

**Title: The Opposite of Denial: Social Learning at the Onset of the Ebola Emergency in Liberia**

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**Abstract:**

**Objective:** The objective of this study was to identify the pace of Ebola-related social learning in urban and peri-urban areas around Monrovia, Liberia during August 2014, the onset of the emergency phase of the epidemic. **Data:** Research teams collected data in 13 discrete neighborhood sites over fourteen consecutive days via focus groups, community discussions, and key informant interviews for the purpose of program development. Data was de-identified and shared with research partners for analysis. **Findings:** The study's findings indicate that within a two-week period, community members demonstrated rapid social learning of correct information about the source of the Ebolavirus and methods for prevention, as well as the rapid dismissal of incorrect information about the virus. The data also suggest that a critical moment for a shift in social learning took place after the research midpoint, during days 7-10 (of a total of 14). **Conclusion:** The research demonstrates that under conditions of accelerating health crises, low-income and low-resource communities can rapidly assimilate correct health information and dispel incorrect information, even in a context of heightened instability, suspicion, and misinformation.

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## Introduction

The West African Ebola epidemic has rapidly outpaced the response efforts of local and national governments, and those of the international community. From the beginning of the emergency phase of the epidemic, which was marked by the World Health Organization's declaration of the Ebola outbreak in Liberia, Sierra Leone, and Guinea as a Public Health Emergency of International Concern (PHEIC) on August 8, 2014, there has been an ongoing debate regarding the success of the global health response to engage local communities through public health communications campaigns [1,2]. This debate has been matched by a wide-ranging set of concerns regarding local communities engagement with, acceptance of, and adherence to public health messages about the causes of Ebola and mechanisms for preventing its spread [3].

This research demonstrates how rapidly urban Liberian communities learned factual messages and discarded non-factual messages about (1) the causes of Ebola and (2) protective measures to prevent Ebola spread during the early emergency phase of the current West African epidemic. Social learning theory [5-7] posits that learning can occur purely through observation or instruction in social contexts in the absence of structured pedagogy or direct instruction. In the context of the Ebola outbreak in urban Liberian settlements, social learning was the principal vehicle through which local communities learned about Ebola in the early months of the outbreak. Secondary messages were distributed through public media (newspapers, radio public service announcements and billboards), social media campaigns (text messages, community education activities), and direct education initiatives sponsored by Government of Liberia (GOL) and UNICEF community education teams. In the early weeks of the outbreak, however, the principle mechanism for learning about Ebola was through verbal information sharing, peer-to-peer verbal and text phone communications, public and private community-based conversations, and direct observation of Ebola morbidity and mortality -- in short, social learning was the dominant mechanism by which Ebola messages were transmitted, received, and internalized by local Liberian communities.

While much is known about how social learning contributes to changes in health behavior [4], to global health communication efforts [8], and to social marketing campaigns that target epidemics like HIV/AIDS [9,10], there has been no effort to study the rate at which social learning around health issues can take place in a context of public health emergency. In this paper, we map the following four trends from thirteen communities studied over a fourteen-day period at the outset of the emergency: (1) how *rapidly* communities assimilated positive health messages about the causes and transmission of Ebola, and best methods for protection; (2) how rapidly communities abandoned both positive or negative health messages about Ebola; (3) whether or not there was a qualitative shift in community belief in, and adherence to, public health messages about Ebola in contexts in which message reporting appeared constant, and (4) anomalous or contextual local conditions, beliefs and practices that impacted social learning about Ebola.

In order to understand the pace of social learning about Ebola in urban Liberia, it is important to highlight that during the period of research, there was a concurrent growth in the burden of mortality due to Ebola, a general collapse and shutdown of the entire healthcare sector in urban Monrovia and surround areas, a pronounced expansion of health communications initiatives that related sometimes confusing information, and the emergence of political and economic strains. All of these factors may have accelerated the pace of information sharing and adoption. The context of the current Ebola outbreak must factor in the specific epidemiological and institutional factors that informed the process and pace of social learning.

This research demonstrates that local communities under extreme public health conditions can rapidly learn and internalize positive health messages, abandon negative health messages, and refine known health messages, but that political and social factors can impact the health education process and muddy informational messaging.

### **Methods:**

The analysis presented below is based upon data collected by Liberian-staffed GOL/WHO research teams trained and directed by an applied medical anthropologist during the period August 4-17, 2014. The research involved thirteen communities, including nine urban settlements in Monrovia, the capital of Liberia, and four peri-urban townships in Montserrado and Margibi counties within driving distance to Monrovia<sup>1</sup>. During the period of data collection, research teams conducted focus groups in each of the thirteen communities in order to identify which local and government messages were being circulated and retained about Ebola. At the same time, researchers, including the team leader, conducted key informant interviews with local community members, community leaders, and local and regional health and governmental officials. At the end of data collection in each community, the GOL/WHO research team facilitated community discussions that included education and training on Ebola causes and preventive behaviors to large community groups.

The study was implemented for the purpose of program development and evaluation and public health communication. De-identified data were analyzed<sup>2</sup> by a team of public health and anthropological researchers at the University of Florida in October 2014, who thematically identified, coded, and analyzed trends at the community level and correlated trends with key informant interviews and PI field notes. The findings reported below incorporate both quantitative data from the focus group analysis and qualitative data from key informant interviews and field notes. The figures below were derived by plotting a linear relationship between the cumulative presence or absence of reported messages over time. Each data point on each chart represents a single community, on a single day, and does not represent comprehensive surveys of all communities on each day.

### **Findings:**

For both of the topics studied – reported messages about the causes of Ebola and about methods for preventing Ebola -- the most significant finding was that rapid and noticeable changes were detectable in patterns of reported messaging in less than two weeks. Across most of the tables showing changing patterns below, **the period between Day 7 and Day 10 marked a noticeable shift** from presence to absence of certain messages, or vice versa. This rate of social learning substantially outpaces the “many months and years” of community education and behavior changes that are often thought to be required to sustain public health behavior change.

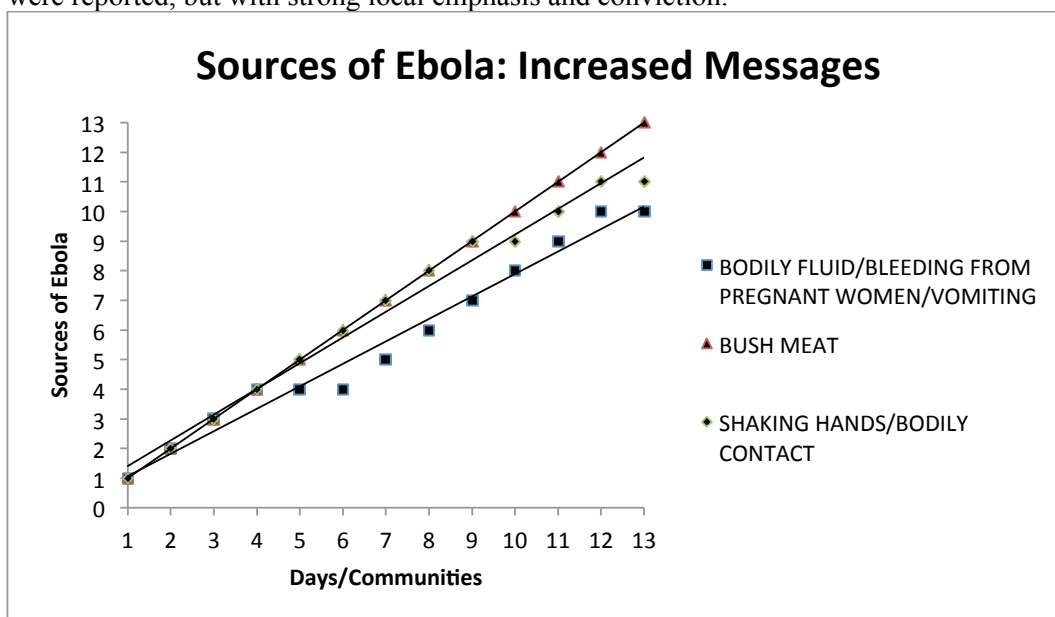
### ***Sources of Ebolavirus and Sources of Ebola Infection***

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<sup>1</sup> Specific research locations included: nine in Monrovia: Old Road 1 (Church of Christ), Catholic Hospital Community, Soul Clinic Community, Say Town Sinkor, Old Road 2 (Sinkor), St. Paul Bridge, Lakpazee Community (Sinkor), Old Road 3, Logan Town. Four in peri-urban areas: Mboo Statutory District, Duazon (in Margibi County), and Fendell (Montserrado County)

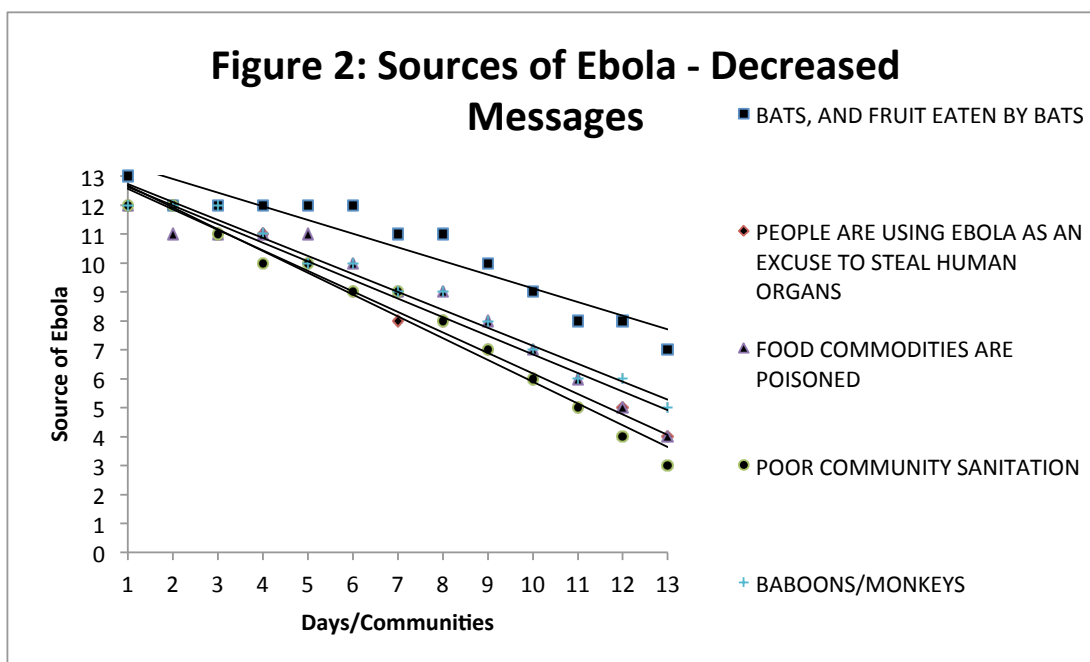
<sup>2</sup> This study received an expedited review and exemption under the University of Florida Institutional Review Board for the Protection of Human Subjects (IRB-02) #2014-U-1117.

During fourteen days of data collection in thirteen communities, questions about the “source of Ebola” were often conflated to mean the vectors by which Ebola is spread, the specific introduction of Ebola into Liberia, and the practices that were likely to result in Ebola exposure and transmission. Although imprecise, three important -- and correct -- risk factors were increasingly reported by local populations (see Figure 1). These included: exposure to bodily fluids, (vomit, blood, urine, and sweat); bodily contact with other people (including shaking hands or intermingling in crowded locations); and handling or consuming poorly prepared or un-cooked bush meat. Qualitative data support the premise that social learning took place regarding correct sources of Ebola virus by noting that correct risk factors were initially reported as part of government messages, however, two weeks later, the same Ebola risk factors were reported, but with strong local emphasis and conviction.



During this same period, a number of erroneous messages about the sources of Ebola also quickly tapered off (See Figure 2). These included information indicating that Ebola was helping westerners and Liberian government officials steal organs for ritual purposes and that witchcraft, demons, African sign (sorcery), and Satan had brought Ebola to Liberia as a test or as a punishment. As Ebola infections were reported in Western aid workers (thereby removing the illusion of protection that surrounded aid workers) and as public health messaging campaigns improved, these factors ceased to be reported as sources of Ebola.

False messages about the sources of Ebola were also introduced to the general population through faulty governmental health messaging campaigns, and after gaining an initial hold through social learning, were rapidly abandoned. For example, at the outset of the emergency phase of the epidemic, the Government of Liberia launched a public health campaign that confused preventive messages about cholera and malaria with Ebola by enjoining individuals to wash their hands before eating, cook food properly, and clean their homes and communities. They also related inconsistent information regarding the consumption of bush meat. Thus, local populations initially believed that insects, dirty communities, and baboons or monkeys were sources for Ebola.

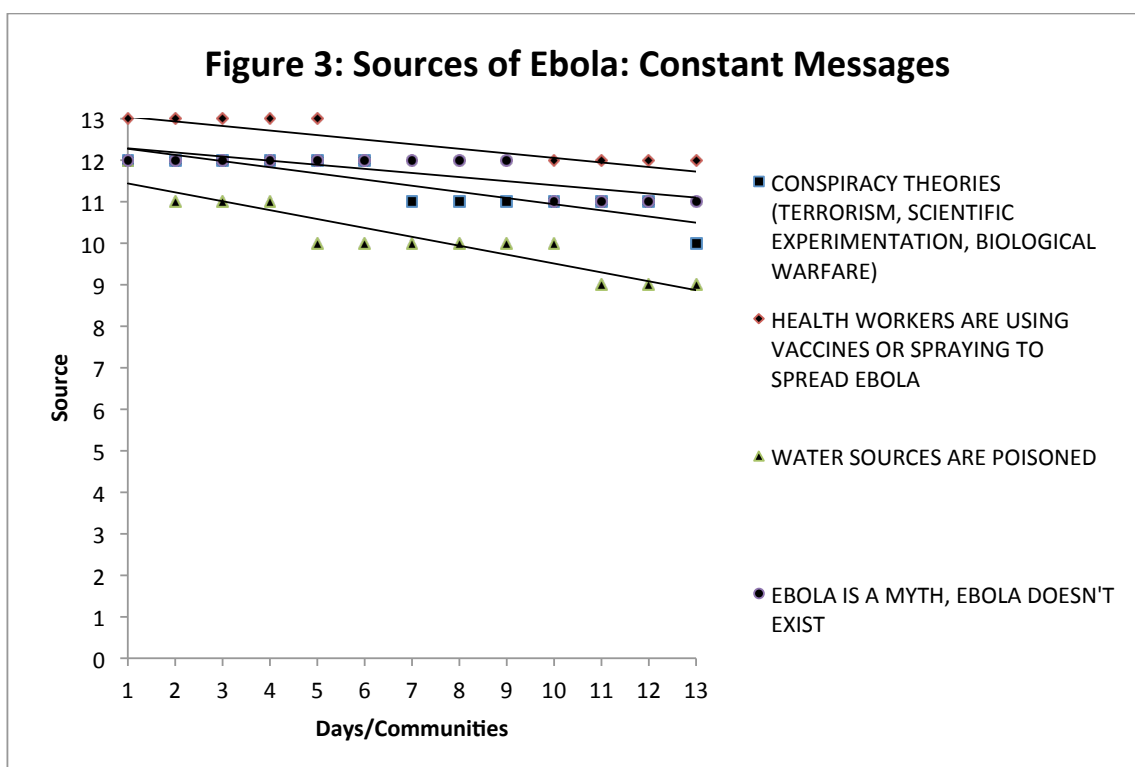


Several erroneous messages were reported consistently during the two-week data collection period (see Figure 3) and were reinforced through text messaging campaigns and local news reports. The first message was that Ebola was brought to Liberia as part of a conspiracy theory. These conspiracies were potent and widespread, and revealed a widespread fear and distrust of both governmental and international partners. Reported theories postulated that Ebola was invented in a laboratory and was being spread in Liberia for the purposes of experimentation: that Ebola virus was planted in monkeys and bats in order to infect and kill Africans; and that Ebola was introduced by biological warfare or was being circulated as an act of terrorism. A widespread misperception was that the Liberian government was spreading Ebola, or that the government was strategically failing to address it in order to raise money from the international community.

The second message, and perhaps the more virulent, was the widespread perception that media and government reports of the presence of Ebola were myths. This initial perception must be understood within Liberia’s historical and cultural context, which had led to widespread skepticism in the veracity of public media campaigns. Historically, during the Liberian civil war, government regimes and competing political actors used incorrect messages on radio, newspaper, and other information services (including locally planted rumor campaigns) to manipulate aspects of the conflict and manufacture evidence of military successes or failures, as well as to instigate fear, conceal troop movements, or induce population flight and displacement. But towards the end of the data collection period, those who claimed Ebola was not real were asking for evidence and proof, thus differentiating their concerns from earlier claims that Ebola was not real, which were more closely related to conspiracy theories or beliefs that symptoms of Ebola were actually manifestations of another disease.

Third, community focus groups widely reported the locally held belief that healthcare workers were infecting community members with Ebola. Early reports of healthcare workers spreading the disease referenced injections as the mechanism, however, overtime the message

changed to indicate that healthcare workers were infecting people by spraying them. Fears regarding the involvement of health care workers in the spread of Ebola reflect urban Liberians' observations of health care worker activities as they shifted their focus from routine primary health care (e.g. vaccinations, injections) to Ebola transmission prevention efforts, which included spraying disinfectant bleach in local communities during the research period.

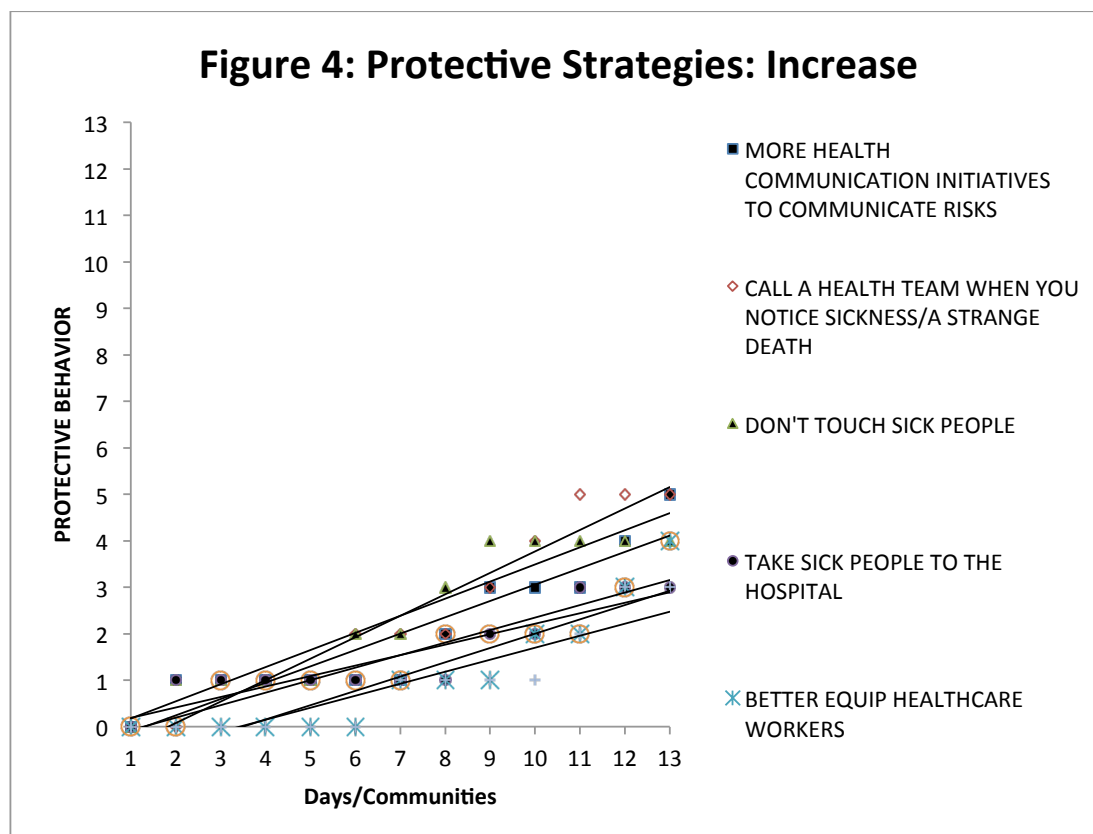


***Protecting Individuals and Families Against Ebola virus***

During the two-week research period, information regarding how an individual might protect oneself or one's family against Ebola virus underwent a noticeable upward shift (see Figure 4). After 8 days, focus group participants identified that they should call a health team when they recognized a strange sickness or a death in the community; they reported they shouldn't touch people who were sick, and that they should take sick people to a clinic or hospital. However, during the same time period, the nationwide closure of clinics and hospitals created a nation-wide medical crisis, and communities managing Ebola found themselves being turned away from hospitals and clinics, while emergency Ebola cellular phone lines manned by two Ministry of Health and Social Welfare workers notoriously remained unanswered.

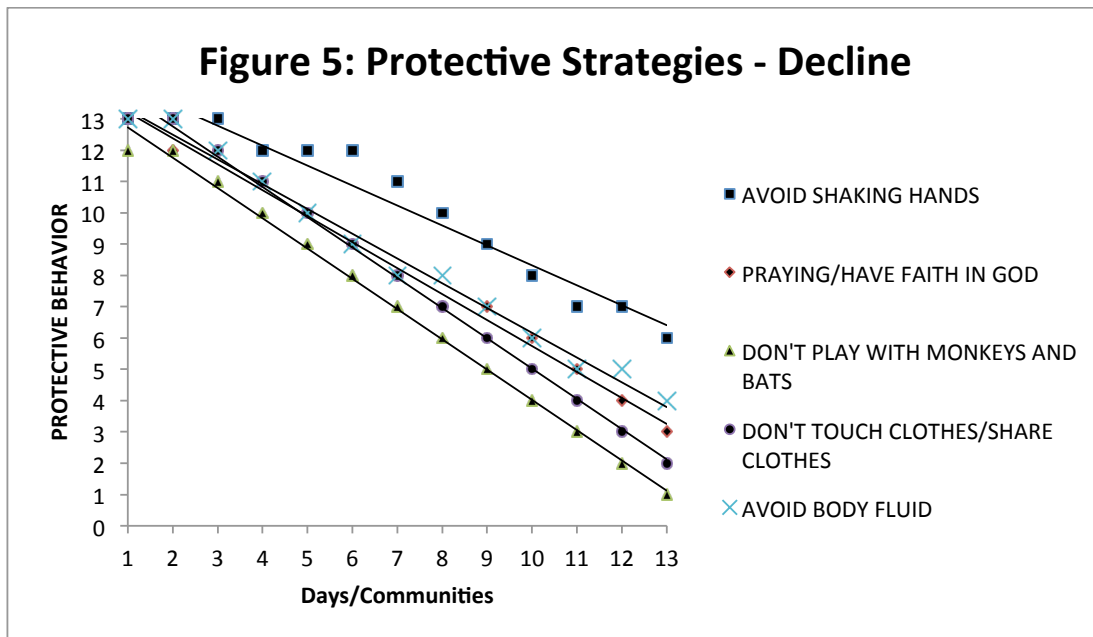
By the end of 7-8 days, there was also growing report of demand for better resources, infrastructure, and government communications to support Ebola patients, families, and communities also appeared after one week of data collection. Communities requested more health communications initiatives to communicate risks, including door-to-door education campaigns, video and photographic imagery to persuade populations of the reality of Ebola; the implementation of home-based quarantines; and the construction of additional treatment facilities, community-based isolation centers, and testing facilities. In the absence of any medical

recourse, local communities decided to devise their own preventive measures, which included the ineffective tactic of washing their bodies with salt water, or drinking large quantities of salt water.

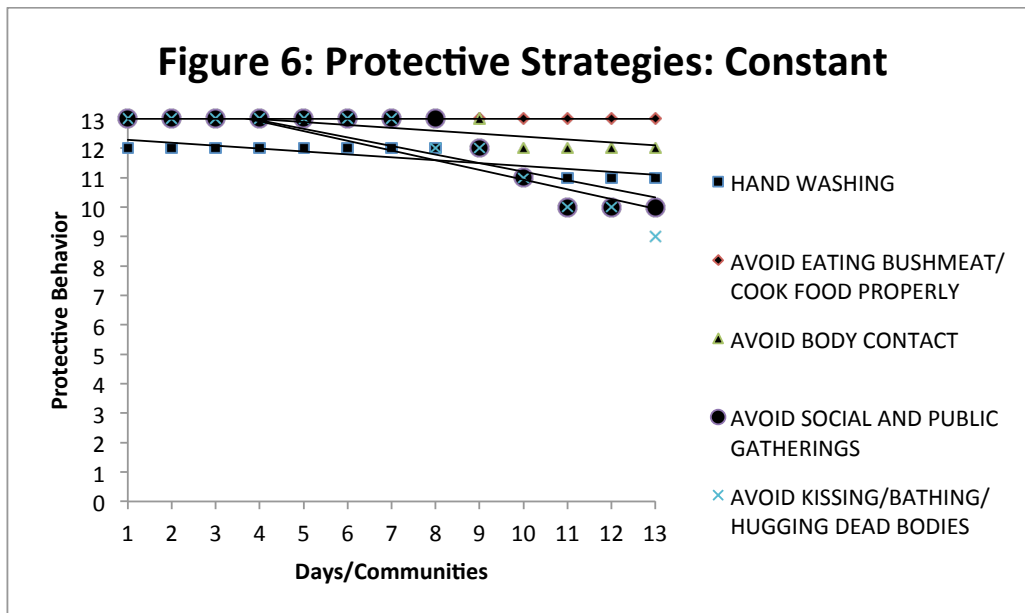


In the same timeframe, the frequency with which communities responded that prayer, faith in God, or other forms of religiosity could protect them from Ebola decreased noticeably. Furthermore, perhaps due to the fact that by early August, Ebola was largely being spread through human-to-human contact and not through animal-to-human contact, populations rarely reported “playing with monkeys and bats” as a risk factor for contracting Ebola. They also ceased to report viewing the touching and sharing of clothing as a risk factor for Ebola. The most significant surprise from this category, however, involved community’s diminishing identification of avoiding *bodily contact* as a protective strategy against Ebola. This requires further investigation (see Figure 5).





A series of proactive preventive measures to protect individuals and their families from Ebola were constant throughout the study; they demonstrates a very limited range of quantitative variation over the two-week period of study (see Figure 6). These included: hand-washing (including washing hands after toileting, washing hands in chlorinated water, and washing hands with soap and water); avoiding eating bush-meat or cooking bush-meat properly; avoiding kissing, bathing, or handling corpses; and avoiding bodily fluids. There was also little change in communities' identification of avoiding social and public gatherings and sporting events. The category of avoiding bodily fluids (urine, public bathrooms, sweat and vomit) is inconsistent with data from the previous section, which showed a greater awareness of bodily fluids as a source of infection (see next section for discussion).



**Limitations:**

There were several significant limitations of this research. First, the study attempts to infer a rate of social learning from a limited set of community cases interviewed sequentially, rather than cumulatively, in a very narrow range of time. This is an artifact of the intent of the study, which was initially designed for practitioner’s program evaluation use, and not for social and public health research. Even so, we believe that the similarities between these c communities (their grouped location around Monrovia, the rapid acceleration of the Ebola emergency during this time period, demographic composition, exposure to a barrage of public health message about Ebola) to justify the authors’ inference that we are observing a patterned change of social learning in these communities. Further research needs to be undertaken to refine these observations.

Second, this study fails to engage sufficiently with community attitudes towards funerals and cremation –significant issues in the current Ebola response. We will be dealing with this issue in greater detail in forthcoming research.

**Conclusion:**

The findings from this study demonstrate that there was a quantitative shift in the acquisition, retention, and discarding of accurate and inaccurate health information about Ebola virus during the first two weeks of the declaration of a state of emergency in Liberia’s urban center, Monrovia. There was also a qualitative shift in local populations’ perceptions of the truthfulness of public health messages, with local populations becoming more persuaded by public health messages at the end of the study than at the beginning of the study. Overall, while certain non-factual messages continued to be reported across the population, the communities that participated in the study showed signs of substantial social learning about Ebola prior to receiving direct instruction from the GOL/UNICEF research and outreach team that collected the data for this study.

Unfortunately, local rumors and text messaging campaigns, and the dissemination of incorrect and misleading government and international healthcare messages complicated social learning by inculcating anxiety and relaying inaccurate information or guidance at a time of critical social learning. These issues, in combination with historical distrust of government and public health messages, muddled social learning processes (see also Sierra Leone [2]). Even so, the implications of this data for the capacity of low-resource local communities to engage in rapid social learning under extreme health crises are profound. This study demonstrates that it was possible for communities to abandon non-factual Ebola information and acquire and retain factual Ebola information, even amidst the circulation of governmental and international conspiracy theories, theories about the poisoning of water and food sources, and theories about health worker complicity in the spreading of the epidemic.

There are some anomalies in the data that suggest that some Ebola messages were recognized and accepted, but ultimately deemed not very practicable in daily life. The two best examples of these anomalies are the apparent conflicts over contact with bodily fluids, with knowledge rising in Figure 1 and prevention messages declining in Figure 5; and the declining reports of messages to avoid public gatherings in Figure 6. Both of these issues require further investigation. These issues suggest a need for both further systematic research, and a need for thoughtful consideration in policy circles about the practicality of many Ebola-related public health messages in these communities.

The implications of these findings have profound implications for current efforts to respond to the Ebola epidemic. Contrary to a widespread perception of “ignorance,” “lack of education,” and lack of human resources,” these communities demonstrate the capacity to uptake information regarding Ebola transmission and management rapidly and efficiently. Furthermore, while Ebola initiatives may take place in communities that continue to believe in conspiracy theories, fears about poisoning, or other malevolent sources of Ebola or other infections, this fact does not preclude social learning about Ebola prevention, care, or treatment. Instead, it might be hypothesized that the presence of conspiracy theories reflects the reasonable social response to ongoing failures to contain the epidemic -- namely, a growing fearfulness and distrust about Ebola, a lack of confidence in governmental and international interventions, and a lack of confidence in a weak and overstretched health sector response. This is consistent with social learning and health practice research that explores the relevance of locus of control and self-efficacy to health messages and health actions [12].

Even so, without the full cultural “buy-in” of local communities to dominant explanations about the sources of Ebola and about methods of prevention, local populations in West Africa can be taught public health and medical prevention messages, protection mechanisms, caregiving skills, case management, and case tracking rapidly, efficiently, and with substantial conviction.

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