lifestyle, and gender structures are linked? For children born in urban areas are shown to have lower birth weights (below 2.5 kg) and size, compared to rural newborns. However, in the case of children, a higher proportion of children, below 5 years old, in rural areas are stunted (45% vs. urban 35%) and underweight (17% vs. urban 11%) [21]. Children from households in low-wealth quintiles accounted for a larger proportion of stunted and overweight children. A slightly higher percentage of children, under 5 years, were overweight or obese in urban areas (5.8% vs. 4.9% rural), although this may be due to random variation. Such findings show that although worse nutritional outcomes are identified for children in urban areas at neo-natal stage, infant health deteriorates upon the infant stage.

Results: Disease Outcome

The outcomes of morbidity diseases show variations across social groups and diseases, and raise questions of the distribution of medicine and access to treatment (Table 4). Diarrhea is higher in urban areas; however, severe diarrhea—with blood, is similar for urban–rural areas. However, different care-seeking practices are shown. Parents/caretakers in urban areas were more likely to seek care—56% of urban caregivers sought care for their children (<5 years old) (vs. 52% rural). Recommended treatments, such as home fluid, were practiced more in urban than rural locations, but almost no difference was found in the proportion of children who were not treated at all. Table 5 shows the context of water and sanitation in Tanzania. Tanzania remains off track to meet the Millennium Development Goals (MDG) and National Strategy for Growth and Poverty Reduction (MKUKUTA) targets for the sectors due to lack of prioritization [31]. Although, on average, urban areas have better access to services, the coverage is

Table 3 Nutrition indicators across urban and rural Tanzania

Nutrition indicators	Urban %	Rural %	Geography disadvantage	Wealth disadvantage
Women BMI thin	8	13	Rural ^a	Low WQ
Women BMI normal	56	72	Urban	Low WQ
Women BMI overweight/obese	36	15	Urban	High WQ
Anemia mild	30	29	Urban	Low WQ*
Anemia moderate	12	9	Urban	High WQ*
Anemia severe	1	1	—	Low WQ*
Anemia any	44	39	Urban ^a	High WQ*
Low birth weight	9.1	5.8	Urban	High WQ
Child size at birth (very small)	3.7	1.3	Urban	High WQ
Child size at birth (smaller than average)	7.7	6.2	Urban	Low WQ*
Child stunting ^b	32	45	Rural ^a	Low WQ
Child wasting	5	5	—	Low WQ
Child underweight	11	17	Rural ^a	Low WQ

Wealth quintiles with * showcase a small difference between the lowest and highest wealth quintiles. The difference was less than 3%. The DHS data is used for consistency across indicators, although some variables are recorded in other National datasets, such as HMIS and the National Census

WQ wealth quintile

^aStatistically significant difference

^bBased on new global growth standards [47]

lower compared to the SSA average, it remains off target, and has not kept up with the pace of urbanization.

Finally, mortality data shows an urban disadvantage. Individuals in rural areas have a higher life expectancy at birth compared to urban areas. Overall there is a gap of 2.7 years between urban and rural geographies. Maternal mortality is higher in urban areas (432 vs. 336 deaths per 100,000 live births). This is mirrored in results for Ifakara's HDSS, where maternal mortality ratio is higher in the Ifakara urban sites (571 urban vs. 517 rural) [11]. Such findings may be reflective of the higher number of deliveries in health facilities, thus recorded, for urban areas.

In terms of health-related behaviors, little variation was found in men's use of tobacco between urban and rural areas (19 vs. 21%). Individuals from low-income households have a higher smoking prevalence compared to the higher wealth quintiles³. For malaria, prevention measures were similar across urban–rural [21]. The possession of at least one insecticide-treated net (ITN) in the household is high for both urban and rural areas (87 vs. 93%) (ibid.). However, the coverage of at least one ITN for every two person (recommended) in the household is lower (63% urban vs. rural (54%). The percentage of children below

5 years and pregnant women that either slept under an ITN the night before the DHS was conducted or in a dwelling sprayed with IRS in the past 12 months was similar for urban and rural (77% for children, 79% for pregnant women). However, access to curative treatment for malaria was higher for pregnant urban women. On average, 63% of women (78% urban vs. 60% rural) took an antimalarial drug during their last recorded pregnancy. Access to SP/Fansidar through ANC visits was higher in urban (39% vs. 27% rural) (ibid.).

Results: Access to Care Outcome

The risk of morbidity, and mortality, reflects how accessible care is in urban–rural areas: vaccinations, ANC visits, facilities delivery, and health knowledge. For children vaccinations, full vaccination is lower overall in urban areas (69% urban vs. 85% rural) (Table 6). When disaggregated, BCG vaccinations were similar for urban and rural areas, but polio (84% urban vs. 97% rural), DPT (81% urban vs. 90% rural), and measles (80% urban vs. 94% rural) show disparities. Children born from the lowest wealth quintiles have lower vaccination coverage. Secondly, coverage, and use, of ANC was higher in urban areas: women in urban areas showed more frequency in having at least four ANC

³ This measures smoking prevalence based on current smoking habit—incorporating the number of cigarettes smoked in the past 24 h.

Table 4 Disease outcomes across urban and rural Tanzania

Indicator	Urban	Rural	Geography disadvantage	Wealth disadvantage
Diarrhea	18%	14%	Urban ^a	High WQ*
Malaria prevalence in children ^b	3.3%	10.4%	Rural	Low WQ
Hemoglobin in children ^c	6.3%	5.4%	Urban	Low WQ
Maternal mortality	432 (rate)	336 (rate)	Urban	–
HIV/AIDS prevalence	7.2%	4.3%	Urban ^a	High WQ
Life expectancy	60 (years)	62 (years)	Urban	–

Wealth quintiles with * showcase a small difference between the lowest and highest wealth quintiles. The difference was less than 3%. The DHS data is used for consistency across indicators, although some variables are recorded in other National datasets, such as HMIS and the National Census

WQ wealth quintile

^a Statistically significant difference

^b Based on RDT for children aged 6–59 months

^c Hemoglobin level <8.0 for children aged 6–59 months

visits during their pregnancy, and having an ANC visit within 4 months of becoming pregnant. In addition, facility delivery is higher in urban areas (82 vs. 42% rural). Use of a facility for delivery is also higher among the highest social quintile compared to the lowest social quintiles (90 vs. 33%). More women in urban areas showcased knowledge of mother to child transmission of HIV, possibly a result of more frequent ANC visits or the fact that the prevalence of HIV is higher in urban areas (7.2 vs. 4.3%) [21]. The sex distribution shows higher prevalence among women, in both settings. Analysis by socioeconomic status reveals high prevalence within the highest wealth quintiles.

However, despite higher coverage of ANC, and delivery within facilities, the results show maternal mortality is higher in urban sites (see Table 4). Great disparities emerge in women's health across urban and rural geographies, to indicate an urban disadvantage.

Therefore what is the quality of maternal care, deliveries and emergency obstetric care (EmOC), in urban areas? What does ANC provide? What is the affordability of urban services? How available is medicine and treatment? What are the changing gender norms in urban and rural areas: are urban women more likely to seek delivery in facilities due to a “changed” culture or do patriarchal relationships act as a hindering factor to women seeking treatment in rural areas? In terms of children's health, targeted vaccines actually have higher coverage in rural areas: why?

Results: Summary

This paper had three objectives, to understand: the health differences (morbidity and mortality) between Tanzania's urban and rural areas; how health inequalities are articulated in Tanzania's urban and rural areas, and

Table 5 Water and sanitation indicators, baseline, and targets in Tanzania

Indicators	Baseline and year	MDG target (2015)
% of rural and urban households using improved sources for drinking water	40% rural (2007) 80% urban (2007)	67% rural target 94% urban target
Number of utility-supplied household connections in regional centers (including Dar es Salaam)	229,574 (2008)	500,000 target
% of rural and urban households with access to at least a basic toilet facility	90.4% rural (2007) 97.7% urban (2007)	95% rural target 100% urban target
Number of pupils (girls and boys) per improved school latrine	58 girls (2008) 64 boys (2008)	40 girls target 50 boys target
Health facilities with access to reliable water supply	1/3 health facilities 42% of hospitals	–
Health facilities with client latrines	2/3 health facilities	–

Source: [31]. Data in source compiled from NBS Household Surveys, EMIS, and EWURA

Table 6 Access to health outcomes across urban and rural Tanzania

Indicator	Urban %	Rural %	Geography disadvantage	Wealth disadvantage
Child full vaccination	86	73	Rural ^a	Low WQ
ANC visit (at least 4)	55	39	Rural	—
ANC visit (in 4 months)	19	14	Rural	—
Health facility delivery	82	42	Rural ^a	Low WQ

Wealth quintiles with * showcase a small difference between the lowest and highest wealth quintiles. The difference was less than 3%. The DHS data is used for consistency across indicators, although some variables are recorded in other National datasets, such as HMIS and the National Census

WQ wealth quintile

^a Statistically significant difference

what impact social exclusion, deprivation, and wealth has on health outcomes; and how health inequalities are articulated across different age groups in urban and rural geographies? The results show that despite high coverage of essential interventions in urban areas, there remains a rural advantage for some indicators. The findings show inequalities remains prevalent—but the degree and cause require investigation. Findings also show there is limited data on intra-urban or rural differences, with data generalized as urban or rural. The data shows health varies across income groups, and there is a rising prevalence of risk factors for obesity due to lifestyle and diet, with a changing disease burden. The findings presented raise concerns over access and quality, and lifestyles within urban–rural spaces.

Discussion: Tanzania's Restructured Health Sector and System

The findings need to be viewed in light of Tanzania's restructured, and evolving, health care system. Since independence, Tanzania's health sector has gone through visionary restructuring with the 2025 National Development Vision identifying five key priorities—achieving high quality livelihoods; peace, security, and unity; good governance; education; and a competitive economy [38]. Within this, improved well-being and the universal access to health is a core foundation. All citizens have the right to health in Tanzania's Constitution. Three key restructuring elements are discussed, of relevance to explaining the urban–rural disparities: (1) health sector management (decentralization and the power of local government authorities); (2) financing (funding, privatization, user-fees, and insurance schemes); and (3) essential health care and resource

allocation mechanisms (service, medicine, and human resources). In connection with specific policy episodes, such restructuring is vital in the story of why inequalities emerge and the mission of universal health care has not been achieved.

The 1970–1980s marked a key transformation phase for Tanzania's health sector. Urbanization rates rose (see Table 1) and a shift changed how the public sector was governed and controlled: moving from government monopolization and state control to increased liberalization and free-market economic policies, following the Structural Adjustment Programmes (1982–1990) aiming to achieve economic growth. As has been heavily criticized: calling for development with a human face [32]. Widening social inequalities were experienced in who can access services with user-fees a norm when accessing “free” services, and an increasing trend to privatizing health care services. The opening of private clinics in the 1980–1990s did little to achieve equity in accessing health as they were not located to match population need [3]. However, a research study comparing quality of services for ANC in Dar es Salaam showed private health providers were better in all aspects (structural features and maintenance; interpersonal patient skills; technical consultations and training levels), compared to natural standards [4]. Better health care is available from private providers; however, access to such improved services remains unequal. In addition, user fees became a norm in accessing services from the 1980s. Medicine may be available but not affordable. In analyzing the affordability of pediatric medicine in Tanzania's public, private, and non-governmental sectors, the United Republic of Tanzania [41] shows availability is low across all three services, and although there was no significant variation in availability of public sector medicine across urban–rural areas, there was increased availability of medicine in private facilities in urban areas. Further, when comparing the price of generic medicines in the public/

private sector, disparities emerge. The lowest priced generic medicines in the private sector were 154.9% more expensive than in the public sector (*ibid.*). Therefore, with low availability in the public sector, patients purchasing drugs in the private sector have to pay 154.9% times more. Figure 1 shows that although government-provided services remain the key source of care across regions, there is a recognizable decline at the tertiary levels, with an increase in faith-based and private hospitals: 41% of hospitals in 2009 were government-owned compared to 71% of health centers and 68% of dispensaries [40].

Out-of-pocket (OOP) payments remain prevalent across Tanzania. In 2010, OOP accounted for 23% of total health expenditure in Tanzania [45]. In addition, OOPs remain regressive: as despite of waivers OOPs cause the highest financial burden to low-income groups and exclude the poorest from accessing care [19]. However, a less explored area in the question of health equity is whether higher OOPs are found for urban residents due to the greater prevalence, and accessibility, of private services in urban areas? Several changes have been made in health insurance schemes for Tanzanians. The Community Health Fund (rural) (1999), Tiba kwa Kadi (urban) (2009), and recent discussions of a Single National Health Insurance [9] showcase that measures are being made to control for the financial burden of ill-health and ensure financial resilience. However, uptake remains low [18].

Following the Decentralisation Act of 1972, decentralization by devolution (1982) was to reform the management, and responsibility, of stakeholders in health care delivery to ensure primary health care was available to all and of good quality (see [36, 39]). Local government

authorities (LGAs) were created, responsible for implementing reforms, improving health-planning, and ensuring services were being delivered. Such politico-administrative boundaries are key for the politico-administrative definition of urban/rural boundaries described above. However, the potential of decentralization has not been realized and local autonomy has been limited in practice (see [29]). Authority in decision-making and resource allocation remains highly centralized.

Previous studies have shown evidence of rural disadvantages in terms of access to medicine, drugs, and human resources: as reflected in this papers findings. Studies show appropriate resource allocation is not being applied to meet need: financial resources centrally distributed do not match need thus resulting in shortages [27]. In allocating resources across LGAs and districts, Tanzania uses an allocation formula of 70/10/10/10: 70% is spent with regards to districts' population levels, 10% according to their under-5-mortality, 10% for the poverty level, and 10% is distributed with respect to the mileage covered by medical vehicles. However, reports have shown the LGA health-block grant allocation has not been used effectively between 2005/6 and 2010/11, with deviations between actual and expected resources allocated (*ibid.*). With deficiencies in resources received, questions need to be raised over how the formula can be improved to equally distribute resources across urban–rural spaces and districts.

In the case of Tanzania's medicine—between 2002 and 2005, a 150% increase in spending was found; however, the drug budget disbursement from the central ministries was random and unpredictable making planning difficult for service providers [8]. Essential drugs

Fig. 1 Distribution of hospitals across regions, in Tanzania. Source: [40].

were continually out-of-stock. Two reasons have been identified for this: the lack of focus given to quantifying and procuring drugs by the Medical Stores Department (MSD), and the fact the allocation formula is not optimal for equitable allocation as data (i.e., population density) used to make decisions is inaccurate and there are missing variables, such as the disease burden (*ibid*). Finally, there is inequality in the distribution and retention of health care workers (see [14]). However, tying these findings together is a question of how do the vulnerable adapt to such shortages and misallocation of resources? A less explored area concerns the movement of people for service access: to what extent are urban areas being over-burdened due to resource misallocation and migration for better services? Does such result in higher mortality rates in urban areas?

Resource allocation is now also being aligned to priority service areas. The first National Package of Essential Health (NPEH) was formed in 1999—later revised and costed in 2013 [37, 42, 43]. The package identifies what the greatest burden of disease is across Tanzania and thus which public health services were to be prioritized. Five service clusters have since been identified: (1) reproductive and child health; (2) communicable diseases; (3) non-communicable diseases; (4) meeting specific district priorities; and (5) promoting community health. The package guides LGA's how to plan their health sector to meet needs in their judiciary, and also puts an emphasis on quality improvement. However, the package continues to promote a curative approach to health in Tanzania: the focus is on treating disease, with minimal effort placed on change the (socio-political-economic) environment by which people become unhealthy. In addition, a \$2 billion USD resource deficiency was identified in making sure that all citizens have access to the identified essential services [42]. Achieving universal health care in Tanzania requires increased resources and improved allocation.

Discussion: Data Validity and Gaps

In completing this research synthesis and paper, limitations of national data sources were identified. Firstly, wealth quintiles were not available for all indicators. Secondly, as discussed, there are three different definitions used for defining “urban” and “rural”

geographies; Muzzini and Lindeboom [20] show the difficulty in understanding the scale of the “urban” problem as the boundaries defining where is urban vary depending on the data and definition used. In addition, the use of income as a measure of inequality in many ways fails to incorporate and recognize the multiple deprivations and sources of livelihoods (assets), and vulnerabilities of poverty, in the spaces. Thirdly, data was not always disaggregated to show intra-urban differences, rather showcasing averages of urban/rural areas. The data on wealth does not provide intra-urban disaggregation. Lastly, there is no, or limited, data collected on mental and social health—national datasets need to go beyond the physical manifestation of disease.

The findings raise an issue of data quality and scale in Tanzania's health and social sectors. Disaggregated data is required. Intra-urban and intra-rural data need to be collected and available to be able to make conclusive decisions on urban–rural health disparities. The indicators used in this study do not differentiate between the socioeconomic groups and spaces within urban or rural areas, or within districts. There remains great value in exploring the use of datasets such as the Sample Vital Registration with Verbal Autopsy (SAVVY), a demographic surveillance system, whereby data is disaggregated at a smaller scale (see [10]).

Finally, urban and rural areas, and health outcomes, are interconnected rather than disconnected binaries. The data does not show where patients have come from, for example whether sick patients migrate from (or to) rural areas and the percentage of urban–rural residents who access urban health services and medicine. More specialized facilities and referral hospitals are found in urban areas; however, a recent study by Shemdoe et al. [26] show there are difficulties in recruiting and retaining medical doctors and highly skilled cadre in urban, as well as rural, areas.

Discussion: the Need for a Social Determinants of Health Perspective

The results raise questions on the complex relationship between social determinants, the quality of urban life, and health. The findings show urban disadvantages emerge for some health indicators, including urban dwellers on average dying younger. On the

one hand, where you live matters. As shown, a high number of urban dwellers live in informal housing, and research in Dar es Salaam has shown that cholera incidence is linked to housing, income, and density: rising by 1% with a percentage increase in informal residents, 2% with a rise in population density of 1000 people per square kilometer, and falling by 50% with improvements in income, as per asset ownership (see [24]). Substance abuse was found to be higher for residents of poor urban areas [16]. On the other hand, lifestyle factors matter. The nutrition available, and costs influence dietary decisions: urban Tanzania has been found to have high intakes of cholesterol and sucrose matched with low fiber diets [15]. Additionally, consumption of meat, fish, and coconut milk has been found to be more frequent in urban areas (compared to rural and pastoral) and this diet correlated to higher blood pressure [22]. Access to physical space, and activities, influences healthiness. As a study in urban Mwanza shows, the high physical activity energy expenditure of young-middle aged men in urban Mwanza reduced the risk of cardiovascular disease [23]. The energy expenditure was linked to job employment. However, such jobs are gendered and open spaces for physical activity remain limited in cities. Healthy urban spaces, and politics, are required for promoting a healthy quality of life.

Conclusion

Results presented showcase health outcomes in rural and urban areas vary and are unequal. The national datasets analyzed show that the risk of disease, living a longer life, and unhealthy behaviors are not the same for urban and rural areas, and across income groups. Urban areas show a disadvantage in life expectancy, HIV/AIDS, maternal mortality, children's morbidity, and women's BMI. Although a greater level of access to health facilities and medicine is reported, we raise a concern of quality and availability in health and what sources are being used to make decisions on urban–rural inequalities.

Rural and urban health outcomes are interconnected and link to the wider political economy of health systems, decision-making, financing, and resource allocation, within Tanzania. Although the datasets show urban and rural disadvantage in some indicators, with inequalities across income, the

conclusions are not as simple or clear-cut. Further research is required to analyze the factors contributing to these inequalities and disparities especially within urban spaces. Additionally what is the quality of the services and who is accessing them? We need to understand more on the diversity of the populations residing in such spaces. The findings of this research raise a broader question of planning, efficiency, and allocation to meet health needs across Tanzania. Improvements in data are required to disaggregate within urban and rural areas and make effective decisions concerning essential health needs—supply and demand.

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Appendix

Appendix: List of abbreviations

AIDS—Acquired immune deficiency syndrome
 ANC—Antenatal care
 BCG—Bacillus Calmette-Guerin vaccine
 BMI—Body mass index
 DHS—Demographic health survey
 DPT—Diphtheria-tetanus-pertussis vaccine
 EA—Enumeration areas
 EmOC—Emergency obstetric care
 HBS—Household budget survey
 HDSS—Health Demographic Surveillance Survey
 HIV—Human immunodeficiency virus
 ITN—Insecticide-treated net
 LGA—Local government authorities
 MDG—Millennium Development Goals (MDG)
 MKUKUTA—National Strategy for Growth and Poverty Reduction (NSGPR)
 MLHSD—Ministry of Lands and Human Settlement
 NBS—National Bureau of Statistics
 NPEH—National Package of Essential Health
 PO-RALG—President's Office-Regional Administration and Local Government
 SAVVY—Sample Vital Registration with Verbal Autopsy
 URT—United Republic of Tanzania
 WQ—Wealth quintile

Table 7 Indicators of mortality and morbidity for urban and rural Tanzania

Indicator	Data source	Health concern	Reference period
Nutritional status			
Women BMI thin	DHS 2010	Nutritional status of women (reproductive age)	2009/2010
Women BMI normal	DHS 2010		2009/2010
Women BMI overweight/obese	DHS 2010		2009/2010
Anemia mild	DHS 2010	Nutritional status of women (reproductive age)	2009/2010
Anemia moderate	DHS 2010		2009/2010
Anemia severe	DHS 2010		2009/2010
Anemia any	DHS 2010		2009/2010
Low birth weight	DHS 2010	Weight and size at birth	2005–2010
Child size at birth very small	DHS 2010		2005–2010
Child size at birth smaller than average	DHS 2010		2005–2010
Child stunting	DHS 2010	Weight and size of child. Nutritional status of child	2005–2010
Child wasting	DHS 2010		2005–2010
Child underweight	DHS 2010		2005–2010
Access to care			
ANC visit (at least 4)	DHS 2010	Women can visit clinic, receive check-ups and appropriate interventions	2005–2010
ANC visit (in 4 months)	DHS 2010		2005–2010
Health facility delivery	DHS 2010	Mothers can access medical attention during delivery	2005–2010
Child full vaccination	DHS 2010	Essential vaccines provided to protect children	2005–2010
Disease outcomes			
Diarrhea	DHS 2010	Risk to infectious diseases, i.e., diarrhea, malaria, etc.	2009/2010
Malaria	DHS 2010		
Knowledge of mother-child HIV transmission	DHS 2010	Knowledge on HIV mother-child transmission	2009/2010
Maternal mortality	Census 2012	Risk of maternal mortality	2000–2010
HIV/AIDS prevalence	THMIS 2012	Risk to HIV/AIDS	2011/2012
Life expectancy	Census 2012	Life expectancy	2012

*Children born in reference period

THMIS: Tanzania HIV and Malaria Indicator Survey [30]

References

1. African Development Bank Group (AfDB). *Tracking Africa's Progress in Figures*, Africa Development Bank, Tunis: Tunisia; 2014.
2. Afrobarometer: Afrobarometer Online Data Analysis 2014/2015. <http://afrobarometer.org/online-data-analysis>. (2015). Online Accessed 1st Dec 2015.
3. Benson SJ. The impact of privatisation on access in Tanzania. *Soc Sci Med*. 2001; 52(12): 1903–15.
4. Boller C, Wyss K, Mtasiwa D, Tanner M. 'Quality and comparison of antenatal care in public and private providers in the United Republic of Tanzania'. *Bull World Health Organ*. 2003;81(2): 116–22.
5. Boyle, J.: Dar es Salaam: Africa's Next Megacity? *BBC News*. <http://www.bbc.com/news/magazine-18655647>. (2012). Online Accessed 10th Sept 2015.
6. Cooksey B, Mamdani M. Summary of Conclusions from Recent Research and Synthesis of Key Issues on Poverty in Tanzania. Research on Poverty Alleviation (REPOA). http://www.repoa.or.tz/documents/Synthesis-poverty_studies_-_Cooksey_Mamdani.pdf. (2004). Accessed 25th May 2016.
7. Corbridge S, Jones AG. The Continuing Debate About Urban Bias: the Thesis, It's Critics, It's Influence, and Implications for Poverty Reduction, London School of Economics Research Papers. <http://www.lse.ac.uk/geographyAndEnvironment/research/researchpapers/99%20corbridge%20jones.pdf>. (2010). Online Accessed 1st Sept 2015.
8. Euro Health Group. *The United Republic of Tanzania: Drug Tracking Study: Final Report*, August 2007, Soborg: Denmark. 2007.
9. Health Policy Project (HPP). *Health Financing Profile: Tanzania*, USAID, PEPFAR and Health Policy Project. 2016.

- https://www.healthpolicyproject.com/pubs/7887/Tanzania_HFP.pdf. Accessed 1 July 2016.
10. Ifakara Health Institute (IHI). *Sentinel Panel of District (IHI-SPD)*. 2016. <http://spd.ihl.or.tz/savvy/>. Accessed 1 May 2016.
 11. Ifakara Health Institute (IHI). *Health Demographic Surveillance Survey (IHI-HDSS), Profile, Online*. 2016. <http://www.indepth-network.org/Profiles/Ifakara%20HDSS.pdf>. Accessed 1 Apr 2016.
 12. Kilama B, Lindeboom W, Van der Weide R. 'Where are the Poor?', Methodology Paper, Mimeo, *Location unknown*, 2006.
 13. Lipton M. *Why Poor People Stay Poor: Urban Bias in World Development*. London: Temple Smith; 1977.
 14. Manzi F, Schellenberg A-J, Hutton G, Wyss K, Mbuya C, Shirima K, Mshinda H, Tanner M, Schellenberg D. Human resources for health care delivery in Tanzania: a multifaceted problem. *Hum Resour Health*. 2012; 10: 3.
 15. Mazengo CM, Simell O, Lukmanji Z, Shirima R, Karveti R-L. Food consumption in rural and urban Tanzania. *Acta Trop*. 1997; 68(3): 313–26.
 16. Mbatia J, Jenkins R, Singleton N, White B. Prevalence of alcohol consumption and hazardous drinking, tobacco and drug use in urban Tanzania, and their associated risk factors. *Int J Environ Public Health*. 2009; 6(7): 1991–2006.
 17. Minot N, Simler K, Benson T, Kilama B, Luvanda E, Makbel A. *Poverty and Malnutrition in Tanzania: New Approaches for Examining Trends and Spatial Patterns*, International Food Policy Research Initiative (IFPRI), Washington DC, 2006.
 18. Mtei, G., and Mulligan, J-A. Community Health Funds in Tanzania: A Literature Review, Consortium for Research on Equitable Health Systems (CREHS), Ifakara Health Institute, Dar es Salaam, 2007.
 19. Mtei G, Makawia S, Ally M, Kuwawenaruwa A, Meheus F, Borghi J. Who pays and who benefits from health care? An assessment of equity in health care financing and benefit distribution in Tanzania. *Health Policy Plan*. 2012; 27: 23–34.
 20. Muzzini E, Lindeboom, W. *The Urban Transition in Tanzania: Building the Empirical Base for Policy Dialogue*. The International Bank for Reconstruction and Development, The World Bank Washington DC; 2008.
 21. National Bureau of Statistics (NBS) [Tanzania] and ICF Macro. *Tanzania Demographic and Health Survey 2010*. Dar es Salaam, Tanzania: NBS and ICF Macro; 2011.
 22. Njelekela M, Sato T, Nara Y, Miki T, Kuga S, Noguchi T, Kanda T, Yamori M, Ntogwisangu J, Masesa Z, Mashalla Y, Mtabaji J, Yamori Y. Nutritional variation and cardiovascular risk factors in Tanzania—rural–urban difference. *S Afr Med J*. 2003; 93(4): 295–9.
 23. Njelekela M, Muhili A, Mpembeni R, Masesa Z, Kitamori K, Mori M, Kato N, Mtabaji J, Yamori Y. Prevalence of cardiovascular disease risk factors among young and middle-aged men in urban Mwanza, Tanzania. *J Public Health*. 2011; 19(6): 553–61.
 24. Penrose K, de Castro M-C, Werema J, Ryan TE. Informal urban settlements and cholera risk in Dar es Salaam, Tanzania. *PLoS Negl Trop Dis*. 2010; 4(3): 1–11.
 25. Satterthwaite, D. The under-estimation of urban poverty in low and middle-income nations, IIED Poverty Reduction in Urban Areas Series, Working Paper 14. 2004.
 26. Shemdoe A, Mbaruku G, Dillip A, Bradley S, William J, Wason D, Hildon Z-JL. Explaining retention of healthcare workers in Tanzania: moving on, coming to 'look, see and go', or stay? *Hum Resour Health*. 2016; 14: 2.
 27. Sikika. Tanzanian Health Sector Budget Analysis: 2005/06–2011/12, November 2012, Department of Health Governance and Finance, Dar es Salaam: Tanzania. 2012.
 28. Sliuzas RV, Ottens H, Kreibich V. *Managing Informal Settlements: a Study Using Geo-information in Dar es Salaam, Tanzania*. Enschede: ITC; 2004.
 29. Sundet G. *Public expenditure and service delivery monitoring in Tanzania: some international best practices and a discussion of present and planned Tanzanian initiatives*, Working Paper no.7, Dar es Salaam: HakiElimu; 2004.
 30. Tanzania Commission for AIDS (TACAIDS), Zanzibar AIDS Commission (ZAC), National Bureau of Statistics (NBS), Office of the Chief Government Statistician (OCGS), and ICF International. *Tanzania HIV/AIDS and Malaria Indicator Survey 2011–12: Key Findings*. Dar es Salaam, Tanzania: TACAIDS, ZAC, NBS, OCGS, and ICF International, 2013.
 31. Taylor B. Situation analysis of women, children and the water, sanitation and hygiene sector in Tanzania. *Extended Analysis of Women, Children and the Water, Sanitation and Hygiene Sector in Tanzania, 2009*, Discussion Paper: Draft 5.3, September 2009. 2009.
 32. United Nations Development Programme (UNDP). *Human Development Report 1990: Concept and Measurement of Human Development*. Oxford: Oxford University Press; 1990.
 33. United Nations Human Settlement Programme (UN-HABITAT). *State of the World Cities 2008/2009: Harmonious Cities*, Nairobi, Kenya. 2008.
 34. United Nations International Children's Fund (UNICEF). *United Republic of Tanzania: Statistics*. 2013. https://www.unicef.org/infobycountry/tanzania_statistics.html. Accessed 1 May 2015.
 35. United Nations Population Fund (UNFPA). Fact sheet: the power of 1.8 billion: adolescents, youth and the transformation of the future sub-Saharan Africa, <https://www.unfpa.org/sites/default/files/resource-pdf/SWOP%202014%20fact%20sheet%20-%20Youth%20in%20SUB-SAHARAN%20AFRICA.pdf>. (2014).
 36. United Republic of Tanzania (URT). *National Health Policy*. Dar es Salaam, Tanzania: Ministry of Health (MoH); 1990.
 37. URT. *National Package of Essential Health Interventions in Tanzania*. Dodoma: Ministry of Health (MoH); 2000.
 38. URT. *The Tanzania Development Vision 2025*, URT Planning Commission. 1991. <http://www.tzonline.org/pdf/theTanzaniadevelopmentvision.pdf>. Accessed 1 Apr 2016.
 39. URT. *Primary Health Services Development Programme - MMAM 2007–2017*. Dodoma: Ministry of Health and Social Welfare; 2007.
 40. URT. *Health Sector Strategic Plan III: 2009–2015: Partnership for Delivering the MDGs*, Ministry of Health and Social Welfare (MoHSW) United Republic of Tanzania, Dar es Salaam, Tanzania. 2009.
 41. URT. *Assessment of the Prices and Availability of Medicines for Children in Tanzania, November 2010*. Dar es Salaam, Tanzania: Ministry of Health and Social Welfare (MoHSW); 2011.

42. URT. *National Essential Health Care Interventions Package—Tanzania (NEHCIP)*, May 2015. Dodoma: Ministry of Health and Social Welfare (MoHSW); 2013.
43. URT: *Tanzania in Figures 2012*, National Bureau of Statistics. http://www.nbs.go.tz/takwimu/references/Tanzania_in_figures2012.pdf. (2015). Online Accessed October 2015.
44. Wenban-Smith, H. *Urbanisation in Tanzania: Population Growth, Internal Migration and Urbanisation in Tanzania 1967–2012: A Census Based Regional Analysis*, International Growth Centre, April 2014, Working Paper. 2014.
45. WHO: Global Health Expenditure Database, WHO, Geneva. <http://apps.who.int/nha/database/ViewData/Indicators/en>. (2016). Online Accessed 22nd May 2016.
46. World Bank: *The World Bank Data—Tanzania*. <http://data.worldbank.org/indicator/SP.RUR.TOTL>. (2015). Online Accessed 1st Nov 2015.
47. World Health Organisation (WHO), Multicentre Growth Reference Study Group. *WHO Child Growth Standards: length/height-for-age, weight-for-age, weight-for-length, weight-for-height and body mass index-for-age*. Geneva: World Health Organization; 2006.