The Homegrown Violent Extremist Radiological Threat and the Psychosocial Impact on the Affected Population

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Abstract

The recent increases in political violence and violent social movements have potentially elevated the threat posed by a homegrown violent extremist (HVE) employing a radiological dispersal device (RDD or "dirty bomb") for a future attack. RDDs have generally fallen into the threat assessment category of high impact/low probability in a comprehensive range of national security studies, such as those from the Heritage Foundation in 2004 and the U.S. Nuclear Regulatory Commission in 2003. The primary elements that had previously hindered a successful RDD attack had predominately been extremists' lack of access to materials, technical knowledge, and ideological motivation. However, the Rajneeshees in 1984, Aum Shinrikyo in 1995, Amerithrax in 2001, and Khalid Aldawsari in 2011 all demonstrate that highly educated radicalized individuals with access to radiological materials could construct and detonate an RDD domestically. Additionally, the public response to radiological events like the 1987 Goiânia, Brazil incident provides HVEs a motivator to employ an RDD as a psychological weapon instead of solely intended to produce casualties to further an ideological agenda. The research is a qualitative case study analysis of the incidents above to examine the increased opportunity, capability, intent, and probability of an HVE RDD attack.

Keywords: homegrown violent extremism; dirty bomb; radiological dispersal device; WMD terrorism; CBRN

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Introduction

Chemical, Biological, Radiological, and Nuclear (CBRN) events have a significant psychological impact on the affected community and the world, especially when it involves a deliberate release such as a Weapon of Mass Destruction (WMD) terrorist incident. CBRN events almost always result in a mass casualty event that overwhelms first responders, healthcare facilities, and other public services and infrastructure, which adds panic and chaos following the release of a CBRN agent. Therefore, psychological response to a CBRN event plays a significant role in the duration and effectiveness of both incident response and disaster recovery. In addition, the public's limited or misinformed knowledge, understanding, and perception of radiological and nuclear materials and effects can significantly influence the psychological impact of a radiological dispersal or exposure device (RDD/RED). Consequently, psychosocial elements are a substantial component in pre-event planning regarding prevention, protection, and mitigation strategies for potential CBRN/WMD events.

Three psychology of actors theories are integral to understanding when conducting impact analysis, developing continuity and contingency plans, and strategizing incident response and disaster recovery. The first is Emotion and Motivation and directly relates to how the public and decision-makers will prepare for and respond to a CBRN event. The second is Group Processes, as this theory will be critical in how information is disseminated and will determine how effective planning and strategies will be before, during, and after a CBRN event. The final theory is Intergroup Conflict which addresses the challenges decision-makers will face during

response and recovery, as well as aiding in understanding why an actor would engage in the deliberate release of a CBRN agent.

Social movements' current heightened state of political extremism, radicalization, and violence has significantly increased the likelihood of a highly educated homegrown violent extremist (HVE) employing a CBRN weapon. For example, the Rajneeshees in 1984, Aum Shinrikyo in 1995, Bruce Ivins ("Amerithrax") in 2001, and Khalid Aldawsari in 2011 all represent cases where radicalized individuals or groups with higher levels of education attempted or succeeded in perpetrating a CBRN attack against a civilian population. The project's focus is on RDDs and REDs but will briefly discuss bioterrorism in response to the impact of the Covid-19 pandemic on the world's population.

The following presentation will serve as a "lessons learned" after-action review from the previously stated case studies and offer recommendations based on what worked and what did not during previous CBRN responses. The research paper also discusses threat perception trending toward the ever-increasing probability of a CBRN event and subsequent mass casualty incidents by an HVE. The presentation will additionally address how decision-makers can take steps to mitigate severe disruptions and widespread public panic, which severely burden the infrastructure of the affected community. Finally, the project offers recommendations on how decision-makers can diminish the terrorist or state actor propaganda and publicity for the intentional release of CBRN agents against civilian targets and briefly examine the psychological reasoning behind why a hostile actor would choose to perpetrate such an attack.

Literature Review

Numerous scholarly sources and government publications directly address the psychological impact of a CBRN event, WMD terrorism, and emergency management

procedures for the prevention, protection, mitigation, response, and recovery relating to CBRN events. Except for WMD terrorism, many of the sources draw very similar conclusions and make comparable recommendations. The point of contention is whether hostile state and non-state actors would have the intent, opportunity, or capability to perpetrate an attack utilizing a CBRN agent despite well-documented occurrences in the past. Analyzed independently, one could surmise that the likelihood of a deliberate release of a CBRN agent is improbable. However, past case studies into Aum Shinrikyo, the Rajneeshees, Al Qa'ida, and Da'esh (ISIS or Islamic State) demonstrate that intent, capability, and opportunity exist. Comparative literature analysis will show how decision-makers can lessen a CBRN event's negative psychological and sociological impact. Similarly, the research will examine how law enforcement and national security services can better combat and deter hostile actors that would seek to deliberately release CBRN agents against a civilian population to serve political and ideological agendas.

Psychological Impact of a CBRN Event

Addressing specific psychological and sociological responses to all-hazard events, both natural and man-made disasters, was the first step in understanding the supplementary impacts of a CBRN event. Rubin, Amlot, Page, and Wessely (2008) identify early issues with accurately gauging psychological response within a population because of the volume of the independent and dependent variables to consider. For example, Rubin et al. (2008) list proximity and exposure to a terrorist attack or disaster as not always indicative of how the population will respond on an individual or group basis. Furthermore, when one adds more influential elements, such as the inclusion of CBRN agents, it can dramatically skew the results. Sharma (2010) makes parallel arguments noting that the variance in contamination and lethality between different CBRN agents will also make it challenging to predict the psychological impact.

Krieger, Amlot, and Rogers (2014) make similar assertions comparing the relatively limited reaction to the 2006 Polonium poisoning of Alexander Litvinenko that contaminated several locations in London. Still, there were many "psychological casualties" from the 1995 Tokyo subway Sarin attack. Kreiger, Amlot, and Rogers (2014) delve into how the rarity and public ignorance about CBRN agents and their properties typically drive the increased psychological response to a CBRN event. Carter et al. (2018) go further into this and state that the public's lack of preparedness for all-hazard events adds to the heightened psychological response and influence after a CBRN event. The Center for Disease Control and Prevention has also identified these shortcomings and created an informational blog page promoting "zombie apocalypse preparedness," exploiting pop culture to encourage citizens to take more significant steps to endure an all-hazard event (Khan 2011).

It is important to note that Krieger, Amlot, and Rogers (2014) state that terror attacks do not always result in panic, fear, and depression. In certain circumstances, such as the evacuation of the World Trade Center on 9/11 and the 7/7 London bombing, people could find a collective calm to increase the odds of everyone's survival. Comparably, people observed similar reactions during the Boston Marathon bombing. Race participants continued running to nearby hospitals to donate blood or scale barricades to render life-saving aid to victims (Carter et al. 2018). This group process can be encouraged during a CBRN event with hasty and orderly decontamination and medical treatment. The impacted population will generally conduct this activity with calm and resilient behaviors despite fear and confusion (Carter and Amlot 2016). Points of contention or conflict usually derive from a desire to reunite with family members, impatience with protocols, and embarrassment over decontamination procedures.

Cavallini, Bisogni, and Mastroianni (2014) add a final element to the Emotional and Group Processes theories following a CBRN event: the impact on the affected community's economy, specifically relating to biological threats. Cavallini, Bisogni, and Mastroianni's (2014) analyses are particularly relevant to the project regarding the current economic hardships experienced due to the COVID-19 pandemic. The authors focus on the economic components, including infrastructure disruption, loss of consumer confidence, and costs for decontamination, and discuss the social pitfalls such as unemployment, lifestyle modifications, and social trust changes.

Government Response to CBRN Events

The Joint Chiefs of Staff (2018) produced an operations manual for conducting military operations in CBRN environments and discussed how to assess and respond to the psychological impact of a CBRN event. The Joint Chiefs (2018) include Defense Support of Civilian Response, which states' jurisdictional and international partner CBRN psychosocial response guidance parroted (New Jersey State Police n.d.; Stevens and Raphael 2008). Stevens and Raphael (2008) and the Joint Chiefs (2018) reinforce the assertions made by Sharma (2010). The authors claim that, particularly during a CBRN event, first responders and medical treatment facilities can become rapidly overwhelmed by the asymptomatic, psychological casualties prohibiting them from managing the existing mass casualty incident more effectively.

Stone (2007) discusses the "worried well" – the psychological casualties – and how government response can dramatically sway the number of psychologically impacted and the overall influence a CBRN event has on a population. For example, Stone (2007) argues that during the 1987 Goiania, Brazil radiological contamination event, government encouragement for the public to seek treatment created panic, depression, and inundated medical facilities

beyond capability. Similarly, Stone (2007) establishes that eighty-five percent of the people seeking treatment after the Aum Shinrikyo Sarin gas attack were asymptomatic. However, early misidentification of the CBRN agent contributed to delayed response and treatment for those exposed (Carter et al. 2018).

Public trust in government response is a significant component of reducing negative psychological impact and promoting positive influence. Parker (2013) concludes that strategies employed by the U.S. and its international partners are working towards improved prevention and protection from bioterrorism. However, the focus is on more conventionally projected biological warfare methods and forms of bioterrorism. Koblentz and Tucker (2010) address weaknesses in effectively mitigating biological warfare and bioterrorism and are reflected in many of the shortcomings and challenges currently being experienced in the COVID-19 response. Koblentz and Tucker further assert that the forensic pathology process is too time-consuming. As a result, the results are often inconclusive or misleading, as represented in the 2001 Amerithrax case that took almost a decade to determine culpability. The implication is that the public cannot rely on the government to identify or combat a weaponized pathogen effectively adds to increased anxiety, undermines social order and public trust, and can rapidly escalate to civil disorder; again, the current COVID-19 pandemic demonstrates this assertion.

The research materials on bioterrorism exposed another challenge in earning and maintaining public trust in the government's response to diminishing the negative social and psychological impact. That is disseminating reliable and valid technical information, especially regarding radiological and nuclear threats – the most unlikely being a nuclear CBRN event involving an improvised nuclear device or errant or intentional weapon strike. Still, using an RDD (Radiological Dispersal Device, aka "dirty bomb") or RED (Radiological Emission

Device) is far more probable. McDonald, Coursey, and Carter (2004) provide an article directed more toward those with a firm understanding of radiation physics but annotate their findings in a manner that a reader can understand in terms of national and global security. Katz (2014) also presents substantial technical data explaining RDD detection and mitigation techniques and strategies but reinforces the difficulties in educating and reassuring an anxious public. Finally, Maurer (2015) highlighted many vulnerabilities in detecting radiological materials and RDDs at ports of entry, where organizations can improve, and how detection and interdiction would be almost impossible once across a state border. The technical jargon regarding radiological threats and the inability to accurately locate and stop an RDD or biological pathogen only increases negative psychological and social impacts preceding a CBRN event.

Psychology of Hostile Actors' Use of CBRN Agents

In two separate 2012 articles, Medalia discusses in fairly lay terms the effectiveness and attractiveness of RDDs by hostile actors, specifically violent extremist organizations, primarily because of the inherent irrational fear and psychological impact of radiological and nuclear materials by the general public. Medalia (2012) dispels many misconceptions associated with radiological material that does not require a background in nuclear or health physics and offers alternative vectors for deploying radiological materials in a CBRN attack that did not involve a dirty bomb. Acton, Rogers, and Zimmerman (2007) authored an article that also speculated about alternate dispersal methods of radiological materials without involving conventional explosives to inflict casualties. Many of the hypothesized techniques did not present themselves as overly effective in producing casualties. However, Acton, Rogers, and Zimmerman did conclude that there would be a significant, if not greater, psychological and social impact on the affected community. Allan and Leitner (2006) similarly propose that hostile actors could use an

alternative RDD for agro-terrorism against different food industry components. An act of agro-terrorism, whether radiological, chemical, or biological, would have a dramatic psychological and social impact and could even result in a global health crisis with long-term implications.

Bioterrorism is a less likely vector of CBRN attacks by hostile actors. However, the subject necessitated investigation because individuals or groups have used them in past attacks and are still included in many states' arsenals against international arms agreements and conventions. Repez (2012) details the various pathogens categorized as bio-terror weapons and rates their effectiveness. When contrasted against Parker's (2013) findings with the psychology behind certain pathogen selection for deliberate release against a civilian population, it allows for a more accurate threat perspective for decision-makers and the public. Jansen, Breeveld, Stijnis, and Grobusch (2014) validate and compliment many of the previous sources on which pathogens would be most effective for bioterrorism and motivations for their deployment by hostile actors as speculate as to why most bioterrorism attempts are largely unsuccessful. Greub and Grobusch (2014) offer a rebuttal argument to Jansen, Breeveld, Stijnis, and Grobusch's (2014) claim and downplay the probability of a bioterrorism event being a preferred method of attack by hostile actors yet acknowledge that the likelihood is increasing.

Conclusion

The literature reviewed for the theory application project focused on the primary psychological theories most closely associated with the impact on a population due to a CBRN event. The dominant views examined were an actor's emotion and motivation, Group Processes leading up to, during, and following an event, and Intergroup Conflict that would inspire the intentional release of a CBRN agent against a civilian population. In addition, the project had to consider other relevant subjects, such as government prevention, protection, mitigation,

response, and recovery strategies and implementation and the effect those had on fostering public trust and diminishing negative psychological and social impacts. Finally, political and ideological motivators for hostile actors, specifically violent extremists, to attempt to utilize CBRN agents were examined in greater detail, focusing on bioterrorism and "dirty bombs."

Research Design and Methodology

The project employed a mixed-methods research methodology utilizing the predominately qualitative comparative analysis to explore previous publications and source materials discussing a CBRN event's psychological and sociological impact. The project additionally performed an evaluative study of past events involving the deliberate release of CBRN agents. The latter topic necessitated examining the ability, intent, and opportunity of hostile actors and the political circumstances and ideological agendas that would cause them to employ CBRN agents against a civilian population. The Toulmin Argumentation Model was the principal approach to conducting the research due to the project's analysis evaluating evidence supporting the recommendation. Intelligence analysis is heavily reliant on the Analysis of Competing Hypotheses, which is very similar in structure to the Toulmin Model. Still, the latter adds a more academically minded approach to rebuttal and counter-rebuttal to eliminate confirmation bias and maintain objectivity. The topic of a deliberate release of a CBRN agent against a civilian population is still primarily regarded as both a High-Impact/Low Probability and What If?... scenario despite examples presented by previous cases utilized in the project.

Research Design

The presentation sought to examine CBRN events' psychosocial and psychological impact based on three case studies from recent history. The case studies originally included the Chornobyl disaster, the current COVID-19 pandemic, and the terrorist attacks of September 11th,

2001 because of their significant psychological and psychosocial impacts globally. However, the latter was not a CBRN event. As the research progressed, it became apparent that the Chornobyl disaster and 9/11 attacks were better used as examples to provide context for the theories rather than the project's focus. Instead, the presentation should use more relevant case studies on WMD terrorism to close information gaps and issue recommendations. In addition, the Aum Shinrikyo Tokyo subway Sarin gas attack, the 2001 Amerithrax case, and the Rajneeshees' Salmonella poisonings provided much better contrast and comparison for the study and better served to tie in the research on the current COVID-19 pandemic.

Research Methods

The research methodology involved compiling qualitative and quantitative data from previously published peer-reviewed academic sources and government publications. The project predominately used scholarly sources to examine the past analysis of the psychological and societal impact of a CBRN event and the government publications viewed to evaluate past and current tactics, techniques, and procedures (TTPs) incorporated into emergency management plans to address both the CBRN event and subsequent psychological impact on the affected community.

The Toulmin Model of Argumentation was the foundation of the qualitative research methodology in source identification and vetting to confirm the initial hypothesis. To ensure mitigation of cognitive and perceptual biases and maintain objectivity in the study, the study also examined rebuttal sources followed by alternative sourcing to identify counter-rebuttal arguments to refute the contested claims. The project drew from the academic libraries of two different institutions to find research materials and an open-source, web-based search engine to locate relevant government documents and source material. Searches focused on the

psychological and psychosocial impact of CBRN and WMD events and incident response and disaster recovery related to CBRN/WMD events and WMD terrorism. Independent and dependent variables also had to be considered in source identification and vettings, such as intentional versus accidental release, the relevance of when the incident occurred, location and governance of the event, access to information about the incident, and the ratio between the scale of contamination/release versus lethality/impact.

Finally, the paper examined whether or not a hostile actor, specifically homegrown violent extremists, would have the intent, opportunity, and ability to perpetrate a CBRN/WMD attack. Terrorist attacks have their own unique psychological and psychosocial influence on the population and were essential to address in the broader study. Again, the Toulmin Argumentation Model was used to find sources that refute the original findings to avoid confirmation biases in the research and discover material to offer a rebuttal in favor of the stated hypothesis. The briefing portion of the brief also provides decision-makers with recommendations as to how to combat and deter the motivations for hostile actors to employ CBRN agents as part of their political strategy.

Data Analysis

The paper had to consider several dependent and independent variables to determine better the extent of a CBRN event's psychological and societal impact and provide relevant recommendations. Dependent variables consisted of the scale of the release and levels of contamination, duration of exposure and contamination to the affected community, levels of preparedness and speed of response, and length of recovery. Independent variables included access to information, type of governance, and intentional ideological or political motivations for using weapons of mass destruction.

Conclusion

The research methodology for the project sought to establish clear correlations between the psychology of actors' theories of Emotions and Motivation, Group Processes, and Intergroup Conflict in determining the psychological impact of a CBRN event. The project predominately used the Toulmin Argumentation Model to establish objectivity for the project and its similarities to the intelligence analysis method of Analysis of Competing Hypotheses. Finally, the brief considered the previously stated independent and dependent variables to provide more accurate recommendations to decision-makers to mitigate the psychological impact of a CBRN event. The research methodology justified the project's need for increased research into the psychological impact of a CBRN event, particularly a deliberate release by hostile actors, based on past events and current levels of preparedness.

Analysis and Findings

Chemical, Biological, Radiological, and Nuclear (CBRN) events are the CBRN agents' intentional or accidental release, such as toxic or hazardous chemicals, biological warfare pathogens, and radiological materials. A CBRN event often results in a mass casualty incident. It rapidly overwhelms healthcare and first responder services and strains other critical infrastructure elements such as communications, transportation, and government. The need for specialized protection equipment and medical treatment facilities and site contamination further complicate incident response and disaster recovery. The general population also rarely has a solid understanding of CBRN agents' long- and short-term effects, varying levels of contamination, lethality, and the protection and mitigation methods during or after a CBRN event. All the added unknowns create an environment where an increased panic and anxiety accompanies such an incident, much more so than a traditional terrorist attack or natural disaster.

The research project examined case studies of the Aum Shinrikyo Tokyo subway Sarin gas attack, the 2001 Amerithrax case, the Rajneeshees' Salmonella poisonings, and the current COVID-19 pandemic. In addition, the research project addressed how the psychosocial theories of Emotion and Motivation, Group Processes, and Intergroup Conflict play into exacerbating the difficulty of response and recovery from a CBRN event and what policymakers can do to help mitigate the psychological impact of a CBRN incident. The Chornobyl disaster and September 11th, 2001 attacks were used as examples for comparison in addressing specific themes but not to the extent they require a dedicated case study.

Hostile actors, such as Da'esh and Al Qa'ida, have long sought to use a CBRN agent to perpetrate a psychologically devastating attack against U.S. and European targets but have yet had the capabilities to do so to the extent it raises real security concerns. At its height, Da'esh may have had the financial resources to obtain CBRN agents and employ them against a civilian population. Still, it is more likely that a lone extremist with intent, ability, and opportunity would be the perpetrator of such an attack (House, 2016). For example, Aum Shinrikyo and the Rajneeshees were able to recruit individuals with the knowledge and technical ability to commit an act of WMD. In the former case, it failed to have the desired effect due to poor dispersal design, and in the latter, it was intended for political gain and not to be lethal. The Amerithrax case also was largely unsuccessful in its lethality. Still, contamination fears and timing immediately following the September 11th attacks the event exponentially increased its psychological impact on the target population.

Bioterrorism is unique from the rest of the CBRN categories. Many pathogens can be effortlessly and cheaply obtained or cultivated, and the majority do not require a sophisticated delivery device to be effective. It is unlikely that most non-state actors could procure a

genetically modified or weaponized bioterrorism pathogen and would more likely turn to a more cost-effective dispersal method to include the use of human or animal vectors (U.S. Army 2007). As has been shown from the recent COVID-19 pandemic outbreak among a civilian population that an uncommon, incurable, or deadly disease would become the focal point of a significant amount of public anxiety and panic (Dorminey, 2014). Similarly, there are concerns that a hostile actor would obtain and use radioisotopes in an RDD or RED against a civilian population. The threat perception of such an attack has been increasing ever since the attacks of September 11th, 2001. Al Qa'ida and Aum Shinrikyo attempted to create an RDD but were unable to do so due to technical inexperience and lack of logistical ability. These setbacks would not necessarily prevent a radicalized individual with the knowledge and access from acting independently in perpetrating a CBRN event. The Amerithrax case demonstrated this scenario in which Dr. Brice Ivins obtained weaponized Anthrax and mailed small quantities to various high-profile individuals to show U.S. vulnerability to bioterrorism.

The primary purpose of employing an RDD is not to inflict many casualties but rather to create an environment of irrational fear and panic. Most of the global population has very little knowledge or understanding about the radioactive properties of the various radioisotopes or the effects resulting from contamination beyond what they have seen in the media. Several radiological elements, such as Cobalt-60, have very short half-lives in which their radioactive properties begin to decrease to easily survivable levels exponentially. After being contaminated by a dirty bomb, the negative association of an area such as Wallstreet or Disney World would last decades and likely would never lose the negative connotations. Even after government officials deemed a previously contaminated area completely safe, it would probably never fully

recover perceptually or economically because of the irrational fear that the public has regarding anything associated with radiation.

Alternative RDD attack vectors such as dispersed into a water supply or aerosolized and released from an aircraft or drone could also have a significant negative impact on a targeted area even if there were not a single case of radiation sickness or casualty as a result. For example, radioactive materials released in the form of agro-terrorism against livestock or crops would quickly create a global food crisis because of the potential disruption of the food supply. Meat processing facilities where there have been outbreaks of COVID-19 have already begun to have a noticeable influence on national food supplies that could have a global impact. Another example would be following the Fukushima disaster; many states prohibited seafood products originating from areas throughout the Pacific region surrounding Japan from being imported by almost all post-industrialized states. A final scenario includes a mass exodus of inhabitants from anywhere where a contaminated water source feeds into the water supply even if the radiological source was, by volume, essentially harmless, even over a prolonged period. A hostile actor would not even have to inflict a single casualty to create a massive disruption based on the psychological response to the deliberate release of a radiological agent.

Any CBRN event will have a significant psychological and social impact on the targeted population. Still, radiological and biological tend to have more significant implications because of the lack of accurate information and the appearance of few protections after dispersing an agent, like the unknown or asymptomatic spread of a biological agent such as has been seen with COVID-19. Similarly, the irrational fear of radiological materials and the associated physical side effects of radiation sickness will invoke significant emotional responses in people and create group processes trending towards panic and anxiety. Therefore, decision-makers are responsible

for giving timely and accurate information to mitigate panic and issue a proportionate response to the hostile actors responsible for regaining public trust and deterring future acts.

Recommendations

Chemical, biological, radiological, and nuclear events will have a dramatic psychological and psychosocial impact on the affected community and the global populace as a whole. CBRN agents almost always result in a mass casualty scenario that overwhelms local resources and infrastructure and is compounded by the chaos derived from the fear, panic, and anxiety of those not directly affected but impacted nonetheless, particularly after a deliberate release. Much of the psychological elements that exacerbate the fright and trepidation is a lack of public understanding about CBRN agents, their properties, and lethality relative to the level of contamination or dispersal (Carter et al. 2018). Even the need for special protective equipment, medical facilities, and decontamination procedures has a psychological and sociological impact on a population. Policymakers should consider these during each phase of prevention, protection, mitigation, response, and recovery (Sharma 2010).

Decision-makers must consider several factors during a CBRN incident's planning, response, and recovery phases that go beyond what conventional terrorist attacks or all-hazard events and natural disasters usually require to address better and lessen the psychological impact of a CBRN event. For example, decision-makers should factor in the Emotion and Motivation of the populace and relevant actors, Group Processes during and following an event, and the Intergroup Conflict that would set the stage for a deliberate release of a CBRN agent on a civilian population. The following are the recommendations to decision-makers to better address each of these issues in the event of an event similar to the 1995 Tokyo subway Sarin gas attack or the current COVID-19 pandemic.

Recommendation 1

Timely and accurate dissemination of information is the most critical component to mitigating the negative psychological and sociological impact following a CBRN event. Numerous casualties and widespread contamination caused by CBRN agents will overwhelm first responders and medical treatment facilities, but the "worried well" will add to that burden. Therefore, responders and decision-makers must address them quickly to prevent the collapse of response efforts (Stone 2007). The "worried well" refers to those individuals who believe they were exposed to a CBRN agent but are asymptomatic or were not suffering from contamination. These individuals should be triaged and treated in an area far enough away not to hinder operations or result in exposure or cross-contamination (Stevens and Raphael 2008).

Information to be disseminated should include the best estimate of the scale and scope of the contamination (i.e., Hot, Warm, and Cold Zones), the type of agent involved and symptoms of exposure, and publicly available prevention, protection, and mitigation techniques and materials. Response and recovery efforts should also be regularly broadcast over many mediums (radio, television, and social media), but minimize or avoid discussion of lethality projections to reduce panic. To clarify the latter point, this is not to say that decision-makers should diminish or underestimate projected casualties or the risk the CBRN agent poses to the public. Instead, decision-makers should wait until the most accurate data is available before releasing that information to the public. An example of this was the gross overestimations of casualties following the collapse of the World Trade Center buildings during the 9/11 terror attacks, which only stoked public fear, anxiety, and depression.

Finally, the decision-makers' responsibility is to report their findings accurately and impact analysis of the CBRN incident to the affected community and others that may become

impacted or otherwise require cognizance of the incident and its implications. A rudimentary examination into the level of information dissemination in the 1986 Chornobyl radiological disaster and the current COVID-19 pandemic shows the lack of candor and timely and accurate information provided to the global community by the Soviet Politburo and Chinese Communist Party, respectively, significantly hindered and delayed appropriate response. As part of the risk assessment and management framework for a CBRN event, decision-makers should understand and convey to the public and other cognizant parties to increase confidence, dispel rumors, foster resilience, and reinforce prevention, protection, and mitigation techniques (Lemyre et al. 2005). All of these elements will aid in reducing the emotional response promoting fear, anxiety, and depression, as well as post-traumatic stress in the affected community and those who may later become impacted.

Recommendation 2

Addressing Group Processes is primarily connected with the Emotion and Motivation discussed in the previous recommendation. Individual fear, panic, and anxiety spread rapidly in the absence of information, and decision-makers have to address them quickly to avoid social collapse and the unavailability of services and resources. Groupthink can manifest in creating in-group/out-group social divisions resulting in scapegoating and other acts of hostility (Stone 2007). Decision-makers should incorporate in their information briefs to the population messages that reinforce community cohesiveness and solidarity within the impacted community and seek to combat the association of blame during the response phase and early recovery efforts. Decision-makers should reinforce messages cultivating and bolstering public trust in the response and recovery activities and future prevention, protection, and mitigation strategies. The most effective method of developing public trust and shifting away from negative group think

trends is through transparency and demonstrations of efficacy (Krieger, Amlot, and Rogers 2014). Decision-makers can most accurately analyze the effectiveness of the information campaigns by examining economic impact and recovery, degree and duration predominately, and number and escalation of civil disorder occurrences.

Recommendation 3

Intergroup Conflict relates directly to the intentional release of CBRN agents on a civilian populace and how decision-makers can act to help combat violent extremist narratives and deter WMD terrorism. First, decision-makers should seek to undermine violent extremists' narratives and discourage using CBRN agents as an attack vector against civilian and military targets. This strategy should focus on reinforcing the long- and short-term consequences of using WMDs and what level of response would be warranted by the affected actor. Hostile state actors are generally more easily deterred from utilizing CBRN agents against their opposition through sanctions and multinational regimes' threat of military intervention. However, this does not prevent all instances (Joint Chiefs of Staff 2018); for example, the Russian Federation has been known to use CBRN agents such as Ricin, Polonium, and Novichok as targeted killing methods (Krieger, Amlot, and Rogers 2014).

Non-state actors are much more challenging to dissuade from seeking to commit WMD terrorism attacks. The monumental fear-inducing psychological impact of a CBRN event makes this form of attack even more inviting as a tool for propaganda or exerting political influence. Decision-makers should endeavor to undermine the passive and active support hostile non-state actors rely on for resources and material support to combat the draw of WMD terrorism against civilians. Passive and active supporters of terrorist organizations and insurgencies will typically share ideological values and beliefs with the violent extremists. However, it will likely not share

the level of radical pragmatism associated with the intentional release of a CBRN agent against civilians. Again, decision-makers should convey that such an attack would garner a proportional response, and the level of preparedness would not be worth the attempt. "Lone wolf" HVEs will be the most challenging to detect, deter, and disrupt from utilizing a CBRN agent. Mitigation of this threat should focus on counter-extremism messaging and deradicalization of disaffected sub-national identity groups.

Conclusion

The brief served to provide rudimentary guidance to decision-makers on addressing the psychological and psychosocial impact of a chemical, biological, radiological, or nuclear (CBRN) event, specifically related to the intentional release of such agents. The paper provided recommendations to address Emotion and Motivation, Group Process, and Intergroup Conflict psychology of actors theories under the unique circumstances involving a CBRN event. The project established its recommendations on qualitative analysis derived from case studies into the Aum Shinrikyo Sarin gas attack, the Amerithrax case, the Rajneeshee Salmonella poisoning, and the current COVID-19 pandemic. The key takeaways from the project are that decision-makers need to disseminate information in a timely and accurate manner that diminishes fear and anxiety, restores public trust, promotes solidarity, and deters the intentional release of CBRN agents by hostile actors.

References

Acton, J. M., Rogers, M. B., & Zimmerman, P. D. 2007. Beyond the Dirty Bomb: Re-thinking Radiological Terror. *Survival (00396338)*, *49*(3), 151-168. doi:10.1080/00396330701564760

Allan, S. M., & Leitner, P. 2006. Attacking Agriculture with Radiological Materials--A Possibility? *World Affairs*, *168*(3), 99-112

Bennett, D. 2004. Terrorists and Unconventional Weapons: Is the Threat Real? *Low Intensity Conflict & Law Enforcement*, *12*(1), 20-50. doi:10.1080/0966284042000306721

Blair, J. D. 2014. Why the dirty bomb is still ticking? *Journal of Healthcare Protection Management*, *30*(1), 109-115.

Carter, Holly, and Richard Amlôt. 2016. "Mass Casualty Decontamination Guidance and Psychosocial Aspects of CBRN Incident Management: A Review and Synthesis." *PLoS Currents* 8 (September).

Carter, Holly, Louis Gauntlett, G. James Rubin, David Russell, Melissa Genereux, Louise Lemyre, Peter Blain, Mark Byers & Richard Amlôt. 2018. "Psychosocial and behavioural aspects of early incident response: outcomes from an international workshop." *Global Security: Health, Science and Policy,* 3:1, 28-36.

Cavallini, Simona, Fabio Bisogni, and Marco Mastroianni. 2014. "Economic Impact Profiling of CBRN Events: Focusing on Biological Incidents." *Archivum Immunologiae Et Therapiae Experimentalis* 62 (6) (12): 437-444.

DHS, & FBI. (2008). *Potential terrorist attack methods.* Retrieved from Department of Homeland Security and Federal Bureau of Investigation website: http://nsarchive.gwu.edu/nukevault/ebb388/docs/EBB015.pdf

Friedrich, S., Stan, R., & Lyudmila, Z. 2008. Risk Due to Radiological Terror Attacks with Natural Radionuclides. *AIP Conference Proceedings*, *1034*(1), 3-15. doi:10.1063/1.2991254

Frost, R. 2005. Dirty Bombs: Radiological Dispersal and Emission Devices. *Adelphi Papers*, *45*(378), 75-78.

Greub, G., & Grobusch, M. P. (2014, June). Bioterrorism: myth or reality? *Clinical Microbiology & Infection*. pp. 485-487. doi:10.1111/1469-0691.12713.

House, C. N. 2016. The Chemical, Biological, Radiological, and Nuclear Terrorism Threat from the Islamic State. *Military Review*, *96*(5), 68-75.

Jansen, H. J., Breeveld, F. J., Stijnis, C., & Grobusch, M. P. (2014). Biological warfare, bioterrorism, and biocrime. *Clinical Microbiology & Infection*, *20*(6), 488-496. doi:10.1111/1469-0691.12699

Joint Chiefs of Staff. 2018. *Joint Publication (J.P.) 3-11: Operations in Chemical, Biological, Radiological, and Nuclear (CBRN) Environments*. Washington, D.C.

Jones, G. 2016. ISIS and Dirty Bombs | RAND. Retrieved from http://www.rand.org/blog/2016/06/isis-and-dirty-bombs.html

Khan, Ali. 2011. "Preparedness 101: Zombie Apocalypse | Blogs | CDC." Center for Disease Control and Preparedness. Last modified May 16th, 2011. https://blogs.cdc.gov/publichealthmatters/2011/05/preparedness-101-zombie-apocalypse/.

Koblentz, G. D., & Tucker, J. B. (2010). Tracing an Attack: The Promise and Pitfalls of Microbial Forensics. *Survival (00396338)*, *52*(1), 159-186.

Koblentz, G. D. (2012). From biodefence to biosecurity: The Obama administration's strategy for countering biological threats. *International Affairs*, *88*(1), 131-148.

Kramer, D. 2014. Are the makings of a dirty bomb in your neighborhood? *Physics Today*, *67*(8), 22-23.

Krieger, Kristian, Richard Amlôt, and M Brooke Rogers. 2014. "Understanding Public Responses to Chemical, Biological, Radiological and Nuclear Incidents — Driving Factors, Emerging Themes and Research Gaps." *Environment International* 72 (November 2014): 66–74.

Lemyre, Louise, Mélanie Clément, Wayne Corneil, Lorraine Craig, Paul Boutette, Michael Tyshenko, Nataliya Karyakina, Robert Clarke, and Daniel Krewski. "A Psychosocial Risk Assessment and Management Framework to Enhance Response to CBRN Terrorism Threats and Attacks." *Biosecurity and Bioterrorism: Biodefense Strategy, Practice, and Science* 3, no. 4 (2005), 316-330.

Medalia, J. 2012. "DIRTY BOMBS": BACKGROUND IN BRIEF. *International Journal of Terrorism & Political Hot Spots*, *7*(1/2), 101-117.

Medalia, J. 2012. "DIRTY BOMBS": TECHNICAL BACKGROUND, ATTACK PREVENTION AND RESPONSE, ISSUES FOR CONGRESS. *International Journal of Terrorism & Political Hot Spots*, *7*(1/2), 119-206.

New Jersey State Police. N.D. *New Jersey Hazmat Emergency Response Course*.

Ollerton, J. E. 2004. "Emergency Department Response to the Deliberate Release of Biological Agents." *Emergency Medicine Journal: EMJ* 21 (1) (01): 5

Oppenheimer, A. (2014). CBRN Defense in the Age of I.S. and Ebola. *Military Technology*, *38*(11), 32-37

Parker, L. (2013). Bioterrorism and Intelligence. *Global Security Studies*, *4*(3), 53-63.

Repez, F. (2012). BIOTERRORISM -- PRESENT THREAT FOR SECURITY. *Bulletin of the 'Carol I' National Defense University / Buletinul Universitatii Nationale De Aparare 'Carol I'*, (1), 13-20

Rubin, G James, Richard Amlôt, Lisa Page, and Simon Wessely. 2008. "Methodological Challenges in Assessing General Population Reactions in the Immediate Aftermath of a Terrorist Attack." *International Journal of Methods in Psychiatric Research* 17 Suppl 2 (December): S29–35.

Sharma, Rakesh. 2010. "Chemical, Biological, Radiological, and Nuclear Disasters: Pitfalls and Perils." *Journal of Pharmacy and Bioallied Sciences* 2 (3) (07): 155-156.

Stevens, Gary, and Beverley Raphael. 2008. *CBRN Psychosocial Response Guidelines*. Sydney, AU: Western Sydney University.

Stone, Fred. 2007. *The "Worried Well" Response to CBRN Events: Analysis and Solutions*. Maxwell Air Force Base, Alabama: USAF Counterproliferation Center, Air University.

U.S. Army. (2007). *Terrorism and WMD in the contemporary operational environment*. TRADOC, U.S. Army

Venter, A. 2015. RADIOLOGICAL DISPERSAL DEVICES FOR JIHAD. *Counter Terrorist*, *8*(1), 58-67