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BUILDING TRUST  
THROUGH TECHNOLOGY:

## DISASTER VICTIM IDENTIFICATION (DVI)

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# BUILDING TRUST THROUGH TECHNOLOGY: **DISASTER VICTIM IDENTIFICATION (DVI)**

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In today's world, the workforce generally comprises Generation X, Millennials, Generation Z, and most currently, Generation Alpha. Why is this important? The advances in technology since the beginning of Generation X in 1965 have improved our ability to perform almost every task. Technology has enhanced the capability and capacity for individuals to perform their jobs both faster and safer. The successful adoption of these advances often hinges on the ability to understand how the technology can be implemented within an existing process or procedure, including the need for proper information technology infrastructure and data storage capacity. As a result of competing priorities and procurement delays, the new technology can be significantly different than the existing process.

**M**any new technologies are also marketed directly to law enforcement agencies; as a result, agencies may acquire technology and not understand how it should be properly implemented. Further, the adoption of a new technology can create a domino effect of required updates and upgrades, all of which require a funding source. With proper planning, jurisdictions can utilize shared resources to provide an efficient, robust response that benefits the affected community.

## EMERGENCY OPERATIONS

First responders are trained to protect citizens, neutralize threats, save lives, and rescue those in need. The main goal of emergency operations commonly deployed immediately following mass disasters such as tornados, hurricanes, tsunamis, and, of late, massive, unexpected weather events ranging from extreme heat and fires to extreme rain and flooding, is to save as many lives as possible. In many mass disaster situations, the process of search and rescue often quickly transitions to search and recovery. The identification of the unknown deceased is a critical function that

occurs in each of these scenarios. The frequency of such events is increasing, and the need to provide identifications as quickly as possible is critical as family members wait for information.

Methods often used to identify individuals include fingerprints and DNA analysis. Identification via fingerprints is dependent on a set of prints for comparison; fingerprints taken, for example, for the purposes of a VISA, a passport, or a TSA pre-check application or for a job application or relating to a past arrest can be compared to fingerprints of unknown deceased. Fingerprints have been used as a means of identification for more than 100 years; however, what if the hands are badly decomposed or if fingerprints are not available? Identification via DNA analysis requires family DNA reference samples for comparison to the DNA profiles of the unknown individual. However, some individuals may not have family reference samples available and may be identified via DNA from a deduced reference sample such as a medical sample, a toothbrush, or a hairbrush. Other means of identifica-







tion also exist such as dental records or serial numbers associated with hip or breast implants. Each mass fatality event presents a unique set of circumstances that must be navigated. What technologies are available to expedite these identifications?

### SURFSIDE, FLORIDA

On June 24, 2021, the first 911 calls regarding a partial collapse of the Champlain Towers South building were received at 1:23 a.m. At 1:30 a.m., Miami-Dade Fire Rescue (MDFR) arrived on scene. Urban Search and Rescue teams (USAR) and other first responders rescued 35 residents and treated 10 individuals at the scene. Two individuals were transported to the hospital where one of the individuals succumbed to her injuries. An additional 97 deceased individuals were identified within the next four weeks via either fingerprints or DNA. The fingerprints were collected via the Miami-Dade County Medical Examiner Department in conjunction with the Miami-Dade Police Department (MDPD) Crime Laboratory. The initial DNA analysis of the family reference samples was completed onsite using Rapid DNA instruments in a satellite laboratory facility in Surfside, Fla., by the MDPD Crime Laboratory. The MDPD Crime Laboratory's participation was a departure from the expected response; the Crime Laboratory was able to bring its DNA analysis capabilities to the scene. This effort was unprecedented in Florida.

### FAMILY REUNIFICATION/FAMILY ASSISTANCE CENTER

A Family Reunification Center was established by the MDPD at 7:16 a.m. on June 24, 2021, to provide a location for families to gather and receive information. Family members provided information to MDPD personnel such as apartment numbers, likely location of family members during the event, and information about personal belongings. The MDPD Crime Laboratory provided family tree forms to MDPD personnel on scene. Biological relatives for each person reported as missing filled out the forms with information including the name and date of birth of the missing person and their biological relationship to the individual who was filling out the form. The relative filling out the form also provided a buccal swab (cheek swab) as a family reference sample, with signed consent for DNA analysis and upload of the DNA profile into a DNA database used only for the purpose of comparing the reference DNA profile to the DNA profile obtained from samples from any unknown deceased.

On June 27, 2021, the Family Assistance Center (FAC) operations commenced. This Center provided services to meet the families' basic needs, including grief counseling, financial and mental health services, and other support services. Twenty-six community organizations participated in the FAC; in addition, MDPD Crime Laboratory personnel and other MDPD operations were also co-located with the FAC. The MDFR provided briefings twice a day regarding the rescue efforts with representatives from the Israeli Defense Force, the Miami-Dade Medical Examiner Department, MDPD Command Staff, victim advocates, and other MDPD personnel in attendance to answer questions. Representatives from Cadena International in Mexico also responded to provide assistance.

On July 7, 2021, search and rescue operations transitioned to search and recovery. The FAC meetings continued in person until July 26, 2021, when the FAC transitioned to virtual operations. On August 23, 2021, the FAC ceased operations and the Jewish Community Services continued to provide disaster case management via government and non-government entities. Technology enabled the FAC to provide a virtual option for those families that could

not attend in person; because of the COVID-19 pandemic, Zoom was now a commonly used platform. Further, communication also occurred via text messages and the Everbridge Alert Notification System. These information technology platforms enabled family members to receive frequent updates regarding ongoing efforts.

### DRONES

Mapping and modeling of the collapsed building was critical in supporting rescue and recovery operations. Multiple agencies participated in the drone response. The State Unmanned Aircraft Systems (UAS) Team supported two Florida USAR teams and the Federal Emergency Management Agency with regular mapping and modeling of the building collapse site from June 26, 2021, through July 18, 2021, generating 1.1 TB of data and information. Challenges during this operation included factors such as operating drones in and around heavy machinery as well as around active rescue personnel conducting search and rescue operations, data management, volumetrics, and upstream bandwidth. Clearly, technology requires planning beyond its actual deployment.

### RAPID DNA TECHNOLOGY

First responders understand their role; what is not always immediately clear is how new technologies can assist first responders at a mass fatality event or crime scene. Recent rapid DNA technology advancements, in the form of miniaturized, faster, and portable instrumentation, facilitate the identification of individuals at the disaster scene. Due to the closed setting and the need to identify the missing as quickly as possible, the MDPD Crime Laboratory conducted DNA analyses in satellite locations in Surfside, Florida, outside normal forensic-accreditation and quality-assurance practices. Many of the first responders had no idea that MDPD Crime Laboratory personnel were working nearby; laboratory personnel worked 24/7 to analyze the family reference samples and the samples from the unknown deceased. Within 48 hours of the building collapse, the MDPD Crime Laboratory had set up five Rapid DNA instruments: two from its own crime laboratory facility in Doral, Florida, one from the City of Miami Police Department, and two instruments from the Palm Beach Sheriff's Office Crime Laboratory. Thermo Fisher Scientific, the vendor for all five instruments, made every resource available to the crime laboratory to set up the instruments and keep them operational for as long as needed.

### LOGISTICS AND TRAINING

A holistic approach to emergency management would benefit all stakeholders. Disaster Training typically includes ICS Training and Documentation, planning meetings, WebEOC, resource tracking, and other topics. Law enforcement agencies, fire rescue personnel, and emergency operations logically conduct training scenarios both separately and collaboratively. The Miami-Dade Medical Examiner Department participates in the Florida Emergency Mortuary Operations System (FEMORS). The FEMORS encompasses all aspects of emergency operations. The MDPD Crime Laboratory has participated in the FEMORS operations; these operations include Rapid DNA instruments as well as the use of fingerprints. What is lacking is a training that incorporates all entities so that each agency is aware of the capabilities of its partners. For example, all stakeholders should be aware of how Rapid DNA technology could be used for DVI. Further, there are currently two vendors who manufacture Rapid DNA instruments. Space requirements or other limitations and/or procurement regulations may dictate which instrument is purchased; training exercises would

include instruments from both vendors, if applicable. However, information-sharing processes and procedures should be established prior to the training exercise.

Additionally, emergency management and fire rescue operations typically have personnel dedicated to logistics. Law enforcement, medical examiners and coroners, and crime laboratory personnel typically do not have staff assigned to this function until the disaster event is looming or has already occurred. All stakeholders should include logistics in their training and disaster planning. While WebEOC offers the ability to track information, the planning for what information needs to be tracked should be all-inclusive. There should be a single point of entry for missing person information, including vetting the information provided by family members; for example, the correct spelling of names and the correct date of birth are critical to searching fingerprint databases. One wrong number or letter can prevent an identification. Also, when family members are reporting a missing person, their biological relationship to the missing person is critical to the DNA identification process.

Understanding the wide range of needs is dependent on full collaboration. A few questions to consider: What are the requirements for data upload and storage? What are the power needs for the required equipment? How will that be provided? If the need cannot be met immediately, what is Plan B? Which individuals need to be on speed dial to provide what is needed? Who is responsible for maintaining that contact list? Asking and answering

critical questions ahead of time, and re-evaluating these questions annually based on new technologies, facilitates a confident, swift, comprehensive response.

#### A PATH FORWARD

On June 14, 2021, ten days prior to the building collapse in Surfside, Florida, the Miami-Dade Chief Medical Examiner and MDPD's current Chief Scientific Officer exchanged e-mails discussing the benefits associated with the use of Rapid DNA technology by multiple agencies throughout Miami-Dade County, including the Medical Examiner Department, to respond to mass fatalities. Ultimately, law enforcement agencies and medical examiners could then respond within a short time frame with multiple instruments, creating a regional Rapid DNA consortium that could then be expanded statewide. The Chief Medical Examiner replied, "The concept of being prepared for a future mass fatality is appealing." The infrastructure for an emergency response already exists. On a local, state, and national level, there is a strong need to collaboratively incorporate new technologies wherever possible. These efforts need to occur across all affected entities including, but not limited to, law enforcement, fire rescue, emergency operations centers, medical examiners, coroners, and crime laboratories. Further, the even greater need is for the development of emergency response plans that include all stakeholders. The silos of information can be eliminated; the technology exists to move forward collectively. A cooperative effort that capitalizes on existing partnerships and creates new ones will strengthen the response to mass fatality events, ultimately enhancing the trust that our communities place in our hands in times of dire need.



*About the Author:* **Stephanie Stoiloff** has more than 25 years of forensic experience and is currently assigned as the Chief Scientific Officer at the Miami-Dade Police Department, overseeing the Forensic Services Division. The Forensic Services Division includes the Crime Scene and Evidence Bureau as well as a full-service, accredited Crime Laboratory that provides forensic services for the Miami-Dade Police Department, all municipal agencies in Miami-Dade County, and state and federal agencies, upon request.

Ms. Stoiloff is a member of the Major Cities Chiefs Forensic Science Committee and the International Association of Chiefs of Police (IACP) Police Investigative Operations Committee. She also currently serves on working groups and advisory boards including the national Forensic Laboratory Needs Technical Working Group established by the National Institute of Justice, the Federal Bureau of Investigation's Rapid DNA Crime Scene Technology Advancement Task Group, the National Technology Validation and Implementation Collaborative (NTVIC); and the American Society of Crime Laboratory Directors (ASCLD) Advocacy and Member Resource Committees.

Ms. Stoiloff also served as a member of the Technical Working Group for the Preservation of Biological Evidence, the Sexual Assault Forensic Examination Response (SAFER) Working Group, the Practitioner and Technical Advisory Board for the Center for Statistics and Applications in Forensic Evidence (CSAFE), and the External Board of Advisors for the Florida International University International Forensic Research Institute. Ms. Stoiloff has provided presentations at national and international meetings on topics including forensic intelligence, accreditation, man-aging forensic operations, biological evidence preservation, and Rapid DNA analysis.