Ebola is a wakeup call for technical communicators too

Improved vigilance is needed in medical communications, government guidelines, human factors, and cross-cultural communication

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“We have to rethink the way we address Ebola infection control, because even a single infection is unacceptable.”

–Tom Frieden, director of the Centers for Disease Control and Prevention, announcing changes to equipment- and procedure-related protocols on October 13, 2014 following the transmission of Ebola to American nurses in Dallas, Texas

“I feel that one way to honor the many lives that have been lost to Ebola is to seize the opportunity this crisis has provided our global health and social development communities to unite in advocating across our professions and organizations for increased training, funding, research, and preparedness on risk communication and other disease mitigation measures both at the global, community, and local levels.”

–Renata Schiavo, editor of the Journal of Communication in Healthcare
Abstract

The Ebola outbreak in West Africa was arguably the most important international event in 2014, and certainly one of the largest medical or scientific news stories to covet media attention in recent years. This sprawling public health emergency demanded the attention of not only the medical and health authorities, but also policy makers, journalists, and scientists both domestically and abroad. This list should also include technical communicators, but, despite Ebola’s importance, the scientific and technical communication community remains eerily silent about its significance to the field.

Here, several important aspects of the Ebola outbreak that warrant further research and discussion by technical communicators are discussed, including poor information design in government guidelines, ongoing usability issues with donning and doffing personal protective equipment, and poor cross-cultural communication practices. All of these issues have been actively discussed in both the popular media and academic literature, but technical communicators are not fully engaged in these conversations even though these issues are interrelated with the core tenets of the field. Ebola needs to be considered a chance for technical communicators to voice their opinions, design and propose real solutions for complex public health problems, and become increasingly involved in the healthcare landscape. This will require a huge amount of collaboration, but first technical communicators will need to wake up and assess technical communication failures in the world’s response to Ebola. This needs to be a priority as the field of technical communication continues to develop.
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Do technical communicators have anything to say about Ebola?

This has been said many times, but it is worth repeating: the ongoing Ebola outbreak in West Africa is unprecedented by almost every conceivable metric. It is the largest Ebola outbreak ever, simultaneously affecting more than one country, multiple continents, locations outside of Africa, and urban and capital areas for the first time in history.\(^3\) The latest estimates by the World Health Organization (WHO) report over 26,000 cases and 11,000 deaths (and these are widely considered underestimates).\(^4\) The economic impact could exceed tens of billions of dollars, further exacerbating the already dire situation of the poor, war-ravaged host countries. Although much progress has been made, the outbreak continues to linger at the time of this writing.

The Ebola outbreak was arguably the single most important medical event of 2014, but the scientific and technical communication community remains eerily silent about its significance. This is unfortunate because the wide-ranging ramifications of the Ebola outbreak warrant further attention, research, criticism, and collaboration by technical communicators. Many of the core tenets of technical communication—information design, human factors and usability (especially in medical settings), designing instructions for complex procedures, assessing the needs and abilities of both educated and lay audiences, and cross-cultural communication—are fundamentally intertwined in ways that are perhaps most apparent when viewed through the lens of the Ebola response. Technical communicators are in a unique position to address systemic and ongoing issues related to the Ebola outbreak, as well as the imperfect response by domestic and international health authorities.

Ebola needs to be seen as a chance for technical communicators to voice their opinions, design and propose real solutions for complex public health problems, and become increasingly involved in the rapidly changing healthcare landscape. Ebola essentially lays bare the
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intersection between inadequate global public health responses and healthcare technologies, both of which deserve further input by technical communicators. Moreover, applications in biotechnology and healthcare will surely become more important in the coming years, and technical communicators need to position themselves accordingly.

Here, I discuss several important aspects of the Ebola outbreak that warrant further discussion by technical communicators: poor information design in government guidelines; usability issues with donning and doffing personal protective equipment; and poor cross-cultural communication practices. I cite many articles that have been published throughout both the popular media and academic and scientific literature in order to provide an idea about how widespread these issues have been discussed. However, the technical communication issues discussed here should not be considered an all-encompassing or complete list by any means.

The need to continually test and critique poorly designed government guidelines

Personally, I did not give much thought to the intersection of technical communication and Ebola until I read an article on Vox, a general interest news site. The article—“How does an American nurse contract Ebola? With directions like these”, written by Sarah Kliff and published on October 13, 2014—is one of the few readily available critiques of the Centers for Disease Control and Prevention’s (CDC) infectious disease protocols that was seemingly written from an information design perspective.

Kliff’s article critiques the CDC’s posters for their depiction of donning and doffing personal protective equipment (PPE) (see the explanations in Figure 1). These posters have since been removed from the CDC’s website, though they can still be accessed via the Internet Web Archive. These instructions were originally included in the CDC’s 2007 Guideline for Isolation
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*Precautions: Preventing Transmission of Infectious Agents in Healthcare Settings*, but the sections on Ebola were updated by the CDC in October 2014 following the transmission of Ebola to two American nurses in Dallas, Texas. When treating patients suspected of harboring Ebola, US healthcare workers should now follow the updated guidelines included in *Infection Prevention and Control Recommendations for Hospitalized Patients Under Investigation (PUIs) for Ebola Virus Disease (EVD) in U.S. Hospitals.* These updated guidelines also contain PPE instructions in the section entitled *Guidance on Personal Protective Equipment To Be Used by Healthcare Workers During Management of Patients with Ebola Virus Disease in U.S. Hospitals, Including Procedures for Putting On (Donning) and Removing (Doffing).*

These new guidelines consist primarily of text, and, at the time of this writing, no new infographics or posters have been released (although instructional videos are available). That being said, the 2007 *Guideline for Isolation Precautions* remains the go-to guidance for healthcare workers in infectious disease settings, though there is some concern that these protocols are outdated and largely only address routine infections and airborne disease. For example, negative-pressure isolation units that use filtered air are recommended to prevent the spread of airborne diseases (such as SARS and tuberculosis), but this precaution would largely be ineffective against Ebola because it is spread via bodily fluids.

Kliff details the problems with the instructions shown in the CDC’s original posters. Multiple sections are presented—each for a different piece of equipment—and each section contains multiple steps. For example, 21 steps are needed to doff PPE in one set of instructions, but, confusingly, two separate examples of instructions are provided on doffing PPE without an explanation about which set of instructions should be preferred. This is especially important because doffing PPE is now considered a major issue because most transmission to healthcare
workers occurs during this step.\textsuperscript{14,15} There are also numerous inconsistencies throughout the poster that could hamper reader comprehension. It is difficult to imagine that any sort of stringent usability testing was applied to these posters before they were finalized. Kliff bluntly states this assumption: “Imagine trying to keep all this in mind while also trying to treat a patient.” This is exactly the sort of criticism that technical communicators should direct toward government guidelines on a regular basis.

Just as damaging, as explained in a series of tweets by Jonathan Reiner, a cardiologist at George Washington University, some of the presented information was inaccurate. Ernest Wang, an emergency physician, tweeted similar criticisms about the posters, stating that multiple potential routes of exposure are visible in the poster. A representative with Médecins Sans Frontières (MSF) (more commonly known as Doctors Without Borders in the US), an organization that has always been at the forefront of combating Ebola in Africa, stated “I’ve seen the CDC poster. It doesn’t say anywhere that it’s for Ebola. I was surprised that it was only one set of gloves, and the rest bare hands. It seems to be for general cases of infectious disease.”\textsuperscript{16} This is particularly important because MSF has its own PPE guidelines, but the CDC had not taken these into consideration.
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Figure 1. Select critiques of the CDC’s poster for donning and doffing personal protective equipment

From the first sentence, these instructions are immediately vague and leave room for interpretation.

The instructions end without mentioning the lower body or footwear.

Examples of especially important “safe work practices” should be provided.

“Heavy contamination” should be defined. Or, should all visible contamination be disinfected?

The instructions only require washing hands following contamination, and do not mention other parts of the body.

Asterisks should not be used to clarify information at the bottom of the instructions: this breaks up the continuity of the tasks and makes it harder for the reader to keep her place.

The CDC needs to provide 24-hour contact information so health personnel can call to clarify unclear instructions.

Letters are used to indicate the order in which steps should be performed, but bullets are used next to the written instructions. This makes the instructions harder to follow.

Are washing hands and alcohol-based hand sanitizer considered equivalent following all possible contamination scenarios?
The 2007 Guideline for Isolation Precaution is voluntary and allows a wide variety of medical equipment. Consequently, “many American hospitals have improperly trained their staffs to deal with Ebola patients because they were following federal guidelines that were too lax”, or hospitals have had to devise their own stricter protocols. Another infection control expert called the initial CDC guidelines “absolutely irresponsible and dead wrong” and stated that he was “[blown off]” when he tried to warn the CDC about the lax guidelines. (Note the lack of collaboration here: I will circle back to this point later.) Another article in a nursing journal criticized the technical procedures described in the CDC guidelines, including the fact that “these guidelines also did not consider the complex psychomotor processes of donning and doffing as well as individual healthcare worker characteristics, including fatigue and potential comorbid conditions.” Basically, the instructions failed to take into account audience considerations and seemingly explained improper techniques that could have resulted in exposure to pathogen-bearing materials.

This sort of confusion presumably did result in exposure, thereby resulting in two American nurses contracting Ebola from their patient—a Liberian national who had contracted Ebola prior to coming to the US—at Texas Health Presbyterian Hospital, located in Dallas, Texas. At the time of this writing, these two nurses are the only people who have contracted Ebola in the US. (Another nurse in Spain also contracted Ebola from a patient; all other Ebola patients in the US and Europe contracted the disease in Africa and were subsequently transported for further treatment.) One of these American nurses is now suing her employing hospital, and her original petition brings to light several questionable practices including the lack of training, policies, guidance, procedures, and equipment. This led to nurses and hospital administrators “Googling” and printing off PPE information from the internet moments before administering
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care to a possibly contagious patient. Nurses did not wear proper protective gear for at least two days, and “the nurses were just using their best guesses and their instincts to protect themselves.” Nursing associations have similarly criticized the CDC guidelines, claiming that lax, unforced guidelines were easily ignored by hospitals and that no protocols or training sessions were provided, thereby putting healthcare workers at risk.

The transmission of Ebola to these two American nurses serves as a stark example of how US hospitals and healthcare workers can respond to major disease outbreaks, and confirms the value of designing easy-to-use and accessible guidelines. The CDC immediately blamed a “protocol breach”—thereby shifting blame to individuals, rather than acknowledging the shortcomings of institutions and federal guidelines—though it is also widely recognized that few US hospitals could respond to Ebola, and training and communications protocols remain inconsistent.

As technical communicators, one of our most important roles is to advocate for the user, and this is especially important when discussing the guidelines and technologies used by frontline healthcare workers. Perhaps 6% of US hospitals are prepared to receive an Ebola patient, and most hospitals cannot realistically adhere to CDC guidelines. Of course, donning and doffing PPE is a very complex procedure that leaves little margin for error. However, this margin is inevitably widened by protocols and instructions that are open to interpretation and require independent and subjective decision-making: in other words, human error will find a way if given the opportunity. Removing ambiguity from the perspective of the end user needs to be a priority for any updated set of guidelines, though this might not be possible due to the variability in hospital preparations across the US.
Ongoing constructive criticism of federal medical guidelines by technical communicators is warranted and needs to be encouraged. When I first read Kliff’s article criticizing the CDC’s poster, I was immediately reminded of Edward Tufte’s critique of NASA’s engineering documents in the wake of the Challenger disaster, wherein poor information design was cited as a contributing factor that allowed the shuttle to launch despite warnings from the engineers. There is a similar corollary with the events in Dallas, wherein poorly designed and inadequate access could have played a supporting role in an unprecedented event that many considered impossible.

The CDC guidelines have been updated, are now considered more detailed, and take into consideration the guidelines used by MSF and scientists at biocontainment laboratories. Besides restricting skin exposure and providing specific equipment recommendations, the guidelines now emphasize intensive training, practice, and supervision during the removal of PPE. Still, this does not mean the problem has been solved: “while the changes should diminish the risk of transmission to the healthcare worker, the removal of PPE is now even more complicated. Thus, the need for improved protective technologies continues to evolve.”

My concerns—from a technical communication standpoint—include:

1) Are the updated protocols easier to understand and access?; and
2) What continued reviews and usability tests will be performed?

Because these protocols were quickly written and put in place following a major and chaotic news event, it is best to err on the side of caution and assume improvements could be made. For example, determining how to best apply protocols devised in Africa for use in the US is especially important and requires thoughtful research (needless to say, these healthcare settings can differ substantially). I am skeptical that such research will be conducted in a timely
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manner. Unfortunately, user-centered design and testing is too often neglected throughout healthcare applications, unlike other industries such as aviation.\(^{36}\)

My concerns also stem from the fact that the CDC’s standing and updated guidelines remain typical of most government guidance: long, incredibly dense, and difficult to navigate. Despite their importance, government guidelines are often taken at face value and accepted without continued diligence. The 2007 Guideline for Isolation remained posted, uncriticized, and unchallenged until nurses contracted Ebola on US soil for the first time in history. More broadly, technical communicators need to ask:

1) Is the 225-page 2007 Guideline for Isolation Precaution, which contains over 1100 citations and is largely devoid of visual instructions and other forms of media, sufficient for explaining complex medical procedures in the digital age?;

2) How might government guidelines be improved to present information in a way that is easier to understand?;

3) How might technical communicators work to increase collaboration between agencies?; and

4) What are the best ways to disseminate new guidelines to frontline healthcare workers?

In particular, I encourage all technical communicators—especially those with interests in web and information design—to spend some time surfing the CDC website and to voice their recommendations. It has been acknowledged that “most Americans do not get their health information from the CDC website,\(^{37}\) but maybe this is, at least in part, influenced by the poor information design of many government websites? Perhaps the CDC gets away with having a
poorly designed website because of its status as the leading public health institution in the US. Iterative design is too often neglected even in private industry, and it might not even be a serious consideration at top government institutions.

Janice Redish wrote about the need for government websites to change their online communication practices in her article “Content as conversation in government websites”. She refers to the old model of government websites as “virtual filing cabinets—offering people access to paper documents.” This certainly seems to be the case for the CDC’s website, which can be a confusing and frustrating experience with multiple PDFs, tables, checklists, videos, and long reams of text spread over multiple pages. Information is often both redundant and hard to find. This reality is clearly at odds with Redish’s main point, that usability should be defined as the ability to “find, understand, and act” using a reasonable amount of time and effort. The ability to find, understand, and act is especially important in healthcare settings, as time is often of the essence.

Redish encourages using plain language to enhance usability. The CDC still clearly struggles with adopting its guidelines for use in the digital age using plain language, as evidenced by the title of their updated PPE guidance—Guidance on Personal Protective Equipment To Be Used by Healthcare Workers During Management of Patients with Ebola Virus Disease in U.S. Hospitals, Including Procedures for Putting On (Donning) and Removing (Doffing)—which is clearly quite a mouthful. The remainder of the guidance is presented as a numbered and bulleted outline, which is not conversational either. Here, we see how the CDC misses one of Redish’s most important points: people do not come to government websites to find guidelines; they come to government websites to find information. Finding ways to rewrite the CDC’s website using a more conversational tone would certainly help overcome any long-
standing usability issues and improve the site for future use. This is perhaps especially important when considering instructions, such as those used to direct the use of PPE, as most instructions can easily be envisioned as a conversation between two people.

The CDC will presumably continue to release updated guidance and instructions, which need to be critically evaluated by technical communicators. Ongoing usability assessments are essential, especially for guidelines that might be revised once every 10 years. Notably, the CDC has released video instructions (rather than written guidelines and infographics) as part of their revised guidelines, but the effectiveness of this new communication practice warrants further evaluation.

The usability of federal medical guidelines remains a major issue, especially if healthcare workers are tempted to find guidance online when needed, as was the case in Dallas.

**Human factors and “mundane” processes**

Ebola is especially dangerous for healthcare workers in Africa. Huge amounts of bodily fluids are shed by Ebola patients, and exposure to even very small amounts of Ebola-carrying fluid can result in transmission (the viral load is notoriously high in both living and dead Ebola patients). The latest statistics by WHO report over 800 infected healthcare workers, of whom over 500 have died. This includes prominent and experienced doctors. In addition to the human tragedy, this carries enormous psychological and logistical costs to the entire response effort.

The causes of transmission to healthcare workers are multifactorial: the health infrastructures of the host countries are inadequate, and there are far too few healthcare workers; Ebola is new to West Africa, and the health infrastructure was caught off guard; PPE is in short
supply and can be improperly used; Ebola patients require a huge amount of care, taxing the available healthcare workers to their physical and emotional limits; recognition is often delayed because Ebola appears similar to other diseases common in West Africa, and diagnostics are in short supply.

The high risk of infection requires healthcare workers undergo extensive training and supervisory periods. (MSF requires 2–5 days of training, followed by 3–6 weeks of supervised work.) PPE are cumbersome and hot, especially in the West African climate. Doffing PPE is a laborious process, and since healthcare workers are often covered in contaminated bodily fluids at that point, extreme care must be taken to avoid transmission. Exhaustion, however, can and does lead to mistakes and exposure. PPE usability also directly influences patient care: draped in layers of PPE with their faces concealed, healthcare workers struggle to bond, communicate, and develop trust with their patients. These factors are summed up succinctly in MSF’s one-year report:

In the eight-piece ‘space suit’ worn by MSF medical teams on the ground temperatures can reach 46 degrees Celsius. One of the most dangerous moments is removing the soiled suit, a meticulous 12-step process that is frustratingly complex, can take up to 20 minutes, and is repeated at least three times per day.

‘We have to move and breathe slowly due to the overpowering heat, limiting us to spending an hour maximum inside at a time,’ says Dr. Hilde De Clerk. ‘Inside the high-risk zone, I have to plan the most crucial activities I can squeeze into that hour. It’s
frustrating and upsetting that I can’t spend unlimited time with my patients or connect with them as I usually would, with a smile or comforting human touch.  

Some of these PPE issues are logistical and economic, but some fall squarely within the realm of technical communication. When discussing healthcare solutions, oftentimes too much emphasis is placed on the need for new vaccines, new medical treatments, and new technologies. Technical communicators need to acknowledge that Ebola confirms that “the mundane world of process” is equally as important, if not more so. Oftentimes technical communicators struggle to convince institutions and industry of their value, but technical communicators can really make a difference by working to improve training protocols, instructions, and knowledge gaps in technical procedures (e.g., the flaws in the electronic medical records that initially allowed the Liberian patient to be released from the hospital with Ebola-like symptoms).

Such sentiments were echoed in the medical literature during the early stages of the Ebola outbreak:

Protection of healthcare workers in Ebola outbreaks does not happen by accident—it is achieved through the provision of adequate PPE and, more important, a focus on systems processes that enforce the safe use and removal of PPE. The challenges and successes in Africa should inform the discussion in the rest of the world about reducing the risk of transmission and refocus the conversation on the process of donning and doffing PPE rather than simply increasing the amount of it.
Atul Gawande, a surgeon and public health researcher, has written extensively about how healthcare should be viewed as a process that can be improved. One of his most basic recommendations is increasing the use of checklists in healthcare settings, as medical procedures are increasingly too complex to be remembered solely using one’s own memory. This is sometimes met with scorn by physicians—it is seen as unnecessary, bureaucratic paperwork, or as interfering with “the art of medicine”—though the evidence shows that it works. Similarly, the surgical checklist issued by WHO is considered “phenomenally successful.” Developing and testing similar checklists in medical settings needs to be fully embraced by technical communicators, in addition to cross-collaboration among agencies who develop and use similar protocols.

Of note, in response to the Ebola outbreak, the US Agency for International Development hosted “A Grand Challenge for Development” in an effort to develop better PPE. The first nominees have already been announced, which include new protective suits that are easier to don and doff, antiviral sprays, and cooling systems. Similarly, “some currently available products provide excellent protection but are nearly impossible to remove without self-contamination,” and repurposing these products will be an ongoing endeavor. Incorporating blunt scissors into redesigned PPE has also been proposed as a way to facilitate doffing, though that would require even more stringent testing and usability assessments. Many healthcare researchers are actively thinking about solutions to these problems, but technical communicators are needed to hash out and continually revise the processes that will actually make these solutions usable in clinical situations.

Technical communicators should keep abreast of further PPE developments as these initial innovations enter the testing phase. Usability testing, the development of instructions, and
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their integration into existing protocols are opportunities for technical communicators. Thinking a step ahead, multidrug-resistant organisms and other zoonotic diseases are already considered public health risks, and these risks need to be considered in future PPE designs. Fortunately, as evidenced by do-it-yourself PPE designers\(^{56}\) to wedding dress designers being hired by Johns Hopkins,\(^{57}\) there are more opportunities than ever for technical communicators to apply their skills and collaborate.

**Maintaining credibility and cross-cultural communication**

No matter how well designed a product or set of instructions, its use will be influenced by the cultural contexts of the users. Really, there is no universal “best” way to design a product or explain a concept that will be equally effective across all cultures. This is especially true in the health and medical sector, as care is a highly contextualized phenomenon that is strongly rooted in one’s community. It should not be surprising that cultural considerations are at the forefront of the response to the current Ebola outbreak. Unfortunately, cultural oversight is not unique to the 2014 Ebola outbreak: Western aid organizations have been accused of “cultural chauvinism” in their responses to prior Ebola outbreaks.\(^{61}\) The 2014 outbreak is the 25\(^{th}\) Ebola outbreak in history, but cultural ignorance is an often-repeated and tragic mistake.

Liberia, Guinea, and Sierra Leone are poor, war-ravaged countries with inadequate infrastructures, especially within the health sector. Distrust of authorities is common.\(^{62}\) The region is incredibly diverse, with a huge number of cultures, tribes, traditions, and languages. Public health authorities have struggled to provide correct information, dispel myths,\(^{63}\) and maintain positive interactions with the affected communities, and in some instances healthcare providers have been attacked and killed.\(^{64}\) Attempts to warn people about the risks of Ebola have
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backfired, “fuelling hopelessness and despair” that subsequently drove people to avoid help from public health authorities."^65 Countering the sway of traditional healers and engrained cultural practices—especially burial practices, which include washing and touching deceased family members—has been a significant issue. Moreover, women are disproportionately susceptible to Ebola because they traditionally take on roles as caregivers and healthcare workers, but women are also prone to isolation from public health campaigns."^66 Without acknowledging these culture realities, audience assessments and communication efforts have been hamstrung.

Ikea—long revered by technical communicators for designing wordless, easy-to-use furniture instructions—takes cultural considerations very seriously and does a huge amount of market research, including “home visits, surveys, [and] sending anthropologists into people’s homes.”^58 Most importantly, Ikea makes an effort to learn from their mistakes: for example, quickly realizing that Americans did not understand furniture dimensions listed in centimeters and subsequently adapted their products for sale in the US. Ongoing review and product testing within cultures is an integral part of Ikea’s business model. In contrast, following the 2008 financial crisis, the WHO was forced to make large and dramatic cuts across various departments."^59 “The WHO’s epidemic and pandemic response department—including a network of anthropologists employed to overcome cultural differences during outbreaks—was dissolved, and its duties split among other departments,” reported The New York Times."^60 Some experts in the field left the organization altogether. The shortsightedness of this decision is a tragic lesson for public health officials, as well as for technical communicators, as it likely slowed containment efforts.

Kirk St. Amant recently wrote about care contextualization and developing medical visualizations across cultures. Providing accurate health information “involves more than just
translating texts,” as cultural expectations and context must be acknowledged for information displays to be credible. St. Amant recommends using prototype theory to examine “the connections between visual representation and cultural preferences.” In practice, this means designers should review images made for use within cultures by members of those cultures. Á la Gawande, a checklist of features can be devised to guide the designs made by outsiders that are more culturally credible because they take into account, for example, the typical cultural representations of tools.

More importantly, this idea can be applied beyond the designs of posters and leaflets to specific contexts: for example, evaluating the cultural representations of the individuals who provide care. So, in the context of the 2014 Ebola outbreak, health communicators need to ask: Do West Africans associate foreigners in “space suits” with their cultural representations of caregivers? My hunch is that the answer to this question is no, and I suspect this oversight damaged the credibility of the aid agencies who initially encountered resistance in isolated communities. Similar critiques can be made about the physical contexts in which care is administered: some West African populations are wary of being transported to new makeshift hospitals located many miles from their homes because this is not the context in which they typically receive healthcare. Without recognizing contextualizations, trust and credibility cannot be built and aid is therefore viewed with skepticism. Overcoming these long-held cultural contextualizations is difficult and cannot be done without significant research and outreach; moreover, it cannot be done by simply reiterating scientific facts as these arguments do not hold water across all cultures and contexts. Ultimately, bridging gaps in credibility requires forging relationships with local leaders who understand the needs of their communities and how to overcome cultural obstacles. Such collaboration needs to be encouraged anyway, and this
collaboration can be used to research and develop effective personas. Once these personas are established, they can be incorporated into the design of new guidelines and public health initiatives.

Accordingly, the logistics of communicating with different forms of technology also needs to be considered within the context of public health initiatives for prototype theory to be successfully applied. Technical communicators, especially those in the West, need to keep in mind that 60% of the world’s population does not have internet access. These relatively poor and isolated populations oftentimes comprise the last pockets of disease that are the hardest to eradicate, and communicating health information to holdouts is notoriously difficult due to the shame and stigma that often accompany disease. Information campaigns in West Africa have relied on radio and billboard warnings, but these efforts are complicated by the number of spoken languages and illiteracy. WHO has experimented with using text messaging to spread accurate information and coordinate responses efforts, as upwards of 40% of the West African population uses mobile phones. One such tool is mHero (Mobile Health Worker Electronic Response and Outreach), a mobile phone-based system for coordinating healthcare workers, training materials, test results, and other logistics. Technical communicators need to recognize and find ways to work within these limitations, which are not often priorities in more developed countries.

That being said, similar lessons can be applied to the atmosphere in the US following Dallas and how the CDC responded to concerns that Ebola might spread with the US. In many ways, certain populations in the US are just as isolated as those in West Africa: the health system is fragmented and inaccessible to some populations; distrust of government authorities is not uncommon; and some people hold an innate distrust of science (e.g., climate change, vaccine,
and evolution deniers). Technical communicators, scientists, and physicians often think such “science communication problems” can be explained away using more facts, better figures, comprehensive research, and compelling statistics. But these strategies do not work across all populations because it misses the importance of credibility across contexts. The contextualizations of education and care are almost always associated with the community, not government health officials who can easily be viewed as distant, faceless, and out of touch (and who do not use plain language). Much like in the public health response to Ebola, scientific holdouts need to hear from people they trust and share other important values. To be truly successful in communities that do not embrace scientific consensus, technical communicators will have to break out of their comfort zone and conduct ongoing outreach to leaders in communities who can serve as ambassadors.

Richard D. Smith, reflecting in 2006 on the lessons learned following the SARS epidemic, lists several factors that can result in confidence loss and thereby exacerbate epidemics. Nearly all of the factors he lists can be applied to the Ebola outbreak, but one in particular is noteworthy: “suspicion that risks are being downplayed.” This issue is ultimately about trust and credibility. In addition to audience assessments and community outreach, building trust requires addressing the risk perceived by the public and the actual risk conveyed by institutions in public-facing communications (e.g., the CDC website). Ideally, this ongoing strategy would address concerns in real-time. Public health initiatives might be new ground for technical communicators, and it’s a notoriously difficult territory (the audience considerations are basically endless), but here technical communicators can help adapt communications written by policy and medical personnel for use by the general public, both domestically and abroad, in language they can understand, believe, and trust.
Information overload and the need for better collaboration

Finally, the sheer volume of official materials available on Ebola that have been published by various government and public agencies is overwhelming. The CDC, WHO, MSF, the European Centre for Disease Prevention and Control, OSHA, NIH, various biocontainment laboratories and hospitals, and many, many more organizations and agencies have published their own statistics, reports, guidance, resources, and instructions. Numerous updates have been issued since the international response began in earnest in early summer 2014, and more reports and recommendations will surely follow in the coming months as (hopefully) the Ebola outbreak is contained and finally stopped.

This is not surprising given the explosion of information encouraged by internet technologies. The Ebola outbreak is truly unprecedented, and every government and nongovernmental agency, journal, newspaper, and organization with an interest in health has been forced to acknowledge and report Ebola. MEDBOX is perhaps one of the best resources for finding guidelines and other official documents from multiple official sources, though it is still in development and should be considered incomplete. The Center for Infectious Disease Research and Policy also provides a fairly comprehensive list of Ebola-related resources. Branching out to include articles published in the general press and medical literature could be considered a hopeless task. Identifying and sorting through less-than-reliable sources of information is another issue altogether.

From a technical communication standpoint, not only is the amount of information staggering, but these documents demonstrate a huge range in terms of style, tone, plain language, visual design, use of infographics and multimedia, checklists, instructions, etc that are used to present this information. This is a major research opportunity for technical communicators.
interested in assessing various aspects of the technical response to Ebola—what works best, what issues need to be addressed, and other inadequacies in how information is accessed, understood, and used—and finding ways to collate and organize this information. More importantly, future research on these documents should be used to spur additional collaboration between experts. Notably, in the wake of Dallas, the CDC amended its 2007 Guideline for Isolation Precautions to take into account the protocols used by MSF. This should have been done earlier, given MSF’s status as an Ebola fighter, though, of course, hindsight is always 20/20. WHO similarly revised its guidelines.

This is precisely the type of collaboration that needs to be encouraged and implemented on an ongoing basis; however, this is increasingly difficult given the huge amount of available information. The need to work together, avoid repeating the same mistakes, and combine research findings is more apparent than ever given the realities of globalization and the speed at which diseases can travel. Unfortunately, rich countries and international organizations acted too slowly to muster an appropriate response to Ebola, despite warnings from organizations such as MSF. This is stated unequivocally in the MSF report: “For the Ebola outbreak to spiral this far out of control required many institutions to fail. And they did, with tragic and unavoidable consequences.”

Publically acknowledging these problems with the global health community’s preparedness to detect and respond to disease outbreaks is the first step to any reform efforts. As pointed out in an op-ed by Bill Gates, the flaws in the response by the WHO and CDC are not even the real issues: “the problem is that we don’t have a system at all.” Personally, however, I wonder if such a system will ever get up and running, or if it even matters. WHO has been roundly criticized for delaying and mishandling the Ebola response because of internal
politics,\textsuperscript{78,79} and calls for significant reform are being considered. But, it’s important to keep in mind that any new system could eventually succumb to similar political problems.

I do not believe a new, or revamped, system is the solution: the solution is better collaboration. Clearly this is easier said than done, but the era of the “closed shop [is dead]”\textsuperscript{80} and technical communicators need to learn how to apply skills outside of our own employers and collaborate across disciplines. Ebola was not contained by the work of a single organization (or system), nor will future outbreaks. Containment requires governments, nongovernmental organizations, militaries, private companies, and local community leaders to trust each other and work together. The Ebola response shows that closed shops—like the CDC and WHO—are prone to mistakes that damage public trust, credibility, their own reputations, and, ultimately, the effectiveness of their own public health responses. It is apparent that such closed shops need to find ways to broaden their collaboration practices, make their activities more transparent, and use plain language to explain technical concepts; doing so might be the only way to ensure the success of public health initiatives, where trust and credibility are arguably more important than all the vaccines, PPE, and guidelines that receive so many of our resources. Hopefully, collaboration would also help stem the blaming and finger-pointing that inevitably follows in the aftermath of any crisis.

**Looking ahead**

In mid-December 2014, when the Ebola outbreak was still relatively severe, Margaret Sullivan, the public editor of *The New York Times*, wrote an op-ed discussing how Ebola has affected journalism.\textsuperscript{81} She mentions its scope—how Ebola required coverage across multiple departments, including “international, business, metro, national, investigative, Washington, and
science’’—and “the strong graphic component.” Ebola Facts is an excellent, data-driven resource, and *The New York Times* also posts a fair amount of other multimedia. Blogs and social media were used to answer reader questions in real time. Providing accurate reporting and information was not easy in “an atmosphere of fear, anxiety, and misinformation,” but, in an age when newspapers are increasingly cutting coverage in order to save costs, “the Ebola coverage is worth acknowledging as a remarkable example of what *The New York Times* must preserve as it moves forward.”

I know similar lessons can be applied to technical communication as the field continues to develop. Much like journalism, technical communication needs to adapt to changing communication practices and problems. Government guidelines need to move beyond the glacial pace at which they are currently updated and revised. In our increasingly globalized world, technical communicators need to quickly adapt instructions and guidelines for use by other cultures—the Ebola outbreak shows that this is especially important to public health endeavors. Government guidelines need to adopt multimedia applications that have become so commonplace everywhere else. Guidelines need to be reevaluated, especially following revision in the wake of serious events as new lessons are learned, and constantly critiqued and reassessed thereafter. The use of plain language in guidelines and public-facing government guidelines absolutely has to increase. The technical communication community needs to document these missteps in communication, information design, and usability that have hampered the world’s response to the Ebola outbreak and propose realistic solutions.

Beyond Ebola, the medical landscape is rapidly changing and becoming increasingly more complex. Coming innovations in biotechnology and healthcare could rival or even dwarf the significance of computers and internet technologies. Biology and healthcare are the next
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frontiers in technical communication. Battling emerging pathogens (e.g., zoonotic diseases, multiple drug-resistant organisms) will require guidelines that anticipate the risks faced by healthcare workers. Even outside of major disease outbreaks, point-of-care medicine, consumer medicine, and telemedicine will require the better presentation of instructions and information to both the general public and healthcare workers. These instructions and guidelines will undoubtedly be more complex than those that currently exist, and new strategies need to be developed than can efficiently explain this information to multiple audiences across cultures in real time. This will require a huge amount of collaboration across disciplines, and technical communicators should view themselves as the professionals who can spearhead these issues.
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Citations


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