

THE 17<sup>th</sup> SECTOR: THE DEATHSCAPE AS CRITICAL INFRASTRUCTURE AND ITS  
ROLE IN EMERGENCY PREPAREDNESS AND NATIONAL SECURITY

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by

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## ABSTRACT

This paper argues for the creation of a 17th critical infrastructure sector—the Deathscape Services Sector (DSS), because of its foundational, yet obfuscated role in our country’s emergency preparedness (EP) and national security (NS). In this paper, we: *(i)* define the deathscape, *(ii)* offer a brief history of EP and NS, and note the benefits of operational consolidation, *(iii)* explore the foundational role the deathscape plays in EP, *(iv)* illustrate how deathscape actors already participate in the EP process, through the examination of the Federal Emergency Management Agency’s five mission areas and explain why the deathscape is an entry point into EP for urban and regional planners, and *(v)* propose that to address current, and prevent further vulnerabilities, the deathscape should be designated the Cybersecurity & Infrastructure Security Agency’s 17<sup>th</sup> critical infrastructure sector.

## BIOGRAPHICAL SKETCH

Elizabeth Redmond is a student of Urban and Regional Studies at Cornell University. Prior to, and while attending Cornell University, she worked for Chrysalis Archaeological Consultants. Her longest running and most involved project involved the monitoring of Hart Island—New York City’s potter’s field—and the disinterment of disturbed remains as a result of Hurricane Sandy and the subsequent sea wall constructed by FEMA.

She has served four terms as part of the leadership of the Organization of Urban and Regional Studies: one term as the Freshman Representative, one term as the Student-Faculty Liaison, and two terms as President. She has served as the undergraduate representative on the CRP Curriculum Committee as well as the AAP Dean’s Student Advisory Council. In her final year of her undergraduate degree, she was a part of several research projects spanning topics such as: the debated merits of econometrics versus machine learning for mapping parcel change, national broadband accessibility, quality of life in New York City, and climate resilience in Bangladesh.

Elizabeth will be returning to Cornell University to pursue a Master of Science in Regional Science in Fall 2023. Her interests include national security, geopolitics, extraction economies, national infrastructure, and future technologies. In past research, she has focused on the American interior, specifically the Appalachian region and the Midwest.

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## LIST OF ABBREVIATIONS

AICP – American Institute of Certified Planners  
APA – American Planning Association  
ASPR – Administration for Strategic Preparedness and Response  
BCP – Body Collection Point  
CBRN – Chemical, Biological, Radiological, and Nuclear  
CBRNE – Chemical, Biological, Radiological, Nuclear, and high-yield Explosive  
CDC – Centers for Disease Control and Prevention  
CISA – Cybersecurity & Infrastructure Security Agency  
CMS – Critical Manufacturing Sector  
CS – Communications Sector  
DHS – Department of Homeland Security  
DMORT – Disaster Mortuary Operational Response Teams  
DoD – Department of Defense  
DSS – Deathscape Sector  
EP – Emergency Preparedness  
ES – Energy Sector  
ESS – Emergency Services Sector  
EVD – Ebola Virus Disease  
FEMA – Federal Emergency Management Agency  
GIS – Geographic Information System  
GSA – General Services Administration  
HHS – Department of Health & Human Services  
HPH – Healthcare and Public Health Sector  
HUD – Department of Housing & Urban Development  
ITS – Information Technology Sector  
MA – Mission Area  
ME/C – Medical Examiner and Coroner  
MFI – Mass Fatality Incident  
NFDA – National Funeral Directors Association  
NS – National Security  
PAHO – Pan American Health Organization  
PPE – Personal Protective Equipment  
SRMA – Sector Risk Management Agency  
SSP – Sector-Specific Plan  
TSS – Transportation Systems Sector  
WHO – World Health Organization  
WWS – Water and Wastewater Systems Sector

## **I. Introduction**

There are ambient processes and structures all around us, supporting our way of life without begging for our attention. Critical infrastructure operates in this space, essential to the function of our nation but largely unnoticed by the public: the roads we drive on to drop children off at soccer practice, the satellites that we mistake for stars, the factory in the next town over that produces chemicals we can't pronounce, the fire station down the road that wakes us up in the middle of the night, and as I will argue in this paper, the cemetery we gather in to put our loved ones to rest. The deathscape, which I define as encompassing both the deathcare industry—e.g., funeral homes, morgues—and death's built environment—e.g., cemeteries, crematoria—exists in a state of unattended liminality. Most will never need to understand the national security considerations of the interstate highway system or understand the complicated supply chain management needed to keep a chemical manufacturer in business, but we all have to come face to face with death.

Death is a human universal, and yet the physical and network infrastructures that it comprises are nearly invisible to us, obfuscated by ephemeral discomfort and anxiety. While the common philosophical and anthropological analyses of death have their own merits, there is a serious blind spot in understanding death's physical and logistical role in our everyday lives, leaving our country vulnerable and reducing our emergency preparedness and national security capabilities. Discussions of planning for mass fatality incidents as a logistical necessity may seem clinical and insensitive; the contemporary focus on comfort, especially in times of emergency, means that issues of the deathscape are usually treated through the lens of public relations instead of as

critical infrastructure. Yet, no matter the political climate or the state of the economy, death will not disappear if you ignore it. If the deathscape collapses under the weight of a disaster, no amount of image management will make the uninterred bodies of loved ones go away. Everyone, even in death, is entitled to dignity; a well-functioning deathscape is essential in ensuring this.

This paper will explore the current diffuse web of actors who comprise the deathscape and will propose that to address the myriad of emergency preparedness and national security vulnerabilities, the deathscape should be designated the Cybersecurity & Infrastructure Security Agency's 17<sup>th</sup> critical infrastructure sector: the Deathscape Sector (DSS). This would consolidate the fragmented sector and would provide its actors—public and private, civilian and military—with a federal point of contact, as well as a dedicated Sector-Specific Plan to identify DSS-relevant risks and goals.

To structure this argument, we will:

1. Define the deathscape.
2. Offer a brief history of emergency preparedness (EP) and national security (NS), and note the benefits of operational consolidation.
3. Explore the foundational role the deathscape plays in emergency preparedness.
4. Illustrate how deathscape actors already participate in the EP process, through the examination of the Federal Emergency Management Agency's (FEMA) five mission areas: prevention, protection, mitigation, response, and recovery. Explain why the

deathscape is an entry point into EP for urban and regional planners through their ability to shape and reshape the built environment.

5. Propose that to address current, and prevent further vulnerabilities, the deathscape should be designated the Cybersecurity & Infrastructure Security Agency's (CISA) 17<sup>th</sup> critical infrastructure sector: the Deathscape Sector (DSS).

## II. What is the Deathscape?

The term “deathscape” was first coined by early-twentieth-century poet Malcolm Lowry, and later adopted by Professors of Geography Avril Maddrell and James D. Sidaway. It was discussed in-depth in a collection of essays edited by the pair entitled *Deathscapes: Spaces for Death, Dying, Mourning and Remembrance*. *Deathscapes* explored the spatial relationship between death and place, especially as it expanded past the boundaries of the cemetery, and into places of commemoration. Lily Kong, in her foreword to the collection, explains that the volume:

“...reminds us particularly that death and dying are intensely anchored in space and place. Death and dying draw attention to the meanings that we invest in space and place, in as much as spaces and places offer a lens through which to understand death and dying. The ability of spaces and places associated with death and dying to evoke the deepest of memories and to stir an intensity of emotions is evidence of the power of place, and is a reminder that the very nature of our meaningful experience with place is fundamentally anchored in emotions, not functions. At the same time, the process and experience of death and dying is intensely place-based, deeply associated as they are with particular sites and locations. This spatial significance is expressed, for example, through the creation of memorial sites, the choice of which carries deep symbolic meaning. Yet, this locatedness of grief and memory faces increasing challenges as pressures on space for alternative uses erode the ability to anchor meaning in place.”<sup>1</sup>

Maddrell and Sidaway do an excellent job retaining the emotional component of death in their spatial examination. One should not underestimate the sentimental importance of the deathscape, even when applying seemingly objective modes of analysis. Instead of ignoring death’s

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<sup>1</sup> Sidaway, James D. 2012. *Deathscapes: Spaces for Death, Dying, Mourning and Remembrance*. Edited by Avril Maddrell and James D. Sidaway. N.p.: Ashgate Publishing Limited.

convolutions, the authors of this book make an effort to integrate the corporeal with the incorporeal. In doing so, Maddrell and Sidaway define the deathscape:

“We are adapting the broad heading of deathscapes to invoke both the places of final disposition and of remembrance, and representations of all these. Not only are those places often emotionally fraught, they are frequently the subjects of social contest and power; whilst sometimes being deeply personal, they can also often be places where the personal and public intersect.”<sup>2</sup>

We will build off of Maddrell and Sidaway’s definition of the deathscape, acknowledging their important contribution in anchoring the deathscape spatially, and in recognizing its role at the intersection of public and private interests. There are two major components in our discussion of the deathscape: the deathcare industry—comprised of private actors like funeral directors and morticians—and the built environment, the physical components of death like cemeteries, crematoria, and other death-related structures.

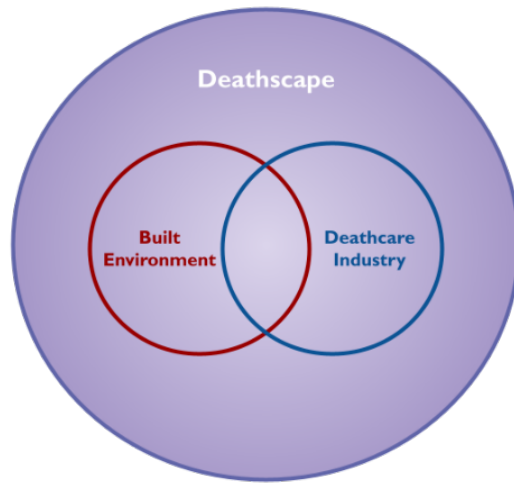
For use in this paper we offer the following, novel, definition:

*The deathscape encompasses both the deathcare industry and death’s built environment; it highlights both physical and network infrastructures. The deathscape expands beyond funeral homes and cemeteries, it includes death’s ancillary spaces and actors across local, state, and federal levels; public and private, civilian and military.*

This framing notably incorporates the previously peripheral urban and regional planner, whose role in shaping and reshaping the built environment is essential to our discussion of the deathscape as critical infrastructure and its role in emergency preparedness.

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<sup>2</sup> Sidaway, James D. 2012. *Deathscapes: Spaces for Death, Dying, Mourning and Remembrance*.



**Figure 1: The deathscape's dual components.**



### III. Emergency Preparedness and National Security

Emergency preparedness (EP) is an integral part of the American national security (NS) apparatus. The Federal Emergency Management Agency (FEMA) explains that:

“Emergency management is an essential role of government. The Constitution tasks the States with responsibility for public health and safety – hence they are responsible for public risks. The Federal government assumes a secondary role. The Federal Government’s ultimate obligation is to help when State, local or individual entities are overwhelmed.”<sup>3</sup>

President Carter established FEMA after the notorious partial meltdown at Pennsylvania's Three Mile Island nuclear facility in March of 1979. The response required “more than 100 entities to coordinate...efforts,”<sup>4</sup> highlighting the weakness of the diffuse system. That same year, FEMA was given the “dual mission of emergency management and civil defense,”<sup>5</sup> pulling together previously fragmented agencies across the Department of Defense (DoD), the Department of Housing and Urban Development (HUD), and the General Services Administration (GSA).<sup>6</sup> The consolidation of these EP agencies was essential for efficient planning and response, as high levels of cooperation and coordination are required during times of emergency; poor communication only exacerbates the high-stress environment of a crisis. After the 2001 September 11th attacks, there was another round of EP-NS consolidation, as 15 component

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<sup>3</sup> “Emergency and Risk Management Case Studies Textbook.” n.d. FEMA Training. Accessed May 11, 2023.

<https://training.fema.gov/hiedu/docs/chapter%201%20-%20intro%20to%20crisis,%20disaster%20and%20risk%20mgmt%20concepts.doc>.

<sup>4</sup> Department of Homeland Security, FEMA, Publication 1, [https://www.fema.gov/sites/default/files/2020-03/publication-one\\_english\\_2019.pdf](https://www.fema.gov/sites/default/files/2020-03/publication-one_english_2019.pdf).

<sup>5</sup> Department of Homeland Security, FEMA, Publication 1.

<sup>6</sup> Department of Homeland Security, FEMA, Publication 1.

agencies from across the federal government, including FEMA, were brought under the jurisdiction of the new Department of Homeland Security (DHS).<sup>7</sup>

In our discussion of EP as it relates to the deathscape, we will focus on two DHS agencies: FEMA and the Cybersecurity and Infrastructure Security Agency (CISA), which are together responsible for natural, manmade, and cyber disasters. After the founding of DHS, most of FEMA’s “terrorism-related preparedness programs were consolidated with other counterterrorism activities to refocus [the] Agency’s efforts primarily on natural disasters.”<sup>8</sup> CISA, established in 2018, absorbed DHS’ National Protection and Programs Directorate (NPPD) and was tasked with the defense of both America’s cyberspace and its critical infrastructure.

Throughout this paper, we will use several frameworks offered by the two agencies to highlight how deathscape actors already participate in EP and why their roles are crucial. We will also explore how and why the nation’s diffuse deathscape actors should be consolidated into one CISA critical infrastructure sector—the Deathscape Sector (DSS)—to promote efficiency and resilience.

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<sup>7</sup> Department of Homeland Security. 2023. “Operational and Support Components.” Homeland Security. <https://www.dhs.gov/operational-and-support-components>.

<sup>8</sup> Department of Homeland Security, FEMA, Publication 1.

## IV. The Deathscape and Emergency Preparedness

The deathscape is fundamental to our nation's emergency preparedness. EP, at its core, aims to reduce loss of life through managing risk and practicing risk avoidance.<sup>9</sup> The fact of the matter is that, regardless of how prepared our country is for disaster, there is no way to guarantee zero loss of life; the deathscape absorbs the deceased. Moreover, the deathscape is expected to absorb those who die as a direct result of disaster and from natural causes *concurrently*. Inadequate infrastructure for handling death will lead to more death.

Disasters exacerbate the deathscape's weaknesses, and consistently overwhelm it. Most of the deathscape's actors operate within the private sector—e.g., funeral directors, funeral homes, private cemeteries, morticians—and have no centralized mode of communication. These private actors operate on a hyperlocal scale and are sensitive to the economic shocks that occur as a result of a disaster, immediate or protracted. Additionally, the sector as a whole is prone to cascading failures, as it is highly dependent on several critical infrastructure sectors, such as the Healthcare and Public Health (HPH) Sector, as well as Emergency Services Sector (ESS), the Energy Sector (ES), and the Critical Manufacturing Sector (CMS).

In the next section, we will explore the role deathscape actors currently play in EP and NS, through the examination of FEMA's five mission areas. However, before we can move on, it is important to note how widely distributed and disconnected the current deathscape system is. For

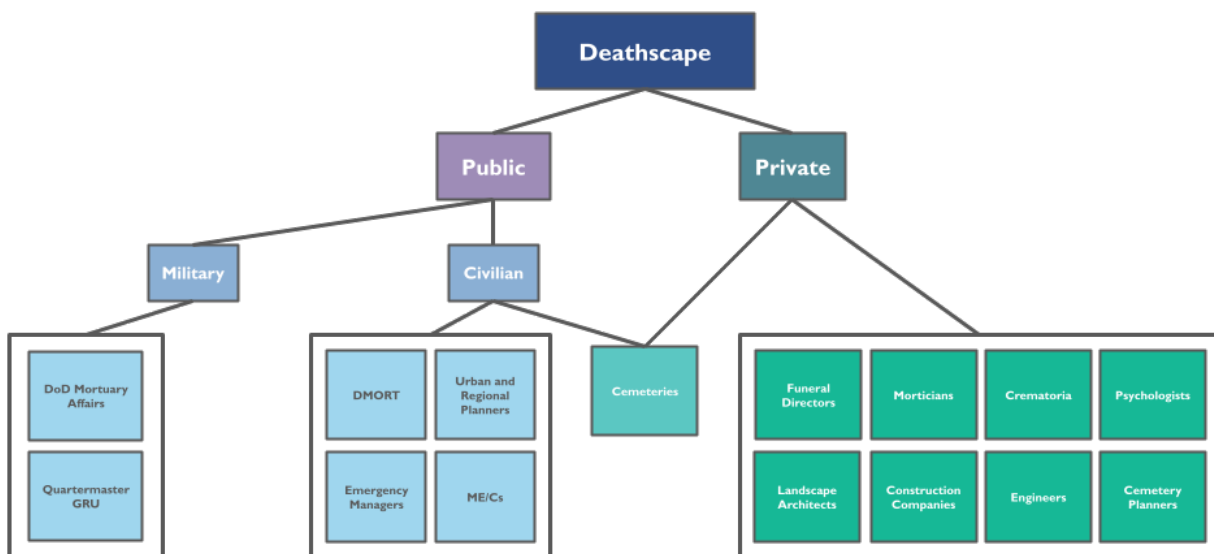
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<sup>9</sup> "Emergency and Risk Management Case Studies Textbook." n.d. FEMA Training. Accessed May 11, 2023.

a cursory sense of scale of the deathscape, take into consideration that in the United States there are:

- Over 18,800 funeral homes, almost 90% of which are family owned, employing over 117,000;<sup>10</sup>
- Over 144,800 graveyards, and many more unregistered or forgotten;<sup>11</sup>
- Over 2,000 Medical Examiner and Coroner offices that employ almost 11,000 people, including almost 900 autopsy pathologists.<sup>12</sup>

Figure 2 (below), illustrates the current web of main actors and how they exist across different scales, markets, and jurisdictions. The sheer number of actors coupled with the deathscape’s multi-scalarity creates a system with very little continuity.



**Figure 2: The deathscape’s web of actors.**

<sup>10</sup> NFDA. 2022. “Statistics.” National Funeral Directors Association. <https://nfda.org/news/statistics>.

<sup>11</sup> Stevens, Joshua. 2018. “Graveyards of The Contiguous USA.” Joshua Stevens. <https://www.joshuastevens.net/blog/graveyards-of-the-contiguous-usa/>.

<sup>12</sup> Brooks, Connor. 2021. “Medical Examiner and Coroner Offices, 2018 | Bureau of Justice Statistics.” Bureau of Justice Statistics. <https://bjs.ojp.gov/library/publications/medical-examiner-and-coroner-offices-2018>.

While it is not a comprehensive list of all actors, Fig. 2 breaks the deathscape down into its public and private components. Understanding the mixed jurisdictional nature of the deathscape is crucial to understanding its vulnerabilities. Importantly, many of the public actors have a federal point of contact, and guidelines that they must follow during an emergency, whereas the deathscape's private actors have essentially no structure and no centralized, dependable mode of communication.

## V. The Current Deathscape and its Role in Emergency Preparedness

As explained above, we will be exploring the current role of deathscape actors in EP and NS through the examination of FEMA's five mission areas (MA)—prevention, protection, mitigation, response, and recovery—as laid out in the agency's National Preparedness Goal (2015). These five mission areas encompass 32 core capabilities, some of which are specific to one MA, some of which apply to several, and three—planning, public information and warning, and operational coordination—which span all five. Each MA has a corresponding national framework: the Prevention MA corresponds with the National Prevention Framework, the Protection MA corresponds with the National Protection Framework, etc.



**Figure 3: FEMA's five mission areas in timeline form, highlighting temporal associations.**

Figure 3 (above) shows the five mission areas in timeline form, which is helpful for understanding their temporal interactions with disaster and with each other. The first three MAs tend to run parallel to each other, prior to the actual disaster. Once disaster strikes, the EP community moves into the response phase, and through into recovery. Recovery includes more than just the physical rehabilitation of structures; it also feeds back into the first three MAs.

Ideally the recovery phase takes lessons learned and implements solutions, thereby building resilience back into the system.

This section is meant to help make sense of the vast web of deathscape actors who participate in the myriad of EP and NS activities, from handling irradiated remains to dampening the psychological effects mass fatality incidents (MFI) have on communities. This section begins to introduce the reader to some of the deathscape's vulnerabilities. This section is also meant to pull back the veil on the darker side of the deathscape. The deathscape is not immune to market forces; there are segments of its private sector which participate in rampant commodification and inflation, taking advantage of the weak regulatory environment. These actors wear the emotional discomfort of death as camouflage, banking on the fact that most won't want to see the inner workings of the embalming table. This section is not meant to be an exhaustive study of the deathscape; rather it is meant to illustrate its breadth.

## **1. Prevention**

Prevention, unlike the other four MAs, is specifically meant to address imminent threats. The National Prevention Framework states that:

An imminent threat is intelligence or operational information that warns of a credible, specific, and impending terrorist threat or ongoing attack against the United States. This Framework helps achieve the National Preparedness Goal of a secure and resilient Nation that is optimally prepared to prevent an imminent terrorist attack within the United States.<sup>13</sup>

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<sup>13</sup> Department of Homeland Security. 2016. "National Prevention Framework, Second Edition." FEMA. [https://www.fema.gov/sites/default/files/2020-04/National\\_Prevention\\_Framework2nd-june2016.pdf](https://www.fema.gov/sites/default/files/2020-04/National_Prevention_Framework2nd-june2016.pdf).

There are four Prevention-specific core capabilities: 1) Intelligence and Information Sharing, 2) Screening, Search and Detection, 3) Interdiction and Disruption, and 4) Forensics and Attribution. The second and third core capabilities are those in which deathscape actors are most involved, especially in relation to attacks of Chemical, Biological, Radiological, Nuclear (CBRN) origin. Screening, Search, and Detection includes the responsibilities to conduct “chemical, biological, radiological, nuclear, and explosive (CBRNE) surveillance search and detection operations...ambient and active detection of CBRNE...and biosurveillance,” while Interdiction and Disruption includes the responsibility to “render safe and dispose of CBRNE hazards in multiple locations and in all environments consistent with established protocols.”<sup>14</sup>

In Prevention, we will discuss the role of the Medical Examiner and Coroner (ME/C) and the part they play in Prevention’s core capabilities. While ME/Cs perform parallel medicolegal functions, there is a huge distinction between the two, “embedded in the manner of their selection by electoral process versus appointment and their professional status.”<sup>15</sup> Medical Examiners are appointed, board certified medical professionals, while coroners are “elected lay people who often do not have professional training.”<sup>16</sup> Coroners are usually associated with the Sheriff’s office, and have subpoena and inquest powers,<sup>17,18</sup> whereas Medical Examiners are “required, by law, to determine the cause, circumstances and manner of death for those cases found to be under the Office’s legal jurisdiction,”<sup>19</sup> including those determined to be related to “homicide, suicide, accident, a patient with no attending physician, an industrial related death, an

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<sup>14</sup> Department of Homeland Security. 2016. “National Prevention Framework, Second Edition.” FEMA.

<sup>15</sup> Institute of Medicine and Committee for the Workshop on the Medicolegal Death Investigation System. 2003. *Medicolegal Death Investigation System: Workshop Summary*. N.p.: National Academies Press.

<sup>16</sup> Institute of Medicine and Committee for the Workshop on the Medicolegal Death Investigation System. 2003.

<sup>17</sup> Office of the Chief Medical Examiner. 2022. “How is a Medical Examiner different from a Coroner? | San Francisco.” City of San Francisco. <https://sf.gov/information/how-medical-examiner-different-coroner>.

<sup>18</sup> Institute of Medicine and Committee for the Workshop on the Medicolegal Death Investigation System. 2003.

<sup>19</sup> Office of the Chief Medical Examiner. 2022. “How is a Medical Examiner different from a Coroner? | San Francisco.” City of San Francisco.



unidentified person or where there is some medical reason to consider that the death might be due to a contagious disease.”<sup>20</sup>

## Screening, Search, and Detection

ME/Cs play an active role in biosurveillance, the process by which one “detects, monitors, and characterizes national security health threats, in human and animal populations, food, water, agriculture, and the environment.”<sup>21</sup> Biosurveillance “involves the detection of disease outbreaks as well as the responsibility to ‘provide decision-makers and the public with accurate and timely information about how adverse impacts might be prevented, managed or mitigated.’”<sup>22</sup> Through investigations and autopsies, ME/Cs might be one of the first actors to encounter possible biological hazards, identifying the threat before the national security apparatus and the public become aware an act of terrorism was even committed. In fact, “[d]uring the past few decades, several diseases of public health importance, including new or emerging infectious diseases, have been recognized and identified through the collaborative efforts of public health partners and medical examiners, performance of autopsies, and subsequent postmortem diagnostic testing.”<sup>23</sup> An example of this type of collaborative effort includes the development of Med-X, a “pathology-based syndromic surveillance system”<sup>24</sup> developed by the New Mexico Office of the Medical Investigator (NMOMI). The Med-X surveillance system helped successfully identify

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<sup>20</sup> Office of the Chief Medical Examiner. 2022. “How is a Medical Examiner different from a Coroner? | San Francisco.” City of San Francisco.

<sup>21</sup> Patel, Deepali M., Steve Olson, Board on Health S. Policy, and Institute of Medicine. 2012. *Information Sharing and Collaboration: Applications to Integrated Biosurveillance: Workshop Summary*. Edited by Steve Olson and Deepali M. Patel. N.p.: National Academies Press.

<sup>22</sup> Patel, Deepali M., Steve Olson, Board on Health S. Policy, and Institute of Medicine. 2012. *Information Sharing and Collaboration: Applications to Integrated Biosurveillance: Workshop Summary*.

<sup>23</sup> Blau, Dianna M., Steven C. Clark, and National Association of Medical Examiners Ad-hoc Committee for Bioterrorism and Infectious Diseases. 2013. “Infectious Disease Surveillance by Medical Examiners and Coroners.” NCBI. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3647513/>.

<sup>24</sup> Nolte, Kurt B., Marc M. Fischer, Sarah B. Reagan, Ruth M. Lynfield, and Members of the National Association of Medical Examiners Ad Hoc Committee for Bioterrorism and Infectious Diseases. 2010. “Guidelines to Implement Medical Examiner/Coroner-Based Surveillance for Fatal Infectious Diseases and Bioterrorism (“Med-X”).” *The American Journal of Forensic Medicine and Pathology* 31, no. 4 (December): 308-312. 10.1097/PAF.0b013e3181c187b5.

cases of infectious disease that would have otherwise gone under the radar.<sup>25</sup> Programs like these—created at the local level, but easily scalable—could very well aid in the detection of weaponized or manufactured biological agents.

## **Interdiction and Disruption**

Biological agents are one of the more common CBRNs that a ME/C will encounter. Thankfully, it is likely that those who die as a direct result of a biological weapon would not be infectious after death, as very few diseases pose high risk after death.<sup>26</sup> However, the “[d]etonation of a nuclear weapon or activation of a radiological dispersal device”<sup>27</sup> would likely produce radioactively contaminated decedents. Rendering these remains safe, and disposing of them accordingly, falls well within the Interdiction and Disruption core capability.

It is of the utmost importance that “remains will be processed as expeditiously as possible and released to the families,” and that if the family wishes to have “a viewing or the religious practice of the decedent calls for a ceremonial washing, this will be allowed even though it causes some additional radiation exposure.”<sup>28</sup> Several deathscape actors would be involved in this process, from the ME/C who takes charge of the remains at the primary site, to the funeral home which prepares the remains for viewing, although the general advice is that any funeral

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<sup>25</sup> Nolte, Kurt B., Marc M. Fischer, Sarah B. Reagan, Ruth M. Lynfield, and Members of the National Association of Medical Examiners Ad Hoc Committee for Bioterrorism and Infectious Diseases. 2010. “Guidelines to Implement Medical Examiner/Coroner-Based Surveillance for Fatal Infectious Diseases and Bioterrorism (“Med-X”).”

<sup>26</sup> Nelson Marlborough District Health Board. n.d. “The Infectious Hazards of Dead Bodies.” Nelson Marlborough District Health Board. <https://www.google.com/url?sa=t&ret=j&q=&esrc=s&source=web&cd=&ved=2ahUKewj4suau5e7-AhVGLFkFHT7bC8oQFnoECAoQAQ&url=https%3A%2F%2Fwww.nmdhb.govt.nz%2Fdocsdocument%2F61-the-infectious-hazards-of-dead-bodies&usq=A0vVawliPP6vQjx4z3828MqWuS1O>.

<sup>27</sup> Wood, Charles M., Frank DePaolo, and R. Doggett. 2007. “Guidelines for Handling Decedents Contaminated with Radioactive Materials.” Radiation Emergency Medical Management. <https://remm.hhs.gov/radiation-decedent-guidelines.pdf>.

<sup>28</sup> Wood, Charles M., Frank DePaolo, and R. Doggett. 2007. “Guidelines for Handling Decedents Contaminated with Radioactive Materials.” Radiation Emergency Medical Management.

home not properly trained or equipped as per CDC guidelines should reject suspected irradiated remains. However, there are very few actual laws regulating this process. The Centers for Disease Control and Prevention (CDC) states that:

“Although there are laws regulating radioactive material in live patients or in industrial materials there are no federal regulations regulating radioactive material in human remains. There is some published guidance on special cases of radioactively contaminated decedents, such as from medical sources, transportation accidents, or the military. There are state regulations or common carrier policies for shipment of decedents; and federal regulations for shipment of radioactive material. There have been very few exercises in recent years involving radioactively contaminated fatalities, and those generally end with remains recovery at the scene without involving medical examiners, coroners, or morticians.”<sup>29</sup>

Without regulation or preemptive drills, there are massive vulnerabilities in our system. It is likely that the deathscape actors who will be responsible for the care and disposition of irradiated remains will be poorly prepared to perform their duty.

## **2. Protection**

The Protection and Prevention mission areas have many areas of overlap; the main divergence lies in Protection’s all-hazard purview. The National Protection Framework clarifies:

“The Prevention and Protection missions are closely aligned and integrated. Prevention includes the capabilities necessary to avoid, prevent, or stop a threatened or actual act of terrorism. For the purposes of the National Planning Frameworks, the term “prevention” refers to preventing imminent threats from terrorism. The Prevention mission area focuses

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<sup>29</sup> Wood, Charles M., Frank DePaolo, and R. Doggett. 2007. “Guidelines for Handling Decedents Contaminated with Radioactive Materials.” Radiation Emergency Medical Management.

on those intelligence, technical, and law enforcement actions that prevent an adversary from carrying out an attack within the United States when the threat is imminent in order to thwart an initial or follow-on terrorist attack... Protection activities, on the other hand, focus on government, private sector, and citizen measures that detect, deter, and/or disrupt terrorist surveillance, planning, and/or execution activities or deter and disrupt other threats and hazards and, like mitigation, focus on minimizing the consequences of significant events...Many other activities traditionally considered preventative, such as disease prevention and cybersecurity, fall under the Protection mission based on the distinction between Prevention and Protection in the National Preparedness Goal.”<sup>30</sup>

There are five core capabilities unique to Protection: 1) Access Control and Identity Verification, 2) Cybersecurity, 3) Physical Protective Measures, 4) Risk Management for Protection Programs and Activities, and 5) Supply Chain Integrity and Security. The third core capability is the most relevant to the deathscape. We will look specifically at two components of Physical Protective Measures, the development and implementation of “risk-based physical security measures, countermeasures, policies and procedures,” and of “biosecurity and biosafety programs and practices.”<sup>31</sup>

### **Development and Implementation of Risk-Based Physical Measures, Countermeasures, Policies, and Procedures**

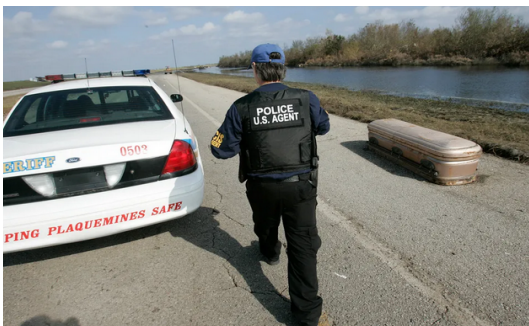
One of the most pervasive threats to the physical security of our nation’s deathscapes are natural disasters, especially hurricanes and floods. To protect our nation’s cemeteries and their inhabitants, it is of paramount importance that deathscape actors take physical security measures.

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<sup>30</sup> Department of Homeland Security. 2016. “National Protection Framework, Second Edition.” FEMA. [https://www.fema.gov/sites/default/files/2020-04/National\\_Protection\\_Framework2nd-june2016.pdf](https://www.fema.gov/sites/default/files/2020-04/National_Protection_Framework2nd-june2016.pdf).

<sup>31</sup> Department of Homeland Security. 2016. “National Protection Framework, Second Edition.” FEMA.

There are numerous accounts of coffins being taken out with the tide after floodwaters and storm surges make their way to the cemetery gates. An example of the scale of these disasters includes the 1993 Missouri River flood, when “...700 of the 1,500 graves in the Hardin, Missouri cemetery were displaced. A year afterwards only 100 could be securely identified. Nearly 150 remains were never identified.”<sup>32</sup> Other examples include the Flint River flood which “displaced more than 400 caskets in two Albany, Georgia cemeteries,” and Hurricane Issac which “displaced hundreds of caskets from cemeteries in Braithwaite, Louisiana,” by “as much as a quarter mile.”<sup>33</sup>



**Photograph 1: Casket displaced by Hurricane Katrina.**  
*Source: McGonigal, Chris. 2015. “These Are the Forgotten Images of Hurricane Katrina.” HuffPost.*



**Photograph 2: Casket Displaced by Hurricane Ida.**  
*Source: Grunfeld, David. 2021. “Lafitte sashes through the mud nine days after Hurricane Ida slammed the coastal community.” NOLA.com.*

When this type of large-scale displacement occurs, it usually falls on the ME/C to identify lost remains. This is much easier said than done, as caskets rarely have personal identifiers. The State of Louisiana tried to address this issue in the wake of Hurricane Katrina in 2005, estimated to have displaced nearly one thousand sets of remains, by requiring individual coffins to have some

<sup>32</sup> Chicora Foundation, Inc. 2013. “Cemetery Disaster Planning.” Chicora Foundation. <https://www.chicora.org/pdfs/Cemetery%20Disaster%20Planning.pdf>.

<sup>33</sup> Chicora Foundation, Inc. 2013. “Cemetery Disaster Planning.” Chicora Foundation.

kind of identifier.<sup>34</sup> This was an attempt to take some of the burden off of ME/Cs who, already struggling with a lack of resources and manpower, could not adequately manage the caseload of both the recently deceased and the long dead.<sup>35</sup>

Protecting against these events can be as simple as defensive landscaping. Chicora Foundation, Inc. offers some suggestions for precursory steps to take before a disaster occurs, including the strategic placement of carefully selected species of trees. They note that a “variety of species, ages and layers of trees and shrubs to maintain diversity”<sup>36</sup> fare especially well. They also recommend creating 30-100 foot buffer zones around cemeteries that exist within a fire-prone region, as well as the constant maintenance of cemetery drains.

## **Development and Implementation of Biosecurity and Biosafety Programs and Practices**

Highly trained deathscape actors are likewise indispensable in the event of an outbreak of a deadly pathogen such as Ebola Virus Disease (EVD). EVD is a highly infectious hemorrhagic fever with an average fatality rate of 50%, and a peak fatality rate of 90%.<sup>37</sup> While EVD has several modes of transmission, it is relevant to the deathscape that transmission is possible, and prevalent, through contact with the deceased. Studies show that “[h]umans who die of EVD typically have high levels of viremia, suggesting that most fresh corpses contain high levels of

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<sup>34</sup> Overland, Martha A. 2016. “Keeping The Dead In Their Place.” NPR. <https://www.npr.org/2016/09/23/495034748/keeping-the-dead-in-their-place>.

<sup>35</sup> Koppel, Lily. 2005. “Coffins and Buried Remains Set Adrift by Hurricanes Create a Grisly Puzzle (Published 2005).” The New York Times. <https://www.nytimes.com/2005/10/25/us/nationalspecial/coffins-and-buried-remains-set-adrift-by-hurricanes.html>.

<sup>36</sup> Chicora Foundation, Inc. 2013. “Cemetery Disaster Planning.” Chicora Foundation.

<sup>37</sup> Pan American Health Organization. n.d. “Ebola Virus Disease.” PAHO. Accessed April 30, 2023. <https://www.paho.org/en/topics/ebola-virus-disease>.

infectious virus.”<sup>38</sup> In fact, it is suggested that up to “80% of ebola transmissions in Sierra Leone during the 2014-16 outbreak were the result of contact with dead bodies.”<sup>39</sup>

In the case of an EVD outbreak in the United States, there must be biosafety programs in place. Deathscape actors must act efficiently in order to dispose of infectious remains in a safe and timely manner, both for their own safety and for the safety of the public. The CDC offers detailed guidelines for the safe handling of EVD victims, stating that cremation should always be prioritized over burial. They also state that it one should:

“Ensure that anyone handling the body bag wears single-use (disposable) gloves with extended cuffs and a long-sleeved disposable gown. Do not open the body bags. Do not embalm the body. Do not remove any implanted medical devices. Cremate the remains. An oversized cremation container may be needed to contain the bagged body for cremation. Cremated remains are no longer infectious and can be handled and provided to the family using normal procedures.”<sup>40</sup>

This type of preparation will require a massive amount of cooperation between deathscape actors, the healthcare industry, and the critical manufacturing sector who are responsible for providing the specialty PPE necessary for the safe handling of remains infected with EVD.

### 3. Mitigation

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<sup>38</sup> Prescott, Joseph, Trenton Bushmaker, Robert Fischer, Kerri Miazgowiec, Seth Judson, and Vincent J. Munster. 2015. “Postmortem Stability of Ebola Virus.” *Emerging Infectious Diseases* 21, no. 5 (May): 856-859. 10.3201/eid2105.150041.

<sup>39</sup> McConville, Kieran. 2018. “The unsung heroes fighting Ebola with safe and dignified burials.” Concern Worldwide US. [https://www.concernusa.org/feature\\_story/ebola-safe-burials/](https://www.concernusa.org/feature_story/ebola-safe-burials/).

<sup>40</sup> Centers for Disease Control and Prevention. 2022. “Guidance for Safe Handling of Human Remains of Ebola Patients in U. S. Hospitals and Mortuaries | Ebola Virus Disease | Clinicians | Ebola (Ebola Virus Disease) | CDC.” Centers for Disease Control and Prevention. <https://www.cdc.gov/vhf/ebola/clinicians/evd/handling-human-remains.html>.

Mitigation exists to create a “culture of preparedness” across all scales, from the individual to the highest rungs of government. Mitigation activities are meant to support Prevention and Protection in that:

“Mitigation is risk management action taken to avoid, reduce, or transfer those risks. By reducing the impact of disasters, mitigation supports protection and prevention activities, eases response, and speeds recovery to create better prepared and more resilient communities.”

As described in the National Mitigation Framework, there are four Migration-specific core capabilities: 1) Community Resilience, 2) Long-term Vulnerability Reduction, 3) Risk and Disaster Resilience Assessment, and 4) Threats and Hazard Identification. The first and third core capabilities are the most relevant to the deathscape as it stands now.

## **Community Resilience**

Community Resilience is a “holistic approach to risk reduction.” It engages actors across the board, from individual families up to local government leaders, to make sure that everyone is risk-informed and prepared in the event of a disaster, so that they can play the part they are meant to. A major component of Community Resilience is the ability to conduct community preparedness activities that “empower individuals and communities with information and resources that facilitate actions to enhance their resilience.”<sup>41</sup> Preparedness drills are one of the best ways to gauge community and sector preparedness. Conducted in preparation of a disaster,

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<sup>41</sup> Department of Homeland Security. 2016. “National Mitigation Framework, Second Edition.” FEMA. [https://www.fema.gov/sites/default/files/2020-04/National\\_Mitigation\\_Framework2nd\\_june2016.pdf](https://www.fema.gov/sites/default/files/2020-04/National_Mitigation_Framework2nd_june2016.pdf)



these drills make clear where the flaws in the system are, what level of coordination is feasible, where the major community and sector nodes are, and what problems should be dealt with to increase resilience.

In 2006, a Joint Task Force Civil Support Mass Fatality Working Group was formed to “discuss the infrastructure’s preparedness to effectively respond to a high fatality pandemic.”<sup>42</sup> The Working Group found four “key functions” that a portion of deathscape actors would have to maintain, those being: 1) death reporting and tracking, 2) command and control of mass fatalities, 3) provision of funeral services and final disposition of remains, and 4) provision of family assistance and behavioral health.<sup>43</sup> However, the Working Group also found that while “several of the key functions identified...are the natural purview of the death care sector, their level of preparedness—and their ability to support the offices of the local ME/C—is largely unknown.”<sup>44</sup>

The study *Mass Fatality Preparedness in the Death Care Sector*, reached out to 492 “operators, owners, managers, and employees of funeral homes, cemeteries and crematories; funeral industry suppliers; accredited mortuary school and program students, educators and administrators; and retirees and those formerly employed in the funeral industry.”<sup>45</sup> The study found that:

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<sup>42</sup> Gershon, Robyn, Lori A. Magda, Halley Riley, and Jacqueline Merrill. 2011. “Mass Fatality Preparedness in the Death Care Sector.” *Journal of Occupational and Environmental Medicine* 53, no. 10 (October): 1179-86. 10.1097/JOM.0b013e31822cfe76.

<sup>43</sup> Gershon, Robyn, Lori A. Magda, Halley Riley, and Jacqueline Merrill. 2011. “Mass Fatality Preparedness in the Death Care Sector.” *Journal of Occupational and Environmental Medicine*.

<sup>44</sup> Gershon, Robyn, Lori A. Magda, Halley Riley, and Jacqueline Merrill. 2011. “Mass Fatality Preparedness in the Death Care Sector.” *Journal of Occupational and Environmental Medicine*.

<sup>45</sup> Gershon, Robyn, Lori A. Magda, Halley Riley, and Jacqueline Merrill. 2011. “Mass Fatality Preparedness in the Death Care Sector.” *Journal of Occupational and Environmental Medicine*.

“With respect to interorganizational planning, 55% of the sample reported that their workplace/school had participated in pandemic planning with one or more local agencies, and 29% had engaged in planning with two or more local agencies. Most frequently, planning activities were conducted with local health departments (35%), ME/C offices (34%), EMS/fire department (26%) and law enforcement (21%). Thirty percent of the respondents reported that they did not participate in any planning with local agencies. A large proportion (87%) of respondents indicated that they intended to call upon these other agencies—whether or not they had participated in planning with them, with most of these respondents (90%) expecting that these agencies would be able to provide them with help.”<sup>46</sup>

In this representational sample of the industry, only a little more than half of respondents stated that they had participated in pandemic planning with their local agencies. Because most deathscape actors operate in the private sector, there are usually no requirements that they engage in preparedness building.

## **Risk and Disaster Resilience Assessment**

One of the critical tasks deathscape actors participate in is the creation and maintenance of redundant information and records systems in order to maintain critical medical and identification information. The identification of remains is “important for both legal and humanitarian reasons;”<sup>47</sup> the World Health Organization reminds us that “[i]t is a basic human right for a deceased person to be identified, issued with a death certificate and disposed of in accordance with local customs.”<sup>48</sup> Unidentified remains can come about both organically, as

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<sup>46</sup> Gershon, Robyn, Lori A. Magda, Halley Riley, and Jacqueline Merrill. 2011. “Mass Fatality Preparedness in the Death Care Sector.” *Journal of Occupational and Environmental Medicine*.

<sup>47</sup> International Committee of the Red Cross. 2013. “4154 Forensic Identification of Human Remains.” International Committee of the Red Cross. [https://www.icrc.org/sites/default/files/topic/file\\_plus\\_list/4154-forensic\\_identification\\_of\\_human\\_remains.pdf](https://www.icrc.org/sites/default/files/topic/file_plus_list/4154-forensic_identification_of_human_remains.pdf).

<sup>48</sup> Fisher, Julie, and Bob Reed. 2013. “Disposal of dead bodies in emergency conditions.” World Health Organization (WHO). [https://cdn.who.int/media/docs/default-source/wash-documents/who-tn-08-disposal-of-dead-bodies.pdf?sfvrsn=530b5835\\_4&download=true](https://cdn.who.int/media/docs/default-source/wash-documents/who-tn-08-disposal-of-dead-bodies.pdf?sfvrsn=530b5835_4&download=true).

during Hurricane Katrina when countless offices containing remains identification information were destroyed, as well as through human error or maleficence, as we will discuss as a component the poorly regulated “tissue bank” industry.

As discussed above, Hurricane Katrina sent nearly a thousand caskets afloat; after the floodwaters receded, deathscape actors got to work trying to re-identify the disinterred remains. This process was incremental. As Larry Chedotal, two-term president of the Mississippi Cemetery Association and past president of the Southern Cemetery, Cremation & Funeral Association<sup>49</sup> noted, “Cemeteries often keep descriptions of the caskets so the process of elimination could be used. But, if cemetery offices were destroyed and records were lost, that too could be difficult.”<sup>50</sup> In the wake of Katrina, ME/Cs and Disaster Mortuary Operational Response Teams (DMORT) teams poured over “unusual tattoos, bone fractures and teeth that were compared to dental X-rays recovered from moldy basement storage,”<sup>51</sup> but this was slow and emotionally taxing work. Even after Louisiana’s move to include identifiers in individual caskets, the re-identification of remains has continued to be an issue. Almost two decades after Katrina, Hurricane Ida destroyed a cemetery in Ironton, Louisiana. The community witnessed caskets “landing in the streets and people’s yards...on the side of the levee and out in the field.”<sup>52</sup> In response to the disaster, teams came in to try to re-identify those in the displaced caskets. Ryan Seidemann, chairman of the Louisiana Cemetery Response Task Force, stated that

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<sup>49</sup> “Our Staff | Welcome to Natchez Trace, located in Madison MS.” n.d. Natchez Trace Funeral Home. Accessed May 1, 2023. <https://natcheztracefuneralhome.com/2/Our-Staff.html>.

<sup>50</sup> WLOX. 2005. “Officials Trying To Identify Caskets Displaced By Katrina.” WLOX. <https://www.wlox.com/story/3876233/officials-trying-to-identify-caskets-displaced-by-katrina/>.

<sup>51</sup> Stein, Letitia. 2015. “Katrina’s unclaimed dead conjure memories of her ravages.” *Reuters*, August 25, 2015. <https://www.reuters.com/article/us-usa-katrina-bodies/katrina-unclaimed-dead-conjure-memories-of-her-ravages-idINKCN0QU1A320150825>.

<sup>52</sup> Williams, David. 2021. “Caskets are still scattered around a Louisiana community as residents struggle to recover from Hurricane Ida.” *CNN*, September 25, 2021. <https://www.cnn.com/2021/09/25/us/ida-ironton-caskets-trnd/index.html>.

“[t]he process is so intensive, you know, to make sure that we’re getting it right... We don’t want to get somebody buried in the wrong place or re-buried in the wrong place.”<sup>53</sup>

The Natural Hazards Center, the “National Science Foundation's designated information clearinghouse for the societal dimensions of hazards and disasters,”<sup>54</sup> offers potential best practices to keep cemetery information accessible and easily identifiable in the wake of a disaster:

“Active, contemporary cemeteries, often for-profit businesses, may utilize state-of-the-art management technologies such as Geographic Information Systems (GIS). GIS combines geographic (spatial) data with information (non-spatial) data, and is used to collect, store, edit, manage, query, and display information visually, typically as various types of maps. A cemetery GIS would include information (spatial data) such as headstones, footstones, and plot corner markers, as well as planimetric features, such as roadways, utilities, and landscaping. Other information (non-spatial, or aspatial data) may include burial records, obituaries, death certificates, photographs of headstones and other cemetery peripherals, or any other form of digital records that may be associated with interments. Together, these data constitute a robust, powerful tool for the management of cemetery information, and can exist in both digital (e.g., on a server) and non-digital formats (printed maps), and are the archives of the modern-day sexton.”<sup>55</sup>

These types of technological data management tools, coupled with physical copies, create a robust and redundant cemetery information system for use before, during, and after a disaster.

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<sup>53</sup> Williams, David. 2021. “Caskets are still scattered around a Louisiana community as residents struggle to recover from Hurricane Ida.” *CNN*, September 25, 2021. <https://www.cnn.com/2021/09/25/us/ida-ironton-caskets-trnd/index.html>.

<sup>54</sup> Natural Hazards Center. n.d. “Natural Hazards Center || History and Mission.” Natural Hazards Center. Accessed May 1, 2023. <https://hazards.colorado.edu/about/history-and-mission>.

<sup>55</sup> Lovekamp, Bill, Gary Foster, and Steven Di Naso. 2016. “Preserving the Dead: Cemetery Preservation and Disaster Planning.” *Natural Hazards Observer* XL, no. 6 (August). <https://hazards.colorado.edu/article/preserving-the-dead-cemetery-preservation-and-disaster-planning>.

While this type of information loss is unfortunate and preventable, it is benign. But there are other actors who operate within the deathscape who actively keep incomplete and deficient records of the human remains in their care—those in the “tissue bank” industry. “Tissue bank” is the sanitized name utilized by those in the industry—referred to as “body brokers”—which obfuscates its truth: the for-profit sale of the remains of our country’s most vulnerable. Without proper records and data on the remains in their care, there is real potential for both disease transmission and the desecration of human remains. Stricter regulation of this under-researched industry, where individual companies are pulling in over \$27 million in annual revenue,<sup>56</sup> is necessary in order to mitigate the potential biohazards it poses. A first step in this is the requirement of redundant systems for storing and protecting information and essential records of the remains in body brokers’ custody, which will allow for easier risk identification if a hazardous event were to occur.

Journalist Brian Grow, conducting an in-depth investigation into the “tissue bank” industry for Reuters, was able to purchase a cervical spine and two human heads for nothing more than \$300 each, plus shipping and handling from a company called Restore Life USA. After careful research, Grow, who was able to purchase the remains with absolutely no medical credentials, was able to identify who the spine belonged to: Cody Saunders, a young man from Tennessee who had passed away on his 24th birthday after a lifelong struggle with kidney and heart disease. His family was unable to afford burial or cremation and, without understanding the paperwork they signed, donated his body to Restore Life in exchange for the free cremation of their son. His parents believed that “Restore Life would merely remove small skin samples from Cody for

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<sup>56</sup> Shiffman, John, and Brian Grow. 2017. “How one company made a fortune selling bodies donated to science.” *Reuters*, October 26, 2017. <https://www.reuters.com/investigates/special-report/usa-bodies-science/>.

medical research, cremate him and then return his ashes.”<sup>57</sup> Instead, Cody was dismembered, a fact not disclosed in the consent form his parents signed, and his remains sent all over the country, including to Grow.

When Cody’s cervical spine was received by Grow, it was hastily couriered to Angela McArthur, the director of the Anatomy Bequest Program at the University of Minnesota.<sup>58,59</sup> McArthur noted that it was “odd that the outside of the box was not labeled with a customary warning that human remains were inside.”<sup>60</sup> She also noted that Cody’s medical history was handwritten and that the “medical summary contained neither letterhead nor contact phone number” and had “inconsistencies in the specimen identification numbers listed at the top and bottom of one of the pages.”<sup>61</sup>

Later in the investigation, when Restore Life USA offered, and then sold, two human heads to Grow, purchased for \$300 each, McArthur noted that “[t]he Styrofoam container inside the cardboard box arrived cracked along two of the outside edges, making it vulnerable to leaks and presenting a potential health risk to anyone handling it, from shippers to researchers.”<sup>62</sup>

McArthur also noted that “...neither head had an identification tag,” which are “considered critical...to track identity, especially when working with multiple body parts.”<sup>63</sup>

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<sup>57</sup> Grow, Brain, and John Shiffman. 2017. “How Reuters bought human body parts and learned a donor's tragic story.” *Reuters*, October 25, 2017. <https://www.reuters.com/investigates/special-report/usa-bodies-cody/>.

<sup>58</sup> Grow, Brain, and John Shiffman. 2017. “How Reuters bought human body parts and learned a donor's tragic story.” *Reuters*.

<sup>59</sup> University of Minnesota Medical School. n.d. “Angela M. McArthur | Medical School.” Medical School. Accessed May 1, 2023. <https://med.umn.edu/bio/angela-mcarthur>.

<sup>60</sup> Grow, Brain, and John Shiffman. 2017. “How Reuters bought human body parts and learned a donor's tragic story.” *Reuters*.

<sup>61</sup> Grow, Brain, and John Shiffman. 2017. “How Reuters bought human body parts and learned a donor's tragic story.” *Reuters*.

<sup>62</sup> Grow, Brain, and John Shiffman. 2017. “How Reuters bought human body parts and learned a donor's tragic story.” *Reuters*.

<sup>63</sup> Grow, Brain, and John Shiffman. 2017. “How Reuters bought human body parts and learned a donor's tragic story.” *Reuters*.

Regardless of the countless ethical dilemmas presented by the “tissue bank” industry, there are real national security concerns posed by the transportation of poorly packaged human remains through the U.S. Postal System. There are numerous communicable diseases that can remain present in cadavers, including tuberculosis, antibiotic-resistant staph infections and Creutzfeldt-Jakob disease,<sup>64</sup> which could spread to those handling the remains, especially if the handler is unaware of the risk, let alone the contents of the package.

Reuters also investigated the practice of “cadaver labs,” live medical conference demonstrations which use “tissue bank” obtained cadavers in uncontrolled, non-medical settings. Reuters found that “at least 90 cadaver labs...have taken place since 2012 at hotels or their convention centers in dozens of cities, from New York to San Diego,” and that “[s]ome of the biggest names in the industry, from Hilton and Hyatt to Sheraton and Radisson, have hosted the events.”<sup>65</sup> The ability to control biohazards in these settings is exponentially lower than in a medical facility. Reuters found that there was a situation in which “there was a bin left that had blood-stained linens and plastic that was left in a meeting room and was not picked up,”<sup>66</sup> which had the potential to spread blood-borne pathogens to conference attendees and non-participating hotel guests. While no outbreaks have been linked to the practice, and convention organizers state they screen for diseases like HIV, there has been at least one case where a “body broker...allegedly failed to report positive results for hepatitis B in a cadaver sent to a medical conference.”<sup>67</sup>

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<sup>64</sup> Culliford, Elizabeth. 2017. “Cadavers in the ballroom: Doctors practice their craft at U.S. hotels.” *Reuters*, December 15, 2017. <https://www.reuters.com/investigates/special-report/usa-bodies-hotels/>.

<sup>65</sup> Culliford, Elizabeth. 2017. “Cadavers in the ballroom: Doctors practice their craft at U.S. hotels.” *Reuters*.

<sup>66</sup> Culliford, Elizabeth. 2017. “Cadavers in the ballroom: Doctors practice their craft at U.S. hotels.” *Reuters*.

<sup>67</sup> Culliford, Elizabeth. 2017. “Cadavers in the ballroom: Doctors practice their craft at U.S. hotels.” *Reuters*.

Despite the hazard these “cadaver labs” pose to the public, they are perfectly legal and widely unregulated. A representative from the San Francisco Department of Health, a city in which at least four conferences advertised the use of cadavers, stated that they had never heard of the practice and asked Reuters if they were sure the reports were true.<sup>68</sup> Michael Osterholm, the “director of the Center for Infectious Disease Research and Policy at the University of Minnesota,” asked: “Do shoes become contaminated on a carpet where a day later there’s going to be a wedding dance and you’ve got one-year-olds crawling on the floor?...All you need is one situation to go badly.”<sup>69</sup>

#### 4. Response

Response includes “actions to save lives, protect property and the environment, stabilize the incident, and meet basic human needs following an incident. Response also includes the execution of emergency plans and actions to enable recovery.”<sup>70</sup> Deathscape actors play a consistent role in coordinated disaster response and take on a lead role in the third Response-specific core capability, Fatality Management Services. Fatality management includes the responsibility to:

“Provide fatality management services, including decedent remains recovery and victim identification, working with local, state, tribal, territorial, insular area, and federal authorities to provide mortuary processes, temporary storage or permanent internment solutions, sharing information with mass care services for the purpose of reunifying family

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<sup>68</sup> Culliford, Elizabeth. 2017. “Cadavers in the ballroom: Doctors practice their craft at U.S. hotels.” *Reuters*.

<sup>69</sup> Culliford, Elizabeth. 2017. “Cadavers in the ballroom: Doctors practice their craft at U.S. hotels.” *Reuters*.

<sup>70</sup> Department of Homeland Security. 2019. “National Response Framework.” FEMA. [https://www.fema.gov/sites/default/files/2020-04/NRF\\_FINALApproved\\_2011028.pdf](https://www.fema.gov/sites/default/files/2020-04/NRF_FINALApproved_2011028.pdf).



members and caregivers with missing persons/remains, and providing counseling to the bereaved.”<sup>71</sup>

After a disaster occurs, body recovery is of paramount importance. If there was a slowdown, or a breakdown, in the body recovery process—perhaps because all personnel are diverted to take care of or search for the living—the main concern is not a potential disease outbreak, but rather the psychological burden that would be placed on the affected community. The World Health Organization (WHO) explains that, with the exception of those who die from communicable diseases and instances of contaminated drinking water, “there is no medical evidence to suggest that large numbers of dead bodies, in themselves, cause disease or epidemics. Human remains originating from traumatic events (natural disasters, accidents or warfare) do not represent a health hazard.”<sup>72</sup> They go on to state that “[b]eyond injury, the primary health concern for survivors of a disaster is the psychological trauma of the loss of loved ones and of witnessing death on a large scale.”<sup>73</sup> Mirta Roses Periago, the Director Emeritus of the Pan American Health Organization (PAHO), explains that:

“Death does not end human suffering, especially when death is sudden, as the result of a disaster. The death of a loved one leaves an indelible mark on the survivors, and unfortunately, because of the lack of information, the families of the deceased suffer additional harm because of the inadequate way that the bodies of the dead are handled. These secondary injuries are unacceptable, particularly if they are the consequence of direct authorization or action on the part of the authorities or those responsible for humanitarian assistance.”<sup>74</sup>

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<sup>71</sup> FEMA. 2020. “Mission Areas and Core Capabilities.” FEMA. <https://www.fema.gov/emergency-managers/national-preparedness/mission-core-capabilities>.

<sup>72</sup> Fisher, Julie, and Bob Reed. 2013. “Disposal of dead bodies in emergency conditions.” World Health Organization (WHO).

<sup>73</sup> Fisher, Julie, and Bob Reed. 2013. “Disposal of dead bodies in emergency conditions.” World Health Organization (WHO).

<sup>74</sup> Pan American Health Organization. 2004. *Management of Dead Bodies in Disaster Situations*. N.p.: Pan American Health Organization, Pan American Sanitary Bureau, Regional Office of the World Health Organization.

We can look at a specific case—the Murrah Federal Building bombing in Oklahoma City, OK—to better understand a potential timeline and the different actors of death-specific disaster response. The bombing took place at 9:02 a.m. on April 19, 1995, and took the lives of 168, including 19 children. This timeline is directly quoted from the Oklahoma Department of Civil Emergency Management After Action Report:<sup>75</sup>

*Wednesday, April 19, 1995*

1030: Requests from the **Oklahoma Medical Examiner's Office** were channeled directly through the SEOC, though periodic visits, by the forward element, were made to the temporary morgue, established at the First Methodist Church Building at the N.E. corner of 4th St. and Robinson Avenue.

1330: A **temporary morgue** is established in the First Methodist Church, N.W. 4th St. and Robinson Avenue.

1530: The Office of the State Medical Examiner establishes a "**Family Assistance Center**" (a.k.a. "Compassion Center") at the First Christian Church, N.W. 36th St. and Walker Avenue. Security is provided by the Oklahoma County Sheriff's Office and the National Guard.

*Thursday, April 20, 1995*

0200: FEMA MERS arrives to support FBI and other response agencies. They locate at the FBI Investigative Headquarters, 11 N.E. 6th Street. Additionally, a **Disaster Mortuary Team (DMORT)**, provided by Public Health Services, arrives to support the Medical Examiner's Office.

0730: Agent Kennedy conducts his first inter-agency staff meeting for law enforcement officers involved in the investigative mission of the disaster. He makes it clear that priorities are as follows: 1. locate any survivors; 2. remove any victims; and, 3. process the crime scene.

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<sup>75</sup> Oklahoma Department of Civil Emergency Management. 1996. *After Action Report: Alfred P. Murrah Federal Building Bombing : 19 April 1995, Oklahoma City, Oklahoma*. N.p.: Department of Central Services Central Printing Division. <https://oklahoma.gov/content/dam/ok/en/oem/documents/bombing-after-action-report.pdf>.

Five hundred fifty (550) **body bags** arrive from Dallas, Texas and Memphis, Tennessee

*Saturday, April 22, 1995*

The U.S. Public Health Service establishes a **medical support unit** to provide assistance to the Disaster Mortuary Team (DMORT). The **Oklahoma City Veterans Administration Hospital** is tasked to provide logistical support to the DMORT. The DMORT meets with city, county and state health officials periodically, to provide updates. Also, **30 volunteer morticians, from the Oklahoma Funeral Directors Association**, provide support to the DMORT, the Medical Examiner's Office and the Family Assistance Center.

*Sunday, April 23, 1995*

The 16-person, **54th Quartermaster Graves Registration Unit**, from Ft. Lee, Virginia, arrives in Oklahoma City to support the Medical Examiner's Office at the temporary morgue, located in the First Methodist Church, N.W. 4th St. and Robinson Avenue.

*Tuesday, May 2, 1995*

The 54th Quartermaster Graves Registration Unit is released.

*Friday, May 5, 1995*

The FEMA Disaster Mortuary Team (DMORT) completes its mission for the State Medical Examiner's Office and is deactivated.

*Tuesday, May 23, 1995*

0702 HRS the remains of the Alfred P. Murrah Building are imploded. In the next few days, the bodies of the three remaining victims are located, precisely where they were believed to be. This brings the **final death count to 168**, including the Oklahoma City nurse who responded to the incident and was mortally wounded when struck in the head by a piece of debris.

It took 34 days to fully recover the victims' remains from the rubble of the Murrah Federal Building. Deathscape actors were on site the whole time. The ME was coordinating with emergency managers as early as 10:30 a.m., a mere hour and a half after the bombing occurred.

A temporary morgue was established by 1:30 p.m.; a Family Assistance Center was established by 3:30 p.m.. DMORT wasn't deactivated until May 5th, over two weeks later after they were first called to serve in the effort.

DMORT is an extremely vital, but limited, resource, deployed all over the country from one of ten FEMA regions in the immediate response to a disaster.<sup>76</sup> DMORT was first envisioned in the 1980s as a way “to find a more expedient way to meet the needs of families during sudden, tragic events when local and state entities could not provide enough resources.”<sup>77</sup> Patricia Kauffman MD, a team commander and member of DMORT since 2001, explains the historical and contemporary role of DMORT in an interview with The Department of Health and Human Services' (HHS) Administration for Strategic Preparedness and Response (ASPR):

“When DMORT was a volunteer program years ago, we recruited based on word of mouth. We still operate that way to some extent since many of our staff know people who are knowledgeable, qualified, and want to contribute to the greater good in this distinct way. DMORT didn't start under HHS, rather it started as a community and grassroots response organization. In fact, in the early years, we were called volunteers, but folded into HHS and are now known as ‘intermittent federal employees,’ meaning we become federal employees whenever we are activated.”

There is rampant overreliance on these teams, which rely on temporary deployments. Frank DePaolo, the director for the Special Operation Division at the Office of the Chief Medical Examiner for the City of New York, explains that “[y]ou will notice when you look at mass-

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<sup>76</sup> Sledzik, Paul S. n.d. “Disaster Mortuary Operational Response Teams.” Homeland Security Digital Library. Accessed May 2, 2023. <https://www.hsdl.org/?view&did=776661>.

<sup>77</sup> Webster, Lee. 2013. “When disaster strikes, DMORT answers the call.” New Hampshire Funeral Resources & Education. <https://www.nhfuneral.org/uploads/1/1/7/5/117550115/dmort.pdf>.

fatality disaster plans ... their plans say the following: Call DMORT.”<sup>78</sup> This overreliance leads to “significant problems when we face mass-fatality incidents.”<sup>79</sup>

## 5. Recovery

The Recovery mission area is special in its dependence on, and role in reshaping, the first three preparedness phases. The National Disaster Recovery Framework describes the recovery process as a “sequence of interdependent and often concurrent activities that progressively advance a community toward its planned recovery outcomes,” and explains that “[d]ecisions made and priorities set by a community pre-disaster and early in the recovery process have a cascading effect on the nature, speed, and inclusiveness of recovery.”<sup>80</sup> The framework also explains that recovery is not limited to the repair of physical infrastructure; it includes emotional and financial remediation. In the case of Recovery, the most relevant core capabilities to the deathscape are Health and Social Services, and Infrastructure Systems. However, here we will focus on, and discuss, one of the overarching core capabilities—present in all five of the mission areas—planning.

Planning is fundamental to preparedness and security. It necessitates a multi-scalar approach, one that befits urban and regional planners, who are expected to work at multiple administrative levels, across geographies, and with both public and private actors. This generalist approach is paramount in hazard mitigation and emergency management and could remove the largest

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<sup>78</sup> Institute of Medicine, Board on Health Sciences Policy, Forum on Medical and Public Health Preparedness for Catastrophic Events, Bruce M. Altevogt, Clare Stroud, Lori Nadig, and Matthew Hougan. 2010. *Medical Surge Capacity: Workshop Summary*. Washington, DC, United States of America: National Academies Press. 10.17226/12798.

<sup>79</sup> Institute of Medicine, Board on Health Sciences Policy, Forum on Medical and Public Health Preparedness for Catastrophic Events, Bruce M. Altevogt, Clare Stroud, Lori Nadig, and Matthew Hougan. 2010. *Medical Surge Capacity: Workshop Summary*.

<sup>80</sup> Department of Homeland Security. 2016. “National Disaster Recovery Framework, Second Edition.” FEMA. [https://www.fema.gov/sites/default/files/2020-06/national\\_disaster\\_recovery\\_framework\\_2nd.pdf](https://www.fema.gov/sites/default/files/2020-06/national_disaster_recovery_framework_2nd.pdf).

physical deathscape system vulnerability—jurisdictional discontinuity. However, while it might seem intuitive that urban and regional planners would participate in this multi-scalar disaster preparedness planning, they rarely do, especially when it comes to one of our nation’s most critical deathscape infrastructural components, and an irremovable part of the built environment, cemeteries.

Even though “hazard mitigation and resiliency planning” is an area of practice covered by the American Planning Association’s (APA) American Institute of Certified Planners (AICP) exam,<sup>81</sup> it is often relegated to the periphery of the planning field. Urban planning and emergency planning—ideally intertwined for the best resiliency outcome—are split between separate disciplines and separate agencies. In terms of recovery efforts, local urban and regional planners have the upper hand over both state and federal actors, because disaster preparation and recovery falls under their jurisdiction. Local governments are expected to lead “pre-disaster recovery and mitigation planning efforts” and have “the primary role of planning and managing all aspects of a community’s recovery post-disaster.”<sup>82</sup> Planners, 68% of whom work in local government,<sup>83</sup> are expertly positioned to assist in recovery, and have their efforts feed back into pre-disaster phases.

Urban and regional planners have the capacity to design and redesign the physical and network infrastructures of our cities and towns through the careful development and update of land-use and comprehensive plans, and through the implementation of policy; an integral part of long-

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<sup>81</sup> American Planning Association. 2021. “AICP Certification Exam Outline.” American Planning Association. <https://www.planning.org/certification/examprep/subjectmatter/>.

<sup>82</sup> Department of Homeland Security. 2016. “National Disaster Recovery Framework, Second Edition.” FEMA.

<sup>83</sup> Bureau of Labor Statistics. 2022. “Urban and Regional Planners : Occupational Outlook Handbook: : U.S.” Bureau of Labor Statistics. <https://www.bls.gov/ooh/life-physical-and-social-science/urban-and-regional-planners.htm#tab-3>.

term disaster resiliency. For example, if a planner came face to face with the hurricane and subsequent flood that destroyed the cemetery in Ironton, Louisiana (Risk and Disaster Resilience Assessment, Mitigation), they should re-assess the mechanisms that allowed the cemetery's vulnerable placement, as part of the recovery process. In this era of climate change, planners should be expected to take environmental risk into consideration when developing plans for their locale. The Ironton Cemetery, and the community it serves sits at an elevation of 0 to 3 feet below sea level "on the west bank of the Mississippi River in Plaquemines Parish, about 25 miles southeast of New Orleans"<sup>84</sup>; one of the most hurricane-vulnerable regions in the United States. To avoid the destruction of critical, culturally significant deathscape infrastructures, planners should offer alternatives to current placement and/or mitigation strategies to avoid future catastrophes at the site.



**Photograph 3: Caskets strewn around the Ironton Cemetery in Louisiana after Hurricane Ida.**

*Source: Williams, David. 2021. "Caskets are still scattered around a Louisiana community as residents struggle to recover from Hurricane Ida." CNN.*



**Photograph 4: Casket ripped open amidst household wreckage in Ironton, LA after Hurricane Ida.**

*Source: Williams, David. 2021. "Caskets are still scattered around a Louisiana community as residents struggle to recover from Hurricane Ida." CNN.*

However, because of the lack of institutional focus on emergency preparedness and hazard mitigation within the planning field, the lay planner does not often address these problems. The responsibility is handed off to the Office of Emergency Management or a comparable

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<sup>84</sup> Williams, David. 2021. "Caskets are still scattered around a Louisiana community as residents struggle to recover from Hurricane Ida." CNN.

organization who do not have the same administrative powers that planners do, especially when it comes to the transformation and prosilience of the built environment:

“Traditionally, emergency and disaster managers have not been in positions to determine how urban development is to proceed. Even now, their input is not central to the decision processes appertaining to location and development...Furthermore, the decisions of the urban planning office, which tend to be based on order, efficiency, transportation systems, growth patterns, and other influencing factors, may directly result in new concerns for the emergency manager...”<sup>85</sup>

David R. Godschalk, Professor Emeritus of City and Regional Planning at the University of Northern California explains that it is “...important for the emergency planner to work with the community’s comprehensive or land-use plans, which specify the locations of future growth and development, as well as the adopted goals, objectives, and policies of the community.” He continues, stating that these comprehensive plans “should point out hazard areas...and provide policies and standards to control the development there to reduce vulnerability.”<sup>86</sup>

The physical characteristics, and therefore the safety, of the deathscape are largely dependent on urban and regional planners. However, most of the effect that planners have on the deathscape come from their absences, not their actions. In most municipalities, planners do not differentiate cemeteries from simple open space, despite the pervasive cultural, religious, and bio-environmental differences:

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<sup>85</sup> Britton, Neil R., and John Lindsay. 1995. “Integrating City Planning and Emergency Preparedness: Some of the Reasons Why.” *International Journal of Mass Emergencies and Disasters* 13, no. 1 (March): 93-106. 10.1177/028072709501300106.

<sup>86</sup> Britton, Neil R., and John Lindsay. 1995. “Integrating City Planning and Emergency Preparedness: Some of the Reasons Why.” *International Journal of Mass Emergencies and Disasters*.



“Local governments tend to rely on a basic and general approach, simply describing the zoning categories in which cemeteries can be built and specifying minimum lot sizes and setbacks. Determining the location of cemeteries is an exclusively local function. Most often burial grounds are included in zoning ordinances as by-right or conditional uses in specified districts. Occasionally they are governed by separate ordinances. Most significantly for planners, the regulation of cemetery development and burial practices that most directly affects land use remains at the local level.”<sup>87</sup>

This prescription of cemeteries as open space is insufficient and dangerous in an EP context. Thankfully, this inadequacy could be remedied through the careful consideration of cemeteries in plans, and in the laying out of “explicit ideals, goals, and objectives for cemeteries and burials.”<sup>88</sup>

## Summary

Loss of life is one of the major concerns in any emergency, whether it comes about as a direct result of a terrorist attack or natural disaster, or it comes about because of a second-order failure. Either way, deathscape actors are present in all five preparedness phases. They exist across all levels of government and in both the public and private sectors. As the system is set up now, with little to no continuity-building, the deathscape’s breadth is a weakness when it could easily be a strength.

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<sup>87</sup> Coutts, Christopher, Carlton Basmajian, Dwight Merriam, and Patricia Salkin. 2013. *Planning for the Deceased*. Chicago, IL: American Planning Association. <https://planning-org-uploaded-media.s3.amazonaws.com/publication/online/PAS-Report-572.pdf>.

<sup>88</sup> Coutts, Christopher, Carlton Basmajian, Dwight Merriam, and Patricia Salkin. 2013. *Planning for the Deceased*.

In the next section, we will explore why the best way to address the vulnerabilities we've highlighted—from the fractured ME/C system to poor zoning regulation, to profit-seeking actors—is by designating the deathscape as a CISA critical infrastructure sector.

## **VI. The Deathscape Sector (DSS)**

We have spent most of this paper exploring the diffuse system that makes up our nation's deathscape: medical, material, systemic, institutional. Now that the deathscape's role in EP and NS has been defined, vulnerabilities abound, we have to ask: how do we improve the system and create resilience? We must take into consideration the deathscape's complex composition, consisting of both public and private actors, civilian and military. The best way to build resilience while still taking compositional intricacies into consideration is to designate the deathscape as CISA's 17th critical infrastructure sector, the Deathscape Sector (DSS). As a critical infrastructure sector, the DSS would be given a Sector-Specific Plan which would address its vulnerabilities in more depth than could be done within the scope of this paper. A SSP would include a comprehensive review of the sector profile, sector risks, and critical infrastructure partnerships. Additionally, a SSP would lay out sector visions, missions, goals, priorities, and modes by which to achieve them.

While it is easy to just propose this new designation, there are still particularities to address. The process by which a CIS is designated is a paper in and of itself, so here we will address three specifics:

1. Why consolidate?
2. Why decouple the DSS and HPH?
3. Which Federal agency should become the DSS' Sector Risk Management Agency (SRMA)?

## 1. Consolidation

As we discussed in the beginning of this paper, there is precedent for EP-NS consolidation in the wake of large-scale disasters: Three-Mile Island and the creation of FEMA, September 11th and the creation of DHS. The COVID-19 pandemic is another such disaster; the perfect catalyst for a re-evaluation of our nation's deathscape. The pandemic highlighted how unprepared our nation was for such a complex, widespread, and protracted emergency. It brought issues of the deathscape, usually obfuscated by ephemeral discomfort, to the public's attention. The scale of the COVID-19 pandemic differentiates it from other contemporary disasters. While the social and cultural importance of the next largest MFI, the September 11th attacks, cannot be understated, the death toll is almost negligible in comparison. In total, the attacks on the World Trade Center, the Pentagon, and the attempted Flight 93 attack on Washington D.C., resulted in 2,996 deaths, while the current death toll of the COVID-19 pandemic is over 1,125,000.<sup>89</sup>

The scale of the COVID-19 pandemic, coupled with our devastating failures—from overwhelmed morgues, and body collection points (BCPs) deployed without shelving, to lack of long-term remains storage<sup>90</sup>—begs a serious systemic review. It would do nothing but benefit the American people to have a well-functioning, well-connected DSS.

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<sup>89</sup> World Health Organization. n.d. "United States of America: WHO Coronavirus Disease (COVID-19) Dashboard With Vaccination Data." WHO Coronavirus (COVID-19) Dashboard. Accessed May 11, 2023. <https://covid19.who.int/region/amro/country/us>.

<sup>90</sup> Greater New York Hospital Association. 2020. "GYNHA Lessons Learned/Preparation For Future COVID-19 Waves. Topic: Fatality Management in New York City Hospitals." [https://www.calhospitalprepare.org/sites/main/files/file-attachments/lessonslearned\\_fatalitymanagement.pdf](https://www.calhospitalprepare.org/sites/main/files/file-attachments/lessonslearned_fatalitymanagement.pdf).

## 2. Decoupling the DSS and HPH

The DSS is in desperate need of its own Sector Specific Plan (SSP) to address its intricacies. To achieve this, it is necessary to decouple the DSS from the HPH. We can look at CISA's Communications Sector (CS) and Information Technology Sector (ITS) to support such a decoupling. The CS and the ITS could logically be a single CIS, in the same way that the DSS is currently incorporated into the HPH, in an albeit reduced state. The ITS is the foundation on which the CS operates, responsible for the "design, development, distribution, and support of IT products,"<sup>91</sup> like software and hardware. Communications is the second level of this same system, responsible for services and applications, core networks, and access networks like broadcasting, cable, satellite, wireless, and wireline technologies. Even though the ITS and CS are intrinsically linked, it wouldn't be possible to give both sectors the amount of attention needed to navigate their infrastructural labyrinths; instead they are separate, each with their own SSP. This parallels the DSS and the HPH. It is unreasonable to expect one SSP to effectively cover both the DSS and the HPH in the same way it is unreasonable to expect one SSP to cover both the ITS and the CS.

This does not mean the DSS needs to discard lessons learned from the HPH, especially in relation to both sectors' public-private web of actors. The aim of the DSS is not to nationalize the deathscape, but rather to give those private actors a federal point of contact, and SSPs that they can help develop and follow in times of emergency.

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<sup>91</sup> Department of Homeland Security. 2016. "Information Technology Sector-Specific Plan 2016." CISA. <https://www.cisa.gov/sites/default/files/2023-01/nipp-ssp-information-technology-2016-508%20%281%29.pdf>.

### 3. Identifying the DSS SRMA

If the DSS is successfully separated from the HPH, there would need to be a discussion about the new sector's Sector Risk Management Agency (SRMA). CISA explains that:

“Each critical infrastructure sector has unique characteristics, operating models, and risk profiles. As such, each SRMA leverages their particular knowledge and expertise to:

- Coordinates and collaborate with DHS and other relevant Federal departments and agencies, with critical infrastructure owners and operators, where appropriate with independent regulatory agencies, and with SLTT entities, as appropriate, to implement PPD-21.
- Serve as a day-to-day Federal interface for the dynamic prioritization, collaboration, and coordination of sector-specific activities.
- Carry out incident management responsibilities consistent with statutory authority and other appropriate policies, directives, or regulations.
- Provide, support, or facilitate technical assistance and consultations for that sector to identify vulnerabilities and help mitigate incidents, as appropriate.
- Support the Secretary of Homeland Security's statutory reporting requirements by providing, on an annual basis, sector-specific critical infrastructure information.”<sup>92</sup>

There are many agencies which could feasibly serve as the DSS' SRMA. The identification of the best agency is outside of the scope of this paper, but we offer a few possibilities:

#### 1. *Health and Human Services (HHS)*

HHS is the SRMA for the HPH. Currently, HHS is the most involved agency with the DSS, and is likely the most knowledgeable about its issues.

#### 2. *Department of Homeland Security (DHS)*

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<sup>92</sup> Cybersecurity & Infrastructure Security Agency. n.d. “Sector Risk Management Agencies.” CISA. Accessed May 11, 2023. <https://www.cisa.gov/topics/critical-infrastructure-security-and-resilience/critical-infrastructure-sectors/sector-risk-management-agencies>.

DHS is the SRMA for ten of the sixteen CIS. DHS has the widest variety of CIS responsibilities, including over large physical structures like dams. This focus on physical structures could fill in the gaps of the current HHS system, which focuses on the medical side of the DSS.

### *3. Department of Homeland Security and Health and Human Services*

DHS and HHS could serve as co-leads. Currently, there are three CIS which have co-leads: the Food and Agriculture Sector, the Government Facilities Sector, and the Transportation Systems Sector. By having the DSS overseen by both DHS and HHS, both aspects of DSS infrastructure—physical and network—can be addressed effectively.

These are just a few of the many particulars that must be addressed, but it is helpful to get a basic understanding of the types of questions that will need to be answered. In the next section, we will answer one of the biggest questions posed in any SSP: what are the sectors' interdependencies?

## VII. Interdependencies

An important part of understanding the DSS' vulnerabilities in DHS-CISA frameworks is by addressing its interdependencies with other CIS. By paying attention to these vulnerabilities initially, and addressing them as they arise, we can create resilient critical infrastructure for our nation. This section is not meant to spell out all the interdependencies the DSS will have with other CIS, it's merely meant to showcase the ways in which the DSS is already intertwined with them. Additionally, while the DSS interacts with all the CIS, here we will focus on seven major sectors, the four designated lifeline functions—Transportation, Water, Energy, and Communications—and three other highly involved sectors—Emergency Services, Healthcare and Public Health, and Critical Manufacturing. The DSS is extremely vulnerable to cascading failures, as will become clear through even this cursory exploration of sector interdependencies.

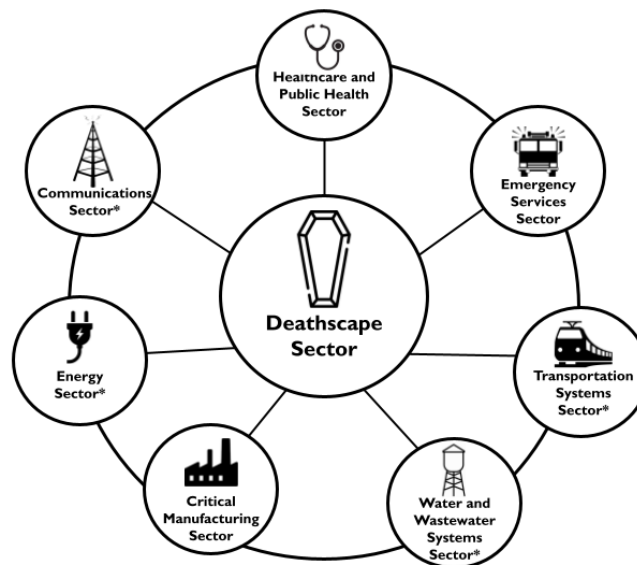


Figure 4: Interdependencies between the DSS and CISA's other Critical Infrastructure Sectors.



## **Designated Lifeline Functions**

There are four critical infrastructure sectors that are designated lifeline functions (DLF): transportation, water, energy, and communications. CISA explains that “their reliable operations are so critical that a disruption or loss of one of these functions will directly affect the security and resilience of critical infrastructure within and across numerous sectors.”<sup>93</sup> Other critical infrastructure sectors are prone to cascading failures if there is a disruption in one of the four DLFs.

### **1. Transportation Systems Sector (TSS)**

Transportation is fundamental in any response or recovery mission, as are well maintained roadways. In a disaster event, transportation is necessary for the movement of critical supplies like PPE and body bags. If there was a breakdown in the TSS it is likely that ESS actors would not be able to transport critically injured patients to the nearest hospital, which could lead to a wave of preventable deaths, potentially overwhelming the DSS. Even in times of calm, the DSS cannot operate up to standard if there was a breakdown in the TSS; bodies would be stuck in limbo, unable to get to and from DSS facilities or to their final resting places.

### **2. Water and Wastewater Systems Sector (WWS)**

Water is a basic human necessity; it takes an average of ten days to die from terminal dehydration. Of course, a scenario in which large portions of the populace don’t have access to any water, tap or bottled, is unlikely. However, there are many negative ramifications to the DSS

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<sup>93</sup> Cybersecurity & Infrastructure Security Agency. 2019. “A Guide to a Critical Infrastructure Security and Resilience - November 2019.” CISA. <https://www.cisa.gov/sites/default/files/publications/Guide-Critical-Infrastructure-Security-Resilience-110819-508v2.pdf>.

if there was a disruption in water and wastewater systems; for brevity we will focus on the latter. The treatment of wastewater is vital for preventing disease, including campylobacteriosis, E. coli, encephalitis, gastroenteritis, hepatitis A, and salmonella, amongst others. A breakdown in wastewater treatment would ripple through several other critical infrastructure sectors; depending on the magnitude of the outbreak, it is possible that both the HPH and DSS would become overwhelmed. Additionally, there are wastewater concerns that stem from common DSS practices, like embalming. When blood and other fluids are drained from the body during the process, it “enters the sewage system and is treated by the wastewater treatment system...The blood can be a substantial load to the BOD (biological oxygen demand) at the sewage plant.”<sup>94</sup>

### **3. Energy Sector (ES)**

All critical infrastructure sectors rely on the Energy Sector and its maintenance. The DSS requires massive amounts of energy to operate normally, especially with the increasing prevalence of cremation rather than burial as a means of final disposition; it is estimated that by 2040 the cremation rate in the United States will rise to nearly 80%.<sup>95</sup> Crematoria require “15 kWh of electricity on average per cremation - roughly the same domestic energy demands as a single person for an entire month,” over the span of about 75 minutes.<sup>96</sup> If the ES were to collapse or cease to function, the need for physical burial space would increase precipitously, and it is very likely that the need wouldn’t be able to be met, especially in dense urban environments that have been running out of burial space for decades, if not centuries.

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<sup>94</sup> Malsparo. n.d. “Medical Waste Management at Funeral Homes.” Malsparo. Accessed May 11, 2023. <https://www.malsparo.com/mortuaries.htm>.

<sup>95</sup> National Funeral Directors Association. 2022. “2022 NFDA Cremation & Burial Report.” California Healthline. [https://californiahealthline.org/wp-content/uploads/sites/3/2022/09/2022\\_Cremation-and-Burial-Report.pdf](https://californiahealthline.org/wp-content/uploads/sites/3/2022/09/2022_Cremation-and-Burial-Report.pdf).

<sup>96</sup> Hickman, Leo. 2005. “Should I ... be buried or cremated? | Environment.” *The Guardian*, October 18, 2005. <https://www.theguardian.com/environment/2005/oct/18/ethicalmoney.climatechange>.

Additionally, the DSS depends on the ES in order to keep morgues cool. While most morticians keep their coolers around 36-39 degrees Fahrenheit, some DSS actors, like those who work at forensic institutes, “keep their coolers far below freezing,”<sup>97</sup> in order to stave off decomposition. Morticians also require their work rooms to be cool, so larger spaces must be kept at between 59-64 degrees Fahrenheit.

#### **4. Communications Sector (CS)**

CISA reminds us that a “strong critical infrastructure security and resilience program is based on collaboration and information sharing.”<sup>98</sup> The Communications Sector is necessary for the exchange of information both internally and between critical infrastructure sectors. The Communications Sector-Specific Plan explains that “[v]irtually every element of modern life is now dependent on cyber infrastructure. As a result, our Nation’s economic and national security relies on the security of the assets and operations of critical communications infrastructure.”<sup>99</sup> In an emergency, it is important that medical and identificatory records can be shared between DSS actors. For example, dental records being shared with a ME/C to positively identify recovered remains.

#### **Other Critical Interdependencies**

#### **5. Emergency Services Sector (ESS)**

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<sup>97</sup> Arctic Walk-in Coolers and Freezers. n.d. “Afterlife Care: An Intro to Mortuary Coolers • Arctic Walk-In Coolers & Walk-In Freezers.” Arctic Industries. Accessed May 11, 2023. <https://arcticwalkins.com/afterlife-care-an-intro-to-mortuary-coolers/>.

<sup>98</sup> Cybersecurity & Infrastructure Security Agency. 2019. “A Guide to a Critical Infrastructure Security and Resilience - November 2019.” CISA.

<sup>99</sup> Department of Homeland Security. 2015. “2015 Communications Sector-Specific Plan.” CISA. <https://www.cisa.gov/sites/default/files/publications/nipp-ssp-communications-2015-508.pdf>.

The DSS is highly dependent on the ESS in any emergency circumstance. The ESS—comprising law enforcement, fire and rescue services, emergency medical services, emergency management, and public works<sup>100</sup>—are our nation’s first responders. They are on-site as soon as possible to help stabilize dangerous situations, and begin response and recovery operations. ESS actors can help treat emergent injuries on scene, even before the HPH, and are therefore an integral part of preventing excess loss of life, which might overwhelm the DSS. Additionally, emergency managers are key to the prevention, protection, and mitigation mission areas and play a key role in averting disasters both manmade and natural before they occur.

## **6. Healthcare and Public Health Sector (HPH)**

The DSS and HPH are profoundly intertwined. Much like emergency services, but to an even greater extent, HPH is the first line of defense against deaths. It is always preferable to prevent loss of life, and this is highly dependent on the safety and continued operation of hospitals and other medical institutions, as well as the maintenance of all the structures that they find necessary. The HPH stated in their SSP that they would promote “formal performance metrics, planned exercises and real world incident response activities,” to “provide opportunities to evaluate Sector progress and for learning and adaptation throughout the Sector.”<sup>101</sup> By addressing their own vulnerabilities and bolstering their resiliency, the DSS only benefits.

## **7. Critical Manufacturing Sector (CMS)**

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<sup>100</sup> Cybersecurity & Infrastructure Security Agency. n.d. “Emergency Services Sector | Cybersecurity and Infrastructure Security Agency CISA.” CISA. Accessed May 11, 2023. <https://www.cisa.gov/topics/critical-infrastructure-security-and-resilience/critical-infrastructure-sectors/emergency-services-sector>.

<sup>101</sup> Department of Homeland Security. 2016. “Healthcare and Public Health Sector-Specific Plan - 2015.” CISA. <https://www.cisa.gov/sites/default/files/publications/nipp-ssp-healthcare-public-health-2015-508.pdf>.

The security and function of critical manufacturing is of paramount importance to all CIS. As described above in the section on the TSS, PPE and body bags, among other supplies, must make their way to DSS actors. We saw a breakdown in this process during the early COVID-19 pandemic; a Congressional report stated clearly that:

“To the extent that data is available, current PPE production and distribution channels appear to continue to be insufficient compared to reported need. Various mechanisms that may be utilized to increase PPE supply or productive capacity, such as the provisions in the Defense Production Act of 1950 (DPA), appear to be applied selectively, and implemented unevenly, potentially based on narrow experience and limited administrative infrastructure within the federal government to oversee and manage its use in a national emergency context.”<sup>102</sup>

The National Funeral Directors Association (NFDA) sent out a memo to their members that stated:

“Due to the unprecedented nature of this pandemic, we have observed some shortcomings in communication between local, state and federal agencies and funeral homes making requests for PPE at the local or state level are being met with confusion. NFDA will continue to discuss logistics with our federal partners, and suggest you also contact your state association as they are on the front lines at the state level and have been working in conjunction with NFDA to address issues as they arise.”<sup>103</sup>

The NFDA ended the memo urging their members to let them know if they became “aware of a solid lead for PPE.”<sup>104</sup>

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<sup>102</sup> Congressional Research Service. 2020. “COVID-19 and Domestic PPE Production and Distribution: Issues and Policy Options.” CRS Reports. <https://crsreports.congress.gov/product/pdf/R/R46628>.

<sup>103</sup> National Funeral Directors Association. n.d. “Personal Protective Equipment (PPE).” National Funeral Directors Association. <https://nfda.org/covid-19/frequently-asked-questions/personal-protective-equipment-ppe>.

<sup>104</sup> National Funeral Directors Association. n.d. “Personal Protective Equipment (PPE).” National Funeral Directors Association.

While PPE was vital for deathcare actors during the COVID-19 pandemic, it would be inordinately more important in the case of a disease that remained highly infectious posthumously, like EVD. The recommendations for the movement of remains infected with EVD are incredibly stringent. The CDC recommends no less than three pre-opened cremation-compatible body bags of different specifications:

“First bag (top layer on gurney): vinyl or other chlorine-free material, minimum of 6 mil thickness (152 micrometers). To prevent any leakage of fluids, all seams should be factory heat-sealed or welded, not sewn, and the zipper should be on top.

Second bag (middle layer on gurney): chlorine-free material impervious to fluids that can be heat-sealed around the body to form a leakproof body bag. This bag should be specifically designed for the containment and transport of infectious human remains. The material should be precut to provide sufficient material to envelop the body and the first bag.

Third bag (bottom layer on gurney): laminated vinyl or other chlorine-free material, minimum of 18 mil thickness (457 micrometers) with handles that are not sewn on, such as riveted handles reinforced with handle straps that run under the pouch. To prevent any leakage of fluids, all seams should be factory heat-sealed or welded, not sewn, and the zipper should be on top.”<sup>105</sup>

This is not to mention the thermal sealers, trauma sheers, spill kits, and other secondary equipment needed for the safe handling of EVD-infected remains. These are highly specific and difficult to manufacture products, which need special consideration in order to keep in high enough supply.

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<sup>105</sup> Centers for Disease Control and Prevention. n.d. “Guidance for Safe Handling of Human Remains of Ebola Patients in U. S. Hospitals and Mortuaries | Ebola Virus Disease | Clinicians | Ebola (Ebola Virus Disease) | CDC.” Centers for Disease Control and Prevention. Accessed May 11, 2023.

## VIII. Conclusion

Through this short examination of the deathscape we defined the deathscape in an EP-NS context, defined a cursory web of actors across jurisdictions and sectors, examined the deathscape's role in EP using FEMA's five National Preparedness Frameworks, and identified an array of weaknesses and vulnerabilities. We also proposed that to address said weaknesses and vulnerabilities the current, fragmented deathscape should be consolidated into CISA's 17<sup>th</sup> critical infrastructure sector in order to start creating cross-sector continuity.

To conclude, it is easy to ignore things that we find uncomfortable; lack of emphasis on the deathscape—by the government as well as the public—only exacerbates its weaknesses and makes this critical sector unable to operate in the way most beneficial to the American people, whether it collapses under the pressure of a disaster, or its obfuscation allows bad actors to run rampant. We are moving into an era of uncertainty. CISA reminds us that “the threats we face — digital and physical, human-made, technological, and natural — are more complex, and the threat actors more diverse, than at any point in our history.”<sup>106</sup> We must face these threats face on and create systems that the American people can depend on to get through the wide array of disasters that we face on a daily basis. The designation of the deathscape as CISA's 17<sup>th</sup> critical infrastructure sector would be an excellent step in building our nation's resilience. At the very least, we will get a comprehensive nationwide study of the deathscape. At best, we can create a

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<sup>106</sup> Cybersecurity & Infrastructure Security Agency. 2022. “CISA Strategic Plan 2023-2025.” CISA. [https://www.cisa.gov/sites/default/files/2023-01/StrategicPlan\\_20220912-V2\\_508c.pdf](https://www.cisa.gov/sites/default/files/2023-01/StrategicPlan_20220912-V2_508c.pdf).

redundant, fair system that can operate smoothly and respectfully amidst even the worst of disasters.

To get into the true depths of the deathscape and its place in emergency preparedness and national security would take multiple hundred-page volumes. There are countless aspects of the deathscape that this paper couldn't even touch on: the history of cemetery planning, the Church's role in the under-regulation of the deathscape, the deathscape's predatory markets, how the deathscape fits into the urban rent gradient, the intricacies of local, state, and federal jurisdiction, the merits of public burial space, etc. Regardless, it is my hope that this paper can act as a jumping off point for a much larger and more involved conversation.



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