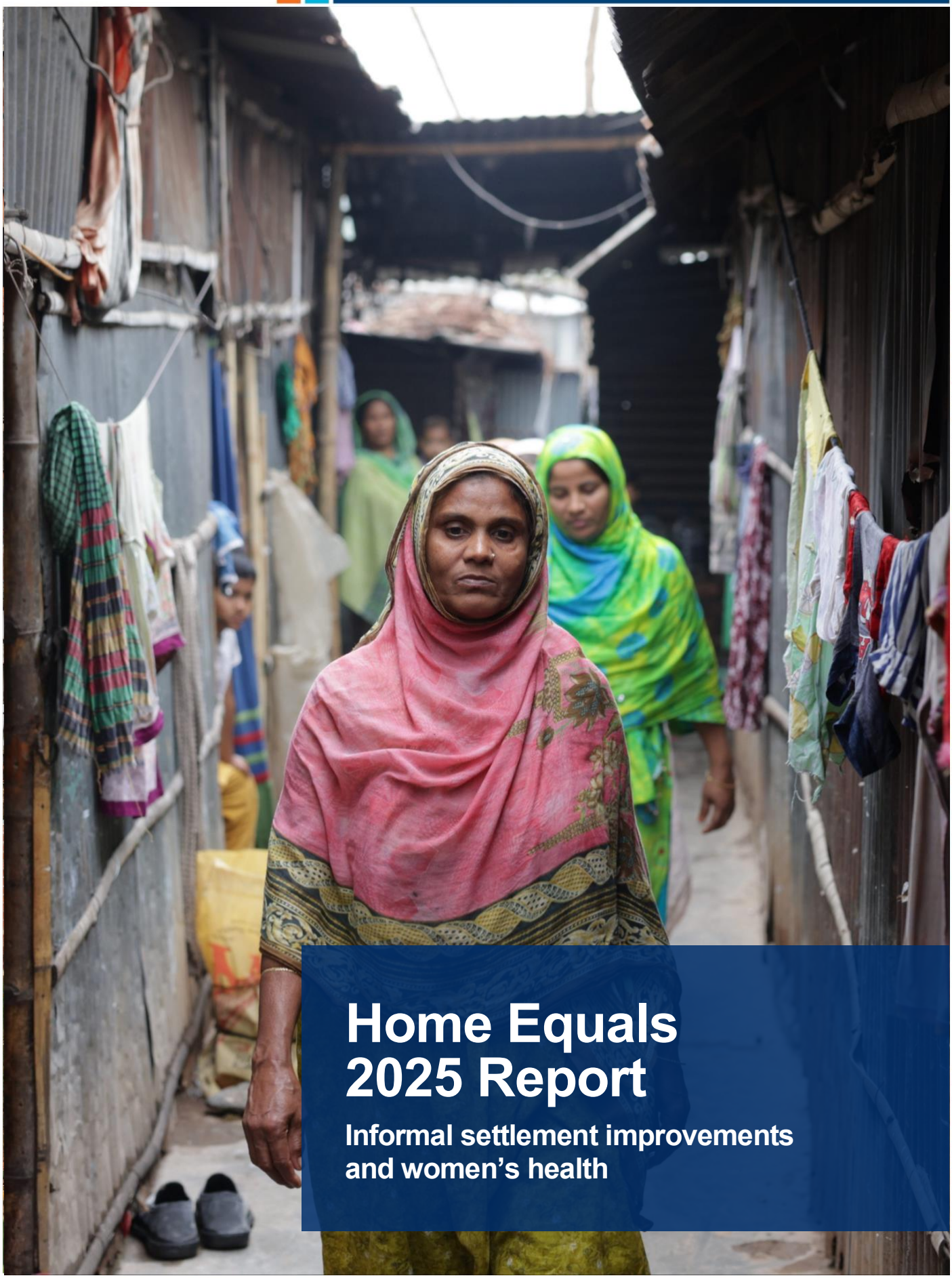
Habitat for Humanity®

Home Equals



Home Equals 2025 Report

Informal settlement improvements and women's health

This report was created to support Habitat for Humanity's Home Equals campaign for more equitable access to adequate housing in informal settlements around the world. It was produced by Global Insight, by an interdisciplinary team of scholars and researchers.

©2025 Habitat for Humanity International. This work is licensed under a CC BY 4.0 license. Material in this report may be shared and adapted, but you must provide appropriate credit, along with a link to the license and an indication of any changes made.

Authors

This report was prepared for Habitat for Humanity International by:

- **Dr. Morgan Richards-Melamdir**, Sector Lead for Poverty and Inequality at Global Insight and a sociologist specializing in gender inequality and cross-national and comparative research.
- **Dr. Caitlyn Placek**, Principal Investigator at Global Insight and a biocultural medical anthropologist specializing in women's behavioral health from a cross-cultural perspective.
- **Mannat Mehta**, research associate at Global Insight and an economist and political scientist specializing in gender-focused mixed-methods, participatory research, monitoring and evaluation.
- **Jillian Foster**, Founder and CEO of Global Insight. She is an expert in gender, peace and conflict with an M.A. in gender studies, M.A. in data science and M.Phil. in political science, and she is finishing her Ph.D.
- **Gabriela Saba**, research assistant at Global Insight and a graduate student with a summa cum laude dual major in political science and Arabic and minor in business administration.

Attribution

Please cite the work as follows: Richards-Melamdir, M.; Placek, C.; Mehta, M.; Foster, J. and Saba, G. 2025. *Informal Settlement Improvements and Women's Health*. Habitat for Humanity International, Washington, D.C.

Acknowledgments

The work in this technical report was commissioned by Habitat for Humanity International and coordinated by Dr. Maria Carrizosa, Associate Director of Global Housing Policy. It was possible thanks to the support of many individuals working across the world.

Indonesia

- Residents of Tanjung Kait in Tangerang and national-level experts
- Punjung Widodo, Senior Specialist, Government Relations Advocacy Partnership, Habitat for Humanity Indonesia
- Paulene Santos, Advocacy Manager, Habitat for Humanity Asia and the Pacific

Kenya

- Residents of Mukuru in Nairobi and national-level experts
- Millicent Adhiambo, Advocacy Manager, Habitat for Humanity Kenya
- Grace Ananda, Policy and Advocacy Manager, Habitat for Humanity Africa

Mexico

- Residents of La Aldana in Guanajuato and national-level experts
- Leticia Cruz Rodriguez, Education Manager, Habitat for Humanity Mexico
- Geraldine Gene, Senior Advocacy Manager, Habitat for Humanity Latin America and the Caribbean

Egypt

- Residents of Ezbet El Haggana in Cairo and national-level experts
- Maha Arouck, Senior Program Manager, Habitat for Humanity Egypt
- Deena Khalil, Senior Manager, Urban Policy, Research and Advocacy, Habitat for Humanity Middle East and North Africa

North Macedonia

- Residents of Kumanovo, Prilep and Bitola and national-level experts
- Liljana Alceva, National Program Director, Habitat for Humanity Macedonia
- Gyorgy Sumeghy, Associate Director of Policy and Advocacy, Habitat for Humanity Central and Eastern Europe

Habitat for Humanity International Review Committee

- Allison Burden, Program Director Housing Opportunity and Mission Engagement
- Amanda Entrikin, Senior Director, Government Relations and International Policy
- Anna Konotchick, Senior Director, Research Evidence and Learning
- Anthony Colombo, Research and Analysis Manager, Strategy Realization Team
- Brenda Pérez-Castro, Director, Urban Programming
- Brian Feagans, Vice President, Global Network Communications
- Carly Kraybill, Associate Director, International Advocacy
- Emily Mason, Senior Director, Global Program Communications
- Katrina Lisnichuk, Monitoring, Evaluation, Accountability and Learning Manager, Habitat for Humanity Latin America and the Caribbean
- Maria Carrizosa, Associate Director of Global Housing Policy
- Rebecca Ochong, Associate Director, Government Relations and International Policy
- Sheldon Yoder, Director, Market Systems Development, Terwilliger Center for Innovation in Shelter
- Stacey Sawchuck, Director, Global and Indigenous Initiatives, Habitat for Humanity Canada
- Sydney Morton, Director, Program Communications

External reviewers

- Mikkel Harder, Partnerships Manager, Slum Dwellers International
- Kelsey Harris, Senior Policy Analyst, Gender Equality and Inclusion Program, Center for Global Development
- Robin King, Director of Knowledge Capture and Collaboration, Ross Center for Sustainable Cities, World Resources Institute

Contents

Abbreviations

GBD: Global burden of disease

GI: Gastrointestinal infections

HDI: Human Development Index

IPV: Intimate partner violence

LAC: Latin America and the Caribbean

MENA: Middle East and Northern Africa

RTI: Reproductive tract infection

SDG: Sustainable Development Goals

SGBV: Sexual and gender-based violence

TB: Tuberculosis

UTI: Urinary tract infection

UN: United Nations

UN-HABITAT: United Nations Human Settlements Programme

WASH: Water, sanitation and hygiene

WHO: World Health Organization

Executive summary

At least 1.1 billion people live in slums or informal settlements globally (UN-HABITAT, 2023), and this is likely an undercount. While this is a global and multisectoral issue, women are overrepresented in informal settlements (UN-HABITAT and UN Women, 2020), a reality that reflects the way in which social norms and structural inequality limit women's access to education; economic opportunities; rights, including the right to housing; and asset ownership (UN Women, 2024). Further, while many women in urban areas can better access education and health services compared to rural women, urban women living in informal settlements remain behind other urban women in terms of educational access. Women in informal settlements experience additional disadvantages relative to their male counterparts (Azcona, Bhatt and Duerto Valero, 2020), including the specific health risks and outcomes discussed in this report.

Despite the challenges, informal settlements provide affordable housing and income-generating opportunities for women and other residents. The Home Equals campaign, a five-year effort initiated by Habitat for Humanity and partner organizations in 2023 to promote housing improvements in informal settlements globally, recognizes slum[i] upgrading and informal settlement transformations as critical tools for sustainable human development. Because urban informal settlement environments provide housing for so many people, improvements[ii] in these

i In this report, the terms "informal settlements" and "slums" are used interchangeably, despite the technical differences between the two. According to UN-HABITAT, informal settlements are residential areas where 1) inhabitants have no security of tenure vis-à-vis the land or dwellings they inhabit, with modalities ranging from squatting to informal rental housing, 2) the neighborhoods usually lack, or are cut off from, basic services and city infrastructure, and 3) the housing may not comply with current planning and building regulations and is often situated in geographically and environmentally hazardous areas. In addition, informal settlements can be a form of real estate speculation for all income levels of urban residents, affluent and poor. Slums are the most deprived and excluded form of informal settlements characterized by poverty and large agglomerations of dilapidated housing, often located in the most hazardous urban land. In addition to tenure insecurity, slum dwellers lack formal supply of basic infrastructure and services, public space and green areas and are constantly exposed to eviction, disease and violence (UN-HABITAT 2015).

ii In this report, the term "improvements" includes a wide range of interventions, from upgrades in sanitation infrastructure to small solutions like improving natural ventilation. "Improvements" does not refer to comprehensive slum upgrading or informal settlement transformation. However, it is understood that informal settlement transformation is often incremental in character, whereby a number of small improvements add up to make positive change.

settlements represent impactful investments in human development. Specifically in terms of health, the Home Equals 2023 launch report established that if upgrades at scale were to occur in informal settlements, the world would experience a 4% increase in life expectancy (Friediani et al., 2023).

The research in this year's report takes a closer look at how improvements in informal settlements are critical for achieving global health goals for women. In addition to sharing insight into the benefits of addressing inadequate housing, it highlights opportunities for policy solutions to address the consequences of living conditions in informal settlements.

Through a synthesis of existing literature and results from a new predictive analysis, the report answers the question: How and to what extent would housing and informal settlements improvements benefit the health of women and girls?

The analysis demonstrates significant potential benefits to women's health if all women in informal settlements had access to key adequate housing features or services, such as clean fuel usage; reduction in overcrowding; water, sanitation and hygiene, or WASH, improvements; access to maternal health services; tenure security and housing made of adequate materials. Considering current access to those features and prevalences of health conditions, estimates suggest that, at a global level and within the first year of introduction[iii], improvements to housing and informal settlements could result in at least:

- 20.3 million fewer cases of illness from respiratory infections, enteric infections, chronic obstructive pulmonary disease, reproductive and urinary tract infections, and heat sickness. This improvement of the health of women in informal settlements is comparable to the cases of paralysis avoided by the polio vaccine over 37 years (CDC, 2025).
- 42.9 million fewer incidences of gender-based violence from intimate partner violence and non-partner sexual violence. The number of violent incidents averted is almost 60% more than the child marriages avoided by a combination of interventions, including education, government investments and public messaging, over the course of 10 years (UNICEF, 2021).
- 80,200 fewer deaths of women and girls in informal settlements from maternal and climate-related events. This means that 1 in 4 maternal deaths and 1 in 6 deaths due to heat stroke could be prevented globally if improvements in informal settlements are implemented (WHO, 2021; WHO, 2023).[iv]

The final section of the report includes recommendations for improving women's health outcomes in informal settlements through specific housing improvements and slum upgrading interventions. These recommendations cover both what kinds of improvements are expected to be most impactful and strategies for organizing informal settlement improvement efforts to achieve positive outcomes for women.

Findings from this report suggest a need to prioritize interventions that are often specific to women — such as those related to sexual and reproductive health and gender-based violence — and may require unique investments that do not overlap with broader community needs. Similarly, the recommendation section addresses specific investments — like clean cooking fuels or security features for shared sanitation — that are generally beneficial for all individuals in informal settlements, and especially for women. Moreover, this research reveals legislative changes that are needed alongside infrastructure and service improvements to fully address women's health needs.

Throughout, recommendations raise the need to pair infrastructure improvements with changes in attitudes and behaviors around harmful social norms, as well as strategies for promoting women's leadership in collaborations with local government to develop community-based solutions. Finally, specific data and evidence gaps are also identified, highlighting the need to generate more evidence globally on the relationship between adequate housing features and women's health.

iii With the exception of chronic obstructive pulmonary disease, which has a longer time threshold for benefits to manifest.

iv To avoid overcounting for any given health outcome, these aggregate figures reflect the value from the housing or informal settlement improvement that yields the largest benefit for each health outcome. Since each instance of a disease, death, etc., has a number of causal factors, counting the benefits from informal settlement improvement for each type of disease just once prevents double counting.

1. Conceptual Framing of Gender and Health

In understanding what affects women's health outcomes in informal settlements, this report applies a social-ecological framework. This framework explains health outcomes as resulting from the interaction of social-ecological factors across multiple levels, including individual, interpersonal, community/institutional (including housing), sociocultural and environmental. The individual level includes personal factors like genetics, sex, age and education. The interpersonal level involves close relationships with friends, peers and family. The community/institutional level covers factors like housing and health care access and community services. The sociocultural dimension acknowledges that women's health is shaped by dynamic interactions between individuals and their social and cultural environments, with "culture" including social norms, like gender norms, and socially transmitted taboos, traditions and customs. Finally, the environmental level addresses nature-related issues like infectious diseases, famine and climate change. The social-ecological model helps understand what factors influence health beyond individual characteristics and promotes a community-based framework for encouraging behavioral change (Bronfenbrenner, 1977; Stokols, 1996; Hewlett, 2004). In alignment with global norms, this model understands housing as a social determinant of health equity (WHO, 2024), embedded within a larger network of social and ecological factors.

Women's health in informal settlements is shaped by factors across social-ecological levels. The findings in this report identify these factors for specific health outcomes and consider how sex (biological elements) and gender (cultural elements) affect health. For example, individual-level factors, like sex and biology, present female-bodied people with the unique challenge of managing menstruation, a challenge compounded in informal settlements by weaker access to WASH within homes or communities (community/institutional-level factors) (Corburn, 2015; Khanna and Das, 2015; Girod et al., 2017; Rajagopal and Mathur, 2017; UN-HABITAT, 2020). Similarly, social norms about gender roles mean women in many places are considered responsible for cooking, which, combined with weaker access to clean fuel in informal settlements (a community/institutional barrier to health), can lead to an elevated risk of respiratory disease (UN-HABITAT, 2022).

Placing the relationships analyzed here within the social-ecological elements helps clarify how sex and gender interact with biology, family, housing, community and sociocultural levels to affect women's health and how those relationships operate in specific ways within informal settlements. A social-ecological framework is especially important here because understanding how gender interacts with sociocultural, community, housing and family factors is critical for explaining women's health outcomes in informal settlements. This adds important nuance, especially around gender norms, to existing housing-focused frameworks, like the housing pathways to health model (Howden-Chapman et al., 2023). The housing pathways to health model understands housing affordability and features as key determinants of what health hazards a person is exposed to (leading to poorer health outcomes). This research similarly understands housing features and the informal settlement context as key determinants but leverages the elements of the social-ecological framework to better elaborate on the way in which gender and social roles and norms interact with housing features to produce unique health outcomes for women.

2. Methodology

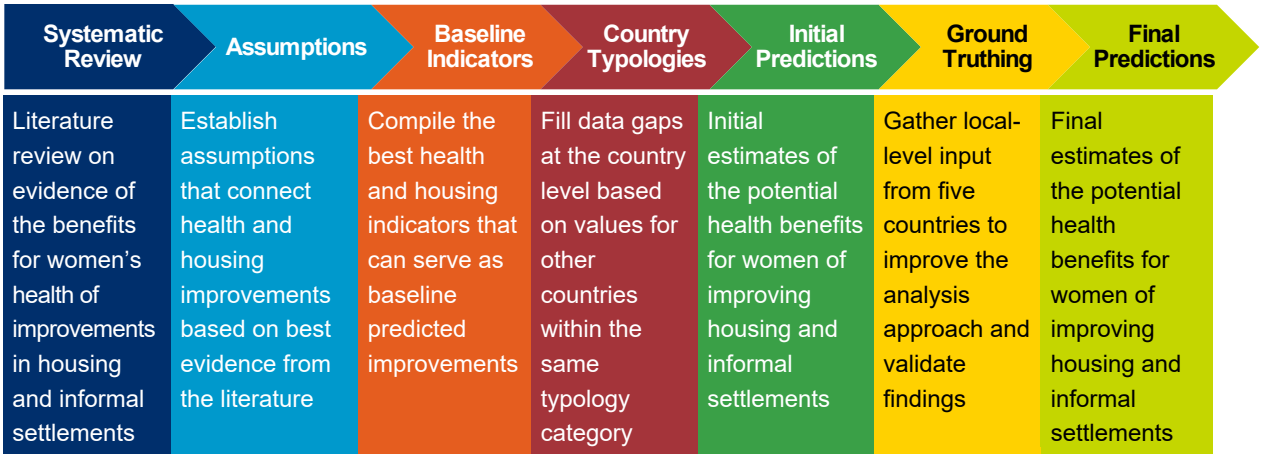
2.1. Overview

This report aims to understand how and to what extent improvements in informal settlement housing and services would improve the health of women. It is based on a combination of a systematic literature review, a predictive analysis, and a "ground truthing" process to validate findings and recommendations. The process began with the review of over 175 studies and other resources — including academic journals and non-academic expert sources of information — from disciplines including public health, gender studies, urban studies and sustainable development in order to understand the health disparities experienced by women in informal settlements and to gather data about the relationship between informal settlement improvements and health outcomes. The predictive analysis explores the extent to which women's health outcomes might improve with informal settlement upgrading. The ground truthing process included 10 workshops across five countries (Kenya, Indonesia, Mexico, Egypt and North Macedonia), with one expert workshop and one informal settlement resident workshop in each country.

The figure below summarizes how the research process progressed and how each successive step built on the previous one. (Annex A includes a detailed description of the methodology.) The systematic literature review, aided by a specialized software, provided information on how improvements in housing and informal settlements could lead to improvements in women's health, as well as the size of the relationship between improvements in housing adequacy and health outcomes. The quantitative evidence collected about the size of the relationships between housing adequacy and health outcomes was the foundation for the predictive analysis assumptions.

The next step was compiling available data at the country level on the housing and health indicators identified by the literature as important in terms of generating gender differences in health outcomes. This set of indicators was used to establish the baseline for the predictions. Then, country typology categories were constructed (discussed more below) that allowed countries with missing data to be assigned the population-weighted averages for housing and health indicators from other countries in the same typology, hence creating a complete dataset. The last part of the process was the predictive analysis, which included a validation or ground truthing step. Predictions used the assumptions generated from the literature about the size of the relationship between housing adequacy improvements and women's health to estimate potential reductions in women's experience with negative health outcomes.

Figure 1. Methodological approach



The predictive analysis ultimately estimates what health outcomes among women in informal settlements might look like if key adequate housing improvements were fully implemented (taking into account current access to those features of adequate housing). These statistics are compared to a baseline statistic, a value for health outcomes among women in and outside of informal settlements (based on current country values for those health outcomes; this is the best available data on the current prevalence of health conditions for women in informal settlements). Finally, the analysis calculates what the new population statistic for each health outcome would be, if just the informal settlement environment was affected by housing or service improvements. This shows how investments in informal settlements increase progress toward global health goals. The health benefits reported are an annual estimate. However, the predictive analysis does not make assumptions about how benefits might change over time. For example, the benefits of reducing overcrowding on respiratory infections might fluctuate year to year based on the severity of the flu or coronavirus strains circulating, for example. Therefore, it is best to think of these estimates as the benefits that come in the first year that housing adequacy improvements are introduced.

Importantly, the results of the predictive analysis are estimates only, representing potential impact based on what is currently known about the prevalence of certain health conditions, availability of data on certain features of adequate housing, and the relationship between the two from a sometimes small body of existing research. Thus, these estimates tell us what might be possible, based on current conditions at a country level, but they are not certainties and are limited by available data. This is further discussed in the limitations section and the recommendations section, which also details what additional information would be necessary to fully understand the links between informal settlement improvements, gender and health. Thus, these estimates should be treated more as indicators of the potential value or scale of the impact on women's health that can be created by investments in informal settlements.

These results are summarized for country typologies rather than countries, with countries categorized based on Human Development Index, or HDI, values and portion of the population living in slums. Summarizing results for country typologies yields more reliable estimates in light of country-specific data gaps. Typologies also allow for comparison across intervention contexts (showing the greater benefits possible from improvements in contexts with many people in slums, for example). These types include the following (exact definitions are in Annex A):

Type	Human development	Portion of the population living in slums
Type 1 Countries	High to very high	Low
Type 2 Countries	High to very high	High
Type 3 Countries	Moderate	Moderate to high
Type 4 Countries	Moderate to low	High

2.2. Scope and data limitations

Regarding scope, not all health conditions that affect women are included, not only from a data availability perspective, but also because this research focuses on those health conditions where gender plays a role in producing unique vulnerabilities for women in informal settlements. These relationships between gender roles and health outcomes, however, are not identical from place to place. This report is global in nature, so it focuses on gender roles present in many, but not all, societies. Therefore, readers may not find every relationship between gender and health relevant in their context. Similarly, health risks can be gendered in ways that increase risks for women through one gender role pathway (e.g., women's responsibility for cooking increasing exposure to smoke and respiratory infections) and increase risks for men through another pathway (e.g., men's responsibility for income generation exposing them to occupational hazards, including chemicals or particulates that increase respiratory infections). Because the objective of this report is to act as a resource and advocacy tool for situating housing as relevant for women's health, gendered pathways less directly connected to housing or informal settlement conditions were not explored.

The analysis is limited by existing data. In particular, the approach relies on existing data on current access to features of adequate housing, current rates of experiences with various health conditions among women, and studies on the relationship between the two (housing features and health conditions). Because datasets of country-level indicators that disaggregate data on housing features and health outcomes by gender and location (specifically inside versus outside informal settlements) are not typically available, the predictive analysis relied on data for countries as a whole, not just informal settlements. To calculate the size of the benefit to women in informal settlements, the population assumed to benefit from a given change in housing adequacy is limited to these women, as their number is an available value. Because women in informal settlements have both lower access to adequate housing and poorer health, on average, this process ***underestimates*** the likely benefit of housing improvements, which is preferable to overestimating benefits.

Additionally, data and research limitations lead to more information on some health conditions and some housing or informal settlement features more than others. In fact, only data points from studies running tests of statistical significance were used to generate the assumptions. For instance, there is far more information available on WASH and health outcomes for women. Within this body of WASH research, though, some nuance is still missing. For example, assessing how improving the quality of piped water would reduce disease transmission (especially relevant for older informal settlements where some improvements in infrastructure have already been implemented) is difficult with available data (most studies look at access to infrastructure improvements in drinking water without measuring the quality or affordability of that water). Similarly, in many places, shared sanitation might be a vastly more feasible solution than private sanitation for providing at least some level of toilet access. Studies that emphasize the benefit of well-maintained and adequate shared facilities as a practical solution in informal settlements include the need for safety measures such as the presence of well-fitting doors with functional locks, facilities separated by gender, solid walls, and roofs without cracks or holes, as well as higher standards of cleanliness (Lebu et al., 2024). However, suitable research on how more frequent cleaning or increased safety features might improve women's health (relative to less clean/safe shared sanitation), for example, is not available.[v] Findings on the benefits of private sanitation should be considered with that in mind.

Additionally, informal settlement residents do experience higher rates of malaria (WHO and UN-HABITAT, 2022), and pregnant women can be particularly vulnerable to this due to weakened immune systems (Dako-Gyeke and Kofie, 2015; Bamgboye et al., 2025). However, suitable research[vi] on specific housing-related factors that make pregnant women more vulnerable to malaria is only starting to emerge (Abong'o et al., 2024). In addition, the data on women's experiences with certain health conditions is very likely to be an underreporting of some issues, especially gender-based violence. Finally, insufficient suitable data prevents a more comprehensive and nuanced analysis that would cover the benefits to health for residents of informal settlements. The reader should keep these realities in mind when considering findings.

v Suitable meaning the use of experimental methods or inferential statistics to generate an estimate of the treatment effect or size of the improvement in health outcomes generated by a given housing improvement. In this case, using clean/safe shared sanitation versus sanitation that does not meet cleanliness or safety standards.

vi Suitable using the same definition as in the previous footnote, so research estimating the extent to which specific housing features reduce the risk or odds of contracting malaria among pregnant women.

Aside from these data limitations, the predictive analysis pulls apart and isolates specific housing-related risks and health outcomes for women. In reality, risks overlap in ways that likely compound the probability of certain health outcomes. The calculations performed here are not able to take this complexity into account. Similarly, there is a large overlap in the probability of experiencing certain health outcomes at the same time in ways that may further complicate women's health. For example, there is a clear overlap between sexual and gender-based violence and reproductive health outcomes. This overlap and how it might affect the final figures is also not well integrated into the approach used here. The reality of a "whole" woman living in an informal settlement is a woman experiencing layered and diverse pressures from social norms and health risks, and even multiple and complex sets of illnesses or health complications, at any given moment. Keeping this more holistic lens when reviewing findings, even as those findings isolate health risks and conditions, may lead to a more nuanced reading of this research.

2.3. Informal settlements as places of provision and power

Despite the deprivations, informal settlements are important locations of housing provision, especially in the face of shortages of affordable housing (Atkinson, 2024), and may offer health benefits and feature effective community empowerment efforts. For example, walking is the most common form of transportation in informal settlements (Loor et al., 2021). Even though informal settlement dwellers walk more because of transportation deprivations, the prevalence of footpaths and increased walkability of informal settlements have significant health benefits. Regular walking can improve cardiovascular fitness by 10%, which is likely to translate into a 15% reduction in mortality risk, and it is associated with a 30% lower risk of developing Type 2 diabetes (Mulley, 2017). Women tend to walk less than men (Banach et al., 2023), but it is likely that women in informal settlements walk more than those in other parts of the city. Further, self-constructed routes and pathways in informal settlements enable essential social and economic connections that can increase residents' well-being (Oviedo et al., 2021). Being embedded in high-quality, close relationships and feeling socially connected are associated with decreased risk for all-cause mortality (50% reduced risk of early death) as well as a range of disease morbidities (Holt-Lunstad et al., 2017). Social connectedness has strong mental health benefits, protecting from depressive symptoms and disorders (Wickramaratne et al., 2022). Constructing footpaths can also be a form of historical Indigenous practice that has both symbolic and practical significance (Loor et al., 2021). Further, unlike formal cities where municipal authorities oversee infrastructure provision, residents of informal settlements often create informal infrastructure and even social protections through a bottom-up approach (Bhan, 2023). In this way, informality may also allow for successful individual and collective actions to address community needs.

A strong body of existing literature documents the role of collective action and women's empowerment, meaning their voice and agency, in interpersonal, community and political matters affecting their health, especially as part of informal settlement transformation. Women in many underserviced communities have successfully organized to improve services and infrastructure and hold duty bearers responsible for providing and maintaining safe and clean amenities, with resulting health benefits. For example, women in informal settlements have increased their access to reproductive health services by petitioning for access to government-funded initiatives providing immunizations for pregnant and lactating women and for the provision of health centers (Chatterjee, 2015). Community-based interventions led by women around WASH have reduced the spread of waterborne diseases (Wyant and Spasić, 2015; Corburn et al., 2022). To achieve these benefits, women have advocated for safer toilets and for flooding and pollution mitigation (Sweetman and Medland, 2017; Corburn et al., 2022), learned how to do water testing and public budget monitoring (Wyant and Spasić, 2015) to hold duty bearers accountable, and provided community care during the COVID-19 pandemic (Akter et al., 2024). Women's groups have similarly helped maintain the health and economic well-being of women in their community through networks of mutual aid to cope with environmental crises, advocating for the needs of displaced families and providing emotional and material support. Through these networks, women found spaces for mutual support, shared resources and advocacy for better housing solutions that also help to reduce stress, loneliness and depression (Sletto et al., 2022).

When well-conceived, women's empowerment interventions, in addition to community-based social and normative changes, are especially critical for reducing women's experiences with sexual and gender-based violence, or SGBV (discussed in more detail in the related section). Importantly, normative change at the

community and institutional levels is necessary for ending violence against women, and this must include changes in men's attitudes and behaviors (Wyant and Spasić, 2015; Gram et al., 2022; Paradkar et al., 2024). However, through collective action, women in informal settlements have effectively referred other women to counseling services, intervened during disputes, stopped suicide attempts, brought survivors home to their parents or to the hospital, offered financial help or shelter, and provided socioemotional support (Paradkar et al., 2024). Similarly, collective consciousness-raising work among women has created solidarity around new norms that reject violence instead of tolerating it (Chatterjee, 2015; Cities Alliance, 2021).

Instances of women's success in holding government accountable and increasing government coverage of vital services and programs are especially important outcomes of women's empowerment. This is because, while patterns of reciprocal support among women and communities are essential components of collective well-being (Roy et al., 2018), community-based support should not be seen as an opportunity for states to absolve themselves of responsibility for providing critical infrastructure and social services. Similarly, grassroots, national and international organizations should not overutilize women's labor at a community level without ensuring women have a voice in formal political systems where decisions are ultimately made (Rakodi, 2014; World Bank, 2020).

As the examples above demonstrate, informal settlements are also sites of empowering community organizing. These spaces often offer affordable housing options in the face of shortages. Especially when improved, these neighborhoods respond to the needs of their residents in ways that organically integrate social, economic and cultural traditions. Thus, while this report focuses on areas where health could be improved, these findings should be situated within an understanding that living in informal settlements may also offer benefits and that these communities are spaces where women can and do use their power to take collective action and address the challenges they face.

3. Findings

Findings are organized around key health outcomes that emerged from the literature review and are used in the predictive analysis. Many outcomes also overlap with key Sustainable Development Goals, or SDGs, and their indicators and targets. This section discusses why gender matters for each health outcome within the context of informal settlements and presents evidence collected on how improvements that make housing more adequate are critical from a gender and health perspective. Then, relevant data from the predictive analysis is presented. The findings cover, in order, 1) respiratory infections, 2) diarrhea and gastrointestinal infections, 3) reproductive and menstrual health, 4) SGBV and 5) climate-related health outcomes.

3.1. Respiratory conditions

3.1.1. Respiratory conditions and clean fuel

Women in informal settlements are often responsible for cooking, due to the gendered division of labor. As a result, they are at an elevated risk of respiratory conditions often caused or exacerbated by poor air quality from smoke produced by stoves and fires used for cooking and heating (Jabeen, 2014; Elsey et al., 2016; UN-HABITAT, 2022; Boateng and Adams, 2023). This demonstrates how the sociocultural level (norms) of the social-ecological model interacts with housing features (fuel types, ventilation, etc.) to affect women's health. Many women acknowledge that the design and structure of their homes contribute to these respiratory problems. One woman described her experience:

> *"Because of smoke, I suffer from eye irritation, and the baby cannot sleep properly. There are numerous other internal effects as well. … If the wood isn't dry, a lot of smoke is emitted. … I experience a burning sensation in the eyes. I need to blow into the fire continuously until it burns. It gives me a headache and cough." (Elsey et al., 2016)*

Respiratory infections are likely more common among informal settlement populations, with one study finding that informal settlement residents were 1.4 times more likely to report such infections compared to residents in other communities (Mannan, 2018). Studies both inside and outside informal settlements have connected cooking fuels and indoor air pollution to respiratory infections, chronic respiratory conditions, and even increased mortality or reduced life expectancy (Marais and Cloete, 2014; Zhou et al., 2014; Hamilton et al., 2015; Zimmerman et al., 2017; Dianati et al., 2019; Sharma and Jain, 2019; Kua and Lee, 2021). Thus, clean fuel technologies are a potential solution to reducing women's risk of respiratory illnesses in informal settlements. Based on existing research about clean fuel technologies, ambient pollution and respiratory illnesses (Hamilton et al., 2015; Zimmerman et al., 2017; Dianati et al., 2019; Marais and Cloete, 2014; Zhou et al., 2014; Kua and Lee, 2021; Fyfe et al., 2022), the following assumptions are likely true about how using clean fuels affects health outcomes:

- Clean fuel usage reduces the odds of respiratory infections by 37.5%.
- Clean fuel usage reduces the risk of chronic obstructive pulmonary disease, or COPD, by 77%.

Predicted improvements

Data on respiratory infection prevalence also suggest these infections are more common in countries with larger slum populations. The current percentage of women with respiratory infections (excluding tuberculosis, discussed below), based on available population-level data, ranges from 5.3% in the first group of countries (higher income with lower slum populations) to 7.1% in countries with lower development and higher slum populations (Table 1). Type 3 and Type 4 countries — the groupings where more than 30% of the population, on average, live in informal settlements — have lower portions of the population using clean fuels for cooking (66.5% and 29.9%, respectively). These lower rates of clean fuel usage translate to significant potential benefits in terms of reduced incidence of respiratory infections among women should clean fuels be adopted. Specifically, ***if all informal settlement residents used clean fuel, the percentage of women with respiratory infections in informal settlements could drop to 5.5% in Type 3 countries and 5.2% in Type 4 countries.*** For Type 4 countries, this means 1 in 8 expected respiratory infections among women could be prevented with clean fuel usage. ***Globally, this could reduce the number of women with respiratory infections by just over 5.4 million*** (preventing 1 in 30 expected infections among women).

Table 1: Respiratory infection rates and clean fuel usage in informal settlements

Country type	HDI value (2022)[i]	Percentage of population living in slums[ii]	Percentage of population using clean fuel	Actual percentage of women with respiratory infections	Estimated percentage of women in informal settlements with respiratory infections with complete usage of clean fuel	Adjusted percentage of all women with respiratory infections after complete clean fuel usage in Informal settlements[iii]
1	0.85	2.7%	96.6%	5.3%	5.2%	5.3%
2	0.75	27.8%	92.9%	5.9%	5.7%	5.8%
3	0.63	34.1%	66.5%	6.4%	5.5%	6.0%
4	0.48	59.2%	29.9%	7.1%	5.2%	6.0%

i United Nations Development Programme, 2022. Human Development Report.
ii UN-HABITAT. 2023. Indicator 11.1.1, U.N. SDG Indicators Database (data for most recent available year).
iii Adjusted meaning the percentage of women with respiratory infections if all women in informal settlements used clean fuel.

COPD is a lung and airway disease that can occur due to repeated exposure to air pollutants, including from fuels used to cook and heat homes (Zhou et al., 2014; Duan, Hao and Yang, 2020). COPD develops over time, so it represents a measure of the cumulative effect of pollutants, where respiratory infections indicate more immediate health outcomes. COPD cases are rarer than respiratory infections (with only 1.5% to 2.1% of women in Type 4 and Type 3 countries having COPD). Still, ***complete usage of clean fuel among women in informal settlements for five to 10 years could reduce cases of COPD in Type 3 and Type 4 by just under 1.1 million and over 1.6 million, respectively. Globally, complete usage of clean fuels in informal settlements could reduce the number of women with COPD by nearly 3.6 million.***

3.1.2. Respiratory conditions, overcrowding and ventilation

Additional housing factors, such as overcrowding and close proximity to neighbors, also contribute to respiratory illnesses. Smoke from one household can easily seep into neighboring homes, exacerbating the problem (Elsey et al., 2016). Additionally, tight quarters contribute to the spread of infectious diseases. For example, during the COVID-19 pandemic, women in informal settlements struggled more to isolate from sick family members due to overcrowded conditions *and* their social reproductive roles, which required they care for sick family members and cover increased cleaning and cooking demands (Akter et al., 2024). Ventilation can help reduce the effect of pollution from cooking fuel while also reducing the spread of infectious diseases, like coronaviruses and tuberculosis, or TB (Lygizos et al., 2013; Pardeshi et al., 2019), and women who live in well-ventilated homes report not only better respiratory health but also improved mental health and overall well-being (World Bank, 2022). Data at a country level for a sufficient number of countries on what portion of homes currently have adequate ventilation is not available. As a result, even though research strongly connects ventilation improvements to reduction in infectious disease transmission (Lygizos et al., 2013; Baker et al., 2017; Pardeshi et al., 2020), estimating the impact of improvements in the availability of ventilation is not done here. However, available data does support estimates of the health benefits of overcrowding reduction for women, specifically around reduced contraction of TB. TB cases are relatively rare (with prevalence rates well under 1% in all country types), although the illness is very serious when contracted. However, although a dated study, informal settlement residents were found to be 1.7 times more likely to contract TB than residents in other communities (Marais and Cloete, 2014). Based on existing research about the association of housing features and TB prevalence (Lygizos et al., 2013; Pardeshi et al., 2020; Marais and Cloete, 2014), the predictions used the following assumption about how mitigating overcrowding might reduce TB transmission:

- Reducing the number of people per room could lead to an 11% reduction in the odds of TB infection.

Predicted improvements

If overcrowding were reduced in informal settlements so that there was one less person per room in overcrowded homes, ***the number of TB cases among women globally could be reduced by 30,197.***

3.1.3. Respiratory conditions and WASH

Women and girls are also exposed to respiratory diseases as a result of sanitation systems and facilities or water point accesses which are not sufficiently available, structured, cleaned or ventilated in ways which prevent disease transmission (Marais and Cloete, 2014; Corburn, 2015; Parikh et al., 2020; UN-HABITAT, 2020; Sletto et al., 2022; Boateng and Adams, 2023). Women's vulnerability to respiratory infections is exacerbated by their roles in fetching water, increasing their exposure when water sources are not sanitary (Parikh et al., 2020). For instance, residents of Los Platanitos, Dominican Republic, reported that insufficient WASH systems caused sewage to drain into the channel running alongside their homes, contributing to respiratory health problems in the community (Sletto et al., 2022). The connection between adequate WASH facilities and respiratory diseases became particularly evident during the COVID-19 pandemic, when women in informal settlements felt an increased fear of infection due to unimproved shared sanitation facilities (Akter et al., 2024). Based on a selection of existing research on the relationship between WASH improvements and respiratory infections (Marais and Cloete, 2014; Fyfe et al., 2022; Kua and Lee, 2021), the predictive analysis assumes the following:

- Private (versus shared) sanitation reduces the odds of respiratory infections by 44%.[vii]
- Water nearby lowers the odds of respiratory infections by 53%.

Predicted improvements

Private sanitation is a less common resource, especially among countries with larger populations living in informal settlements. On average, only 26.4% and 37.8% of people in Type 4 and Type 3 countries, respectively, have access to private sanitation. As a result, the potential benefit in terms of reducing respiratory infections from ensuring access to private sanitation among all women in informal settlements is large. As stated above, however, improved shared sanitation may still be the best option in some communities (Lebu et al., 2024). ***If all women in informal settlements had access to private sanitation, the percentage of women with respiratory infections in informal settlements in Type 4 countries could drop from 7.1% to 4.6%, putting the estimated adjusted percentage for the population at 5.6%. Similarly, in Type 3 countries, rates of respiratory infections among women in informal settlements could drop from 6.4% to 4.3%.*** Because shared sanitation is still present outside Type 4 and Type 3 countries (with close to 1 in 4 people using shared sanitation even in Type 1 countries), ***an estimated 10.9 million cases of respiratory infections among women could be prevented globally (nearly 8.9 million in Type 3 and Type 4 countries) if all informal settlement residents had access to private sanitation.***

Having water accessible within less than a 30-minute walk is fairly common, even in Type 4 countries, with 88.8% of people, on average, accessing water within this distance in Type 4 countries and 96.6% in Type 3 countries. So, the size of the benefit that could come from closing these relatively smaller gaps in access is less. Nevertheless, ***ensuring all women in informal settlements are able to access water close to their residence could still prevent nearly 2.1 million cases of respiratory infections among women.***

3.2. Diarrhea and gastrointestinal infections

3.2.1. Diarrhea, GI infections and WASH

Existing data suggests informal settlement residents may be 1.5 times more likely to report diarrheal diseases compared to people in other communities (Mannan, 2018). Inadequate WASH facilities expose women and girls, especially, to health risks from gastrointestinal diseases (Joshi, 2017; UN-HABITAT, 2020). Due to sociocultural norms, women and girls are often tasked with managing household wastewater (including collecting and disposing of wastewater, cleaning sanitation facilities and maintaining hygiene practices for their families), which increases their risk of exposure to infectious and waterborne diseases (World Bank, 2022; Sletto et al., 2022). As stated, women's roles in fetching water increase their exposure to illness when water sources are not sanitary (Parikh et al., 2020). Community/institutional barriers to health, such as poor flood mitigation measures, improper drainage of sewage water, and inadequate toilets and sanitation facilities, increase these risks (Parikh et al., 2015; World Bank, 2020; Corburn et al., 2022; Sletto et al., 2022). Similarly, lack of disclosure about water sources, including untreated wastewater, intensifies these issues. For example, one research participant recounted how wastewater is sometimes concealed in water tankers:

vii Private sanitation is defined as sanitation not shared with other households.

> *"Nowadays if tankers deliver water, we ask, where is the water coming from? We know the hydrants are shut. A woman who lives a few lanes away from my house — her youngest child got sick, severe gastrointestinal sickness, after a water tanker delivery. Later she learned it was wastewater from an ice factory. She had to pay expensive medical bills and seek help from neighbors, borrow money." (Anwar et al., 2020)*

Inadequate WASH also disproportionately affects women because of their roles as caregivers for family members who fall ill from these conditions (Sweetman, 2017). Lack of access to water can also create psychological distress for women when social norms dictate providing safe water to the family is women's responsibility and they "fail" to meet these expectations (Anwar et al., 2020).

A fairly strong body of evidence documents a relationship between various WASH improvements and a reduction in enteric infections (Butala et al., 2010; Turley et al., 2013; Marais and Cloete, 2014; Wolf et al., 2014; WHO, 2019; Wolf et al., 2022; Musiime et al., 2022). From this, the predictive analysis assumes the following relationships between sanitation improvement and enteric infections:

- Sewer connections reduce the odds of enteric infections by 69%.
- Access to private sanitation reduces the odds of enteric infections by 44.5%.
- Access to improved sanitation (not using unimproved sanitation or open defecation) reduces the risk of enteric infections by 16%.
- Access to piped water reduces the risk of enteric infections by 79%.
- Access to water on premises reduces the odds of enteric infections by 71.7%.
- Access to at least basic water sources reduces the risk of enteric infections by 47%.
- Solid waste removal reduces the odds of enteric infections by 50%.

Predicted improvements

When looking at the prevalence of enteric infections (including diarrheal diseases, typhoid and paratyphoid, and invasive salmonella), these infections are more common among women in countries with larger informal settlement populations (with Type 1 and Type 2 countries having rates of less than 0.5% and Type 3 and Type 4 countries showing rates of 0.9% and 1.5%, respectively). Table 2 on page 17 summarizes what would happen to cases of enteric infections if all women in informal settlements had access to different types of sanitation improvements. ***The largest reduction in GI cases among women comes from complete access to improved sanitation (more than 3 million cases, or 1 in 8 expected cases globally),*** in part because such connections are rare (especially in Type 4 countries), meaning there is more room to grow as an intervention to prevent enteric infections. ***Complete access to private sanitation among women in informal settlements could reduce the number of cases of enteric infections among women markedly (estimated at nearly 1.7 million).*** Finally, ***if no women in informal settlements used unimproved sanitation or open defecation, over 160,000 enteric infection cases among women in Type 4 countries could be prevented.***

Figure 1: Possible enteric infections prevented through informal settlement improvements

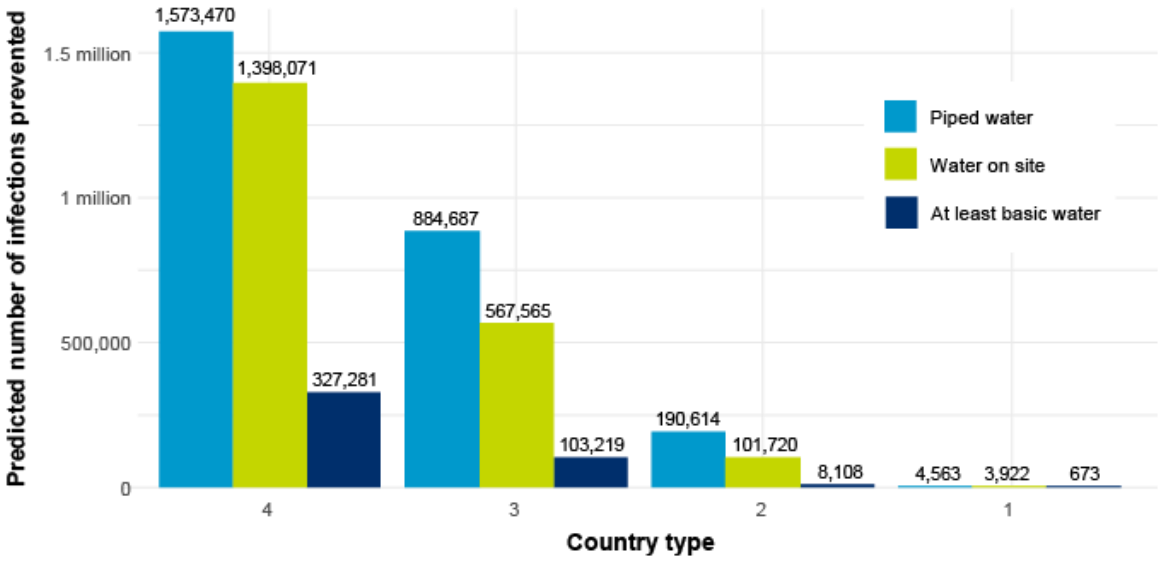


Table 2: Estimated reductions in cases of enteric infections among women from sanitation improvements in informal settlements

Country type	Percentage of population with sewer connections	Estimated cases of enteric infections avoided with sewer connections	Percentage of the population with private sanitation	Estimated cases of enteric infections avoided with private sanitation	Percentage of the population using improved sanitation (including shared)	Estimated cases of enteric infections avoided with improved sanitation
1	78.8%	10,643	75.4%	10,206	97.6%	211
2	50.9%	289,269	62.9%	121,293	97.2%	3,777
3	31.7%	939,815	37.8%	504,362	90.0%	26,426
4	8.2%	1,786,028	26.4%	1,039,001	76.3%	130,203
Total		**3,025,755**		**1,674,862**		**160,617**

Regarding improvements from water access, ***if all women in informal settlements had access to piped water or water on premises, nearly 2.7 million or nearly 2.1 million cases, respectively, of enteric infections among women could be avoided globally*** (1 in 9 and 1 in 11 expected cases among women, respectively). This reduction in disease burden is driven almost entirely by improvements in Type 3 and Type 4 countries, because these are where such infrastructure improvements are most needed. While less impactful, because most women have access to at least basic water, ***if all women in informal settlements had access to at least basic safe water sources, this could prevent nearly half a million cases of enteric infections among women***. With adequate solid waste management still somewhat uncommon in Type 4 countries, ***if all women in informal settlements had access to safe waste management, there could be more than 1.1 million fewer enteric infections among women in Type 4 countries and 393,124 fewer enteric infections among women in Type 3 countries***.

3.2.2. Physical discomfort, shame and WASH

Beyond the risk of enteric infections, social norms around sanitation also impact women's physical comfort and mental health. Women often report withholding the need to defecate or urinate, leading to abdominal pain, vomiting and urinary tract infections (discussed more below) (Khanna and Das, 2015; Joshi, 2017). Women's lack of access to socially acceptable places to relieve themselves forces women to delay such activities until nighttime or early morning. Women may be expected to complete their sanitation needs before dawn, regardless of their immediate needs (Sahoo et al., 2015) or — in the absence of improved shared sanitation — travel long distances to find private places, even when experiencing significant pain:

> *"Sometimes there is a lot of pain and discomfort even in changing the clothes. If your stomach is upset, then you have to go at least a kilometer. You have to go far in the heat and come back in the heat. But how can we go in such heat? You can't help it, so you go." (Khanna and Das, 2015)*

Violating social norms by being outside alone to relieve themselves or being visible while relieving or bathing themselves if sufficiently private toilets or bathing facilities are not accessible (Sahoo et al., 2015; Joshi, 2017) also heightens feelings of stress and shame. This is especially true when social norms are experienced differently by different types of women, with young women and women from marginalized castes especially vulnerable to social controls and backlash for violation of norms around toilet use (or the lack thereof) and bathing (Sahoo et al., 2015). Thus, the physical and mental health of women and girls depends on access to toilets that are near their homes or work, safe, and culturally appropriate enough for them to use regularly and without social backlash.

3.3. Reproductive and menstrual health

3.3.1. Reproductive tract infections and menstrual hygiene

Menstruation creates a critical need for WASH facilities for girls and women. Sufficient facilities and resources for managing menstrual hygiene, as well as awareness of good hygiene, are critical for avoiding reproductive tract infections, or RTIs. Thus, poor coverage of basic sanitation services in informal settlements (Armah et al., 2018) represents a community/institutional barrier to health. Further, social taboos, which can be a sociocultural barrier to health, sometimes label menstruation as unclean. This can compel women and girls to conceal menstrual cloths and menstruation-related needs. Similarly, norms that consider menstruation women's sole responsibility to manage can lead to a lack of prioritization of private spaces for changing and washing during menstruation. Unhygienic facilities and the lack of clean toilets with water in schools and communities exacerbate menstrual hygiene issues (Corburn, 2015; Hulland et al., 2015; Khanna and Das, 2015; Girod et al., 2017; Rajagopal and Mathur, 2017; UN-HABITAT, 2020).

Globally, experiences with RTIs are unfortunately common. Country-level data on such infections is sparse, but using available data suggests at least 1 in 5 women of reproductive age experience such infections (Peebles, 2019). And some evidence suggests women living in informal settlements are 1.4 to 2.1 times more likely to experience reproductive tract infections than women in other communities (Rahman et al., 2013). Menstrual cloth usage can be associated with a higher risk of RTIs (Bhilwar et al., 2015; Nallari, 2015), especially when limited access to clean, affordable washrooms and toilets (pay-per-use hygienic latrines are often unaffordable) prevents women from changing menstrual pads as needed (Rajagopal and Mathur, 2017). One participant described insufficient pad changes because of a lack of facilities in this way:

> *"As girls, when we lack enough toilets, we have a lot of problems. For example, if our schools do not have toilets, where will we dump our pads after using them? This causes girls to stay with one pad for a whole day without changing until she arrives home." (Corburn, 2015)*

In contrast, having indoor space to change reduces infection rates (Das et al., 2015), as does bathing locations that are closer to homes (Baker et al., 2017). Based on this prior research about the relationship between RTIs and changing spaces that offer privacy, the analysis used the following assumption to predict changes in RTIs with improved access:

- Access to an indoor place to change menstrual hygiene products (proxied by open defecation rates) reduces the odds of RTIs by 44%.

Predicted improvements

Because these infections are common, filling the remaining gap in access to indoor sanitation (which 7.3% of people in Type 4 countries still lack, on average) could prevent a large number of infections. Specifically, ***if all women in informal settlements had access to indoor places to change menstrual hygiene products, there could be over 1 million fewer cases of these infections in Type 4 countries alone (1.8 million fewer globally).***

3.3.2. RTIs, menstrual hygiene products and awareness

Lack of access to enough menstrual hygiene products — another form of community or institutional barrier to health — also leads to insufficient changes of pads and to RTIs. For example, one study in Kenyan informal settlements found that, even in private schools, many girls could not afford disposable pads. Nongovernmental organizations occasionally donated pads, but these efforts were inconsistent (Girod et al., 2017). In some cases, girls and women wear the same pad for over eight hours or remove it without having a replacement (Joshi, 2017). When disposable pads are unavailable, women resort to reusing cloths or other materials, which can also cause lacerations and discomfort (Kwiringira et al., 2014; Rajagopal and Mathur, 2017; TNUSSP, 2018). Importantly, awareness of the link between RTIs and menstrual hygiene practices varies (TNUSSP, 2018), with women and girls sometimes lacking comprehensive information about menstruation (Girod et al., 2017). This reinforces the importance of both access to menstrual hygiene products and raising awareness on menstrual hygiene practices. Additionally, awareness-raising should include both males and females, as destigmatizing menstruation is key for reducing experiences of harassment, stress and shame.

3.3.3. Psychosocial health and availability of menstrual hygiene products and facilities

Menstrual hygiene emerged as a significant source of stress for women living in informal settlements, due to inadequate WASH infrastructure and cultural norms that encourage girls to hide menstruation-related needs and challenges. Open defecation and a lack of safe toilet facilities with sufficient privacy heighten feelings of shame, fear and discomfort during menstruation (Khanna and Das, 2015; TNUSSP, 2018). One study based in Odisha, India, identified menstruation as most likely (22% probability) to be ranked the most stressful sanitation-related behavior among women from urban slums (Hulland et al., 2015). In contrast, women with access to private toilets report lower stress levels, underscoring the importance of safe and accessible sanitation facilities during menstruation (TNUSSP, 2018).

Menstruation-related stress can be particularly intense for adolescent girls in informal settlements. High pupil-to-water-point and pupil-to-latrine ratios (for example, Girod et al., 2017, found ratios of 27:1 in public schools and 88:1 in private schools) force girls to feel rushed through sanitary pad changes and can cause bullying, resulting in stress and anxiety, while insecure facilities mean girls are exposed to harassment and assault from boys. This can lead girls to delay sanitary pad changes until they return home (Girod et al., 2017) or to miss school entirely. For example, research in Kenya estimated 3.5 million learning days were lost monthly due to the lack of menstrual management resources, as fewer than 25% of primary and secondary schools met minimum latrine requirements, forcing girls to stay home during their periods (Corburn, 2015). An absence of proper pad or sanitary product disposal methods further causes stress and embarrassment. Adolescent girls in Nairobi reported often carrying used pads in their pockets due to a lack of disposal bins, constantly fearing accidental exposure. Improper disposal methods further contribute to unsanitary conditions in restrooms, deterring women and girls from using them and causing distress (Subbaraman et al., 2015; Girod et al., 2017). One girl shared these struggles and the accompanying stress and shame:

> *"Since the pad box is not there, if you put the pad in your pocket, it may start smelling, or it may fall down, and you'll get embarrassed and ashamed." (Girod et al., 2017)*

Despite the pervasive impact of these issues, sanitation interventions largely focus on defecation and fecal management, often neglecting menstrual hygiene and its psychosocial implications. Further, studies that do exist on the psychosocial stress associated with menstruation usually focus on adolescent girls, with limited research on its impact on older populations. As noted by one study, stressors associated with menstrual hygiene management are a "significance throughout the life course," highlighting a need for more comprehensive and inclusive research on the psychosocial repercussions of menstrual management among older populations (Hulland et al., 2015; Sahoo et al., 2015).

3.3.4. Urinary tract infections and WASH

Lack of access to proper sanitation facilities is also associated with higher rates of urinary tract infections, or UTIs, among women (Venugopal et al., 2016; Andersen and Dowdell, 2019; Devane-Padalkar et al., 2024). A study in Bangladesh documented a high (46%) UTI rate among women in informal settlements (Singh et al., 2018). This is often due to the practice of delaying urination and defecation (Khanna and Das, 2015; Nallari, 2015; Joshi, 2017). Unhygienic conditions also deter women and girls from drinking water to avoid using the facilities, which further increases the risk of UTI. As a participant in one study of informal settlements in Rajasthan, India, describes:

> *"The toilets are not clean. In such a situation, we try and avoid using the toilets. We also refrain from drinking too much water." (Rajagopal and Mathur, 2017)*

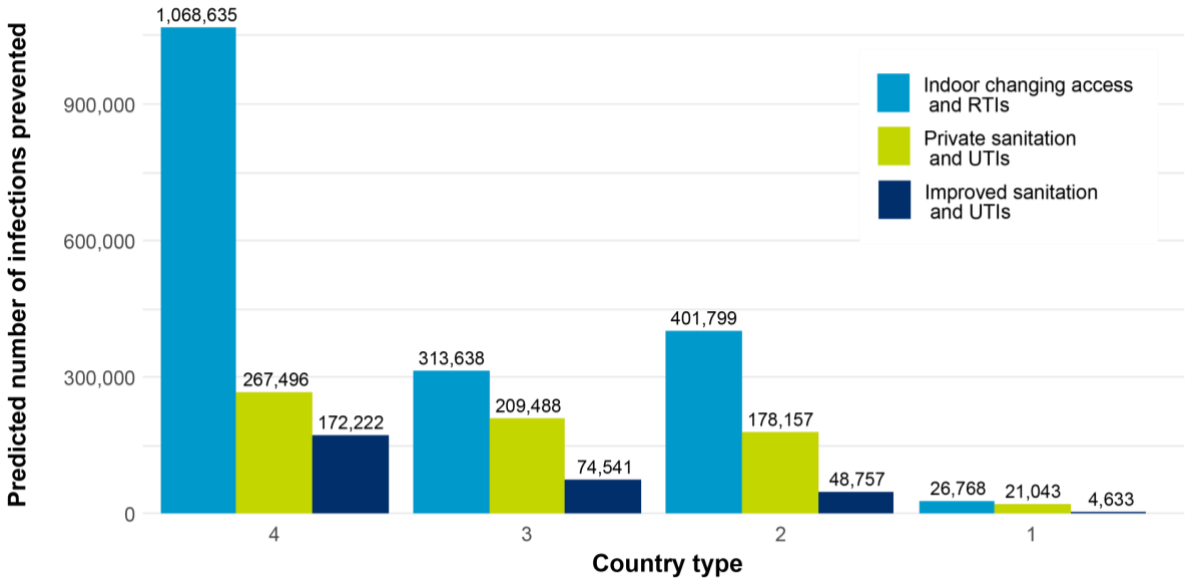
Based on this research on the relationship between sanitation and reductions in UTIs, the predictive analysis uses the following assumptions about the benefits to better sanitation:

- Access to a private toilet reduces the odds of UTIs by 77.3%.
- Access to improved sanitation (not using unimproved sanitation or open defecation) reduces the odds of UTIs by 83.3%.

Predicted improvements

Thus, ***if all women in informal settlements had access to private toilets, the rates of UTIs could reduce by 42.3% in Type 4 countries and 22.9% in Type 3 countries***, where access to private toilets is lower (see Table 2 on page 17). In total, ***ensuring complete access to private toilets in informal settlements could mean 676,184 fewer UTIs among women.*** This translates to preventing about 1 in 9 expected cases of UTIs among women globally.

Figure 2: Possible RTIs and UTIs prevented through informal settlement improvements



Currently, more women have access to improved sanitation than to private toilets. This indicates that a larger number of women would benefit from having access to private toilets, rather than from expanding current access to improved sanitation. Thus, the benefits of closing the access gap and ensuring all women in informal settlements can use improved sanitation facilities are a bit smaller, even though the size of the relationship (shown in the assumption above) between access to improved sanitation and lower odds of UTIs is comparable. Thus, ***if all women in informal settlements used improved facilities, instead of unimproved facilities or open defecation, this could prevent an estimated 300,153 cases of UTIs globally among women.***

3.3.5. Sexual and reproductive health and health services accessibility

For housing to be adequate, individuals need access to essential services, including health services. Women in informal settlements struggle to access health services due to both a lack of conveniently located services and affordability issues (Rakodi, 2014; Wyant and Spasić, 2015; Chatterjee, 2015; Joshi, 2017; ICED, 2019; Van der Heijden et al., 2019; UN-HABITAT, 2020; Singh et al., 2020; Batura et al., 2022; McNab et al., 2022). In particular, women and girls living in slums often lack access to adequate reproductive health and family planning services (Ochako et al., 2016; Ziraba et al., 2018; UN-HABITAT, 2020; Yadav et al., 2020; Tetui et al., 2021). This gap negatively affects their use of contraceptives (Ochako et al., 2016; Rajagopal and Mathur, 2017; Tetui et al., 2021). Studies suggest slum residents are less likely to use modern contraception (Fotso et al., 2014) and instead rely on non-recommended contraceptive methods (Nkombondo et al., 2024). Poorer access to sexual and reproductive health facilities in informal settlements may result in earlier pregnancies (including teen pregnancy) and more unwanted pregnancies from a lack of family planning resources (Chatterjee, 2015; UN-HABITAT, 2020). Further, limited access to family planning services and barriers to using contraceptive methods in slums can contribute to a higher prevalence of abortion. For instance, one study found the abortion rate in slums, at 29.2 per 1,000, was nearly double that of those living outside slums, at 13 per 1,000 (Nkombondo et al., 2024). Factors that encourage health care access include proximity to services, strong social networks and positive perceptions of providers (Akhter et al., 2020; Yadav et al., 2020).

3.3.6. Maternal outcomes and health services accessibility

Access to adequate reproductive health services can be especially important for maternal health. Evidence suggests conveniently located health facilities increase the likelihood of using prenatal care and skilled birth attendance in informal settlements (Chatterjee, 2015; Akhter et al., 2020; UN-HABITAT, 2020). Further, because pregnancy itself may reduce mobility, a lack of nearby clinic infrastructure (i.e., in informal settlements) represents an additional barrier to health care access for pregnant women (Satterthwaite et al., 2018). When accessible, however, skilled birth attendance and facility-based births are associated with lower maternal mortality (Ziraba et al., 2009). Additionally, higher levels of economic marginalization for women as compared to men mean that affordability of health services represents a larger deterrent to health access for women than for men. Affordability is even a barrier to women's access to maternal health care. Some women avoid these services out of fear of job loss or because missing work is not an option. One participant shared her experience:

> *"At the eighth month of my pregnancy, a health worker came to our area, explained to me the benefits of a hospital delivery, and gave me a red card [for free delivery at an Urban Primary Health Care Project facility]. But I could not go out of fear. Even if it was a normal delivery, I felt the doctors would intentionally opt for a C-section. We work our whole lives to survive. If we have a baby via C-section, we'll lose several days of work and won't be able to carry water or wash clothes." (Akhter et al., 2020)*

Coping with high hospital delivery costs is also associated with poor mental health outcomes, like depression, among mothers (Azad et al., 2019). Collectively, these sexual and reproductive health service accessibility challenges underscore the need to establish conveniently located and affordable services that respond to the unique challenges faced by women in informal settlements. Thus, predictive analysis based on existing evidence on the impact of health center proximity on maternal deaths (Ziraba et al., 2009; Elci et al., 2025) yielded the following assumptions about how health care access might affect maternal mortality:

- Access to a skilled birth attendant reduces the risk of maternal mortality by 67.8%.
- Giving birth at a health facility reduces the risk of maternal mortality by 74.5%.

Predicted improvements

If all women of reproductive age in informal settlements ***had access to health centers within proximity and used those facilities for birthing, 76,836 maternal deaths could be prevented***. Similarly, if all women in informal settlements ***gave birth with a skilled attendant, 61,059 maternal deaths could be prevented***. This translates to 1 in 4 and 1 in 5 expected maternal deaths globally.

3.3.7. Maternal outcomes and WASH

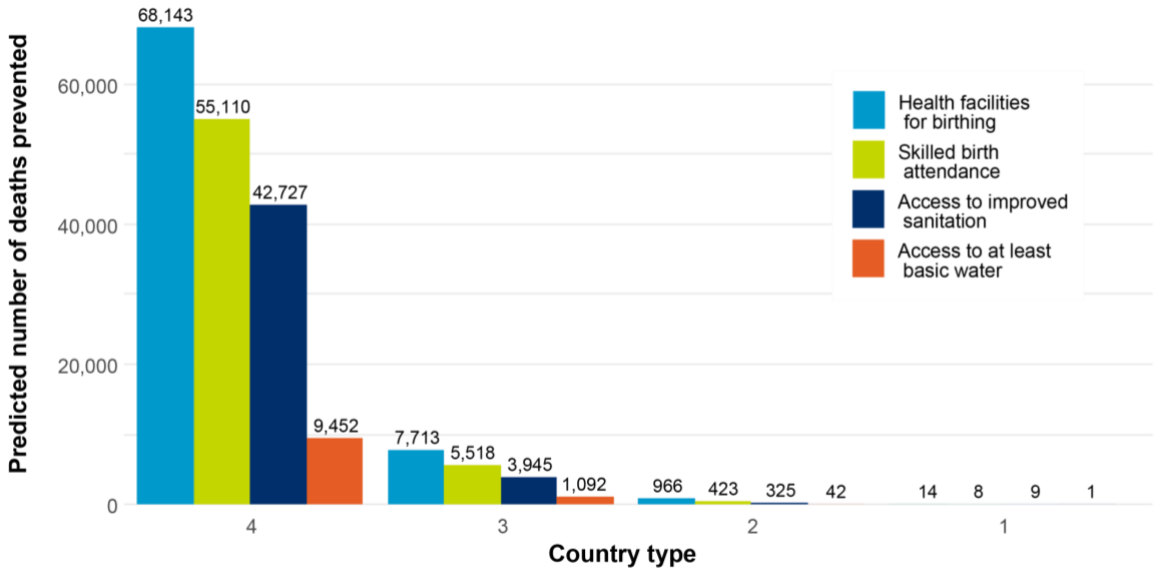
A lack of WASH services and facilities can also affect maternal health (Muldoon et al., 2011; Cheng et al., 2012; Benova et al., 2014). Childbearing women are at significant risk of sepsis, and this leading cause of maternal deaths can be drastically reduced with adequate WASH access (Sweetman, 2017). Similarly, barriers to accessing open defecation sites can be especially difficult for pregnant women, due to more frequent urination. This can lead pregnant women to abstain from food and water to avoid using such sites, which can have severe consequences on pregnant women's health and nutrition. Thus, existing evidence suggests WASH improvements might affect maternal mortality in this way:

- Access to improved sanitation reduces the odds of maternal mortality by 67.4%
- Access to at least basic water reduces the odds of maternal mortality by 33.3%.

Predicted improvements

If all women of reproductive age in informal settlements had ***access to improved sanitation, this could prevent an estimated 47,006 maternal deaths in informal settlements,*** with most of those in Type 4 countries (42,727), where access to improved sanitation remains incomplete. Similarly, complete access to ***at least basic water in informal settlements could prevent an estimated 10,587 maternal deaths*** (9,452 in Type 4 countries).

Figure 3: Possible maternal deaths prevented through informal settlement improvements



3.4. Sexual and gender-based violence

3.4.1. SGBV and WASH

A strong body of evidence finds that women and girls are exposed to violence when trying to access open defecation sites, unsafe shared toilets or shared water sources (Gonsalves et al., 2015; Hulland et al., 2015; Jadhav et al., 2016; Belur et al., 2016; Kulkarni et al., 2017; Swart, 2012; Barchi and Winter, 2019; Gibbs et al., 2020; Winter et al., 2020). Further, women in informal settlements may experience higher levels of violence as compared to non-settlement residents. For example, one study reported women are 1.5 times more likely (Mberu et al., 2016), and another found rates are more than two times higher for women in informal settlements (Swart, 2012). These experiences with violence also have consequences for women's mental health (Hulland et al., 2015; Winter et al., 2020). One study noted that rape and sexual assault were particularly salient as sanitation-related stressors for urban women, with 71% saying they were a stressor, of which 86% were always concerned about them, and 100% described them as a highly severe issue. In comparison, only 55% of rural and Indigenous women in the study identified rape and sexual assault as stressors (Hulland et al., 2015).

In particular, the design and placement of sanitation facilities contribute to the risk of SGBV, especially for women using outdoor or public sanitation facilities. Key factors heightening women's vulnerability include a lack of gender separation in toilet cubicles, poor lighting and proximity to secluded areas (Belur et al., 2016; Khanna and Das, 2015; UN-HABITAT, 2022). For example, nearly one-fifth of surveyed women from a Mumbai slum reported being subject to harassment when using public toilets. Almost all these toilets had adjacent cubicles for men and women, with no wall separating the genders (Belur et al., 2016). Nighttime water collection also presents SGBV risks, with women often attacked in the early morning or late-night hours when collecting (Sommer et al., 2014; World Bank, 2015). One study noted that women had to find someone to accompany them during water collection, given the possible dangers of assault or rape at night. Men generally did not experience such a limitation, highlighting the gendered difference in WASH access and safety (Kwiringira et al., 2014).

Gender and age further intersect to create unique vulnerabilities for adolescent girls, as studies report incidents of SGBV during trips to public toilets or while engaging in open defecation. A study from Mumbai revealed that caretakers of public toilets sometimes made inappropriate comments toward young women (Belur et al., 2016). Girls at schools reported incidents of boys peeking into stalls through vents and doors, prompting some to stop using improved toilets, even though they were cleaner than other available options (Girod et al., 2017). Female respondents also express heightened concerns for their daughters' safety when using sanitation facilities, particularly for daughters with physical or mental disabilities (Kulkarni et al., 2017).

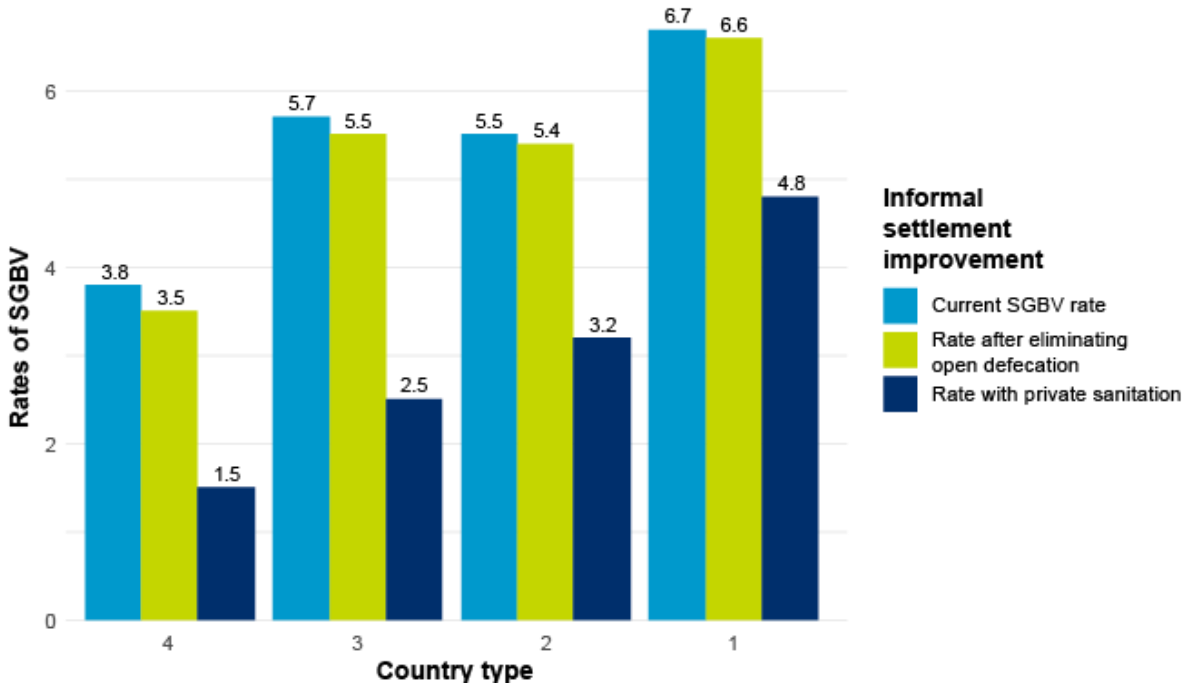
Based on existing research on the relationship between WASH access and sexual violence (Gibbs et al., 2020; Barchi et al., 2019; Gonsalves et al., 2015; Jadhav et al., 2016), the analysis used the following two assumptions to assess how exposure to non-partner sexual violence might be reduced with improved access to sanitation facilities:

- Access to a private toilet reduces the odds of non-partner sexual violence by 69.2%.
- Access to sanitation that is not open defecation reduces the odds of non-partner sexual violence by 55.6%.

Predicted improvements

Ensuring all women in informal settlements have ***access to private toilets would reduce the rates of experiences with non-partner sexual violence among these women for the first 12 months after the improvements are implemented, from 3.8% in Type 4 countries to 1.5%.*** Reported rates of experiences with this kind of violence are actually higher in Type 3 countries, where women's complete access to private toilets in informal settlements might reduce rates of violence exposure among these women from 5.7% to 2.5%. ***If all women in informal settlements had private toilets, over 8.6 million fewer women could experience this type of violence in Type 3 (estimated at over 3.5 million) and Type 4 (estimated at nearly 5.1 million) countries.***

Figure 4: Possible SGBV rate changes after informal settlement improvements



3.4.2. Intimate partner violence and WASH

For many families in informal settlements, water insecurity exacerbates household stress, contributing to intimate partner violence, or IPV, especially where ensuring family access to sufficient water is considered women's responsibility (Anwar et al., 2020; Parikh et al., 2020; Ombija et al., 2024). Further, stress caused by informal settlement living conditions, such as overcrowding, extreme temperatures, noise, lack of privacy and limited space, can lead to an increase in domestic violence (Lisnichuk, 2024). As noted by a study participant from South Africa:

> *"... maybe there is no electricity and there is no water and others — they are not even working — that kind of thing can pile up into stress whereby someone he took his frustration out to his partner." (Pelowich et al., 2024)*

Estimates suggest women in informal settlements may be 2 to 2.3 times more likely to experience IPV (either physical or sexual) (Okedare and Fawole, 2023). As stated, water access plays a key role in this violence. One study based in Nairobi, Kenya, notes that women without access to water reported higher rates of physical violence (60% versus 38.8%), emotional violence (36.6% versus 35.5%) and sexual violence (10.5% versus 6.4%) than those with access to water, culminating in an overall IPV prevalence of 71.6% (versus 56.5% among women with water access).

Even among women with water access, the source of water played a critical role. Women accessing water from outside taps or public sources faced significantly higher IPV risks compared to those with household-based water access (extended time spent fetching water increases IPV risk because partners may misinterpret delays as breaches of trust) (Bachwenkizi et al., 2023; Ombija et al., 2024). Similarly, lack of sanitation facilities was linked to a 72% IPV prevalence, as compared to 60.1% among women with access to toilets (Choudhary et al., 2020; Ombija et al., 2024). These findings reflect vulnerabilities created by long travel times, competition for water resources, and perceived violations of patriarchal expectations regarding women's roles and mobility. Further, a study based in India found that carrying water had the highest probability of causing psychosocial stress among women in urban slums at 33%, as compared to 15% for women in rural areas, emphasizing the unique pressure this activity places on women in informal settlements (Hulland et al., 2015). From the existing body of research (Ombija et al., 2024; Bachwenkizi et al., 2023; Choudhary et al., 2020), the analysis uses the following assumptions to explore the extent to which these rates might be reduced with informal settlement improvements:

- Access to on-premises water reduces the odds of IPV by 74.2%.
- Access to piped water reduces the odds of IPV by 26.9%.
- Walking less than 30 minutes to reach water reduces the odds of IPV by 2.9%.

Predicted improvements

IPV rates are higher, on average, for countries in Types 3 and 4 (where an average of 30% or more of the population lives in slums) (Table 3). Increasing access to water on premises is a very impactful change, based on these assumptions and current rates of different types of water access. ***If all women in informal settlements had access to on-premises water, rates of IPV could drop from an estimated 17.5% in informal settlements to 9.0% in Type 4 countries and from 14.7% to 10.2% in Type 3 countries. This brings down average country-level rates of IPV noticeably within those types of countries as well (down by just under 2 percentage points for Type 3 countries and over 5 percentage points for Type 4 countries)***.

Table 3: Estimated change in IPV experiences among women from water access on premises in informal settlements

Country type	Percentage of population with water on premises[1]	Actual percentage of women experiencing IPV in the past 12 months[2]	Estimated percentage of women in informal settlements experiencing IPV with complete access to water on premises	Adjusted percentage of all women in informal settlements experiencing IPV with complete access to water on premises[3]
1	96.1%	5.0%	4.5%	5.0%
2	92.8%	8.1%	7.0%	7.9%
3	79.1%	14.7%	10.2%	12.9%
4	56.0%	17.5%	9.0%	12.3%

1 WHO and UNICEF, 2022

2 UN Women, 2018, SDG 5.2.1

3 Adjusted meaning the percentage of women experiencing IPV if all women in informal settlements had complete access to water on premises.

The relationship between IPV and piped water is not as strong (based on existing research), but ***complete access to piped water among women in informal settlements could still lower rates of IPV among these women from 17.5% to 15.5% in Type 4 countries and from 14.7% to 13.3% in Type 3 countries***. Walking less than 30 minutes to reach water had an even smaller effect, possibly indicating, when contrasted with on-premises water, that water "trips" in general (even those involving shorter distances) can trigger IPV (as some literature indicates). This relationship bears more investigation. IPV rates, based on this assumption, reduce little (the percentage change is consistently less than a percentage point) if all women in informal settlements travel less than 30 minutes to access water (both because of the weaker relationship and because rates of access to water closer than this distance are already high in many countries; over 95% of people in country Types 1–3 and 88.8% of people in country Type 4, on average, have this kind of access).

3.4.3. IPV and tenure security

In many rural or informal settlements, land is often controlled by community or family structures, with women's land rights tied to their roles as wives or daughters rather than being independently recognized. This dependency on male relationships for housing security can expose women to economic vulnerability and increase their tolerance for violence, placing them at greater risk of violence, exploitation and eviction (Khalifeh et al., 2013; Song and Dong, 2016; Kaminaga and Sheldon, 2020; World Bank, 2020). However, granting women joint ownership or independent property rights can serve as a protective measure against IPV, as property ownership can enable women to leave abusive relationships without fearing homelessness. One study in India found that 49% of women who did not own property reported physical IPV in comparison to only 18% of women who owned land (World Bank, 2020). Relatively few studies have looked at the relationship between tenure security — more broadly conceived as not just titled ownership — and IPV using more advanced research methods. Combined with the patchier country-level data on tenure security indicators, this makes prediction for this relationship very tentative. Based on existing research (Song and Dong, 2016; Khalifeh et al., 2013), the analysis assumes:

- Having residential land in a woman's own name decreases the probability of IPV by 2%.

Predicted improvements

If all women in informal settlements had residential land in their name (including joint land rights), this could reduce IPV rates among women in informal settlements from 17.5% to 16.9% in Type 4 countries and from 14.7% to 13.7% in Type 3 countries.

3.4.4. GBV and changes in gender norms

Infrastructure improvements and increasing legal protections for women is likely not sufficient for eliminating GBV. Normative changes at individual and community levels are necessary. For women, consciousness-raising and similar empowerment interventions are long-standing tools for reducing GBV. These efforts often focus on increasing women's understanding of their basic rights, including their rights to bodily autonomy (and other forms of decision-making power) and freedom from violence. Because social norms often underpin women's experiences with violence, collective consciousness-raising among women creates solidarity around new norms that reject violence instead of tolerate it (Chatterjee, 2015; Cities Alliance, 2024).

For individual women engaged in consciousness-raising processes, however, the psychological benefits may not always translate into freedom from violence (Gibbs et al., 2020; Willan et al., 2020). Instead, normative change around GBV at a community and institutional level is generally understood as necessary to end violence against women (Wyant and Spasić, 2015; Gram et al., 2022; Paradkar et al., 2024). These interventions address the harmful social norms underlying GBV, encouraging both men and women to reflect on and critique gender norms, roles and inequalities. Men, especially, are encouraged to identify their privileges in society; how norms reinforce patterns of power, control and violence; and how they can use their privileges to combat these norms and patterns of violence (Paradkar et al., 2024). Similar interventions work directly with historically violent men to reduce that propensity toward violence (Gibbs et al., 2020; Willan et al., 2020; Mannell et al., 2023). Thus, to address GBV in informal settlements, as in other contexts, a mix of interventions aimed at changes in individual and community attitudes and behaviors is essential alongside infrastructure and service improvements.

3.5. Climate-related injuries and deaths

3.5.1. Heat stress and access to cooling strategies

Heat is the leading cause of climate-related deaths and exacerbates cardiovascular disease, diabetes, mental health issues and many infectious diseases (WHO, 2024). Rising temperatures are a key feature of climate change, and informal settlement residents are disproportionally exposed to these temperature changes (Anwar, 2023; Ramsay et al., 2021). Both building materials, which trap heat, and population density, which exacerbates environmental heat, lead to more hours of higher temperatures indoors in informal settlements (French and Gardner, 2012; Mukhopadhyay et al., 2021). In contrast, housing designed to mitigate heat stress can reduce exposure to dangerous temperatures (Maneechote et al., 2014). Heat can also increase the prevalence of other types of diseases common in informal settlements (Egondi et al., 2012; Damte et al., 2022). Women can be especially vulnerable to heat-related injuries and death, with women's higher core temperatures and greater body

fat contributing to this vulnerability (Kim et al., 1998; Kazman et al., 2015; Climate Resilience Center, 2025). Time-use research shows that women spend more hours of the day inside, which makes them especially vulnerable to indoor heat, a more common problem in informal settlements (Euler, 2025). Heat can also contribute to complications in pregnancy and birth (Baharav et al., 2023). Access to water can be critical for cooling through drinking water or using water to wet clothes, floors and walls (Tran et al., 2013; Swain et al., 2019; Ramsay et al., 2021), as can access to public spaces, including green spaces and shaded areas (Swain et al., 2019). Emerging research on the impact of reflective roof coatings as a cost-effective solution to reduce temperatures in informal settlements is a promising adaptation solution (Broadbent et al., 2022; Santamouris et al., 2017; Virk et al., 2014; Macintyre and Heaviside, 2019). Based on this existing research reviewed about the relationship between access to cooling strategies and heat stress (Tran et al., 2013; Swain et al., 2019; Ramsay et al., 2021), the analysis assumes:

- Access to public spaces, including green spaces, reduces the odds of severe heat stress by 65%.
- Access to at least basic water sources reduces the odds of severe heat stress by 58%.

Predicted improvements

Because access to public space remains weak in many countries (just 27.9% of people in Type 4 countries, on average, have convenient access to public space), increasing access to public spaces, especially green spaces, has great potential to reduce cases of severe heat stress among women in informal settlements. ***If all women in informal settlements had access to public spaces or urban green spaces to escape indoor heat, cases of severe heat stress (causing death or disability) might reduce by 294,038 globally.*** This translates to just over 1 in 13 expected cases of severe heat stress among women globally. Because basic water access is already high, the benefits from increasing access to basic water are more modest. Still, ***if all women in informal settlements had access to at least basic water, cases of severe heat stress among women could be reduced by an estimated 29,176 globally.***

3.5.2. Climate-related injuries and deaths, housing conditions and WASH access

Often located in flood-prone areas and built with nondurable materials, the precariousness of informal settlement infrastructure and location places strain on the habitability of these environments (Subbaraman et al., 2015; Elsey et al., 2016). Problems associated with climate change and extreme climate events, such as flooding, are aggravated by poor-quality housing and overcrowding. Gender roles and norms introduce unique climate-related risks for women, especially in informal settlements. As a result, some evidence suggests women die at a higher rate than men due to climate-related causes, particularly in developing countries (Erman et al., 2021). Kantamaneni et al. (2022) connect higher climate-related death rates for women in India to cultural factors, including strict adherence to traditional dress, which severely limits women's mobility in disaster scenarios. Similarly, research suggests women in informal settlements may be especially vulnerable where the settlements are more flood-prone (Okaka and Odhiambo, 2019).

Extreme weather events, especially floods and landslides (more frequent and more drastic due to climate change) also increase women's exposure to physical harm when seeking open defecation sites (Kwiringira et al., 2014; Khanna and Das, 2015; Kulkarni et al., 2017). In cases where open defecation is the only option, sites are often far from women's homes (particularly as urbanization increases) and frequently require women to pass through natural or physical barriers, which become more dangerous during flooding, mudslides and other weather events (Sahoo et al., 2015; Khanna and Das, 2015; Kulkarni et al., 2017). These physical barriers are more impactful for women in urban slums; 30% reported these challenges versus 5% at both rural/Indigenous sites in one study (Hulland et al., 2015). These findings reveal the importance of having improved sanitation facilities that are within community boundaries (e.g., that do not expose women to environmental or climate-induced dangers).

Women's increased vulnerability to disasters in informal settlements affects both their immediate experience and long-term recovery. After displacement, the loss of privacy, such as having to sleep outdoors or facing even more restricted access to private places for bathing and menstrual hygiene, exacerbates the existing reproductive health and violence risks highlighted above. Maternal health also tends to be overlooked during climate disasters, with preexisting gendered and discriminatory health policies becoming even more pronounced in these times (Ajibade et al., 2013).

Finally, climate-related disasters, including flooding and monsoons, often have adverse effects on water quality and access in informal settlements. This poses a particular challenge for women as water collectors. Contamination of unimproved water sources during crises can contribute to deaths associated with disasters (Healey et al., 2023).

Because climate change is an immediate and growing threat, this is also an area of growing importance within the social-ecological model of health for women, at the intersection of environmental-level risks to health, housing, and gender roles and norms. Unfortunately, robust quantitative research into the relationship between disasters, gender and health in informal settlements is comparatively weak. Still, based on the previously mentioned available research related to the relationship between housing conditions, water access and climate-related health outcomes, the analysis assumes:

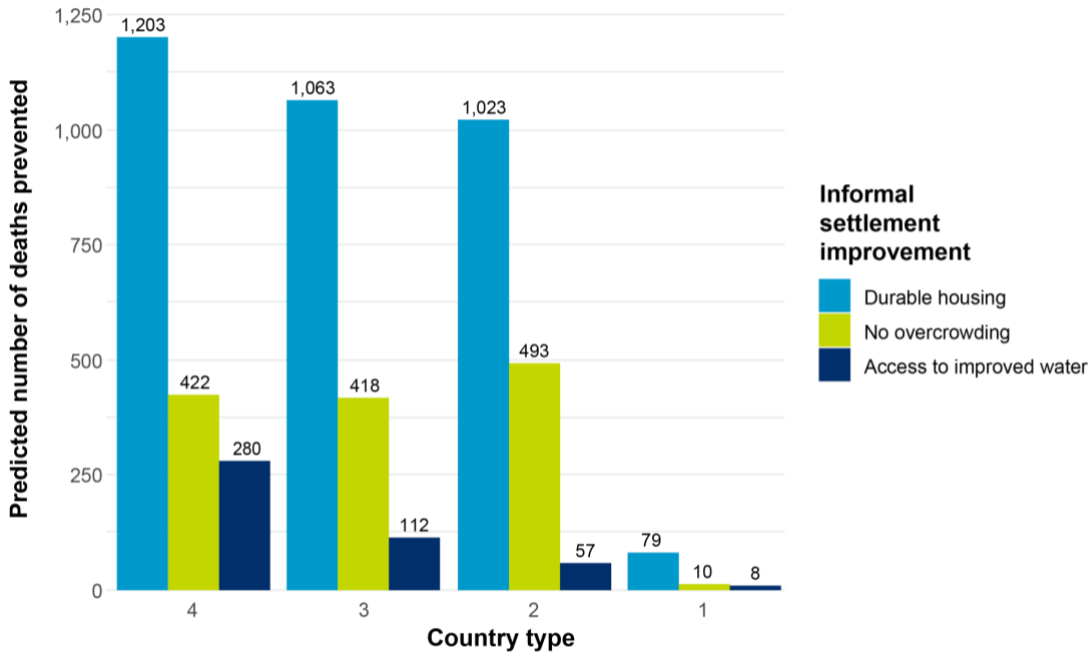
- Housing made of adequate materials reduces the odds of death during climate-related crises by 35.6%.
- Housing that is not overcrowded reduces the odds of death during climate-related crises by 29%.
- Access to improved water sources reduces the odds of death during climate-related crises by 32.2%.

Predicted improvements

Because the available research on how housing affects individual climate-related health outcomes is limited, the estimates in this section are more tentative. Additionally, the prevalence of climate-related deaths across the different country typologies suggests deaths in Type 2, 3 and 4 countries are under-reported. For example, there are nearly 10 times as many climate-related deaths (per 100,000 people) reported in Type 1 countries, on average, compared to Type 4 countries. Based on 10-year averages of deaths, to adjust for year-to-year disaster-related fluctuations, through 2022 (the last year with data available) there are, on average, 98,202 climate-related deaths in Type 1 countries (858 per 100,000 people), 25,728 in Type 2 (129 per 100,000 people), 14,205 in Type 3 (275 per 100,000 people) and 7,195 (87 per 100,000 people) in Type 4. For both these reasons, the below estimates are likely undercounts of the effects of informal settlement improvements on climate deaths. ***If all women in informal settlements lived in housing constructed with adequate materials, an estimated 3,368 fewer women might die from climate-related causes globally.*** In Type 4 countries, this is a drop in an expected yearly count of deaths from 7,195 to 5,992. This translates to avoiding just over 1 in 6 climate-related deaths among women in Type 4 countries.

Further, ***if all women in informal settlements lived in housing that was not overcrowded, climate-related deaths might reduce by 1,344 globally***. Access to improved water sources is relatively high in most countries, even in Type 3 and Type 4 countries, so these improvements are estimated to lead to more modest reductions in deaths. Specifically, ***complete access to improved water sources could result in 458 fewer deaths from climate crises among women in informal settlements***.

Figure 5: Possible climate-related deaths prevented through informal settlement improvements



3.5.3. Mental health and environmental conditions

Living in disaster-prone areas is associated with increased stress levels among women due to two primary determinants: the risk of the climate disaster itself and the threat of eviction associated with disaster risk reduction efforts (Elsey et al., 2016). Women displaced from their homes due to environmental or climate factors, such as flooding and riverbank erosion, often face emotional distress exacerbated by the loss of their homes and social networks and the disruption of daily routines, including livelihood activities (Ajibade et al., 2013; Akter et al., 2019; Sletto et al., 2022). Women in informal settlements often feel a deeper sense of loss when their homes are destroyed, as these spaces serve as vital safe havens from both human threats and harsh weather.

The gendered division of labor exacerbates this, as women often bear increased burdens during environmental crises, including responsibilities for caregiving, securing resources and managing household recovery efforts (Akter at al., 2019; Singh et al., 2020), which they would usually rely on social networks, disrupted during crises, to achieve. These disproportionate caregiving responsibilities heighten women's anxiety about the well-being of their children during disasters (Ajibade et al., 2013). When asked to describe their emotional reaction to displacement in one study, most displaced women said they felt sad, worried, desperate, fearful and uncomfortable, while a quarter (24%) said they experienced loneliness (Sletto et al., 2022). One woman explained the loss of dignity and isolation in this way:

> *"This river drove me away from my roots where my ancestors lived. Since the day of being uprooted, I live in troubled times. Nobody knows us here [Ulania], and everybody treats us as inferior. Local people call us river-eroded [displaced] people. I need to ask for permission to use others' pond, take my cattle to others' land, even to collect dry leaves from others' garden, while I did not have to seek permission from others in my native village." (Akter et al., 2019)*

In contrast, maintaining social bonds, an interpersonal-level facilitator, can help residents adapt to climate-related displacement (Singh et al., 2020), while community-driven support and resilience efforts have been shown to improve the wellness of women (reducing stress, loneliness and depression, and increasing access to food and other relief supplies) in times of environmental crises and recovery (Sletto et al., 2022).

4. Conclusions

Informal settlements are not just spaces of housing deprivation but also hubs of resilience, provision and collective action. Often, their self-constructed infrastructure promotes social connectedness and can reinforce their walkability, with benefits for both physical and mental health. Women's grassroots organizing is often strong, improving access to health care, sanitation and social support while providing solidarity and intervention to reduce women's experiences with SGBV. These communities demonstrate the power of bottom-up solutions, where residents actively shape their environment and advocate for better living conditions. While challenges remain, interventions should build on these existing strengths to ensure sustainable, community-driven improvements.

Still, women in informal settlements face significant health risks due to a combination of environmental hazards, infrastructure deficits and gendered social roles. The five groups of health risks covered here (respiratory, gastrointestinal, reproductive, SGBV and climate-related) represent those which existing literature identified as the most common and impactful for women. This includes increased risk of respiratory illnesses from exposure to indoor air pollution, overcrowding, poor ventilation and poor sanitation, as well as increased risk of enteric infections, RTIs and UTIs from inadequate WASH infrastructure. Women's greater responsibility for cooking, fetching water and managing household sanitation increases their exposure to these illnesses, as do social norms constraining women's sanitation-related behaviors. Women in informal settlements also face greater sexual and reproductive health risks due to limited access to health care services because of financial barriers, leading to poorer maternal health outcomes. Inadequate WASH infrastructure further exacerbates maternal health risks, especially the risk of sepsis. SGBV and IPV are also closely linked to insufficient WASH resources, as women are more vulnerable to violence when collecting water or using unsafe sanitation facilities. Additionally, tenure insecurity increases IPV risk, as women without stable housing may be exposed to economic dependency, forcing them to stay in abusive relationships due to fear of homelessness.

Women's higher core body temperatures, greater proportion of body fat and more time spent indoors make them more vulnerable to heat-related illnesses, which are more common in informal settlements due to higher densities and inadequate housing materials. Similarly, women are at risk of injury during climate-related disasters when housing structures are not adequate because they spend more time in their homes. Further, displacement due to climate-related disasters leads to disruptions in social networks and increased care-work burdens for women, affecting both their mental and physical health.

There is strong evidence from literature, analysis and ground truthing showing significant potential to improve women's health in informal settlements through a few critical interventions. Expanding access to clean fuels and improved ventilation can reduce exposure to indoor air pollution, lowering the risk of respiratory infections. Strengthening WASH infrastructure by increasing access to improved shared sanitation, private sanitation, sewage connections and piped water can prevent millions of cases of enteric infections. Increasing access to private, clean indoor spaces for changing sanitary products (and access to the products themselves) can address menstrual hygiene challenges, reduce health risks related to RTIs, and enhance women's and girls' mobility and dignity. Improving access to skilled birth attendants and health facilities, along with enhancing WASH infrastructure to ensure clean water and sanitation, can significantly reduce maternal mortality and improve overall reproductive health outcomes.

Secure tenure rights for women, coupled with interventions targeting changes in norms at the individual and community levels, can reduce IPV by providing stability and protection from forced evictions, unsafe housing conditions and economic dependency. Safety interventions, such as increasing lighting, separate stalls, strong locks, mechanisms to report/reduce harassment, expanding private sanitation and providing on-premises water access, can reduce SGBV risks. Upgrading the durability of housing materials and reducing overcrowding can mitigate disaster-related health risks including during flooding and monsoons. Additionally, heat adaptation measures, including increased access to public spaces, green spaces, basic water sources and housing designed for cooling, can decrease instances of heat stress.

Despite identifying some well-supported interventions, this study finds significant gaps in empirical evidence at the intersection of gender, health and informal settlements. This includes a lack of quantitative research on how public transportation and public features, such as adequate street lighting, affect women's experiences with SGBV, as well as the relationship between overcrowding and increased SGBV risk. Additionally, and as mentioned previously, further data is needed on how improving tenure security might reduce IPV risks. The effects of industrial and traffic pollution and inadequate drainage on respiratory health, which were highlighted during ground truthing, also require further study. Similarly, the impact of different fuel types (and the emissions they generate) on maternal mortality is understudied. Ground truthing also revealed a need for more nuanced WASH research examining, for example, the quality of piped water and enteric infections, as well as how specific safety and cleanliness strategies can make shared sanitation safe and healthy for women. With few exceptions, research on the relationship between housing materials and climate- or fire-related deaths, as well as the risk of malaria, remains largely underexplored. Similarly, although there is evidence that drainage systems prevent flooding-related losses in infrastructure, more evidence is needed to confirm their effect on flooding-related deaths (and illness/deaths from enteric infections following heavy rains and floods). Addressing these gaps is crucial for informing future interventions and ensuring that policies and advocacy more effectively target women's health needs in informal settlements.

5. Recommendations

Recommendations are organized into three categories:

1. The types of housing and informal settlement improvements[viii] that are likely most important for efforts to increase women's health and well-being.
2. Recommendations for improving the process of developing and implementing initiatives in informal settlements so they better address women's health needs.
3. Recommendations for filling gaps in data and research.

5.1. Recommendations for types of improvements

1. Prioritize health challenges that are largely unique to women in development interventions.

Health challenges, like SGBV and RTI (specifically bacterial vaginosis), more often affect women, and these were the health conditions with the highest rates of exposure identified in this report. The solutions to these issues sometimes overlap with broader community needs (e.g., access to nearby, indoor toilets to ensure sufficient menstrual hygiene product changes), but also require unique investments at times, like increasing access to sufficient sanitary products. Ensuring infrastructure improvements respond to women's unique health needs will yield larger benefits in terms of reduced morbidity and mortality among women.

2. Prioritize gender-sensitive slum upgrading interventions.

Specific infrastructure investments are especially beneficial for women. Targeting these types of investments in public works programs (and ensuring public works programs include informal settlements) and projects implemented by nongovernmental organizations, civil society and community groups is a particularly gender-sensitive strategy. Investing in green spaces enhances air quality and helps alleviate overcrowding that can lead to respiratory infections while reducing women's risk of heat sickness from indoor heat exposure. Improved street lighting along pathways enhances safety, especially for women. Cost-effective home improvements, such as raised foundations and waterproofing, strengthen resilience against extreme weather, ultimately reducing women's greater risk of climate-related injuries and deaths within their homes (where they tend to spend more time than men). Piped water, rainwater harvesting, water-filtration systems, sewage connections, and private sanitation within homes or, if necessary, well-constructed, maintained and safe shared WASH infrastructure very near homes, reduce women's risk of illness and SGBV. Enhancements to shared sanitation to increase gender sensitivity should include greater privacy (gender-separated with walls and doors without gaps) and security (strong locks, good lighting and mechanisms to report/reduce harassment), along with waste containers that are regularly emptied for menstruation-related waste products.

3. Introduce legislative changes and public service improvements that support women's health and well-being.

For example, addressing SGBV requires stronger legal protections for women and enforcement of those protections. Legislation to strengthen women's property rights enhances their financial security, increases their decision-making power and reduces the incidence of IPV. National and local government programs to support women's economic empowerment (skills training, access to finance, etc.) increase women's health agency and reduce their exposure to violence. Increased access to publicly funded emergency shelters could similarly increase women's ability to leave abusive relationships. Additionally, gender roles create unique risks for women related to climate change and disasters. Government — and nongovernmental development and humanitarian — interventions to reduce climate-related risks should address those gender differences, including through gender-sensitive risk assessments, disaster risk reduction strategies and disaster response services. Finally, ensuring access to public health care centers and providers in informal settlements with gender-responsive protocols in place ensures equitable and appropriate access to health services among women.

viii As previously stated, in this report the term "improvements" includes a wide range of interventions, from upgrades in sanitation infrastructure to small solutions like improving natural ventilation. "Improvements" does not refer to comprehensive slum upgrading or informal settlement transformation. However, it is understood that informal settlement transformation is often incremental in character, whereby a number of small improvements add up to make positive change.

5.2. Recommendations for housing and informal settlement improvements

1. Leverage service improvements to challenge gender norms that increase women's health risks.

Gender roles and norms that organize men's and women's lives and labor in different ways are at the heart of why the health risks covered in this report affect women differently. Addressing these norms, especially for certain health risks, like those related to SGBV, is key to improving women's health outcomes. Combining adequate housing-related interventions with changes to norms is, therefore, an important avenue through which to bring about greater reductions in gender inequality in health. Thus, awareness campaigns introducing new technologies or infrastructure can co-occur with communication on changes in attitude and behavior around the gender roles that create health risks. For example, unsafe cooking fuels expose women to indoor air pollution and respiratory risks. Solutions like clean fuels and tools (e.g., liquid petroleum gas, biogas and electric stoves) and financial assistance or cooperatives to make cleaner fuel more affordable can be introduced alongside awareness campaigns that directly confront relevant harmful gender norms that overexpose women to indoor air pollution.

2. Promote women's leadership in collaborations between local government and communities.

Collaborations between informal settlement residents and local governments can yield marked benefits, including for women's health and especially when women spearhead these collaborations. For example, women's participation in water governance, monitoring and testing promotes quality, safety, accessibility and community-driven solutions that address their specific needs. Similarly, women's participation in community-led waste collection services and drainage systems maintenance (such as clearing blockages) and improvement efforts can enhance sanitation, reduce health risks, and ensure the integration of menstrual hygiene and waste management. Similarly, climate-related disaster preparedness programs would benefit from women's involvement in designing plans suited to their unique needs. For example, maintaining women's social networks during relocation efforts is especially critical, as these networks are vital to their well-being. Relocation assistance for displaced families could integrate that consideration.

3. Engage women in the development of community-driven solutions.

Informal settlement upgrading programs should be designed with input from residents and a broad range of stakeholders. Women's participation in that process is critical for ensuring improvements address (and definitely do not worsen) gender inequalities. Additionally, women's participation in project design can lead to interventions specifically suited to women's needs. Further, a strong body of evidence has shown that women's empowerment and collective action have led to significant improvements in community infrastructure, with health benefits. Informal settlement residents consulted during the ground-truthing workshops suggested some priorities. Residents requested emergency shelters for IPV survivors, safe spaces and SGBV prevention programs. They identified skills training, cash for work, financial inclusion and other women's economic empowerment interventions as key to women's health autonomy. Finally, they identified expanding anti-stigma programs focused on menstrual and reproductive health as essential for improving women's access to health resources (e.g., sanitary products and contraception) and overall well-being.

5.3. Recommendations on closing data and research gaps

Comprehensive and gender-responsive data collection is essential to inform policies that effectively address women's health vulnerabilities in informal settlements. Critical gaps can be categorized based on missing data points on adequate housing features or health outcomes and missing research on the relationship between the two.

1. Missing indicators for specific adequate housing features

Increasing the availability and quality of country-level data — specific to informal settlements — on adequate housing features in the following areas would improve data-driven decision-making related to informal settlements:

- Levels of/adequacy of ventilation
- Adequate insulation for both heat and cold protection

- Housing resilience to disasters
- Adequate drainage systems
- Adequate settlement lighting

2. Missing indicators of health outcomes

There is a need for more comprehensive country coverage, repeated measurement over time/updated measurement and gender disaggregation for the following health indicators that specifically capture living conditions within informal settlements:

- Concerning RTIs, there is need for more country coverage, more frequent updates and repeated measurements over time.
- Mental health indicators, like stress, anxiety and depression are not systematically collected and aggregated to the country level to produce a global dataset at all.
- SGBV indicators need more country coverage and updated and repeated measurement over time. Data quality is also a significant issue. Based on input from this research's ground truthing, this is particularly an issue in informal settlements, where cases are underreported or inaccurately recorded. Further, public recording practices may also compound underreporting (e.g., police records do not consistently capture the intent behind deaths, leading to underreporting of femicide cases).
- Concerning climate injuries and deaths, most indicators need gender disaggregation and greater country coverage.
- Gender-disaggregated data on tenure security needs to have more country coverage and updated/repeated measurement over time.

3. Relationships between housing and health outcomes

The following gaps include areas where the research on these relationships is absent, where evidence is more qualitative than quantitative, or where it is insufficient to reveal the particularities of informal settlements. Key gaps in this area include the relationships between:

- Poor natural illumination of informal settlement buildings — often exacerbated by narrow streets and densely packed structures — and vitamin D deficiency, especially among women who spend more time indoors.
- Passive cooling technologies that are affordable, accessible and repairable by the community and heat-related illnesses.
- Housing features, including housing materials, and reductions in climate-related injuries and deaths, including deaths from flooding and fires (caused by increased heat/dryness and storms related to climate change).
- Inadequate drainage and flood-related deaths.
- Safe public spaces and transportation and reductions in SGBV.
- Overcrowding and SGBV.
- Increased safety features for shared sanitation (relative to less-safe shared sanitation) and SGBV.
- Tenure security and IPV and access to/affordability of health services.
- Smoke from cooking fires and maternal mortality.
- Malnutrition, gender and housing features, such as a closer examination of the link between anemia and WASH conditions, particularly during women's reproductive years.
- Housing features and malaria contraction among pregnant women.
- Proximity to industry and respiratory infections.
- Proximity to traffic and respiratory infections.
- Inadequate drainage and respiratory infections.
- The quality of piped water and enteric infections.
- Improved shared sanitation (relative to unimproved shared sanitation) and enteric infections.
- Inadequate drainage and enteric infections.
- Informal settlement features, like walkability, social interaction and use of sustainable materials, and positive health benefits.

Annex A: Detailed methodology

Systematic literature review

The research team conducted a systematic literature review[ix] to examine the overlap between informal settlement improvements, health and gender in existing literature. This literature review answers the "how" part of the research question, providing insights into what kinds of health challenges women face in informal settlements and how those relate to gender norms or different biological realities for women versus men.

The first step in such a review is to determine the inclusion and exclusion criteria for selecting studies. This includes the source material and the time frame. The research team, in collaboration with Habitat for Humanity International, identified the most important academic journals and non-academic expert sources of information related to the research questions. This included evidence from public health, global health, gender studies, urban studies, housing and sustainable development. In total, the team searched 76 journals and organizations for relevant articles and publications (please see Annex B for a list of sources searched). Additionally, a time-window limit for studies conducted in the last 10 years ensures findings come from those studies that are the most relevant for contemporary contexts. Finally, a set of search terms was used to access articles and reports relevant for the research question. Importantly, only studies with at least some evidence generated from informal settlements (comparative studies met the criteria) were included here, so all findings about the health challenges for women and their causal factors reflect research done within the informal settlement context. After setting out the criteria for selecting studies, the research team accessed and analyzed all studies that met the criteria. In total, the team analyzed 102 studies for the systematic literature review portion of the work (which focused exclusively on articles exploring women's health in informal settlements) and more than 70 additional studies to fill gaps on the relationship between features of adequate housing and health.

The analysis part of the systematic literature review included the following steps:

1. Using Atlas.ti, the research team assigned codes to findings within the literature. Assigning codes tagged pieces of information and quotations for rapid collation. For example, the codes include a set for key informal settlement improvements (e.g., improvements in WASH) and gender-specific health outcomes (e.g., maternal mortality).
2. After assigning codes, reports of all findings on key relationships between informal settlement improvements and health outcomes (e.g., how WASH improvements affect maternal mortality) were generated.
3. Findings from these reports were used to synthesize available data against the primary research question.

Annex C includes details on the hypotheses for how the elements of adequate housing might be associated with key health outcomes. The research team used this table to develop the search terms and codes for Atlas.ti. High-quality studies on all these relationships were not available, so this literature review reflects the strongest findings available. Table A.1 below summarizes the health outcomes covered by existing literature, demonstrating there is a stronger body of available evidence for SGBV, for example, and relatively weaker evidence on climate-related illnesses. The list is not exhaustive of what the literature covered, but the table includes the health conditions with the most evidence and relevance for the topics included in this report.

Table A.1: Health outcomes covered by the literature on health and gender in informal settlements*

Health and gender topic	Number of studies
Sexual and gender-basic violence (including IPV)	60
Mental health	50
Sexual and reproductive health (including RTIs, UTIs and maternal health)	38
Diarrheal and waterborne diseases	20
Malnutrition	18
Health services access	14

ix A systematic literature review follows a structured protocol, focuses on a specific research question, uses exhaustive sources (see Annex B), applies predefined selection criteria (see Annex C) to minimize bias and is often aided by specialized software (in this case Atlas.ti). It often includes a quantitative synthesis of evidence (see Annex D with the online Evidence Gap Map).

Health and gender topic	Number of studies
Respiratory conditions	11
Disaster-related injury, illness or death	8
Heat-related illness	4

* The studies listed are not all studies ultimately included in the report. Instead, these are the studies that met the criteria for the systematic literature review (the 10-year time period, preferred list of sources and dedicated to exploring women's health in informal settlements).

Statistical analysis

The second part of this research involved a statistical analysis to answer the second part of the research question: To what extent would improvements in informal settlements also benefit women's health? This analysis used existing, country-level data on key health indicators and adequate housing features (limited to urban areas where possible), as well as existing research quantifying the relationship between features of housing or service access and those health outcomes. Based on these pieces of information, the analysis estimated what would happen to women's health if women in informal settlements had *complete* access to key informal settlement improvements. For example, the analysis estimates how much rates of respiratory infections might reduce if all women in informal settlements had access to clean fuel.

The country-level data used covers a single year (using the most recent year available for each indicator, except for climate-related deaths, where a 10-year average was used to adjust for dramatic fluctuations in deaths). The health benefits reported are an annual estimate. However, the predictive analysis does not make assumptions about how benefits might change over time. For example, the benefits of reducing overcrowding on respiratory infections might fluctuate year to year based on the severity of the flu or coronavirus strains circulating. Therefore, it is best to think of these estimates as the benefits that come in the first year that improvements to increase housing adequacy are introduced.

This analysis relies on several key assumptions in terms of data sources. These assumptions are designed to be conservative, meaning they underestimate, instead of overestimate, the likely effect of informal settlement improvements on health indicators. These assumptions are dependent on existing, country-level datasets, which rarely disaggregate data on housing conditions by those inside versus outside informal settlements. As stated, these assumptions undercount the percentage of women experiencing each health condition in informal settlements and overcount access to housing or service features. Both of these flaws in the assumptions, however, ensure the numbers produced here ***understate*** the likely benefits of improvements in informal settlements on women's health (which is preferable to making claims that are larger than what would occur in reality). These baseline assumptions include:

1. The percentage of women experiencing each health condition in informal settlements matches that at the country level. Available comparative literature, while sparse, often suggests that *more* women in informal settlements experience these negative health outcomes, so this is likely a conservative assumption. However, data does not exist (for each country or in a systematized way) on exactly how many more women in informal settlements suffer from various health ailments, so using the existing country level is still the best data point.
2. The level of access to each housing or service feature also matches the level for urban areas (or the country level, where location disaggregation by urban versus rural is not available). This is also a conservative assumption, as access among individuals in informal settlements is almost certainly poorer, on average.

In addition to these assumptions about the baseline data, the analysis uses the assumptions that follow about the relationships between informal settlement improvements and health outcomes (relational assumptions). Only data points from studies running tests of statistical significance were used to generate these assumptions. However, because very little quantitative evidence exists on the strength of these relationships exclusively in informal settlements among women, the selection criteria for studies contributing to these assumptions were not limited to those studying women in informal settlements.

Using the relational assumptions listed below yielded new statistics on what health outcomes among women in informal settlements would look like if improvements were in place. This was compared to the baseline statistic (current population statistic) shared with women in other locations. As an additional step, the analysis also estimated what the new population statistic for each health outcome would be if just the informal settlement environment was affected. This shows how investments in informal settlements increase progress toward global health goals.

Relational assumptions

Respiratory outcomes

1. Reducing the number of people per room is associated with an 11% reduction in the odds of TB infections.
2. Clean fuel usage reduces the risk of COPD by 77%.
3. Water nearby lowers the odds of respiratory infections by 53%.
4. Private (versus shared) sanitation reduces the odds of respiratory infections by 44%.
5. Clean fuel usage reduces the odds of respiratory infections by 37.5%.

Gastrointestinal illness

1. Sewer connections reduce the odds of enteric infections[x] by 69%.
2. Access to private sanitation reduces the odds of enteric infections by 44.5%.
3. Access to improved sanitation[xi] reduces the risk of enteric infections by 16%.
4. Access to at least basic water sources reduces the risk of enteric infections by 47%.
5. Access to water on premises reduces the odds of enteric infections by 71.7%.
6. Access to piped water reduces the risk of enteric infections by 79%.
7. Refuse removal reduces the odds of enteric infections by 50%.

Maternal and reproductive health

1. Access to improved sanitation reduces the odds of maternal mortality by 67.4%.
2. Access to at least basic water reduces the odds of maternal mortality by 33.3%.
3. Access to a skilled birth attendant reduces the risk of maternal mortality by 67.8%.
4. Giving birth at a health facility reduces the risk of maternal mortality by 74.5%.
5. Access to an indoor place to change sanitary napkins (proxied by open defecation rates) reduces the odds of RTIs[xii] by 44%.
6. Access to a private toilet reduces the odds of UTIs by 77.3%.
7. Access to improved sanitation reduces the odds of UTIs by 83.3%.

Sexual and gender-based violence

1. Access to sanitation that is not open defecation reduces the odds of non-partner sexual violence by 55.6%.
2. Access to a private toilet reduces the odds of non-partner sexual violence by 69.2%.
3. Access to on-premises water reduces the odds of IPV by 74.2%.
4. Access to piped water reduces the odds of IPV by 26.9%.
5. Walking less than 30 minutes to reach water reduces the odds of IPV by 2.9%.
6. Having residential land in a woman's own name decreases the probability of IPV by 2%.

Climate-related injuries and deaths

1. Access to at least basic water sources reduces the odds of severe heat stress by 58%.
2. Access to public spaces, including green spaces, reduces the odds of severe heat stress by 65%.
3. Access to improved water sources reduces the odds of death during climate-related crises by 32.2%.
4. Housing that is not overcrowded reduces the odds of death during climate-related crises by 29%.
5. Housing made of durable materials reduces the odds of death during climate-related crises by 35.6%.

Typology construction

To adjust for data gaps and report more reliable estimates that are comparable across different contexts (highlighting those where informal settlement improvements could be the most impactful), the study reports findings at the country-typology level, even though the calculations were done at the country level for 185 countries (see Table A.3 in Annex D). This typology follows the approach of the Home Equals launch report (Frediani et al., 2023).[xiii]

x Includes diarrheal diseases, typhoid and paratyphoid, and invasive salmonella.

xi Excludes unimproved sanitation and open defecation but includes shared sanitation.

xii Bacterial vaginosis.

xiii While considered, expanding the typology using data on urbanization rates was ultimately rejected because the very high correlation between percentage of the population living in slums and urbanization rates meant it added complexity, rather than nuance, to the presentation of findings.

- **Type 1:** Higher HDI and lower population of slum dwellers (very high HDI and lower than 30% slum population *or* high HDI with less than 10% slum population).
- **Type 2:** Higher HDI and higher population of slum dwellers (very high HDI and more than 30% slum population *or* high HDI with more than 10% slum population).
- **Type 3:** Moderate HDI with moderate to high slum dwellers (medium HDI and less than 70% slum population *or* low HDI with less than 30% slum population).
- **Type 4:** Moderate to low HDI with a higher percentage of slum dwellers (medium HDI and more than 70% slum population *or* low HDI with more than 30% slum population).

Where country-level data were missing on any indicator (other than HDI and percentage of the population living in slums, which were required for inclusion in the analysis), the population-weighted mean for the other countries in the typology was used to fill the gap and include the country in the calculations.

Indicators and data sources

The analysis used the following indicators and data sources.

Health outcomes

- TB incidence (SDG 3.3.2), 2023, WHO
- Number of respiratory infections (includes lower respiratory, upper respiratory, COVID-19 and otitis media), 2021, Global Burden of Disease (GBD) study
- Number of enteric infections (includes diarrheal diseases, typhoid and paratyphoid, and invasive salmonella), 2021, Global Burden of Disease (GBD) study
- Number of deaths and missing persons attributed to disasters (SDG 13.1.1), 2013–2022 (10-year average), United Nations Office for Disaster Risk Reduction
- Heat and cold exposure, number of cases, 2021, Global Burden of Disease (GBD) study
- Maternal mortality ratio (SDG 3.1) and maternal deaths, 2022, WHO
- Number of cases of UTIs and interstitial nephritis, 2021, Global Burden of Disease (GBD) study
- Rates of bacterial vaginosis, various years, Peebles et al., 2019
- Proportion of women and girls age 15 years and older subjected to sexual violence by someone other than an intimate partner in the previous 12 months (SDG 5.2.2), various years, United Nations Statistics Division
- Proportion of ever-partnered women and girls age 15 years and older subjected to physical, sexual or psychological violence by a current or former intimate partner in the previous 12 months (SDG 5.2.1), 2018, UN Women

Housing and services indicators

- Proportion of people with secure tenure rights to land out of total adult population, disaggregated by sex, various years, U.N. SDG Indicator Database (Indicator 1.4.2)
- Access to electricity, urban (% of urban population), 2022, World Bank
- Proportion of population with primary reliance on clean fuels and technologies for cooking (%), 2022, WHO
- Limited (more than 30 minutes distance) access to drinking water (% of urban population), 2022, WHO and UNICEF
- Proportion of population using improved and safely managed sanitation facilities (excluding shared) (% of urban population), 2022, WHO and UNICEF
- Proportion of population with sewer connections (% of urban population), 2022, WHO and UNICEF
- Portion of the population with access to at least basic or limited (shared) sanitation (% of urban population), 2022, WHO and UNICEF
- Portion of the population using open defecation (% of urban population), 2022, WHO and UNICEF
- Portion of the population with access to at least basic water sources (% of urban population), 2022, WHO and UNICEF
- Portion of the population with access to water on premises (% of urban population), 2022, WHO and UNICEF
- Portion of the population with access to piped water (% of urban population), 2022, WHO and UNICEF
- Waste collection coverage (% of urban population), various years, World Bank
- Adequate housing index, various years, World Bank
- Portion of the population with convenient access to an open public space, 2023, UN-HABITAT

- Portion of births delivered in a health facility, various years, WHO
- Births attended by skilled health personnel (%), various years, WHO

Other indicators

- Total population, 2019–2023, World Bank
- Total population, female, 2019–2023, World Bank
- Population ages 15–64, female, 2019–2023, World Bank
- Population ages 65-plus, female, 2019–2023, World Bank
- Percentage of urban population living in slums, 2022, UN-HABITAT
- Human Development Index, 2022, United Nations Development Programme, or UNDP

Ground-truthing workshops

To refine the systematic literature review and validate the preliminary findings, the team coordinated ground-truthing exercises with national-level experts and informal settlement residents in five countries across five regions: Indonesia, in Asia-Pacific; Kenya, in Africa; Mexico, in LAC; Egypt, in MENA; and North Macedonia, in Central and Eastern Europe. These 10 workshops were conducted by Habitat for Humanity national offices in these five countries, supported by the researchers and Habitat for Humanity International staff.

The expert workshops occurred as both virtual and hybrid meetings in each of the five countries, gathering 15–30 local stakeholders, including experts in housing, health and/or gender (both researchers and implementers), government representatives, civil society organization representatives, and Habitat staff/consultants at the national, regional and headquarters levels. The research team presented both the literature review and predictive analysis findings and draft recommendations. National-level experts on health, gender and housing reflected on the relevance of the subject matter, the accuracy of the analysis assumptions and findings, and additional relationships they felt were important to consider. These recommendations and discussions were documented and integrated into these final findings and recommendations.

The informal settlement resident workshops occurred in person in settlements in the five target countries, namely: Tanjung Kait in Tangerang, Indonesia; Mukuru in Nairobi, Kenya; Ezbet El Haggana in Cairo, Egypt; settlements in the cities of Kumanovo, Prilep and Bitola in North Macedonia; and La Aldana in Guanajuato, Mexico. A total of 133 informal settlement residents participated in the workshops, including 83 women and 50 men (15 women and 10 men in Egypt; 29 women and eight men in Indonesia; 14 women and 13 men in Kenya; 11 women and 16 men in North Macedonia; and 14 women and three men in Mexico).

Leading up to the workshops, Habitat for Humanity national offices engaged in training held by the research team to prepare for data collection and informal settlement resident engagement. This training included an in-kind capacity-building presentation on gender-sensitive planning and monitoring. The national offices further received a detailed workshop guide, checklist and logistical support (to identify locations, make lists of materials required, etc.).

During the workshops, residents collaboratively explored gender and health challenges in informal settlements, reviewed proposed recommendations and generated innovative ideas to address these challenges to integrate residents' needs more directly into the recommendations of the report. This occurred through small-group activities (during which participants matched challenges with recommendations and provided feedback using color-coded sticky notes) and plenary discussions (during which groups presented their findings and discussed common themes, disagreements and fresh solutions). The national office staff facilitators documented these outputs using a systematization matrix, pictures and additional notes, forming the data from these workshops. The research team then analyzed this data using Atlas.ti, following the established workshop methodology.

This approach aligned challenges identified by the study team with corresponding recommendations, ranked them by perceived relevance, and determined points of agreement, disagreement and newly proposed solutions. These outputs were directly included in the recommendations section of this report.

Annex B: Systematic literature review sources searched

The list of search terms generated from the table in Annex C was applied to each of the sources below to access any research produced that matched the criteria for inclusion in a systematic literature review. These criteria included being produced in the past 10 years, having at least some evidence generated from informal settlements (comparative studies met the criteria), and analyzing some relationship between housing (or informal settlements as a context), health *and* gender. Importantly, not all searched sources yielded articles that met the criteria for inclusion. Additionally, sources might have included information on health and housing without any gender dynamic and so did not meet the criteria for inclusion in the systematic literature review. This occurred frequently during the search process, as the gendered dynamics of health and housing in informal settlements are understudied.

Academic journals

1. *American Journal of Public Health*
2. *Asian Journal of Women's Studies*
3. *BMC Global and Public Health*
4. *BMC Public Health*
5. *BMC Women's Health*
6. *BMJ Global Health*
7. *BMJ Public Health*
8. *Bulletin of the World Health Organization*
9. *Cities: The International Journal of Urban Policy and Planning*
10. *Demography*
11. *Environment and Urbanization*
12. *European Journal of Women's Studies*
13. *Feminist Economist*
14. *Feminist Review*
15. *Gender & Society*
16. *Gender and Development*
17. *Gender Issues*
18. *Gender, Place and Culture: A Journal of Feminist Geography*
19. *Geoforum*
20. *Globalization and Health*
21. *Globalizations*
22. *Habitat International*
23. *Housing Studies*
24. *International Development Planning Review*
25. *International Journal of Epidemiology*
26. *International Journal of Housing Policy*
27. *International Journal of Urban and Regional Research*
28. *Journal of Global Health*
29. *Journal of Housing and the Built Environment*
30. *Journal of International Women's Studies*
31. *Journal of Planning Education and Research*
32. *Journal of the American Planning Association*
33. *Journal of Urban Affairs*
34. *Journal of Urban Planning and Development*
35. *Land Use Policy*
36. *Nature*
37. *New England Journal of Medicine*
38. *NORA-Nordic Journal of Feminist and Gender Research*
39. *Planning Theory & Practice*
40. *PLOS One*
41. *Progress in Planning*
42. *Social Science & Medicine*
43. *Sustainability*
44. *The Lancet*
45. *The Lancet Global Health*
46. *Urban Geography*
47. *Urban Science*
48. *Urban Studies Built Environment*
49. *Women's Studies International Forum*
50. *World Development*

Sample of key organizations producing research

1. Asian Coalition for Housing Rights
2. CAHF, Centre for Affordable Housing Finance in Africa
3. Center for Urban Research and Excellence
4. Cities Alliance
5. European Network for Housing Research
6. G7 Information Centre, University of Toronto
7. Global Land Tool Network

8. Global Shelter Cluster
9. ICCCAD, International Centre for Climate Change and Development
10. IIED, International Institute for Environment and Development
11. Indian Institute for Human Settlements
12. Institute for Housing and Urban Development Studies
13. International Housing Coalition
14. International Monetary Fund
15. Lincoln Institute of Land Policy
16. Mahila Housing Trust
17. ODI, Overseas Development Institute
18. OECD, Organisation for Economic Co-operation and Development
19. Reall
20. Slum Dwellers International
21. Stanford University School of Sustainability
22. UCLG, United Cities and Local Governments
23. UN-HABITAT
24. UN Women
25. UNFPA, United Nations Population Fund
26. University of Cape Town, Heat Adaptation Benefits for Vulnerable Groups in Africa
27. Urban Institute
28. WHO, World Health Organization
29. WIEGO, Women in Informal Employment: Globalizing and Organizing
30. World Bank
31. WRI, World Resources Institute

Annex C: Hypothesized relationships and codes for systematic literature review

Table A.2: Adequate housing elements and health outcomes included in the systematic literature review and codes assigned in Atlas.ti

Adequate housing elements	Hypothesized health outcomes	Housing codes	Health codes
Security of tenure	• Improvement in women's and girls' mental health (e.g., reduced stress from less secure land tenure and increased feelings of independence for women, especially divorced and widowed women with traditionally less secure tenure) • Improvement in stress-related diseases, like cardiovascular disease, stroke and high blood pressure • Reductions in domestic violence (associated with less housing-related stress) • Insecure tenure can force people onto hazardous land where risks like flooding and contamination are higher (with secondary effects from those hazards captured below under environmental adequacy and WASH). • Tenure insecurity can prevent residents from accessing essential infrastructure such as clean water, sanitation and waste management (with secondary effects captured below under WASH). • Greater investments in WASH, housing improvements and green spaces due to feelings of ownership (with secondary effects from those changes captured below)	• Security of tenure	• Mental health • Domestic violence • Gender and: ▪ Cardiovascular disease ▪ Stroke ▪ High blood pressure
Availability of services, materials, facilities and infrastructure	• Access to water and sanitation leads to declines in maternal mortality, malnutrition and waterborne diseases. • Access to water and sanitation reduces the burden of work on women and girls and frees up time for rest and improved mental health. • Access to WASH leads to a decline in SGBV occurring during water-retrieval activities or public toilet usage. • Access to menstrual hygiene products, private sanitation units, sanitary disposal units and hand washing improves the mental health of women and adolescent girls. • Access to electricity and lighting increases security and reduces women's and girls' exposure to violence. • Access to electricity reduces respiratory diseases and burns associated with cooking on open fires. • Access to the internet increases women's and girls' access to health care services.	• WASH • Menstrual hygiene • Electricity • Internet • Health services access	• Maternal mortality • SGBV/GBV • Gender and: ▪ Mental health ▪ Malnutrition ▪ Waterborne diseases ▪ Respiratory diseases ▪ Burns ▪ Health care services access

Adequate housing elements	Hypothesized health outcomes	Housing codes	Health codes
Affordability	• Increased disposable income allows women to spend more on their health expenses, especially maternal health care. • Increased disposable income allows women to spend more on their own nutritional needs. • Increased disposable income allows women to make decisions and invest in recreational and well-being activities — enhancing mental and physical health. • Increased access to income-generating activities (as an approach to increasing affordability) allows women to spend more on health expenses.	• Affordable housing • Income-generating activities	• Maternal health care access • Maternal mortality • Gender and: ▪ Malnutrition ▪ Health care access
Location	• Proximity to health services and other services leads to reductions in maternal mortality. • Improvements in location reduce women's and girls' exposure to environmental hazards (e.g., fewer dirt roads are associated with less respiratory disease, and better locations are farther from pollution, reducing associated illnesses). • Improvements in location increase access to high-quality food and increase nutrition. • Reduction of SGBV associated with location-based safety hazards. • Proximity to green spaces, parks and play areas increases women's mental health (especially as it relates to easing childcare responsibilities). • Improvements in location reduce feelings of stigmatization and increase mental health.	• Distance to health services • Exposure to environmental hazards • Safety features • Access to green spaces	• Maternal mortality • Gender and: ▪ Environmental hazards ▪ Pollution ▪ Respiratory diseases ▪ Mental health ▪ Malnutrition
Habitability	• Habitable spaces lead to a reduction of gender disparities in respiratory infections, tuberculosis, influenza and malaria. • Habitable spaces lead to improvements in women's and girls' mental health. • Reductions in climate-related health complications for women and girls from improved ventilation, heat resistance, etc. • Improved appropriate spaces for women's and children's needs and for people with disabilities makes the caring responsibilities (primarily carried by women) easier, reducing physical and mental pressure.	• Habitability	• Gender and: ▪ Respiratory infections ▪ Tuberculosis ▪ Influenza ▪ Malaria ▪ Heat stroke/ illness ▪ Mental health
Accessibility	• Improved accessibility reduces health complications for women with disabilities and their carers (primarily women and girls).	• Settlement accessibility	• Women with disabilities

Adequate housing elements	Hypothesized health outcomes	Housing codes	Health codes
Cultural adequacy	• Improvements in women's sense of belonging/identity expression and mental health • Women's organic community organizing in informal settlements creates improvements in women's living conditions (WASH infrastructure, caregiving facilities, etc.), health care access and well-being.	• Cultural adequacy • Empowerment/ collective action	• Gender and: ▪ Mental health ▪ Health care access
Environmental sustainability/ resilience	• Improvements in environmental sustainability/ resilience reduce the incidences of heat-related cardiovascular diseases. • Improvements in environmental sustainability/resilience reduce the incidences of floods and landslides, reducing women's and girls' exposure to injury and death from these events. • Improvements in environmental sustainability/resilience reduce women's and girls' exposure to SGBV associated with natural disasters and environmental stressors.	• Environmental sustainability • Environmental resilience	• Gender and: ▪ Cardiovascular diseases ▪ Disaster-related illness/death • Disasters and SGBV

Annex D: Countries included in the predictive analysis and typology values

Table A.3: Countries included and typology values

Country	HDI Value (2022)	HDI Category	Percentage of population living in slums or informal settlements[xiv]	Country type	Estimated illnesses prevented[xv]	Estimated incidences of GBV prevented[xvi]	Estimated maternal and climate deaths prevented
Somalia	0.38	Low	48.69%	4	134,020.70	229,657.30	1,705.50
South Sudan	0.381	Low	94.20%	4	172,121.60	624,238.10	2,889.20
Central African Republic	0.387	Low	68.91%	4	66,453.70	143,319.30	754.9
Chad	0.394	Low	82.00%	4	238,779.10	479,862.50	5,024.20
Niger	0.394	Low	70.44%	4	264,273.20	414,756.00	2,557.30
Mali	0.41	Low	92.50%	4	333,269.40	546,337.40	1,985.30
Burundi	0.42	Low	36.75%	4	58,116.60	168,942.90	310.2
Yemen	0.424	Low	44.20%	4	92,093.90	427,716.50	561.7
Burkina Faso	0.438	Low	87.88%	4	320,698.90	465,422.90	305.1
Sierra Leone	0.458	Low	49.28%	4	63,769.80	174,548.30	221.8
Mozambique	0.461	Low	54.96%	4	289,894.90	514,060.30	643.2
Afghanistan	0.462	Low	71.59%	4	209,554.40	1,066,872.10	3,343.40
Guinea	0.471	Low	43.96%	4	91,005.40	189,209.90	735.8
Congo (Democratic Republic of the)	0.481	Low	78.36%	4	1,204,180.70	4,876,552.50	6,827.10
Guinea-Bissau	0.483	Low	59.00%	4	17,218.60	51,641.90	175.2
Madagascar	0.487	Low	65.72%	4	71,752.30	166,362.20	309.3
Liberia	0.487	Low	60.48%	4	477,526.80	790,546.80	1,619.40
Ethiopia	0.492	Low	64.31%	4	1,273,992.00	2,053,905.30	4,311.00
Eritrea	0.493	Low	48.69%	4	57,600.90	47,825.50	117.8
Gambia	0.495	Low	37.08%	4	12,682.30	17,003.30	54.4
Benin	0.504	Low	64.01%	4	193,346.10	270,039.00	378.6
Malawi	0.508	Low	37.97%	4	118,778.60	250,926.40	161.2
Djibouti	0.515	Low	48.69%	4	8,067.10	21,826.00	8.1
Sudan	0.516	Low	73.70%	4	388,703.60	1,026,096.60	2,235.30
Senegal	0.517	Low	46.41%	4	122,013.80	123,000.80	137.2
Lesotho	0.521	Low	25.55%	4	9,197.80	14,279.50	27.7
Tanzania (United Republic of)	0.532	Low	70.09%	4	599,866.30	2,090,579.90	1,603.60
Côte d'Ivoire	0.534	Low	48.26%	4	198,386.50	364,122.90	835.8

xiv From most recent year measured.

xv Includes the following: respiratory infections, enteric infections, COPD, RTI, UTI, heat sickness.

xvi Includes intimate partner violence and non-partner sexual assault.

Country	HDI Value (2022)	HDI Category	Percentage of population living in slums or informal settlements[xiv]	Country type	Estimated illnesses prevented[xv]	Estimated incidences of GBV prevented[xvi]	Estimated maternal and climate deaths prevented
Mauritania	0.54	Low	58.56%	4	39,825.30	61,891.10	216.4
Pakistan	0.54	Low	55.97%	4	1,650,857.10	3,834,862.00	2,847.70
Togo	0.547	Low	38.46%	4	70,043.90	101,884.20	171.7
Nigeria	0.548	Low	48.50%	4	1,522,872.70	2,829,512.40	26,112.80
Rwanda	0.548	Low	38.35%	4	80,554.10	228,747.00	70.1
Congo	0.593	Medium	75.34%	4	68,967.30	135,264.70	86.6
Sao Tome and Principe	0.613	Medium	82.39%	4	4,297.90	6,743.10	1.3
Zimbabwe	0.55	Medium	54.88%	3	359,018.30	1,173,208.90	1,226.40
Uganda	0.55	Medium	52.68%	3	116,382.50	277,023.60	297.5
Haiti	0.552	Medium	51.06%	3	101,489.90	199,158.20	255.7
Syrian Arab Republic	0.557	Medium	41.13%	3	42,566.80	172,660.90	36.7
Solomon Islands	0.562	Medium	1.95%	3	139.4	788.1	0.2
Timor-Leste	0.566	Medium	33.92%	3	5,201.80	8,030.30	15.2
Papua New Guinea	0.568	Medium	22.27%	3	33,443.30	62,956.80	69.1
Zambia	0.569	Medium	48.26%	3	142,413.30	427,187.20	153.8
Comoros	0.586	Medium	48.50%	3	6,178.70	7,311.70	3.7
Cameroon	0.587	Medium	32.67%	3	133,524.10	329,798.70	765.6
Angola	0.591	Medium	62.70%	3	251,237.50	891,583.30	1,266.60
Cambodia	0.6	Medium	42.27%	3	65,670.20	165,609.70	27.6
Kenya	0.601	Medium	40.50%	3	385,399.60	885,246.50	986.5
Nepal	0.601	Medium	40.06%	3	240,034.10	293,161.50	277.8
Ghana	0.602	Medium	33.49%	3	218,091.60	269,978.50	291.7
Myanmar	0.608	Medium	58.28%	3	294,661.60	526,264.90	702.4
Namibia	0.61	Medium	41.40%	3	2,818.90	3,195.90	5.9
Eswatini (Kingdom of)	0.61	Medium	17.01%	3	26,128.30	36,747.80	18.8
Vanuatu	0.614	Medium	3.06%	3	111.9	625.7	0.1
Lao People's Democratic Republic	0.62	Medium	54.84%	3	41,592.80	35,994.40	49.6
Honduras	0.624	Medium	31.50%	3	46,340.20	35,558.00	14.3
Kiribati	0.628	Medium	5.93%	3	170.9	383.2	0.1
Guatemala	0.629	Medium	37.60%	3	75,926.40	76,985.50	109.7
India	0.644	Medium	5.41%	3	1,182,932.90	2,046,855.70	386.5
Equatorial Guinea	0.65	Medium	64.69%	3	11,807.80	63,297.70	39.1
Tuvalu	0.653	Medium	50.90%	3	46.7	107.8	0
Cabo Verde	0.661	Medium	46.41%	3	3,176.90	3,552.90	0.3
Nicaragua	0.669	Medium	5.52%	3	3,883.70	3,995.10	0.7
Bangladesh	0.67	Medium	51.51%	3	1,663,835.70	2,636,652.20	1,312.50

Country	HDI Value (2022)	HDI Category	Percentage of population living in slums or informal settlements[xiv]	Country type	Estimated illnesses prevented[xv]	Estimated incidences of GBV prevented[xvi]	Estimated maternal and climate deaths prevented
Iraq	0.673	Medium	49.34%	3	171,306.30	279,614.60	196.3
El Salvador	0.674	Medium	16.48%	3	11,015.00	13,498.00	0.3
Tajikistan	0.679	Medium	0.05%	3	43.6	83.2	0
Bhutan	0.681	Medium	44.69%	3	2,577.10	3,458.70	36
Suriname	0.69	Medium	15.80%	3	1,205.80	1,175.00	0.5
Gabon	0.693	Medium	38.77%	3	9,020.00	29,159.80	8.5
Nauru	0.696	Medium	0.60%	3	0.4	0.8	0
Bolivia (Plurinational State of)	0.698	Medium	46.63%	3	59,843.90	66,423.00	167.8
Morocco	0.698	Medium	10.85%	3	39,913.50	43,551.40	15.4
Venezuela (Bolivarian Republic of)	0.699	Medium	25.70%	3	73,368.30	137,098.20	37.1
Belize	0.7	High	15.73%	2	394.4	491.9	0.3
Samoa	0.702	High	34.59%	2	652.4	1,448.90	0.6
Botswana	0.708	High	39.60%	2	10,645.10	11,507.80	0.3
Philippines	0.71	High	35.87%	2	403,487.10	501,477.80	573.9
Indonesia	0.713	High	19.41%	2	426,086.40	991,133.90	886.8
Palestine, State of	0.716	High	19.50%	2	5,919.60	14,768.90	0.4
South Africa	0.717	High	24.20%	2	108,890.70	229,137.00	136
Vietnam	0.726	High	32.50%	2	219,192.90	192,350.60	58.2
Paraguay	0.731	High	15.10%	2	12,279.90	10,001.30	1.1
Jordan	0.736	High	23.40%	2	9,974.50	14,946.40	17.5
Mongolia	0.741	High	17.88%	2	5,192.50	15,358.00	5.3
Guyana	0.742	High	11.30%	2	889.6	1,909.00	0.3
Algeria	0.745	High	13.25%	2	22,367.90	92,486.10	11
Libya	0.746	High	16.58%	2	8,502.40	11,281.30	1.2
Azerbaijan	0.76	High	26.93%	2	21,234.40	26,244.20	2.4
Brazil	0.76	High	14.90%	2	334,039.40	383,429.70	9.7
Peru	0.762	High	45.06%	2	545	1,196.40	0.2
Maldives	0.762	High	34.85%	2	123,875.10	385,816.30	34.3
Cuba	0.764	High	11.04%	2	11,900.10	18,196.20	0
Ecuador	0.765	High	57.80%	2	120,426.70	127,358.70	125.7
Dominican Republic	0.766	High	11.25%	2	10,209.90	15,453.50	0.5
Iran (Islamic Republic of)	0.78	High	44.69%	2	211,700.60	465,963.00	57.4
Sri Lanka	0.78	High	44.69%	2	86,530.80	92,258.10	2.9
Mexico	0.781	High	17.60%	2	189,636.80	229,654.80	45.9
China	0.788	High	26.32%	2	1,321,527.20	2,430,604.60	16.2
Mauritius	0.796	High	48.69%	2	2,714.70	5,111.40	0.7

Country	HDI Value (2022)	HDI Category	Percentage of population living in slums or informal settlements[xiv]	Country type	Estimated illnesses prevented[xv]	Estimated incidences of GBV prevented[xvi]	Estimated maternal and climate deaths prevented
Seychelles	0.802	Very High	48.69%	2	302.4	534.1	0
Kyrgyzstan	0.701	High	2.44%	1	678.1	1,160.30	0.6
Jamaica	0.706	High	0.88%	1	196.4	315.2	0
Lebanon	0.723	High	4.53%	1	1,461.80	2,652.50	0.1
Saint Lucia	0.725	High	0.44%	1	5.6	9.7	0
Uzbekistan	0.727	High	7.10%	1	14,157.80	36,427.60	0.5
Egypt	0.728	High	3.84%	1	17,797.10	44,262.80	11.5
Fiji	0.729	High	9.40%	1	892.5	1,677.80	0.5
Marshall Islands	0.731	High	2.38%	1	6.9	21.3	0
Tunisia	0.732	High	7.64%	1	3,386.00	8,946.40	0.3
Ukraine	0.734	High	1.10%	1	3,485.40	9,064.60	5.1
Tonga	0.739	High	0.31%	1	2.4	4.8	0
Turkmenistan	0.744	High	8.38%	1	2,087.90	5,067.80	0
Colombia	0.758	High	9.70%	1	54,860.50	181,790.10	9.7
Moldova (Republic of)	0.763	High	6.50%	1	1,053.40	2,507.90	0.7
North Macedonia	0.765	High	0.28%	1	108.9	103	0
Saint Vincent and the Grenadines	0.772	High	2.76%	1	18.2	26	0
Bosnia and Herzegovina	0.779	High	0.31%	1	198.8	175.7	0
Armenia	0.786	High	8.39%	1	3,709.00	210.3	5.8
Albania	0.789	High	2.70%	1	863.5	1,527.50	0
Palau	0.797	High	0.62%	1	1	1.1	0
Bulgaria	0.799	High	0.20%	1	76.8	116.5	0
Belarus	0.801	Very High	0.00%	1	1.9	3.4	0
Kazakhstan	0.802	Very High	0.79%	1	668.1	1,450.60	0.8
Thailand	0.803	Very High	2.00%	1	16,161.50	18,228.70	0.1
Serbia	0.805	Very High	1.42%	1	1,807.20	1,207.90	0
Costa Rica	0.806	Very High	3.55%	1	2,028.20	3,288.10	0.2
Malaysia	0.807	Very High	0.20%	1	335.1	655.7	0.3
Trinidad and Tobago	0.814	Very High	8.63%	1	3,917.50	218.1	6
Georgia	0.814	Very High	7.08%	1	612.7	1,321.20	0.1
Oman	0.819	Very High	0.00%	1	0	0	0
Panama	0.82	Very High	16.30%	1	5,219.00	10,612.00	1.6
Russian Federation	0.821	Very High	2.62%	1	37,189.90	77,708.30	14.9
Brunei Darussalam	0.823	Very High	21.60%	1	362.1	962.6	0.1
Antigua and Barbuda	0.826	Very High	2.65%	1	14	58.3	0
Romania	0.827	Very High	2.52%	1	2,266.90	3,057.80	0.2

Country	HDI Value (2022)	HDI Category	Percentage of population living in slums or informal settlements[xiv]	Country type	Estimated illnesses prevented[xv]	Estimated incidences of GBV prevented[xvi]	Estimated maternal and climate deaths prevented
Uruguay	0.83	Very High	1.30%	1	208.8	424.7	0.5
Montenegro	0.844	Very High	8.77%	1	803.9	728.8	0
Kuwait	0.847	Very High	0.00%	1	0	0	0
Argentina	0.849	Very High	14.50%	1	50,615.10	98,299.10	2.9
Hungary	0.851	Very High	7.20%	1	1,816.20	1,943.70	0
Türkiye	0.855	Very High	14.13%	1	10	14.2	0
Slovakia	0.855	Very High	0.07%	1	54,865.90	110,044.50	2.8
Chile	0.86	Very High	7.32%	1	1,165.20	1,623.20	19.2
Portugal	0.874	Very High	0.06%	1	9.8	18.6	0.1
Saudi Arabia	0.875	Very High	0.55%	1	0	0	0
Qatar	0.875	Very High	0.00%	1	545.5	1,173.20	0
Croatia	0.878	Very High	0.53%	1	67.5	77.1	0
Latvia	0.879	Very High	0.59%	1	60.9	120	0
Lithuania	0.879	Very High	0.51%	1	22.2	24.2	0.2
Poland	0.881	Very High	4.22%	1	7,115.00	6,828.30	0
Andorra	0.884	Very High	0.00%	1	0	0	0
Bahrain	0.888	Very High	0.00%	1	0	0	0
Greece	0.893	Very High	0.05%	1	6	3.6	0
Czechia	0.895	Very High	0.03%	1	15.2	18.5	0
Estonia	0.899	Very High	0.35%	1	5.3	10.5	0
Italy	0.906	Very High	0.02%	1	41.5	269.4	0
Cyprus	0.907	Very High	0.27%	1	13.7	8.4	0
France	0.91	Very High	0.00%	1	0	0	0
Spain	0.911	Very High	0.05%	1	89.5	103.3	0
Malta	0.915	Very High	0.04%	1	0	0	0
Israel	0.915	Very High	0.00%	1	0.7	1.5	0
Japan	0.92	Very High	2.00%	1	11,685.50	15,976.40	0.2
Slovenia	0.926	Very High	0.53%	1	3.6	3	0
Austria	0.926	Very High	0.05%	1	43.2	72.7	0.1
United States	0.927	Very High	0.09%	1	0.1	0.3	0
Luxembourg	0.927	Very High	0.02%	1	456.8	635.8	3.7
Korea (Republic of)	0.929	Very High	4.50%	1	8,353.70	30,723.40	1.6
Canada	0.935	Very High	1.10%	1	1,450.70	3,353.40	1.7
United Arab Emirates	0.937	Very High	0.11%	1	10.1	12.8	0
New Zealand	0.939	Very High	0.00%	1	0	0	0
United Kingdom	0.94	Very High	0.16%	1	75.8	116	0

Country	HDI Value (2022)	HDI Category	Percentage of population living in slums or informal settlements[xiv]	Country type	Estimated illnesses prevented[xv]	Estimated incidences of GBV prevented[xvi]	Estimated maternal and climate deaths prevented
Belgium	0.942	Very High	0.00%	1	0	0	0
Finland	0.942	Very High	0.00%	1	0	0	0
Australia	0.946	Very High	0.04%	1	31	280.3	0
Netherlands	0.946	Very High	0.00%	1	0	0	0
Singapore	0.949	Very High	0.00%	1	0	0	0
Ireland	0.95	Very High	8.50%	1	0	0	0
Germany	0.95	Very High	0.00%	1	1,337.70	2,846.50	0
Sweden	0.952	Very High	0.34%	1	0	0	0
Denmark	0.952	Very High	0.00%	1	57.5	96	0.3
Hong Kong, China (SAR)	0.956	Very High	1.75%	1	307.6	339.5	0.6
Iceland	0.959	Very High	0.00%	1	0	0	0
Norway	0.966	Very High	0.00%	1	0	0	0
Switzerland	0.967	Very High	0.00%	1	0	0	0
Human Development Index, 2022, UNDP; Percentage of urban population living in slums, 2022, UN-HABITAT							

References

Abong'o B.; Agumba S.; Moshi V.; Simwero J.; Otima J.; and Ochomo E. "Insecticide Treated Eaves Screens Provide Additional Marginal Protection Compared to Untreated Eave Screens Under Semi-Field Conditions in Western Kenya." *MalariaWorld Journal*. 2024 Jan 25;15:1. Retrieved from: link

Ajibade, I.; McBean, G.; and Bezner-Kerr, R. (2013). *Urban Flooding in Lagos, Nigeria: Patterns of Vulnerability and Resilience Among Women*. Retrieved from: link

Akhter S.; Dasvarma G. L.; and Saikia U. (2020). *Reluctance of Women of Lower Socio-Economic Status to Use Maternal Healthcare Services — Does Only Cost Matter?* Retrieved from: link

Akter, K.; Dey, S.; and Hasan, S. (2019). *Riverbank Erosion and Its Impact on Rural Women: Case Study of Ulania Village in Bangladesh.* Retrieved from: link

Akter, S.; Hakim, S.; Islam, A.; and Rahman, S. (2024). *Housing Infrastructure and Women in Care: COVID-19 Experiences from Urban Informal Settlements of Khulna, Bangladesh*. Retrieved from: link

Andersen, L. and Dowdell, B. L. (2019). *Access to Clean Water and Urinary Tract Infections in Haitian Women*. Retrieved from: link

Anwar, N. H.; Sawas, A.; and Mustafa, D. (2020). *'Without Water, There Is No Life': Negotiating Everyday Risks and Gendered Insecurities in Karachi's Informal Settlements.* Retrieved from: link

Armah, F. A.; Ekumah, B.; Yawson, D. O.; Odoi, J. O.; Afitiri, A. R.; and Nyieku, F. E. (2018). *Access to Improved Water and Sanitation in Sub-Saharan Africa in a Quarter Century.* Retrieved from link.

Ashraf, S.; Kuang, J.; Das, U.; Shpenev, A.; Thulin, E.; and Bicchieri, C. (2022). *Social Beliefs and Women's Role in Sanitation Decision Making in Bihar, India: An Exploratory Mixed Method Study.* Retrieved from: link

Atkinson, C. L. (2024). *Informal Settlements: A New Understanding for Governance and Vulnerability Study.* Retrieved from: link

Azad, R.; Fahmi, R.; Shrestha, S.; Joshi, H.; Hasan, M.; and Khan, A. N. S. et al. (2019). *Prevalence and Risk Factors of Postpartum Depression Within One Year After Birth in Urban Slums of Dhaka, Bangladesh.* Retrieved from: link

Azcona, G.; Bhatt, A.; and Duerto Valero, S. (2020). *Harsh Realities: Marginalized Women in Cities of the Developing World.* Retrieved from: link

Bachwenkizi, J.; Mohamed, H.; Funsan, P.; Rweyemamu, D.; Nelson, W.; Shao, M.; Kaijage, H.; Muyumbana, N.; Salehe, S.; Mwelange, L. P.; Shabani, S.; Olirk, B. T.; Mamuya, S.; and Mlimbila, J. (2023). *Access to Water Sources and Intimate Partner Violence Against Women in 26 Sub-Saharan African Countries.* Retrieved from: link

Baharav, Y.; Nichols, L.; Wahal, A.; Gow, O.; Schickman, K.; Edwards, M.; and Huffling, K. (2023). *The Impact of Extreme Heat on Pregnant People and Neonates: A State of the Science Review.* Retrieved from: link

Baker, K. K.; Padhi, B.; Torondel, B.; Das, P.; Dutta, A.; Sahoo, K. C.; Das, B.; Dreibelbis, R.; Caruso, B.; Freeman, M. C.; Sager, L.; and Panigrahi, P. (2017). *From Menarche to Menopause: A Population-Based Assessment of Water, Sanitation, and Hygiene Risk Factors for Reproductive Tract Infection Symptoms over Life Stages in Rural Girls and Women in India*. Retrieved from: link

Bamgboye, E. A.; Ogunwale, A. O.; and Al-Mukhtar, A. et al. (2025). *Understanding Malaria Treatment Patronage from Informal Healthcare Providers in Nigerian Urban Settlements: Insights from Community Members and Providers.* Retrieved from: link

Banach, M.; Lewek, J.; Surma, S.; Penson, P.E.; Sahebkar, A.; Martin, S.S.; Bajraktari, G.; Henein, M.Y.; Reiner, Z.; Bielecka-Dąbrowa, A.; and Bytyçi, I., on behalf of the Lipid and Blood Pressure Meta-analysis Collaboration (LBPMC) Group and the International Lipid Expert Panel (ILEP). (2023). *The Association Between Daily Step Count and All-Cause and Cardiovascular Mortality: A Meta-Analysis.* Retrieved from: link

Barchi, F. and Winter, S. C. (2019). *Non-Partner Violence in Sub-Saharan Africa and the Built Environment: A Multicountry Analysis of the Effects of Sanitation, Water Access, and Urban Settings.* Retrieved from: link

Batura, N.; Poupakis, S.; and Das, S. et al. (2022). *Factors Associated with Women's Healthcare Decision-Making During and After Pregnancy in Urban Slums in Mumbai, India: A Cross-Sectional Analysis.* Retrieved from: link

Belur, J.; Parikh, P.; Daruwalla, N.; and Joshi, R. (2016). *Perceptions of Gender-Based Violence Around Public Toilets.* Retrieved from: link

Benova, L.; Cumming, O.; and Campbell, O. M. (2014). *Systematic Review and Meta-Analysis: Association Between Water and Sanitation Environment and Maternal Mortality.* Retrieved from: link

Bhan, G. (2023). "Operationalising Social Protection: Reflections from Urban India." *Urban Studies,* 61(5), 765-781. Retrieved from: link

Bhilwar, M.; Lal, P.; Sharma, N.; Bhalla, P.; and Kumar, A. (2015). *Prevalence of Reproductive Tract Infections and Their Determinants in Married Women Residing in an Urban Slum of North-East Delhi, India.* Retrieved from: link

Boateng, G. O. and Adams, E. A. (2023). *A Multilevel, Multidimensional Scale for Measuring Housing Insecurity in Slums and Informal Settlements.* Retrieved from: link

Bonnet, F.; Joann V.; and Martha C. (2019). *Women and Men in the Informal Economy – A Statistical Brief.* WIEGO & ILO. Retrieved from link.

Boonyabancha, S.; Kerr, T.; Joshi, L.; and Tacoli, C. (2019). *How the Urban Poor Define and Measure Food Security in Cambodia and Nepal.* Retrieved from: link

Broadbent, A. M.; Declet-Barreto, J.; Krayenhoff, E. S.; Harlan, S. L.; and Georgescu, M. (2022). "Targeted Implementation of Cool Roofs for Equitable Urban Adaptation to Extreme Heat." *Science of the Total Environment*, 811, 151326. Retrieved from: link

Bronfenbrenner, U. (1977). *Toward an Experimental Ecology of Human Development.* Retrieved from: link

Butala, N. M.; VanRooyen, M. J.; and Patel, R. B. (2010). *Improved Health Outcomes in Urban Slums Through Infrastructure Upgrading.* Retrieved from: link

Centers for Disease Control and Prevention. (2025). *About Global Polio Eradication.* Retrieved from: link

Chant, S. (2014). *Exploring the "Feminisation of Poverty" in Relation to Women's Work and Home-Based Enterprise in Slums of the Global South.* Retrieved from: link

Chatterjee, B. (2015). *ActionAid's Young Urban Women Programme in Urban India: Taking an Intersectional Approach to Decent Work, Unpaid Care, and Sexual and Reproductive Health and Rights.* Retrieved from: link

Cheng, J. J.; Schuster-Wallace, C. J.; Watt, S.; Newbold, B. K.; and Mente, A. (2012). *An Ecological Quantification of the Relationships Between Water, Sanitation and Infant, Child, and Maternal Mortality.* Retrieved from: link

Climate Resilience Center. (2025). *Extreme Heat Exposes Stark Gender Inequalities.* Retrieved from: link

Conteh, A.; Wilkinson, A.; and Macarthy, J. (2021). *Exploring Gender, Health, and Intersectionality in Informal Settlements in Freetown.* Retrieved from: link

Corburn, J. and Hildebrand, C. (2015). *Slum Sanitation and the Social Determinants of Women's Health in Nairobi, Kenya*. Retrieved from: link

Corburn, J.; Njoroge, P.; Weru, J.; and Musya, M. (2022). *Urban Climate Justice, Human Health, and Citizen Science in Nairobi's Informal Settlements.* Retrieved from: link

Choudhary, N.; Brewis, A.; Wutich, A.; and Udas, P. B. (2020). *Sub-Optimal Household Water Access Is Associated with Greater Risk of Intimate Partner Violence Against Women: Evidence from Nepal.* Retrieved from: link

Dako-Gyeke, M. S. and Kofie, H. M. (2015). *Factors Influencing Prevention and Control of Malaria Among Pregnant Women Resident in Urban Slums, Southern Ghana*. Retrieved from: link

Damte, E.; Manteaw, B. O.; and Wrigley-Asante, C. (2022). *Urbanization, Climate Change and Health Vulnerabilities in Slum Communities in Ghana.* Retrieved from: link

Das, P.; Baker, K. K.; Dutta, A.; Swain, T.; Sahoo, S.; Das, B. S.; Panda, B.; Nayak, A.; Bara, M.; Bilung, B.; Mishra, P. R.; Panigrahi, P.; Cairncross, S.; and Torondel, B. (2015). *Menstrual Hygiene Practices, WASH Access and the Risk of Urogenital Infection in Women from Odisha, India.* Retrieved from: link

Deuba, K.; Mainali, A.; Alvesson, H. M.; and Karki, D. K. (2016). *Experience of Intimate Partner Violence Among Young Pregnant Women in Urban Slums of Kathmandu Valley, Nepal: A Qualitative Study.* Retrieved from: link

Devane-Padalkar, A.; Kale, S.; and Joshi, P. (2024). *Effect of Access to Sanitation on Urinary Tract Infections in Urban Women, Maharashtra, India.* Retrieved from: link

Dianati, K.; Zimmermann, N.; Milner, J.; Muindi, K.; Ezeh, A.; Chege, M.; Mberu, B.; Kyobutungi, C.; Fletcher, H.; Wilkinson, P.; and Davies, M. (2019). *Household Air Pollution in Nairobi's Slums: A Long-Term Policy Evaluation Using Participatory System Dynamics.* Retrieved from: link

Duan, R. R.; Hao, K.; and Yang, T. (2020). *Air Pollution and Chronic Obstructive Pulmonary Disease.* Retrieved from: link

Dunkle, K.; Gibbs, A.; Chirwa, E.; Stern, E.; Van Der Heijden, I.; and Washington, L. (2020). *How Do Programmes to Prevent Intimate Partner Violence Among the General Population Impact Women with Disabilities? Post-Hoc Analysis of Three Randomised Controlled Trials.* Retrieved from: link

Egondi, T.; Kyobutungi, C.; Kovats, S.; Muindi, K.; Ettarh, R.; and Rocklöv, J. (2012). *Time-Series Analysis of Weather and Mortality Patterns in Nairobi's Informal Settlements.* Retrieved from: link

Elci, O. C.; Edmonson, S. B.; and Juusela, A. L. (2025). *Maternal Morbidity and Mortality from a Population Health Perspective*. Retrieved from: link

Elsey, H.; Manandah, S.; Sah, D.; Khanal, S.; MacGuire, F.; King, R.; Wallace, H.; and Baral, S. C. (2016). *Public Health Risks in Urban Slums: Findings of the Qualitative 'Healthy Kitchens Healthy Cities' Study in Kathmandu, Nepal.* Retrieved from: link

Erman, A.; Robbe, S. A. D. V.; Thies, S. F.; Kabir, K.; and Maruo, M. (2021). *Gender Dimensions of Disaster Risk and Resilience*. International Bank for Reconstruction and Development/The World Bank. Retrieved from: link

Euler, K. (2025). *Women on the Frontlines of Heat: The Surveys Informing Climate Resilience.* Retrieved from: link

Faruque, A. S. G.; Khan, A. I.; Islam, S. M. R.; Nahar, B.; Hossain, M. N.; Widiati, Y., Hasan, A. S. M. M., Prajapati, M., Kim, M., Vandenent, M.; and Ahmed, T. (2021). *Diarrhea Treatment Center (DTC)-Based Diarrheal Disease Surveillance in Settlements in the Wake of the Mass Influx of Forcibly Displaced Myanmar National (FDMN) in Cox's Bazar, Bangladesh, 2018*. Retrieved from: link

Fotso, J. C.; Izugbara, C.; and Saliku, T. et al. (2014). *Unintended Pregnancy and Subsequent Use of Modern Contraceptive Among Slum and Non-Slum Women in Nairobi, Kenya.* Retrieved from: link

Frediani, A. A.; Cociña, C.; and Roche, J. M. (2023). *Improving Housing in Informal Settlements: Assessing the Impacts in Human Development.* Habitat for Humanity International. Retrieved from link.

French, M. and Gardner, J. (2012). *The Health of Informal Settlements: Illness and the Internal Thermal Conditions of Informal Housing.* Retrieved from: link

Fyfe, C.; Barnard, L. T.; Douwes, J.; Howden-Chapman, P.; and Crane, J. (2022). *Retrofitting Home Insulation Reduces Incidence and Severity of Chronic Respiratory Disease.* Retrieved from: link

George, C. E.; Norman, G.; and Wadugodapitiya, A. et al. (2019). *Health Issues in a Bangalore Slum: Findings from a Household Survey Using a Mobile Screening Toolkit in Devarajeevanahalli*. Retrieved from: link

Gibbs, A.; Jewkes, R.; Willan, S.; and Washington, L. (2018). *Associations Between Poverty, Mental Health and Substance Use, Gender Power, and Intimate Partner Violence Amongst Young (18–30) Women and Men in Urban Informal Settlements in South Africa: A Cross-Sectional Study and Structural Equation Model.* Retrieved from: link

Gibbs, A.; Reddy, T.; Khanyile, D.; and Cawood, C. (2020). *Non-Partner Sexual Violence Experience and Toilet Type Amongst Young (18–24) Women in South Africa: A Population-Based Cross-Sectional Analysis.* Retrieved from: link

Gibbs, A.; Washington, L.; Abdelatif, N.; Chirwa, E.; Willan, S.; Shai, N.; Sikweyiya, Y.; Mkhwanazi, S.; Ntini, N.; and Jewkes, R. (2020). *Stepping Stones and Creating Futures Intervention to Prevent Intimate Partner Violence Among Young People: Cluster Randomized Controlled Trial.* Retrieved from: link

Girod, C.; Ellis, A.; Andes, K. L.; Freeman, M. C.; and Caruso, B. A. (2017). *Physical, Social, and Political Inequities Constraining Girls' Menstrual Management at Schools in Informal Settlements of Nairobi, Kenya.* Retrieved from: link

Global Land Tool Network (2024). *Policy Directions Housing, Land and Property Solutions to Resolve and Prevent Displacement.* Retrieved from: link

Gonsalves, G. S.; Kaplan, E. H.; and Paltiel, A. D. (2015). *Reducing Sexual Violence by Increasing the Supply of Toilets in Khayelitsha, South Africa: A Mathematical Model*. Retrieved from: link

Gram, L.; Paradkar, S.; and Osrin, D. et al. (2022). *'Our Courage Has Grown': A Grounded Theory Study of Enablers and Barriers to Community Action to Address Violence Against Women in Urban India.* Retrieved from: link

Hamilton, I.; Milner, J.; Chalabi, Z.; Das, P.; Jones, B.; Shrubsole, C.; Davies, M.; and Wilkinson, P. (2015). *Health Effects of Home Energy Efficiency Interventions in England: A Modelling Study*. Retrieved from: link

Hassan, F.; Grant, E.; and Stevens, S. (2020). *Understanding Shelter from a Gender Perspective: The Case of Hawassa, Ethiopia*. Retrieved from: link

Healey, S.; Lloyd, S.; Gray, J.; and Opdyke, A. (2023). *Does Safer Housing Save Lives? An Analysis of Typhoon Mortality and Dwellings in the Philippines.* Retrieved from: link

Hewlett, B. S. (2004). *Fathers in Forager, Farmer, and Pastoral Cultures.* Retrieved from: link

Holt-Lunstad, J. (2017). *Why Social Relationships Are Important for Physical Health: A Systems Approach to Understanding and Modifying Risk and Protection*. Retrieved from: link

Holt-Lunstad, J., Robles, T. F.; and Sbarra, D. A. (2017). *Advancing Social Connection as a Public Health Priority in the United States.* Retrieved from: link

Hossain, M. M.; Roy, A.; Hanif, A. A. M.; Akter, F.; Hasan, M.; Khan, M. S. A.; Shamim, A. A.; Hossaine, M.; Ullah, M. A.; Rahman, S. M. M.; Bulbul, M. I.; Mitra, D. K.; and Mridha, M. K. (2024). *Distribution and Disparities of Healthy Lifestyles and Noncommunicable Diseases Risk Factors Between Men and Women Aged 20–59 years in Bangladesh: Evidence from a Nationwide Survey.* Retrieved from: link

Howden-Chapman, P.; Bennett, J.; Edwards, R.; Jacobs, D.; Nathan, K.; and Ormandy, D. (2023). *Review of the Impact of Housing Quality on Inequalities in Health and Well-Being.* Retrieved from: link

Hulland, K. R. S.; Chase, R. P.; Caruso, B. A.; Swain, R.; Biswal, B.; and Sahoo, K. C. et al. (2015). *Sanitation, Stress, and Life Stage: A Systematic Data Collection Study Among Women in Odisha, India.* Retrieved from: link

Infrastructure and Cities for Economic Development (ICED). (2019). *Revealing and Strengthening the Links Between WASH, Productivity, and Well-Being for Informal Vendors in Durban, South Africa, and Nakuru, Kenya.* Retrieved from: link

Islam, M. and Sultana, N. (2019). *Risk Factors for Pregnancy-Related Complications Among Urban Slum and Non-Slum Women in Bangladesh.* Retrieved from: link

Jabeen, H. (2014). *Adapting the Built Environment: The Role of Gender in Shaping Vulnerability and Resilience to Climate Extremes in Dhaka.* Retrieved from: link

Jabeen, H. (2019). *Gendered Space and Climate Resilience in Informal Settlements in Khulna City, Bangladesh.* Retrieved from: link

Jadhav, A.; Weitzman, A.; and Smith-Greenway, E. (2016). "Household Sanitation Facilities and Women's Risk of Non-Partner Sexual Violence in India." *BMC Public Health* 16, 1139. Retrieved from: link

Joshi, A.; Arora, A.; Amadi-Mgbenka, C.; Mittal, N.; Sharma, S.; Malhotra, B.; Grover, A.; Misra, A.; and Loomba, M. (2019). *Burden of Household Food Insecurity in Urban Slum Settings.* Retrieved from: link

Joshi, N. (2017). *Low-income Women's Right to Sanitation Services in City Public Spaces: A Study of Waste Picker Women in Pune.* Retrieved from: link

Joshi, S.; Roy, S.; Mowri, S.; and Bailey, A. (2022). *Devising Gender-Responsive Transport Policies in South Asia.* Retrieved from: link

Kajale, N. A.; Oza, C.; Ladkat, D.; Gondhalekar, K.; Katapally, T. R.; and Bhawra, J. et al. (2024). *A Comparative Study of Bone-Health and Associated Factors in Healthy Indian Adolescents and Young Women.* Retrieved from: link

Kaminaga, A. S. and Sheldon, H. (2020). *Help or Harm? The Impact of Property Titling on Women's Acceptance of Intimate Partner Violence.* Retrieved from: link

Kanougiya, S.; Daruwalla, N.; Gram, L.; Gupta, A. D.; Sivakami, M.; and Osrin, D. (2021). *Economic Abuse and its Associations with Symptoms of Common Mental Disorders Among Women in a Cross-Sectional Survey in Informal Settlements in Mumbai, India.* Retrieved from: link

Kanougiya, S.; Daruwalla, N.; and Osrin, D. (2024). *Mental Health on Two Continua: Mental Wellbeing and Common Mental Disorders in a Community-Based Cross-Sectional Study with Women in Urban Informal Settlements in India.* Retrieved from: link

Kantamaneni, K.; Panneer, S.; Sudha Rani, N. N. V.; Palaniswamy, U.; Bhat, L. D.; Jimenez-Bescos, C.; and Rice, L. (2022). *Impact of Coastal Disasters on Women in Urban Slums: A New Index.* Retrieved from: link

Kawade, R.; Radkar, A.; Thadathil, A.; and Thakur, D. (2019). *Access to Sanitation and Risk of Developing Urinary Tract Infections Among Women from Low Socio-Economic Settings.* Retrieved from: link

Kazman, J. B.; Purvis, D. L.; Heled, Y.; Lisman, P.; Atias, D.; Van Arsdale, S.; and Deuster, P. A. (2015). *Women and Exertional Heat Illness: Identification of Gender-Specific Risk Factors.* Retrieved from: link

Kelly, P.; Murphy, M.; and Mutrie, N. (2017). *The Health Benefits of Walking*. Retrieved from: link

Khalifeh, H.; Hargreaves, J.; Howard, L. M.; and Birdthistle, I. (2013). *Intimate Partner Violence and Socioeconomic Deprivation in England: Findings From a National Cross-Sectional Survey.* Retrieved from: link

Khanna, T. and Das, M. (2015). *Why Gender Matters in the Solution Towards Safe Sanitation? Reflections from Rural India.* Retrieved from link.

Kim, H.; Richardson, C.; Roberts, J.; Gren, L.; and Lyon, J. L. (1998). *Cold Hands, Warm Heart.* Retrieved from: link

Kua, K. and Lee, D. (2021). *Home Environmental Interventions for Prevention of Respiratory Tract Infections: A Systematic Review and Meta-Analysis*. Retrieved from: link

Kulkarni, S.; O'Reilly, K.; and Bhat, S. (2017). *No Relief: Lived Experiences of Inadequate Sanitation Access of Poor Urban Women in India.* Retrieved from: link

Kwiringira, J.; Atekyereza, P.; and Niwagaba, C. (2014). *Gender Variations in Access, Choice to Use and Cleaning of Shared Latrines; Experiences from Kampala Slums, Uganda*. Retrieved from: link

Lebu, S.; Sprouse, L.; Akudago, J. A.; Twinomucunguzi F. R. B.; Rosenberg R.; and Lugali Y. S. et al. (2024) *The Case for Shared Sanitation Access in Informal Settlements: A Dialogue on Science, Policy, and Practice Integration.* Retrieved from: link

Li, J. and Liu, Z. (2018). *Housing Stress and Mental Health of Migrant Populations in Urban China*. Retrieved from: link

Lintelo, D.; Gupte, J.; McGregor, J.; Lakshman, R.; and Jahan, F. (2018). *Wellbeing and Urban Governance: Who Fails, Survives or Thrives in Informal Settlements in Bangladeshi Cities?* Retrieved from: link

Lisnichuk, K. 2024. *Housing and Domestic Violence Prevention*. Habitat for Humanity Latin America and the Caribbean. Retrieved from: link

Loor, I. and Evans, J. (2021). *Understanding the Value and Vulnerability of Informal Infrastructures: Footpaths in Quito.* Retrieved from: link

Lygizos, M.; Shenoi, S. V.; and Brooks, R. P. et al. (2013). *Natural Ventilation Reduces High TB Transmission Risk in Traditional Homes in Rural KwaZulu-Natal, South Africa*. Retrieved from: link

Maci, G. and Kitchin, F. (2021). *Ghost Citizens: Women and Informality in Cities, What Can Europe Do?* Cities Alliance. Retrieved from link.

Macintyre, H. and Heaviside, C. (2019). "Potential Benefits of Cool Roofs in Reducing Heat-Related Mortality During Heatwaves in a European City." *Environment International*, 127, 430–441. Retrieved from: link

Madhavan, S.; Clark, S.; and Hara, Y. (2018). *Gendered Emotional Support and Women's Well-Being in a Low-Income Urban African Setting.* Retrieved from: link

Maneechote, W.; Liu, J.; and Jareemit, D. (2014). *Cool Facades and Pavements: Mitigating Heat Stress and Improving Urban Thermal Conditions in Affordable Housing Project – A Case Study in Thailand.* Retrieved from: link.

Mannan, M. A. (2018). *Burden of Disease on the Urban Poor: A Study of Morbidity and Utilisation of Healthcare Among Slum Dwellers in Dhaka City*. Retrieved from: link

Mannell, J.; Washington, L.; Khaula, S.; Khoza, Z.; Mkhwanazi, S.; Burgess, R. A.; Brown, L. J.; Jewkes, R.; Shai, N.; Willan, S.; and Gibbs, A. (2023). *Challenges and Opportunities in Coproduction: Reflections on Working with Young People to Develop an Intervention to Prevent Violence in Informal Settlements in South Africa.* Retrieved from: link

Marais, L. and Cloete, J. (2014). *'Dying to Get a House?' The Health Outcomes of the South African Low-Income Housing Programme.* Retrieved from: link

Mberu, B. U.; Haregu, T. N.; Kyobutungi, C.; and Ezeh, A. C. (2016). *Health and Health-Related Indicators in Slum, Rural, and Urban Communities: A Comparative Analysis.* Retrieved from: link

McNab, S.; Scudder, E.; Syed, U.; and Freedman, L. P. (2022). *Maternal and Newborn Health for the Urban Poor: The Need for a New Mental Model and Implementation Strategies to Accelerate Progress.* Retrieved from: link

Meth, P. (2017). *How Women and Men Experience the City: Gender in an Informal Urban Context.* Retrieved from: link

Mntambo, S.; Adebayo, P.; and Ndinda, C. (2023). *Women, Informal Settlements, and the Policy Practice Disjuncture in South Africa.* Retrieved from link.

Mueller, V.; Grépin, K.; Rabbani, A.; Ngunjiri, A.; Oyekunle, A.; and Wenham, C. (2023). *Domestic Burdens Amid COVID-19 and Women's Mental Health in Middle-Income Africa.* Retrieved from: link

Mukhopadhyay, B.; Weitz, C. A.; and Das, K. (2021). *Indoor Heat Conditions Measured in Urban Slum and Rural Village Housing in West Bengal, India.* Retrieved from: link

Mulamba, K. C. (2024). *Modeling the Relationship Between Living in Informal Dwellings and Fear of Crime in Gauteng Province, South Africa.* Retrieved from: link

Muldoon, K. A.; Galway, L. P.; and Nakajima, M. et al. (2011). *Health System Determinants of Infant, Child and Maternal Mortality: A Cross-Sectional Study of UN Member Countries.* Retrieved from: link

Mulley, C. (2017). *Mobility as a Services (MaaS) — Does It Have Critical Mass?* Retrieved from: link

Musiime, A. K.; Krezanoski, P. J.; Smith, D. L.; Kilama, M.; Conrad, M. D.; Otto, G.; Kyagamba, P.; Asiimwe, J.; Rek, J.; Nankabirwa, J. I.; Arinaitwe, E.; Akol, A. M.; Kamya, M. R.; Staedke, S. G.; Drakeley, C.; Bousema, T.; Lindsay, S. W.; Dorsey, G.; and Tusting, L. S. (2022). *House Design and Risk of Malaria, Acute Respiratory Infection and Gastrointestinal Illness in Uganda: A Cohort Study*. Retrieved from link

Mutahi, A. W.; Borgese, L.; Marchesi, C.; Gatari, M. J.; and Depero, L. E. (2021). *Indoor and Outdoor Air Quality for Sustainable Life: A Case Study of Rural and Urban Settlements in Poor Neighbourhoods in Kenya*. Retrieved from: link

Mwau, B.; Sverdlik, A.; and Makau, J. (2019). *Towards Holistic Solutions to Nairobi's Affordable Housing Crisis*. Retrieved from: link

Nallari, A. (2015). '*All We Want Are Toilets Inside Our Homes!': The Critical Role of Sanitation in the Lives of Urban Poor Adolescent Girls in Bengaluru, India.* Retrieved from: link

Naved, R. T.; Mamun, M. A.; Mourin, S. A.; and Parvin, K. (2018). *A Cluster Randomized Controlled Trial to Assess the Impact of SAFE on Spousal Violence Against Women and Girls in Slums of Dhaka, Bangladesh.* Retrieved from: link

Nchanji, E. B.; Chagomoka, T.; Bellwood-Howard, I.; Drescher, A.; Schareika, N.; and Schlesinger, J. (2023). *Land Tenure, Food Security, Gender and Urbanization in Northern Ghana*. Retrieved from: link

Nguyen, P. H.; Scott, S.; Headey, D.; Singh, N.; Tran, L. M.; Menon, P.; and Ruel, M. T. (2021). *The Double Burden of Malnutrition in India: Trends and Inequalities (2006–2016).* Retrieved from: link

Nkombondo, G. B.; Kabasubabo, F. K.; and Akilimali, P. Z. (2024). *Abortion Incidence Among Young Women in Urban Slums and Non-Slums in Kinshasa, DR Congo.* Retrieved from: link

Nyambe, S.; Agestika, L.; and Yamauchi, T. (2020). *The Improved and the Unimproved: Factors Influencing Sanitation and Diarrhoea in a Peri-Urban Settlement of Lusaka, Zambia*. Retrieved from: link

Ochako, R.; Izugbara, C.; Okal, J.; Askew, I.; and Temmerman, M. (2016). *Contraceptive Method Choice Among Women in Slum and Non-Slum Communities in Nairobi, Kenya.* Retrieved from: link

Office of the Prime Minister of Canada. (2024). *Prime Minister Advances Shared Progress and Prosperity at the G7 Summit.* Retrieved from link.

Okaka, F. O. and Odhiambo, B. D. O. (2019). *Health Vulnerability to Flood-Induced Risks of Households in Flood-Prone Informal Settlements in the Coastal City of Mombasa, Kenya.* Retrieved from: link

Okedare, O. O. and Fawole, O. I. (2023). *Intimate Partner Violence Among Young Women in Ibadan, Nigeria: Are There Slum and Non-Slum Differences?* Retrieved from: link

Olubodun, T.; Balogun, M. R.; Odeyemi, K. A.; Osibogun, A.; Odukoya, O. O.; Banjo, A. A.; Sonusi, S. E.; Olubodun, A. B.; Ogundele, O. O. P.; and Dolapo, D. C. (2022). *Effect of Social Marketing on the Knowledge, Attitude, and Uptake of Pap Smear Among Women Residing in an Urban Slum in Lagos, Nigeria.* Retrieved from: link

Ombija, S.; Wao, H.; and Esho, T. (2024). *Water, Sanitation, and Intimate Partner Violence: Insights from Kibra Slums, Nairobi*. Retrieved from: link

Orindi, B. O.; Maina, B. W.; Muuo, S. W.; Birdthistle, I.; Carter, D. J.; Floyd, S.; and Ziraba, A. (2020). *Experiences of Violence Among Adolescent Girls and Young Women in Nairobi's Informal Settlements Prior to Scale-Up of the DREAMS Partnership: Prevalence, Severity and Predictors.* Retrieved from: link

Ouma, S.; Corburn, J.; and Weru, J. (2022). *Property Rights, Public Health, and Planning for Informal Settlements in Nairobi, Kenya.* Retrieved from: link

Oviedo, D.; Okyere, S. A.; Nieto, M.; Kita, M.; Kusi, L. F.; Yusuf, Y.; and Koroma, B. (2021). *Walking Off the Beaten Path: Everyday Walking Environment and Practices in Informal Settlements in Freetown.* Retrieved from: link

Panchang, S. V. (2021). *Beyond Toilet Decisions: Tracing Sanitation Journeys Among Women in Informal Housing in India.* Retrieved from: link

Paradkar, S.; Singh, C.; Suryavanshi, A.; Tiwari, A.; Cislaghi, B.; Daruwalla, N.; Osrin, D.; and Gram, L. (2024). *'Mostly Women's Issues' — Gender Differences in Community Responses to a Large-Scale NGO Programme to Prevent Violence Against Women in Urban India.* Retrieved from: link

Pardeshi, P.; Jadhav, B.; Singh, R.; Kapoor, N.; Bardhan, R.; Jana, A.; David, S.; and Roy, N. (2020). *Association Between Architectural Parameters and Burden of Tuberculosis in Three Resettlement Colonies of M-East Ward, Mumbai, India*. Retrieved from: link

Parikh, P.; Diep, L.; Gupte, J.; and Lakhanpaul, M. (2020). *COVID-19 Challenges and WASH in Informal Settlements: Integrated Action Supported by the Sustainable Development Goals.* Retrieved from: link

Parikh, P.; Fu, K.; Parikh, H.; McRobie, A.; and George, G. (2015). *Infrastructure Provision, Gender, and Poverty in Indian Slums.* Retrieved from: link

Peebles, K.; Velloza, J.; Balkus, J. E.; McClelland, R. S.; and Barnabas, R. V. (2019). *High Global Burden and Costs of Bacterial Vaginosis: A Systematic Review and Meta-Analysis.* Retrieved from: link

Pelowich, K. A.; Akibu, T.; Pellowski, J.; Hatcher, A.; Rebombo, D.; Christofides, N.; and Hampanda, K. (2024). *Male Perspectives on Intimate Partner Violence: A Qualitative Analysis from South Africa.* Retrieved from: link

Peters, S. A. E.; Woodward, M.; Jha, V.; Kennedy, S.; and Norton, R. (2016). *Women's Health: A New Global Agenda.* Retrieved from: link.

Piashi, S. R. and Van Eerd, M. (2024). *Investigating the Connectivity Between Urban Foodscape and Migrant Women's Household Food Security: A Case of Greenland Slum, Khulna, Bangladesh.* Retrieved from: link

Rahman, S.; Currie, M. J.; Breiman, R. F.; Reza, M.; Rahman, M.; and Nessa, K. (2013). *Reproductive Tract Infections Associated with Vaginal Discharge and Their Socio-Demographic and Reproductive Determinants Among Clinic Attendees in Bangladesh.* Retrieved from: link

Rajagopal, S. and Mathur, K. (2017). *'Breaking the Silence Around Menstruation': Experiences of Adolescent Girls in an Urban Setting in India.* Retrieved from: link

Rakodi, C. (2014). *Expanding Women's Access to Land and Housing in Urban Areas.* Retrieved from: link

Ramsay, E. E.; Fleming, G. M.; Faber, P. A.; Barker, S. F.; Sweeney, R.; Taruc, R. R.; Chown, S. L.; and Duffy, G. A. (2021). *Chronic Heat Stress in Tropical Urban Informal Settlements.* Retrieved from: link

Ringwald, B.; Taegtmeyer, M.; Mwania, V.; Muthoki, M.; Munyao, F.; Digolo, L.; Otiso, L.; Wangui Ngunjiri, A. S.; Karuga, R. N.; Tolhurst, R.; and Korogocho ALIV[H]E research team (2023). *Power and Poverty: A Participatory Study on the Complexities of HIV and Intimate Partner Violence in an Informal Urban Settlement in Nairobi, Kenya.* Retrieved from: link

Rokicki, S.; Montana, L.; and Fink, G. (2014). *Impact of Migration on Fertility and Abortion: Evidence from the Household and Welfare Study of Accra.* Retrieved from: link

Roy, A. S.; Mazaniello-Chézol, M.; Rueda-Martinez, M.; Shafique, S. and Adams, A. M. (2023). *Food Systems Determinants of Nutritional Health and Wellbeing in Urban Informal Settlements: A Scoping Review in LMICs.* Retrieved from: link

Roy, B.; Riley, C.; Sears, L.; and Rula, E. Y. (2018). *Collective Well-Being to Improve Population Health Outcomes: An Actionable Conceptual Model and Review of the Literature.* Retrieved from: link

Sahoo, K. C.; Hulland, K. R.; Caruso, B. A.; Swain, R.; Freeman, M. C.; Panigrahi, P.; and Dreibelbis, R. (2015). *Sanitation-Related Psychosocial Stress: A Grounded Theory Study of Women Across the Life-Course in Odisha, India.* Retrieved from: link

Santamouris, M.; Ding, L.; Fiorito, F.; Oldfield, P.; Osmond, P.; and Paolini, R. et al. (2017). "Passive and Active Cooling for the Outdoor Built Environment — Analysis and Assessment of the Cooling Potential of Mitigation Technologies Using Performance Data from 220 Large-Scale Projects." *Solar Energy*, 154, 14–33. Retrieved from: link

Satterthwaite, D.; Sverdlik, A.; and Brown, D. (2018). *Revealing and Responding to Multiple Health Risks in Informal Settlements in Sub-Saharan African Cities.* Retrieved from: link

Schofield, D. and Gubbels, F. (2019). *Informing Notions of Climate Change Adaptation: A Case Study of Everyday Gendered Realities of Climate Change Adaptation in an Informal Settlement in Dar es Salaam.* Retrieved from: link

Sharma, D. and Jain, S. (2019). *Impact of Intervention of Biomass Cookstove Technologies and Kitchen Characteristics on Indoor Air Quality and Human Exposure in Rural Settings of India*. Retrieved from: link

Shehayeb, D. (2009). *Advantages of Living in Informal Areas. Cairo's Informal Areas Between Urban Challenges and Hidden Potentials: Facts, Voices, Visions.* Retrieved from link.

Singh, A. and Singh, P. (2021) *Assessing the Extent of Domestic Violence Against Indian Women after the Implementation of the Domestic Violence Act of India, 2005*. Retrieved from: link

Singh, B.; Katiyar, D.; and Tilak, R. (2018). *Prevalence of Urinary Tract Infection Causing Microorganism and Determination of Susceptibility to Antibiotic Among Slum Women of District Varanasi, India*. Retrieved from link.

Singh, D. (2020). *Gender Relations, Urban Flooding, and the Lived Experiences of Women in Informal Urban Spaces.* Retrieved from: link

Sletto, B.; Luguana, A. M. L.; Rakes, K.; and Stycos, M. (2022). *Intersectionality, Gender, and Project-Induced Displacement in the Informal City: The Struggle over Stormwater Development in Los Platanitos, Dominican Republic.* Retrieved from: link

Sommer, M.; Ferron, S.; Cavill, S.; and House, S. (2014). *Violence, Gender and WASH: Spurring Action on a Complex, Under-Documented and Sensitive Topic*. Retrieved from: link

Song, Y. and Dong, X. Y. (2016*). Domestic Violence and Women's Land Rights in Rural China: Findings from a National Survey in 2010.* Retrieved from: link

Ssemugabo, C.; Halage, A. A.; Namata, C.; Musoke, D.; and Ssempebwa, J. C. (2020). *A Socio-Ecological Perspective of the Facilitators and Barriers to Uptake of Water, Sanitation and Hygiene Interventions in a Slum Setting in Kampala, Uganda: A Qualitative Study.* Retrieved from: link

Stevenson, E. G. J.; Ambelu, A.; Caruso, B. A.; Tesfaye, Y.; and Freeman, M. C. (2016). *Community Water Improvement, Household Water Insecurity, and Women's Psychological Distress: An Intervention and Control Study in Ethiopia.* Retrieved from: link

Stokols, D. (1996). *Translating Social Ecological Theory into Guidelines for Community Health Promotion.* Retrieved from: link

Subbaraman, R.; Nolan, L.; Sawant, K.; Shitole, S.; Shitole, T.; Nanarkar, M.; Patil-Deshmukh, A.; and Bloom, D. E. (2015). *Multidimensional Measurement of Household Water Poverty in a Mumbai Slum: Looking Beyond Water Quality.* Retrieved from: link

Swain, S.; Bhattacharya, S.; Dutta, A.; Pati, S.; and Nanda, L. (2019). *Vulnerability and Adaptation to Extreme Heat in Odisha, India: A Community-Based Comparative Study*. Retrieved from: link

Swart, E. (2012). *Gender-Based Violence in a Kenyan Slum: Creating Local, Woman-Centered Interventions.* Retrieved from link.

Sweetman, C. and Medland, L. (2017). *Introduction: Gender and Water, Sanitation and Hygiene.* Retrieved from: link

Tamil Nadu Urban Sanitation Support Programme (TNUSSP). (2018). *Scoping Study on Menstrual Hygiene Management in Periyanaicken-Palayam and Narasimhanaicken-Palayam.* Retrieved from: link

Tetui, M.; Baroudi, M.; Ssekamatte, T.; Birabwa, C.; Kibira, S. P.; Atuyambe, L.; Delamou, A.; and Makumbi, F. E. (2021). *Total Demand, Use and Unmet Need for Modern Contraceptives Among Women Living in Informal Settlements in Kira Municipality, Wakiso District, Uganda.* Retrieved from: link

Thara, K. (2017). *In Troubled Waters: Water Commodification, Law, Gender, and Poverty in Bangalore.* Retrieved from: link

The International Development Research Centre. (2023). *Driving Gender-Transformative Policy Change to Improve Women's Health Equity in Urban Informal Settlements.* Retrieved from link.

Tran, K. V.; Azhar, G. S.; Nair, R.; Knowlton, K.; Jaiswal, A.; Sheffield, P.; Mavalankar, D.; and Hess, J. (2013). *A Cross-Sectional, Randomized Cluster Sample Survey of Household Vulnerability to Extreme Heat Among Slum Dwellers in Ahmedabad, India.* Retrieved from: link

Turley, R.; Saith, R.; Bhan, N.; Rehfuess, E.; and Carter, B. (2013). *Slum Upgrading Strategies Involving Physical Environment and Infrastructure Interventions and Their Effects on Health and Socio-Economic Outcomes.* DOI: 10.1002/14651858.CD010067.pub2.

UN-HABITAT. (2003). *Slums of the World: The Face of Urban Poverty in the New Millennium?* United Nations Human Settlements Programme. Retrieved from link.

UN-HABITAT. (2018). *Gender Equality Enhancer*. Retrieved from: link

UN-HABITAT. (2020). *Harsh Realities: Marginalized Women in Cities of the Developing World.* Retrieved from: link

UN-HABITAT. (2022). *World Cities Report 2022: Envisaging the Future of Cities.* Retrieved from link.

UN-HABITAT. (2024a) *UN-HABITAT Highlights Critical Need for Urban Transformation.* Retrieved from link.

UN-HABITAT. (2024b) *Review of Existing Elements and Options for the Development of a Framework for Measuring and Reporting on the Adequacy of Housing Across Diverse National and Local Contexts.* Retrieved from: link.

UNICEF. (2021). *10 Million Additional Girls at Risk of Child Marriage due to COVID-19* [Press release]. Retrieved from: link

UN WOMEN. (2024). *Progress on the Sustainable Development Goals: The Gender Snapshot 2024*. UN Women and UN-DESA. Retrieved from: link.

Van der Heijden, J.; Gray, N.; and Stringer, B. et al. (2019). *'Working to Stay Healthy' — Health-Seeking Behaviour in Bangladesh's Urban Slums: A Qualitative Study*. Retrieved from: link

Venugopal, V.; Rekha, S.; Manikandan, K.; Latha, P. K.; Vennila, V.; Ganesan, N.; Kumaravel, P.; and Chinnadurai, S. J. (2016). *Heat Stress and Inadequate Sanitary Facilities at Workplaces — An Occupational Health Concern for Women?* Retrieved from: link

Virk, G.; Jansz, A.; Mavrogianni, A.; Mylona, A.; Stocker, J.; and Davies, M. (2014). "The Effectiveness of Retrofitted Green and Cool Roofs at Reducing Overheating in a Naturally Ventilated Office in London: Direct and Indirect Effects in Current and Future Climates." *Indoor and Built Environment*, 23(3), 504–520. Retrieved from: link

Wado, Y. D.; Austrian, K.; and Abuya, B. A. (2022). *Exposure to Violence, Adverse Life Events and the Mental Health of Adolescent Girls in Nairobi Slums*. Retrieved from: link

Weaver, E.; Richmond, A.; and Pegues, K. (2022). *The Health of Women in Sub-Saharan African Informal Settlements: A Literature Review.* Retrieved from: link

Wickramaratne, P. J.; Yangchen, T.; Lepow, L.; Patra, B. G.; Glicksburg, B.; Talati, A.; Adekkanattu, P.; Ryu, E.; Biernacka, J. M.; Charney, A.; Mann, J. J.; Pathak, J.; Olfson, M.; and Weissman, M. M. (2022). *Social Connectedness as a Determinant of Mental Health: A Scoping Review.* Retrieved from: link

Willan, S.; Gibbs, A.; Shai, N.; Ntini, N.; Petersen, I.; and Jewkes, R. (2020). *Did Young Women in South African Informal Settlements Display Increased Agency after Participating in the Stepping Stones and Creating Futures Intervention? A Qualitative Evaluation.* Retrieved from: link

Winter, S. C.; Dreibelbis, R.; Dzombo, M. N.; and Barchi, F. (2019). *A Mixed-Methods Study of Women's Sanitation Utilization in Informal Settlements in Kenya.* Retrieved from: link

Winter, S. C.; Obara, L. M.; and McMahon, S. (2020). *Intimate Partner Violence: A Key Correlate of Women's Physical and Mental Health in Informal Settlements in Nairobi, Kenya*. Retrieved from link.

Wolf, J.; Prüss-Ustün, A.; Cumming, O.; Bartram, J.; Bonjour, S.; Cairncross, S.; Clasen, T.; Colford, J. M.; Curtis, V.; De France, J.; Fewtrell, L.; Freeman, M. C.; Gordon, B.; Hunter, P. R.; Jeandron, A.; Johnston, R. B.; Mäusezahl, D.; Mathers, C.; Neira, M.; and Higgins, J. P. T. (2014). *Systematic Review: Assessing the Impact of Drinking Water and Sanitation on Diarrhoeal Disease in Low- and Middle-Income Settings: Systematic Review and Meta-Regression.* Retrieved from: link

World Bank Group. (2015). *Unsettled: Water and Sanitation in Urban Settlement Communities of the Pacific.* Retrieved from: link

World Bank Group. (2020). *Handbook for Gender-Inclusive Urban Planning Design.* Retrieved from: link

World Bank Group. (2022). *Integrating Gender in Land Projects: A Toolkit.* Retrieved from: link

World Health Organization. (2019). *Safer Water, Better Health.* Retrieved from: link

World Health Organization. (2022). *World Health Statistics 2022: Monitoring Health for the SDGs, Sustainable Development Goals.* Retrieved from link.

World Health Organization (2024). *Fact Sheet: Heat and Health*. Retrieved from: link

World Health Organization. (2024). *Operational Framework for Monitoring Social Determinants of Health Equity.* Retrieved from link.

World Health Organization, UN-HABITAT. (2022). *Global Framework for the Response to Malaria in Urban Areas*. Retrieved from: link

Wyant, R. and Spasić, K. (2015). *Grassroots Women's Accountability Mechanisms: Strengthening Urban Governance Through Organising and Partnerships.* Retrieved from: link

Yadav, K.; Agarwal, M.; Shukla, M.; Singh, J. V.; and Singh, V. K. (2020). *Unmet Need for Family Planning Services Among Young Married Women (15–24 Years) Living in Urban Slums of India.* Retrieved from: link

Zhou, Y.; Zou, Y.; Li, X.; Chen, S.; Zhao, Z.; He, F.; Zou, W.; Luo, Q.; Li, W.; Pan, Y.; Deng, X.; Wang, X.; Qiu, R.; Liu, S.; Zheng, J.; Zhong, N.; and Ran, P. (2014). *Lung Function and Incidence of Chronic*

Obstructive Pulmonary Disease after Improved Cooking Fuels and Kitchen Ventilation: A 9-Year Prospective Cohort Study. Retrieved from: link

Zimmermann, N. S.; Dianati, K.; Milner, J.; Chege, M.; Csuvár, B.; Muindi, K.; Mberu, B.; and Ucci, M. et al. (2017). *Indoor Air Pollution as an Issue of Nonattention in Nairobi's Informal Settlements.* Retrieved from: link

Ziraba, A.; Orindi, B.; Muuo, S.; Floyd, S.; Birdthistle, I. J.; Mumah, J.; Osindo, J.; Njoroge, P.; and Kabiru, C. W. (2018). *Understanding HIV Risks Among Adolescent Girls and Young Women in Informal Settlements of Nairobi, Kenya: Lessons for DREAMS.* Retrieved from: link

Ziraba, A. K.; Madise, N.; Mills, S.; Kyobutungi, C.; and Ezeh, A. (2009). *Maternal Mortality in the Informal Settlements of Nairobi City: What Do We Know?* Retrieved from: link

Further reading

Chapman, R. and Howden-Chapman, P. (2021). "Does Reframing Urban Policy Around Wellbeing Support Carbon Mitigation?" *Buildings & Cities* 2(1):688–99 21.

Chapman, R.; Howden-Chapman, P.; Viggers, H.; O'Dea, D.; and Kennedy, M. (2009). "Retrofitting Housing with Insulation: A Cost-Benefit Analysis of a Randomised Community Trial." *Journal of Epidemiology and Community Health* 63:271–77 22.

Chapman, R.; Preval, N.; and Howden-Chapman, P. (2017). "How Economic Analysis Can Contribute to Understanding the Links Between Housing and Health." *International Journal of Environmental Research and Public Health.* 14:996

Dahlgren, G. and Whitehead, M. (2021). "The Dahlgren-Whitehead Model of Health Determinants: 30 Years on and Still Chasing Rainbows," *Public Health,* Volume 199, Pages 20-24, https://doi.org/10.1016/j.puhe.2021.08.009.

Friesen, J.; Friesen, V.; Dietrich, I.; and Pelz, P. F. (2020). "Slums, Space, and State of Health — A Link Between Settlement Morphology and Health Data." *International Journal of Environmental Research and Public Health*.19;17(6):2022. DOI: 10.3390/ijerph17062022. PMID: 32204347; PMCID: PMC7143924.

Lund, F.; Alfers, L.; and Santana, V. "Towards an Inclusive Occupational Health and Safety for Informal Workers." *New Solutions*. 2016;26(2):190-207. doi:10.1177/1048291116652177

Sverdlik, A. (2011). "Ill-Health and Poverty: A Literature Review on Health in Informal Settlements." *Environment & Urbanization,* 23(1), 123-155. https://doi.org/10.1177/0956247811398604

World Health Organization. (2009). *Guidelines for Indoor Air Quality: Dampness and Mould.* Copenhagen: WHO Regional Office for Europe

World Health Organization. (2011). *Health in the Green Economy: Health Co-Benefits of Climate Change Mitigation — Housing Sector.* Rep., WHO, Geneva. https://apps.who.int/iris/handle/10665/44609 175.

World Health Organization. (2018). *World Health Organization Housing and Health Guidelines.* Rep., WHO, Geneva. https://www.who.int/publications/i/item/9789241550376 176.

World Health Organization. (2021). *Roadmap to Improve and Ensure Good Indoor Ventilation in the Context of COVID-19.* Rep., WHO, Geneva. https://www.who.int/publications/i/item/9789240021280 177.

World Health Organization. (2021). *WHO Report on the Global Tobacco Epidemic, 2021: Addressing New and Emerging Products.* Rep., WHO, Geneva. https://www.who.int/publications/i/item/9789240032095 178.

World Health Organization. (2022). *Household Air Pollution and Health.* Fact Sheet. WHO, Geneva. https://www.who.int/news-room/fact-sheets/detail/household-air-pollution-and-health

World Health Organization. (2024). *Operational Framework for Monitoring Social Determinants of Health Equity.* https://www.who.int/publications/i/item/9789240088320

Home equals safety and security.
Home equals health.
Home equals opportunity for a better future.

Questions or feedback? HomeEquals@habitat.org

25-91489/PDF-DOC/GRA/05-2025/ARS

Habitat for Humanity®

285 Peachtree Center Ave. NE, Suite 2700, Atlanta, GA 30303-1220 USA
322 W. Lamar St., Americus, GA 31709-3543 USA
(800) 422-4828 fax (229) 928-8811 publicinfo@habitat.org habitat.org