washplus

Supportive Environments for Healthy Communities

WASHplus in Kenya Baseline Findings

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USAID

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Acronyms

CHW	Community Health Workers
CLTS	Community-Led Total Sanitation
CU	Community Unit
FP	Family Planning
GOK	Government of Kenya
HH	Households
HIV/AIDS	Human Immunodeficiency Virus/Acquired Immunodeficiency Virus
JMP	Joint Monitoring Programme
MDG	Millennium Development Goals
ODF	Open Defecation Free
PLHIV	Persons Living with AIDS
SDA	Small Doable Actions
TB	Tuberculosis
TOT	Training of Trainers
USAID	United States Agency for International Development
WASH	Water, Sanitation, and Hygiene
WSP	Water and Sanitation Program
WSS	Water Supply and Sanitation

Executive Summary

The WASHplus project intervention in Kenya is aligned with one of the prongs of the USAID programming in that country: ensure that gains achieved through significant U.S. investment are not lost in HIV/AIDs, malaria, family planning, and tuberculosis. It is also aligned with the Government of Kenya's interest in meeting water and sanitation Millennium Development Goals, particularly with its campaign to have an open defecation free country by the end of 2014. The goal of the WASHplus activities in Kenya are to improve water, sanitation, and hygiene (WASH) practices of communities, families, and individuals with a special focus on vulnerable populations. In the context of WASHplus activities in Kenya, three vulnerable populations have been defined: children less than 5 years of age, people with HIV/AIDS, and the elderly. The WASHplus project in Kenya focuses on the following intervention elements: community-led total sanitation, inclusive sanitation, menstrual hygiene management, hand washing, and household treatment and storage of drinking water.

This report presents the findings of a baseline survey that WASHplus conducted in 2013 in households with targeted vulnerable populations in three strata: peri-urban, rural, and semi-nomadic. A total of 3,211 households meeting specific eligibility criteria were visited in Kenya. The research design included both intervention and control households. The households were located in the slums of Nairobi, the rural area of the Nyanza Province, and the semi-nomadic pastoralist settlements in the Rift Valley. Availability of targeted study participants in the semi-nomadic areas made it impossible to meet the sample quota for this sample stratum in the time allocated for the activity. In the case of the specific stratum, only about half of the expected household quota was met.

Of the households visited, 93.6 percent had children under 5, 15.3 percent had a family member over age 65, 3.8 had a chronically ill family member, and 1.2 percent had a bedridden chronically ill woman aged 18–50 years old. Families visited may have had more than one family member that met the criteria for inclusion in the survey.

Interviews were conducted with the major caregiver for the vulnerable populations of interest. Most study participants were female (94.1 percent) and only 5.9 percent were male. Over half (68 percent) of those interviewed were 18–34 years old, 78.3 percent had attended school, and 75.4 percent could read simple sentences.

About 35 percent of all households visited practice open defecation. However, open defecators were in the rural and semi-nomadic areas. Whereas open defecation in rural areas may be as high as 44.5 percent, it can reach 96.6 percent in semi-nomadic households. Most households in peri-urban areas have improved sanitation facilities when study groups (intervention and control) are combined (90.9 percent). Practically all of the improved sanitation facilities in peri-urban areas are shared with other households. Half the households with children under 5 declared that the youngest child in the household used a sanitation facility, potty, or diaper the last time (s)he defecated. About one-third of respondents indicate that their household has been visited by a community health educator to stop open defecation (31.2 percent), and 21.1 percent indicate that their village had been involved in an activity to stop open defecation.

Importance attributed to hand washing during critical junctures is uneven. Although 78.7 percent of the sample indicated without prompting that hands should be washed before eating, only 40.3 percent indicated that they should be washed before food preparation, and 27.7 percent indicated that they should be washed before feeding a child. By the same token, 73.7 percent of study participants indicated that hands should be washed after any toilet visit, only 38 percent indicated that they should be washed after cleaning a child, 19.2 percent after cleaning a latrine, and only 13.6 percent after cleaning a potty. Three-

quarters of visited households allowed enumerators to visit the location where study participants commonly wash their hands (78.5 percent). Hand washing supplies were observed in 42.8 percent of these locations, most of which were in the yard (44.8 percent) or in the kitchen (38.5 percent).

Almost two-thirds of households (62.7 percent) had access to an improved water source with large differences between the sampling strata in favor of peri-urban household where it was almost universal. Less than half of the study participants (42 percent) declared that they treat their drinking water. The most commonly mentioned treatment method is boiling (25.4 percent) followed by chlorination (13.3 percent). Half the households (53.3 percent) declared that they treat drinking water because they do not trust the source and 3.3 percent because the water was muddy. Most households that treat drinking water store it in containers with a tight lid (78.8 percent).

Background and Significance

Diarrhea is considered the second-most deadly disease for the world's poorest children.[1] According to the UN Interagency Group for Child Mortality[2], diarrheal disease caused 11 percent of child mortality worldwide in 2012. Pruss-Ustun et al. estimated that in 2012, 528,000 diarrhea deaths worldwide were caused by inadequate drinking water or inadequate sanitation.[3] Additionally, contaminated drinking water is a major source of hepatitis, typhoid, and opportunistic infections that attack the young and the immune-compromised, especially persons living with HIV/AIDS (PLHIV). Diarrhea reduces a person's ability to absorb antiretroviral medicines as well as nutrients. Further, diarrhea increases the burden on caregivers both in clinics and in the home. PLHIV in particular are susceptible to diarrhea with 90 percent of PLHIV getting diarrhea at some point

Kenya is a water-scarce country made up mostly of arid and semi-arid lands and variable rainfall that limits the socio-economic opportunities of local populations[4]. Kenya's adoption of water resources management and water supply and sanitation (WSS) sector reforms is informed by the availability of water, and USAID has assessed these reforms to be promising. In addition, despite recent political setbacks, Kenya may still be able to meet Millennium Development Goals (MDGs) for water and sanitation access if it implements proposed reforms and builds needed management capacity.

The 2010 Joint Monitoring Report corroborates this conclusion suggesting that 18 percent of rural Kenyans still practice open defecation; this percentage may be larger in certain parts of the country.[5] As a result, the Government of Kenya (GOK) has been accelerating sanitation activities in a concerted attempt to meet the MDG sanitation target. In 2011, the GOK launched the Open Defecation Free (ODF) Kenya by 2013 campaign to help reach that target. The government developed a comprehensive ODF roadmap and is engaging all WASH partners to galvanize the entire country to achieve ODF status by 2014. The

[1] UNICEF. 2012. Pneumonia and diarrhoea: Tackling the deadliest diseases for the world's poorest children. www.unicef.org_eapro_Pneumonia_and_Diarrhoea_Report_2012.pdf.
[2] UN Interagency Group for Child Mortality Estimation. 2013. Levels and trends in child mortality. http://www.childinfo.org/files/Child_Mortality_Report_2013.pdf
[3] A Pruss-Ustun, Bartram J, Clasen T, Colford J, Cumming O, Curtis V, Bonjour S, Dangour A, De France J, Fewtrell L, Freeman M C, Gordon B, Hunter PR, Johnston RB, Mathers C, Mausezahl D, Melicott K, Neira M, Stocks M, Wolf J and Cairncross S. 2014. Burden of disease from inadequate water, sanitation and hygiene in low and middle-income settings: A retrospective analysis of data from 145 countries. *Tropical Medicine and International Health*. Volume 19, No 8, 894-905.
[4] World Bank. 2010. Project appraisal document, proposed grant from the Global Environment Facility to the Republic of Kenya for an Adaptation to Climate Change in Arid and Semi-Arid Lands (KACCAL) project. http://www-wds.worldbank.org/external/default/WDSContentServer/WDSP/IB/2010/05/28/000333038_20100528011018/Rendered/PDF/390580PAD0P078101Official0use0Only1.pdf
[5] See http://www.wssinfo.org/fileadmin/user_upload/resources/KEN_san.pdf

GOK used the community-led total sanitation (CLTS) approach to improve sanitation coverage: from 2007 to May 2012 more than 1,000 villages claimed ODF status.[6]

USAID/Kenya is undertaking a "two-pronged approach [in health] to ensure that gains achieved through significant US Government investments are not lost, particularly in HIV/AIDS, malaria, Family Planning (FP), and tuberculosis (TB)." The first prong focuses on near term impact while the second prong emphasizes longer term approaches to strengthen the health system. WASHplus, a five-year USAID centrally funded project, operates within the first prong. WASHplus uses proven, at-scale interventions to reduce diarrheal diseases and acute respiratory infections to create supportive environments for healthy households and communities. The goal of the WASHplus program in Kenya is to improve water, sanitation, and hygiene (WASH) practices of communities, families, and individuals with a special focus on vulnerable communities.

Intervention Approach and Strategy

The goal of WASHplus intervention activities is to help the Kenyan government generate demand for sanitation, improve WASH practices among all households, and introduce simple supportive technologies to vulnerable households. While the CLTS approach currently being used by the GOK can help generate demand for sanitation, efforts in other countries show that moving people up the sanitation ladder to improved sanitation options requires a ready and affordable supply of improved options with private sector participation, behavior change, and sustained commitment from government. Based on this knowledge, WASHplus is implementing a CLTS+ approach to address the GOK's need for CLTS contributors while simultaneously testing new components. The aim of these new components is to help households meet minimum sanitation standards that do not require subsidy and can be replicated across the country in an effort to improve sanitation facility coverage and quality.

The CLTS+ approach used in Kenya incorporates a new tactic, small doable actions (SDA), which has been introduced by the WASH-HIV integration program and embraced by the government and partners alike. SDA assumes that behaviors promoted can be aligned along a continuum going from the desirable to the optimal and that individuals may take steps along the continuum to change their practices. The proposed WASHplus CLTS+ approach will also highlight other unique elements, such as inclusive sanitation, which USAID and WASHplus will share across Kenya and beyond to other sanitation efforts. Inclusive sanitation refers to any promotional approach and/or technical innovation that lead to affordable access of quality sanitation goods and services for a population previously excluded from such access. This population could be at the base of the socio-economic pyramid or characterized as a composite of vulnerable sub-populations not previously targeted by sanitation interventions such as the PLHIV, children, or the elderly.

[6] Government of Kenya. 2014. Protocol for implementing CLTS in Kenya.

The CLTS+ approach was successfully implemented to increase sanitation coverage in Ethiopia. In conjunction with the Water and Sanitation Program (WSP) of The World Bank and the Amhara Health Bureau, the USAID-funded Hygiene Improvement Project implemented by AED and partners was able to reduce open defecation by 24 percent in a program implemented over a two-year period.

Intervention Elements in Kenya

- CLTS
- Community health workers negotiate small doable actions in families through household visits

Actions

- Constructing latrines
- Installing supports for inclusive sanitation
- Hand washing with a cleansing agent
- Installing tippy taps/leaky tins
- Treating drinking water
- Storing drinking water safely
- Menstrual hygiene management

The WASHplus program in Kenya also focuses on correct hand washing. Washing hands with soap at critical junctures can help reduce diarrhea prevalence by 35 to 50 percent. Critical junctures identified by the WASH sector can be divided into two large categories: after the risk of contact with human feces (cleaning a child's bottom, defecating) and before the handling of food, including preparation and consumption (feeding oneself or anybody else). Evidence also suggests that hand washing with soap can reduce acute respiratory infections by 23 percent.[7]

Two additional content areas of the WASHplus program in Kenya include treatment and appropriate storage of drinking water and menstrual hygiene management, particularly among households with PLHIV. Regarding water treatment, Nath et al.[8] concluded that the providing safe water alone at the household level can reduce diarrheal and other enteric diseases. While this can result in disease reduction that ranges from 6 percent to 50 percent, this change can be observed even in the absence of improved sanitation or other hygiene measures. Similarly Clasen et al. also concluded that household interventions are more effective than interventions at the water source in preventing diarrhea when comparing water treatment at the source and at the point of consumption.[9]

CLTS+ will integrate the SDA approach into the child health platform that includes CLTS activities. The plus will allow for a more focused emphasis on hand washing with soap and inclusive sanitation (focusing on sanitation needs for the mobility challenged such as the elderly, physically challenged, and children), which is often not adequately integrated into CLTS programs. Recognizing the preliminary WSP research on sanitation marketing that found there may be a market for on-site sanitation in Kenya, WASHplus explored promising approaches to improve the uptake of improved sanitation facilities, based on the government's minimum sanitation standards.

Specific practices recommended by WASHplus include the following:

- Dispose of human feces safely by practicing fixed point defecation
- Make sanitation possible for individuals with impaired mobility including the use of bedpans/commodes, setting up supportive devices such as ropes and bars on the path to sanitation facilities, setting up higher seat latrines or pull-up bars inside latrines

[7] T Rabie and V Curtis. 2006. Hand washing and risk of respiratory infections: A quantitative systematic review. *Tropical Medicine and International Health*, 11(3), 258-267.
[8] K Nath, Bloomfield S, and Jones M. 2006. Household water storage, handling and point-of- use treatment. A review commissioned by IFH. http://www.ifh-homehygiene.org.
[9] T Clasen, Roberts I, Rabie T, Schmidt W, and Cairncross S. 2006. Interventions to improve water quality for preventing diarrhoea. *Cochrane Database of Systematic Reviews* 2006, Issue 3. Art. No.: CD004794. DOI: 10.1002/14651858.CD004794.pub2.

- Wash hands with soap before handling food (preparing food, feeding children, and eating) and after contact with human feces (cleaning up a child's bottom, cleaning up the feces of a person who is chronically ill or defecating, visiting a toilet)
- Treat drinking water using efficacious technologies including chlorination, filtration, or solar disinfection
- Cover drinking water using a tight lid
- Use a narrow neck container to store treated drinking water
- Wash blood-stained menstrual materials and dry in sun

Specific WASHplus Program Activities

Using the USAID-developed Hygiene Improvement Framework, WASHplus's mandate in Kenya is to work on the framework's three elements: enabling environment, access to hardware products and services, and hygiene promotion. That is, WASHplus works to ensure that there is: 1) an enabling policy environment supporting WASH interventions targeting vulnerable populations, especially PLHIV; 2) a private sector that can address the demand for WASH products and services among vulnerable populations and households; and 3) increased demand for improved sanitation options (products and services), and an increased uptake of promoted hygiene practices.

WASHplus has already developed strong working relationships with the Ministry of Health, its partners, and bilateral actors (e.g., APHIAplus and Centers for Disease Control and Prevention partners) in selected provinces. WASHplus has also introduced WASH-HIV integration strategies and activities into government policy documents and training guidelines, and tested tools in English and Swahili for community health workers to use in hygiene promotion among vulnerable households.

WASHplus assists the Government of Kenya to accelerate CLTS programming at the community level throughout the country and develop a sanitation marketing strategy that will have national implications. To this end WASHplus will implement a demonstration project that trains trainers (TOT) targeting government community health extension workers to implement the CLTS+ approach in three intervention districts. The latter will in turn train community health workers (CHWs). Two community units per intervention districts have been chosen for this purpose.

The training with s focuses on how to promote WASH practices in vulnerable households and how to negotiate with families the adoption of hygiene practices that make sense for families. CHWs also learn how to negotiate with families the pace at which changes will occur. To carry out their mandate, CHWs will use job aids developed by WASHplus. CHWs will also participate in efforts that trigger communities to implement CLTS activities. The intervention in the three districts mentioned will last about 12 months. A baseline survey was conducted before WASHplus implemented any WASH promotion at the community level.

Study Objectives

The primary study objective was to collect baseline data for an evaluation study that will examine the effectiveness of the WASHplus intervention.

The specific objectives of the study were:

- To establish baseline levels on key WASH coverage and hygiene practices in intervention and control sites within the three different types of geographic areas

- To assess the comparability of intervention and comparison sites with a focus on the study participants' socio-demographic characteristics, the presence of vulnerable household members, exposure to previous WASH activities, and household-level key WASH outcomes
- To provide recommendations to refine or further adapt the intervention approach and content to address geographic differences as appropriate

Study Populations

The study populations include residents in:

- Nairobi slums
- Rural areas of Nyanza
- Semi-nomadic pastoralist settlements in the Rift Valley

Study respondents were the primary caregivers of vulnerable household members. Vulnerable household members include children under 5, chronically ill individuals who are bedridden and in need of home-based care, and the elderly.

Methods

Study Design

A pre-post study design with nonequivalent comparison groups was used. This design requires conducting a baseline and endline in both the intervention and a control groups. The design is represented below.

	Baseline	Intervention	Endline
N	O	X	O
N	O		O

Sample Size

The sample size initially calculated included 670 cases per study group, which would entail visiting 10 households in 67 clusters. This calculation implied that with a total of six study groups (three provincial sites representing peri-urban, rural, and semi-nomadic populations, and an intervention and a control group per provincial site) the research would have a total sample size of 4,020 study participants. This calculation was done using CSurvey (see Annex 1) and is based on the following assumptions:

- Increase in population with access to (any) sanitation from 82 percent to 95 percent
- Estimation error $\pm$ 5 percent
- 95 percent confidence internal
- Design effect = low

Data collectors confronted serious challenges finding study participants in the semi-nomadic areas. Funds available were exhausted with less than half of the anticipated quota per study group filled. Due to financial constraints, data collection in the semi-nomadic areas had to be stopped before the established quota was met. The following chart reflects both the planned and the actual sample size once the data were collected. This chart excludes cases that did not meet the eligibility criteria despite the fact that they were visited (e.g., study participants were minors or were households with no vulnerable population members).

. **Table 1 – Sample Size Distribution by Sampling Strata and Study Groups, Planned and Actual**

Sampling Strata	Intervention Sites		Comparison Sites		Total	
	Planned	Actual	Planned	Actual	Planned	Actual
Peri-urban	670	658	670	634	1,340	1,292
Rural	670	661	670	663	1,340	1,324
Semi-nomadic	670	330	670	265	1,340	595
Total	2,010	1,649	2,010	1,562	4,020	3,211

Sampling Strategy

The primary sampling unit was the community unit (CU), defined as a set of communities managed together by the health programs implemented by the GOK to maximize health impact. In each one of the three sampling strata, two high HIV-prevalence adjacent CUs where intervention activities were planned were purposively selected through a consultative process by both WASHplus and the health district management team. The control districts and CUs were also located in high HIV-prevalence districts, had similar socio-economic characteristics as the intervention CUs, and were selected through the same consultative process. Little contamination was expected between the intervention and the control group since health workers in control districts would not be receiving any kind of training and no job aids used in the intervention area were available in the control districts. Since the intervention is mainly based on interpersonal communication by CHWs, no spillover effects were anticipated.

A two-stage cluster sampling strategy was used. Sixty-seven clusters were randomly selected in the first stage from each site. This was done by first combining the list of households (HHs) in the two adjacent CUs in the intervention or comparison sites and dividing the total number of HHs into 67 clusters with equal number of HHs in each cluster. In the second stage, 10 household were randomly selected with replacement in cases where the selected HHs did not meet the eligibility criteria. Data collection had to be terminated early in the nomadic areas after data had been collected from only one of the two CUs in both the intervention and comparison groups. Mapping of households in each CU was conducted with the help of CHWs to create sampling clusters.

Once the clusters were compiled, households were randomly selected from each cluster with replacement. Selected households were visited to determine if they were eligible for the study. Consent to participate in the study was obtained with household members from at least one of the following vulnerable populations: children under 5, chronically ill individuals, and the elderly. If no consent was reached, households were replaced with previously randomly selected households.

Survey Instrument

Enumerators used a standardized survey questionnaire uploaded onto personal digital assistants to collect data. The questionnaire included questions on the following topic areas.

- Socio-demographics (profile of respondent, family size, vulnerable household members, household characteristics, and possessions)
- Drinking water treatment and storage practices
- Hand washing practices and stations with essential supplies
- Management of human feces, including type of facility usually used by households members
- Sanitation facility condition and current use
- Factors that facilitated or hindered installation of a latrine
- Factors that facilitated or hindered drinking water treatment and storage practices
- Menstrual hygiene management practices
- Exposure to hygiene promotion efforts and source of information

Translation of Questionnaires and Pretest

The survey instrument was translated in to Kiswahili, Dholuo, and Maa and pretested prior to training enumerators in peri-urban and rural locations to check whether or not it captured the intended information. Up to 10 urban and rural households were visited. Refinements to the instrument were made after enumerator training was completed.

Data Analysis

Descriptive statistics were generated to report on respondents' demographic characteristics, exposure, and practices measuring intervention outcomes. Cross tabs were also generated by intervention and control sites within each geographic area.

Comparing intervention and control sites at the baseline was helpful for determining if households chosen were comparable on variables and socio-demographics and whether they differ on study outcomes related to WASH. Such analysis helped to establish if there were potential differences that need to be incorporated as covariates in future data processing.

For sanitation, drinking water treatment and storage, and hand washing, the analysis was done for all households with at least one vulnerable population member regardless of the type of vulnerable family members. Analysis on indicators related to latrine and bed pan accessibility were conducted in households with chronically ill or elderly members. While analysis on menstrual hygiene management practices were limited to households with chronically ill and bedridden women ages 15 to 49.

Findings

Findings are presented by sampling strata and study group within each strata. The strata in question are: peri-urban, rural, and semi-nomadic. The study groups are referred to as "Int" for Intervention and "Comp" for Comparison. The tables used to present findings contain percentages. The denominators used for the calculations are presented by variable as part of the variable heading since data may be missing for some variables. Footnotes have been added to the tables to indicate when data were missing.

Respondent Profile

The following table presents the distribution of gender, age, and education variables of the study participants. The table presents percentages for each variable listed. It also presents the sample size for each variable, which served as the denominator used to perform percentage calculations. The sample size may change slightly per variable as there may have been obstacles collecting the information from all study participants**.** The percentages for the highest level of education include only respondents that ever attended school**.**

Table 1: Primary Caregiver Demographic Characteristics

	Peri-Urban		**Rural**		**Semi-Nomadic**		**Total**
	Int (%)	**Comp (%)**	**Int (%)**	**Comp (%)**	**Int (%)**	**Comp (%)**	**(%)**
Gender	N=658	N=634	N=661	N=663	N=330	N=265	N=3,211
• Male	3.8	4.7	5.6	14.0	0	1.1	5.9
• Female	96.2	95.3	94.4	86..0	100.0	98.9	94.1

Age	N=658	N=634	N=661	N=663	N=330	N=265	N=3,211
• 18 to 24	41.1	41.5	22.7	24.0	24.5	19.2	30.3
• 25 to 34	45.9	48.3	33.4	25.5	40.0	39.9	38.4
• 35 to 44	9.0	7.4	17.9	17.3	19.4	25.7	14.7
• 45 to 54	3.3	1.4	7.6	13.1	11.8	8.0	7.1
• 55 and above	0.8	1.4	18.5	20.1	4.2	8.3	9.5
Literacy	N=657	N=632	N=661	N=662	N=329	N=261	N=3,202
• Can read and write	94.1	95.7	80.8	74.3	15.2	10.3	72.7
• Can only read	1.5	1.1	2.6	5.7	4.0	0.4	2.7
• Cannot read or write	4.4	3.2	16.6	19.2	80.9	88.9	24.6
Ever attended school	N=658	N=634	N=661	N=659	N=330	N=263	N=3,207
• Yes	98.8	97.9	87.6	85.0	19.1	14.1	78.3
• No	1.2	2.1	12.4	15.0	80.9	85.9	21.7
Highest level of school completed among those ever attending school	N=650	N=621	N=579	N=562	N=63	N=37	N=2512
• Primary School	62.3	45.9	84.6	82.8	81.0	94.6	68.9
• Secondary School	33.5	39.5	13.8	10.7	12.7	2.7	24.4
• High School	0.3	3.1	0.9	3.8		2.7	2.0
• College (Certificate)	2.3	6.6	0.3	1.8	6.3	0.0	2.9
• College (Diploma)	1.5	5.0	0.3	0.9	0.0	0.0	1.9

[1]

Overall a majority of the survey respondents were female with a higher percentage of older respondents in the rural and nomadic areas. Literacy rates, school attendance, and completion of primary school were highest among respondents in the urban areas followed by respondents in the rural areas.

The survey respondents in the intervention and control sites within each region also had similar demographic characteristics with a few exceptions. Almost all or most survey respondents in the intervention and control sites were female. Respondents in the intervention and control sites were also similar in age, literacy levels, and school attendance (less than 5 percent difference). A higher proportion of respondents within the intervention sites in the urban and nomadic regions completed primary school when compared to respondents in the comparison sites in these regions (14–15 percent difference).

Target Population

Table 2 presents the distribution of vulnerable populations in the sample by region.

Table 2: Households with Vulnerable Household Members

	Peri-Urban		**Rural**		**Semi-Nomadic**		**Total**
	Int (%) N=658	**Comp (%) N=634**	**Int (%) N=661**	**Comp (%) N=663**	**Int (%) N=330**	**Comp (%) N=265**	% N=3211
Chronically ill	0.8	2.1	4.8	7.5	3.0		3.8

Elderly over 65 years of age	1.2	1.4	22.0	23.3	18.0	15.3	13.0
Children under 5	99.5	98.3	81.2	85.0	93.7	93.6	91.4
Bedridden and chronically ill women ages 18 to 50	0.3	1.3	1.4	1.7	0.9	1.5	1.2

Overall the proportion of households with chronically ill, elderly, or chronically ill and bedridden women was low in the study sample. A majority of households had at least one child under 5. Households in the rural and nomadic areas had a slightly higher proportion of chronically ill and elderly household members while rural households had a slightly lower proportion of children under 5. These differences may reflect the fact that in Kenya the elderly that may have lived in urban areas retire in rural areas. The number of HHs with bedridden and chronically ill women ages 18 to 50 was very low or zero in all regions. Households in the intervention and control sites within each region had similar proportions of vulnerable household members.

Key WASH Outcomes

Sanitation

Table 3 presents the percent distribution of sanitation facilities detected per self-reports by sample strata (peri-urban, rural, and semi-nomadic) and study group (intervention and control). This distribution does not follow the classical Joint Monitoring Programme (JMP) definitions that groups HHs into three categories: open defecation, unimproved, and improved sanitation. The information presented in Table 3 breaks down the improved and unimproved sanitation into two subgroups based on whether the facility is shared. Thus, instead of three categories in the typology, we are using five.

This approach was adopted for this baseline report because of the high percentage of households that share their facilities and the considerable sharing reported among those who reported having an improved facility. The JMP classification would normally consider all shared sanitation to be unimproved. Separating the improved and unimproved sanitation facilities in this case, however, offers the possibility of understanding the importance of shared improved facilities especially in the peri-urban area.

It should be noted that the total denominator for the calculations presented in Table 3 was 3,041. That is, 170 cases fewer than the denominator for previous tables. This occurred because many cases did not report whether their facility was shared or not. These 170 cases were excluded from the analysis presented in Table 3.

Table 3: **Sanitation Coverage among Households with a Vulnerable Population Member by Sampling Strata and Study Group**

Sanitation Categories	**Peri-Urban**		**Rural**		**Semi-Nomadic**		**Total**
	Int % N=658	**Comp (%) N=539**	**Int (%) N=630**	**Com (%) N=659**	**Int (%) N=312**	**Comp (%) N=265**	**% N=3041**

Improved sanitation	Improved sanitation facility not shared	1.9	2.8	14.0	14.1	1.3	1.9	7.1
	Improved sanitation facility shared	90.9	87.2	21.3	17.3	6.1	0.8	43.3
Unimproved sanitation	Unimproved sanitation facility not shared	0.0	0.0	12.1	11.7	1.6	0.8	5.3
	Unimproved sanitation shared	4.2	4.6	18.6	12.4	1.3	0.0	8.4
Open defecation		3.0	4.1	34.1	44.5	89.7	96.6	35.9
Total		100%	100%	100%	100%	100%	100%	100%

Most HHs in peri-urban communities fall higher on the five-step sanitation ladder while most HHs in the nomadic communities are at the lowest rungs. Almost all households in peri-urban communities share a sanitation facility with improved characteristics. Almost all nomadic HHs, on the other hand, do not have a facility and practiced open defecation. Additionally, very few peri-urban and nomadic households have attained the top step of the sanitation ladder. Conversely, households in rural communities are spread across the different steps of the sanitation ladder with about 15 percent at the very top and about a third at the lowest level. All the differences presented in Table 3 are statistically significant. For all comparisons in the table, Chi2=2286.02 and p=.000. This is also true when comparing differences within the intervention or the control study groups. The statistical values are Chi2= 1233.71, p =.000 for the intervention group and Chi2=1067.9, p=.000 for the control group.

For the most part, the differences between intervention and control groups are within a 5 percent bracket. Exceptions that may confirm the rule may be found when considering: 1) open defecation in the intervention and control groups in the rural area where the difference between them is about 10 points; 2) open defecation when comparing the study groups in the semi-nomadic area where the difference is over 6 points; and 3) shared unimproved sanitation where the difference is also about 6 points.

Table 4 presents findings by sample strata and study group pertaining to the disposal of child feces**.** The appropriate places for a young child to defecate included a diaper, potty, or sanitation facility when constructing this table. Appropriate places for disposing child feces were a latrine or a toilet connected to a sewage system. We excluded burial of fecal matter due to an emerging debate among UNICEF and WSP sanitation experts that suggests that burying children feces is inappropriate as the burial site is often too shallow to make it hygienic since the feces could be easily washed away during the rainy reason or be excavated out by animals. The analysis presented in Table 4 is limited to HHs with children under 5, thus the reduced sample size of 2,936 was used as the denominator for the calculations.

Table 4: Management of Human Feces among Households with Children Under 5 by Sampling Strata and Study Group

	Peri-urban		Rural		Semi-Nomadic		Total
	Int	Comp	Int	Comp	Int	Comp	
Sample size	635	623	539	562	312	248	2,936
% of households where the youngest child used a sanitation facility, potty, or diaper the last time he or she defecated	79.4	89.1	41.7	21.5	13.3	3.2	50.1
% of household where the respondent disposed of child feces in a sanitation facility	42.1	71.3	49.4	37.5	9.1	2.8	42.0

The findings presented in Table 4 indicate that half the study participants declared that the last time the child under their care passed a stool, (s)he did it in a location considered appropriate in this analysis. The findings also indicate that 42 percent of the study participants declared to have disposed of the feces properly per the definition noted above. Yet, it was more common to have had the child defecate in the appropriate location in the peri-urban areas than elsewhere. Further, the appropriate disposal of child feces is more frequently mentioned in the peri-urban and rural areas than among semi-nomads. These differences are statistically significant (Chi2=, p.000). Because striking differences exist between intervention and control households in the peri-urban and in the semi-nomadic strata, it can be argued that on this variable alone, the study groups are not comparable.

Two-thirds (65 percent) of the entire sample had access to a sanitation facility; 30 percent reported that this facility was on the premises or near the place of residence, and when asked to show the facility to an enumerator, 25 percent agreed. The proportion of HHs with latrines on the premises is significantly higher in rural areas than in urban areas in both intervention and control groups. (Chi2=936.02, p<.000). Only 23 percent of the facilities observed were reportedly constructed in the 12 months prior to the survey, with 28.9 percent in the intervention group and 24.6 percent in the comparison group. This finding implies that observed facilities were generally not constructed recently.

Among sanitary facilities observed on/near the premises across the sample, 70.8 percent provided privacy. The breakdown by study group was only possible in rural areas where sufficient numbers allowed a comparison between the intervention and the control groups. In this stratum, the study detected 64.3 percent of the facilities with such an entry in the intervention group against 69.5 percent in the comparison group. Regarding the cleanliness of observed facilities and when using a three point scale, the data suggest that those in peri-urban settings are less clean given a larger abundance of soiled anal cleaning material on the floor (F=22.01. p=.00). This comparison was only possible for the peri-urban and rural areas as too few latrines were observed in the semi-nomadic stratum to keep it in the analysis.

In general, latrines observed did not have any inclusive sanitation features. For example, 88 percent (N=747/848) of the facilities observed in peri-urban and rural areas had a clear path to the latrine. Yet, only 1.2 percent of the facilities had some type of support along that path to help anyone with walking difficulties requiring a railing or a rope. This general tendency was true in the intervention and in the comparison group, even though in the peri-urban comparison group the proportion of HHs with such support structures was higher. However, this was most likely determined by the few number of observed sanitation facilities in such a setting.

In addition, when looking at data from the peri-urban and rural areas, only 1.3 percent and 2.6 percent of the observed latrines in the intervention and the comparison group had a raised toilet seat. By the same token, 0.4 percent and 0.6 percent of observed latrines in the intervention and the comparison group, respectively, had a mechanism (e.g., pole or rope) inside the latrine to help anybody stand up after using the latrine.

Hand Washing

Study participants were asked to indicate at which junctures hands should be washed. Responses were unprompted. Table 5 presents the findings, organized by risk of contact with fecal matter and prior to food handling. Study participants may have mentioned more than one juncture. Multiple responses may have been provided without probing.

Table 5: Unprompted Junctures at which Study Participants Indicate Hands Should Be Washed by Sampling Strata and Study Group

Junctures		Peri-urban		Rural		Semi-Nomadic		Total
		Int	Comp	Int	Comp	Int	Comp	
		N=658	N=634	N=661	N=663	N=330	N=265	N=3211
After risk of fecal contact	After any toilet visit	93.6	93.7	76.4	62.0	77.6	7.2	73.7
	After defecating	11.7	42.7	44.0	30.9	63.6	49.1	36.9
	After cleaning a child	44.5	56.2	34.2	13.9	50.0	32.8	38.0
	After cleaning a latrine	7.1	30.6	25.4	7.8	43.3	5.3	19.2
	After cleaning a potty	7.4	22.4	20.3	0.9	31.2	1.1	13.6
Before food handling	Before food prep	27.7	29.2	49.2	39.4	59.7	54.7	40.3
	Before eating	78.7	69.9	86.1	81.6	77.9	75.1	78.7
	Before feeding a child	17.5	30.3	31.0	14.3	54.8	38.9	27.7

The findings in Table 5 suggest an uneven recognition of the significance of the junctures considered critical for preventing diarrheal disease for the sample as a whole. An exception to this general comment is the perception of the need to wash hands before eating, where the highest percentage among all junctures listed is detected. The distinction between hand washing after any toilet visit and after defecating is puzzling even though one may recognize that not all have toilets and even if they did one may go to the toilet not only to defecate. The differences between the intervention and control study groups make it harder to see trends by sampling strata, except for the fact that the significance of hand washing after visiting a toilet is more frequently mentioned in urban settings than elsewhere, yet the significance of doing so after cleaning a latrine or before food preparation is more frequently mentioned in rural and semi-nomadic households.

Most study participants (78.5 percent) allowed enumerators to see the place where they usually wash their hands; disaggregated into 79.9 percent among intervention study participants and 76.9 percent among those in the comparison group. Among intervention groups, peri-urban participants were the most

forthcoming about granting this authorization (98.8 percent) compared to 70.2 percent in the rural setting and 62.8 percent among the semi-nomad households. Percentages for the comparison group were 72.4 percent, 76.5 percent, and 88.7 percent in the peri-urban, rural, and semi-nomadic strata, respectively**.**

Table 6 presents the detailed findings regarding the most commonly used hand washing facilities observed by sample strata and study group. These data indicate that the most frequent location for these facilities across the sample is either the yard (44.8 percent) or the kitchen (38.3 percent). Further, a commonly used hand washing facility located at or near toilets is rare (6.5 percent). This location varies significantly by stratum and study group. In fact, the kitchen is the most frequently observed location among semi-nomadic households, whether we are referring to the intervention or the comparison study group. The yard, however, is the most frequently observed location in rural areas, irrespective of the study group. The location for commonly washing hands seems to be more equally distributed among options considered in the urban stratum. These differences are statistically significant overall (Chi2 = 910, p=.00).

Table 6: Observed Location of Place Where Study Participants Most Commonly Wash their Hands by Sampling Strata and Study Group

Location	Peri-urban		Rural		Semi-Nomadic		Total
	Int	Comp	Int	Comp	Int	Comp	
	N=650	N=456	N=462	N=502	N=204	N=234	N=2508
Yard	37.5	34.2	53.2	76.7	27.9	15.4	44.8
Kitchen (at or within 5 m)	38.6	24.3	36.4	18.7	72.1	81.6	38.3
Toilet	0.2	28.1	6.5	0.6	0.0	0.0	6.5
Elsewhere	23.7	13.4	3.9	4.0	0.0	0.0	10.4
Total	100%	100%	100%	100%	100%	100%	100%

Table 7 presents the results pertaining to the functionality of the hand washing device/station most commonly used by study participants by sampling strata and study group. Functionality in this case refers to the presence of any or both of the hand washing supplies needed to practice hand washing: water and a cleansing agent. The data presented in this table indicate that there are four categories of options: no supplies, only water, only cleansing agent, and both supplies present. The category of cleansing agent includes different cleansing products: soap, ash, or sand.

Table 7: **Functionality of Hand Washing Device/Station Commonly Used by Study Participants by Sampling Strata and Study Group**

Location	Peri-urban		Rural		Semi-Nomadic		Total
	Int	Comp	Int	Comp	Int	Comp	
	N=650	N=456	N=462	N=502	N=204	N=234	N=2508
No supplies	21.7	17.6	36.4	62.0	29.4	3.4	30.5
Water only	10.8	17.0	13.1	7.7	15.7	12.8	12.4
Cleansing agent only	5.5	31.8	5.2	16.8	4.4	25.1	14.3
Both water and cleansing agent	62.0	33.6	45.3	13.5	50.5	58.7	42.8
Total	100%	100%	100%	100%	100%	100%	100%

The data presented in Table 7 indicate that in general 42.8 percent of devices/stations observed had both supplies needed to practice hand washing. At the other end, 30.5 percent had no supplies at all. In between are those HHs where there was only water (12.4 percent) or only a cleansing agent (14.3). The latter two subgroups add up to 26.7 percent, allowing us to say that they form an intermediate category: one supply or the other. Significant differences exist by sampling strata and study group. That is, the absence of both supplies is more frequently found in the rural areas than in the other two sampling strata, despite the fact that this is more pronounced in the comparison than in the intervention group. On the other hand, the presence of both supplies is more frequently found in the peri-urban, with the tendency being more pronounced in the intervention group. These differences are all statistically significant (Chi2=276.8, p=.001).

That said, the data also indicate that 90 percent of the hand washing devices/stations observed were basins, thus movable. Basins were less common in the control study group in urban households where

only 61.8 percent had them, yet that is still a considerably high percentage. Among those that had fixed stations, tippy taps were only observed in rural areas and mostly among households in the intervention group (10.6 percent).

Of the 843 households where latrines were visited, only 122 had a hand washing device/station at this location. This represents 14 percent of the observed latrines. Among those with a hand washing station at this location, 30.3 percent had no hand washing supplies at all, 27 percent had only a cleansing agent, and 42.6 percent had both supplies. No breakdown by sampling stratum or study group is presented in this report as the absolute number of households involved is so small that such comparison would be meaningless.

Only 19 individuals of those interviewed declared having a hand washing device/station at or near the place where food is handled. All allowed the enumerator to see the location where this device/station was kept. Five of these households had no supplies at the time of the observation, five had soap, and nine had both soap and water. Again, because these are very low absolute numbers no comparison by sampling strata or study group was possible.

Drinking Water Treatment and Storage

Table 8 presents findings regarding access to a safe drinking water source and drinking water treatment practices by sampling strata and study group. These data used the JMP definition for an improved water source. Responses to a question about drinking water treatment were grouped in the table for presentation purposes following sector conventions about grouping water treatment technologies: boiling, chlorination, filtration, and others. No household reported solar disinfection so this technology is not listed in the table.

Table 8: Drinking Water Source and Treatment among Households by Sampling Strata and Study Group

Drinking water source and treatment	Peri-Urban		Rural		Semi-Nomadic		Total
	Int (%) N=658	Comp (%) N=634	Int (%) N=661	Com (%) N=663	Int (%) N=330	Com (%) N=265	3,211
Source							
Improved water source	99.7	98.6	47.2	75.1	77.0	7.5	62.7
Treatment							
None	55.0	54.4	52.8	52.6	80.0	73.2	57.9
Boiling	32.5	35.1	19.4	17.6	17.9	22.3	25.4
Chlorination	12.0	9.8	22.1	21.1	0.9	4.5	13.3
Filtration	0.0	0.2	0.2	0.0	0.0	0.0	0.1
Other than solar disinfection	0.5	0.5	5.6	8.6	1.2	0.0	3.2
Total	100%	100%	100%	100%	100%	100%	100%

Findings in Table 8 indicate that 62.7 percent of HHs reported access to an improved water source. Access to an improved water source is more common in the peri-urban areas visited than elsewhere. Yet access to such sources differs when comparing intervention vs. comparison districts (Chi2=772.57, p=.000). Further, 42.1 percent reported treating the water they drink at home. In order of frequency, water treatment methods used across the sample are boiling (25.4 percent), chlorination (13.3 percent), filtration (0.1 percent). Few households (3.2 percent) use other methods. Chlorination is a method more frequently

mentioned in rural areas than elsewhere. Differences in terms of methods, especially chlorination are observed between the intervention and the control study groups in both the peri-urban and the semi-nomadic strata. These differences are statistically significant (Chi2=363.25, p=.000). A chlorine residual test revealed the presence of chlorine in samples drawn from 77.5 percent the 324 households that reported using chlorination. That percent was 64.4 percent in intervention households and 96.9 percent in control households. Most HHs that reported treating their drinking water (79.8 percent) knew where to get chlorine. As may be expected, the proportion of such respondents was significantly higher among chlorinators (95.4 percent) (Chi2=106.6, p=.00).

About one-third (31.2 percent) in the whole sample reported treating water daily. Yet, 55.1 percent reported doing so weekly, about 1 percent reported doing it during specific events (emergencies or somebody being ill in the family), and 13.2 percent under an array of circumstances that have been grouped as "miscellaneous." Daily users of water treatment, however, are more common either in the peri-urban areas or among semi-nomadic households than in rural areas, regardless of the study group.

Table 9 below presents findings regarding the reasons why households opted to treat drinking water among households that did so. The three major reasons across the sample population are related to mistrusting the water quality of their source, including water turbidity; habit; and being motivated by information/training received to this effect. Availability of supplies and having somebody in the house ill at the time of the household interview play a minor role. Differences exist by sampling strata and by study group. For example, habits seems to be more important determinants of the practice in peri-urban areas than elsewhere, and the role of having been exposed to training or information on drinking water treatment serves to justify the practice more frequently in semi-nomadic areas than elsewhere. Yet large differences existed between the nomadic intervention and comparison groups. All differences were statistically significant (Chi2=228.0, p=.00).

Table 9: Reported Reasons for Treating Drinking Water among Water Treatment Users by Sampling Strata and Study Group

Reasons for treating drinking water	Peri-Urban		Rural		Semi-Nomadic		Total
	Int (%) N=289	Comp (%) N=283	Int (%) N=239	Com (%) N=306	Int (%) N=66	Com (%) N=71	3,211
Does not trust water	55.0	70.7	35.6	61.8	51.5	2.8	53.3
Water is muddy	1.0	1.8	2.9	3.9	15.2	7.0	3.3
Habit	28.0	15.5	17.6	20.3	13.6	5.6	19.3
Received training/info	6.9	5.3	25.9	8.8	15.2	81.7	15.3
I had supplies	0.3	0.0	1.3	0.3	1.5	1.4	3.3
Somebody currently ill in family	3.8	2.8	1.7	2.0	3.0	1.4	2.6
Other reasons	4.8	3.9	15.1	2.9	0.0	0.0	5.6
Total	100%	100%	100%	100%	100%	100%	100%

Table 10 presents findings concerning the storage of treated water in HHs where the enumerators were able to observe the storage container for drinking water. The data indicate that 93.2 percent of the households use closed containers and that 78.8 percent use containers that have a tight fitting lid; in 5 percent of the households the observed storage containers had a tap. The data also indicate that 84.9 percent of HHs keep their water storage containers out of the reach of animals. Differences exist across

sampling strata and study groups. The use of closed containers and containers with a tight fitting lid is less common in the semi-nomadic areas than elsewhere. On the other hand, the use of containers with taps was more frequently observed in rural and semi-nomadic households in the intervention group. The intervention and comparison groups are quite different regarding the placement of storage containers out of the reach of animals and the difference is not consistent. For example, whereas the percentage of households keeping their water storage container out of the reach of animals is 95.4 percent and 72.2 percent, respectively in intervention and comparison groups in the peri-urban areas, it is 56.7 percent and 92.5 percent in intervention and comparison groups among households in semi-nomadic areas.

Table 10: Storage of Treated Water by Sampling Strata and Study Group

	Peri-Urban		**Rural**		**Semi-Nomadic**		**Total**
	Int (%) N=282	**Comp (%) N=177**	**Int (%) N=235**	**Com (%) N=185**	**Int (%) N=60**	**Com (%) N=67**	**N=1,006**
Storage practices							
% of households using a closed container	90.4	95.5	99.1	96.2	86.7	76.1	93.2
% of households that use a container with a tight fitting lid	90.1	93.7	72.3	58.9	**76.7**	**71.2**	78.8
% of households with a container that has a spigot	2.1	2.3	12.3	3.3	8.3	0.0	5.0
% of households with storage containers kept out of the reach of animals	95.4	72.2	92.4	77.8	56.7	92.5	84.9

Exposure to WASH Activities

This section focuses on exposure to information about different topics of interest: diarrhea, sanitation, hand washing, and drinking water treatment. The tables in this section have two denominators. The first denominator includes all cases under analysis for which data are available as we are reporting which study participants have indicated that they have been exposed to information about the topics of interest. The second denominator includes only the number of study participants who reported exposure. Thus, it is a lower number. Table 11 presents the findings for exposure to diarrhea-related messages.

Table 11: Exposure to and Source of Information on Diarrhea in the Past One Month by Sampling Strata and Study Group

	Peri-Urban		**Rural**		**Nomadic**		**Total**
	Int (%) N=658	**Comp (%) N=543**	**Int (%) N=661**	**Comp (%) N=663**	**Int (%) N=210**	**Comp (%) N=265**	**N=3,000**
Exposure to information on Diarrhea[1]							
% of primary caregivers who have heard or seen any information on diarrhea in past one month	15.7	9.0	6.4	13.7	10.0	14.0	11.4

The information presented in Table 11 indicates that overall 11.4 percent of study participants had heard or seen information on diarrhea in the month prior to the survey. A complicated pattern emerges because of the detected differences between intervention and control areas. The percentage of study participants reporting exposure to diarrhea-related messages is higher in the comparison groups in the rural and semi-nomadic strata, but not in the peri-urban stratum where the opposite is true. Lower exposure occurred in the rural stratum, but only in the intervention area.

Sources of exposure are not listed in Table 11 because all respondents reporting exposure to diarrhea-related messages mentioned the health center as practically their only source of information. All other potential information sources were reported by fewer than 10 respondents, which represent less than 3 percent of those reporting exposure.

A different situation was detected in the case of exposure to sanitation-related messages. This information is presented in Table 12. Forty percent of study participants indicated being exposed to information about sanitation in the month prior to the survey. Details about the sources of information are presented in Table 12.

Table 12: Exposure to and Source of Information on Sanitation in the Past One Month by Sampling Strata and Study Group

	Peri-Urban		**Rural**		**Nomadic**		
	Int (%) N=658	**Comp (%) N=634**	**Int (%) N=661**	**Comp (%) N=663**	**Int (%) N=330**	**Comp (%) N=265**	**Total (%) N=3,211**
Exposure to information on sanitation							
% of primary caregivers who have received information about sanitation in past one month	30.7	39.6	60.5	36.7	39.1	23.4	40.1
Sources of information on sanitation[1]							
	N=202	**N=251**	**N=400**	**N=243**	**N=129**	**N=62**	**N=1287**
Health center	20.8	31.5	10.0	16.5	52.7	50.0	23.4
Village health educator	10.9	5.6	79.2	30.5	36.4	50.0	39.3
Chief public meeting	1.0	1.2	3.5	0.8	9.3	1.6	2.6
School children	3.5	0.4	0.5	1.6	39.5	6.5	5.4
Radio	15.3	21.5	7.5	37.0	47.3	21.9	22.0
Other	29.2	6.4	6.2	22.2	7.0	6.2	13.0

[1] Among respondents exposed to information on sanitation within the past one month (N=630)

When asked if they had received information about sanitation in the past month, the information presented in Table 12 indicates that an overall higher proportion of caregivers in rural areas responded affirmatively, in comparison to peri-urban and nomadic caregivers, who had roughly the same percentages of positive responses. The sources of information about sanitation were varied, although at least half of the nomadic caregivers received information from a health center.

The largest difference (23.8 percentage points) in exposure to sanitation information is seen between the intervention and control groups in rural areas, with a smaller gap (15.7 percentage points) in nomadic areas

and the smallest (8.9 percentage points) in peri-urban areas. The peri-urban areas were the only areas where a higher percentage reported exposure in the comparison sites than in the intervention sites. Caregivers who had received information reported a wide variety of sources in both the intervention and comparison groups in all three geographic areas. In all categories except village health educator, the nomadic intervention group reported higher percentages of sources than did the control group.

Table 13: Household Reach with Community Activities on Open Defecation by Sampling Strata and Study Group

	Peri-Urban		**Rural**		**Nomadic**		
	Int (%) N=650	**Comp (%) N=627**	**Int (%) N=652**	**Comp (%) N=641**	**Int (%) N=330**	**Comp (%) N=263**	**Total 3,163**
% households whose village participated in community activity to stop open defecation[1]	20.3	10.5	29.6	30.6	19.8	6.0	21.1
N	648	546	655	636	224	260	2,969
% of households ever visited by a community health educator to stop open defecation[2]	13.3	5.9	64.7	35.7	33.9	30.8	31.2

[1] Data missing on village-level participation in open defecation activity from 1.5% of HHs (N=3163)
[2] Data on HH visits by a community health worker missing from 7.5% HHs with more than 5% missing data from the urban intervention site and rural comparison site (N=2969)

In all study groups, per the data in Table 13, less than one-third of respondents had participated in a community activity to stop open defecation, with the highest percentage being in rural areas and the lowest in nomadic areas. In rural and nomadic areas, a larger proportion of respondents reported having ever been visited by a community health educator to stop open defection than had participated in a community activity, with about one- to two-thirds of the caregivers responding affirmatively. A much smaller percentage of peri-urban caregivers reported having been visited.

Roughly the same proportion of rural households in the intervention and control groups reported having participated in a community activity to stop open defecation, while about a 10 percentage point difference existed between the two groups in peri-urban areas, and an even larger difference (14 percentage points) between the groups in nomadic areas. The largest difference between visits by a community health educator to stop open defecation in intervention and comparison groups is seen in rural areas (29 percentage points), with a moderate gap (about 8 percentage points) in peri-urban areas, and only a small gap (about 3 percentage points) in nomadic areas.

Table 14: Exposure to and Source of Information on Hand Washing in the Past One Month by Sampling Strata and Study Group

	Peri-Urban		Rural		Nomadic		
	Int (%) N=658	Comp (%) N=634	Int (%) N=661	Comp (%) N=663	Int (%) N=333	Comp (%) N=264	Total (%) N=3,211
Exposure to information about hand washing							
% of primary caregivers who have heard or seen any information on hand washing in past one month	41.5	56.0	46.0	30.3	33.6	27.3	41.0
Sources of information on hand washing[1]							
	N=273	**N=355**	**N=303**	**N=203**	**N=112**	**N=73**	**N=1,319**
Health center	22.3	28.7	11.8	17.4	46.4	45.7	24.1
Village health educator	5.5	3.4	78.6	23.4	23.6	60.0	29.0
Chief public meeting	1.1	0.8	2.6	2.0	6.4	1.4	2.0
School children	12.1	3.9	1.6	4.5	47.3	8.6	9.1
TV	54.6	68.6	1.0	7.0	0.9	0.0	31.2
Radio	16.5	28.5	6.9	39.8	50.0	22.9	24.1
Other	13.2	4.5	9.9	25.4	14.5	10.0	13.0

[1] Among respondents exposed to information on hand washing within the past one month (N=1319)

Per Table 14, across all sites, roughly one-third to one-half of caregivers had been exposed to information on hand washing in the past one month, with the smallest proportion in nomadic areas. Information sources varied widely, although chief public meetings were overall not a highly cited source of information.

Regarding exposure to information on hand washing, the intervention and control groups in nomadic areas reported roughly the same proportion of exposure, while peri-urban and rural areas showed about a 15 percentage point difference between the intervention and control groups, although these differences were in opposite directions; in the peri-urban areas the comparison group reported more exposure and in rural areas the intervention group reported more exposure. The largest differences in sources of information exposure on hand washing between intervention and comparison groups is seen in rural and nomadic areas regarding village health educators, in nomadic areas regarding school children, and in rural and nomadic areas regarding radio. Only the nomadic group reported high exposure to hand washing information via school children, with almost half of caregivers citing this source.

Table 15: Exposure to and Source of Information on Water Treatment in the Past One Month by Sampling Strata and Study Group

	Peri-Urban		Rural		Nomadic		Total
	Int (n=658)	Comp (n=634)	Int (n=661)	Comp (n=663)	Int (n=330)	Comp (n=265)	3,211
Exposure to information about water treatment and storage							
% of primary caregivers who have heard or seen any information about drinking water	49.4	50.5	59.3	38.3	36.4	27.9	46.2

treatment in past one month							
Sources of information about water treatment and storage[1]							
	(n=325)	(n=320)	(n=392)	(n=254)	(n=120)	(n=74)	(n=1485)
Health center	26.2	32.8	16.3	18.5	48.3	56.8	27.0
Village health educator	7.1	3.4	74.5	27.2	27.5	52.7	31.4
Chief public meetings	0.6	0.0	1.3	0.8	8.3	1.4	1.3
Radio	18.1	22.6	13.3	44.8	51.2	22.0	25.4
School children	5.2	0.9	0.3	1.2	27.5	12.2	4.4
Other channels	20.6	6.9	7.1	17.7	10.8	9.5	12.3

[1]Among study participants reporting exposure to messages on water treatment in the past month, n=1485

Table 15 shows that depending on the stratum overall one-third to almost two-thirds of caregivers reported exposure to information on water treatment in the past one month, with the lowest proportion of respondents being in nomadic areas. The information sources were again varied, but generally the most commonly reported sources in order of frequency were village health educators, the health center, and radio, with consistently low numbers reported for chief public meetings.

Exposure to information on water treatment in peri-urban areas was almost exactly the same between the intervention and comparison groups, while a small gap (about 8 percentage points) existed between the two groups in nomadic areas and a large gap (about 21 percentage points) was seen between the two groups in rural areas. The largest differences between the intervention and comparison groups regarding information sources were seen in rural and nomadic areas regarding village health educators and rural and nomadic areas regarding radio exposure.

Limitations

The findings presented here reflect some limitations encountered while collecting data. These limitations may be summarized as follows.

- The study team decided not to use a sampling framework from rosters of PLHIV visited by community health workers to avoid stigmatizing an individual or household as it would have been clear that the study was targeting HIV-affected households in the community. By the same token, the team chose chronically ill members of the household as a proxy definition for HIV-infected household members. This definition, however, proved ineffective as chronically ill persons represented people who were bedridden.

- Few chronically ill and elderly household members were identified in all three sites, with the exception of the rural areas, which had a higher number of households with elderly members. Overall this makes it difficult to report on sanitation facilities modified to address mobility issues among these groups. This may also limit the ability to generalize the results.

- Few bedridden females were included in the sample, which makes it difficult to track menstrual hygiene management among this group. This represents an important gap in knowledge on practices for vulnerable groups.

- Nomadic communities were difficult to reach while conducting the survey. Additionally, data collection was terminated early after only half of the sample was interviewed. Thus, the sample

may not be as representative of this group as intended, and may be more difficult to generalize to the larger population.

- Intervention and comparison households differed widely on baseline levels for some indicators. This suggests that additional variables may have been overlooked when matching intervention and comparison communities on socio-demographic characteristics.

Implications

The numbers show that a lot of work is still needed to improve WASH practices for Kenyan households.

Sanitation

Open defecation was highest in nomadic areas and present in rural areas, but rarely mentioned in urban areas. Unimproved sanitation was more common in urban and rural areas. In urban sites, the unimproved label is mainly due to sharing latrines rather than latrines with poor characteristics. The data also show that while urban households have access to improved sanitation equipment, almost all share latrines, which by the international definition means they are unimproved because people do not have unlimited access. The lack of space in peri-urban areas makes it unlikely that this situation will change any time soon in the future.

Those households that practice open defecation, mostly in rural and semi-nomadic sites, need to be persuaded to stop and get onto the sanitation ladder. For those with unimproved toilets, especially in the rural areas, the government or NGO programs need to find ways to move them to improved sanitation facilities.

Rarely did latrines have supports that would make it easier for children, the elderly, or the chronically ill to use the latrine. Only 40 households had any measure of inclusive sanitation (raised toilets, ropes, etc.) out of a sample of over 3,200. Here again is a practice that can be improved greatly and speaks to the value of promoting inclusive sanitation.

Hand Washing with a Cleansing Agent

Most people do not use a fixed hand washing station, which is a proxy measure of hand washing and increases the probability of hand washing at critical times. Only 5 percent of the total sample had a fixed hand washing station, and of those 5 percent, only half had hand washing supplies (soap and water). This shows a great opportunity for promoting fixed hand washing stations across all populations.

The task may be easier because many people already have a basin that they use for hand washing. But researchers speculate that it may be easier to improve and sustain hand washing practice if a fixed station is established and maintained with hand washing supplies.

The established hand washing stations may not already be placed near a latrine or food preparation facilities. Getting families to establish a fixed hand washing station near one of these two areas may be a greater challenge.

Treating and Storing Drinking Water

Given that most peri-urban households had an improved water source and did not generally treat their water, water treatment may be more common in areas where water sources are considered poor. Boiling was the most common water treatment noted, however, almost half of rural households treated their drinking water using an effective method other than boiling. Further, those that reported using chlorine were shown to actually have chlorine residual in their water, implying that once a household starts treating its water, the practice may be sustainable.

In rural areas, half the population does not treat drinking water. Further room also exists for households to practice more effective water treatment methods.

Keeping water safe to drink requires using a container to store the water that has a tight fitting lid. This practice was followed almost universally in peri-urban areas and in three-quarters of the rural households. But only one-third of the semi-nomadic households practiced this.

The possibility of recontaminating treated water was high in all communities. Households mixed treated and untreated water and kept treated water for longer than the 24 hours recommended. This indicates that households keep treated water until it has been drunk. Clearly preventing recontamination is an area that would be important to emphasize in the intervention.

Vulnerable Populations

There were only 15 women of reproductive age who were identified as chronically ill, so the study will not be able to make any determination about menstrual hygiene management. As noted in the limitations, this may be because the study did not have people self-identify as HIV-positive. This was done purposefully so as not to identify the households with infected individuals. Instead we used "chronically ill" as a proxy measure, but this may not have adequately captured the affected households.

However, because so few people in the sample were bedridden yet of an age to menstruate, the researchers speculate that the menstrual hygiene management component of this intervention may be a lower priority compared with the other WASH aspects of the intervention.

Conclusions

- The small doable action approach appears to be a viable strategy to move households toward better WASH practices in all three sites.
- Not sharing latrines in urban areas will remain a challenge.
- The semi-nomadic sites seem to have the greatest need for improving WASH practices, but they are the hardest to reach.