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Operation Wasatch: Scenario Based Planning to Assess the Cold Weather Preparedness of the National Disaster Medical System

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Abstract

Background: The National Disaster Medical System has little experience with sustained mission operations under anything other than temperate environmental conditions. Extreme weather events increase the complexity of disaster response by presenting significant logistic, operational, and safety challenges. Identifying gaps and vulnerabilities in response capabilities can promote improved Disaster Medical Assistance Team preparedness.

Methods: This discussion based exercise utilized a scenario involving a 7.0 magnitude earthquake along the Wasatch Fault in winter. This exercise was conducted with members of the Wisconsin-1 Disaster Medical Assistance Team. Team members provided oral and written feedback in response to exercise objectives and prompts. This feedback was supplemented with input from the Operations Section Chief and Logistics Section Chief at the organizational level.

Results: Respondents identified a high level of confidence in their ability to respond to a disaster of this magnitude under winter conditions. Gaps and vulnerabilities in preparedness were identified in equipment, supply chain, responder readiness, and resources.

Conclusions: The discussion based exercise provided a direct examination of current perceived response capabilities. The data gathered provides a compelling justification for the additional assessment of NDMS preparedness, both internally and independently. By identifying gaps and vulnerabilities in response capabilities, the exercise identifies areas for improvement in training, equipment, and supplies. Additionally, the project promotes more rigorous benchmarks that, at present, are ill-defined.

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Chapter One: Introduction

The National Disaster Medical System (NDMS) has a long history of responding to the country's emergency medical needs during disasters and public health crises (Murray, 2012). The service substantially contributes to Emergency Support Function (ESF) 8 - Public Health and Medical Services (Hanlon, 2014). Disaster Medical Assistance Teams (DMAT) have multiple training opportunities to improve their responder skills, but the value of this training is unknown (*NDMS DMAT Training*, n.d.). Over its history, NDMS has undergone numerous reorganizations to enhance its ability to respond effectively. A recent restructuring has refocused efforts on increasing the number of responders and providing effective training ("HHS Should Take Actions to Ensure It Has an Adequate Number of Effectively Trained Emergency Responders," 2020). This scenario based exercise is designed to provide a greater understanding of the gaps and vulnerabilities in the ability of NDMS to respond to a complex disaster in a cold environment. As a result, this information can guide further research into education, training, and benchmarks for continued quality improvement.

In 1981, President Reagan established the Emergency Mobilization Preparedness Board (*Emergency Mobilization Preparedness Board (EMPB)*, n.d.). They were tasked with developing national policies and procedures to facilitate a civilian-military partnership capable of mobilizing mass casualty victims (Lee et al., 2022). In 1984, this working group established NDMS to provide evacuation and definitive medical care for returning overseas military casualties as its primary purpose (Toner et al., 2007). In the intervening years, three main roles for NDMS have emerged. First, provide assistance to support overwhelmed local medical services. Second, evacuate patients from areas with disrupted medical capabilities. Finally, deliver definitive medical care to those impacted by natural and man-made disasters, terrorist activities, armed

conflicts, biological releases, and nuclear events. To date, NDMS responses have been almost exclusively limited to deploying medical assistance teams in support of state, local, tribal, and territorial medical delivery systems (Brown et al., n.d.).

The National Support Framework provides the blueprint for the nation's response to all manner of disasters and emergencies. NDMS is the primary source of medical responders under ESF 8 - Public Health and Medical Services and ESF 6 - Mass Care, Emergency Assistance, Temporary Housing, and Human Services (*NDMS | Home*, n.d.). DMATS are staffed by highly qualified medical providers who fulfill such roles as medical officer, registered nurse, respiratory therapist, and medic. Once hired, several training opportunities are available to prepare responders to deploy. These include virtual and in-person team training, online learning modules, specialty training events with preparedness partners such as the University of Nebraska Medical Center, and the NDMS Summit (*NDMS DMAT Training*, n.d.). The content and scope of individual team training are at the discretion of team commanders and serve to foster team cohesiveness and response skills. Online training modules provide just-in-time training for mission-critical preparedness and yearly mandatory training in select topics. The NDMS Summit is a systemwide conference that provides workshop-based and mission-focused hands-on training, supports new members' deployment preparedness, and brings together responders from all divisions of the service for collaboration and education. However, the utility of these educational resources in improving responders' preparedness has not been validated.

In the course of its history, the services of NDMS have fallen under the umbrellas of multiple government agencies, including the Department of Defense (DOD), Health and Human Services, the Federal Emergency Management Agency, and the Department of Veterans Affairs. At times, NDMS has been found lacking in its response capabilities resulting in restructurings

and reorganizations. Extensive disasters, like Hurricane Katrina, have revealed shortcomings in the organization's response efforts (Franco et al., 2007). Most recently, during the extensive 2017 hurricane season, a shortage of providers led to the need to supplement responses with other services, such as the DOD (Rubin, 2020). The Pandemic and All-Hazards Preparedness and Advancing Innovation Act of 2019 recommended a GAO review of HHS's responder capacity (*Pandemic and All-Hazards Preparedness and Advancing Innovation Act (PAHPAIA)*, n.d.). This review, published June 18, 2020, identified the need for an increased workforce of skilled providers and the development of training and evaluation processes to support mission-critical skills ("HHS Should Take Actions to Ensure It Has an Adequate Number of Effectively Trained Emergency Responders," 2020). Furthermore, the HHS 2022 Public Health and Social Services Emergency Fund identifies that NDMS requires an additional 2,600 appropriately trained responders to be considered fully staffed (*Fy-2022-Phssef-Cj.Pdf*, n.d.).

In 2022 another reconfiguration occurred, and ASPR was elevated from an HHS Staff Division to an Operating Division and renamed the Administration for Strategic Preparedness and Response. Subsequently, the ASPR Strategic Plan for 2022-2026 was released. This plan detailed four strategic goals: preparedness, Federal response management, partnership development, and workforce readiness (*ASPR Strategic Plan for 2022-2026*, n.d.). Of these goals, the proposed Capstone project will facilitate improved preparedness and workforce readiness by identifying gaps in capabilities and competencies. This will aid the development of preparedness objectives to better support mission operations and enable the successful implementation of the 2022-2026 Strategic Plan.

Chapter Two: Background and Literature Review

The Capstone project comprises a discussion based exercise to assess DMAT preparedness for deployment to an austere, intemperate environment. Tabletop exercises are valuable tools for evaluating roles and responsibilities based on existing plans and policies. However, NDMS currently lacks established policies and procedures for these unique missions. Therefore, scenario-based planning (SBP) was used as an alternative (Davies et al., 2015; Moats et al., 2008). The SBP process uses a hypothetical model to examine the possible consequences of simulated decisions and actions in response to a series of events. This method involves multiple stages: select the scenario, estimate response requirements, assess baseline preparedness, define the gaps, develop/implement strategies, and evaluate/apply lessons learned. Facilitated discussions of a theoretical disaster scenario can help assess baseline preparedness and identify potential gaps or vulnerabilities in response competencies. This discussion-based approach provides a low-consequence, collegial environment to assess preparedness capabilities. SBP fosters creativity in problem solving, expands risk awareness, and improves preparedness. This exercise simulated a hypothetical earthquake response along the Wasatch fault in Salt Lake City (SLC) under winter conditions. The scenario was constructed to clarify the capacity to establish and sustain safe, effective, and coordinated operations throughout the simulated disaster response.

Significant resources are invested in NDMS. The enacted budget for the fiscal year 2022 was over 91 million dollars, with an additional 28 million dollars appropriated to supplement the Covid response (*Fy-2022-Phssef-Cj.Pdf*, n.d.). The increased funding directly reflects the extensive support NDMS provided during the Covid-19 pandemic (Dawson, 2020). In the calendar year 2020, 5,389 Covid missions were conducted. In addition, NDMS responded to

multiple natural disasters, including Hurricanes Laura, Zeta, Delta, and Sally, the Oregon wildfires, and the Puerto Rico earthquake. NDMS also provided medical support for the funerals of Justice Ginsberg and Congressman Lewis, the State of the Union Address, the United Nations General Assembly, and the Officer's Memorial (*Fy-2021-Phssef-Cj.Pdf*, n.d.).

The extraordinary number of missions during this time demonstrates the ability of NDMS to safeguard the nation's health during times of crisis. However, it should be noted that these missions occurred primarily in temperate regions of the country and were predominantly hospital-based missions. Consequently, NDMS response capabilities remain largely untested at austere mission sites during extreme weather conditions. With the evolution of global climate change, extreme weather events are becoming more commonplace, with cascading hazards producing more complex disaster events (Cutter, 2021). For example, winter storm Uri brought 164 hours of below-freezing temperatures to Texas, severely impacting power delivery and water services (*2021-Winter-Storm-Uri-AAR-Findings-Report.Pdf*, n.d.). Two hundred forty-six fatalities were reported because of the storm (Doss-Gollin et al., 2021). Significant winter storms may become more common with growing evidence that warming Artic regions correlate with more severe winter weather extremes in the US (Cohen et al., 2018).

Additionally, climate change will likely open new operational environments to which NDMS has not previously responded. For example, the thawing of Arctic regions has increased their importance as areas of rapid economic development and potential geopolitical conflict. This evolving landscape of valuable natural resources, transport corridors, and trade operations is also vulnerable to disasters, both natural and man-made (Lavengood, 2021). NDMS has no prior experience operating in this environment and may be caught unprepared to assist with medical services in this unique environment. The ability of NDMS to continue to respond effectively to

increasingly complex missions in challenging environments requires a renewed focus on preparedness for extreme weather conditions.

With this understanding of the evolving disaster landscape and the novelty of a mission in a cold climate, several objectives emerged and are presented in Table 1. These were designed to align with the SMART criteria to be specific, measurable, achievable, relevant, and time-bound (Doran, 1981). Objectives were established for setting up the base of operations (BOO) and billeting, patient care, provision of support functions, supply chain reliability, and communication systems operability.

Table 1

Objective	HPP Capability
Establish base of operations (BOO) and billeting within 12 hours of arriving at operational site.	Health Care and Medical Response Coordination
Provide a functional, environmentally appropriate operational area within 24 hours of BOO setup.	Health Care and Medical Response Coordination
Establish patient care areas that will protect patients' safety and privacy throughout triage, medical care, discharge, and transport.	Continuity of Health Care Service Delivery
Provide support functions, including onsite food, potable water, washing, and toileting facilities within 72 hours of team arrival.	Health Care and Medical Response Coordination
Establish an effective supply chain to fulfill ongoing supply requirements and provide resupply in under 48 hours.	Health Care and Medical Response Coordination
Validate functionality and interoperability of primary and backup communication devices within 8 hours of BOO setup and reevaluate at each shift change.	Health Care and Medical Response Coordination

A literature review reveals a lack of peer-reviewed, research driven publications. A recent scoping study examined the available literature for manuscripts related to NDMS (Lee et al., 2022). Since 1984, 1,207 sources were identified that reference NDMS, including book chapters, government publications, and monographs. More than half of these publications were simple descriptions of the program. Only 17% represented original peer-reviewed literature. The majority of the literature was published since 2001. None of the publications discussed the use of SBP to evaluate responder preparedness.

In summary, NDMS is the backbone of the country's health security in times of crisis. The history of NDMS reveals multiple opportunities for improvement in building response capabilities. Climate change, disaster complexity, and extreme weather events constantly evolve and continually test these capacities. ASPR's strategic planning clearly identifies the need for an expanded and adequately prepared workforce. However, educational activities, while numerous, have not been validated as to their utility in creating an adequately trained workforce. Furthermore, the benchmarks to define the parameters of an effective response range from ill-defined to nonexistent. The proposed capstone project aims to define current capabilities and identify gaps in preparedness. The information gained can then be used to create benchmarks, design training, and establish protocols to ensure continuous quality improvement.

Chapter 3: Methods

The proposed Capstone project was planned with the assistance of Keith Hanson, MBA, Richard Catherina, MD, of NDMS, and Lisa Hass-Peters, Commander, Wisconsin-1 DMAT. The scenario was purposefully designed to constrain resources and challenge responders under winter conditions. An earthquake was chosen to add the variable of a tent-based mission, which presents an additional level of complexity to the response. While the planned scenario is contrived, it is still plausible and closely mimics the February 2023 earthquake along the East Anatolian Fault in Turkey.

Operation Wasatch was conducted with the members of the Wisconsin-1 DMAT during in-person training. Team members include individuals experienced with medical care in austere environments, logistics management, operational safety, and complex disaster management. The team was recruited to participate in the exercise by the team Medical Officer and Commander via email and team meetings. The exercise was conducted at the Medical College of Wisconsin Campus in a designated conference room. Team members were briefed during the morning welcome session, with the exercise commencing immediately after a short introduction. The event was concluded, and a debrief occurred after a lunch break.

In addition to the original exercise, feedback was gathered from an Operations Section Chief (OPS) and a Logistics Section Chief (LSC). This information served two purposes: clarifying questions from the team that were not answered during the SBP and providing the operational perspective for responding to such a mission.

For the SBP, the scenario involved a 7.0 magnitude earthquake along the Wasatch Fault near Salt Lake City (*The Wasatch Fault*, n.d.). According to the Utah Geologic Survey, this

scenario has a 1:2 probability of occurring in the next 50 years (*Scenario for a Magnitude 7.0 Earthquake on the Wasatch Fault–Salt Lake City Segment*, 2015). Models indicate 84,000 households will be displaced, accounting for over 230,000 residents. Of these, 53,000 will have immediate shelter needs. It is anticipated that there will be over 3,000 fatalities and 9,300 injuries requiring hospital care. However, the SLC region's current bed capacity is limited to 3,200 inpatient beds, and models indicate that all SLC area hospitals will have a high probability of moderate damage. The site of operations is located on the grounds of Salt Lake Regional Medical Center, a 158-bed facility serving SLC for over one hundred years. A full 35-member DMAT will be deployed for the mission, with a complete cache at their disposal. The DOD will provide force protection for the duration of the event.

The discussion was composed of three modules. The team was tasked with establishing a BOO and billeting (module one), sustaining functional medical services under winter conditions in the aftermath of the earthquake (module two), and preparing to demobilize from the scene (module three). Maps of the incident and surrounding area were supplied in exercise materials, both as a PowerPoint presentation and as hardcopy handouts. Logistics personnel provided information about the contents of the cache used during deployments. Prompts used during the exercise to propel play included:

1. Identify personnel and equipment required to establish a BOO and billeting within 12 hours of arriving at the operational site.
2. Identify physical, logistical, and operational gaps and vulnerabilities in providing a functional, environmentally appropriate operational area within 24 hours of BOO setup.
3. Identify an austere disaster environment's impact on ongoing supply chain requirements.
4. Identify the impacts an austere disaster environment could have on establishing patient care areas and protecting patients.

5. Identify the impacts an austere disaster environment could have on support functions, including onsite food, potable water, washing, and toileting facilities within 72 hours of team arrival.
6. Identify the impacts an austere disaster environment could have on the functionality and interoperability of primary and backup communication devices within 8 hours of BOO setup and reevaluate at each shift change.

Data in the form of participant responses were gathered in multiple formats. Real-time note taking captured the discussion as it occurred. Participants provided written comments about perceived strengths and weaknesses after each module. Additionally, participant feedback forms were collected at the conclusion of the exercise. Conversations with the OPS and LSC were incorporated into this information. After the discussion, further input and clarifications were carried out by email and phone calls as warranted.

Chapter Four: Results

The scenario, as designed, functioned well for the SBP. The exercise was constructed to be flexible and adaptable to the respondents and their feedback. Attendance at the exercise was moderate. The number of participants lent itself well to a whole team group discussion. Had the turnout been larger, groups would have consisted of operational divisions with feedback shared at a group level for an abbreviated time. Since the conversation occurred at a group level, there was more extensive interplay among team members, facilitating a vigorous dialogue. The exercise planner guided and led the discussion through its three modules. Some redirection was required to keep discussions based on the module under consideration. There was a tendency for the conversation to gravitate toward the mission execution of module two without fully considering the objectives of the module in progress, but this was quickly rectified. The time allowed for the execution of the exercise was sufficient without being excessive.

The Wisconsin-1 DMAT held the Wasatch Fault SBP exercise on May 20, 2023, at the Medical College of Wisconsin. The training was conducted over six hours and included three modules. The complete exercise materials and the PowerPoint presentation used to facilitate the planning exercise are provided as separate files. Sixteen DMAT members representing command, logistics, pharmacy, medical services, safety, and operations, were present. Participants responded to the scenario guided by exercise objectives and prompts when necessary. They then provided written feedback for each module, reflecting on the strengths and weaknesses of the team and the ability to conduct operations under the planned scenario. At the conclusion, team members provided their top three concerns and perceived abilities for responding to a winter earthquake. Additionally, the OPS and the LSC shared their expertise and discussed concerns and areas for improvement related to the scenario from an organizational

standpoint. These written submissions and notes from the discussion sessions were collated and evaluated to understand the current level of DMAT preparedness in this unique environment.

Module One: Establish BOO and Billeting

The predominant strength described by all participants was confidence in the team's abilities to execute the mission based on extensive prior experience. Unanimously, responders felt a high degree of comfort in responding to a cold-weather earthquake event. From an organizational standpoint, there was also a high level of confidence in the ability of NDMS to function in this environment. However, from an operational viewpoint, this would be a significant mobilization, including establishing a patient movement aeromedical evacuation point of embarkation to participating Veterans Administration Hospitals, utilizing the Trauma and Critical Care Teams to provide onsite medical care, staffing shelter-based medical operations, and providing hospital and emergency department decompression. Implementing this response requires an enormous workforce and substantial material resources, leading to logistics and workforce readiness concerns at the operational level.

On scene, participants expressed confidence in promptly establishing a Western shelter BOO. Some team members expressed concern about removing snow from the intended setup location, citing that the cache does not include shovels, snowblowers, or ice control chemicals. Additionally, based on prior mission experiences with slow BOO construction, some participants voiced concerns about the time involved in tent setup. No responders had previously constructed Western shelters under winter conditions. Team members with logistic roles expressed confidence in maintaining an adequate ambient operating temperature within the Western tents with available cache equipment. However, the LSC did not consider tents the ideal protection

under winter conditions and advocated for a building-based BOO. The feasibility of this option is unknown after a severe earthquake with strong aftershocks.

Additionally, heating Western shelters under winter conditions has not been trialed. Fuel consumption for heating units is anticipated to exceed that of air conditioning units used for warm weather deployments. The fuel consumption rate versus the continuity of supply chain fuel deliveries is unknown and a significant concern for all participants. Finally, scene safety was seen as a high priority by many participants. Safety concerns included safe transport to and from the site, securing the perimeter at the BOO, threats of aftershocks, and using outdoor work guidelines to reduce the risk of cold injury.

Module Two: Establish and maintain operations

While conducting operations, the team expressed high confidence in the ability to provide ongoing, high-quality patient care. However, concerns about keeping patients warm during treatment and rewarming patients with hypothermia were raised. The cache does not contain blankets, IV fluid warmers, or active patient rewarming devices. Concerns also were raised about the impact of cold weather on patient throughput at the BOO. Particularly since patient overflow areas, housed outside in warm weather deployments, are not an option in this environment.

Additionally, pharmacy personnel noted that pharmaceuticals require storage in a temperate environment that avoids freeze and thaw cycles. Indoor stocking is needed to maintain the ideal storage environment for all medications and IV fluids. From an equipment standpoint, no evidence suggests medical equipment will not function well in cold conditions. However, some devices, such as oxygen concentrators, will be less efficient. Additionally, multiple freeze and thaw cycles can reduce battery life. Therefore, indoor storage of medical equipment is

necessary. Existing BOO configurations do not account for these expanded indoor storage requirements. Finally, effective communication between participating organizations and within NDMS is a frequent issue during deployments. Workshop attendees had no additional concerns about the reliability, redundancy, or interoperability of communication devices in this environment except to reinforce that communication failure in this cold environment could have more significant consequences than during warm weather deployments.

Team members referred to NDMS-supplied uniforms, including waterproof jackets with fleece liners, as an advantage when deploying in cold weather. However, team members hired after the distribution of uniforms do not have these items. Additionally, any winter gear, such as winter-rated boots, waterproof pants, gloves, hats, and base layers, would be the responsibility of individual responders. Obtaining this gear represents a significant personal expenditure.

Discussions also involved the living conditions for a two-week deployment. Concerns were raised about the level of comfort a tent-based winter deployment would allow. The cache supplies cots and sleeping bags, which, added to personal deployment gear, were believed to yield appropriate warmth. Regarding food supplies, team members are well-versed in providing for their needs for the first 72 hours of deployment. After that time, meals ready to eat (MREs) are distributed. Many MREs contain heating units to warm food packets before consumption. However, these warming units cannot heat frozen food adequately. Therefore, MREs and water must be stored inside the Western shelter to avoid freezing. Toileting and hygiene were additional concerns. The cache contains showers and water bladders for outdoor showering facilities, which will not be usable under winter conditions. Toileting facilities are similarly subject to freezing under winter conditions. Several participants noted the strain such conditions might place on responders' mental health. Long work hours in unfamiliar surroundings under

stressful circumstances are the norm on most deployments. However, team members also discussed the additional impact of a cold environment and the possible lack of creature comforts such as adequate food, water, and hygiene.

Module Three: Preparing to demobilize and reload

The final module involved reloading operations with a new DMAT and generated discussions of the feasibility of continued operations, sustainability of supply chain materials, the level of demand for continued medical care, and efficient onboarding of the new DMAT. Logistics personnel identified that if fuel consumption exceeded resupply capacity, ongoing operations at the BOO site would be significantly hindered. Therefore, the feasibility of ongoing operations would balance the continuing need for medical services versus the ability to provide medical care at the BOO effectively. Finally, some team members wanted to offer the reloading team predeployment briefings of lessons learned and site-specific information.

Summary

Overall, team members, the OPS, and the LSC expressed high confidence in completing a cold-weather earthquake mission. Logistic concerns include the adaptability of Western shelters to cold weather, fuel consumption, and supply chain reliability. Safety concerns include scene safety, perimeter protection, and the risk of aftershocks. Communication concerns centered around the consequences of unreliable communication equipment and infrastructure. Operational matters include the effect of cold conditions on medications, supplies, equipment, patient throughput, safety, and comfort. Primary concerns for personnel comprise the adequacy of food, water, and hygiene, along with mental health resiliency.

Chapter Five: Discussion

The goal of this exercise in SBP was not to solve issues or develop policy but rather to identify future directions for research, training, and planning. In this way, the exercise provided valuable information about current gaps and vulnerabilities along with opportunities to improve DMAT preparedness for missions under intemperate conditions. However, there are limitations to SBP. Scenarios are subjective and, if not carefully planned, can have too limited a scope to be beneficial. Also, they provide limited information, which needs to be expanded and tested to have value in developing policies. Guided by the Integrated Preparedness Cycle, the insights obtained are discussed in the following categories: planning, organization, equipment, training, and exercises.

Planning

Scenario based planning was used for this exercise since specific plans for this type of cold weather response have yet to be developed by NDMS. Operation Wasatch confirmed gaps in planning for a response in this environment. These gaps included a lack of plans for climate appropriate accommodation of staff, effective patient care operations, work safety in cold weather, and logistic supply chain reliability.

The information gained during this activity can be used to begin planning activities to create operating procedures for this unique environment. As one example, participants noted that there is currently no guidance about safe work cycles for winter conditions. Additionally, OSHA does not have a specific standard for outdoor work in the cold but does provide some helpful information about working in these conditions (*Winter Weather - Cold Stress | Occupational Safety and Health Administration*, n.d.). However, guidelines are essential for disaster work where some teams are unfamiliar with working under winter conditions, and twelve-hour shifts

are standard. As plans are developed, they can be tested and critiqued with tabletop exercises to assess their utility.

Organization

Organizing teams to respond to cold weather disasters requires understanding the capabilities needed for this unique environment. The exercise revealed high confidence in the participant's ability to respond effectively under cold conditions. However, team members of the Wisconsin-1 DMAT are very experienced with living and working in a winter environment. The same may not be true of other teams. Gaps in organization include a lack of preparing, equipping, and educating responders for living and working in a cold environment.

Therefore, specific competencies and skill sets need to be identified for this environment. The information gained from this exercise can be valuable for developing benchmarks for these capabilities. The importance of benchmarks lies in their ability to measure performance in relation to a particular standard. Further research is warranted regarding the baseline core competencies needed for this environment and ways to ensure responders can meet these requirements to support a safe, effective, and successful mission.

Equipment

The exercise revealed deficiencies in equipment for a winter response. Some gaps include the adaptability of tents, efficiency of heating units, integrity of medications and intravenous fluids, suitability of personal winter gear, showering and toileting facilities appropriate for cold weather, and battery life and reliability of electronic medical equipment.

For example, participants identified the NDMS provided uniforms, particularly jackets, as helpful for deployments in cold weather. However, not all team members have these uniforms.

Additionally, clothing to withstand a winter response is needed to ensure safety while working in the cold. Therefore, guidance is required regarding a gear list for deployment during winter.

Another equipment concern was tent availability. The exercise was constructed to be a fully tent-based mission, which may or may not reflect actual operating conditions. A tent-based operation in cold weather may outstrip the Western shelters provided in the cache. Due to indoor storage requirements of pharmaceuticals, equipment, food, and water, indoor space may be scarce for billeting and patient care. Additionally, the quality of pharmaceuticals and IV fluids may be compromised by freeze and thaw cycles before appropriate storage and redundant supplies may be needed. Finally, some equipment may function less efficiently in the cold, and battery life may be impacted, affecting reliability.

Participants also noted that the cold could impact food, water, and hygiene supplies. Potable water and MREs will require indoor storage that is not necessary during above freezing missions. Concerns were raised about personal hygiene regarding toilets and showers. The cache supplies equipment suitable for warm environments that may not be adaptable to the winter. This equipment includes outdoor showers, latrines, and water storage bladders. For these reasons, consideration needs to be given to the suitability of the available cache for winter deployments. Of note, from the conversations prompted by the exercise, there was some confusion about whether there was a cold weather cache. One respondent maintained that there was a supplemental equipment package that contained insulated walls for the Western shelter, heavy-weight sleeping bags, and snow removal supplies, among other items. Further investigation by the DMAT logistics officer and LSC revealed no such equipment.

Training

Knowledge gained from this exercise indicates this unique operational environment requires responders to have particular skills, abilities, and knowledge. Therefore, specific training is needed to prepare DMATs for this type of mission. However, training is expensive and needs to be developed to address gaps in competencies in a cost-effective manner. One option is just-in-time training which can occur online and focus on identifying and preventing cold injuries, understanding the effect of cold stress on responder capabilities, and educating on hydration, nutrition, and self-care in this challenging environment.

Another concern that emerged during exercise discussions was mental well-being. Participants identified that this austere, cold weather response would be challenging on multiple levels. Everyday stressors related to a disaster response may be exacerbated by the cold and its impact on creature comforts such as hydration, nutrition, sleep cycles, hygiene, and toileting. Normal stress alleviating activities such as outdoor exercise, healthy food, and restorative rest may be limited during this type of deployment. Therefore, reinforcement of psychological first aid techniques will be a highly valuable tool for predeployment preparation.

Additionally, any training implemented to improve responder knowledge of living and working in this novel environment needs to be validated. If the results cannot be measured, the value of this learning will be unknown. Investing in responder education must correlate with improved performance to justify the expenditure.

Exercises

The Operation Wasatch exercise highlights the need for further exercise development. Next steps can include workshops, drills, and tabletop exercises. Collaboration using a workshop format can help develop operating plans and policies. Once a consensus exists regarding these

documents, a tabletop would be a valuable next step to clarify and refine the initial policies to develop finalized emergency operation plans. Additional vital exercises are drills. As revealed in the SBP, experience setting up Western shelters under winter conditions is lacking. A drill to establish an operational tent in a cold environment would have value on multiple levels. On one level, it allows testing of the current cache and understanding its advantages and limitations. Additionally, teams would be able to examine skills such as snow removal, tent construction, and heating system setup. These activities can be timed to determine if a winter environment impacts the efficiency of BOO setup. Once the tent is established, evaluating the capacity to maintain an adequate ambient temperature and the resultant fuel consumption will be possible.

Conclusions

Since 1984, NDMS has been the foundation of our nation's healthcare during times of crisis. In the intervening years, the organization has supported ESF 8 in various missions, including natural disasters, national events, and public health responses. Recently, ASPR identified the need for an expanded, appropriately trained DMAT workforce to meet its preparedness goals. Additionally, weather extremes are becoming more common, and future missions will likely occur under unfamiliar environmental conditions. Operation Wasatch used scenario based planning to provide an initial description of the gaps and vulnerabilities in cold weather preparedness. The exercise reveals the need for further research into performance benchmarks, environment-specific equipment, operating procedures, and mission-focused training to prepare responders for these novel deployments.

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