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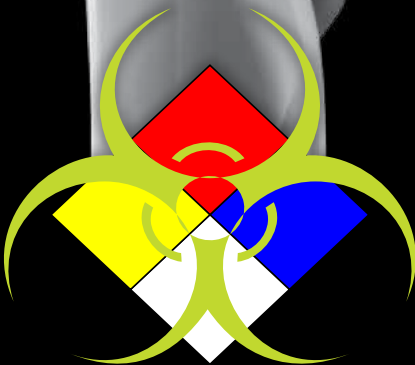*By Michael Mabee*

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# Creating the Problem, Then Solving It

*By Catherine L. Feinman*

It is interesting to stop for a moment and think, "How did we get here?" The emergency preparedness and response profession has come a long way, offering emergency preparers, responders, and receivers many more invaluable tools at their disposal than their counterparts had in previous years. Over time, plans and procedures have adapted to ever-evolving needs and environments. And technology has advanced beyond the imagination of their predecessors 50 years ago. However, for every advancement, a new challenge(s) emerges.

By solving one problem, people sometimes create others, which they are later tasked to resolve. Critical infrastructure, for instance, provides life-sustaining resources, but it ages and needs to be maintained and secured. The legalization of drugs provides some tax revenue, but it corresponds to a growing public health crisis. Information resources provide actionable data for emergency preparedness and response, but they can be corrupted or false.

For many innovative solutions, the potential negative cascading effects as well as ways to close gaps and overcome vulnerabilities must also be considered. In the cases of the electrical grid or drugs, overcoming the vulnerabilities created by a growing dependence now requires taking swift legal action to ensure the power stays on, people stay healthy, and life-sustaining resources remain available. For information resources, due diligence is needed to prevent the receipt or distribution of bad information, while leveraging reliable data in order to make well-informed decisions.

Nonetheless, the emergency preparedness profession is persistent, resourceful, and resilient. The Strategic National Stockpile, for example, has transformed from a resource to protect against biological and chemical attacks into a massive supply chain resource for a variety of health emergencies. Robust logistical capabilities are invaluable considering the public health threats the nation faces today and the ones yet to emerge tomorrow.

As 2019 comes to an end, DomPrep would like to thank all the practitioners who work diligently each day to protect their communities by reflecting on the lessons learned from the past year but continuing to look and plan toward the next. Now, the challenge questions for 2020 are, "Where do we want to go?" and "How do we plan to get there?"

# Looking Ahead – Future of the
# Strategic National Stockpile
*By Greg Burel*

*This year marks 20 years since Congress established the Strategic National Stockpile (SNS), originally named the National Pharmaceutical Stockpile, in preparation for the year 2000. The intent was to arm the country against possible terrorist threats that could disrupt the U.S. medical supply chain. With a $51 million appropriation and a handful of public health staff based at the Centers for Disease Control and Prevention, the stockpile began in 1999 with a sole focus to protect the American people from biological and chemical attacks.*
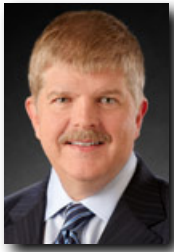
I n those early days of what is now the SNS, the ability to move a 12-hour Push Package to any location in the United States within 12 hours of a decision to do so was the measure of success. The 12-hour Push Package is a 50-ton load of a variety of medical supplies that might help public health and emergency management respond to a variety of threats. Today, the SNS still holds 12-hour Push Packages because they might be useful if the federal response community knows there is a problem, but the actual problem is not clear. Because of tremendous advancements in threat detection technology, the 12-hour Push Package that represented the SNS's most important response asset is now the most well-known but least critical response asset. They make up less than 5% of the modern-day SNS inventory.

The SNS's early beginnings as a small logistics capability have given way to an exceptional response asset. The stockpile is now a robust medical supply chain and logistics operation with a formulary valued at more than $8 billion. The professionally, scientifically governed formulary provides the nation with capabilities to respond to a wide array of threats, including bioterror agents like anthrax, smallpox, and plague, as well as naturally occurring disasters. The stockpile is prepared to respond to chemical events with the fielding of almost 2,000 forward-placed installations of chemical nerve agent antidotes ready at a moment's notice to be used by state and local hazmat responders. The SNS holds countermeasures that allow the U.S. government to respond to nuclear and radiological events. Established relationships and experience in crafting immediate response capability allow SNS experts to underpin the supply chain requirements for many emerging infectious disease responses.

The annual appropriation has grown to $650 million and the staff has expanded to nearly 200 members with expertise in not just public health but also supply chain management, medical logistics, facility management, transportation, pharmaceuticals, emergency management, quality control, and more. The organization and its scope have evolved, but the mission remains the same: to get the right materiel to the right place at the right time to

secure the nation's health. The space in which the stockpile delivers its mission continues to evolve and change. New threats emerge regularly, and new technologies are introduced daily that can change how SNS responders work while not changing the task at hand.

Stockpile personnel have achieved much since the early days of moving a small 12-hour Push Package to the point of responding with vast amounts of materiel in far less than 12 hours in many cases to the site of any health emergency in the United States and its U.S. territories. The value of the stockpile goes far beyond just what is held in warehouses; the value is found in its capability to bring a range of professional disciplines to craft a supply chain-based response to unpredicted health emergencies. SNS experts are constantly working toward improving those capabilities further.

### Uniting Federal Medical Countermeasure Response Efforts

In October 2018, the SNS joined the Office of the Assistant Secretary for Preparedness and Response (ASPR) at the Department of Health and Human Services. This move unites the SNS's capability to acquire and deliver medical materiel to the site of any public health emergency with ASPR's ability to provide vital staffing at disasters and its imperative to manage all federal medical response efforts. This move allowed ASPR to re-evaluate response assets and its positioning and management across the entire medical response framework.
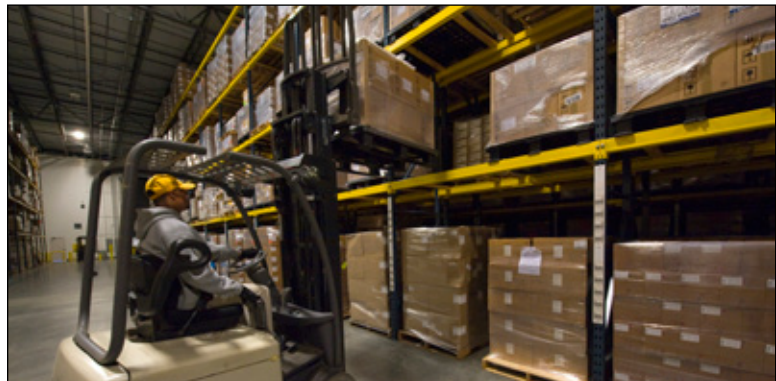


The Strategic National Stockpile is the nation's largest repository of emergency medical countermeasures. Nearly $8 billion of medicines and supplies are stored in warehouses strategically located across the United States.
*Source:* Strategic National Stockpile

The SNS is positioned to take full advantage of ASPR's capabilities and support to achieve future success. Working with the Biomedical Advanced Research and Development Authority (BARDA) to jointly develop all new development contracts will ease the transition of novel medical products from BARDA development to SNS sustainment and use. The SNS is working with the National Disaster Medical System (NDMS) to find new ways to leverage the buying power of the stockpile to improve access to medical materiel purchasing and management at lower cost.

In just its first year with ASPR, the most concrete example of the improvements the SNS is making is the assumption of responsibility for NDMS materiel management. This development allows the federal government to streamline its medical countermeasure (MCM) logistics operations by consolidating the warehouse footprint for medical materiel

readied for public health responses. Now, during an emergency response, the SNS can move both MCM needed to protect and treat the affected public and the medical supplies required by the disaster response medical professionals in the field treating those who are exposed or injured. This also gives the SNS the opportunity to make acquisitions jointly for the separate organizations, thus creating better purchasing capability and more supply chain influence.

Future opportunities exist to strengthen federal purchasing power and offer pathways for product use in other settings than just disasters. The various operating elements of ASPR can work more directly together on collective needs. SNS has long partnered with other federal agencies, but the direct connection with ASPR opens new doors and allows the stockpile to improve interagency partnerships at a higher level. Now, as part of ASPR, the SNS can unite with other parts of the U.S. government to enter into longer-term contracts and use more creative contracting mechanisms. As a result, the federal government will realize better integration with other product development and procurement activities under ASPR.

### Innovations for the Future

Technology improvements continue to change the world at rapid speed. The challenges of today that limit federal, state, and local capabilities to distribute and dispense MCM in a public health emergency may be a distant memory in the next 20 years. Perhaps robots are delivering medicine door-to-door or drones are dropping packs of MCM to precise locations based on GPS data. Many of these advancements are here today and the challenge exists to improve them and integrate them into response operations. To exploit all the new and emerging technology that can help the SNS keep pace with its future, SNS personnel are working hand in hand with ASPR's innovation team. Together these two entities are planning, researching, and developing new technology-driven capabilities that can get the right thing to the right place at the right time. BARDA continues to develop new MCM and now the SNS can better engage in the innovation space together to deliver response assets in a better way.



Federal SNS staff regularly meet with external partners to improve information sharing, coordination, and communication pathways across the commercial medical supply chain and between public and private sectors before, during, and after a disaster or public health emergency requiring medical countermeasure response. *Source:* Strategic National Stockpile

Think of a scenario where a medicine is needed at a disaster site but, for many reasons, moving that medicine is an incredible challenge in itself. For example, moving large quantities of fluids is expensive and difficult. Considering how

to improve and shorten the cycle for movement of materiel has led the SNS to invest in early efforts to manufacture critical care products on demand at or near the scene of an emergency. The thought is that if something can be made at the time it is needed and where it is needed, then critical time is saved in moving huge volumes of materiel. This may account for a fraction of what will ultimately be needed, which can allow the federal government to start its response efforts and simultaneously begin to continuously manufacture additional product on site throughout the response.

Consider chronic conditions that some of the most vulnerable citizens deal with every day. In disasters, reaching those vital therapies to sustain these individuals may become impossible. Considering how to help these individuals, the SNS has worked with ASPR to invest in mobile hemodialysis capability and continues to look at new advancements. Taking the therapy to the patient versus moving the patient far from home and far from his or her regular environment and support network might lead to better response and far superior health outcomes.

Robotic capabilities to load and unload materiel are in beginning stages of testing, and SNS experts have begun to consider how robotics might actually be used to deliver medicine directly to an individual. If a robot or drone or something not yet envisioned can bring medicine to the community without risking human life, then citizens might be able to stay home in a safer environment during an emergency. The opportunity exists for even more impressive innovations, some of which have not yet been imagined. The key is to find those partners that have the great imagination to conceive the future.

The SNS has arrived at the forefront of advancements in medical logistics and is poised to make use of the newest technology available. In current operations, the SNS uses modeling to explore better solutions for deploying product as quickly and efficiently as possible. By bringing on professional staff who are in the top of their fields and by partnering with thought leaders, industry, academia, IT, and others, the SNS can make use of those advancements to further the availability and use of MCM in public health emergencies.

### Strengthening Partnerships for the Future

Just as those technological advances are key to moving the SNS forward in the next 20 years, so are the partnerships that the SNS has fostered with private industry. The current collaboration with manufacturers, distributors, and other medical supply industry partners must continue to inform both the government and the commercial market of supply-and-demand concerns both in normal operations and during emergencies. The SNS invests in vital assets to secure the nation that include more than just the materiel in the warehouses. Those vital assets include SNS experts and the partners across government and industry that can mean the difference between success or failure.

Since its inception, the SNS has engaged with state and local public health partners on planning for the worst imaginable public health scenarios. But with each response, and especially during the 2009 H1N1 pandemic influenza response and the domestic efforts for the 2014 Ebola epidemic, it was clear that both public and private interests must work together

for the best possible outcomes. Knowing what product is available in the marketplace, what is available from the government, and the current picture of supply and demand is invaluable when making decisions on whether to deploy MCM from the SNS and in what quantities. This planning and relationship building between the government and commercial partners is best done in advance of an emergency, just as the planning efforts underway between federal, state, and local public health and emergency management.

There is much work still to be done with public/private partnerships. The SNS's Strategic Logistics Branch, still growing and maturing, is charged with leading efforts to establish and nurture new and unique partnerships that will allow the whole of the United States to improve its response capability. SNS experts work together with personnel across ASPR to connect with partners – healthcare organizations, manufacturers, and distributors, for instance – to better understand their operations, challenges, and opportunities and to work with them on needs anticipated during emergency responses. This is work that was not even conceptualized 20 years ago when the SNS was established as that small logistics capability to deliver 50 tons of supplies that might be useful in a disaster.

The future is bright for the SNS and overall medical response operations in the United States. By working together, both government and private industry can do more and do it better. No one can do this kind of work alone. The SNS is poised to continue and advance its key role in working with critical partners to: share information; collaboratively develop solutions; encourage advancements in warehousing, distribution, and transportation; and strengthen and streamline federal MCM operations for effectiveness and efficiency. The SNS will continue to make progress in new and exciting innovations that can improve response efforts and just might make day-to-day healthcare and the lives of all Americans just a little better, too.

*This article is the third of a three-part series:*
*Part 1 (published in October 2019):* The Early Years: Shaping a National Stockpile for Preparedness
*Part 2 (published in November 2019):* Evolving the Scope of the Strategic National Stockpile

*Author's personal note: It has been the greatest honor of my career to work with the incredible and dedicated staff of the SNS in making us who we are in this instant. From our rather humble beginnings, we have pushed hard for years to reach the scope and scale of capability we can provide the nation today. I will depart my role as SNS Director at the end of 2019 leaving behind a capable and robust organization filled with truly amazing people with the skill and drive to keep SNS on a forward path. I know that as I move to my own future of retirement, the SNS will continue to grow, change and improve. I look forward to watching that as the biggest fan and cheerleader of our nation's Strategic National Stockpile!*

*Greg Burel is director of the Strategic National Stockpile, managed by the Department of Health and Human Services' Assistant Secretary for Preparedness and Response. As head of the nation's largest stockpile of medicines and supplies available for emergency use, he is a leading expert on medical supply chain management in the United States. With more than 35 years of civil service, he has risen through the ranks of the federal government, beginning his career at the Internal Revenue Service and serving in leadership roles in both the General Services Administration and the Federal Emergency Management Agency. In 2006, he assumed the helm of Strategic National Stockpile operations. He was awarded the Samuel J. Heyman Service to America Medal for Management Excellence and selected as a National Academy of Public Administration fellow in 2016.*

# Drugs, Homelessness & a Growing Public Health Disaster

*By Paula D. Gordon*

In June 2019, Victor Davis Hanson wrote about the growing homeless population in California in the National Review in an article entitled "America's First Third-World State":

> *By many criteria, 21st-century California is both the poorest and the richest state in the union. Almost a quarter of the population lives below the poverty line. Another fifth is categorized as near the poverty level – facts not true during the latter 20th century. A third of the nation's welfare recipients now live in California. The state has the highest homeless population in the nation (135,000). About 22 percent of the nation's total homeless population reside in the state – whose economy is the largest in the U.S., fueling the greatest numbers of American billionaires and high-income zip codes.....*
>
> *If someone predicted half a century ago that a Los Angeles police station or indeed L.A. City Hall would be in danger of periodic, flea-borne infectious typhus outbreaks, he would have been considered unhinged. After all, the city that gave us the modern freeway system is not supposed to resemble Justinian's sixth-century Constantinople. Yet typhus, along with outbreaks of infectious hepatitis A, are in the news on California streets. The sidewalks of the state's major cities are homes to piles of used needles, feces, and refuse. Hygienists warn that permissive municipal governments are setting the stage – through spiking populations of history's banes of fleas, lice, and rats – for possible dark-age outbreaks of plague or worse.*

— Victor Davis Hanson, "America's First Third-World State," *National Review*, June 2019

Conditions of squalor, which may be found in a refugee settlement or on the streets of a third world country, appear to be rapidly increasing in certain places in the United States over the past several years. This phenomenon is evident not only in a growing number of cities in California – including San Francisco, Oakland, San Jose, Los Angeles, and San Diego – but in cities in Oregon, Washington State, Colorado, and elsewhere. During the past several years, similar signs of deteriorating conditions have also become increasingly evident in New York City and Washington, D.C.

The more people attracted to these locales, the more overwhelmed law enforcement and all social service providers have become. As a result, the attractions for some to these locales may include being able to obtain, use, and possess drugs, including marijuana, without risking arrest or interference. This raises many questions for preparedness professionals, which include:

- What might some of the reasons be for these increases in the homeless population, especially in these locales?
- Why would those who are homeless gravitate to some areas rather than others?
- Why would there be a notable increase in certain places in the last few years?
- Might many, if not most of the people gravitating to these locations do so for some of the same common reasons?
- Might they be attracted to locations where they are able to get by without the undue interference of law enforcement and other government authorities?
- Might many of the now homeless who gravitated to these locales have done so, at least in part, because law enforcement no longer enforces what in the past would have been treated as infractions of the law?

Surely not all homeless persons use drugs and not all are mentally ill. Living in squalor, however, can certainly take a toll. Homeless persons can find themselves in a downward spiral. If they had not used mood-altering and psychoactive substances before, they might well begin to use them after they enter the ranks of the homeless. Users or would-be users living in jurisdictions where marijuana use was illegal and where marijuana and other drug laws were previously strictly enforced, might well be attracted to locales where marijuana possession and use are legal and readily obtainable or where such drug use is no longer strictly enforced.

### Lessons Learned From Colorado & Seattle

Users and would-be users may also have been attracted to locations where it is possible to use drugs of all kinds without fear of penalty or jail. This appears to have been the case in Colorado. The increase in the number of homeless and in the number of encampments of homeless have been noticeable since the legalization of marijuana in Colorado in 2014. So too has been the increase in polydrug use in general and in opioid use and addiction.

In October 2016, Dr. Karen Randall, an emergency room physician in Pueblo, Colorado, tells a heart-rending story of what has happened in Pueblo since the legalization of marijuana. There has been an influx of homeless, accompanied by widespread abuse by many of these non-residents of the social service system. Some of the most "enterprising" of these homeless individuals have admitted that they have advertised on Craigslist in order to find a local resident whom they can pay in order to use that resident's address. Thereby, they establish a "faux" residency and become eligible for benefits and social services that they would not otherwise be eligible to receive.

There was an influx of people coming from out of state to Colorado beginning at the time that marijuana was legalized in that state. This pattern may be repeated elsewhere where drug laws and their enforcement has radically changed or ceased. Understanding what happened in Pueblo may well help explain similar kinds of problems involving the growing number of homeless in California and elsewhere.

Perhaps drug use, not just of marijuana, but of all psychoactive drugs and opiates has increased at least in part to the changing laws concerning marijuana use. Christopher Rufo of the Discovery Institute Center on Wealth and Poverty authored a report in December 2019, entitled "Compassion With Results: Action Plan on Homelessness for American Cities," which

addresses the impact of changing laws. He states that "many cities have pursued a policy of decriminalization that has led to a significant increase in public disorder." In that report, Rufo also quotes a former Seattle crime adviser Scott Lindsey who reflects as follows on the connection between "street disorder" and drugs in Seattle:

> *The increase in street disorder is largely a function of the fact that [hardcore drug] possession has been largely legalized in the city over the past several years. The unintended consequence of that social policy effort has been to make Seattle a much more attractive place to buy and sell hardcore drugs.*

A reduced effort on the part of law enforcement or laxity with respect to law enforcement can be found in the disinclination of law enforcement to enforce laws on the books regarding everything from panhandling, to sleeping on the sidewalk or in a public park, to pitching a tent on a sidewalk, to urinating and defecating in a public place. Crimes – including home and car break-ins, and thefts – are on the increase, contributing greatly to the degradation of the quality of life in the community.

Legalized and "legitimized" marijuana use and the poly drug use that has been associated with it are major contributing factors in the growth of conditions similar to refugee camps, massive homelessness, mental illness, violence, crime, and a myriad of health and safety problems that are now found in once beautiful cities and areas of the country. Emergency services are being called on increasingly to address this spreading combined "epidemic" of drug use, addiction, and homelessness. As a result, law enforcement, medical services, and social services are becoming overwhelmed as well.


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Randall is one of a group of several hundred Colorado physicians who have been on the "front lines" of what has happened since marijuana was legalized in Colorado. Many of these physicians have told their stories in what is known as the Code Red series of video presentations. In one of the presentations, Randall provides a vivid picture of the effect that the legalization of marijuana has had in Colorado and on Pueblo in particular. She describes the impact on the growth of refugee camp-like settlements of homeless. She notes that large numbers of people began to move into the Pueblo area from other states since 2014, many drawn by the fact that marijuana use had become legal and could be legally obtained. Some were drawn by the possibility of employment opportunities in the industry.

Randall tells of the increasing numbers of patients in the emergency room suffering from psychotic breaks, some of whom have needed to be restrained owing to their violent behavior. She has also discussed a condition known as "cannabis hyperemesis syndrome" (CHS), which she has treated numerous times, a condition increasingly suffered by chronic marijuana

users. CHS has the nickname of "scromiting" because the condition typically involves severe vomiting that is so painful that those experiencing the pain scream uncontrollably. Those developing this condition can become seriously dehydrated. In a few cases, CHS has resulted in death.

A successful treatment of CHS can be a very curious one; one such treatment involves the closing down of the pain receptors by having the individual take extended long hot showers. The individual must also stop using marijuana for the condition to improve. This can be difficult to accomplish since some users reject the possibility that their use of marijuana is responsible for their condition. Indeed, thousands of dollars may be spent on medical workups when the person suffering from CHS rejects the diagnosis or when those treating the individual have not recognized or identified the cause of the symptoms.

Many marijuana users have long ago decided that marijuana is a "relatively" harmless drug, reasoning that, "after all, it is a natural substance." Jimson weed, hemlock, ricin, and belladonna are also natural substances, but would never be taken for recreational purposes. Many users of marijuana are not inclined to believe that marijuana use could trigger health problems such as scromiting. The vaping of Tetrahydrocannabinol (THC) can have the most serious health consequences, with many hundreds being hospitalized and a growing number of deaths occurring.

Marijuana users can readily purchase marijuana from other sources than the "legal" state-licensed dispensaries. To save money, users may begin to purchase their drugs from the black market. It should be noted that the activities of drug cartels and the black market have exploded in jurisdictions – including Colorado, California, Oregon, and the State of Washington – that all have "legal" licensed dispensaries. A reason that drug use of all kinds has exploded is that black marketers can easily undercut the prices of "legitimate" dispensaries. In her 2014 article for the AP entitled "[Legal pot in Colorado hasn't stopped black market](#)," reporter Sadie Gurman describes an account of this phenomena. There have been a number of documentaries on the topic as well.

As users become customers of black marketers, they can be and are too often introduced to a variety of other drugs, including methamphetamine, cocaine, and opioids. Indeed, black marketers may purposely sell heroin at lower prices than marijuana, this way ensuring that their client becomes a chronic user. This has increased substantially not only the number of marijuana addicts, but the number of polydrug users, and opioid addicts as well.

### Call to Action
The nation's drug crisis is having demonstrable ill-effects on the health and safety in many areas in the United States. These patterns have become increasingly apparent in jurisdictions where:

- Marijuana use has been legalized;
- Drug use of marijuana and other drugs is no longer being treated as an illegal activity; and
- Users are not remanded to drug court-type programs or other programs that provide education, counselling, treatment, or rehabilitation services to enable them to cease their drug-taking behavior and their reliance on drugs.

The "cure," if there can be one, may well require a "full court press" on the part of all relevant institutions. Efforts to turn around current trends will require that all in the community and those at all levels of government in roles of responsibility for the health, safety, and welfare of citizens do their jobs. Indeed, a multi-disciplinary approach involving a multi-pronged strategy is needed that is designed to make inroads into the drug use and addiction problems of the homeless person and to help those involved in drug-taking behavior to reorient their lives and become fully functioning human beings.

What has happened in parts of Pueblo, Colorado, can be seen as a microcosm of what is happening in many cities in the nation. The result has been the establishment of refugee-camp-type situations, where illnesses are rampant and squalor is widespread. Conditions can be likened to a war zone or the aftermath of a major natural calamity that has resulted in widespread devastation. They can be likened, as Victor Davis Hanson has pointed out, to life in third world countries.

The first step in successfully addressing a problem is to identify the factors fueling the problem. Emergency management and emergency services are on the front lines of protecting public health and safety and observe these factors every day. To stop this "epidemic," it is critical for those on the front lines to work with decision-makers and inform them concerning the nature and scope of the crisis, with emphasis on the following:

- The gravity of this public health and safety disaster is threatening to spread further in the nation.

- The recent rapid threat negatively affects the quality of life and public safety in metropolitan areas.

- Practices that are being used by those illicitly growing marijuana contribute measurably to the degradation of the environment. "Legal" as well as illegal marijuana "grows" are having a devastating impact on the nation's natural resources, including depletion of already scarce water and pollution of natural resources and destruction of wildlife.

- Connections exist between the widening use of drugs, laxity regarding addressing the problem of drugs, and diminishing attention to enforce the most basic laws that help sustain a first world quality of life.

It may be up to those in emergency management and emergency services to help policymakers understand the necessity of implementing a full-court press approach to addressing the growing crisis. In this way, significant steps may be taken that result in safeguarding the health and safety of the public and getting people off the streets and on their feet again.

*Paula D. Gordon, Ph.D. is an educator, writer, and consultant, based in Washington, D.C. She has had responsibilities in the federal government for coordinating interagency and intergovernmental efforts and directing or taking part in projects in various fields, including drug abuse prevention and emergency management and homeland security. These assignments have included the National Institute for Mental Health, the National Science Foundation, the Federal Emergency Management Agency, and the Environmental Protection Agency. In addition, she has served as an adjunct professor and practitioner faculty member for The George Washington University and Johns Hopkins University, among other institutions. She is currently developing and teaching online courses for Auburn University Outreach on topics including the drug crisis as a national public health disaster, the effects and impacts of marijuana use and legalization, and emergency management and homeland security. Her websites include the following: http://GordonDrugAbusePrevention.com, http://GordonPublicAdministration.com, and http://GordonHomeland.com (e-mail: pgordon@starpower.net).*

# Data-Driven Emergency Management

## By Terry Hastings

*As the discipline has evolved, data and quantitative analytics are becoming a bigger part of emergency management. This trend is likely to continue as technology and data become more available. Current and future emergency managers need to understand data and how it can be used to support all phases of emergency management.*
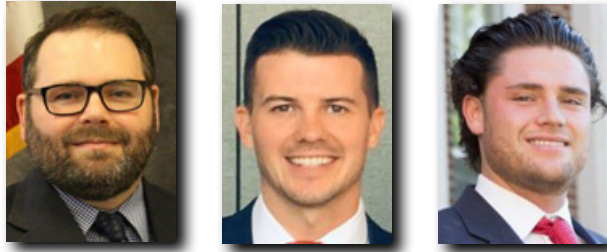
Emergency managers need a variety of "soft skills" to lead and coordinate diverse stakeholder groups and the associated personalities. Leadership, teamwork, problem solving, and communication are just a few of the many skills emergency managers must employ on a regular basis. However, as technology and data have become more prevalent, emergency managers must also develop at least a working knowledge of data and data analytics as these concepts are becoming more ingrained in all phases of emergency management.

### Data for Preparedness

Preparedness is a notoriously challenging concept to quantify, but quantitative measures are being used to assess the capabilities necessary to prepare for disasters and other emergency situations. For example, FEMA now requires the identification (and associated assessment) of specific data points as part of the annual Threat and Hazard Identification and Risk Assessment (THIRA) process. Jurisdictions that complete the THIRA must set capability targets by identifying a series of key metrics related to each capability, and then annually assess the jurisdiction's ability to meet the targets. The net result of this process is a much greater emphasis on the ability to identify, gather, and analyze data.

States are also advancing more data-informed preparedness efforts as well. For example, the New York State Division of Homeland Security and Emergency Services (DHSES) worked in concert with local emergency management stakeholders to create the County Emergency Preparedness Assessment (CEPA) program. As part of the CEPA process, DHSES captures both quantitative and qualitative information related to local (i.e., county) risk and capability levels. That insight is then used to help inform decision making. DHSES also employs data visualization techniques to better identify CEPA trends and analyze the information against other open-source data, to include census data and FEMA's disaster declaration data set. The DHSES data visualization process allows different data points to be mapped and overlaid simultaneously so that trends and data correlations can be quickly spotted and analyzed. The agency has received accolades for their forward-thinking approach to data analytics, but many other jurisdictions are placing an increased emphasis on data and technology as well. In fact, some jurisdictions are even hiring Chief Data Officers.

### Data for Response & Recovery

Due to the nature of the work, the response phase of emergency management is also ripe with available data. Power outage numbers, road closures, precipitation amounts, shelter totals, and the number of resource requests are just a few of the many types of data points emergency managers often covet. Collectively this information can be used to enhance situational awareness and inform response activities. Emergency management agencies, to include the Arizona Department of Emergency and Military Affairs, use this type of data to create operational dashboards and other situational reports. FEMA also relies on a great deal of data for their Daily Operations Brief. In addition, their new community lifeline toolkit contains resources to help jurisdictions quantify and visualize the impacts to community lifelines. Instead of data availability, data overload can often be a bigger challenge during the response phase, which speaks to the need for emergency managers to package and present information in a way that decision makers can understand and use.

There are a variety of key indicators and data points in the recovery phase as well, to include economic impact data, unemployment rates, housing numbers, and several other indicators that are used to understand how a community is recovering from disasters. Additionally, the number of infrastructure projects, and the associated funding and expenditure rates are also often scrutinized. The process to obtain a federal disaster declaration relies heavily on data, as states must meet (and quantify) per capita damage thresholds to obtain a declaration. FEMA's implementation of the Disaster Recovery Reform Act (DRRA) will result in an increased emphasis on the ability to quantify a variety of information, to include new factors and criteria for the Individual Assistance program, such as state fiscal capacity, insurance data, disaster related unemployment statistics, and other indicators. Essentially, the process to obtain a federal disaster declaration (and the associated recovery funding) has become more data dependent. This further reinforces the need for emergency managers to be able to understand and work with data.

> *Emergency managers who incorporate scientific and data-driven approaches will be better positioned to tackle the current and future challenges facing their jurisdictions.*

### Data for Mitigation

Studies have shown that every dollar invested in mitigation can save up to six dollars in disaster-related impacts. As such, it is easy to see how the mitigation phase of emergency management may also rely on data to demonstrate a return on investment. Additionally, the mitigation planning process requires a great deal of quantitative analytics when it comes to understanding the risks posed by the various hazards facing state and local communities. Natural hazards lend themselves to trend analysis and other quantitative measures to understand their potential threats, vulnerabilities, and consequences.

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NYS DHSES is again leading the way when it comes to the use of technology and data for mitigation planning. DHSES strategically partnered with the Albany Visualization and Informatics Lab ([AVAIL](#)), a data science and planning laboratory at the University at Albany to transform the state's hazard mitigation plan from a static, linear, 2,000-page document into a living, data-forward, nonproprietary, web-based planning platform called [MitigateNY](#). MitigateNY serves as a foundation of centralized data to maximize efficiency and reduce the burden and cost of data processing required for local planning. This data-driven planning process will transform the way state and local emergency managers think about mitigation planning in New York State.

### Tools & Skills Needed for All Emergency Managers

The increasingly ubiquitous nature of data and [technology](#) means that emergency managers must develop at least a working knowledge of how to identify, gather, and analyze data. Emergency managers should also explore data visualization tools and other technologies to help process and display data for decision making purposes. However, to be truly effective in today's dynamic environment, emergency managers cannot neglect the soft skills as well, because emergency management is still about working with people at the end of the day. However, emergency managers that can incorporate more scientific and data-driven approaches will be better positioned to tackle the current and future challenges facing their jurisdictions. Academic institutions that offer [emergency management related degree](#) programs should also keep this mind and ensure their curriculum includes at least some basic level coursework in data and data analytics. In doing so, they can help to ensure the [next generation](#) of emergency managers have the necessary skills to succeed.

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# The Electric Grid – Overcoming Vulnerability
### By Michael Mabee

*In 1850 – nine years before the* <u>Carrington Event</u> *and 12 years before the Civil War – the population of the United States was 23 million people. At the end of 2018, the population of the U.S. had reached 328 million people. What enabled the population to increase by 305 million people is quite simple: technology. New technologies that promoted this growth include: advances in medicine, advances in agricultural methods, the ability to transport food across the country (and across the world), new sources and uses of energy, an industrial revolution, advances in many areas of technology, and so on. All of these technologies are tied to one significant event: the advent of the electric grid.*

In 1850, the country did not have the technology nor the resources to have supported a human population of 328 million. The plows were drawn by horse or mule. Much of the population worked hard just to survive the winter – growing and preserving food, as well as chopping wood to keep warm, were necessary preparation for survival during colder months. Even in the cities, limitations in technology (e.g., coal mining techniques, transportation, ability to store food) limited the number of people that could be supported by the agriculture and technology of the time.

## Gradual Vulnerability, Sudden Realization

The electric grid is the <u>largest machine in the history of the world</u>, built piece by piece over many generations. It arguably started on 4 September 1882 with Thomas Edison's <u>Pearl Street Station</u> in Manhattan, New York – which initially had had 82 customers and an electric load of 400 lamps. After "the war of the currents" between Edison's direct current ("DC") and George Westinghouse's alternating current ("AC"), electric power availability began to spread to more areas.

The electric grid that exists today has been built gradually over the last century. During that time, it has advanced life in every way imaginable and literally made the impossible possible. The U.S. population between 1930 and 2018 increased by over 200 million (see Figure 1). Gradually, the self-reliance in the 1800s transitioned into complete reliance on all the technologies that the power grid made possible. New ways to heat (oil, gas, steam, electricity, etc.) meant no more chopping wood to keep warm. Farms were made exponentially more efficient, which led to fewer people needing to farm. Better transportation meant that food and goods could be transported long distances.

Gradually, people have become dependent on the ability to get food that is produced elsewhere; and most people no longer preserve food for the winter. Gradually, people have become dependent on goods such as vehicles and medications that were made possible by electricity. Water and sanitation systems are now completely dependent on electricity – gone are dug wells and outhouses. The entire financial system has moved into the Digital Age.

Today, the United States is literally on <u>life support</u>, plugged into the electric grid. The lives of hundreds of millions of people depend on the necessities the electric grid provides.
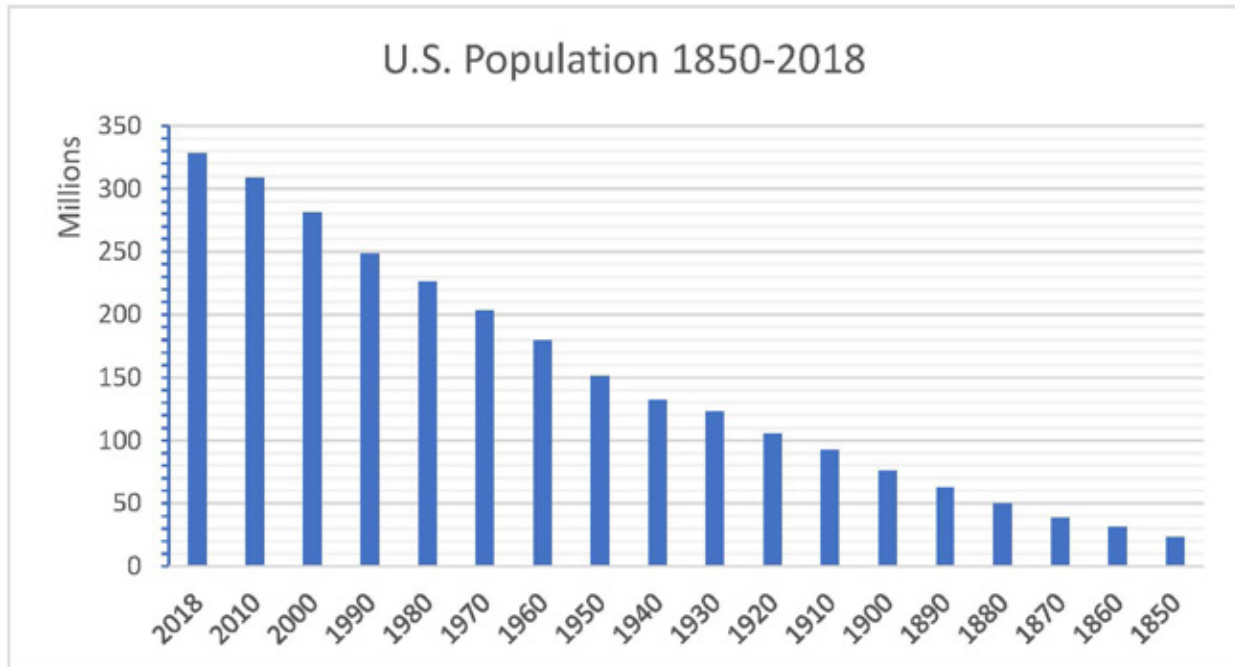
**Figure 1.** U.S. Population 1850-2018

Without it, the nation would be back to a 1850 lifestyle – except the requisite skills are now lacking and most people do not possess necessary resources such as horses or mules.

This scenario, unfortunately, is plausible. In March 2017, the U.S. Senate Committee on Homeland Security and Governmental Affairs said that the majority of the population of the United States would die if the electric grid were successfully attacked – by man or nature. For more than two decades, federal reports, hearings, and congressional records have detailed the threats to the electric grid. However, there is no comprehensive plan to address this threat. A slide from a 24 May 2018 FEMA presentation states that the U.S. federal government has no plan for "very long term or extremely wide spread power outages."

***The Reality of Being "Unplugged"***

There are some recent cautionary tales of what could happen when a society grows dependent on the electric grid, then suddenly lose power. Two key examples are Hurricane Maria and the Venezuelan blackouts.

During Hurricane Maria in September 2017, much of Puerto Rico lost power and did not regain it for months. Despite the massive assistance and resources provided by the rest of the United States, much of the island was also without potable water for months. The Milken Institute of Public Health estimated the "excess deaths" (i.e., attributable to the aftermath of Hurricane Maria) at 2,975. The *New England Journal of Medicine* estimated the "excess deaths" at 4,645. Although the exact number of deaths associated with that storm may never be determined, it is clear that the loss of power and the problems that accompany a loss of power caused thousands of deaths. (Note: The official death count remained at 64 until 28 August 2018, when the Government of Puerto Rico revised it to 2,975 based on the Milken Institute study.)

The March-April 2019 blackouts in Venezuela serve as another clear example of what happens when grid-dependent society loses power. Within a short period of time:

- People had to resort to getting water from the sewage canals;
- Food rotted without refrigeration;
- Cities experienced anarchy;
- Unruly crowds ransacked stores;
- Armed residents guarded their property from looters;
- Hospitals had no power or water; and
- Bodies decomposed in the morgue.

Most people only experience power outages that last a few hours, or a few days at most. The expectation is often that help is on the way, utility trucks are coming from other states, and somebody will come to the rescue. However, this complacency is dangerous.

### Taking Action

There are 35,000 towns and cities in the United States. If a substantial portion of them are in the "disaster area" in a national-scale power outage, "help" may not be available. There has never been a national-scale disaster in this country. Even Hurricane Katrina and Hurricane Maria were regional in scale. Massive resources were available and brought in from elsewhere in the country (i.e., from outside the "disaster area").

However, if a substantial portion of the entire country is in the disaster area, any particular town could be on its own for a long period of time – weeks, months, or longer. Today, the nation is generations removed from adversity and self-reliance. Generations removed from having to worry about surviving the winter, the nation has become extremely vulnerable.

Throughout history, Americans have taken action to accomplish great things and invented much of the industry and technology that exists today. In a technology-dependent society, Americans now need to take the following actions to avoid catastrophe:

- Hold the federal and state governments accountable for protecting the electric grid.
- Prepare communities for catastrophic disasters by building a culture of preparedness.

If enough people take action to secure the grid and mitigate the effects of a widespread power outage, then each person will make a difference.

*This article was adapted from "Q: How Did We Became So Vulnerable?"*

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