Incentives for Bushmeat Consumption and Importation among West African Immigrants, Minnesota, USA

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DOI: https://doi.org/10.3201/eid2312.170563

The knowledge, attitudes, and practices surrounding bushmeat consumption and importation in the United States are not well described. Focus groups of West African persons living in Minnesota, USA, found that perceived risks are low and unlikely to deter consumers. Incentives for importation and consumption were multifactorial in this community.

Bushmeat hunting and butchery are risk factors for zoonotic disease transmission (1–3). However, less is known about health risks to those who consume products that are already butchered when purchased. Bushmeat in this report refers to meat from wild African animals such as rodents, hooved animals, carnivores, primates, and bats (3).

Thousands of pounds of bushmeat are illegally imported into the United States annually (4), mostly from West Africa (5). A previous study of bushmeat consumption by African immigrants in the United States described mixed perceptions regarding the risks and benefits of consuming bushmeat (5). Improved understanding of the complex social drivers of these practices is needed to better characterize risk and formulate communication strategies.

To identify the cultural perspectives and knowledge, attitudes, and practices surrounding bushmeat importation and consumption, we held focus groups with members of the Liberian community living in the Minneapolis–St. Paul area of Minnesota, USA. Minneapolis–St. Paul has the largest Liberia-born population in the United States, and ranks fifth in overall African populations in US metropolitan areas (6). Recognizing the history of stigmatization associated with increased risk for Ebola virus among persons from West Africa, we engaged a community-based organization to partner in the planning and execution of this study (7,8). Creating a comfortable environment where participants share personal experiences and insights freely is a key tenet of focus group methodology (9); this partnership was essential in gaining trust and maintaining cultural sensitivity.

Inclusion criteria for participant selection included: 1) minimum age 18 years, 2) self-identification as West African, and 3) willingness to discuss bushmeat in a group setting. The partner organization recruited community members by using a combination of purposeful sampling and social media advertisement and facilitated 3 focus groups (10–12 participants, each for 90 min) in January and February 2016; a designated research team member attended each session. A standard guide for questions was used for each session (online Technical Appendix, https://wwwnc.cdc.gov/EID/article/23/12/17-0563-Techapp1.pdf). The University of Minnesota Institutional Review Board approved this study.

Sessions were audio recorded and transcribed; participants were not identified. Nonverbal cues (i.e., gestures, emotions, points of hesitation, nods of agreement) and other participant interactions were added to the transcript by a notetaker. We analyzed the collected data by using a modified grounded theory method with inductive analysis as previously described (10). Two authors (E.W., J.D.A.) analyzed each transcript by using an open and selective coding approach. Subsequently, all transcripts were analyzed together by using axial coding further describing relationships among themes (Table); representative quotes from participants were selected to exemplify a relationship or common theme (9) (Table). We supported validity of findings by using member-checking, triangulation of findings with multiple sources, and peer debriefing (9). Many themes were repeated in all groups; however, this study was limited by inability to confirm that we had reached saturation of perspectives. According to Creswell, it is ideal...
Inconsistent gaps in knowledge of import regulations, it was in the processing of carcasses. Although there were con chased dried consumer products and had not participated and butchering techniques, but most participants pur titional Liberian cooking techniques (extensive boiling for cooking mitigated risk. For instance, participants cited tra potential, most believed careful preparation and thorough harboring Ebola virus. Among those who acknowledged this suaded few participants from obtaining or consuming me while visiting West Africa (Table).

Participants had resided in the United States from 6 months to 35 years; approximately half were female (on-line Technical Appendix Table 1). All had consumed bushmeat, either abroad or in the United States. The 2 fundamental drivers of consumption in the United States were to 1) strengthen connection with African roots or 2) share the social experience with friends or relatives (Table). Many participants also reported frequent consumption of bushmeat while visiting West Africa (Table).

Most participants reported preference for what they described as “dried bushmeat.” “Drying” involved varying degrees of smoking, aging, and desiccation. Dried bushmeat, compared with raw or partially smoked products, was preferred for importation because its decreased odor is believed to reduce detection.

Concern about zoonotic or foodborne disease dissuaded few participants from obtaining or consuming bushmeat, despite heightened awareness that wildlife could harbor Ebola virus. Among those who acknowledged this potential, most believed careful preparation and thorough cooking mitigated risk. For instance, participants cited traditional Liberian cooking techniques (extensive boiling for long durations) as a protective factor (Table).

Some participants were knowledgeable of hunting and butchering techniques, but most participants purchased dried consumer products and had not participated in the processing of carcasses. Although there were consistent gaps in knowledge of import regulations, it was commonly perceived that political, public health, or discriminatory (e.g., racist, xenophobic) justifications were factors (Table).

These focus groups yielded detailed and nuanced information on the knowledge, attitudes, and practices related to bushmeat use and consumption among Liberians and Liberian Americans in a US metro area. Although this study did not directly enumerate the volume and type of bushmeat imported into the United States, our results provide a description of sociocultural factors involved on the demand side of the supply chain, a common gap in most risk assessments, and give insight into potential education and risk management strategies. We found that engaging the community in a culturally appropriate manner encouraged open dialogue, creating opportunities for education regarding import regulations and risk mitigation strategies (e.g., careful preparation and thorough cooking).

**Acknowledgments**

We acknowledge African Career, Education, and Resources Inc. for assistance in planning, hosting, and conducting the focus groups. Particular thanks to Nelima Sitati Munene, Denise Butler, and Wynfred Russell for initial planning stages and contributions to wording of the question script and to Wokie Freeman for moderating the focus groups. We thank Arnold Vang for contributions in planning and information on local airport confiscations. Additional thanks to Jared Erdmann with the Minneapolis Health Department for providing collaborative training with partners.
This study was funded by the International Society of Travel Medicine (ISTM) 2014–2015 Research Award, as well as the Department of Veterinary Population Medicine, College of Veterinary Medicine, University of Minnesota.

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Porcine Astrovirus Type 3 in Central Nervous System of Swine with Polioencephalomyelitis

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DOI: https://doi.org/10.3201/eid2312.170703

Using next-generation sequencing, we identified and genetically characterized a porcine astrovirus type 3 strain found in tissues from the central nervous system of 1 piglet and 3 sows with neurologic signs and nonsuppurative polioencephalomyelitis. Further studies are needed to understand the potential for cross-species transmission and clinical impact.

Astroviruses have been identified in a variety of mammals and birds; infection is often asymptomatic (I). Recently astroviruses have been implicated in cases of encephalomyelitis in humans, mink, cattle, and sheep (2–5). We describe the use of unbiased next-generation sequencing to identify and genetically characterize a porcine astrovirus type 3 (PoAstV-3) in central nervous system (CNS) tissues of a 5-week-old piglet and 3 sows with neurologic signs and histopathologic lesions compatible with a neurotropic viral infection.

A multisite swine production farm submitted swine neurologic cases on 3 different occasions over a 9-month period to the Iowa State Veterinary Diagnostic Laboratory (Ames, Iowa, USA); 1 submission (2 live piglets) represented a population of 4–12-week-old pigs and 2 submissions (submission 2, two live sows; submission 3, head and tissue of sow) representing sows. In all cases, affected swine exhibited clinical signs that ranged from hind limb weakness to quadriplegia and occasionally convulsions (Video, https://wwwnc.cdc.gov/EID/article/23/12/17-0703-V1.htm). The sow farm reported a case-fatality rate of 100%. The young pigs, which were farrowed from sows from the aforementioned sow farm, originated...
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Technical Appendix

Focus group question guide

1. Please tell us your name, how long you’ve lived in Minnesota, and what country you are from.
2. Can you describe what the term ‘bushmeat’ means to you?
   • Probe 1: What other wild animal foods have you seen or heard of someone bringing back to the U.S. from West Africa?
   • Probe 2: What medicines or other things do you take that are made with wild animal products?
3. What do people living in the U.S. from your community like about bushmeat?
4. What do people living in the U.S. from your community dislike about bushmeat?
5. How do you or people you know use or eat bushmeat in MN?
   • Probe- are there other times people like to eat bushmeat in MN?
6. Can you describe for me how bushmeat gets to MN?
   • Probe- is that process different than how you get bushmeat in West Africa?
7. It seems like getting bushmeat in MN is sometimes more complicated than just going to the supermarket. What are some of the important factors someone thinks about when deciding if bushmeat is worth this extra effort?
8. Is there anything else you’d like to mention on the topic we’ve discussed today?

Technical Appendix Table 1. Aggregated self-reported demographic characteristics of focus group participants.

| Demographic characteristics of focus group participants (n = 32) |
|---------------------------------------------------------------|
| Gender                                                       |
| Male                                                        | 44% |
| Female                                                      | 56% |
| Age                                                         |
| Minimum (years)                                             | 18  |
| Maximum (years)                                             | 70+ |
| Years residing in USA                                       |
| Mean (years)                                                | 13  |
| Minimum (years)                                             | 0.5 |
| Maximum (years)                                             | 35  |
| Country of birth                                            |
| Liberia                                                    | 97% |
| Sierra Leone                                                | 3%  |
### Technical Appendix Table 2. Open and selective codes (with definitions) used in analysis of bushmeat focus group transcripts

#### Defining bushmeat

| Code | Definition                                                                 |
|------|---------------------------------------------------------------------------|
| Bushmeat is from the countryside | Bushmeat is animals hunted in countryside (rather than city) |
| Bushmeat is hunted animals | Bushmeat is a species that a hunter kills and brings back for food |
| Bushmeat is wild animals | Bushmeat is wild animals hunted from forest or bush |
| City vs forest animals as bushmeat | Wild animals hunted in cities might also be defined as bushmeat |
| U.S. ‘domestic’ bushmeat | U.S. wildlife (such as deer) is a type of ‘domestic’ bushmeat that I could eat |
| Food of rural poor | Eating bushmeat is associated with not having options and living in rural area in Liberia |

#### Definition by species

| Code | Definition                                                                 |
|------|---------------------------------------------------------------------------|
| Bushmeat is defined as the following species | Bushmeat can be defined as the following species |

#### Cultural definition of bushmeat

| Code | Definition                                                                 |
|------|---------------------------------------------------------------------------|
| The species defined as bushmeat or as a source of food varies by culture and perspective | The species defined as bushmeat or as a source of food varies by culture and perspective |

#### Individual species preferences

| Code | Definition                                                                 |
|------|---------------------------------------------------------------------------|
| Which species are defined as desirable foods may just be individual or local preference | Which species are defined as desirable foods may just be individual or local preference |

#### Primitive

| Code | Definition                                                                 |
|------|---------------------------------------------------------------------------|
| People may avoid bushmeat because it is seen as primitive or not Western | People may avoid bushmeat because it is seen as primitive or not Western |

#### Stigma against talking about it

| Code | Definition                                                                 |
|------|---------------------------------------------------------------------------|
| No one wants to talk about bushmeat, or people aren’t talking about it because they emotional response to the subject | No one wants to talk about bushmeat, or people aren’t talking about it because they emotional response to the subject |

#### Taboo or religion influence

| Code | Definition                                                                 |
|------|---------------------------------------------------------------------------|
| Eating some species is taboo for religious or cultural reasons | Eating some species is taboo for religious or cultural reasons |

#### America as melting pot

| Code | Definition                                                                 |
|------|---------------------------------------------------------------------------|
| U.S. culture and food is an amalgamation of things brought by different immigrant groups | U.S. culture and food is an amalgamation of things brought by different immigrant groups |

#### Western perception of bushmeat

| Code | Definition                                                                 |
|------|---------------------------------------------------------------------------|
| What Liberians think Americans or other ‘Westernized’ people think about bushmeat | What Liberians think Americans or other ‘Westernized’ people think about bushmeat |

#### Strong smell

| Code | Definition                                                                 |
|------|---------------------------------------------------------------------------|
| Bushmeat products can have a strong/distinctive smell | Bushmeat products can have a strong/distinctive smell |

#### Bushmeat for non-food purpose

| Code | Definition                                                                 |
|------|---------------------------------------------------------------------------|
| Some African bushmeat species can also be used for non-food purposes | Some African bushmeat species can also be used for non-food purposes |

#### Drivers for consumption in U.S.

| Code | Definition                                                                 |
|------|---------------------------------------------------------------------------|
| Bushmeat is cheaper | In Africa, bushmeat is less expensive than domesticated meats |
| Good taste or smell | Positive sensory traits of bushmeat |
| Natural or organic | Bushmeat is desirable because it is natural |
| Supports health | Consuming bushmeat has special health properties |
| Tastes like home | Eating bushmeat reminds me of home and invokes connections with home |
| Wild taste | Preference for bushmeat because the taste is better than domesticated animal meat |

#### Laws and regulations around bushmeat

| Code | Definition                                                                 |
|------|---------------------------------------------------------------------------|
| Educate doctors | Doctors need to know about how bushmeat is used; they’re clueless |
| Legalizing bushmeat | If bushmeat could be tested or regulated, it could become legal |
| Liberian government | People don’t trust the Liberian government to self-regulate meat for export |
| Regulations needed | Regulations are needed to ensure meat/foods are safe to eat |

#### Ways bushmeat gets to the U.S.

| Code | Definition                                                                 |
|------|---------------------------------------------------------------------------|
| Airline luggage | You could bring bushmeat to the U.S. on a plane in airline luggage |
| Airline luggage- not anymore | One used to be able to bring in bushmeat in airline luggage, but not anymore |
| Available in town | Yes, African origin bushmeat is available in MN and I have eaten it |
| Not available in town | We don’t eat bushmeat because it isn’t available in MN |
| Buying bushmeat in African countries | Experiences purchasing bushmeat to bring back to U.S. |
| Get from friend or relative | Can acquire bushmeat in MN from friend or relative who had traveled home to Liberia |
| Postal service | You could mail bushmeat to the U.S. using the postal service |
| U.S. stores | You could purchase bushmeat at some U.S. stores |

#### Zoonoses risk: skepticism and support

| Code | Definition                                                                 |
|------|---------------------------------------------------------------------------|
| Bushmeat has never caused disease | Experiences eating bushmeat for years and never had an issue |
| Confusion | Confusion or unsure if bushmeat has been linked to disease |
| Cooking cannot inactivate disease | Bushmeat could carry disease, and risks cannot be mitigated by cooking |
| Cooking inactivates disease | Bushmeat could carry disease, but risk can be mitigated by proper cooking |
| Food preparation | Food preparation and sanitation are key to preventing disease or illness when eating bushmeat |
| Worth the risk | If there is a risk to eating bushmeat, it is still worth it |
| Zoonosis origin stories | Explanations or examples about how disease has transferred from animals to people, usually focused on Ebola |

#### Other themes

| Code | Definition                                                                 |
|------|---------------------------------------------------------------------------|
| Preparation of bushmeat | The ways to prepare bushmeat vary by preference |