Caption: Focus Group Discussion in Kenema District. Photo Credit: STOP Spillover Sierra Leone

Activity 2.3.1.2: Assessment of social norms and external factors affecting or influencing the adoption of Ebola risk reduction behaviors.

Sierra Leone

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Strategies to Prevent Spillover (STOP Spillover) is a USAID-funded project implemented by a consortium of partners led by Tufts University. The purpose of the project is to enhance country capacity to prevent and/or mitigate spillover and to reduce the amplification and spread of known priority target viruses once they have spilled over to humans. We acknowledge those listed below for their assistance in conducting and completing this study.

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DEFINITIONS

Wild meat/wild meat: meat for human consumption that comes from wild animals found in the forest (locally known as the bush). In certain regions of the world, including Africa, wild meat may pose a communicable disease risk. In this report, the term wild meat is used.

Community engagement: the process of developing relationships and structures that engage communities as equal partners in the creation of disease prevention and response solutions that are acceptable and workable for those they impact.

Community dialogue: an interactive, participatory communication process of sharing information between people or groups of people aimed at reaching a common understanding of and workable solution to a specific community challenge.

Culture: integrated patterns of human behavior that include the language, thoughts, communication, actions, customs, beliefs, values, and institutions of racial, ethnic, religious, or social groups.

Ebola virus disease (EVD): a rare and deadly disease affecting people and non-human primates.

Lassa fever: an animal-borne, or zoonotic, acute viral illness spread by the common African rat. It is endemic in parts of West Africa including Sierra Leone, Liberia, Guinea, and Nigeria.

Outcome mapping (OM): a participatory process that uses a collaborative stakeholder-driven approach to engage a broad range of traditional and non-traditional stakeholders to identify and map desired outcomes.

One Health: a collaborative, multisectoral, and transdisciplinary approach that recognizes the interconnection between people, animals, plants, and their shared environment and works at the local, regional, national, and global levels with the goal of achieving optimal health outcomes.

Qualitative research: a method used to understand people's beliefs, experiences, attitudes, behavior, and interactions. The goal is to understand participants' own perspectives as embedded in their social context. It generates non-numerical data. Qualitative research typically includes a small sample size and uses focus group discussions, in-depth interviews, observation, etc. to generate data. Qualitative research is usually focused on *why* people adopt specific practices, beliefs and behaviors.

Risk communication: the real-time exchange of information, advice, and opinions between experts or officials and people who face a threat or hazard to their survival, health, or economic or social wellbeing.

Social mobilization: the process of bringing together intersectoral stakeholders to raise awareness of and demand for a particular program, assist in the delivery of resources and services, and strengthen community participation for sustainability and self-reliance.

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List of Abbreviations

CHW	Community Health Worker
COVID-19	Coronavirus Disease 2019
DHMT	District Health Management Team
EVD	Ebola virus disease
FGD	Focus Group Discussion
GRNP	Gola Rainforest National Park
HCW	health care worker
IEC	Information, Education, and Communication
IPC	infection prevention and control
KII	Key Informant Interview
NGO	non-governmental organization
OH-DReaM	One Health-Design, Research and Mentorship Working Groups (OH-DReaM)
PPE	Personal Protective Equipment
SBC	Social and behavior change

EXECUTIVE SUMMARY

This report provides a summary of research findings on social norms and external factors that affect or influence the adoption of Ebola prevention behaviors in Kenema District, Sierra Leone. Specific research questions focused on local knowledge of Ebola infection; sources and causes of Ebola transmission; at-risk populations and high-risk groups; current Ebola prevention measures; perceived risk mitigation behaviors; traditional cultural norms, social norms, and practices that influence risk; as well as trusted sources of information.

This study included focus group discussions (FGDs), key informant interviews (KIIs) to collect data on social norms and other external factors such as cultural beliefs, traditions, behaviors, economic factors, policies, and power dynamics that affect or influence the adoption of Ebola risk reduction behaviors in four chiefdoms in eastern Sierra Leone. Direct observations were used to document wild meat market butchering, waste management, and wholesale and retail sales practices. A total of eight communities (two communities per chiefdom) were selected for data collection, plus the Kingsway Corner wild meat market in Kenema. The eight communities selected are located around the Gola Rainforest National Park (GRNP) in Kenema district. Study participants included 141 men and 166 women (54%), focusing on community members who were hunters (all men), wives of hunters, wild meat transporters (all men) and processors (mostly women), consumers, traditional chiefs (seven men, one woman), traditional healers (all men), and Community Health Workers (CHWs; 75% women) living in selected communities.

Research findings revealed that most community members are aware and knowledgeable of Ebola and described the disease as a dangerous sickness that can be transmitted from one person to another and through eating wild animals such as bats, chimpanzee and monkeys. However, a few respondents misunderstood the causes and sources of Ebola Virus Disease (EVD), its signs and symptoms as well as its transmission routes, confusing it with other diseases like malaria, typhoid, HIV and COVID-19. Most respondents associated EVD with vomiting, fever and bleeding.

Many study participants felt that everyone in the community is at risk of EVD, irrespective of age or gender. They acknowledged that nurses/health professionals, hunters, traditional healers, travelers, women, old people and children under five years of age are the highest risk group for EVD. Health workers, hunters (especially young men) who hunt wild meat to eat and to sell, as well as women who process, cook, and prepare wild meat for sale, were most frequently mentioned by study participants as having increased risk of EVD.

Community members mentioned different preventive measures they could use to protect themselves from diseases. For example, hunters said that protective boots, thick cloth (gown), and thick protective gloves could prevent them from handling wild meat with their bare hands, which in turn may prevent them from contracting EVD and other diseases. Hand washing with soap and water before and after contact with live and dead animals was generally mentioned by all study participants, but a few revealed that this is not a common practice by people in the community. They said that many people only wash their hands when they recall that their hands are dirty and when blood spills on them. Some hunters confirmed that they use a clean sack to lay the animal on for slaughtering, while others use banana leaves to cut the meat. They also noted that their wives cover the meat well to avoid flies. Some wild meat traders and processors mentioned that they wear protective gloves and use a thick plastic sheet to cover their meat from flies and diseases. However, they said it is not commonly practiced because of the lack of availability of gloves and thick plastic material. A few wild meat traders and processors said, ‘’**it’s only God who can save us from sickness’’.**

Findings from the study revealed that some study participants, especially men, believed that wild meat is better for secret society activities (initiation rites). Many men said wild meat is preferred because of its taste compared to the taste of other domestic animals. Wild meats were described as 'a gift God provides' for them as food, employment, and traditional herbal medicine. Informants also described the spiritual roles of animals in the community. According to them, wild meat is consumed by men in large quantities during the traditional celebrations and during special occasions when important visitors come to their community. They also noted that wild meat is important during the performance of traditional healing rituals by traditional healers.

When asked about key influencers, community members identified Community Health Workers (CHWs), traditional chiefs, religious leaders, mammy queens (women leaders) as people they listen to. District radio programs, community barray (town hall) meetings, CHWs, nurses and other health officers were identified as trusted sources of health information in the community.

The findings from this qualitative research will be used to design social and behavior change (SBC) interventions to encourage the adoption of practices that reduce EV spillover risks in communities around the Gola Rainforest National Park (GRNP). The STOP Spillover team developed typical personas or archetypes that can be used to design tailored SBC approaches to improve the adoption of EVD risk reduction interventions in target communities, by specifically identifying the complex risk factors and risk drivers for each value chain actor. This study recommends new and innovative ways to address barriers to the adoption of risk reduction behaviors, in order to improve the adoption of infection prevention and control (IPC) biosafety practices in this high-risk interface.

1. INTRODUCTION

1.1 BACKGROUND

The wild meat industry has been a topic of increasing importance among both conservationists and public health officials for its influence on zoonotic disease transmission and animal conservation. Communities worldwide have practiced sustainable wild meat hunting practices for generations, to fulfill vital protein needs. However, wild meat hunting in West and Central Africa has risen unsustainably, threatening the sustainable sourcing of wild meat species, and the future livelihoods of communities that depend on wild meat for nutrition (1, 2, 3). Some studies (4, 5, 6, 7) have reported the effects, impacts and implications of the Ebola crisis on trading and consumption of wild meat in West Africa. However, there is less information on the public health risk behaviors and underlying determinants of wild meat consumption during the EVD outbreak in Sierra Leone, specifically (8). Such information is vital for policy makers, the development of effective regulatory frameworks, and planning for Ebola Virus Disease (EVD) prevention and control, as well as for assisting vulnerable groups during outbreaks. This information is vital for both advocacy and mass public health education programs.

A recent study showed that the prominent behavioral factors associated with the transmission of diseases from animals to humans are eating and/or hunting habits (9). In Sierra Leone, studies on the effects of civil conflict in protected parks, such as GRNP, have not observed a strong link between conflict and increased wild meat hunting for most protected species (10). In their study, Lindsell and colleagues found that urban demand for wild meat for human consumption is the major driver for overharvesting in Sierra Leone (10). They further mentioned that wild meat also serves as an important role in cultural practices in certain communities (10). Additional studies show that cultural belief shapes and influences an individual's or a group's attitude towards a health issue or disease. It then influences traditional perception and explanation of such a health condition or disease (11).

During the 2014-2016 EVD outbreak in Sierra Leone, several socio-behavioral factors such as wild meat hunting, traditional burials, secret societies, and naming ceremonies were identified as crucial factors affecting EVD prevention and control (12). One report on the role of wild meat in the spread of EVD in Liberia revealed that the consumption of wild meat and the frequency of meals which included wild meat decreased during the EVD outbreak. Affluent households cut back on wild meat consumption during the EVD crises (12).

Many reports have highlighted weakness and challenges in Ebola communication strategies and efforts during the 2014 - 2016 EVD epidemic in West Africa (11, 13). Initial Ebola communication strategies focused exclusively on simple messages using mass media and support media such as posters and brochures; these communications tapered off when the epidemic ended in 2016[1]. In 2021, Johns Hopkins Center for Communication Programs restarted Ebola behavior change efforts in five countries including Sierra Leone[2]. Behavior change requires interventions based on an understanding of peoples' knowledge, beliefs, attitudes and behavioral patterns. In particular, the gendered drivers of zoonotic spillover need to be better understood, especially with regards to EVD (14, 15).

[1] http://ebolacommunicationnetwork.org/wp-content/uploads/2014/11/Ebola_Communication_Plan_SIERRALEONE_UNICEF_APR2014.pd; https://ebolacommunicationnetwork.org/country/sierra-leone/ http://ebolacommunicationnetwork.org/wp-content/uploads/2014/10/National-Ebola-Communication-Strategy_FINAL.pdf

[2] https://ccp.jhu.edu/2021/04/12/ccp-relaunches-ebola-communication-network/;

STOP Spillover aimed to fill gaps identified in the literature by enhancing understanding of the complex drivers of EVD in high-risk hunting communities around Gola Rainforest National Park (GRNP). Findings from this research will be used to inform and support the design of interventions and to promote biosafety practices that reduce Ebola virus spillover risks. This research focused on social norms and external factors (cultural, economic, and behavioral factors, political factors, policies and power dynamics, etc.) that affect or influence the adoption of EVD prevention behaviors[3]. STOP Spillover's research focused on the following groups of study participants:

- Hunters (all male youth)
- Hunters' wives
- Wild meat traders and processors (predominantly women)
- Wild meat consumers (both men and women)
- Wild meat transporters (mostly male youth)
- Chiefs (predominantly men, and a few women)
- Traditional healers (predominantly men)
- Community health workers (mostly women, and a few men)

The results of this research, coupled with findings from previous lessons learned workshops and research studies on EVD, will be used to co-design SBC interventions to support STOP Spillover Activity 2.2.2.2 (Ebola biosafety interventions). STOP Spillover will engage community members in high-risk communities around GRNP to reduce pathogen spillover by targeting the drivers of zoonotic spillover, addressing key risk factors and the barriers that affect the adoption of risk reduction behaviors.

1.2 Objectives

This research had the following objectives:

1. To understand the influencing factors (political, economic, cultural, and environmental) and social norms that facilitate or impede behavior change for EVD prevention and spillover risk reduction in the high-risk interface;
2. To use research findings to develop and implement an SBC strategy that is informed by previous work and formative research. The SBC strategy will be designed to reduce the risk of pathogen spillover by increasing the adoption of EVD risk reduction interventions.

1.3 Research Questions

This study provides answers to the following research questions:

1. What is the level of knowledge of EVD among study participants in the study sites?
2. Who is most at risk for EVD in the study sites?
3. What EVD preventive measures do community members know and practice?
4. What cultural practices and socio-cultural activities place community members at risk for EVD?
5. What are the specific behaviors and religious, traditional, or cultural beliefs that encourage or discourage wild meat consumption in target communities?
6. Who are the major influencers of these religious, traditional, and cultural practices?
7. Where and from whom do study participants get trusted information about EVD?

[3] This research focused explicitly on two things—the social, cultural and economic factors driving risk, and the factors influencing the uptake of Ebola prevention behaviors.

2. METHODOLOGY

2.1 RESEARCH DESIGN

This study used qualitative data collection techniques including focus group discussions (FGDs), key informant interviews (KIIs), and direct observation to gain a deeper understanding of social norms and external factors (cultural, economic, and political factors; behaviors, policies; power dynamics; etc.) that influence the adoption of Ebola prevention behaviors among communities around the GRNP in Kenema district. Five types of FGDs and three types of KIIs were conducted for this study, in eight communities. FGDs included hunters, wives of hunters, wild meat traders and processors, wild meat consumers, and wild meat transporters. KIIs included traditional chiefs, traditional healers, and CHWs. Two facilitators and two notetakers conducted FGDs and KIIs in each community. The study population was drawn from eight communities (Sandaru, Sembehun, Lorwuma, Baoma, Kongohun, Kwawuma, Njalahun, and Mapuma) located in four chiefdoms around the GRNP in Kenema district. In addition, the team interviewed a traditional chief and wild meat traders from the Kingsway Corner wild meat market in Kenema township.

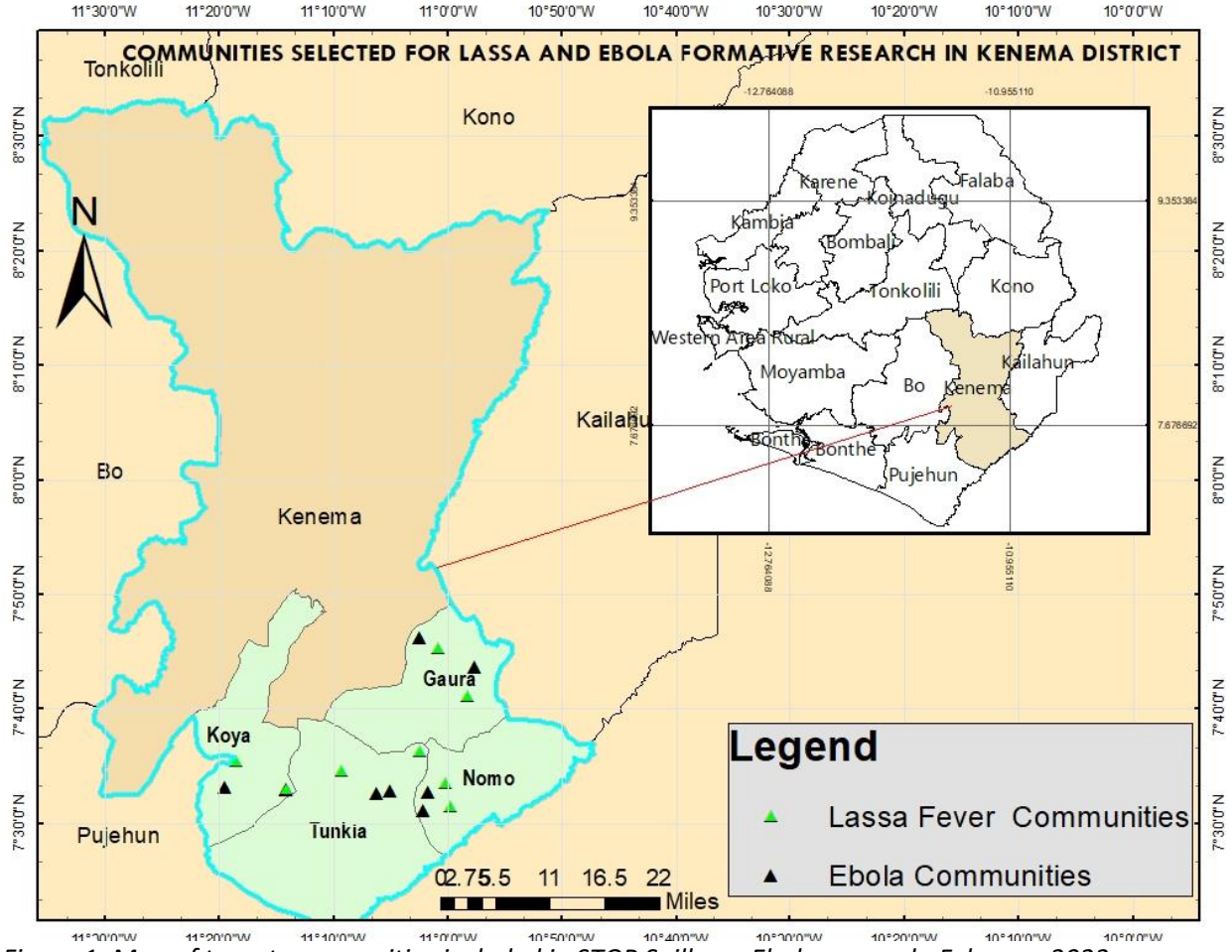

Figure 1: Map of target communities included in STOP Spillover Ebola research, February 2023

The chiefdoms and communities were selected based on the following criteria:

1. The community should be in one of the four chiefdoms (Koya, Gaura, Tunkia, and Nomo) around the GRNP in Kenema District.
2. The community must be accessible by vehicle in the dry season.
3. The community needs to have at least 20 houses from which to select sufficient people for the different FDGs.
4. The community should be a hunting community. These communities were identified during stakeholder engagement meetings in 2022.
5. Priority was given to communities with previous cases of EVD.

2.2 Data Collection

2.2.1 Tools

The study team carefully designed and pretested qualitative data collection tools to ensure they were clearly understood by facilitators and intended respondents. Facilitators and notetakers (three men and one woman) received four days of training (including practical hands-on training) to thoroughly understand underlying research questions and accurately interpret and record responses. Data collectors received training to facilitate FGDs and use the KII guide, audio voice recorder, and the data collection KoboCollect application which was loaded onto Samsung Galaxy tablets. Training discussions focused on social norms and external factors that affect or influence the adoption of Ebola prevention behaviors. Specific questions included in discussion guides related to knowledge about EVD infections; the sources and transmission of EVD; EVD at-risk populations; EVD risk perception; EVD prevention control measures; EVD behaviors and barriers to the use of EVD control measures; cultural norms, social norms, and practices that influence EBD spillover risk; and trusted sources of wild meat related information.

2.2.2 Respondents

The study participants were adults (18 years of age and older) community members including hunters (all of whom were male youth), hunters' wives, wild meat traders and processors (mostly women), consumers (men and women), transporters (predominantly men), traditional chiefs (mostly men and one woman), traditional healers (all men), and Community Health Workers (CHWs; women and men) living in selected communities around the GRNP. Study participants were selected based on recommendations from community leaders, CHWs and the District Health Medical Team (DHMT) coordinator. In total, 273 people participated in FGDs, and 34 people participated in KIIs (166 women overall, or 54% of all respondents).

Table 1: Total number of focus group discussion and key informant interview participants, by gender

Type of Respondents	Men	Women	Total
FGD Hunters	64	0	64
FGD Hunters Wives	0	64	64
FGD Traders and Processors	20	61	81

Type of Respondents	Men	Women	Total
FDG Wild meat Consumers	26	38	64
KII Transporters	10	0	10
KII Traditional Chiefs	7	1	8
KII Traditional Healers	8	0	8
KII Health Workers	6	2	8
TOTAL	***141***	***166***	***307***

Key Informant Age Groups: Traditional chiefs were mostly men (one woman) and averaged 52 years of age, varying from 40 – 60 years old. Bushmeat transporters were all men, and varied in age from 28 – 40 years of age (average 33.8 years). Most Community Health Workers (CHWS) were women (75%), 27 – 60 years of age (average age 43.7 years). All of the traditional healers interviewed were men, from 37 – 80 years of age (average age 50 years). All traditional healers had been practicing a long time – from a minimum of 10 years to a maximum of 30 years (average 18.5 years).

2.2.3 Process

To inform the design of the research protocol and data collection tools, the STOP Spillover team collaborated with local stakeholders to form a One Health Design, Research, and Mentoring (OH-DreaM) Working Group (OH-DWGs) of 17 members (including five women, 29.4%). OHDWG members included national One Health actors, district health team members (social mobilization coordinators), research specialists from Njala University, and resource partners from Breakthrough Action and the Gola Rainforest National Park (GRNP).

OHDWG members drafted the research tools and the formative research training guide for data collectors, which were reviewed and revised by Tufts University Consortium (TUC) technical specialists. The data collection team used FGDs, KIIs, and direct observation to understand community members' beliefs, practices, and behaviors related to Ebola spillover risk factors. A team of data analysts reviewed qualitative data using a data analysis template designed by the STOP Spillover technical team. To guide manual analysis of the qualitative data, the STOP Spillover team using codes to identify key value chain practices, high-risk behaviors, and trends within different communities, which were disagregated by gender and age. The team used data from KoboCollect and transcripts from audio recordings of FDGs and KIIs for data analysis.

2.2.4 Data management

Facilitators used hard copies of the FGD and KII guides to conduct discussions around the central research themes. Notetakers documented FDG findings and KII responses on tablets using the KoboCollect application. FGD and KII discussions were recorded using handheld recorders. Facilitators, notetakers, data collection supervisors, and STOP Spillover technical leads reviewed the notes in KoboCollect to ensure that all relevant responses were captured. Qualitative data was uploaded each day into a secure server for storage, with responses anonymized to ensure privacy.

2.2.5 Data analysis

All digital field recordings, as well as field notes that were uploaded on the KoboCollect app, were transcribed from the local Mende dialect into English by a team of translators. English transcripts were reviewed, spot checked for accuracy and saved in a password encrypted computer for data management and analysis by members of the STOP Spillover team. A qualitative data analysis template was developed based on study objectives and interview guide content. Data analysts reviewed study findings and drafted an initial report over a 15-day period at the STOP Spillover office in Freetown. Qualitative data were grouped and summarized by community, study participant category, and research themes, capturing key gender and age differences. The team used manual thematic coding to analyze all qualitative data collected in this study.

2.2.6 Limitations

- The SBC aspect of the study was not carried out independently; it was embedded into the overall Ebola study, in order to save time and reduce participant burnout. This format did always result in sufficient time for participants to provide in-depth responses to SBC research questions.
- Qualitative data was collected from a purposeful sample of specifically targeted community members; as a result, responses are not generalizable to the entire population in target communities.

2.2.7 Ethical considerations

The study protocol conformed to the ethical guidelines of the Institutional Review Board (IRB) of Tufts University which approved the study. Ethical approval was also granted by the Sierra Leone Ethics and Scientific Review Committee after a thorough review of the study protocol. All participants were taken through the informed consent process before the start of KIIs and FGDs, ensuring participant privacy and confidentiality.

3. RESULTS

3.1 KNOWLEDGE OF EVD INFECTION, SOURCES, AND TRANSMISSION

Focus group respondents and key informants were asked about their knowledge of EVD, its cause/sources of infection, signs and symptoms, transmission routes, and known preventive measures. All community members and community health workers (male and female) confirmed that they heard about EVD through community sensitization during the 2014-2016 outbreak. The majority of people were aware and knowledgeable about EVD causes and transmission routes, including contact with sick people and contacting or consuming wild animals including bats, monkeys, baboons, duikers and chimpanzees. However, some participants confused the signs and symptoms of EBV with other diseases like malaria, diarrhea, HIV and COVID-19. A few respondents mentioned that Ebola is caused by God or was made up by government or western people. There were some other misconceptions of Ebola transmission and prevention. Some hunters believed washing themselves with salt and hot water can prevent Ebola.

> *''During the Ebola outbreak in Sierra Leone, we were informed that, when you eat dead animals like bats, you will contract Ebola. The health workers in this community told us that touching an infected person will transfer the virus (called "tumbu" in Mende) to another person. Again, if the infected person dies of the disease, and you touch him or her you will get the virus.''- KII participant, male transporter*

> *''According to what we were told through training, Ebola attacks someone in the form of fever; headache, diarrhea, then persistent sneezing, you see, then if you have Ebola, you will experience a cold on your spine. These signs mean you are infected with Ebola''– A statement by a traditional chief*

Many study participants believed EVD can be transmitted from animals to people and from person to person. Some participants believed that eating bats, monkeys, and bush pigs can cause EVD.

> *''We have been told by health workers that bats and bush rats are dangerous animals. They said eating bats and sick and dead animals cause Ebola, but I also heard from people that eating bush rats can lead people to contact Ebola. So as a chief, I do advise people not to eat bush rat and bat to avoid Ebola'' – KII session with Traditional chief*

> *''Ebola disease is dangerous and a complicated one caused by eating bats. But to be honest with you, Ebola signs and symptoms are confused with many other diseases like Coronavirus, diarrhea and malaria. As a CHW, the common signs and symptoms I have learnt about Ebola are vomiting, high fever, and bleeding and can be transmitted from one person to another through contact with an infected person.'' – A statement by a CHW'*

A few study participants confused the signs and symptoms of EVD with that of other diseases like COVID-19, mentioning over-crowding, shaking hands, and coughing and breathing without using a face mask. One hunter said that he had heard about EVD but had little knowledge about the disease.

Most study participants (especially women) mentioned that they have been educated to wash their hands with soap and water before and after handling meat, but they are not doing this regularly.

> *''For me, I heard that when you eat certain animals like bats and monkeys, or eat dead animals, you can be infected with Ebola but my brother it's only God who can save us because I sell meat almost every day. I cannot process or sell without touching the meat. We buy dead animals. As I said, it only God can protect us because we don't know what kills the animals we buy from the hunters, and we don't even have gloves in this community to buy.'' – Female trader and processor*

Some participants mentioned that eating sick or dead animals, especially bats and monkeys, can cause one to be infected with EVD. A few participants (hunters, hunter's wives, consumers) mentioned that they eat all animals -- including those that are sick or dead -- because they are poor, and that they believe these animals are a "gift from God." Most hunters described Ebola as a killer disease, and many said "Ebola kills".

3.1.1 Gender differences in knowledge, attitudes and practices related to EVD

Relationships between male and female roles in power sharing, decision making, and the gendered division of labor, both within the household and in the society at large, made women more vulnerable to EVD than men in Sierra Leone, and resulted in more female deaths during the 2014 – 2016 outbreak, mostly due to their roles in caring for sick family members and as CHWs (14). According to respondents in all communities, male youth are hunters and transporters of wild meat, while women process and sell wild meat. These two groups, along with health care workers and health care service providers, are most at risk for EVD.

Women (hunters' wives) more frequently mentioned protective equipment and hygiene practices to use before, during and after processing and cooking wild meat than men (hunters). A few women mentioned using gloves or changing their clothes after processing meat, and all mentioned a desire to wash their hands with soap, although few women practiced it. Women come into contact with wild meat once per week, or less during the dry season. Wild meat is the most common source of protein in hunters' households, especially duiker, squirrel, porcupine and grass cutters. Snail and fish were also mentioned as important sources of protein. Women come into contact with wild meat both alive and dead. Only women process and prepare wild meat for home consumption. They eat all parts of wild meat except feces, bile and nails, and the skin of the porcupine. Wastewater is thrown into the backyard, toilet or river

by women and girls. Butchering tools are washed in the river and dried in the sun. Sometimes women use soap to wash these tools.

Through direct observations made by the research team at the Kingsway Corner market, butchering of wild meat is mainly done by women, before wild meat is marketed and sold. Women and young girls are key participants in butchering, processing, and selling wild meat. Women package and arrange meat in containers for retail sales. Wild meat processors (mostly women) used their bare hands to butcher and package meat for sale; no gloves or other protective gear were used during wild meat processing.

3.1.2 EVD Information sources and influencers

The study revealed that community members generally trust CHWs and chiefs as their main source for EVD information. Many CHWs pointed out that limited mobile networks make disseminating and receiving information difficult. Community members mentioned that radio programs and in-person community meetings conducted by CHWs, district health officers, NGOs, and chiefs serve as trusted sources of information. Participants revealed that meetings are the only times when they have an opportunity to ask questions and get immediate responses. Other studies conducted by BBC Media Action also found that radio dominates the media sector in Sierra Leone. Other sources of information according to a few community members include social media, and dreams from late parents (noted by traditional healers).

The major influencers who promote wild meat consumption include traditional chiefs, hunters, the village chairperson, the head of the family, religious leaders, youth leaders and brothers (especially for wild meat traders and processors). The most influential people that promote positive cultural practices that could reduce the spread of EVD include traditional chiefs, traditional leaders, traditional healers, religious leaders, local sanitary inspectors, government, health workers, *bondo* and *poro* society leaders (secret society leaders), Mamy Queen (women leaders) and elders.

The primary influencers in-terms of decision making, designing, and enforcing bylaws in the community are elderly men and a few women who served as traditional chiefs. Few women are given the opportunity to serve as traditional chiefs, although there are exceptions. Traditional chiefs generally believed that handling wild meat is one potential source of Ebola infection, along with contacting infected people. Preventive measures include bylaws that communities should observe, including hand hygiene and community cleaning to prevent disease. Monitoring of strangers and travelers is also important, according to traditional chiefs. A few traditional chiefs and all CHWs mentioned calling the 117 hotline if there were any suspected cases.

3.1.3 EVD practices

In Sierra Leone, there is limited research on interventions and practices to reduce EVD risks. According to study findings, most community members believed that eating wild meat including bats, monkeys and other animals increases Ebola spillover risks. All family members – men,

women and children, consume wild meat, especially during the rainy season when it is easier to catch. However, not all of the most commonly hunted wild animals are known Ebola virus reservoirs, such as grasscutters, porcupine, groundhog, snake, squirrel, bushpig and rabbits. Monkeys, chimpanzees and bats are either known to be infected by or carry Ebola virus, and are commonly eaten in hunting households.

Male youth, male adults and a few elderly men, who in some cases are key stakeholders in the community, engaged in wild meat hunting. Findings from this study reveal that hunters used their bare hands and local tools to process and kill animals if captured alive, without observing any protective measures to reduce disease transmission risks.

> *''I have been hunting for many years since the age of 19 years. I used to accompany my father to the forest when he was alive. I don't think I am exposed to the risk of Ebola Virus Disease (EVD). I feel happy and lucky handling wild meat and their bodily fluids. So, I have been into hunting wild meat for long and nothing has happened to me and my family.'' – Hunter, Jaluahun village.*

Some hunters believed that Ebola does not have an animal origin, because wild meat hunting, trading, and consumption have been a way of life since the time of their ancestors, with no associated sicknesses. Other stakeholders considered the consumption of wild meat as a potential source of contracting EVD. A few hunters mentioned the use of thick gloves and thick clothing as possible ways of preventing EVD transmission, but they were rarely, if ever, used.

Women are involved in the butchering and sale of wild meat in the urban and rural settlements, especially in the Kenema- Kingsway wet market. Wild meat traders and processors are perceived to be at high risk of EVD because of their work with wild meat. Some said, ''*it's only God who can save us from sickness*''.

Based on observations and responses from study participants, the butchering and processing of wild meat is done with bare hands and no protective clothing used to prevent or limit contact with the bodily fluids of wild animals for sale. Some measures identified by traders included the use of protective gloves and special clothing when processing and selling meat. Many traders in Kenema town seemed aware of and had heard about risks of contact with wild meat in terms of disease spread.

Most traditional healers denied using wild meat in their practice. Several of them said they only use leaves and roots to cure people. Some said that domestic animals (sheep, goat and chicken, for example) are provided by patients for use in traditional medicine. One traditional healer reported using liver and dried animal meat for stomach aches, and another reported using elephant bones and oil from Liberia.

> *"I have never used animals to cure someone, because I will not destroy life to cure life" – A traditional healer key informant*

3.2 AT-RISK GROUP/POPULATIONS FOR EVD INFECTIONS

3.2.1 Overview of EVD at risk groups and issues

Study participants felt that everyone in the community is at risk of Ebola, irrespective of age or gender. However, they said that some individuals in the community are at higher risk of EVD than others. They identified health workers, hunters, women and children as groups at high risk for EVD. Hunters (especially young men) who hunt wild meat to eat and to sell, as well as women who process, cook, and prepare wild meat for sale were often mentioned by study participants as having increased risk of EVD. A few community members mentioned prostitutes (who have multiple sex partners) and travelers as high-risk groups. Youth were also commonly mentioned because they are more likely to work in the forest, burn or clear farmland, hunt, transport dead animals and travel through forests and swamps, increasing their exposure to EVD.

> *''Everyone is at risk of Ebola, irrespective of your age but the people I heard that are more at risk of contracting Ebola are women, hunters and those who process and sell meat. I said this because they mostly encounter wild meat by touching their blood and urine. That was what we were told during the Ebola outbreak.''* – Traditional chief

3.2.2 Gender differences in EVD risks

There is currently no evidence that biological differences in women and men lead to an increased risk of EVD. However, there is documented evidence of differences in the level of EVD exposure between men and women due to their social and cultural roles in the community and household (14, 15). This study identified hunters (mostly young men) as high-risk groups for EVD. Young male hunters have daily or weekly encounters with wild meat in the forest. Study participants said that adult women and young girls are also at risk of EVD. Some community members and CHWs mentioned that they reached this conclusion based on their observations during the 2014-2016 EVD outbreak in Sierra Leone. Participants confirmed that women in their community not only cook for and take care of children and men when they are sick, but they also process and buy wild meat from hunters as well as from farmers who trap wildlife around their farms. Women butcher wild meat, process it, and cook it for sale and for home consumption. It is important to ensure women have access to information, services, and personal protective equipment to enable them to protect themselves from infection. Education and engagement of women is crucial to protect them from infectious diseases.

3.3 TRADITIONAL/CULTURAL BELIEFS AND SOCIAL NORMS RELATED TO EVD

Many study participants believed that wild meat is the most accepted meat for secret society activities (new initiates from Bondo and Poro secret societies). Study participants believe wild meat is preferred because of its taste compared to the taste of other domestic animals in the community. Wild meat is sometimes smoked, but many people prefer raw meat for cooking. This finding is similar to a study conducted in Liberia which indicates that factors such as taste preference or tradition may play an influential role in local dietary choices.

Many hunters and their wives said they eat sick or dead animals. They don't think eating wild meat is a threat or risk because hunting and eating animals has been done for many years, and wild meat is a ''gift from God''.

Study participants revealed that wild meat served as an important source of food and income for hunters, employment for traders, and they also eat wild meat to reduce crop losses on their farms. Some hunters believed that the horns of deer can protect children from evil spirits. Also, the hair of a duiker can cure sores. Porcupines are used as medicine to cure stomach aches.

Some men and women mentioned activities such as traditional cultural dances and community disco dances as activities that put them at risk of disease through increased body contact. A few participants revealed that they believe other forms of social activities such as football games, mosques and church gatherings put them at risk, along with societal initiation ceremonies where wild meat is often consumed. In some cases respondents may have confused COVID-19 social distancing messages with past Ebola messages.

3.3.1 Beliefs and practices that promote wild meat consumption

The consumption of wild meat is an ancient tradition in West Africa, where it is eaten as a protein source in both rural and urban areas (12). In this study, wild meat served as food, income, employment, and a means to reduce crop losses on farms. According to study participants, they use the scales and intestines of porcupines as medicine to cure stomach aches. Buffalo's blood is also used as medicine to cure deafness. The skin of deer and duiker are used as leather to make shoes and local traditional drums, mostly by men.

Informants also described the spiritual roles of wild animals in the community. According to them, wild meat is consumed in large quantities during traditional celebrations related to *Bondo* and *Poro* initiation rites, as well as during special occasions when important visitors come to their community. Men (*poro* society) typically consume more wild meat than women (*bondo* society) during traditional celebrations. Large quantities of meat are cooked during these celebrations.

Participants said wild meat is hunted for taste and for its affordable price. Some participants revealed that they heard from healthcare workers that eating bats and sick and dead animals placed them at risk for EVD infections. However, they unanimously confirmed that it's difficult to avoid such behaviors because of poverty. Respondents including hunters and farmers accepted eating sick or dead animals and said there is no threat because hunting or eating animals had been done for many years**.**

3.3.2 Beliefs and practices that discourage wild meat consumption.

According to study participants, wild meat is generally considered an important source of protein and income for community members. Some study participants said that Islam forbids eating monkeys, bats, pigs, and dead animals, but some acknowledged the consumption of these animals irrespective of Islamic law. Participants also revealed that they were advised by CHWs not to eat animals that are sick or dead.

> *''This village is a Muslim dominated community and many communities in Tonkia chiefdom. I am a chief and know a lot about the Islamic Quran and its principles. My religion forbids people from eating certain animals like monkeys and bush pigs and dead animals. We tell our people to adhere to it. But to be honest, I'm aware many people do go against this Islamic law. So, to answer your question, there is no other law I am aware of that discourages people from eating wild meat''. – A statement by a traditional chief*

Many community members said they see wild meat as a tasty type of meat that is good to eat. Study informants also revealed that there are no bylaws in their community that stop them from eating wild meat, or sick or dead animals. They mentioned that there are bylaws that prevent hunting around the GRNP. These bylaws are enforced by Gola Rainforest Conservation Forest Guards.

3.3.3 Drivers and influencers of cultural practices and change related to wild meat consumption

Study participants mentioned traditional chiefs, religious leaders, secret society leaders (*poro* for male societies and *bondo* for female societies), healthcare workers, mammy queens (women leaders), youth chairman and charladies, as their major influencers in their community. CHWs, traditional chiefs and religious leaders (male and female) are key influencers in the community because of their roles in promoting positive health behaviors and development. Some study participants revealed that traditional healers influence their behavior in decision making over their personal life and even on community development issues.

3.3.4 Social and livelihood practices related to wild meat consumption and EVD

Participants revealed that they have been sensitized by government health officers that eating bats puts them at risk of EVD. Some community members mentioned traditional cultural dance celebrations and events including funerals as events which might spread diseases from infected persons through bodily contact. Some community members mentioned handling and butchering infected animals, as well as the consumption of wild meat (whether sick or dead) as an important potential source of EVD risk. Many rural livelihoods are highly dependent on the wild meat value chain for food/protein and income, and also to keep wild animals out of their crop fields. Wild meat consumption is also influenced by weather (seasonality) and urban demand, which competes for local consumption.

4. Discussion

Based on these findings, there are critical risk factors and current practices that increase Ebola spillover risks in target communities, including eating animals that are found dead in the forest, slaughtering wild animals without any food safety precautions, and poor wild animal waste and wastewater management. In particular, hunters, hunters' wives, and wildmeat transporters, traders and processors practice these high-risk behaviors. Interventions should be designed to reduce these risks, and associated activities should address the cultural and social norms which make adopting lower risk behaviors easier or harder.

There are also motivating factors and practices that facilitate the adoption of risk reduction behaviors. For example, most women who process meat and many men hunters mentioned that they are aware of potential risks from handling wild meat. Traditional chiefs and religious leaders are also aware of these risks and are ready to be engaged in efforts to reduce these risks. Religious beliefs and edicts that discourage eating certain wild animals including bats and non-human primates should be leveraged. Recent communication efforts around COVID-19 and past Ebola communication campaigns make PPE use more common and acceptable.

High risk practices are more common during the rainy season (May – October) when hunting is common, and during secret society initiation ceremonies in December. Barriers to behavior change include a belief that wild animals taste better than domestic animals, that wild animals found dead in the forest are a gift from god, and the high cost and lack of availability of PPE and water and soap for handwashing in local wild meat markets, among others. Engaging key influencers such as traditional and religious leaders will be an important component of an SBC strategy to reduce EBV risk and encourage uptake of safety practices (Tables 2 and 3).

Table 2: Priority target audiences, risk factors, current practices, key influencers, and trusted sources of information related to wild meat consumption and EVD spillover risks in target communities.

Priority Audiences	Risk factors	Current practices	Key influencers	Trusted sources of information
Hunters (male youth)	• Hunt and kill wild meat for consumption • Hunt animals during bushfires	• Cut meat on banana leaves using cutlass and knife • Store meat in a sack and plastic bag • Kill animals with no protective clothing • Butcher animals using bare hands	•Traditional chiefs (paramount chief, section	• Radio • CHWs • Town hall meetings

Priority Audiences	Risk factors	Current practices	Key influencers	Trusted sources of information
	• Set traps in the forest and farms • Touch wild meat fluids (urine, feces, blood) with their bare hands • Consume sick and dead animals • Poor hygiene practices at home	• Use animal skins to prepare drums for traditional celebrations • Use animal parts for medicinal purposes and secrete society celebrations	chief, town chief) • CHWs • Experienced, older hunters	
Hunters' Wives	• Touch wild meat fluids (urine, feces, blood) with their bare hands • Perform care giving roles at home • Process and cook wild meat • Eat sick and dead animals	• Clean and process (cut into pieces) with bare hands • Dry and smoke meat on a wooden fire • Use a tray/bowl to cut or process the meat for cooking/consumption • Cover the meat with plastic and pieces of mosquito nets to avoid contamination by flies • Don't use preventive measures (hand washing) when processing • Some use specific clothing when processing and change afterward • Throw wastewater and animal carcasses animals at the back of their houses • Sell some of the wild meat to earn money to buy food items and provide other	• Traditional chiefs • CHWs • Husbands • Religious Leaders	

Priority Audiences	Risk factors	Current practices	Key influencers	Trusted sources of information
		household support		
Wild meat traders & processors (mostly women)	• Cut meat into pieces for sale • Perform caregiving roles at home (women) • Store meat in houses • Poor hygiene practices at home and marketplaces	• Buy wild meat from hunters placed in plastic or bags • Dead animals are removed from bags and placed on the ground/floor. • Dry crops on plastic sheet, old clothing, etc. • Smoke and dry meat on firewood • Dig trenches at the back of houses and market to dump waste • Throw wastewater and animal carcasses animals at the back of their houses • Use some wild meat parts as traditional medicine • Sell wild meat to earn money to buy food items and provide other household support	• Traditional chiefs • CHWs • Market Chairlady • Husbands and brothers	
Wild meat Transporters (male youth)	• Transport wild meat alongside other food items • Touch wild meat fluids (urine, feces, blood) with their bare hands	• Does not use preventive measures (hand washing) when handling animals • Place dead animals in sacks and plastic bags for transport • Transport live and dead animals with people and food items	• Traditional chiefs • Chairman of bike riders' association • CHWs	

Table 3. Traditional beliefs, cultural practices and values from research findings, and potential SBC support for EVD interventions.

Beliefs/cultural practices/values	**How information will inform interventions**	**Potential SBC support for EVD interventions**
• Wild meat is the most accepted meat for secret society activities (*Bondo* and *Poro* initiation ceremonies) because of taste preferences • Eating sick or dead animals is accepted because hunting and eating animals has been done for many years • Wild meat is seen as a "gift from God." • Wild meat is an important source of food, livelihood, and traditional medicine. • Wild meat is consumed to reduce crop losses.	• Target secret societies with SBC efforts to reduce wild meat consumption during initiation ceremonies • Discuss edicts and bylaws against eating dead animals from the forest with religious and traditional leaders • Discuss the traditional belief that wild meat is a gift from god with traditional and religious leaders, and support communication efforts to change these narratives • Design SBC efforts around alternative livelihood interventions	• Engage wild meat sellers and processors and market leadership through meetings, workshops, and training of trainers on the proper disposal of wild meat waste, and market cleaning processes to reduce risk, addressing barriers to adoption including policies, bylaws and compliance, enforcement, motivation and cost factors that will increase success. • Promote infection prevention and control (IPC) and biosafety practices through training and dissemination of IPC and IEC materials at designated community locations (chief's house, health center, community town hall meetings and marketplaces, etc.) to improve the adoption of food safety practices to reduce direct contact with wild meat. SBC activities could include the promotion of biosafety materials (gloves, aprons, buckets etc.), handwashing practices, and safe waste disposal (carcasses and wastewater) as well as regular cleaning of community spaces including marketplaces, using trusted leaders, social influencers and effective communication channels • Support women and youth contests and outreach related to EVD risks, traditional practices and beliefs, and gender roles • Integrate EVD health education into regular IPC information, education, and communication (IEC) materials to increase awareness of EVD risks and prevention as part of standard food safety and water, sanitation and hygiene (WASH) efforts

The findings from this qualitative research will be used to design SBC interventions to encourage the adoption of practices that reduce EVD spillover risks in communities around the Gola Rainforest National Park (GRNP). Given the limited use of PPE, spillover risk is considered very high as most study participants revealed that they do not use any protection while trading wild meat especially at certain points along the wild meat value chain (hunting, transporting, and processing). This study recommends designing new and innovative ways to improve the promotion of infection prevention and control (IPC) and biosafety practices at local markets, as well as community engagement exercises that target EVD prevention with high-risk populations, especially women and youth.

4.1 Wild meat Value Chain Personas

Using information from FGDs and KIIs, the data collection and analysis team created "personas" that summarize the characteristics of key stakeholders and actors in the wild meat value chain. Identifying specific value chain actors' cultural and traditional beliefs, social norms, and knowledge, attitudes, and practices related to wild meat allows STOP Spillover staff and partners to develop tailored interventions designed to address the specific spillover risks faced by each at-risk group and their behavioral determinants. Understanding the socio-economic and political drivers of zoonotic spillover risk allows the STOP Spillover team and stakeholders to design interventions and approaches that address these systemic issues and are more likely to have sustained impacts. Personas have been created for the following wild meat value chain actors: Hunters, hunters' wives, wild meat consumers, wild meat traders/processors, transporters, traditional chiefs and traditional healers. These personas will ultimately inform both the design of risk reduction interventions and the design of effective, tailored and targeted SBC efforts to support those interventions.

Wild meat hunters in all communities visited were male youth. They are also involved in alternative livelihoods like motorbike transport, subsistence farming, and mining. Hunting is done with firearms, nets, traps, and/or dogs. Wild meat is hunted live or gathered when found dead in the forest and carried from the site of capture without any protection or concern about contact with body fluids including saliva, urine, blood, and feces. Some hunters believe that the Ebola virus does not have an animal origin because wild meat hunting, trading, and consumption have been a way of life since their ancestors, with no associated sickness. However, other hunters did consider the consumption of wild meat as a potential source of Ebola. Measures mentioned to prevent Ebola infections included avoidance of greetings or handshakes, social distancing, washing hands with soap, and the use of face masks, face shields, gloves, and aprons, especially while processing wild meat. Hunters were concerned about the availability and affordability of protective gear.

Wild meat hunter (Idrissa)

As a young man, Idrissa worked many different jobs to support his family, including hunting wild meat, subsistence farming, motorbike transport, and mining. When hunting for wild meat, Idrissa hunts live animals or collects animals that are found dead in the forest. He does not typically use any form of protection (e.g., gloves, masks or special clothing) when transporting or processing animals that he collects. Despite being exposed to bodily fluids from these

animals, Idrissa does not feel he is at risk of contracting Ebola, because the best measures to prevent Ebola are avoiding handshakes, social distancing from those who are sick, washing hands, and wearing face masks. Moreover, people have been hunting wild animals for years before Ebola came. However, he would be interested in using gloves, face masks, or other protective clothing if they were affordable and available to him.

Hunters' wives are engaged in petty trading and selling wild meat in the community. They are also farmers. They handle dead wild animals hunted by their husbands and touch wild animal blood, saliva, and feces without any precautions. They believe handling wild meat is a potential risk for Ebola infection, but they have few options. The use of gloves or other protective clothing while handling wild meat, avoiding handshakes, and frequent handwashing with soap are seen as effective prevention measures. They would be willing to use protective clothing to reduce the risk of infection if it were affordable and locally available. They mentioned many medicinal benefits of wild meat for their children.

Hunter's wife (Fatima)

As the wife of a wild meat hunter, Fatima is frequently involved in trading, processing, cooking and selling wild meat door to door in her community. In this role, she handles dead animals and frequently comes into contact with their bodily fluids. Unlike her husband, Fatima believes that handling and consuming these animals puts her at risk for contracting Ebola. However, she continues to do so because wild meat is often the only source of protein in her home, and hunting wild meat is the primary source of income for her family. Fatima is very willing to use gloves and protective clothing when handling wild meat but is concerned about the availability and, most importantly, the affordability of protective equipment.

Wild meat consumers include both men and women, old and young people, and rural and urban populations. Wild meat consumers consider wild meat as an important cultural heritage and a preferred protein source. It is not eaten only by food insecure or poor households; it is consumed by the urban elite as well as rural families. Wild meat plays an important role as food, medicine, and in spiritual activities in rural communities. Animal skins are used to make local drums. Consumers purchase wild meat using their bare hands and do not use any protective measures.

Wild meat consumer (Kaday)

Kaday frequently consumes wild meat because it is a traditional and reliable source of protein for her and her community. Eating wild meat is a common practice for her whether she is staying in her rural villages or visiting family members in urban towns. She often prepares wild meat for traditional festivities and celebrations, and when she receives special visitors at home. She recognizes that hunting and processing wild meat can increase the risk of contracting Ebola, but she does not perceive eating wild meat as putting her at risk. After all, people have been eating wild meat for generations before Ebola came. She also believes that wild animal products have special powers and can protect her and her family from some traditional ailments.

Wild meat traders/processors consist largely of women (of all ages) and a few men (involved in wild meat processing but not retail sales). Traders/processors butcher and process wild meat at

key wild meat markets in urban and peri-urban areas. They use rudimentary tools including machetes and knives, which are also used for other butchering tasks. They butcher meat with their bare hands and do not use protective clothing. These women requested water and sanitation facilities in the wet market at Kingsway corner in Kenema, and affordable, available reusable gear.

Wild meat trader/processor (Aminata)

Aminata butchers and sells wild meat in the urban wet market in Kenema town. She processes wild meat with her bare hands and does not use anything to limit her contact with their bodily fluids. She knows that her job puts her at risk for contracting Ebola but, given that this is her primary source of income, she continues in this work. She feels that having safety gear to do her job, including boots, a rubber apron, long gloves, and safety goggles, would be very beneficial. Aminata would also like WASH facilities to be available in the market, but she is concerned about the costs associated with using safety equipment and improved hygiene facilities.

Transporters include young men who transport goods and people via motorbike as their livelihood. Transporters come into contact with the bodily fluids of wild meat during transport. They do not use any protective gear, and they do not separate other food items that may be transported with wild meat. The majority of transporters do not care about Ebola risks, and they have very limited knowledge about these risks. They said they are willing to implement measures that will reduce the risk of being infected with disease, including wearing helmets, protective clothing, latex gloves, rain boots, and face masks.

Transporter (Foday)

Like other young men in his community, Foday earns most of his income by transporting people and goods using his motorbike. When transporting wild meat, he often comes into contact with bodily fluids because he does not use any protective gear. Other foods are typically transported with the wild meat and can easily become contaminated. Foday does not know much about Ebola risks and does not perceive himself to be at risk of contracting Ebola by transporting wild meat or contaminating other goods he carries. He is willing to implement preventive measures but is concerned about the costs associated with them.

Traditional chiefs are mostly elderly men, except in one community where the chief was an elderly woman. They are the primary influencers in terms of decision making and creating and enforcing local bylaws. Some chiefs are involved in wild meat hunting and are also wild meat consumers. They said that wild meat hunters, processors, and consumers are highly exposed to animal fluids that are potential sources of Ebola. They believe that handling wild meat is one possible source of infection. They mentioned preventive measures including policies and bylaws that communities should observe like social distancing, avoiding wild meat consumption, hand washing hygiene, and reporting people suspected of having Ebola to the chief or using the toll-free line (117). They believe health messaging, megaphones, and affordable protective gear are needed in their communities. Chiefs are interested in next steps in terms of interventions. They are concerned about the affordability and availability of protective gear for people interacting with wild meat.

Traditional Chief (Saidu)

As an elder and traditional chief, Saidu has a major influence over decision making and bylaw enforcement within his community. He sometimes hunts wild meat himself but recognizes that handing and consuming wild meat puts his community at some risk of contracting Ebola. He thinks that other interactions are much more likely to result in contracting Ebola. For Saidu, the best preventative measures to reduce the risk of Ebola are policies and bylaws that his community should observe, including social distancing, avoiding wild meat consumption, practicing good hand hygiene, and reporting sick or people suspected to have Ebola to the chiefs or toll-free line. He believes that health messages, megaphones, and affordable protective gear for the community are needed.

Traditional healers: All the traditional healers interviewed were male, with a mix of old and younger people living in rural villages. They stated that herbs are used exclusively for the treatment of sickness and other traditional healing practices. They use domestic animals such as sheep, goats, and fowl in some traditional healing ceremonies. They believe that handling and processing wild meat is an important source of Ebola infection and other diseases, and that using PPE, social distancing, handwashing with soap, and adhering to bylaws (including avoiding wild meat hunting) are critical measures to prevent the infection and spread of Ebola.

Traditional Healer (Alusine)

Alusine is a traditional healer who has spent many years treating people in his village for a wide variety of ailments with traditional herbs. He believes that handling and processing wild meat can be a source of Ebola infection and other diseases. Alusine was actively engaged in Ebola behavior change communications during the past Ebola outbreak, which significantly impacted his livelihood and changed the way he practices healing. Alusine thinks that using gloves, social distancing, hand washing, and adhering to bylaws such as avoiding wild meat hunting are all important measures to prevent the infection and spread of Ebola within his community.

5. Recommendations

The STOP Spillover Team will use the qualitative data collected from targeted communities and from the Kenema Kingsway Corner Market to design interventions to reduce Ebola spillover risks. Associated SBC activities will increase the likelihood that these interventions will be and can be sustainably adopted by target groups. Interventions to reduce Ebola spillover risks will reduce the frequency and intensity of human contact with potential Ebola reservoirs, including bats, duikers, monkeys and other non-human primates. Potential interventions are described in more detail in the Ebola research report (Activity 1.2.6.2), and will prioritized and be ground truthed in continued and on-going discussions with local communities. In this report the STOP Spillover team will focus on ways that SBC tools and approaches, including identified behavioral obstacles and the use of positive deviants and influencers can be used to support and improve intervention efficacy. By prioritizing the behaviors that are most critical to change and then defining logical pathways from desired results through the factors inhibiting or motivating practice of those behaviors, to the key supporting actors or influencers required to sustain change, we will ultimately arrive at the interventions most like to achieve behavior change. Social norms and behavioral barriers should drive the design of interventions, and not vice versa. Human centered design principles will be applied to ensure that target groups are involved in all aspects of the design, testing and validation of proposed risk reduction interventions.

In the following section the STOP Spillover team outlines potential SBC support to proposed interventions designed to reduce Ebola spillover risk in target communities.

Potential Intervention I. Improve wild meat market governance and hygiene in Kenema

Wet markets lack hygiene and food safety standards. Animals are slaughtered in the market near common areas where the public shops. There are no cooling facilities or sanitized equipment including clean knives or cutting surfaces. Effluents and wastewater from slaughtered animals pose a significant hygienic risk to the environment and to people. The study team observed wild meat lying on the ground, and women butchering and selling wild meat using their bare hands.

To enhance food safety, market management must install water and handwashing stations, ensure the availability and appropriate use of PPE, and assess IPC capacities (including WASH and waste management) in the market. Market managers need to ensure regular waste disposal and cleaning, with proper disposal of garbage and wastewater to prevent the spread of diseases. Traditional chiefs, local government and market actors must ensure food (including wild animal meat) and water are stored properly, and promote the use of protective gear such as gloves, aprons, masks, etc. for wild meat handling.

Barriers to the adoption of these practices include the lack of effective market governance and limited enforcement of existing regulations and standard operating procedures, stronger

advocacy and leadership skills needed by local women retailers, and costs associated adopting many of these improvements. SBC approaches will focus on strengthening networks among market actors to improve waste management and hygiene practices, designing and testing incentives and motivations to improve market management, and designing and testing compliance and enforcement strategies to improve the adoption of risk reduction behaviors.

Potential Intervention II. Promote IPC and Biosafety Practices With High Risk Value Chain Actors

STOP Spillover staff and OHDWG members could work with key high-risk groups (hunters and women wild meat processors) to identify appropriate, affordable biosafety materials they can use when processing wild animal meat. However, adequate training is required to promote appropriate use of biosafety practices among bush meat consumers, traders, and processors in order to reduce the risk of transmission of EVD and other possible zoonotic viruses. STOP Spillover staff will engage key actors and influencers (women, traditional chiefs, health care workers, etc.) using social and behavior change approaches s to increase the adoption of biosafety practices and reduce direct contact with wild meat. The adoption and appropriate use of PPE (gloves, aprons, etc.), handwashing practices, waste disposal (carcass and wastewater) and regular cleaning of community marketplaces are critical to reduce zoonotic spillover risks.

Potential Intervention III. Promote the Adoption of Ebola Risk Reduction Behaviors

Study participants identified the handling and processing of wild meat with bare hands, hunting with dogs, and eating sick and dead animals by community members as key EVD risk behaviors. Community members confirmed that wearing protective clothing when slaughtering and processing meat as well as washing hands with soap are not commonly practiced. To change these behaviors, the STOP Spillover team will work with OHDWG members and key influencers (CHWs, Chiefs, Religious leaders) to promote the adoption of Ebola risk reduction behaviors using SBC approaches. STOP Spillover will engage religious leaders to counter ideas that wild meat is a gift from God, and to promote halal and other religious edicts relating to safe animal consumption, and those that restrict the consumption of key wild animals including bats, monkeys and non-human primates.

6. CONCLUSIONS

This study was designed to answer six key questions to inform the design of culturally and contextually relevant and sustainable interventions and associated social behavior change efforts to reduce Ebola virus spillover risks in the wild animal – human interface.

1. **Knowledge of EVD:** This study found that most study participants believe that the consumption of monkeys and other non-human primates and bats may increase Ebola spillover risks. However, this knowledge did not directly reduce hunting or the consumption of wild meat. A few respondents confused the causes and sources of EVD, its signs and symptoms as well as its transmission routes with other diseases like COVID-19, HIV, malaria and typhoid, which is understandable given recent communication efforts. Most respondents associated EVD with fever, diarrhea and bleeding. The relatively remote likelihood that a particular animal might have Ebola does not outweigh the important economic, cultural and nutritional value of eating wild meat. Communication efforts that focus on eliminating wild meat consumption are unlikely to be successful unless Ebola threats increase. Therefore, efforts to make wild meat consumption safer and less risky are more likely to succeed. Moreover, the majority of the wild meat species consumed are neither at risk of hosting Ebola nor protected species.
2. **Who is at risk of EVD:** Hunters (male youth), women and health workers were identified as the highest risk groups for EVD. Hunters and wild meat processors do not use any protection while working with wild meat. Given the limited use of PPE, risk of spillover is high. Participants believe that women may be at higher risk of infection because they care for sick family members and handle wild meat purchasing and/or engage in butchering, processing, and cooking wild meat for sale. Hunting and eating wild meat are highest during the rainy season and during traditional initiation ceremonies, so SBC efforts related to the adoption of EVD interventions should target these time periods and prioritize these critical actors, as well as the people who influence them.
3. **Potential EVD preventive measures:** Community members (male and female) mentioned the use of protective boots, thick cloth, and thick protective gloves as potentially effective means of protection when handling wild meat, although they are rarely used in practice. Hand washing with soap and water before and after contact with live and dead animals was mentioned by many study participants, but few people practiced these methods. Some wild meat traders and processors mentioned that they wear protective gloves and use thick plastic to cover meat from flies and diseases. However, they affirmed that these were not common practices. A few wild meat traders and processors said *''it's only God who can save us''* from sickness. Barriers related to cost and the availability of these items need to be addressed in order to design effective, appropriate and sustainable food safety practices to reduce Ebola spillover risks.
4. **Cultural practices and socio-cultural activities that increase EVD risks:** Some study participants, especially men, believed that wild meat is the most accepted meat for secret

society activities. Many men said wild meat is preferred because of its taste compared to the taste of farmed animals. According to them, wild meat is consumed by men in large quantities during the traditional celebrations like Poro society, as well as during special occasions when important visitors come to their community. SBC efforts should focus on secret society leaders and youth who are initiated into these secret societies.

5. **Religious, traditional and cultural beliefs that encourage or discourage wildmeat consumption:** Wild meat was described as a gift God provided for food, employment, and traditional medicine. Informants also described the spiritual roles of animals in the community. Imams and other religious leaders should be engaged to integrate discussions about wild meat consumption practices into sermons and group discussions, through training and discussion guides.
6. **Major influencers of EVD prevention practices and wild meat consumption, and trusted sources of information:** CHWs, traditional chiefs, religious leaders, and mammy queens (women leaders) were identified by community members as people they listen to. Local radio programs, community barray meetings and health staff are trusted sources of health information in the community. These influencers and communication channels should be leveraged to support the adoption of any proposed EBV risk reduction interventions.

ANNEX 1: WILD MEAT VALUE CHAIN PERSONA DECONSTRUCTION

The following persona characteristics, risk practices and perceptions, and risk factors were used to develop the personas described in Section 4 of this report:

Persona Title	**HUNTERS (Idrissa)**
Characteristics (gender, age, location, etc.)	Youth are actively engaged in wild meat hunting in all communities visited. Adults and a few elderly people are also engaged in wild meat hunting. Hunters are men. Most hunters have alternative livelihoods including motorbike riding, subsistence farming, and mining.
Interaction with risk factors (What is their general interaction or exposure with risk factors?)	Hunting is done with firearms, dogs, nets, and traps in all communities, individually and in groups. Wild meat is hunted live or found dead and carried from the site of capture without any protection. Bare hands and local tools are used to process and kill the animal if captured alive.
Risk Perception (Do they view Ebola as a risk? To what extent do they feel at risk?)	All hunters interviewed believe that they are not highly exposed to Ebola risks. Some do not believe Ebola has an animal origin because wild meat hunting, trading, and consumption is a way of life from their ancestors with no associated illnesses. A few considered the consumption of wild meat as a potential source of Ebola.
Perceived value of prevention measures (What prevention measures are perceived as valuable or invaluable, and why? Are they willing to implement any prevention measures?)	Measures mentioned by respondents to prevent Ebola infections included avoidance of greetings or handshakes, social distancing, washing hands, and using face masks, gloves, and aprons, especially while processing wild meat. They would use gloves, protective clothing, and other PPE if available and affordable to use.
Needs/costs (What do they need to implement prevention measures and what are the associated costs that they will bear?)	Arm length gloves, reusable plastic bags for packaging wild meat from site to town, face shields to prevent splashes of bodily fluids from processing.

Persona Title	HUNTERS (Idrissa)
Questions/concerns (What questions or concerns do they have about implementing risk mitigation measures?)	Hunters were concerned about the availability or affordability of protective gear to prevent infection.

Persona Title	**HUNTERS' WIVES (Fatima)**
Characteristics (gender, age, location, etc.)	Women are engaged in local petty trading of retail goods. They are also farmers and rural settlers. They include both young and older women.
Interaction with risk factors (What is their general interaction or exposure with risk factors?)	They handle dead wild animals hunted by their husbands and come into contact with wild animal blood, saliva, and feces. They also handle and process dead animals found for consumption without precautions.
Risk Perception (Do they view Ebola as a risk? To what extent do they feel at risk?)	Most hunters' wives believe handling wild meat is a source of Ebola infection risk but there are no alternatives. Wild meat provides food and medicine for their family and is an important source of household income.
Perceived value of prevention measures (What prevention measures are perceived as valuable or invaluable, and why? Are they willing to implement any prevention measures?)	The use of gloves and protective clothing while handling wild meat is perceived as a positive prevention measure, as are avoiding handshakes or greetings and frequent handwashing. They are willing to use preventive gear that will reduce the risk of infection while processing wild meat if it is available and affordable.
Needs/costs (What do they need to implement prevention measures and what are the associated costs that they will bear?)	Gloves, protective clothing, and packaging materials for retail of wild meat.
Questions/concerns (What questions or concerns do they have about implementing risk mitigation measures?)	The major concern raised by hunters' wives is the availability and affordability of protective gear to prevent Ebola infection.

Personal Title	WILD MEAT CONSUMERS (Kaday)
Characteristics (gender, age, location, etc.)	This category included young and old men and women living in rural and urban areas. Wild meat is consumed by all community members and is a traditional protein source for most Sierra Leoneans. It is perceived as an acceptable and desirable practice to consume wild meat.
Interaction with risk factors (What is their general interaction or exposure with risk factors?)	Consumers handle wild meat with their bare hands. No protective measures are used.
Risk Perception (Do they view Ebola as a risk? To what extent do they feel at risk?)	Consumers believe handling, processing, and consumption of wild meat risks Ebola infection if precautionary measures are not followed
Perceived value of prevention measures (What prevention measures are perceived as valuable or invaluable, and why? Are they willing to implement any prevention measures?)	Consumers view the use of protective gear for processing wild meat for consumption, avoiding handshakes or greetings, frequent hand washing, and promotion of alternative protein sources perceived as valuable measures to reduce the risk of Ebola in communities.
Needs/costs (What do they need to implement prevention measures and what are the associated costs that they will bear?)	Gloves, protective clothing including an apron, and face shields that prevent splashes during butchering of wild meat.
Questions/concerns (What questions or concerns do they have about implementing risk mitigation measures?)	Respondents are concerned about the availability and affordability of protective gear to prevent Ebola infection.

Persona Title	TRADERS/PROCESSORS (Aminata)
Characteristics (gender, age, location, etc.)	This group consists mostly of women and a few men. A few men were involved in processing or butchering wild meat, while women are mainly involved in the processing and trading of wild meat. Women are involved in the butchering and sale of wild meat in urban settlements, especially in the Kenema-Kingsway wet market.
Interaction with risk factors (What is their general interaction or exposure with risk factors?)	The butchering and processing of wild meat are done with bare hands and without protective clothing to prevent or limit contact with the bodily fluids of wild animals for sale.
Risk Perception (Do they view Ebola as a risk? To what extent do they feel at risk?)	Contact with and consumption of wild meat is considered a risk source of Ebola. Traders/processors come into daily contact with wild meat, and selling wild meat is a major source of income.
Perceived value of prevention measures (What prevention measures are perceived as valuable or invaluable, and why? Are they willing to implement any prevention measures?)	Women wild meat traders positively perceived potential preventive measures to reduce risks, including the use of safety gear. Participants thought that PPE such as gloves, jackets, rain boots, face masks, rubber bowls, aprons, and safety goggles could help them reduce risk and assure the safety of their livelihood.
Needs/costs (What do they need to implement prevention measures and what are the associated costs that they will bear?)	Safety gear including reusable plastic aprons, face shields, rain boots, and butchering and processing platforms.
Questions/concerns (What questions or concerns do they have about implementing risk mitigation measures?)	They were concerned about the availability of WASH hygiene facilities in the wet market at Kingsway corner and the affordability and availability of reusable PPE.

Persona Title	**TRANSPORTERS (Foday)**
Characteristics (gender, age, location, etc.)	These are largely youth engaged in motorbike riding as their main livelihood.
Interaction with risk factors (What is their general interaction or exposure with risk factors?)	They usually contact bodily fluids of animals while transporting them, and no protection is used to prevent contact with these fluids. Additionally, other food items are transported alongside wild meat.
Risk Perception (Do they view Ebola as a risk? To what extent do they feel at risk?)	Most of these transporters do not care about Ebola risks. Few respondents revealed any risk perceptions.
Perceived value of prevention measures (What prevention measures are perceived as valuable or invaluable, and why? Are they willing to implement any prevention measures?)	Most motorbike riders in the communities said hand washing and using gloves, facemasks, helmets, and transporting bags could be valuable measures to prevent Ebola transmission and other infections. They are willing to implement any measures that will reduce the risk of being infected.
Needs/costs (What do they need to implement prevention measures and what are the associated costs that they will bear?)	Helmets, protective clothing, latex gloves, rain boots, safer container for transporting meat and nose masks.
Questions/concerns (What questions or concerns do they have about implementing risk mitigation measures?)	No concerns or questions were brought up during the interview.

Persona Title	TRADITIONAL CHIEFS (Saday)
Characteristics (gender, age, location, etc.)	Traditional chiefs were mostly men except in one community where the chief is a female. They all were elderly. Some of the chiefs were involved in hunting wild meat and are also consumers.
Interaction with risk factors (What is their general interaction or exposure with risk factors?)	They are hunters, processors, and consumers of wild meat and are highly exposed to fluids of wild meat that are potential sources of Ebola.
Risk Perception (Do they view Ebola or Lassa as a risk? To what extent do they feel at risk?)	They all believed the risk of Ebola and the handling of wild meat are a source of infection.
Perceived value of prevention measures (What prevention measures are perceived as valuable or invaluable, and why? Are they willing to implement any prevention measures?)	Chiefs endorsed preventive measures like policies and bylaws that communities should observe, including social distancing, avoiding wild meat consumption, practicing hand washing with soap, and reporting confirmed or suspected Ebola cases to the chief or the toll-free line (117). They observed these as effective measures in the communities during the Ebola outbreak.
Needs/costs (What do they need to implement prevention measures and what are the associated costs that they will bear?)	Health messages, posters, megaphones, and affordable protective gear.
Questions/concerns (What questions or concerns do they have about implementing risk mitigation measures?)	The main question asked by the chiefs is “what happens next?” in terms of interventions. They also raised concerns about the affordability and availability of PPE for people interacting with wild meat.

Persona Title	**TRADITIONAL HEALERS (Alusine)**
Characteristics (gender, age, location, etc.)	The traditional healers interviewed were a mix of old and young men living in rural villages. Most of them have many years of experience healing people. They use herbs exclusively for the treatment of sickness and other traditional healing practices.
Interaction with risk factors (What is their general interaction or exposure with risk factors?)	No risk was observed because traditional healers only use herbs and not wild animals in their practices. If animals are used, they are domestic animals such as sheep, goats, and fowl.
Risk perception (Do they view Ebola or Lassa as a risk? To what extent do they feel at risk?)	They believed handling and processing of wild meat is an important source of Ebola infection and spillover risk.
Perceived value of prevention measures (What prevention measures are perceived as valuable or invaluable, and why? Are they willing to implement any prevention measures?)	They see the use of gloves, social distancing, hand hygiene, and adherence to bylaws such as avoidance of wild meat hunting as valuable efforts to prevent Ebola infection and spread.
Needs/costs (What do they need to implement prevention measures and what are the associated costs that they will bear?)	No needs suggested as they exclusively use herbs for healing practices which involves little-to-no spillover risk.
Questions/concerns (What questions or concerns do they have about implementing risk mitigation measures?)	N/A

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