

POTENTIAL BENEFITS  
OF SOCIAL MEDIA IN A  
WEAPONS OF MASS DESTRUCTION (WMD) EVENT

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by

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POTENTIAL BENEFITS  
OF SOCIAL MEDIA IN A  
WEAPONS OF MASS DESTRUCTION (WMD) EVENT

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This work is dedicated to my thoughtful wife and family, for believing in my abilities and supporting this effort to glorify our God, our Savior, our Christ. We hope to provide others its meaning to His glory.

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POTENTIAL BENEFITS  
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ABSTRACT

Weapons of mass destruction (WMD) can come in multiple forms. Regardless of their nature being chemical, biological, nuclear, or high explosives, their use will disrupt normalcy and governance of nations. Application of WMDs is no longer an improbability, and life sciences can be easily manipulated to produce a biological WMD. If a biological WMD is unleashed, strategic communications will be a critical facet for its management. In mass casualty situations, the medium of social media and social networks may offer communications solutions to institutions of public health and emergency preparedness to mitigate the consequences of biological WMDs.

This study conducted a qualitative review of strategic communications preparedness in three levels of government; federal, state, and local institutions of public health and security. The findings show that public health and emergency preparedness agencies are preparing themselves to leverage new media systems, specifically Twitter and Facebook, as channels for strategic communications. Overall, this study found the three tiers of government complementary in their collective vision managing the communications challenges of WMD events. Modeling this study may suggest further studies in the field of strategic communications in such a way to measure the progress of integrating social media and social networks for WMD-related crisis communications.

# Chapter 1

## Introduction

Weapons of mass destruction (WMD) can come in different forms. Military experts view WMD under the rubric of CBRNE (chemical, biological, radiological, nuclear, or high explosive) designed to maximize death, fear and disruption of societal normalcy. It has become a weapon of choice for politically motivated religious extremists, such as Al Qaeda and Afghanistan's Taliban, where organized stateless actors, funded by undeclared private capital, have declared war on the United States and its allies. This proposal suggests using Diffusion of Innovation theory (DOI) to frame and compare how the communicators at various levels of the public health and safety infrastructure, from local public health and first responder organizations to responsible federal agencies, have positioned themselves to use social networking/social media platforms (SN/SM), to disseminate and interact with the public in a biological WMD event.

Because WMD's may result in mass casualties, this research proposal suggests studying the efficacy of SN/SM as a mass communications medium in such national emergencies. It proposes to assess qualitatively the perceptions of public health officials and first responders of how SN/SM can mitigate the strategic and operational communications complexities expected in the nexus of public health and homeland security with the challenges faced by these authorities in preparedness for a biological WMD event and the first 48 hours following the attack.

Strategic communications challenges have been experienced during emergencies precipitated by WMDs, from the World Trade Center bombing (1993) to Oklahoma City

(1995) bombing to 9/11 eighteen years later. Extremists have used mass media as a means of leveraging their lack of overt military power with extremely destructive terrorist tactics against soft targets using WMDs as a tool for political speech and gain the spotlight for their cause. Terrorists have developed expertise in their public relations skills to provide a sympathetic narrative to the world audience, while branding their cause as a righteous Islamic struggle against secularism and imperialism. For example, Al Qaeda's Manifesto for a Holy Jihad justified in the "Ladenese Epistle", written and posted on the internet in 1996, shows one method of Al Qaeda leveraging the Web 1.0 to reach its sympathizers:

"It should not be hidden from you that the people of Islam had suffered from the aggression, iniquity and injustice imposed on them by the Zionist-Crusaders alliance and their collaborators; to the extent that the Muslims blood became the cheapest and their wealth as loot in the hands of the enemies. Their blood was spilled in Palestine and Iraq. The horrifying pictures of the massacre of Qana, in Lebanon are still fresh in our memory. Massacres in Tajakestan, Burma, [Kashmir], Assam, Philippine, Fatani, Ogadin, Somalia, Erithria, Chechnya, and in Bosnia-Herzegovina took place, massacres that send shivers in the body and shake the conscience. All this [happened] and the world watch[ed] ... and not only didn't responds to these atrocities, but also with a clear conspiracy between the USA and its' allies under the cover of the iniquitous United Nations, the dispossessed people were even prevented from obtaining arms to defend themselves. The people of Islam awakened and realized that they are the main target [of] aggression ... All false claims and propaganda about human rights were hammered down and exposed by the massacres that took place against the Muslims in every part of the world... The latest and the greatest of these aggressions ... is the occupation of the land of the two Holy Places ... by the Armies of the American Crusaders and their allies."-Osama Bin Laden.<sup>1</sup>

This manifesto reveals persuasive weaving of ancient and post-modern history into a narrative that frames the United States as a brutish and hypocritical superpower that colludes with Zionists to subjugate the world's Islamic faithful while the United Nations condones such aggression.

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<sup>1</sup> (Shah, 2008), 48-49.

Another media technique used by terrorists is to provide a video narrative, using social media such as YouTube, as a prepackaged broadcast program for further dissemination through the mainstream media. Videos are disseminated on Jihadist websites while copies are given to mass media outlets such as Al Jazeera for further dissemination to traditional media outlets. A recent example is when the Taliban attacked the US Embassy and NATO headquarters on September 13, 2011, which was preceded by the 10<sup>th</sup> anniversary of 9/11.<sup>2</sup> On September 12, a one-hour speech by Al Qaeda's current leader, Ayman Al Zawahiri, M.D., released to Jihadist web sites and Al Jazeera marking the 10<sup>th</sup> anniversary of 9/11.<sup>3</sup> Such coordination among the Taliban and Al Qaeda is standard operating procedure for these organized but stateless actors.

In this environment, the possibility of another WMD attack in the United States looms. Biological warfare (BW) is a major concern. It is incumbent on crisis communicators in government to prepare for such an event. These preparations should include strategic communications plans developed prior to the WMD, as well as post-event plans. This research proposal seeks to assess qualitatively the state of preparedness among public health and emergency preparedness organizations for WMD events. The interviews consist of open-ended questions on how new media-based technologies are being used or planned to be used in WMD crisis communications situations. The interviews encompass "vertically" sampled public health offices and preparedness organizations from local, state and federal levels. Although traditional media also play a significant role in WMD communications environments, this research focuses on the how the various agencies are visualizing the use of Web 2.0 platforms, specifically Twitter

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<sup>2</sup> (Harooni & Shalizi, 2011).

<sup>3</sup> (CBS News On Line, 2011).

and Facebook, for WMD-related crisis communications.

### **Brief History of WMD**

Some historians consider the United States the 68<sup>th</sup> empire in known history<sup>4</sup>. As an empire, the United States has been committed to an open, secular and democratic society while respecting the religious freedom for all. Having harnessed the industrial revolution with science and technology, this nation has prospered. During the course of the 20<sup>th</sup> century through two world wars and the atomic age, study of life sciences enabled American democracy to thrive through advancements in medical research that nearly doubled the life expectancy of its citizens.<sup>5</sup> In 1900, the life expectancy was 47 years among whites and 33 years among African-Americans. Today, they are 78 and 73 years, respectively. In the midst of general level of well-being, the same knowledge in the life sciences allows the threat of bioterrorism to loom over the globe where countless lives are threatened from political extremism and their declared application to weapons of mass destruction (WMD) to enable a global Jihad.

For the past several years, there has been a disquieting conversation among public health professionals about the WMD dilemma.<sup>6</sup> Since the collapse of the Soviet Union, the possibility of state-sponsored threats of biological warfare has diminished. However, from non-state actors, this type of risk is increasing, as terrorists are willing to use biotechnology for WMD applications. It has transitioned from nuclear WMDs to stateless sponsors of bio-terrorism as the terrorist weapon of choice.<sup>7,8</sup> For the West's adversaries,

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<sup>4</sup> (Ferguson, 2004), 14.

<sup>5</sup> (CDC, 2011), 134.

<sup>6</sup> (Bhardwaj, Srivastava, & Karan, 2009).

<sup>7</sup> (Biosecurity 2.0-Enduring threats in the former Soviet Union, 2011), 78.

the “do-ability” of a biological WMD event is getting easier, not harder. The disastrous impact that an audacious WMD attack would have on the United States provides great incentives for organized extremists like Al Qaeda to inflict lasting psychological and economic devastation.

An example of such an attack is the 1995 Japanese cult Aum Shinrikyo (*Supreme Truth*) that attacked the Tokyo subway system with the sarin nerve agent, a manufactured chemical weapon used as a WMD.<sup>9</sup> This attack was the cult’s second WMD attack accomplished in Japan. The first attack occurred in Matsumoto City nine months earlier, where seven citizens were killed and 58 hospitalized.<sup>10</sup> This second successful attack in Tokyo resulted in twelve deaths and forced six thousand subway patrons to obtain emergent medical attention. Due to the rush of patients seeking emergency treatment, the public health system buckled in the Tokyo metropolitan area following the attack.<sup>11</sup> Even after four years, 77% of the victims displayed neurological deficits, and 57% continued to suffer from post-traumatic stress disorder (PTSD), including panic attacks when near trains.<sup>12</sup>

Nine years later, WMD attacks continue. In 2004 terrorists used a bomb in their attack in Madrid, Spain, killing 191 and injuring 2000.<sup>13</sup> Although biological or nuclear weapons were not used in this attack, it must be understood clearly that another WMD attack is likely, and our enemies are capable of more egregious attacks because the enabling technologies have become more common and obtainable. No nation or society is

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<sup>8</sup> (Bansak, 2010).

<sup>9</sup> (Fletcher, 2008).

<sup>10</sup> (Tokuda, Kikuchi, Takahashi, & Stein, 2006), 196.

<sup>11</sup> (Tokuda, Kikuchi, Takahashi, & Stein, 2006), 196.

<sup>12</sup> (Watts, 1999), 569.

<sup>13</sup> (Algora-Weber, 2011), 216.

immune. It is incumbent on today's thought leaders to prepare Americans for this eventuality. The Graham-Talent Commission reported to Congress in 2008:

“The Commission believes that unless the world community acts decisively and with great urgency, it is more likely than not that a weapon of mass destruction will be used in a terrorist attack somewhere in the world by the end of 2013.”<sup>14</sup>

In 2008 following the recommendations of the 9/11 Commission, Congress funded the Graham-Talent Commission to (1) assess the nation's current activities and capabilities to prevent WMD proliferation and terrorism; and (2) detail recommendations for addressing these threats in the future.<sup>15</sup> This report received President Obama's attention, given the sense of its risk to national security. Recognizing this very real threat of WMDs, in the first year of his presidency, the White House made the following point in his National Security Council Policy Directive.

“The effective dissemination of a lethal biological agent within an unprotected population could place at risk the lives of hundreds of thousands of people. The unmitigated consequences of such an event could overwhelm our public health capabilities, potentially causing an untold number of deaths. The economic cost could exceed one trillion dollars for each such incident. In addition, there could be significant societal and political consequences that would derive from the incident's direct impact on our way of life and the public's trust in government.”<sup>16</sup> - Barack Obama

One year later, the Commission's report card, published in January of 2010, gave the US government a grade of F on the question of the US's posture on enhancing “the nation's capabilities for rapid response to prevent biological attacks from inflicting mass casualties.”<sup>17</sup>

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<sup>14</sup> (Graham & Talent, *World At Risk-The Report of the Commission on the Prevention of WMD Proliferation and Terrorism*, 2008), xv.

<sup>15</sup> (Graham & Talent, *Hearing on the Weapons of Mass Destruction Prevention and Preparedness Act of 2010*, 2010)

<sup>16</sup> (National Security Council, 2009), 1.

<sup>17</sup> (Graham & Talent, *Prevention of WMD-Proliferation and Terrorism Report Card*, 2010), 6.

Given this real possibility and the ease of which WMD's may be used for terrorism against Americans, professional communicators have to prepare for rapid and accurate information generation and distribution in such a way to provide maximal public health effects with minimal disruption in its efficacy. The goals of crisis-related communications campaigns are to prevent generalized panic and civic unrest, and to preserve the effected area's public health infrastructure and our faith in institutional governance.

Public health practitioners successfully promoted health campaigns in non-crisis situations, for targeted segments of societies through community-based prevention marketing programs (CBPM), such as breast cancer screening, counter-drug abuse messaging, HIV preventions and screening, and breast-feeding campaigns<sup>18</sup>. Ultimately, the public may be able to accept the possibility of a WMD event and absorb it when it happens, because modern communications platforms in conjunctions with SN/SM, such as Facebook and Twitter, allow for rapid, credible, and reasonable information conveyance to prepare and mitigate the consequences of a WMD attack.

Public health communications systems must be designed and maintained for a WMD attack. Effective and credible strategic communications are of prime concern, and this point was one of the key lessons learned from the Tokyo sarin attack.<sup>19</sup> Crisis management is quite different from crisis communications, but without good crisis communications, crisis management becomes much more difficult. Stakeholders in and out of government must carefully manage available communications platforms in post-WMD environments through planned public and private collaborations. SN/SM platforms

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<sup>18</sup> (Bryant, et al., 2007), 154.

<sup>19</sup> (Beaton, et al., 2005), 103.

may provide important adjunctive channels through which government agencies can augment traditional mass media communications in public health crisis scenarios.

### **Social Networks/Social Media**

Social networking and social media (SN/SM) have become ubiquitous in our society. They are efficient and effective for both visual and text messaging and have grown exponentially. Social media have the potential to moderate and facilitate the information needs of a nation prior to and during national crisis situations when WMD events occur.

One of the health trends enabled by digital technology is the professionals' facilitation of the public's use and consumption of health information. Internet-based medical knowledge has become more convenient and credible.<sup>20</sup> Consumers have recognized that quality health information exists at their fingertips from reputable sources at both public and private websites. The CDC offers robust Web 1.0 resources through their official website. Its audience is the general public and health professionals alike. On their Twitter account, CDC added over 1.3 million unique followers.<sup>21</sup> Hospitals have established their presence in the SN/SM because of their demand. Twitter is represented in over 583 hospitals and Facebook by 551 hospitals for various functions including community outreach, patient education, customer service, public relations (PR), and crisis communications (i.e. outbreaks of disease).<sup>22</sup>

Commercial web sites such as Web MD provide a valuable resource for two-way communications among health consumers. For medical professionals, expert practice

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<sup>20</sup> (Macario, Ednacot, Ullberg, & Reichel, 2011), 145.

<sup>21</sup> (Lubell, 2011).

<sup>22</sup> (Eckler, Worsowicz, & Rayburn, 2010), 1049.

guidelines are easily accessible from fee-based usage sites, “Up To Date” being one example.<sup>23</sup> This access model allows cataloging and indexing of rapidly changing clinical practice guidelines from a number of leading clinical research centers. Taken holistically, these trends have empowered consumers and professionals to be more savvy in searching for and using health information, “pulling” what they want to know and when they want to know it.<sup>24</sup> Although the validity of health information found on the Web can be of dubious quality and even dangerous, websites from the CDC and Web MD garner a high degree of consumer trust in health care information.<sup>25</sup> Such sites are generally useful when coupled with appropriate validation from their personal physicians, which has become the norm for clinical practice today.<sup>26</sup> In crisis health communications, such “pulling” behavior would likely take place, as experienced by the CDC in the 2009 with the H1N1 pandemic.<sup>27</sup>

One can also view SN/SM technology as two-way communications channel that doubles as a “pre-deployed sensor array” that public health professionals can leverage to monitor WMD “disease plumes” over a large populated area in real time. As Tweets and Facebook messaging can be data-mined for key phrases that reflect a community’s perceived wellness and health, appropriate data-mining algorithms can be designed with geo-location feature of the platform's hardware to develop plume models for potential disease wave propagation. “Search” would also be another crucial defensive technology, already used by the CDC in certain disease prevalence models.<sup>28</sup>

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<sup>23</sup> (Up To Date, 2011).

<sup>24</sup> (California Health Care Foundation, 2008).

<sup>25</sup> (California Health Care Foundation, 2008), 7.

<sup>26</sup> (Eckler, Worsowicz, & Rayburn, 2010).

<sup>27</sup> (Lubell, 2011).

<sup>28</sup> (CDC, 2011).

In general, professionals will provide the technical content, but journalists and other information providers will likely be the conduits for communicating to publics about health information in WMD attacks. As public health issues are tracked closely by news organizations, journalists with health care credentials, such as Dr. Sanjay Gupta of CNN, and Dr. Besser of ABC, medical reporters will play key roles in mediating information in WMD-related public health issues. Major print media outlets also employ medical journalists, assuming the role of information intermediaries in reporting the complexities of health information.<sup>29</sup> Given these roles, reporters and journalists will be able to leverage their experiences in potentially minimizing errors, falsities and uncertainties in a SMS, Facebook, and Twitter environment. It should be noted that audiences for traditional print media are believed to be becoming smaller as the Web become more mature.<sup>30</sup> In long-term crisis management strategies and plans, it is important that public health officials have multiples streams of communication to their audiences.

Given the broadness of the available technologies for crisis management, this research begins to develop some of the various communications modalities to maximize crisis prevention, mitigation, and restoration so that any WMD event can be absorbed and overcome, SN/SM technologies being one of the solutions to complex WMD communications problems. It is suggested that WMD mitigation efforts can be enhanced when SN/SM platforms are used to provide reliable “push-pull” information to the publics. Americans are a resilient people, and the SN/SM platforms will reinforce this resiliency when managed appropriately by our leaders well-versed in crisis

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<sup>29</sup> (Johnson, 2006).

<sup>30</sup> (Moses, 2010).

communications. The scope of this research will be limited to bio-terrorism, but strategic communications concepts in a WMD environment are likely to apply in nuclear or chemical WMD attacks as well.

## Chapter 2

### Literature Review

#### Twitter and Facebook as Examples of SN/SM

Twitter's demographic user base is represented in the ages 25-44, with sharp drop offs for ages 55+ and 12-17 and it is considered both as a social network site and a micro-blogging tool.<sup>31</sup> In terms of its functionality, it is a text messaging system that can rapidly go viral due to its re-tweeting architecture.<sup>32</sup> Globally, it is the 8<sup>th</sup> most popular site according to Alexa.<sup>33</sup> Because of how voluminous numbers of tweets has become, its usage database offers large quantities of raw tweet data for research.

Sociologists and other researchers have used Twitter's vast database to approach new ways of framing behavior.<sup>34</sup> Market researchers routinely extract opinions from the Twitter database to measure views about various consumer brands.<sup>35</sup> A relatively new field of sociology has emerged through Twitter, coined "opinion mining" that has the utility of gauging the mood of whole communities during popular events.<sup>36</sup>

Facebook is another important platform for social networking. It is currently the largest online social network site with 750 million users and the second most popular web site in the world.<sup>37,38</sup> Developed in 2004, its users use it for friendship maintenance of pre-existing friendships (bonding social capital) used mostly by users under age 44.<sup>39</sup>

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<sup>31</sup> (Thelwall, Buckley, & Paltoglou, 2011), 407.

<sup>32</sup> (Thelwall, Buckley, & Paltoglou, 2011).

<sup>33</sup> (Alexa).

<sup>34</sup> (Thelwall, Buckley, & Paltoglou, 2011), 406.

<sup>35</sup> (Thelwall, Buckley, & Paltoglou, 2011), 406.

<sup>36</sup> (Thelwall, Buckley, & Paltoglou, 2011), 406.

<sup>37</sup> (Alexa).

<sup>38</sup> (Strauss & Swartz, 2011).

<sup>39</sup> (Alexa).

Research has shown that Facebook is rarely used to develop new friendships and the average nodal links range between 150-200 friends.<sup>40</sup> One of the unique features about Facebook is that it still is a private company, and its true market value in the future is unknown.<sup>41</sup>

Park et al. recently analyzed health organizations' use of Facebook and its features of interactive linking with other social media channels.<sup>42</sup> After categorizing health organizations into five sub-headings (government, hospitals, schools, businesses and non-profit organizations), the study revealed a broad disparity in which different types of health organizations employed the techniques available to users of Facebook in engaging their stakeholders and communities. In this descriptive study, the authors showed that non-profits tended to have the largest participatory postings on Facebook but the least amount of interactive features. In contrast, health care and educational institutions tended to use social media channels more frequently, while government health institutions were the most prolific in using Facebook's interactive features.<sup>43</sup> These contrasting institutional behaviors suggest that the SN/SM medium has not yet matured into a technology that has been optimized for its audience and stakeholders consistently.

Given that social trends and usage patterns for Facebook and Twitter platforms are as dynamic as each new application is invented, it is my belief that a type of paradoxical convergence seems to be emerging as virtual communities replace orthodox communities in certain ways. Some of these communities allow people with similar

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<sup>40</sup> (Quan-Haase & Young, 2010), 352.

<sup>41</sup> (Das & Efrati, 2011).

<sup>42</sup> (Park, Rodgers, & Stemmler, Health Organization's Use of Facebook and for Health Advertising and Promotion, 2011).

<sup>43</sup> (Park, Rodgers, & Stemmler, Health Organization's Use of Facebook and for Health Advertising and Promotion, 2011), 71.

interests to organize on-line and wirelessly with minimal effort.<sup>44</sup> Barriers to entry and participation are low to non-existent.<sup>45</sup> Although the level of commitment of such communities to one another is not well understood, the historical barriers to organizing such groups are diminishing. Where social clubs and advocacy groups required geographic proximity, such is not the case for virtual SN communities.<sup>46</sup> Online communities may catalyze the formation of micro-offline communities and allow seamless coordination among interest groups that self- identify in proximal locations.<sup>47</sup> Thus, in large-scale terrorist attacks, the online community members may rapidly identify their locations so that their virtual community can easily co-locate themselves in safer areas in crisis events, as seen in the Virginia Tech shooting of 2007.<sup>48</sup> It is possible that during crisis communications environments, these virtual communities may find itself the backbone of societal coordination efforts at the street level in the first hours of a man-made catastrophe, especially when bandwidth may be at a premium or temporarily disrupted.

### **Health Risk Communications in Emergent Environments**

From the framework of maximizing efficient health risk communications in a crisis environment, health communicators identified some of the best practices in communicating effectively with their audiences and stakeholders. For example, Covello suggested seven considerations in organizing crisis communications activities:<sup>49</sup>

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<sup>44</sup> (Ansari, Koenigsberg, & Stahl, 2011), 723.

<sup>45</sup> (Greenwood, 2009).

<sup>46</sup> (Himmelboim, 2011).

<sup>47</sup> (Lalonde, 2011).

<sup>48</sup> (Palen, Vieweg, Liu, & Hughes, 2009), 475.

<sup>49</sup> (Covello, 2003).

1. Accept and involve stakeholders as legitimate partners
2. Listen to people
3. Be truthful, honest, frank, and open
4. Coordinate, collaborate, and partner with other credible sources
5. Meet the needs of the media
6. Communicate clearly and with compassion
7. Plan thoroughly and carefully

Covello's best practice guidelines emphasize an open and well-thought out risk communications plans for public health communicators to their audiences and constituents. The guidelines involve respecting the sensitivities of the public's needs in crisis situations while avoiding ambiguities and complexities in such environments.

Crisis communications researchers also recognize that in mass emergency situations, people use repetitive, active and passive means to gain new information.<sup>50</sup> In the 21<sup>st</sup> century, this "push-pull" behavior is magnified by the ubiquity and access points for new media technologies such as tablets, smart phones and mobile web services. Online news services and journalist's blogs are available universally. Stephens and Malone noted that "during crises, such as 9/11, Hurricane Katrina, and tsunamis, people are turning to new media and World Wide Web for information and support."<sup>51</sup> Because WMD events are designed to be both newsworthy and exploitive of ambiguity, it would also reveal the public's propensity to use new media channels to "pull" information more

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<sup>50</sup> (Walter, 2009).

<sup>51</sup> (Stephens & Malone, 2009), 230.

actively and repeatedly. Stephens recommended that press releases should be written to the public and not just towards the media during crisis situations.<sup>52</sup>

It is likely that a WMD event will occur in an urban environment where high-density populations exist. In such settings, society's vulnerabilities are maximized from the viewpoint of the terrorists, especially if they plan for a biological WMD attack. In such environments, the relationship between government officials, journalists, and the citizenry may become strained as the "unknowns" are far greater than the "knowns". This ambiguity is the nature and disproportionate power against open societies targeted by biological WMDs. However, by keeping the SN/SM medium open and dominated by credible and usable content from experts of public-trust organizations, such as public health and preparedness agencies, mitigation efforts and information (e.g. self-help and self-protection videos, text, photos, geo-locations) can be diffused rapidly. Time-saving and life-saving information can be disseminated and made available easily and repeatedly on Web 2.0 platforms.

Strategic communications plans should include contingencies for rapid dissemination-capable technologies using multiple channels. Speed, accuracy, and usefulness of emergency information would likely reduce health concerns and ambiguities appearing prior to an imminent or the first few days after a WMD attack. By its nature, the SN/SM allows for rapid node-mediated information exchange from single point sources to many with good information fidelity. Each point of reception, in turn, can act as another point of relay to many others. Such information sharing has gained the term "going viral" in today's vernacular, reflecting the multiplicative value of news-worthy information or innovative ideas.

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<sup>52</sup> (Walter, 2009).

At each point of relay, the SN/SM users may act as a sort of logic filter by judging the information as being credible, usable and/or reliable for further dissemination to their friends. This propagating and self-checking process, in aggregate over time, has the potential to be a self-correcting information exchange system within the social network seeking collective protection from perceived threats. This propagation of information also could incur dissonance and errors in meaning as messages are shared. But, in case information errors (or abuse), each relay point is a nodal point to reject or correct it, assuming that most participants are not malicious. It would be a false symmetry that networked health information be equally benign or malicious. Information sourced from unknown entities would not easily be accepted while information from known or credible sources would likely be considered for sharing. Boyd, through a longitudinal study, found such self-correcting behavior for guarding privacy over a two year study as he concludes that "users develop[ed] ad-hoc risk mitigation strategies to address privacy threats."<sup>53</sup>

Information and content from the Web may be correct as well as incorrect. The credibility of sources would weigh in greatly in how individuals judge their content about health information. It makes sense that the source (brand) of the message would have a positive bearing on the receiver's acceptance of the information. Roberts showed that the credibility of the source of the information and the messenger have correlative effects of the public trusting the message.<sup>54</sup> The CDC recognizes that their "brand" is perceived as credible, and therefore expends great efforts to preserve their Web content through an

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<sup>53</sup> (Boyd, 2011), 1.

<sup>54</sup> (Roberts, 2010), 43.

elaborate internal vetting process prior to dissemination.<sup>55</sup> Preservation of the CDC brand is a very high priority for CDC's communicators.

This approach assumes that the majority of the SN/SM community members are seeking validated and useful information in health crisis events. An example of this effect was the CDC campaign to promote "social distancing" as one of the key mitigation efforts during the 2009 flu pandemic.<sup>56</sup> The campaign was simple, and its credibility was dependent on CDC's reputation. (This campaign was implemented while awaiting the delayed manufacture and distribution of the H1N1 flu vaccine.) The social distancing campaign was rapidly accepted because it was designed to be workable and found resonance despite some counter-arguments against its efficacy.<sup>57</sup>

In this relaying process, each stage of message reception and re-transmission can be considered a "logic gate", with each iteration being open to corrective influence by updated information. Mis-information or mis-interpretation also could be relayed by well-meaning intermediaries. It also could be subject to intentional malicious message changes. Message changes, however, would be obviated by looking at the internet source and the IP address.

In the abstract, one can model this process as an information quality assurance process in a knowledge "supply chain". If each relay point (node) has a probabilistic incentive to preserve the quality of the information closer to 1 ( $p \approx 1$ ) rather than less than one prior to re-transmission, the digital fidelity of the information in digital form would likely be preserved. Psychologically in crisis situations, the incentive to preserve fidelity would far outweigh the incentive to be malicious with the information. Since participants

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<sup>55</sup> (Lubell, 2011).

<sup>56</sup> (CDC, 2009).

<sup>57</sup> (Jones, 2009).

of SN/SM tend to interact with people they know, this assumption is reasonable in this abstract model.

It is also important that the source of the original information is credible for participants to continue to relay the information. In public health crisis situations, legitimate information sources would be of a premium as the public pulls information. Statistically speaking, information fidelity is more likely to be sustained than not as the incentive to preserve it by the collective far outweighs the incentive to disrupt it.

In general, it is reasonable to assume that active SN/SM participants will consider relaying useful information to their social network. The threshold to allow relaying would be variable depending on many factors. Some of these factors may include applicability, criticality, credibility of source, collegiality, common interests, professional inclinations, level of intimacy, and social acceptability. Disruptive individuals within the group may have malevolent or criminal intentions for information relaying as well. Over time, social networks would try to weed out the disruptions from the stakeholders of the group for the benefit of the group. Although social networks are, by definition, semi-open forums, virtual social groups have self-interests to preserve their community from harm by malicious participants.

If one views social networks as a form of team in a virtual medium, then one can visualize these teams having team group dynamics. Behavioral psychologists theorized that team dynamics has a propensity to generate self-regulatory mechanisms for the good of the whole, despite disruptive forces that may in play.<sup>58</sup> Some of the factors that drive this behavior are clarity of purpose, commitment, group cohesion, and autonomy.<sup>59</sup>

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<sup>58</sup> (Millward, Banks, & Riga, 2010).

<sup>59</sup> (Millward, Banks, & Riga, 2010), 52.

Although this method of framing the SN/SM as a form of team building may be simplistic, it is with some merit considering Milgram's six degrees of separation having now been reduced to 4.37 in the US among Facebook users, and their sense of virtual proximity being more prevalent.<sup>60</sup>

The gate is that the SN/SM participant “tests” the new information (innovation) before he decides to relay it further to his personal network. If he relays it then the participant is opening a “logic gate” for further diffusion to take place. This phenomenon can also be thought of as a type of diffusion of innovation (DOI) process framed in macroscopic socio-behavioral terms that develops a collective intelligence among its participants.<sup>61</sup> Thus SN/SM can be framed as a derivative concept of the new science of networks.

Stated differently, Rogers, in the decision stage, noted that “Most individuals who [sic] try an innovation then move to an adoption decision, if the innovation proves to have at least a certain degree of relative advantage.”<sup>62</sup> An individual’s decision to relay the information is analogous to logic gate event in network science, where useful health information, viewed to be credible, has a higher probability of being forwarded to the next recipient. In digital circuit design, the role of transistors is to allow certain “good” signals to pass through while blocking others, allowing for the design of complex digital logic circuits for signal amplification and control. In the life sciences, such self-correcting processes are how biologists and immunologists conceptualize complex adoptive systems like ant colonies and the human immune system, respectively.<sup>63</sup> In other words, it may be

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<sup>60</sup> (Markoff & Sengupta, 2011).

<sup>61</sup> (Mitchell, 2009).

<sup>62</sup> (Rogers E. M., 2003) (Rogers E. M., 2003), 177.

<sup>63</sup> (Mitchell, 2009).

a fallacy to perceive SN/SM as a chaotic one-to-many communications process. Instead, it is a communications medium that forms an intelligent sociological collective that attenuate complexities and generate solutions to shared problems in pre-established virtual communities defined by its SN/SM participants.

This concept of collective learning and distribution, coined as distributive or participatory learning, has received grants from the MacArthur Foundation who collaborates with Duke University, University of California and HASTAC (Humanities, Arts, Science, and Technology Advanced Collaborative) to consider new models for learning environment optimization through modern communication technology for the critical thinking process.<sup>64</sup> One can perceive the distributive learning process as being similar to collective network learning by complex adoptive organisms.

Collective learning processes are iterative, dynamic, and relatively more efficient for group cognition in the virtual world as social networks interact in crisis communications. One example of how this collective intelligence played out was the behaviors displayed in the Virginia Tech shootings.<sup>65</sup> In this tragedy, social networks were used by the collective as an “I’m OK-Are you OK?” networked relay system within hours after the first murder taking place.<sup>66</sup> This back-channel virtual network allowed the authorities to confirm an accurate accountability of the student body rapidly within hours after the perpetrator committed suicide.

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<sup>64</sup> (HASTAC, 2011).

<sup>65</sup> (Palen, Vieweg, Liu, & Hughes, 2009), 474.

<sup>66</sup> (Palen, Vieweg, Liu, & Hughes, 2009), 471.

## **Tablet Technology and Social Media**

The DOI concept can also be applied to the consumer technology industry. On the hardware side for SN/SM, technological innovations continue. A unique trend in 2011 is the sales growth of tablets as an access platform for Web 2.0 contents. Tablet shipments are projected to increase by 245% in 2011, according to Morgan Stanley, with the increased likelihood of cannibalizing the PC market.<sup>67</sup> This trend will also likely accelerate over the next several years. Tablets are seen as a disruptive technology, and the cannibalization rate is projected to be 29% relative to PC's in 2011. High demand is projected both in the United States and internationally because "tablets may be viewed as content-creation devices."<sup>68</sup>

Tablets are unique devices in that they provide a content accessibility as a fusion of the smartphone and the laptop/pc in a very portable and graphically enriching device. The tablet offers the technological advantage of intuitive touch screens as the human interface, which is ergonomically more efficient as it is easy. It offers low or no-cost downloadable applications with over 500k apps in the Apple App Store and 250k apps in the Android marketplace, respectively.<sup>69</sup> Users of mobile technologies, like smartphones and tablets, are positioned to find more and more utilitarian applications over time. As the consumer accepts rapidly this diffusion of this technological innovation, its presence may become the dominant hardware platform for which SN/SM resources are consumed. Industry watchers suggest that the current consumer attraction to tablets is for "media consumption", and that 24 million tablets were projected to be sold in the US in 2011,

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<sup>67</sup> (Morgan Stanley Research-Global, 2011), 7.

<sup>68</sup> (Morgan Stanley Research-Global, 2011), 4.

<sup>69</sup> (Rodriguez, 2011).

more than doubling the 2010 sales of 10.3 million.<sup>70</sup> Inaugurating the market, iPad sales currently stand at 29 million since its introduction in 2010, representing its dominance in the tablet market.<sup>71</sup>

Given these trends, the sales represent that one out of five adult Americans may have purchased a tablet by the end of this year. This trend is likely to be enhanced by Fortune 500 companies adopting tablets to increase their employee's productivity. For example, all 1400 Alaska Airlines pilots have an iPad, and Lowe use their 42,000 iPhones for their inventory control.<sup>72</sup> With the successful marketing of iPads, Barnes and Noble's Nook, and Amazon's Kindle Fire, CIO's are considering adopting tablets for enterprise integration in their business models, validating this hardware's possibility of increasing human productivity, lowering costs, or both.<sup>73</sup>

On the "pull" side of the information push-pull paradigm, the tablet's projected popularity may be in part attributable to the fact that streaming media and content would no longer be limited by small cell phone screen sizes. Continued development in hardware has allowed tablets to overcome previous limits of relative bulkiness and battery power capacities of laptops without losing portability or computing capacity. Tablets offer robust performance and features rivaling laptops and home computers.

Currently, the iPad and Kindle Fire, respectively, represent that range of cost and form factors for tablet technology. All offer dual processors and full motion wireless

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<sup>70</sup> (Brustein, 2011).

<sup>71</sup> (Streitfeld, 2011).

<sup>72</sup> (Wingfield, 2011).

<sup>73</sup> (Morgan Stanley Research-Global, 2011), 4.

streaming video at reasonable consumer entry costs of \$499 and \$199 respectively. Many useful apps are available for communications using tablets and are inexpensive or free.<sup>74</sup>

### **Social Media Content and Creativity**

As a technology, tablets offer the possibility of delivering robust and vivid content that is both customizable and interactive. Its processing power, audio-visual richness and wireless broadband connectivity allow for customized content to be produced and shared almost without limits in the connected world. As television had revolutionized communications from radio without replacing it, the promise of tablet technology is no less potent, because television programming is available on tablets plus the added benefit of decentralized collaboration and ability to share audio-visual content as created by the users. A poignant example is in the medium of YouTube, where one cancer patient posted his audio-visual diaries of his struggle with terminal cancer to help other cancer patients deal with the disease with dignity.<sup>75</sup>

Complexity of subject matter does not necessarily preclude rapid discrimination and usable comprehension of complex issues by these social networks. The emergence of tablets and smart phones have the potential to redefine the capacity of creative content, regardless of content's file size, where understanding complexity can be made easier by clever packaging of information to usable knowledge through the Web 2.0 as the vehicle of knowledge diffusion. The Kahn Academy has gained substantial popularity and credibility in leveraging this possibility.<sup>76</sup> The Kahn Academy is a free virtual classroom available through the internet (see <http://www.khanacademy.org/>). This service posts

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<sup>74</sup> (Bell, 2011).

<sup>75</sup> (Kline, 2010).

<sup>76</sup> (Thompson, 2011).

videos of science, finance, humanities and math subjects taught on line to anyone seeking a virtual tutor both at home and in the classroom.<sup>77</sup> The concept is similar to podcasts, but the technology offers much more of an enriching and learning experience. Although many of the courses are graphics intensive, requiring faster processors and broadband connectivity, this is not a problem for currently available tablets or smart phones. The content is designed for ease of access and use by a broad range of ages, from elementary school to university students. Its video library has over 2700 lessons and still growing in content diversity. The website has delivered over 87 million high quality micro-lectures in the few years that it has been available.<sup>78</sup>

The technological infrastructure SN/SM can be considered as a pre-existing and imminently manageable communications medium that is both socially dynamic, and dynamically social. It is hoped that the declining barriers of participation in terms of cost will increase its use and penetration in all levels of society. The Federal Communications Commission (FCC) announced recently its plans to facilitate broadband access to low income households for \$9.95 per month. It is called the "Connect to Compete" program that partners with the free National School Lunch Program.<sup>79</sup> The "Connect to Compete" program is a major federal initiative to narrow the digital divide for lower income families, estimated to be over 100 million people not having broadband access in the US.<sup>80</sup> Smart phones and tablets are capable for "transceiving" rich and dynamic content already available on the Web. Given the potential for knowledge and information dissemination to anyone desiring them, regardless of socio-economic barriers, it is a

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<sup>77</sup> (Thompson, 2011).

<sup>78</sup> (Khan Academy, 2011).

<sup>79</sup> (Gottheimer & Usdan, 2011).

<sup>80</sup> (Gottheimer & Usdan, 2011).

reasonable assumption that SN/SM's growth is poised to become more geometric rather than of arithmetic in the next few years.

An interesting novel example of how a type of collective intelligence emerges in SN/SM communities will be recounted here. In Los Angeles, a clever marketing consultant found a way to incentivize a collective intelligence among lunch truck patrons in search of a tasty meal in the LA metropolitan area. Using guerrilla advertising tactics on Twitter, the time and location of his client's mobile lunch truck were disseminated to would-be patrons on Twitter. Targeted Twitter account followers were encouraged to check out a unique taco called Kogi Tacos. Twitter followers were geo-located to where the truck would be in a given day, a type of behavior analogous to swarming, but in this case the pheromone was a simple tweet received by pre-formed virtual communities.

The success of this marketing was reported in Los Angeles Times as having “emerged as a social-networking juggernaut, drawing 300 to 800 people each time it parks (often several times in an evening) and spawning a burgeoning cyber-hippie movement affectionately referred to as "Kogi culture.”<sup>81</sup> This collective behavior was later reported by National Public Radio (NPR) that “It took the virtual world of Twitter to bring about all this face-to-face interaction” with the power to impact behavior and culture of hundreds of people.<sup>82</sup> From a simple Twitter content (new media), the SN/SM marketer reached a national broadcast audience (old media-radio) seamlessly of an unexpected but novel social outcome for a lunch truck proprietor.

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<sup>81</sup> (Gelt, 2009).

<sup>82</sup> (Bergman, 2009).

## **Health Risk Communications in Routine Everyday Environments**

In normal times, health communicators have defined the public health model “as an approach that sees the cause of death and injury as preventable rather than inevitable.”<sup>83</sup> From this definition, Coleman et al. suggests a binary inter-play among public perceptions framed in episodic and thematic frames as originally suggested by Iyengar in 1991.<sup>84</sup> Episodic framing, (i.e. food choices and obesity), of health reporting tended to lead to individual causes while thematic reporting (i.e. abundance of fast food restaurants in poor neighborhoods), lead to societal causes for poor health.<sup>85</sup> These two frames tend to attribute the causal relationship of disease to individuals verses to their environments. Coleman et. al. concluded that the "thematic frame made readers more supportive of public policy changes and encouraged them to improve their own health behaviors."<sup>86</sup> As public health management involves population groups as the patient, it makes intuitive sense that health information should also be framed in thematic frames to maximize behavior changes for population groups.

The way in which health knowledge diffuses to the population has been enhanced and facilitated by internet-based technologies. Health care researchers have documented the transition from “physician-directed management to patient self-management,” where the promise of Web 2.0 will further enhance this transition.<sup>87</sup> Others have suggested that new media offer a unique and under-used solution to overcome challenging barriers for better medical outcomes, given that the United States spends the most, among many

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<sup>83</sup> (Coleman, Thorson, & Wilkins, 2011), 942.

<sup>84</sup> (Coleman, Thorson, & Wilkins, 2011), 942-943.

<sup>85</sup> (Coleman, Thorson, & Wilkins, 2011), 943.

<sup>86</sup> (Coleman, Thorson, & Wilkins, 2011), 941.

<sup>87</sup> (Roblin, 2011), 60.

western nations, on both clinical and public health care services.<sup>88</sup> Termed “dissemination 2.0”, Bernhardt et al. suggests four strategies in providing the bridge for getting evidence-based research knowledge to end-user application more rapidly and seamlessly. These four strategies are noted as: increasing dissemination efforts, assembling inventories of effective programs, partnership building, and increasing demand for evidence-based knowledge.<sup>89</sup>

Health researchers suggest that tailored health communications could prove integral to life-style behavior changes.<sup>90</sup> Lifestyle changes promote health maintenance and reversal of certain conditions. For example, weight loss among obese patients reduces the risk of many chronic diseases such as hypertension, cardiovascular disease, diabetes and osteoarthritis. Public health professionals understand that individual health is as much about life-style as it is about genetics. Although it is easier said than done, a major tenet of risk communications is to maximize credibility and compassion that acknowledges the insecurities of the target audience in the post 9/11 world.<sup>91</sup>

Pulling of health information via SN/SM has become a dominant social trend exercised by more and more people every year.<sup>92</sup> Health risk communicators can exploit this trend in the SN/SM sphere in unorthodox and app-centric ways that were not technologically possible a decade ago. Such “pre-communicating” about emergency preparedness through SN/SM channels will likely help society prepare for WMD events.

Conventional limitations, such as the physical page for print media and event linearity of one-to-many transmission of broadcast media, do not exist for the medium of

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<sup>88</sup> (Bernhardt, Mays, & Kreuter, 2011).

<sup>89</sup> (Bernhardt, Mays, & Kreuter, 2011), 36.

<sup>90</sup> (Noar, Grant-Harrington, Van Stee, & Shemanski-Aldrich, 2011).

<sup>91</sup> (Covello, 2003).

<sup>92</sup> (Lober & Flowers, 2011).

SN/SM. One expert on information technology (IT), John Bielec, Drexel University's CIO, suggests that "enterprise-wide learning management systems (LMSs) will undoubtedly disintegrate into a framework to access cloud-based distributed learning objects creating a Personal Learning Environment (PLE). Facebook, YouTube, Survey Monkey, Twitter, Google Apps, Drupal, and many others (some not even invented yet) will fill the growing need for content and the widening quest for collaboration."<sup>93</sup> The platform for collaboration, the one-to many-to-one paradigm, as suggested by many IT professionals, is the promise of Web 2.0.

If a WMD event does take place, much can be done to protect the health of populations through rapid dissemination of protective self-help instructions. Without credible information, the likelihood of mass confusion and mob behavior is made more likely. With credible health information filling the news vacuum through SN/SM in crisis situations, consequence management would be made easier for public health and preparedness officials.

### **Cyberspace and New Media in the Context of National Security**

One can think of the new media as a type of battle space, a new type of warzone in the framework of national defense. In the post-modern vernacular, it has been generalized as cyber-warfare. Cyber-warfare lends itself to be framed in terms of governments developing resources and infrastructure to attack or defend against cyber-assaults from another hostile government or well-resourced criminal organizations. The basic idea is that these attacks occur with the expressed purpose disrupting automated

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<sup>93</sup> (Bielec, 2011).

processes while hiding the identity of the perpetrator and the specific reasons behind it. The target for this type of attacks are other computers and computer programming codes designed to infiltrate, disrupt, and exploit the enemy's digital systems. Successful cyber warriors seek to remain hidden and never be identified by their intended targets.

This was the case in the "Stuxnet" attack by unknown assailants targeting the computer systems of Iranian WMD nuclear weapons research site in June of 2010. The International Atomic Energy Commission (IAEA) substantiated the success of the attack, reporting that the IAEA identified significant reductions in uranium centrifuge operations in the preceding year.<sup>94</sup> Because of the sophistication and complexity for this type cyber-attacks, government-level resources would be required, and stateless terrorists are likely unable to use cyber-attacks in their terror strategy.<sup>95</sup>

In contrast to cyber-warriors, terrorists seek media attention. The main goal of their attacks is to instill visceral and disproportionate fear in their target communities. This strategy is similar to that of organized criminals where victimization is central to their societal power,<sup>96</sup> but the terrorist's goal is not wealth or commercial gain. The goal for terrorists is political speech and leveraging societal influences that may change governmental behavior. The terrorists thus need access to all forms of media to further their agenda and facilitate their grand design. Without this modern means of publicity, terrorism could not thrive.

As technology further flattens the access points for terrorists to develop more sophisticated messaging on the world-wide-web, the possibility exists where governments will have to be vigilant in countering these messages. Some of these efforts

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<sup>94</sup> (Weinberger, 2011), 143.

<sup>95</sup> (Weinberger, 2011), 144.

<sup>96</sup> (Altheide, 2006), 417.

currently include “limiting terrorists’ access to conventional mass media, reducing and censoring news coverage of terrorist acts, and their perpetrators, and minimizing the terrorists’ capacity for manipulating the media.”<sup>97</sup>

When a WMD crisis occurs, the terrorists are likely to follow up with Web 2.0 tactics using narratives designed to go viral and further increase the anxiety and suffering among the victims of the targeted community. Through software, content, and hardware, governments would be obligated to manage and match such hostile messaging and actively countering it with appropriate messages to alleviate the negative impact on the affected populace. This type of SN warfare was reported in the recent terrorist attacks in Kabul, Afghanistan where the NATO forces are actively engaging and counter-posting the NATO narrative.<sup>98</sup>

If such plans for strategic communications are not pre-planned, mitigation efforts would be placed at risk and possibly reduce the people’s faith in their government. Another more extreme outcome is that citizens would panic and compound mitigation and recovery efforts by the authorities, especially if contagious infectious microorganisms are involved. This could trigger martial law and imposition of quarantine violations requiring exercising lethal police powers. A solution to such scenarios is to increase the communications channels between the people and their government through as many channels and platforms as possible.

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<sup>97</sup> (Weimann, 2008), 70.

<sup>98</sup> (Farmer, 2011).

## **WMD Disasters: Can Social Networks Help?**

One of the more common reasons for poor disaster recovery efforts immediately following the disaster is the lack of reliable communications platforms that remain after the devastation. Whether it is hurricanes, earthquakes or WMD events, the common bottleneck for disaster and crisis managers is the limits on their communications capacity within and external to the affected geographic area and its population. For this reason, rapid recovery efforts may be hampered and first responders and officials find themselves frustrated until communications are restored. If this problem persists, additional lives may be at risk and recovery efforts will be disorganized, redundant, and inefficient. Political attribution may follow, and significant resources may be wasted.

The field of disaster management continues to emerge as a critical discipline as an aftermath of this nation's experiences after 9/11 and Hurricane Katrina.<sup>99</sup> Both disasters were of horrific proportions, one man-made and the other nature-made, that changed the way Americans viewed their sense of national security and sense of individual vulnerability. Both disasters also occurred in the midst of a communications revolution of sorts where technology promoted and exposed increased vulnerabilities in the form of Web 1.0, social media, and wireless telephony. Journalists and private individuals were able to record and transmit real-time news and imagery that served to galvanize this nation. However, government officials were unable to communicate effectively in a timely fashion that met the demand for credible and reliable information. This unpreparedness resulted in FEMA's director, Michael Brown's resignation<sup>100</sup> The media coverage of Katrina compounded mitigation efforts using language to portray

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<sup>99</sup> (Garnett & Kouzmin, 2009), 385.

<sup>100</sup> (Allbaugh, 2005).

government leaders as ineffective managers, thus abdicating the journalist's "role of objective observer to assume a privileged position of pointing blame toward legitimate authorities."<sup>101</sup>

For Katrina, the damage occurred rapidly in a 24-hour period, where a combination of winds, flooding, storm surge, and later the levee breach resulted in recovery costs in excess of \$200B.<sup>102</sup> In this disaster, the events that followed revealed the limitations of civil government, technology and its antecedent failures of telecommunications infrastructure. It is asserted that for period of many days, anarchy prevailed, where looting, lawlessness, and general mayhem persisted until federal resources and institutions of civil governance were restored.<sup>103</sup>

Louisiana's officials reported 1464 deaths as a direct effect of Katrina,<sup>104</sup> but the socio-political aftermath still lingers as disaster managers recognized that the government's initial ineffectiveness was attributable to the lack of pro-active communications platforms available to the heterogeneous group of emergency first responders working in the area.<sup>105</sup> Cellular networks were damaged or destroyed and non-indigenous rescuers and emergency workers did not have the homogeneity of radio equipment and frequencies that were compatible with each other. Coordination between the different agencies was initially rendered unavailable. Restoration of basic emergency communications systems required more than two weeks before the city had a reliable first responder communications system.<sup>106</sup>

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<sup>101</sup> (Littlefield & Quenette, 2007), 28.

<sup>102</sup> (Banipal, 2009), 485.

<sup>103</sup> (Banipal, 2009), 486.

<sup>104</sup> (Louisiana Department of Health and Hospitals, 2006).

<sup>105</sup> (Silberman, 2005).

<sup>106</sup> (Banipal, 2009), 488.

In WMD scenarios, use of nuclear or high explosives would likely render multiple communications systems inoperable. This effect is less likely in chemical or biological WMD's since such weapons do not result in high energy explosions or high radiation pulses. Over time however, as large fractions of exposed workers are incapacitated by radiation, neurotoxins or infectious organisms, the communications workforce may not be able to sustain the operability of the communications infrastructure over the long term.

The limitations of conventional mass communications platforms are repeatedly exposed when publics are confronted with large-scale public safety concerns. Normally, the daily news cycle allows citizens to exercise their routines and habits for news consumption based on the uses and gratification concept.<sup>107</sup> In contrast, through Rogers' DOI theory, communications behavior follows where "[e]arlier adopters have greater exposure to mass media communications channels than to later adopters."<sup>108</sup> From the perspective of the governmental entities, this study assesses the organizational adaptations that communicators within these agencies have evaluated the SN/SM mediums as possible channels to communicate with the public in abnormal crisis situations. The level of adoption would be measured to the degree in which Web 1.0 and 2.0 platforms are integrated into their communications plan for WMD crises, with the intent of this study measuring their "adoptive-ness" to leverage communications technologies in large-scale disasters.

Because today's social participation increasingly involves virtual means, the DOI theory supports the method in which citizens communicate in crisis situations. One argument proposed is that public information seeking behavior transitions to a "push-pull"

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<sup>107</sup> (Rosengren, Wenner, & Palmgren, 1985).

<sup>108</sup> (Rogers E. M., 2003) (Rogers E. M., 2003), 291.

paradigm where individuals seek rapid updates (pull) of useable information when official emergency broadcast communications (push) channels fill the airwaves. When people feel threatened for their personal safety is at stake, their information seeking behavior tend to migrate rapidly toward newer technologies such as SN/SM on the “pull” side, as exemplified by the Virginia Tech shootings in 2007.<sup>109</sup> Due to the lack of usable real-time information during the crisis, students on campus relied upon Facebook as the primary means of finding out who was safe and who was not, as previously noted.<sup>110</sup>

Recent history in the California fires noted another inadequacy of the traditional emergency management system’s reliance on broadcast mediums. Broadcasters, representing the “push” side of media channels, tended to select their reporting of news to gain audience novelty rather than focusing on distributive information models designed to inform the widest audiences in the effected danger areas. Thus emergency management information about the specific locations of the fires was relegated to non-primary airtime when compared to concentrating information mostly on the Malibu area, where celebrities’ homes were threatened. Although the fires affected a much larger area in southern California, from Santa Barbara to San Diego, the commercial broadcast news channels failed to report the events proportionally to the actual risks to the general public.<sup>111</sup>

In contrast to natural disasters, man-made disasters do not impact infrastructure to the degree as it does civil institutions and the public’s faith in governance. In the 9/11 attack, the initial success of destroying the Twin Towers and attacking the Pentagon resulted in severe damage and sense of safety in the psyche of local affected areas, but

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<sup>109</sup> (Winerman, 2009), 376.

<sup>110</sup> (Winerman, 2009). 376.

<sup>111</sup> (Winerman, 2009), 376.

served to galvanize a nation with a common goal to take the fight to the enemy. For natural disasters such as the Japanese Tsunami or the Katrina disaster, the public's reaction seemed to affect the public's faith in their government as large geographical areas were affected and official statements were slow and contradictory. By contrasting the cause of the disaster, three distinct differences can be pointed out.

Firstly, by intent, terrorists design their attacks to maximize disruptions in the "normal flow of business" and the sense of societal security and faith in their government.<sup>112</sup> The psycho-social effects of terror are by design, the end point for the act itself. The terrorist designs the attack as a message to a larger and geopolitical audience that may not be the victim themselves, but to communities or societies who share the victims' identity or allegiance.<sup>113</sup> Part of the disruptive process is to sabotage their confidence in their government about national security and safety through the communications. This wedging strategy focuses on dissolving, especially on the initial stages of a WMD attack, the people's faith in their system of relationships with their leaders.

Secondly, the degree of the long term psychological effects is one of the primary goals of terrorists use of WMD's to civil societies. The purpose of terrorism can be considered a form of political speech in that communication is taking place between the terrorists and their adversarial government. The terrorist's message may be that a government must change a certain foreign policy under the threat of an act of terror. When terrorists succeed in their attack, the success provokes friction between the victim nation's leaders, national policies, and their government's ability to manage international

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<sup>112</sup> (Canel & Sanders, 2010), 450.

<sup>113</sup> (Weimann, 2008), 69.

relationships and economic alliances that may have been the status quo for many years. In this aspect, the attack's success can place a psychological wedge between the government and its traditional allies. Causing political divergence between nations with similar historical interests is a key target of terrorists, as exemplified by the effects of the Madrid bombings and how the Spanish government (and its people) viewed the risks of supporting American policies in Iraq.

In applied terms, terrorism is a method of “leveling the political playing field” between governments and stateless actors with transnational ideological agendas. Terrorists understand that they do not possess the traditional or “hard power” war making capacity to challenge governments directly. However, through various limited but violent and lethal means, terrorists design their attack for maximum psychological impact. Their primary weapon is the media. Through this medium, they can leverage modern technologies in clever and lethal ways to instill fear and insecurity to much larger vulnerable groups. Because terrorists are not constrained by limits of the law, their lack of hard power is compensated by the openness of their target societies.

Thirdly, scholars have noted that since the 1970’s, terrorists developed expertise in manipulating mass media for their political gain. With the goal of amplifying their legitimacy on the world stage, modern terrorists learned from their predecessors while recognizing and applying the powers of persuasion through choreographing compelling narratives after gaining the media’s attention.<sup>114</sup>

The purpose of this study is not to review and develop new crisis communications modalities in biological WMD events. Rather, the study researches how the presence and functionality of SN/SM are identified by public health and safety institutional

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<sup>114</sup> (Weimann, 2008), 71.

communicators, and how their strategy seeks to leverage the use of SN/SM in WMD events requiring mass public health resource mobilizations.

### **Biology in Post-modern War**

Public health professionals know that biological agents are well suited for “weaponization” for mass destruction in developed countries in urban settings.<sup>115</sup> The desired attributes of a weaponized microorganism include their ability to cause mass terror, public anxiety, communicability of disease, high morbidity and mortality rates, decrease confidence in government, provoke a collapse of regional health care systems, and require exorbitant costs for recovery efforts. Given these criteria, public health officials have identified six pathological organisms to be of the highest concern for WMD applications.<sup>116</sup> Known as class “A” agents, these six are:

- Anthrax (*Bacillus anthracis*)
- Smallpox (*variola major*)
- Plague (*Yersinia pestis*)
- Viral hemorrhagic fevers
  - Ebola & Marburg (*filoviruses*)
  - Lassa & Machupo (*arenaviruses*)
- Botulism (*Clostridium botulinum toxin*)
- Tularemia (*Francisella tularensis*).

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<sup>115</sup> (Fischer III, 1999), 28.

<sup>116</sup> (Center for Disease Control and Prevention (CDC)).

Infection by any of these microorganisms is likely to be lethal without prolonged and intensive advanced hospital treatment, and theoretically, a single organism is necessary for morbidity and death.

### **Biology in Pandemics**

Public health professionals know that the potential for microbiology-mediated catastrophes is very serious. The profound power and lethality of microorganisms have been observed occurring naturally and in cycles. The last great flu pandemic of 1918 claimed an estimated 100 million lives worldwide, which eclipses the total death count from the Great War that ended that year.<sup>117</sup>

Because of the possibility that the pandemic of 1918 could be repeated, in 2009, the World Health Organization (WHO) declared the *Stage VI* Flu pandemic. An estimated 61 million people were infected world-wide, but only about 13 thousand deaths occurred.<sup>118</sup> Because the H1N1 flu strain was very contagious, the infection rates fulfilled expectations. Fortunately, the death-rate predictions did not materialize, because the H1N1 strain turned out to be not as lethal as the 1918 strain.

Earlier in 2003, concern about a non-flu pandemic was aroused when the Center for Disease Control (CDC) initiated an emergency surveillance requirement for a new respiratory infection that had a high mortality and transmission rates.<sup>119</sup> Over a twenty-week period, from a single American index case of SARS (severe acute respiratory syndrome), the CDC estimated that over 1400 unexplained cases arose in the US.<sup>120</sup>

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<sup>117</sup> (Center for Disease Control and Prevention, 2009).

<sup>118</sup> (Center for Disease Control and Prevention, 2009).

<sup>119</sup> (Schrag, Brooks, Van Beneden, Parashar, & Griffin, 2004), 188.

<sup>120</sup> (Schrag, Brooks, Van Beneden, Parashar, & Griffin, 2004), 185.

Given that few SARS patients seem to be surviving the infection in Southeast Asia (believed to be originating from Guangdong, China),<sup>121</sup> US public health officials were bracing for the worst. With Western level of medical care, and rapid isolation of suspected patients, all of the SARS patients survived,<sup>122</sup> but many knew that we had dodged another lethal pandemic.

### **Politics of WMD**

The threat of biological weapons (BW) for political gain emerged concurrently with the 9/11 attacks. The anthrax attacks in Washington D.C. and other cities occurred when, a week later on 9/18, four postal letters doused with weaponized anthrax spores were mailed from Trenton, NJ.<sup>123</sup> Although small in scale, this attack resulted in five Americans dying while 17 suffered critically over the next three months.<sup>124</sup> An important fact of this event is that a single point source mailed in New Jersey affected a much wider area to include Florida, Connecticut, New York and as far west as Texas.<sup>125</sup> The FBI estimated the recovery costs as exceeding \$1 billion when the cleanup was completed.<sup>126</sup> Paradoxically, for the microbiology-trained terrorist, the cost of an anthrax weapon was likely only several dollars (the cost of the mass mailings) and the possession of research anthrax spores. The ratio of cost of the attack to the cost of mitigation is surreally lopsided; therefore, it is an ideal weapon for terrorists, and a daunting challenge for their targeted governments.

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<sup>121</sup> (Schrage, Brooks, Van Beneden, Parashar, & Griffin, 2004), 185.

<sup>122</sup> (Schrage, Brooks, Van Beneden, Parashar, & Griffin, 2004), 185.

<sup>123</sup> (Frerichs, 2008).

<sup>124</sup> (Frerichs, 2008).

<sup>125</sup> (Frerichs, 2008).

<sup>126</sup> (Lengel, 2005).

The cost of the cleanup was not based on anthrax's true danger to the population. Its enormous cost was the price paid for mitigating the public's uninformed phobia about the patho-physiology surrounding infectious diseases. The public demanded whole buildings to be condemned or decontaminated, regardless of the actual risk to human habitability. The public's expectation was that that infectious disease risks could be zeroed with sufficient efforts of wholesale clean-up, regardless of cause. The hysteria surrounding this particular WMD event, in effect, drove the mitigation costs to astronomical levels without proportionally reducing the true health risk for the general population. Such irrationality will be repeated unnecessarily if the United States, as a society, fails to educate its population about the limits and simple mitigation techniques that can be used to reduce the risk to near zero, but never practically being zero.

On the other hand, the potential risk for unprepared population groups is staggering. Less than a kilogram, engineered for optimal dispersion as desiccated anthrax spores aerosolized over Chicago could kill over a hundred thousand unsuspecting Americans, and would likely overwhelm Chicago's and the region's public health system rapidly. This outcome can be reduced if public and private institutions disseminate health information collaboratively prior to and during the attack. Strategic communications in crisis management is effective and promotes societal resiliency when terrorist use biological weapons.

The overarching goal for such strategies is to communicate the survivability of WMD attacks/events, and convey the fact that rapid recovery is likely when modern medical and public health practices are integrated, taught, implemented, coordinated, and exercised by the citizenry and their leaders. Such preparations would also have secondary

and tertiary benefits for society in that fear of the unknown would be greatly reduced. We would feel empowered by our knowledge and will be able to unlearn the “learned helplessness” that could result from another WMD attack.

### **Diffusion of Innovation Theory (DOI)**

In 2003, Everett Rogers published an update to his seminal theory on Diffusion of Innovations (DOI, Fifth Edition). His first edition was published in 1962 as Rogers described his research at the University of Iowa analyzing the socio-behavioral determinants that prompted farmers to adopt innovations in new farming techniques. With the 5th edition, he integrates the recent phenomenon of technology-driven changes, specifically in communications platforms, that he observed as a result of the internet and wireless cellular phones.<sup>127</sup> Rogers also noted additional phenomenological effects of “diffusion networks” and “critical mass” as his theory continues to be "derivatized" for communications research.<sup>128</sup>

Orr continued with the theme and when he wrote that the “most striking feature of diffusion theory is that, for most members of a social system, the innovation-decision depends heavily on the innovation-decisions of the other members of the system,” thus offering the applicability of DOI as an explanation of how innovations spread in societies.<sup>129</sup> Orr also introduces the concept of “utility” in his review of the DOI where uncertainty in adoption decisions is mediated by the “cost-benefit” analysis that individuals make routinely.

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<sup>127</sup> (Rogers E. M., 2003), xv.

<sup>128</sup> (Rogers E. M., 2003), xviii.

<sup>129</sup> (Orr, 2003).

As noted earlier, the SN/SM platforms obviate certain needs for multi-media capacity and previously tethered access tools. Traditional broadcast media required devices needing wall outlets, while home computers powerful enough process high-density media content required a bulky desk-top. Miniaturization continues to challenge the orthodoxy of hardware-based conventions in regards to portability and long-use battery technology. Continued ubiquity of wireless broadband technology allows for streaming video on demand, as well as all the Web 1.0 and Web 2.0 content to merge seamlessly into the smart phones and tablets. The potential for growth is coupled with the unrelenting diffusion of digital technology into modernity. Rogers noted that the internet was a form of “critical mass” in his DOI theory, given its adaptation through the 1990’s.<sup>130</sup> From this frame, the SN/SM medium may also have passed its critical mass point, given the sheer number of its participants using SN/SM platforms today.

Since the advent of the Internet, digitization of content continues to transform communications in developed countries along the mechanisms outlined by Professor Rogers. He had updated the theory to reflect wireless telephony and internet as a communications technology that diffuses innovations. Rogers defines communications as "a process in which participants create and share information with one another in order to reach a mutual understanding."<sup>131</sup> He defines diffusion as "the process in which innovation is communicated through certain channels over time among the members of a social system."<sup>132</sup> His theory suggests that individuals in a collective society interact in

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<sup>130</sup> (Rogers E. M., 2003), 346.

<sup>131</sup> (Rogers E. M., 2003), 5.

<sup>132</sup> (Rogers E. M., 2003), 5.

such a way that innovations are communicated, assessed, and adopted in a sequential five step process, the five steps being:<sup>133</sup>

1. Awareness of the innovation (knowledge)
2. Formation of favorable or unfavorable attitude (persuasion)
3. Activity to make a choice to adopt or reject the innovation (decision)
4. Adoption and use of the innovation (decision)
5. Evaluation of expectations met or not met (confirmation)

Rogers' theory categorizes individual behavior adaptations in five broad observable patterns. They are *innovators*, *early adopters*, *early majority*, *late majority*, *laggards*.<sup>134</sup> From this foundation, Rogers' 5<sup>th</sup> edition adds the corollaries that there is interplay between *media channels and interpersonal channels* that affect these patterns in different proportions. For example, Rogers writes, "Mass media channels are relatively more important than interpersonal channels for earlier adopters than for later adopters."<sup>135</sup> Rogers suggests that in the extremes of adoptive behaviors (i.e. innovators verses laggards), this interplay displays the inverse effect in relative proportions, where interpersonal channels dominate adoptive behaviors among laggards while mass media channels dominate among innovators. This difference in proportional channel influences is maximally divergent in the persuasion phase of the innovation-decision process, which is the most critical phase of the *knowledge-persuasion-decision-confirmation* spectrum of adopting an innovative behavior. Innovators and early adopters are more susceptible (or open) to media marketing while laggards are more susceptible to interpersonal relationships.

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<sup>133</sup> (Orr, 2003).

<sup>134</sup> (Furneaux, 2005).

<sup>135</sup> (Rogers E. M., 2003), 211.

For decisions made by organizations, Rogers discusses organizational decision making in terms of three types of innovation-decision categories. These three are termed *optional innovation-decision*, *collective innovation-decision*, and *authority innovation-decision*.<sup>136</sup> In essence, these three types can be simply described as autonomous, consensus oriented, and autocratic organizations. Rogers describes multiple factors that influence how organizations make their decisions. These factors include their size, type of business of the organization, governmental or private organizations, and civilian or military organizations.

The DOI theory seems consistent with the digital revolution that began in the 1980's and validate many milestones that punctuate communications paradigm shifts that were experienced since then. From ARPANET (DoD's precursor to the internet), to internet, to emails and cellular technology, to Web 1.0 and Web 2.0, digital technology has transformed the mediums of communications rapidly.<sup>137</sup> Digital technology is transforming the very essence of how society communicates within itself, mediated by virtual communities linked as an information-rich collective. Its complete effects are difficult to fathom, and its profound importance for society is gaining converts. As an example, Twitter's influence in politics is an interesting case-study.

In 2009, when asked about social media, one British Member of Parliament (MP) Kerry McCarthy made an interesting (under) statement, noting that "Twitter has the potential to transform politics, making it accessible to citizens in a new setting."<sup>138</sup> She was appointed Labour's New Media spokesperson. A year later, shortly before Britain's national elections, the private email addresses of many Labour politicians were sent out

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<sup>136</sup> (Rogers E. M., 2003), 403.

<sup>137</sup> (Rogers E. M., 2003), 346.

<sup>138</sup> (Ramsay, 2009).

inadvertently by email. News of this error, and the addresses, were sent out also on Twitter in a timeframe much faster than main stream media breaking the story.<sup>139</sup> This may have complicated the election process, given how close the elections were to the news story.

In May 2, 2011, Sohaib Athar tweeted his observations of a helicopter assault on Twitter from Abbottabad, Pakistan, starting at 1 AM.<sup>140</sup> This turned out to be the Navy SEALs' attack on Osama Bin Laden's compound. Later in the day, it was confirmed by another Twitter participant that, indeed, Osama was killed by the US Special Forces.<sup>141</sup>

In the summer of 2011, the White house claimed that it has 2.25 million Twitter followers.<sup>142</sup> In July of this year, President Obama had a "town hall meeting" with his Twitter followers on July 6, 2011, hosted by Twitter.<sup>143</sup> From these examples over time, it seems clear that the politics and Twitter have become complementary and synergistic in engaging constituents of political leaders and other stakeholders. This phenomenon is not limited to the western societies either. On September 22, 2011, *Social Media Week* released the "Top 10 Social Media Events that Shook the World", listing the Arab Spring and the Japanese Tsunami as number #1 and #2 in the SN/SM context, complementing mainstream news in world events.<sup>144</sup>

These observations are consistent with Rogers' theory that ties adoptive behaviors to two sub-categories in DOI's communications: *media channels* and *interpersonal channels*.<sup>145</sup> These two channels has been an accepted as the Bass diffusion model among

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<sup>139</sup> (Dunn, 2010).

<sup>140</sup> (Butcher, 2011).

<sup>141</sup> (Sandoval, 2011).

<sup>142</sup> (James, 2011).

<sup>143</sup> (James, 2011).

<sup>144</sup> (Social Media Week, 2011).

<sup>145</sup> (Rogers E. M., 2003), 211.

marketing scholars; it is the two primary channels used by potential adopters of an innovation.<sup>146</sup> An example of using the media channel is the 2008 presidential elections. The Obama Campaign used the social media channels as both a grass-roots political organizing tool and a communications channel that some characterized as a social movement for its participants.<sup>147</sup> In contrast, an example of interpersonal channel use is the day-to-day campaigning that took place with town hall meetings and shaking of hands at campaign stops.

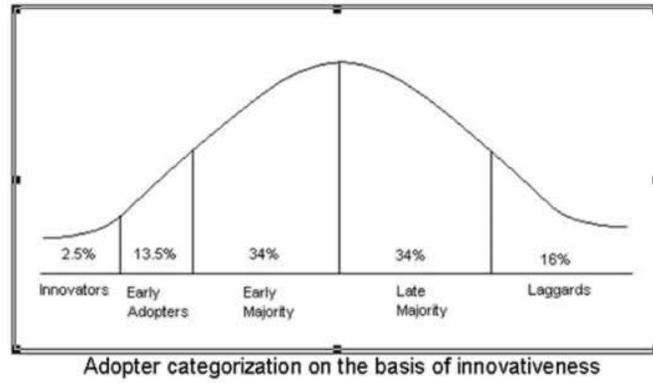
Although Rogers discusses this point in qualitative terms initially for farmers in Iowa, its theory can be applied to consumers transitioning to the Web 2.0 paradigm. In other words, as media channels become more pervasive in the post-modern world, the need for *interpersonal channels*, as Rogers originally envisioned, becomes far less influential for adoptive behaviors to take place in the DOI spectrum of innovators to laggards. This perspective in some respects, would emulate a type of compression (in time) of the adoptive range since SN/SM tends to fuse media with interpersonal (i.e. social) channels of communications. In other words, it is suggested that the distribution curve that Rogers formulated would be positively skewed to the left. In aggregate, the adoption takes place earlier for the whole population (see below).

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<sup>146</sup> (Rogers E. M., 2003), 208.

<sup>147</sup> (Smith, 2009).

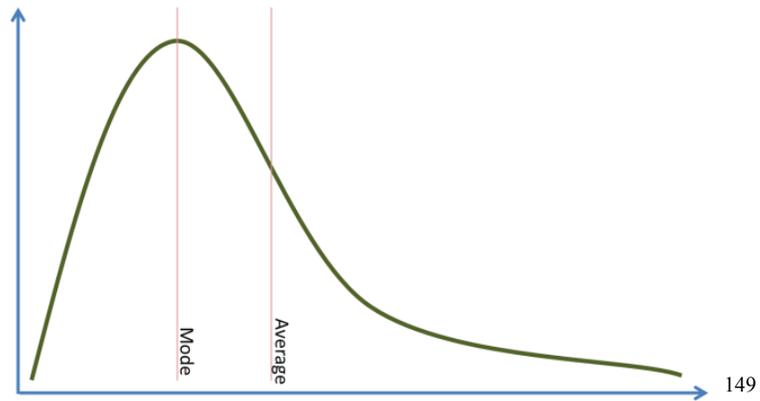
Figure 1:



Source: Everett Rogers with F. Floyd Shoemaker, *Communication of Innovations: a Cross Cultural Approach*, 2nd ed. New York: The Free Press, 1971, p. 182.

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Figure 2:



Suggested Skewing of Roger's Categorizations in Social Networked Systems

<sup>148</sup> (Rogers & Shoemaker, 2008).

<sup>149</sup> (Purestone Partners Analytics LLC, 2010).

In Web 2.0, the media channels developed rapidly as a hybridized fusion of the read-only media (Web 1.0) and social interactivity allowed by real time multimodal wireless “conversations”. In chapter 8 of his Diffusion of Innovation (5th Edition), Rogers discusses the concept of "Diffusion Networks", which addresses the notion of opinion leaders and their influence on adopters of innovation. Rogers writes that "interpersonal communication drives the diffusion process by creating a critical mass of adopters."<sup>150</sup> Today, SN/SM platforms allow interpersonal communications to take place more easily and expand geometrically. Consistent with the DOI theory, the SN/SM platforms may act as an accelerant to personal communications network formation. The resulting effect is innovation being adopted in the qualitative trajectory as Rogers' theory suggests between the continuum of early adopters through laggards, but at a faster rate when compared to old media.

As Moore’s law continues to fulfill expectations on the hardware side, where computer's processing power doubles every 18 months, Rogers’ DOI theory finds consistency in current societal communications trends. It offers a lens to which one can view and attempt to understand the communications processes currently in transformation. This phenomenon of hardware innovations (i.e. smart phones and tablets) potentiate communications and sharing of ideas through sophisticated and elegant content enabled by more hardware power. Although Rogers has not addressed Web 2.0 in his 5<sup>th</sup> Edition, it would not be unreasonable to posit that his DOI theory supports the diffusion of new ideas and penetration of applied health information in routine and crisis situations using Web 2.0 platforms.

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<sup>150</sup> (Rogers E. M., 2003), 300.

The five categories, *innovators*, *early adopters*, *early majority*, *late majority*, *laggards*, are functions of observable behavior patterns that occur over time. It is suggested that Rogers' DOI theory has the additional utility of allowing the communications researcher to view organizations through this lens. Adopting this approach in applying the DOI theory, this research proposal attempts to qualitatively assess and categorize how well public health and preparedness have adopted two Web 2.0 platforms in effecting their WMD strategic communications plans. The degree of adaptation among the various agencies can also be analyzed through a comparative lens that may allow for qualitative analysis if any differences are found between federal, state, and local agencies.

## **Chapter 3**

### Research Methodology and Design

For public health professionals, the concern for WMD consequence management is well founded, given the national security policies established by our nation's leaders. A feature of successful management of WMD's is the rapid and credible pushing forward of information needed for mitigation efforts. The messages also have to encompass credibility and transparency. Whether a disaster is natural or created by humans, effective strategic communications can assist in the successful management of mass casualty situations. Twitter and Facebook is ubiquitous in the technological platforms that define of social networks and social media. Using these platforms as a framework for analysis, this study interviewed a sample of public health and emergency preparedness governmental agencies with the intent of answering the following research question:

**RQ:** How well prepared are local, state and federal public health & preparedness institutions in leveraging their websites (Web 1.0) with social network (SN) and social media (SM) platforms (Web 2.0), specifically Facebook and Twitter, to manage crisis communications in a WMD attack from biological weapons in the pre-event to the first 48 hours after the attack (Phase I and II)?

**Sub-RQ1:** How are these agencies using Facebook and Twitter technology to engage the public and affected stakeholders in preparation for WMD's?

**Sub-RQ 2:** In what ways have the agencies leveraged Facebook and Twitter for optimization to engage Web 2.0 virtual communities requiring health information in national disasters impacting health and well-being?

**Sub-RQ 3:** Do these agencies have preferences in how they use the Internet, their web pages, and social network/media technologies to engage their target audiences while overcoming barriers, if present?

The Institutional Review Board (IRB) of the University of Missouri-Columbia reviewed the scope and methodology of this study and approved the method under the standard IRB exempt protocol, accepting its “minimal risk level” status (IRB Project Number 1200144). Data collection took place by using commercially available internet search engines to review the web pages of the targeted institutions of public health and emergency preparedness. Telephone numbers were obtained using the contact numbers posted on the official web site of the health and preparedness agencies. Concurrently, emails were sent requesting interviews through the various email addresses posted for institutional queries.

First assessment of this research consisted of a qualitative review of web sites of various public health and preparedness agencies at the federal, state, and local levels. The first goal was to assess consistencies and contrasts in how different levels of public health and preparedness agencies approached their strategic communications strategies through the Web 1.0 medium for potential WMD events. The author studied the web-content in the subjective categories of ease of use, coordination with other echelons of government, and consistency of macro-messaging about the biological WMD threat. By reviewing the various Web 1.0 tools to deliver information about biological attacks, the analysis was designed to investigate if the agencies identified biological WMD as a potential threat to its stakeholders. If it was identified as a threat, instructive and amplifying information was reviewed for ease of access and relevancy to biological WMDs. An effort was made

to identify novel or unique content presence to communicate the threat of the WMD, in general, and biological warfare specifically. When Facebook and Twitter icons were present, they were clicked and the content and tweets were read for context and references to WMDs.

This study's first assessment of the Web 1.0 design focuses on government agencies in a vertically tiered three level model. This approach supported the meeting the second goal of the qualitative review, which was to identify any trends, overlaps, and gaps that may be exist. Such assessment would be of interest to communicators, emergency planners, journalists, the military, and health professionals in the WMD consequence management profession as they interact with the colleagues in the other echelons of government.

The second assessment of this research consisted of contacting the target agencies for phone interviews. The interviews consisted of asking open ended questions about how their various local, state and federal public health and preparedness agencies are preparing to use SN/SM as a communications platform with the publics in WMD events, focusing on the platforms of Twitter and Facebook. This approach allowed for discussions of context, priorities, and the integration of Web 1.0 and new media resources from the perspective of WMD consequence management. The scale of WMDs, itself, would likely involve the whole of government at all three tiers, and the perceptions of these mass casualty practitioners would provide valuable insights to enrich the understanding of consequence management philosophies inherent in the three levels of our governance.

The interview discussions were limited to the pre-event preparation phase (phase 1) and the first 48 hours after a WMD event (phase 2). The study established these temporal constraints for three reasons. First, this study was designed to begin a study framed to be consistent with federal strategic planning guidance for national emergencies, as defined by the President under the Homeland Security Presidential Directive (HSPD)-5. This directive establishes the planning authority to Department of Homeland Security (DHS) under the National Response Framework (NRF) guidance provided by DHS.

Another directive, HSPS-18 addresses the requirement for protecting the homeland specifically against WMD threats, using a two tiered approach. Both HSPD-5 and HSPD-18 are the executive authority for the whole of government to prepare for WMD events. Under DHS, FEMA has published the national planning guidance for declared national emergencies, titled National Incident Management System (NIMS).<sup>151</sup> The Department of Defense, in domestic emergencies support NIMS through the Joint Operations Planning Doctrine (JP 5-0).<sup>152</sup> NIMS and JP 5-0 operationalize the two presidential directives.

Second, given the scope of preparing for and managing WMD events to be likely massive and multidisciplinary that can easily consume a professional career, this self-imposed research limitation to the first two phases provides a launch point concerning the strategic communication paradigm in the novel environment of biological WMDs. Follow-on studies could address the other phases of NIMS and JP-5 as time and journalistic interest allow. This scope embraces a scholarly point of demarcation to begin an intellectual dialog in the field of strategic communications specifically addressing the

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<sup>151</sup> (Department of Homeland Security, 2008), i.

<sup>152</sup> (Department of Defense, 2011).

challenges of WMD environments and our national leaders' directives on organizing the management of its consequences.

Third, social networking and social media are emerging phenomena that do not easily lend themselves to partitioned study among the traditional academic disciplines. The approach of this study hopes to view the phenomena using cross-disciplinary lenses of psychology, strategic communications, public health, sociology, mass casualty management, and military science. Because of the scale at which WMD's will affect societies of nations, such a multi-disciplined approach seemed appropriate and reasonable to better assess the complexity and dynamism of SN/SM in the context of WMD consequence management.

This study examined three tiers of governmental organizations. At the federal level, representatives of three agencies were contacted. All three accepted the interviews. They are Center for Disease Control (CDC), Federal Emergency Management Agency (FEMA), and Defense Threat Reduction Agency (DTRA). These three agencies represent three major cabinet level departments of Health and Human Services (HHS), Department of Homeland Security (DHS), and the Department of Defense (DOD) respectively. These agencies were chosen because of the nature of their mandates in protecting United States against mass casualty events, inclusive of WMDs.

At the state level, nine state health departments participated in the study. Although more states were contacted, nine states eventually returned the phone and email solicitations for interview within the time frame of this study. State public health officials have traditionally been the most engaged in managing routine public health functions because public health and infectious diseases management, such as childhood vaccination

programs and sexually transmitted diseases. It was not surprising that this cohort represented the majority of the participant in this study, since public health and preparedness usually fall in the daily operational purview of state health departments.

At the local and municipal level, four public health and preparedness departments completed the phone interview within the time frame of the study. Several interview participants recommended additional points of contact to include an associate dean of medicine at a teaching medical center, a state cabinet level health secretary, and former state health secretary. All were contacted for follow-up and interviewed.

All of the institutions who participated in the phone interviews had active websites concerning public health and emergency preparedness ( $n_{inst}=16$ ). Three additional phone interviews took place with individuals as subject matter experts ( $n_{SME}=3$ ) upon the recommendations of some of the institutional participants. The minimum desired sample size of 15 institutions was exceeded by 4 additional participants. This sample size provided a cross-section of the public health management hierarchy, from federal to local levels.

The instrument of assessment chosen was phone interviews. The researcher was confident that this level of personal interaction is consistent with established qualitative research methodology where language and conversation allow for collegial information exchange and candor preserving interpretive accuracy.<sup>153</sup> The interview technique permitted a level of subjective assessment in revealing possible perceptive SN/SM trends among public health and preparedness professionals when addressing WMD challenges from a strategic communications framework. One specific goal of this study was to seek opinions on the viability of the Twitter and Facebook platforms in the professional nexus

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<sup>153</sup> (Jensen, 1991), 32.

of journalism, public health and crisis communications. Given a biological WMD event, participants were asked on how they perceive the benefits and challenges that they may face in the first two phases (i.e. pre-event and first 48 hours) when using Twitter and Facebook, and whether these two platforms are important or not in mass casualty situations.

This qualitative methodology included open-ended questions on identifying some of the perceived barriers or constraints faced by the participating agencies. Participants were asked to comment on their perceptions of similarities and differences in how the different echelons of government would likely approach the strategic communications terrain.

The theory of DOI was used as the framework in which the innovation of the Web 1.0 and Web 2.0 were discussed. Interviews were conducted as a peer-to-peer query, facilitated by the researcher's credentials as a student of journalism, public health professional and mass casualty clinician. Given that the respondents were well educated as communicators, the DOI theory allowed for a common framework for their agencies to be evaluated. The participants were asked open-ended questions about how they manage their organizations toward SN/SM use in strategic communications with the publics. The discussions included queries concerning organizational homophily and heterophily among their professional groups and institutions.

The following table categorizes the echelons and number of participants.

*Table 1: Survey Participants*

<b>Echelon</b>	<b>Federal</b>	<b>State</b>	<b>Local</b>	<b>SME</b>
<b>Participants</b>	3	9	4	3

## Chapter 4

### Results

#### **Web 1.0 Assessment: Survey of Websites**

##### *Federal:*

Reviews of the institutional websites showed differences among the tiers of government (i.e. federal vs. state vs. local). Within the three federal agencies (CDC, FEMA, DTRA), each agency's website offered information founded on national policy, consistent with the nature of their institutional mandates as identified by their website and Homeland Security Presidential Directive (HSPD) 5 and 18 , and the National Response Framework (NRF). In a national emergency, DHS through FEMA would provide the management leadership and coordination for on-scene response. DTRA and CDC would provide supporting roles for biological WMD attacks. This framework was searchable on the FEMA website. FEMA's website provided links to CDC and DTRA, when more technical detail was desired.

With regards to the technical facilitation of WMDs, DTRA provided most of the information in the activities that the agency is currently engaged in to reduce the strategic threat of WMDs. DTRA emphasized their partnerships with in the whole of the federal government, inclusive of the Departments of Homeland Security, State, and Health and Human Services. These three cabinet departments are the three primary federal institutions responsible for establishing policies and doctrines to defend this nation against WMD according to the National Response Framework (NRF).

The NRF is FEMA's strategy written for senior elected and appointed leaders (i.e. governors, agency heads, federal government department secretaries) to coordinate the

national response in emergencies regardless of scale, inclusive of a WMD attack. It is a layered framework where the concepts of operation and the roles and responsibilities of government are clearly delineated to maximize effective response while minimizing redundancy and overlap.

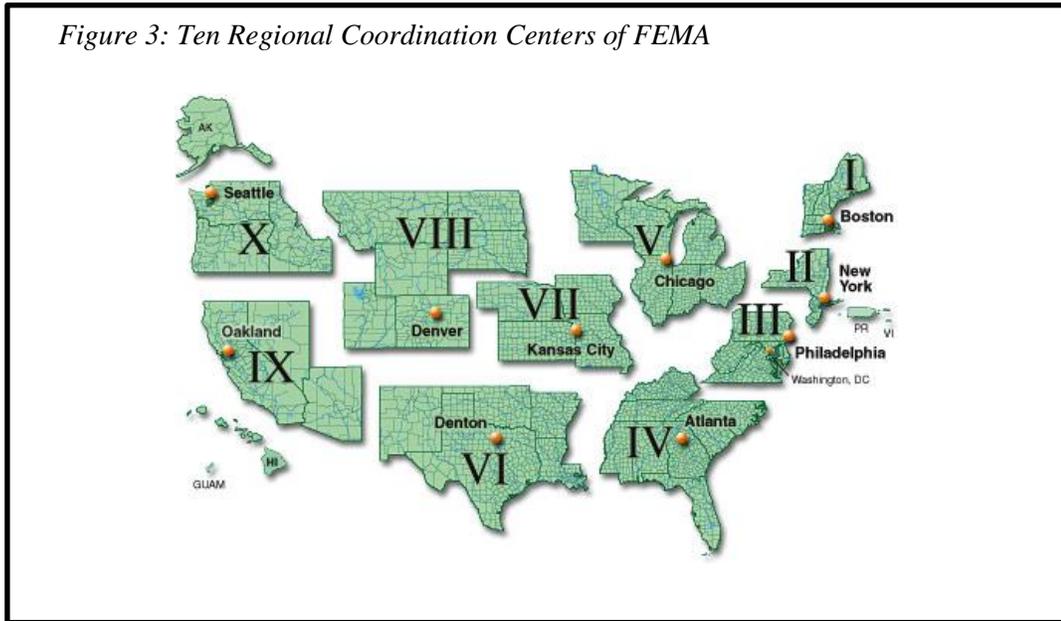
In contrast to DTRA and its international perspective, the Department of Homeland Security (DHS) website provided the most guidance on the architecture of operationalizing national responses to domestic security and consequence management issues. The information available included specific WMD threats to a detail where the public can pull actionable information about CBRNE (chemical, biological, radiological, nuclear and high yield explosives) threats. The dedicated WMD webpage discusses first the biological threat, followed by the nuclear/radionuclide threat and the chemical weapons threat.

For consequence management efforts, the DHS website links to the FEMA website, where further homeland security issues transition to informational content necessary for preparation and mitigation of the WMD events. FEMA dedicated a website branch to the subject of biological WMDs. In accordance with the National Incident Management Systems (NIMS) framework, FEMA divides the nation in to ten regions for disaster coordination.<sup>154</sup> The FEMA regional coordination centers establish the nerve center for disaster management and coordination for the three tiers of government.

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<sup>154</sup> (FEMA, 2010).

*Figure 3: Ten Regional Coordination Centers of FEMA*



After a review of the CDC website, it was observed that the CDC’s website has tailored practical public health information, both in quantity and quality, for both the general public and medical professionals. Archival information is also available from previous pandemics and health bulletins. The CDC’s bioterrorism website tailors its webpage access algorithm through two audience-specific portals, one for the general public and the other for medical professionals. The general public information focused on the highest threat class “A” biological agents. Through hypertext links, the bioterrorism agents are explained in laymen’s terms through a Q&A format to include self-help guidance on what to do if exposure or infection is suspected. A useful feature found in the CDC web site is that the information can be printed or emailed with a single click at the icons available at bottom of each informational webpage. Also, every page had a “1-800-CDC-INFO” phone contact number and a hearing impaired TTY phone number. Although the phone service is only available Monday through Friday, it is a 12 hour

extended phone service (8AM-8PM) that allows for coverage during business hours across all four US time zones.

The CDC bioterrorism website offers another option for medical professionals. This access option offers detailed public health and scientific information that would be important to health professionals concerned about a bioterrorism attack. It includes other than Class "A" bioterrorism agents. The information is easy to access, thorough, and succinct. CDC's approach is well thought out and user-friendly where critical information was usually three clicks or less away from the content desired.

When compared, the relative level of technology adopted by the three federal institutions seems variable. DTRA, as a DoD agency, offers thematic information on the national policies that govern US treaty relationships with other nations concerning WMD non-proliferation agreements. This involves Strategic Arms Reduction Treaty (START II) with Russia that president Obama signed last year. As a combat support DoD agency, DTRA operates more in the international arena and inter-departmental federal levels with less interaction with the general public. Their web site has significant archival information that traces back the legacy of the Cold War years, and the international struggles to reduce nuclear, chemical, and biological weapons. As the federal government's executive agency that administers the SALT II compliance, their website does not reveal day to day operations of their agency. A conspicuous absence of SN/SM was noted. Their support of other military institutions is robust with heavy emphasis on technical reach-back capability of their operations center. The operations center is a 24-7 center. When contacted on a weekend, a person answered the phone and offered guidance and help in answering my questions. Follow-up was also offered.

The FEMA website was found to be very active in current information. At the time of this review, FEMA was handing 96 active disaster declarations for the 2011 calendar year. This included snow-storm related massive power outages in New England, the large wildfires in Texas, and flood recovery in plain states. FEMA website hosts active blogs as an agency, and offers both Twitter and Facebook icons for following FEMA's activities. Both SN/SM sites were active with multiple daily posts. Additional SN/SM services linked were FEMA's own You Tube Channel, FEMA Widgets, SMS service by state, and apps (both Android and Apple devices) for mariners, travelers, and weather information. All links were active, and none resulted in internet dead ends. FEMA's preparedness website has its own web address ([www.ready.gov](http://www.ready.gov)).

The CDC website was also robust in information density, broadness, and detail. When compared to the other two federal sites, the CDC website seemed to have a good balance between archival information and cataloging current health issues for the health care professional. Their availability and use of Twitter and Facebook were up to date and active on a daily basis. At the time of this review, the CDC had its annual campaign to promote seasonal flu vaccine compliance. Other SN/SM channels available were CDC-TV, SMS, Mobile Website, Podcasts, Widgets & Gadgets. A common note that accompanied the CDC's Mobile Website is the phrase, "Your Mobile Source for Credible Health Information". CDC is the only agency that emphasizes the credibility of the information available on their web pages.

Of the three federal websites reviewed, all offered complementary information, in their Web 1.0 and Web 2.0 channels. With the exception of DTRA, it appears that the federal public health and preparedness agencies have incorporated Twitter and Facebook

into their communications strategy, as well as other SN/SM applications. Both FEMA and CDC leveraged the SN/SM platforms while maintaining these channels actively. In contrast, DTRA does not use SN/SM as its public communications channels. However, their operations center operates their phones 24/7. The reasons for this contrast may lie in the fact that DTRA is an externally looking agency directly supporting the military mission of our armed forces. The DoD does not have a direct mission impact internal to the United States except as a supporting role to the civil authorities of DHS and DHHS.

*State:*

Review of the survey of state websites revealed multiple approaches to offer stakeholders information concerning the WMD threat. Despite the heterogeneity of website information tree design the survey revealed significant content homogeneity on the subject of WMDs. This finding seems to be based on the fact that the source of WMD information usually from the same federal agencies supporting the national defense against WMDs.

DHS is the primary federal department that is responsible for protecting the homeland. WMD events will likely use federal resources, and DHS would be in charge. DoD and DHHS will provide support under the authority of DHS. For information about WMDs, the various states' websites hyperlink detailed information residing at the CDC or FEMA websites. This approach reduces the redundancy of information and the possibility of conflicting information about biological WMD preparedness. The websites conformed to the HSPD 5 and 18 directives.

Many states recognized the bioterrorism threat, although not all states developed dedicated web pages for it. The states that had dedicated web pages had large military bases active within the state. These states were Florida, Kansas, Maryland, and Texas. Most states approached the WMD threat more as a national threat rather than a state-specific threat by the way the states presented the threat and referring to the CDC or FEMA for further elaboration. Several states were exceptions to this rule and displayed WMD web pages with substantial preparedness content (Florida, Kansas, Maryland and Texas). Some were dedicated to the biological WMD with detailed preparedness with discussions about national medical countermeasures stockpiles and unique technical/bio-scientific content. The least amount of WMD information was on the Nebraska Department of Health and Human Services website.

*Local/Municipal Websites:*

Review of the four local and municipal public health websites showed that none offered a dedicated WMD information webpage. Two offered hyperlinks back to the CDC bioterrorism website. The primary focus of the local and municipal health department websites were the classic public health issues such as sexually transmitted diseases (STD), flu season preparations, communicable diseases, and senior health services. Other significant content was dedicated to mental health, suicide prevention and environmental health services (i.e. air and water quality, lead abatement). Additional review of local emergency preparedness sub-websites revealed that one of the four local municipalities had a web site dedicated to terrorism through the National Terrorism Advisory System (NTAS) with searchable content from the FEMA. Of note, the NTAS

system replaced the color coding of the obsolete Homeland Security Advisory System (HSAS). The NTAS allows for automated Facebook and Twitter alert tie-ins.

As an overview of the websites surveyed (federal, state, local), all the agencies, except three, provided Twitter feeds. Of the three exceptions, one was a federal agency and two were state agencies. Half of the 16 agencies sampled offered Facebook option in their institutional website, and only three of nine states offered a Facebook feed for their websites. All four local health departments offered Twitter feeds and three of four offered Facebook option. Where available, the author used the Twitter and Facebook-linked pages from the websites offered by local jurisdictions. Most of the postings and tweets were local in character and content, (i.e. helpful health reminders for the winter season).

*Table 2: Sampled echelon's use of Twitter and Facebook*

<b>Echelon</b>	<b>Federal (n=3)</b>	<b>State (n=9)</b>	<b>Local (n=4)</b>
<b>Twitter</b>	2/3	7/9	4/4
<b>Facebook</b>	2/3	3/9	3/4

### **Web 2.0 Assessment: Interviews**

A total of 16 agencies and 3 subject matter experts (SME) agreed to be interviewed. Some of the participants requested that the questions be emailed first for review prior to conducting the interview. The interviews lasted between 20-50 minutes and all interviews were contiguous. The conversations among the representatives of the

three echelons and the SMEs were enriching and collaborative. All agreed that this subject matter was relevant to their professional public health and preparedness offices.

Overall, the participants recognized and shared the need to support interdepartmental and interdisciplinary nature of managing crisis communications that would be required after biological terrorist attack. All participants felt that the strategic communications challenge lie first in the coordination, especially in the first 48 hours of an attack, given the enormity of the scale that WMDs can have on population groups. The need to speak in one voice would be an arduous challenge given the lack of verifiable scientific evidence that would be available in the first few days of an attack.

Another challenging risk would be posed by the possibility that the microorganism may have been weaponized so that conventional public health disease models may not be sufficient to make reliable recommendations to the general public for many days or weeks. Understanding that effective crisis communications would require rapid, credible, and reliable information, the WMD scenario would pose significant difficulties for the public health communicators. Some of these known unknowns would be lethality, incubation periods, infectivity, transmission kinetics, pathogenicity, morbidity, best treatment protocols, and mortality rates.

Most participants felt that FEMA's ten coordination centers are the keys in preparing for and managing a WMD event. Some suggested that the regional intelligence fusion centers will also play a key role especially in the pre-event (phase 1) of an imminent biological WMD attack, or immediately following the attack. The participants understood that the work of these intelligence fusion centers is usually classified, and therefore not available to the public. However, one state participant suggested that they

may have the capability to monitor SN/SM activity in such a way to find ways to help public health offices increase awareness for potential biological WMDs.

Among the state participants, all agreed on the importance of approaching the WMD threat holistically. They felt that the FEMA regional model is the best way to coordinate multi-jurisdictional efforts in preparing for and mitigating the consequences of biological WMDs. The states felt that the coordination infrastructure offered by FEMA and CDC through their regional model is robust, effective, and necessary to ensure that all echelons of government will function in a coordinated fashion, including the use of SN/SM as an adjunct for the overall strategic communications plan.

All the participants recognized the potential of SN/SM in mass casualty crisis situations. At the federal level, FEMA considers Web 2.0 a medium that can be beneficially exploited to facilitate consequence management of WMDs. Communicators at DTRA felt that as a support agency, its need for developing their own Web 2.0 infrastructure would be redundant and unnecessary. The emergency communicators at CDC, unlike DTRA, felt that SN/SM technologies are key commercial infrastructures, especially in the pre-event phase. Coupled with their robust and detailed Web 1.0 platform and content, the synergy offered by digital mass communications media is an invaluable resource for the nation and lower echelons of public health and preparedness. Their sense of importance is accentuated by the fact that about a year ago, CDC reorganized the separate web and SN/SM management teams into one organization.

The majority of the participants agreed that the dual use (send and receive content) of the technology of Web 2.0 was viable for emergency communications needs. They all held favorable opinions of Twitter and Facebook being the two most popular and useable

platforms. One state official felt that You Tube is also part of his top three SN/SM resources.

One county preparedness director was the exception to this opinion, because of funding limitations where he could not support both Twitter and Facebook platforms. He had chosen Twitter over Facebook as his primary SN/SM platform during county emergencies. He noted that Twitter is *the* planned strategic communications doctrine for his county for emergency communications, due to its reliability and reduced need of broadband wireless services. He shared an anecdote of how his agency used the Twitter feed to notify the public about sheltering in place during hurricane and immediate actions to take during an earthquake. He noted that Twitter never was saturated nor buckled under maximum usage load. His agency received accolades from their county executive as well as the local media for his innovative use of Twitter during those public emergencies. He considered broadband wireless infrastructure vulnerable to saturation during crisis situations, and he wanted to rely on a medium that will tax least that vulnerability. Although he was not against Facebook, he felt that for his county's needs, it was redundant.

In contrast, one state preparedness director preferred Facebook over Twitter, although his state maintains both platforms. He responded that although Twitter is the least data-intensive medium of the Web 2.0 technologies, it is also the least capable of all the SN/SM platforms. Because he has currently the resources to fund multiple platforms, both in manpower and contracted services, his state maintains Facebook, Twitter, and You Tube capacities. He noted that for emergency situations, especially in the early phases of consequence management, his department had plans to augment his SN/SM

staff because of the expected sharp increase in Twitter, Facebook, and You Tube participation by the public. He felt that his "surge" capacity could be sustained for about a week before he would have to find alternative medium and long term augmentation of staffing. He felt that these three platforms offer complementary technologies while offering a certain level of redundancy and flexibility, even in crisis situations. Other states seem to perceive Facebook as a useful tool for long-term strategic communications, especially in the pre-event phase, but maintain Twitter capability as a hedge for continuous community contact especially for the first hours following a major disaster.

In terms of national coordination, training, and standardization of operations, the participants recognized the value and importance of NIMS and NRF in coordinating preparations for WMDs. However, NIMS and NRF does not directly address the application of SN/SM for strategic communications guidance. Some felt that the NIMS should be updated to reflect this gap.

Within the organizational model of FEMA's ten regions, it must be noted that the SN/SM is not currently integrated with the individual state systems. Each state has stand-alone Facebook and Twitter management systems and control. One state official suggested that this may be a gap that requires attention by FEMA, especially in managing biological WMD events. He felt that federal fiscal resources are more robust, compared to state public health budgets, and would be a better long-term funding stream to enable a more integrated SN/SM system.

Other barriers to leveraging SN/SM during crisis events were noted. One participant noted that, at least at the state level, federal grant funding was the primary source for her state's funding of innovative strategic communications initiatives,

including SN/SM ventures. She stated that this has been true for the past five years. However, grant funding for homeland security has dried up and many of her SN/SM initiatives now have to be mothballed because of the lack of federal grant funding that state budgets cannot replace. Another participant recounted how she is unable to fund any new emergency preparedness initiatives because her state government is faced with significant budget reductions.

Most interview participants stated that they do not officially permit their employees to represent their agencies independently in Twitter and Facebook platforms. All have policies in place where their agency's SN/SM presence is through official channels only using their official logos. When their agencies participate in Twitter and Facebook, all have in place administrative vetting processes to ensure that tweets and Facebook postings are credible and properly vetted through official internal channels. However, federal participants perceived increased frustrations in ensuring the timely placement of their Twitter and Facebook content because of the length of their vetting processes. Lower governmental agencies enjoyed a higher level of autonomy when posting on their Twitter and Facebook sites.

Another major barrier for communicators in the surveyed agencies is the lack of resources and manpower available in their organizations to monitor and manage SN/SM platforms. This limitation prevents active monitoring of their Twitter and Facebook "walls". Many state and local participants would like to monitor more closely their SN/SM sites, but are unable to do so because of manpower limitations within their agencies. If there are technologies available to use artificial intelligence (AI) to perform this function, most felt that it would be very useful.

Another major barrier noted by several states is the rapidity of staff turnover within their public health and preparedness departments. One state noted that because of personnel turnover, he does not have any experienced staff. Those who handled his state's H1N1 activities in 2009 all had moved to new positions in and out of his organization. He also noted that experienced personnel were hard to find, even when he is able to hire additional staff within his division.

Some participants provided anecdotal evidence that Twitter and Facebook were critical platforms to the mitigation efforts in their jurisdictions as local natural disasters temporarily distressed their old media channels. This came about as electrical power was disrupted for days in highly populated urban areas where home media equipment designed for accessing old media, such as televisions and computers, had no power. They felt that in the first few days of a WMD event, wireless devices accessing emergency information through Twitter and Facebook are viable alternatives, and may be the only alternatives available if the power grid is disrupted.

All interviewed agencies note that Twitter and Facebook are currently adjunctive communications tools and not their primary platforms. None has plans to leverage SN/SM as the primary strategic communications tool. However, all agree that credibility and reliability of their SN/SM content is of paramount importance.

## **Chapter 5**

### Discussion and Conclusions

#### **Discussion**

These interviews provided a cross-sectional sampling of institutions that would be at the forefront of preparation and mitigation efforts for biological WMDs. All the participants were very supportive of the design and mechanics of this study. They felt that the interview method provided a desirable forum that allowed their perspectives and thoughts to be documented for leveraging SN/SM for mass communications needs. All of the participants recognized the strategic and tactical value of Facebook and Twitter for WMD applications. They agreed on the common goal of studying the ways in which SN/SM can be used to manage the consequences of WMDs was a worthy area of research.

Some participants felt that it is unfortunate that only now are their institutions embracing SN/SM's high value for effective communications in abnormal macro-environments. Currently all governments are facing fiscal challenges. Lackluster growth and high unemployment rates portend reductions in public infrastructural outlays, regardless of their perceived benefits. For the medium and long term, the fiscal outlook appears dim. Many participants, being in supervisory or higher positions are faced with hiring freezes and lay-offs of their valuable employees. Their institutions were managing reductions in their workforce instead of considering new initiatives in better meeting their public health and preparedness mandates. Such reductions will inevitably reduce services and capabilities to include active Twitter and Facebook support and stakeholder engagements. This perspective seems to most resonate among state institutions and less so with local and federal agencies.

In the evaluation of the websites, certain trends were identified. For state and local agencies, their websites provided easy to use access points to find usable information about local and regional public health issues. For detailed information about the WMD threat, almost all of the websites provided hyperlinks to the CDC website. This cascading information hierarchy suggests that information is well integrated vertically in the different echelons of government. As a result, redundancy and overlapping of health information was minimal.

Another trend noted was the separate informational access point with one information icon branched to the lay-person, and another branched to the health care professional. This approach seems to have been championed by the CDC. It allows efficient consumption of web-based health information for both of stakeholders while reducing the potential for frustration for its users seeking rapid and relevant information without being confused by too much or too little detail, respectively. The general rule of “three clicks or less” seems to be valid in majority of the website informational searches experienced in this study.

As with the CDC website, FEMA’s website featured easy and convenient access to the searched information. Because of the nature of FEMA’s mandate, their webpage focuses on the preparedness aspect of disasters. Their emphasis on disaster management organization and architecture of authority, as defined by NIMS and NRF, provided up-to-date perspectives for WMD and consequence management plans for the nation. FEMA also believes in the validity of SN/SM as a viable and strategic communications technology that they embrace for WMD management. Although not directly addressed in the NIMS and NRF doctrine, the organizational latitude is given to the ten FEMA

regional coordination centers for deploying of Twitter and Facebook as adjunctive communications platforms.

From the perspective of state public health and preparedness officials, the regional FEMA's regional system is the foundation in which federal, state, and local resources are organized and deployed in a coordinated fashion. State agencies were particularly positive about the way in which FEMA organizes disaster management postures for large geographic areas. Many state agencies agreed that individual states would not have sufficient resources to mitigate the consequences of biological WMD independent of FEMA regional offices. It is interesting to note that the CDC has organized its ten regions around the FEMA model as well.

All agreed that the overarching goal is to begin a rational and objective assessment of this nation's ability to prepare for and mitigate the consequences of a WMD event. The vertically integrated design, sampling all the echelons of government, from federal down to local levels, seemed to be a reasonable lens at which to look at the early impacts of SN/SM both as a technology and sociological phenomenon. It was not clear to the participants on the perceived trajectory of the SN/SM as a potential key adjunct to the communications needs during a mass casualty CBRNE event. However, all agreed that this study provided a unique framework to begin to assess this nation's readiness to manage a biological WMD event.

The sample size may not have been robust in numerical terms, but the quality of the participants offered significant engagement of the institutions that they represented. All the participants were at least supervisors, and most were senior managers of their institutions with consistent longevity within their professions. Due to the caliber,

education, and professional training of the participants, this qualitative methodology came about successfully in allowing certain conclusions in the trends perceived by the institutions interviewed.

The survey respondents were asked to discuss why they viewed SN/SM in such positive terms. Most of the respondents had at least 10 years of experience in the emergency preparedness profession. All felt comfortable with the platforms of Facebook and Twitter. This comfort level is another way of noting the concept of *indigenous knowledge systems* in the DOI theory.<sup>155</sup> Because the participants were already using Twitter and Facebook personally, their resistance to adaptation was reduced when their departments deployed them.

Many felt that, compared to SMS, Facebook offered much more for their organizations, both in terms of internal communications and external communications with the publics. However, they felt that the dependence of SN/SM operability with the cell phone infrastructure was a key vulnerability for the platforms. Regardless of 3G or 4G as a technology, wireless broadband cannot be relied upon for disaster management if the cell tower "grid system" is damaged or destroyed in large swaths of their jurisdictions. Thus, many participants agreed that the complementary aspects of SN/SM with traditional media were exceptional and should be exploited. All felt that the SN/SM technology should not replace old media technologies.

Some felt that the digital to analog mass communications infrastructure should be reversed engineered sufficiently preserve the full spectrum of options available to communicators in WMD environments. This included standardization of emergency radio systems between jurisdictions, although it would be very expensive. Some

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<sup>155</sup> (Rogers & Shoemaker, 2008), 254.

participants suggested that the value of SN/SM is more in the pre-event phase of the WMD consequence management of the continuum, because of this infrastructural vulnerability of cell towers and the dependence of these digital wireless devices to the cellular network.

In the area of information compatibility of emergency preparedness, many of the respondents felt that their rate of adopting their STRATCOM content to Twitter and Facebook was driven by how the technology was being used by the public. In other words, they were following the times of how people were already using the platforms (DOI's critical mass concept). Knowing how pervasive Facebook and Twitter's presence is in modernity, many states chose to use these two platforms to engage the public.

Some pointed out that they studied the events of the Virginia Tech shootings. They noted how SN/SM technologies were adopted as a "I'm OK, Are you Ok?" social checking system that emerged in that shooting event. They noted that this was a lesson learned for their departments. This is the DOI attribute of *compatibility with needs* concept for adaptations to take place more urgently.<sup>156</sup> The participants felt that in the first hours after a mass casualty event, SN/SM would be critical but also susceptible to signal saturation. Some of the agencies in Washington DC experienced network saturation during the recent earthquake that occurred on August 23 of this year as one federal participant noted.

In terms of DOI's sense of complexity, all respondents felt that the Facebook and Twitter processes were not too complex in the operability of the medium. In the complexity and simplicity spectrum that Rogers described, most felt that the medium of SN/SM, in general, is not complex. However, many surveyed felt that the complexity of

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<sup>156</sup> (Rogers E. M., 2003), 246.

SN/SM systems lie in obtaining the funding mechanisms for their agencies to integrate and sustain SN/SM to their strategic communications plan with additional staff. Many desired to hire additional full time staff to monitor and respond to Facebook and Twitter traffic as appropriate. This challenge was mostly voiced in the state and local levels.

In the area of DOI's trialability, many state and local respondents determined that using SN/SM revealed a limitation in their operation of it. They wanted to find ways to monitor and interact with their audiences. Most viewed this effort as a manual process that should not be automated to maximize the one-to-many-to-one interactivity allowed by SN/SM platforms. As public servants, this desire seems to resonate among the surveyed. Current lack of manpower within their departments precluded implementing such interactive processes, however. This limitation in their trialability of engaging their audiences interactively in Facebook and Twitter was a consistent remark from all three levels of government.

Most respondents are themselves networked professionally with others in their profession (DOI's interconnectedness). This networking preceded their initial commitment to SN/SM for their agencies. One state participant stated that his organization's desire to integrate SN/SM to his home state emergency preparedness was "mentored" by the military adjutant general of his state. Another state respondent stated his organization's motivation was due to his recognition of other state programs that he found on line over a period of time. None of the participants felt that they considered themselves as particularly skeptical or traditional when it comes to technology adaptations.

From the sampled participants, it seems that they fell into the first three categories of the adopter spectrum of innovators, early adopters and late adopters. This adoptive behavior was enabled by mostly the interpersonal channel (Bass Model) where participants felt that SN/SM allow their peers to influence their attitudes toward SN/SM.

In terms of DOI's organizational models of decision making, the *collective innovation-decision* model seems to be the model in which their organizations made decisions. This made sense because the respondents first developed consensus within their organizations prior to their organization's decision to spend public money for their establishment of their SN/SM platforms. The participants spoke of discussing extensively within their organizations to justify the expenditures for initiating and sustaining their Twitter and Facebook presence. Many noted that the funding was primarily through federal DHS and FEMA grants.

Like the discursive approach, this methodology lend itself to contextual points of enumeration while hinting at inductive insights to isomorphic perceptions about a technology that may not be sufficiently mature enough for accurate academic judgments. However, by analyzing the degree of communications technology embedded in the interviewed agency's strategic outlook for Facebook and Twitter as a communications platform, some ecological assessment is allowed for early conclusions to be suggested.

The use of DOI theory as a lens provided a workable architecture to view how WMD strategic communications needs were met by organizational adaptation of SN/SM. It was reassuring that the interviewed agencies were so forward-thinking in leveraging Twitter and Facebook as a viable communications medium in crisis environments. It is a reasonable conclusion that the public health and preparedness profession has integrated

the SN/SM innovation to their communications operational plan well. The diffusion of innovation theory suggests that even the laggards, if such characterization of institutions is allowed, are in transition to using SN/SM for crisis communications. However, the delayed adoptive behavior of the lagging institutions is not rooted in psychology, but rather in the fiscal constraints imposed by the current long-term realities of our national economic outlook.

#### *Limitations of Study Methodology*

There are several methodological limitations of this research design. One limitation is that its focus was the information source of the medium (government agencies), and not the medium itself. Because the technology of SN/SM is changing so rapidly, it is possible that public health and preparedness agencies may not possess the organizational nimbleness or metrics to measure success or failure of their SN/SM activities. Further, this research did not capture this intra-organizational dynamism, and was blind to deterministic elements that drive the complex inter-relationships inherent in large bureaucratic organizations.

Secondly, the technology of SN/SM is as novel as it is unproven in true social utility in large scale disasters. The way in which the public uses SN/SM two years from now may be very different from institutional perceptions of it today. It is not clear today how the publics will ultimately use SN/SM during mass casualty situations brought about by biological WMDs. If one was to examine the market viability of previous SN/SM like MySpace, its drive to irrelevancy was a shock to technology market watchers. Neither the researcher nor the participants can really predict where Twitter and Facebook will be a

few years from now. Potential disruptive technologies like tablets may introduce still-to-be-invented applications that negate the relevancy of Twitter and Facebook, or further potentiate its relevancy.

A third limitation of this approach is the lack of ability to interview senior leaders in the targeted organizations. This limitation prevents more complete understanding of how public communications decisions are made by the organization. Although review of established policy decisions is within the scope of this research method, the process in which those policies were made was beyond its scope.

A fourth limitation of this methodology is that this study does not evaluate the hardware necessary for the SN/SM platforms to operate. This study assumes that the infrastructure enabling SN/SM is available in WMD events. It is known that in nuclear WMDs, electronic devices will not be able to withstand the electromagnetic pulse (EMP) of a nuclear detonation. If biological WMD succeeds in its intent, the technicians who maintain the SN/SM infrastructure may become incapacitated in sufficient numbers to risk whole system failure over time, and their skills not be easily replaced.

A fifth methodological limitation was the limited sample size. As a qualitative study, this study was not designed to offer generalizability to the current state of readiness of the whole of government, nor all the stakeholders for WMD response. The study does offer, however, the feasibility experienced by the survey participants while their efforts to facilitate institutional SN/SM participation seemed to provide innovative leadership to their organizations.

Finally, the agencies studied are all funded through different entities of the local, state, and federal governments. Participants noted that until recently, federal grant money

was the primary source of funding SN/SM strategic communications initiatives at the state and local levels. The changes or loss of these funding streams may have hidden or unintended consequences. Perhaps for future research projects, analyzing ways to preserve these funding streams may be of value.

### *Theoretical Limitations*

In terms of theoretical limitations, one weakness of using the DOI framework is that the intended audience is ignored in this research design. Reception theories, thus, was not be engaged, and a potential for not recognizing critical observations about the intended audience would not be known. One can consider reception analysis as a possibility for future research efforts in how the audience would use SN/SM during WMD events.

Another weakness of using DOI theory is its inherent variability in their social systems. Because three of the targeted agencies are large bureaucratic organizations under three different cabinet level departments, they being DHS, DOD, and DHHS respectively, with tens of thousands of employees, organizational compartmentalized dynamics (stove-piping) may preclude a easy qualitative comparison among the three agencies. In other words, qualitative analysis in adoptability may introduce confounders when compared to smaller state and municipal organizations.

Local, state and federal agencies have widely varying constraints on operating budgets relative to each other. Because technology-based hardware requires capital expenditures, training and equipment, financial limits of smaller health departments and safety agencies may not have the financial resources readily available to fund innovations

on the hardware side compared to their federal counterparts. Such limitations make simple qualitative assessments between the groups less intuitive and more susceptible to misinterpretations of the survey answers.

## **Conclusions**

By surveying how institutions of public health and preparedness view SN/SM as a possible solution to biological WMDs, it was hoped that the analysis revealed certain trends that benefit its participants. Further, such as qualitative survey suggests that the DOI theory is a workable adoption model for the institutions surveyed. Because this study's design focuses on government agencies in a vertically tiered three level model, this approach found evidence of adoptive behavioral trends among its surveyed institutions, but not at the expense of redundancy or ignorance of known communications gaps. The lessons learned from 9/11, Washington anthrax attacks, Katrina, and now Fukushima enabled rapid institutional adoption of SN/SM technology because of its unequivocal ubiquity and commercial existence. Such assessment, it is hoped, would be of interest to crisis communicators, emergency planners, journalists and the public health professionals.

Most public health professionals think that WMD attacks/events are survivable, and recovery is probable when modern medical and public health practices are integrated, taught, implemented, coordinated, and exercised. To this end a certain national consciousness and awareness about WMD's has been nurtured through traditional as well as emerging online platforms for public health and preparedness communicators. This includes leveraging SN/SM platforms for mitigation plans for the WMD threat. Twitter

and Facebook are commercial enterprises that seem to be well suited for crisis communications functions because of their ability to establish virtual and reliable communities for critical information exchange in emergent environments. All three levels of government recognize the capability and capacity of Twitter and Facebook as crisis communications platforms.

With the steady and rapid rollout of the smart phone and tablet technologies, and FCC's efforts to narrow the digital divide, the economic barrier to broadband access will continue to be lowered. Content for these new devices will likely rise geometrically, and the connected and wired world will likely become more of the connected and wireless world.

The varieties of content will be used to educate, enrich, create wealth, and enhance security for the collective. If or when a WMD event occurs, the mitigation efforts will be made easier because more public health and preparedness institutional leaders are aware of the necessary actions to communicate reliably and credibly with their stakeholders. Biological WMD attacks are manageable. The collective has a better chance of solving associated problems when their ideas and innovations are connected rather than isolated. Although not a panacea to all the problems we face with WMDs, solving the problems will be easier when teams of minds are engaged rather than individuals.

It is ironic that the same diffusion of life-science innovations that allowed Americans to double their life expectancies from a hundred years ago can be used by terrorists to harm so many so easily. Our nation's leaders have identified the WMD threat as both real and possibly inevitable. Americans coped with and adapted to the 9/11 attack

and the Katrina disaster. With experience gained in this and other crises, journalists and crisis communicators can play critical roles of thought leaders in how well this nation handles and overcomes the next disaster, regardless of it being sourced by nature or by mankind. This study was designed to begin that conversation among health communications professionals to self-evaluate their readiness for WMDs with their fellow Americans.

"I think by far the most important bill in our whole code is that for the diffusion of knowledge among the people. No other sure foundation can be devised, for the preservation of freedom and happiness...Preach, my dear Sir, a crusade against ignorance; establish & improve the law for educating the common people. Let our countrymen know that the people alone can protect us against these evils [tyranny, oppression, etc.] and that the tax which will be paid for this purpose is not more than the thousandth part of what will be paid to kings, priests and nobles who will rise up among us if we leave the people in ignorance." - Thomas Jefferson<sup>157</sup>

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<sup>157</sup> (Jefferson, 1786).

## Appendix

### Definitions

**Biological Weapons:** Microbiological organisms used to infect, incapacitate, and kill human beings.

**Inductive Theory:** Qualitative research theory based on interpretive social sciences where inferences are made from observations of human behaviors that offer a perspective of probable truth.

**Media Relations:** A process in which organizations and institutions interact with the media and its institutions in such a way to offer an institutional point of view that is positive or least negative.

**New Media:** online platforms that enable members to produce, share, or collaborate on content across social networks (i.e. Web 2.0).

**Node:** In a virtual community, the Web 2.0 user who behaves as a “micro-broadcast” relay point for many other users in that community.

**Public Relations:** A process in which organizations and institutions interact with the general public in such a way to offer an institutional point of view that is positive or least negative.

**Publicity:** A process of attracting media attention for the purposes of gaining commercial or community notoriety.

**Social Media:** Technology-based medium that offers participatory communications modality for building relationships.

**Social Responsibility:** The obligation of the journalist as recommended in the Hutchins Commission Report of 1947 to report fair, complete, balanced, and intelligent stories of events relevant to the society.

**Social Networking:** Any process in which multiple digital technology-centered mediums are used to facilitate and organize communities and their agendas.

**Strategic Communications:** Subset of journalism that deals with organizational strategies and plans to provide internal and external stakeholders perspectives of and from the organization.

**WMD crisis-mediated Strategic Communications:** The deliberate process of strategic communications before, during and after a WMD event requiring national coordination and facilitation of policy, strategic and tactical information to be disseminated widely to organizations, institutions, subordinate governments, and citizens. This information flow would be multilateral and managed to maximize legitimacy and resiliency of affected civil society.

**Weapons of Mass Destruction (WMD):** Any man-made chemical, biological, nuclear, radiological, and high explosive (CBRNE) device designed for use in conflict, war, or terrorism.

**Web 1.0:** Any first generation communications technology that allows for unilateral one-way transfer of data and content from its creator to the consumer/receiver.

**Web 2.0:** Any second generation communications technology that allows for multi-nodal and multilateral real-time wired/wireless transfer and sharing of data and content to collaborate in a virtual community that allows any member to participate.

Interview Script and Questions

## **Script for Phone Survey/Interview Questions For Participating Agencies**

Please refer any questions to:  
**Andrew (Andy) Kim**, ,DO, MPH, MS (eq.)

Principle Investigator

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Cell: 443-878-9172

*(To be read over the phone to pre-arranged participating agencies and their reps)*

## **Research Scope**

**“I thank you and your agency for volunteering to be interviewed. You can stop the interview at any time. The interview is designed to be a conversation, and not an interrogation. Not all questions have to be answered, and if you want to take a break, it is not a problem. There are no time limits.**

**Do I have your consent to start the interview? \_\_\_\_ (yes), \_\_\_\_ (no)**

*(If the participant declines, terminate interview, thank the person, ask if any questions arose, answer questions, and go to next agency).*

**May I start now?**

*(pause)*

**The scope of this research is to review the current state and vision of how your agency is considering the use of social networking (SN) and social media (SM) to communicate with your target audiences in the context of a biological weapon of mass destruction (WMD) attack. The questions are open ended to give your agency an opportunity to share, in an academic setting, any plans and innovations for facilitating communications in WMD events.**

**Your agency’s opinions on how best to approach the communications environment in a WMD environment is worthy of research. The policies and strategies of the whole of government is not the subject of this study. It is understood that your agency’s answers to these questions do not represent**

**the policies of the US, state or local governments or official positions. The intent of this research is to provide a forum for discussing and identifying possible applications of the “new media”, enabled by existing modern communications technology in a WMD-related event. Your participation will serve to provide a forum for academic discussions for the benefit of the participants seeking to bridge the communications need in the nexus of a biological WMD scenario and public health.**

### **Social Networks/Social Media**

**One of these unique communications platforms is the social networks (SN) / social media (SM) paradigm that exist today. SN/SM has become ubiquitous in our society. It is efficient and effective for both visual and text messaging in a band-width independent manner. It has proven to be durable and near-universal in its ubiquity among American consumers. The technology transcends socio-economic status (SES) and class. Given these attributes for a communications medium, social media/networking technology has the potential to moderate and facilitate the communications needs of a nation prior to and during national crisis situations provoked by WMD attacks.**

**In mass casualty situations, experts in health departments can also function in critical communications roles, given the trust that public health professionals enjoy in state and local governments. Major media outlets also employ medical journalists, assuming the role of information intermediaries in reporting the complexities of health information, but the credibility of**

**broadcast mediums will be limited in the first few days due to their nature as being intermediaries.<sup>158</sup> Given these overlapping roles, public health officials (as primary sources), reporters and journalists (as secondary sources) will be able to leverage their experiences in moderating errors, falsities and uncertainties in Facebook, and Twitter.”**

### **Interview Questions**

*“Please answer the following questions in the context of WMD’s. All questions do not require answers, and activities and ideas in consideration may be used to address these questions.”*

- 1) What are the public health or community security responsibilities of your agency in regards to WMD’s?

Pre-Event:

First 48 hours after WMD:

- 2) Does your office have designated spokespersons for WMD crisis situations? Does your office require any special qualifications for this responsibility?

Pre-Event:

First 48 hours after WMD:

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<sup>158</sup> (Johnson, 2006).

4) Does your agency feel that Web 1.0 as a communications platform is important to your stakeholders and community during WMD events or other disasters? How and why?

Pre-Event:

First 48 hours after WMD:

5) Does your agency use/plan to use Web 2.0 as a communications platform? Is it part of the communications plan for WMD events or other disasters? Please describe how you use this platform.

Pre-Event:

First 48 hours after WMD:

6) Does your agency have a preference on which Web 1.0/2.0 platforms to use or not use in WMD events or other disasters? And why?

Pre-Event:

First 48 hours after WMD:

7) When using the Web 2.0 platform, do you have guidance or standard operating procedure (SOP) for **Facebook** engagement with the public in WMD events or other disasters? How is **Facebook currently** being used?

Pre-Event:

First 48 hours after WMD:

8) When using the Web 2.0 platform, do you have guidance or standard operating procedure (SOP) for **Twitter** engagement with the public in WMD events or other disasters? How is **Twitter** currently being used?

Pre-Event:

First 48 hours after WMD:

9) Does your agency allow or encourage its employees to use **Facebook** for interacting with the public on a routine basis? Does your agency have a policy for employees using **Facebook** to engage the public? Does this policy change during a national emergency?

10) Does your agency allow its employees to use **Twitter** for interacting with the public on a routine basis? Does your agency have a policy for employees using **Twitter** to engage the public? Does this policy change during a national emergency?

*“We’re about half-way through. Would you like to take a break?”*

*(pause)*

*“If not, may I continue?”*

11) Does **Facebook** represent a primary, secondary, tertiary, or unofficial platform for agency communications?

Pre-Event:

First 48 hours after WMD:

12) Does **Twitter** represent a primary, secondary, tertiary, or unofficial platform for agency communications?

- 13) Does your agency perceive any challenges in working other governmental institutions? Please describe the issues in your own words and your suggestions to overcome them.
- 14) Does your agency have a crisis communications protocol with other agencies? Is it specific for WMD's? How about Biological WMD's? Please describe it in your own words.
- 15) Does your agency perceive of any barriers or challenges in using **Facebook** as a communications platform in WMD environments?  
Pre-Event:  
First 48 hours after WMD:
- 16) Does your agency perceive of any barriers or challenges in using **Twitter** as a communications platform in WMD environments?  
Pre-Event:  
First 48 hours after WMD:
- 17) Do you have any additional comments that reflect your agency's preparations for crisis communications as a result of a biological WMD attack? Feel free to add any information you feel appropriate in this subject

**“This concludes the interview. Thank you and your agency for your participation.**

**Are there any questions you would like to ask?**

*(pause)*

**Thank you again, and have a good day.”**

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