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THESIS

JUST-IN-TIME TRAINING CONSIDERATIONS FOR RURAL EMERGENCY OPERATIONS CENTERS
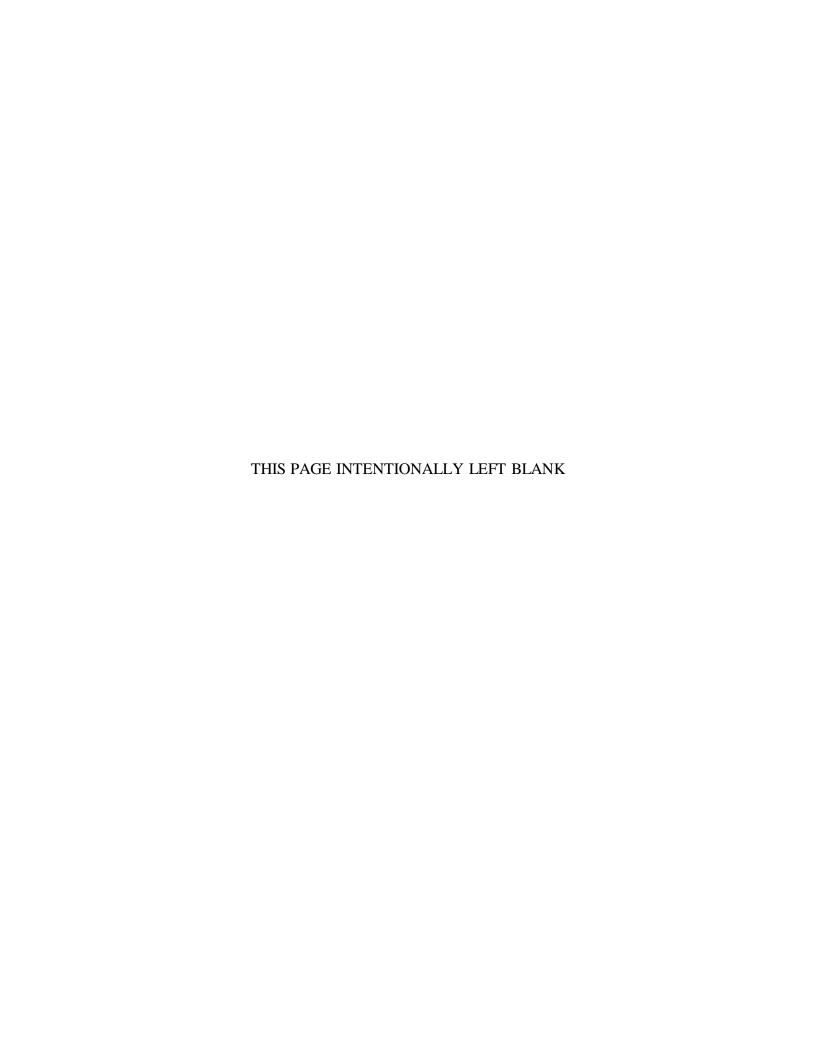
by

Tiffany C. Brown

June 2018

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Redundancy is one of the tenets of emergency management because it helps to promote resilience. Agencies create redundant plans, communication methods, power systems, and locations with which to manage emergencies, mitigate natural hazards and plan for catastrophic threats. Even though Incident Command System (ICS) training guidance indirectly discourages implementing just-in-time training (JITT) for the ICS by exclusively encouraging advanced training, this thesis puts practicality before protocol to consider the use of ICS in a rural emergency operations center in a region prone to severe weather events and natural hazards, and it suggests that a redundant training system can increase resilience. By implementing a JITT program for times when traditional ICS training is not a practical solution, an emergency operations center (EOC) manager can maintain continuity for the ICS while utilizing personnel resources effectively. A carefully considered JITT program can effectively augment traditional ICS training within EOCs to increase resilience, particularly for rural emergency operation centers prone to catastrophic events and ensuing staff shortages.

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JUST-IN-TIME TRAINING CONSIDERATIONS FOR RURAL EMERGENCY OPERATIONS CENTERS

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ABSTRACT

Redundancy is one of the tenets of emergency management because it helps to promote resilience. Agencies create redundant plans, communication methods, power systems, and locations with which to manage emergencies, mitigate natural hazards and plan for catastrophic threats. Even though Incident Command System (ICS) training guidance indirectly discourages implementing just-in-time training (JITT) for the ICS by exclusively encouraging advanced training, this thesis puts practicality before protocol to consider the use of ICS in a rural emergency operations center in a region prone to severe weather events and natural hazards, and it suggests that a redundant training system can increase resilience. By implementing a JITT program for times when traditional ICS training is not a practical solution, an emergency operations center (EOC) manager can maintain continuity for the ICS while utilizing personnel resources effectively. A carefully considered JITT program can effectively augment traditional ICS training within EOCs to increase resilience, particularly for rural emergency operation centers prone to catastrophic events and ensuing staff shortages.

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LIST OF ACRONYMS AND ABBREVIATIONS

CSZ	Cascadia Subduction Zone
EOC	emergency operations center
FEMA	Federal Emergency Management Agency
HSPD-5	*Homeland Security Presidential Directive-5*
ICS	Incident Command System
iJITT	Inclusive Just-in-Time-Training
JITT	just-in-time training
NIMS	National Incident Management System

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EXECUTIVE SUMMARY

A county emergency operations center (EOC) is an integral component of local disaster management as it serves several critical functions essential to saving lives, protecting property, and helping communities respond to and recover from an event. Trained EOC personnel are vital to maintaining operational continuity during a large disaster, yet the same large disaster can render trained personnel unavailable, thus threatening operational continuity.

In disasters, it is common for loss of life and property to result in shortages of staff for first-responder agencies and EOCs alike.[1] Immediately following a catastrophic event such as an earthquake and tsunami, it is unlikely that all trained EOC staff will be able to respond since family and personal emergencies have historically prevented emergency workers from responding during other large-scale disasters.[2] Conversely, untrained staff may show up at the EOC in the form of spontaneous volunteers. While federal training guidance for EOCs does not explicitly prohibit using untrained staff, Federal Emergency Management Agency's (FEMA) key guidance tacitly discourages using unaffiliated volunteers in its *Guideline for the Credentialing of Personnel*.[3] Training in advance is a best practice supported in principle by the National Incident Management System (NIMS) and encouraged by FEMA, but alternative training methods warrant consideration for times when an EOC finds itself without trained staff.

This thesis suggests that current federal training guidance for EOCs fails to adequately address the challenges of rural communities. The research puts practicality before protocol to consider the use of Incident Command Systems (ICS) in rural EOCs in regions prone to severe weather events and natural hazards, and it suggests that a

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[1] The White House, "Chapter Four: A Week in Crisis," *The Federal Response to Hurricane Katrina: Lessons Learned* (Washington, DC: U.S. Government Printing Office), February 23, 2006, https://georgewbush-whitehouse.archives.gov/reports/katrina-lessons-learned.

[2] Richard Hinrichs et al., *Report on the 2010 Chilean Earthquake and Tsunami Response.* OFR 2011–1053 (Reston, VA: U.S. Geological Survey, 2011), 18, http://www.chla.org/sites/default/files/migrated/ChileQuakeReport_Final.pdf.

[3] "Guideline for the Credentialing of Personnel," Federal Emergency Management Agency, August 2011, https://www.fema.gov/pdf/emergency/nims/nims_cred_guidelines_report.pdf.

redundant training system can increase resilience by asking the following questions: *How can operational continuity of the ICS be maintained in rural EOCs during large-scale activations? How can a redundant just-in-time training (JITT) system serve to maintain continuity, and what are the considerations for implementing it?*

The thesis uses a case study method to examine ways in which rural counties can implement a redundant training system consistent with ICS principles to maintain operational continuity despite the absence of previously trained personnel. It encourages rural EOCs to recognize their vulnerability and consider implementing redundant training components to address inadequate staffing and untrained personnel during disasters. It hypothesizes that, by implementing a JITT program for times when traditional ICS training is not a practical solution, an EOC manager can maintain continuity for the ICS while utilizing personnel resources effectively.

Redundancy is one of the tenets of emergency management because it helps to promote resilience. Agencies create redundant plans, communication methods, power systems, and locations with which to manage emergencies, mitigate natural hazards and plan for catastrophic threats. Even though ICS training guidance indirectly discourages implementing JITT for the ICS by exclusively encouraging advanced training, this thesis suggests that a redundant training system can increase resilience. By implementing a JITT training program for times when traditional ICS training is not a practical solution, an EOC manager can maintain continuity for the ICS while utilizing personnel resources effectively. A carefully considered JITT program can effectively augment traditional ICS training within EOCs to increase resilience, particularly for rural emergency operation centers prone to catastrophic events and ensuing staff shortages.

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I.   INTRODUCTION

Rural communities from Northern California to British Columbia along the Pacific Ocean share an immense offshore natural hazard known as the Cascadia Subduction Zone (CSZ), or Cascadia.[1] Scientists predict that the Cascadia could produce an earthquake and tsunami like that devastated the east coast of Japan in 2011. The probability of this happening within the next 50 years is about 1 in 10.[2] When the anticipated event occurs, it is expected to destroy entire coastal towns while isolating communities from one another due to impassable roadways and failed bridges.[3]

Because the last significant earthquake occurred over 300 years ago, Oregonians living on the coast have a limited concept of its consequences. Local information about the January 26, 1700, earthquake and tsunami passed down from native populations via oral tradition was eventually captured in text.[4] The stories and accounts are invaluable as they form our understanding of the impacts to the land, yet they obviously cannot address how the same event will impact our modern infrastructure. It is only by examining contemporary regional catastrophes like the Tohoku Earthquake or Hurricane Katrina that

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[1] "The geography of northern California, Oregon, Washington, and southern British Columbia is shaped by the Cascadia Subduction Zone, where the North American Plate collides with a number of smaller plates: the largest of these is the Juan de Fuca Plate, flanked by the Explorer Plate to the north and the Gorda plate to the south. These smaller plates 'subduct' (descend) beneath the North American Plate as they converge along a 700-mile long (1,130 km) boundary. A large portion of the boundary between the subducting and overriding plates resists the convergent motion, until this part of the boundary breaks in a great earthquake." Cascadia Regional Earthquake Workgroup, Federal Emergency Management Agency, and National Earthquake Hazard Reduction Program, *Cascadia Subduction Zone Earthquakes: A Magnitude 9.0 Earthquake Scenario*, OFR 0–13-22 (Cascadia Regional Earthquake Workgroup, Federal Emergency Management Agency, and National Earthquake Hazard Reduction Program, 2013), 1, http://www.oregongeology.org/pubs/ofr/O-13-22.pdf.

[2] Ibid., 8.

[3] Ibid., 10.

[4] Brian F. Atwater, et al., *The Orphan Tsunami of 1700: Japanese Clues to a Parent Earthquake in North America* (Seattle, University of Washington Press, 2015), 12–13.

one can imagine the widespread destruction that will engulf the area.[5] However, experts agree the Cascadia earthquake will likely be much worse.[6]

Coastal communities in proximity to the Cascadia bear a striking resemblance to one another; each community has a small government, a rural population, and a tourism-based economy. The most populated county hovers around 40,000 residents, and of the 32 incorporated cities, the largest boasts a mere 16,000. However, the census numbers for coastal communities are easily dwarfed by the millions who travel there to visit the scenic beaches and quaint communities along Highway 101.[7] County emergency management offices along the Oregon coast are small, often staffed by one regular employee— typically a professional emergency manager—and rely almost exclusively on persons outside the agency to assist during disaster efforts. In Oregon, county emergency managers have statutory responsibility for activating and maintaining an emergency operations center (EOC) during disasters and emergency events that overwhelm local resources.[8]

A county EOC is an integral component of local disaster management and serves several critical functions essential to saving lives, protecting property, and helping the community recover from an event. In an emergency setting, county EOCs maintain the critical responsibility of coordinating resources and information within their respective jurisdictions, as well as among various levels of government and community partners. During an event, counties activate EOCs to begin gathering information and

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[5] President George W. Bush declared Katrina "one of the worst natural disasters in our Nation's history." The White House, "Proclamation by the President: National Day of Prayer and Remembrance for the Victims of Hurricane Katrina" (news release, White House) September 8, 2005, https://georgewbush-whitehouse.archives.gov/news/releases/2005/09/20050908-12.html. FEMA Director Mike Brown referred to Hurricane Katrina as a "catastrophe within a catastrophe." *Hurricane Katrina: Hurricane Preparedness: Hearing before the Senate Committee on Homeland Security and Governmental Affairs*, 109th Cong., 2nd sess. (February 10, 2006) (testimony of Michael Brown, Director of the Federal Emergency Management Agency).

[6] Katherine Schultz, "The Really Big One," *New Yorker,* July 20, 2015, 52–59.

[7] There are 80 state parks and recreational areas along the Oregon coast.

[8] Oregon Revised Statutes 401.305 (3) states: "The executive officer or governing body of each county, and any city or tribe that participates, shall appoint an emergency program manager who is responsible for the organization, administration and operation of the emergency management agency, subject to the direction and control of the county, city or tribe."

disseminating it to a variety of stakeholders. EOCs use gathered data to develop situational awareness and status reports to share with local partners and state EOCs. They also serve as the hub for the critical responsibility of sending and receiving resource requests on behalf of overwhelmed jurisdictions. The task is particularly important in the early stages of a catastrophic event when resource requests typically relate to lifesaving measures. For the purpose of this thesis, the local EOC environment is discussed within the context of a catastrophic event, specifically a large earthquake and subsequent tsunami, impacting rural coastal communities in proximity to the CSZ.

A. PROBLEM STATEMENT

Based on predictions about the Cascadia earthquake and lessons learned from other events, a catastrophic natural hazard resulting in great loss of life and property will create shortages of staff for first-responder agencies and EOCs alike.[9] A large Cascadia event will result in flooded coastal rivers and failed bridges that isolate communities from one another. As a result, it is unlikely that all trained EOC staff will be able to report for duty. Historically, family and personal emergencies have prevented emergency workers from responding during other large-scale disasters.[10] Some may not have survived. Other personnel may be unavailable to serve in the EOC because they are engaged in the tactical response phase; conversely, untrained staff may show up at the EOC in the form of spontaneous volunteers.[11]

Trained personnel are key to maintaining operational continuity for an EOC during a large disaster, yet the same large disaster can render trained personnel unavailable, thus threatening operational continuity. With this paradox in mind, it becomes clear within the context of catastrophic disasters that it is ideal to train EOC staff in advance of an event—though it is not always practical or adequate. This thesis

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[9] The White House, "Chapter Four: A Week in Crisis," *The Federal Response to Hurricane Katrina: Lessons Learned* (Washington, DC: U.S. Government Printing Office), February 23, 2006, https://georgewbush-whitehouse.archives.gov/reports/katrina-lessons-learned.

[10] Richard Hinrichs et al., *Report on the 2010 Chilean Earthquake and Tsunami Response.* OFR 2011–1053 (Reston, VA: U.S. Geological Survey, 2011), 18, http://www.chla.org/sites/default/files/migrated/ChileQuakeReport_Final.pdf.

[11] "Spontaneous" or "emergent" describe volunteers who show unexpectedly to assist during a disaster yet are unaffiliated with an agency

addresses an enormous challenge for rural jurisdictions prone to catastrophic disasters. Small, rural EOCs face great challenges in the first 72 hours immediately following a disaster due to limited available staffing, which is a product of their remote, sometimes isolated locations, smaller populaces, and the time it takes for outside resources and assistance to arrive. The thesis examines a just-in-time training (JITT) approach for rural EOCs, particularly for events that render a community without an adequate number of trained personnel to effectively maintain operational continuity.

While federal training guidance for EOCs does not explicitly prohibit using untrained staff, the Federal Emergency Management Agency's (FEMA) key guidance discourages using unaffiliated volunteers in its *Guideline for the Credentialing of Personnel*.[12] In it, FEMA states "personnel that arrive at an incident who have not been credentialed and authorized should be turned away unless the incident/unified command or the jurisdiction having authority establishes rules specific to the incident, disaster, or emergency."[13] Beyond the federal guidance, public and private websites featuring articles and lessons intended for homeland security professionals also emphasize the value of advanced training. Training in advance is a best practice supported in principle by the National Incident Management System (NIMS) and encouraged by FEMA, but alternative training methods warrant consideration for times when an EOC finds itself without trained staff.[14] As previously stated, the traditional approach to Incident Command System (ICS) training is not always a practical solution for an EOC.

JITT builds on the philosophy of achieving maximum efficiency and reducing waste in the course of meeting the current need at hand. As defined by experts, JITT systems provide a learning solution "in which the required knowledge and skills are imparted for immediate application, to avoid loss of retention due to a time gap."[15]

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[12] "Guideline for the Credentialing of Personnel," Federal Emergency Management Agency, August 2011, https://www.fema.gov/pdf/emergency/nims/nims_cred_guidelines_report.pdf.

[13] Ibid., 11.

[14] "Providing Participants with Incident Command System Training Prior to an Exercise," Lessons Learned Information Sharing, December 31, 2007, https://www.llis.gov.

[15] Business Dictionary, s.v. "just in time instruction," accessed February 5, 2017, http://www.businessdictionary.com/definition/just-in-time-instruction.html.

Simply stated, it is training delivered when and where it is needed. The concept emerged decades ago, spawned in the Japanese automobile industry, and was subsequently spurred by swiftly changing technologies and hospitality industries.[16] Like just-in-time manufacturing, most JITT examples exist in the private sector; however, some scholars have suggested "the lack of empirical research documenting the just-in-time experience of the public sector can be attributed either to the lack of such experience or perhaps, more realistically, to the recency of such experience."[17] This suggests that more JITT is occurring in the public sector than is reflected in literature, therefore, more research is needed.

Building on the principles established within NIMS, the ICS is a standardized organizational system for managing emergency situations and large events. It is used broadly in the United States and by emergency management communities in Oregon.[18] Within the context of this thesis, the terms "trained" and "untrained" generally describe EOC personnel who have or have not received ICS training. Discussed later in greater detail, the ICS training system consists of general, as well as position-specific, courses that provide informative and critical information for EOC staff. Certain EOC roles (e.g., public information officer or planning section chief) are identified within the formal ICS structure and rely on specifically associated coursework to train participants. Other less formal roles (e.g., call-taker or greeter) have no specific FEMA-developed training like the aforementioned ICS positions and rely primarily on local guidance to perform the associated duties. Because the most informal roles can contribute an integral piece of maintaining operational continuity (consider for a moment the implications of having no one to answer the phone), it is therefore imperative that all personnel working in an EOC

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[16] Mahmoud M. Yasin, Marwan A. Wafa, and Michael H. Small. "Just-in-Time Implementation in the Public Sector," *International Journals of Operations & Production Management,* 21 no. 9 (2001): 1195–1204, https://doi.org/10.1108/EUM0000000005925.

[17] Ibid., 1196.

[18] "The NIMS is a systematic, proactive approach to guide departments and agencies at all levels of government, nongovernmental organizations, and the private sector to work together seamlessly and manage incidents involving all threats and hazards—regardless of cause, size, location, or complexity—in order to reduce loss of life, property and harm to the environment." "National Incident Management System: December 2008," Federal Emergency Management Agency, https://www.fema.gov/media-library/assets/documents/25422.

receive basic ICS training so they understand the bigger enterprise and where they fit in. It is important for the sake of operational continuity that EOC staff receives some level of ICS training; however, particularly for small jurisdictions prone to disasters, there are considerable challenges to maintaining an adequate number of trained staff.

Several examples of effective JITT found in hospital and public health settings are examined in this thesis. One is a program launched in 2010 called Inclusive Just-in-Time-Training (iJITT).[19] Developers conceived the idea in an effort to address patient surges and the unique complexities of public health emergency environments. The iJITT program relies on previous JITT efforts to better accommodate the missions in public health and safety, and it also uniquely addressed aspects of emergency environments considered key to conducting effective operations: culture, communication, and learning style. The program incorporates the core NIMS principles of standardization and flexibility as well as utilizing ICS training components, including incident assessments aimed at continuous analysis and improvement.[20] Two other programs launched by hospitals to provide JITT knowledge management and training updates suggest that effective JITT programs can serve a number of uses and beyond initial intent. Although an EOC serves in a different operational capacity than an emergency health clinic, the robust effort of the public health community to enhance and integrate JITT practices with the iJITT program suggests applicability for the EOC environment. This thesis examines elements of the iJITT program to better understand potential applicability and limitations in EOC environments.

This thesis suggests that current federal training guidance for EOCs fails to adequately address the challenges of rural communities. It illustrates the critical importance of maintaining operational continuity at the local level and suggests that doing so is only achieved by activating certain key positions that vary by event. It examines ways in which rural Oregon counties can implement a redundant training

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[19] "Inclusive Just-in-Time Training (I-JITT)," National Association of City and County Health Officials, last modified 2011, http://apc.naccho.org/Products/APC20102199/Pages/Overview.aspx.

[20] "National Incident Management System," Federal Emergency Management Agency, December 2008, 6–7, https://www.fema.gov/pdf/emergency/nims/NIMS_core.pdf

system consistent with ICS principles to maintain operational continuity despite the absence of previously trained personnel. This thesis does not suggest an alternative organizational method to ICS but advocates, as other practitioners and scholars have done, for augmenting the existing system.[21] It encourages rural EOCs to recognize their vulnerability and consider implementing redundant training components to address inadequate staffing and untrained personnel during disasters. Finally, this thesis explores the application of ICS and NIMS principles to a just-in-time format to meet the staffing demands of catastrophic or even less severe events.

B.   RESEARCH QUESTIONS

How can operational continuity of the ICS be maintained in rural EOCs during large-scale activations? How can a redundant JITT system serve to maintain continuity, and what are the considerations for implementing it?

C.   LITERATURE REVIEW

This section first reviews the literature on EOCs, catastrophic disasters, and spontaneous volunteers, then on JITT as it intersects with the preceding. It relies on information distilled from governmental and non-governmental sources including journals, books, government publications, and electronic sources, and concludes with a brief assessment of each.

1.   Emergency Operations Centers (EOC)

EOCs are unique resources in the world of traditional emergency services due in part to the infrequency with which they are activated. They are typically used only in special circumstances such as large emergencies or planned events that overwhelm jurisdictional resources. Aside from limited academic resources such as government manuals and reports, few resources describe the emergency operations environment, but a

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[21] Renaud asserts that the traditional NIMS approach does not provide responders with the tools to function in the early chaotic stages of a disaster, and she suggests creating an additional component to augment ICS training that addresses what she sees as a missing component. Cynthia Renaud, "The Missing Piece of NIMS: Teaching Incident Commanders How to Function in the Edge of Chaos," *Homeland Security Affairs Journal*, June 2012, https://www.hsaj.org/articles/221.

book by Michael Fagel explores some of the challenges of EOC managers. Fagel characterizes the EOC environment as uncertain, and he reiterates the assumption that during a disaster, ICS-trained personnel may be unavailable to serve in the EOC because they are engaged in the tactical response phase or with personal matters.[22] Fagel further posits, "EOC planners need to assume that a significant percentage of the … team will be coming … for the first time. Other members … may not have been … for some time and forgotten how things work."[23] He boldly suggests that advanced training is not worthwhile because trainees do not retain what they do not use routinely, and many EOC workers serve in that position on rare occasion.

In addition to books on the subject, courses specific to EOC operations are also relatively limited in number. FEMA offers one online course for the EOC-specific environment.[24] Two additional courses offered in a classroom setting provide insights as to how an EOC conducts planning and interfaces with other agencies during an event. The courses differentiate between the strategic environment of an EOC and the operational and tactical emergency environments in the field and suggest that the EOC warrants different considerations when applying ICS. One specific suggestion is that the EOC set a separate operational planning cycle than that used by tactical first responders.[25] Though still in draft form, the recently updated NIMS guidance for EOC operations informs the research in this thesis.[26]

Beyond the recent update to NIMS that fleshes out more specific guidance than previously issued, Internet searches for additional EOC staffing guidance turn up a handful of relevant resources developed by domestic and foreign federal governments. In

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[22] Michael J. Fagel, *Principles of Emergency Management and Emergency Operations Centers,* (Boca Raton, FL: CRC Press, 2011), 282.

[23] Ibid., 283–284.

[24] IS-775 EOC Management and Operations and MGT-346 EOC Operations and Planning for All Hazards.

[25] "EOC Operational Period Planning Cycle," Skamania County Emergency Management, accessed November 23, 2015, http://www.skamania-dem.org/EOC.html.

[26] "Working Draft: National Incident Management System Refresh Review Package," Federal Emergency Management Agency, accessed March 19, 2017, https://www.fema.gov/media-library-data/1467113975990-09cb03e2669b06b91a9a25cc5f97bc46/NE_DRAFT_NIMS_20160407.pdf.

Canada, emergency management officials have developed specific guidelines that follow the requirements of the British Columbia Emergency Response Management System (their version of NIMS).[27] The document provides an overview of EOC operations and activities along with position aids, checklists, templates, and other relevant forms needed in the EOC.[28] In California, the Office of Emergency Services has created an outreach training program to support a breadth of emergency management professionals, and one of those aims is to better address the certification needs of EOC staff. The site provides access to training and curriculum for a variety of EOC positions, which include checklists, position aids, and other NIMS-compliant products developed to better serve the EOC environment.[29] Examples like these illustrate the importance of distinguishing between EOC and field environments and highlight ways in which making that distinction can be accomplished within the framework of the federal system.

2.   Catastrophic Disaster Response

Research on the CSZ has increased dramatically in recent years though the sources are still limited. As such, many rural jurisdictions like those along the Oregon coast have no comprehension of how the anticipated event will impact the region and change the current landscape. Still, scientists have pieced together what they understand about the event using extensive studies of geological data retrieved from land and sea.[30] For example, by using information from the 2011 Japanese earthquake and tsunami, North American scientists can better outline and anticipate the initial impact, response, and recovery phases of a domestic event with the same magnitude.[31]

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[27] British Columbia Emergency Management, *Emergency Operations Centre: Operational Guidelines,* 2nd ed. (British Columbia: Justice Institute of British Columbia Emergency Management Division), accessed March 1, 2018, https://www2.gov.bc.ca/assets/gov/public-safety-and-emergency-services/emergency-preparedness-response-recovery/local-government/eoc_operational_guidelines.pdf.

[28] Ibid., Chapter 3 and Section 4–1.

[29] "Emergency Management Training Program," California Office of Emergency Services, accessed March 1, 2018, http://www.caloes.ca.gov/cal-oes-divisions/california-specialized-training-institute/training-support-compliance/emergency-management-outreach-training-program.

[30] Cascadia Regional Earthquake Workgroup, Federal Emergency Management Agency, and National Earthquake Hazard Reduction Program, *Cascadia Subduction Zone Earthquakes.*

[31] Ibid., 22.

Media reports about the Cascadia event are more commonplace as scientists have expanded understanding of the hazard. In Oregon, the Department of Geology and Mineral Industries and Oregon State University continue to spearhead research, the results of which have been subsequently reported by media. Though little new information has been developed by the scientific community in the last couple of years, a widely shared article published by the *New Yorker* in 2015 seems to have spurred other outlets to capitalize on the topic.[32] Articles about the lurking threat of the Cascadia have increased, but the information remains drawn from the same few sources.

Because information about the CSZ is limited and the anticipated impacts are largely unknown, emergency planners can only rely on accounts of other catastrophic environments to inform their assumptions. Though significant resources exist outlining the challenges for emergency personnel during significant events like Hurricane Katrina and the 2010 Chilean earthquake and tsunami, references to local EOCS are largely absent. Still, the existing accounts serve to illustrate how catastrophic events change our customary strategic working environment whether in the field or EOC.[33] Some accounts also serve to reinforce the reality that many responders will be unavailable to serve.[34]

Traditional ICS training guidance indirectly discourages implementing JITT for the ICS by encouraging advanced training.[35] The tacit stance held by FEMA is underscored by statements like this one found in *Guidelines for the Credentialing of Personnel*: "Personnel that arrive at an incident who have not been credentialed and authorized should be turned away unless the incident/unified command or the jurisdiction having authority establishes rules specific to the incident, disaster, or emergency."[36] Scholarly articles and agency after-action reviews are replete with lessons that support

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[32] Schultz, "The Really Big One."

[33] The White House, "Chapter Four: A Week in Crisis"; Hinrichs et al., *Report on the 2010 Chilean Earthquake and Tsunami Response*, 17.

[34] Ibid., 18.

[35] "The Incident Command System," Federal Emergency Management Agency, March 19, 2015, http://www.fema.gov/incident-command-system-resources.

[36] Federal Emergency Management Agency, "Guidelines for the Credentialing of Personnel," 11.

the best practice of training in advance, as opposed to just-in-time, to work in emergency environments.[37]

But the impacts and implications of rural emergency operations centers turning away untrained personnel when resources are scant are potentially devastating on several levels. From a practical, operational standpoint, effectively stating that no workers are better than untrained workers is foolish since the EOC coordinates lifesaving efforts and must have staff to do so. Additionally, most complex assignments in an EOC can be broken into separate tasks assigned to individual workers, and furthermore, many positions (like call-taker) have no associated formal training anyway. Particularly in the early hours of an event before outside resources (i.e., more highly trained staff from out of the area) has had a chance to show up, rural jurisdictions lacking a bench of EOC workers have few options than to take what help is available. Turning away willing and able community members based on a rigid adherence to perceived NIMS protocol or other motivations could also result in political repercussions if in hindsight, utilizing said volunteers might have changed the result of the event in a positive way. Underutilized personnel resources might also be viewed as an unwillingness or inability to use resources wisely.

Most useful are ideas that seek to improve upon the ICS as the standard system used broadly by agencies across the United States. A thesis written by Cynthia Renaud, alumna of NPS's Center for Homeland Defense and Security program, explores augmenting the ICS training to maximize resources and realize operational improvements for leaders specifically, and it supports the idea that improvements to the existing system are warranted.[38] Another report from the Cascadia Region Earthquake Workgroup cites use of just-in-time strategies for disaster logistics.[39] A few scholars and practitioners alike are critical of ICS altogether but their ideas are less relevant here since the thesis

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[37] Example: Lessons Learned Information Sharing. "Providing Participants with Incident Command System Training Prior to an Exercise."

[38] Renaud, "The Missing Piece of NIMS";

[39] Fred Savaglio and Bob Freitag, "Just-in-Time Inventory: Effects on Earthquake Recovery," Cascadia Region Earthquake Workgroup, 2005, http://www.crew.org/products-programs/cascadia-subduction-zone-earthquakes-magnitude 90-earthquake-scenario.

examines how to maintain operational continuity of the system rather than suggesting another method of organization.

3.   Just-in-Time Training (JITT) and Theory

Devshihka Bose compares the terms "just-in-time" and "just-in-case" training, making a distinction between the traditional approach to teaching the ICS (just-in-case) versus the suggestion in this thesis to provide training at the moment it is needed (just-in-time).[40] Just-in-case training refers to teaching a skill in advance of needing it: JITT is the process of teaching a skill no sooner than needed, and it is rooted in just-in-time theory, an economic approach born of the Japanese auto industry during the 1970s.[41] Economists Cheng and Podolsky identify the principal objective of just-in-time philosophy as "having the right items of the right quality and quantity in the right place and at the right time."[42] In a manufacturing setting, just-in-time theory provides lean efficiency and ultimate cost savings because resources are called upon on only when they are necessary. At a glance, the JITT approach seems incompatible with ICS best practices, which encourage training in advance of an event. Yet upon further consideration, JITT is an inherently adaptable concept around which standardized practices could be incorporated, thus comporting with NIMS key principles.

The body of literature on just-in-time theory and training consists of public- and private-sector examples, though none fit precisely into this research. Research that explores the origin of just-in-time theory is found predominantly in the auto-manufacturing environment, and in fact, most examples are found in the private sector.[43] Numerous examples of JITT are currently found in education, sales, and the hospitality industry, centering largely around knowledge management systems. Although the examples are largely dissimilar from an EOC setting, they can provide insight as to what

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[40] Devshikha Bose, "Just-in-Case or Just-in-Time Training? — Excerpts from a Doctoral Research Study," in *Learning and Collaboration Technologies* (New York: Springer, 2015), 657–667. http://dx.doi.org/10.1007/978-3-319-20609-7_61.

[41] T. C. E. Cheng and S. Podolsky, *Just-in-Time Manufacturing: An Introduction* (London: Chapman & Hall, 1993), 2.

[42] Ibid., 2.

[43] Yasin, Wafa and Small, "Just-in-Time Implementation in the Public Sector."

factors lend to success of a program.[44] Though predominantly found in private sector settings, business experts and co-authors Yafin, Wafa, and Small extensively discuss that just-in-time theory has not previously existed in the public sector but could provide great benefit if only further explored.[45]

As already indicated, information specific to EOCs in the JITT literature tends to be narrowly focused on specific operational tasks. An article by Peter Tiernan offers no significant applicability to an EOC; however, it addresses the effectiveness of videos in a JITT environment.[46] Tiernan's stance that video provides a more effective training environment is subsequently supported by a number of articles crediting visual aids (videos are particularly impactful as compared to written material, still photos, and slide decks) for the level of engagement demonstrated by participants.[47] The breadth of articles relying on both public and private examples demonstrates best practices that are potentially effective in any JITT environment, but the most relevant examples of JITT in an emergency were found almost exclusively in the public health environment.[48] The most robust example was a training program called Inclusive Just-in-Time Training (iJITT) created by a group of Oregon public health officials in 2010, and which will be examined in Chapter III of this thesis.[49]

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[44] Thomas H. Davenport and John Glaser, "Just-in-Time Delivery Comes to Knowledge Management," *Harvard Business Review* (July 2002), accessed February 11, 2018, https://hbr.org/2002/07/just-in-time-delivery-comes-to-knowledge-management; Leach and Haun, "Deliver the Lesson Now," 42–46.

[45] Yasin, Wafa and Small, "Just-in-Time Implementation in the Public Sector," 1195.

[46] Peter Tiernan, "Examining the Use of Interactive Video to Enhance Just in Time Training in the Workplace," *Industrial and Commercial Training* 46, no 3 (2014): 155–164, https://doi.org/10.1108/ICS-09-2013-0061.

[47] Michael J. Jones, "Chapter 9: Just in Time Training," in *Advances in Developing Human Resources* (Thousand Oaks, CA: Sage Publications, 3, no. 4, November 2001): 480–487; Shlomo Globerson and Abe Korman, "The Use of Just-In-Time Training in a Project Environment," *International Journal of Project Management* 19 (2001): 279–285.

[48] "Radiological Terrorism: Just in Time Training for Hospital Clinicians," Centers for Disease Control and Prevention, accessed January 1, 2017, https://emergency.cdc.gov/radiation/justintime.asp.

[49] "Inclusive Just-in-Time Training (iJITT) for Mass Prophylaxis/POD Operations," National Association of City and County Health Officials, last modified 2011, http://phlearnlink.nwcphp.org/plugingile.php/650/mod_scorm/content/2/inclusive_jitt.

4.   Spontaneous Volunteers

A survey of government documents reveals two consistent themes: The first is that emergent volunteers are a menace to already overwhelmed incident managers, but another growing body of research suggests that volunteers are an invaluable, underutilized resource needing only a system to manage them.[50] FEMA's guidance discourages emergent volunteers, but there are repeated examples of literature to the contrary that extol the value of volunteers.[51] In an article titled "Strategies for Managing Volunteers during Incident Response: A Systems Approach," authors Fernandez, Barbera, and Van Dorp characterize emergency volunteers as an inevitable aspect of the disaster landscape.[52] While the paper does not address any specific system for managing volunteers, it does outline considerations for utilizing emergency volunteers. Similar guidance issued by New Zealand and Illinois officials speaks to the larger, more general volunteer environment than the EOC specifically, but that broader volunteer pool is the starting point for identifying EOC staff.[53] These sources provide good general information about executing a volunteer management program and serve as a reminder that the ICS program implemented in an EOC is but one small piece of the bigger picture. A FEMA article that primarily encourages advanced training and volunteer registration suggests some flexibility with regard to staffing EOCs.[54] In a thesis titled "Wasted Resources: Volunteers and Disasters," alumnus of NPS's Center for Homeland Defense and Security program Andrew A. Souza discusses the need for a nationally standardized

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[50] Jakob Rogstadius, et al., "Are Spontaneous Volunteers a Disruption, Resource or Partner? An Introduction for System Developers to Volunteer Roles in Crisis Management," *Information Systems for Crisis Response and Management* (May 2013), https://www.hsdl.org/?view&did=751728.

[51] Federal Emergency Management Agency, "Guidelines for the Credentialing of Personnel."

[52] Lauren Fernandez, Joseph Barbera, and Johan Van Dorp, "Strategies for Managing Volunteers during Incident Response: A Systems Approach," *Homeland Security Affairs Journal* (October 2006).

[53] New Zealand Ministry of Civil Defence and Emergency Management, *Spontaneous Volunteer Management Planning: Civil Defence Emergency Management Best Practice Guide,* June 2006, accessed January 13, 2017, https://www.hsdl.org/?view&did=29347; "Community Guidelines for Developing a Spontaneous Volunteer Plan," Illinois Terrorism Task Force, accessed January 16, 2017, https://www.hsdl.org/?view&did=448409.

[54] "Managing Spontaneous Volunteers in Time of Disaster: The Synergy of Structure and Good Intentions,'" Federal Emergency Management Agency, accessed February 23, 2017, https://www.hsdl.org/?view&did=695844.

volunteer management system, in part, to utilize volunteers more effectively.[55] As the title suggests, Souza asserts that to do less is wasteful and that emergency managers have an ethical responsibility to use resources as effectively as possible, to include utilization of spontaneous volunteers. Finally, in 2001, Lisa Orloff developed a voluminous guide for managing spontaneous volunteers, which serves as a resource for considerations and checklists for jurisdictions contemplating incorporation of a JITT program; the publication provides helpful suggestions for volunteer intake and briefly addresses JITT specifically.[56]

5.   Summary

Generally speaking, most related sources do not address ICS; rather, they speak to EOC positions that tend to be technical in nature or the opposite—roles and responsibilities that require little specialized training.[57] Public-sector examples of JITT highlight that there is a lack of information around the topic. None of the examples address the complexity of couching an organizational management system used in an EOC into a JITT environment. Available resources tend to address environments in which single incidents or standalone tasks are commonplace, unlike an EOC where a number of events might be occurring simultaneously. Although the literature review does not uncover an existing solution for maintaining the operational continuity of an ICS in rural EOCs during large-scale activations, a combination of topics serves to inform development of potential remedies.

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[55] Andrew A. Souza, "Wasted Resources: Volunteers and Disasters," *Homeland Security Affairs Journal,* December 2009, https://www.hsdl.org/?view&did=29536.

[56] Lisa Orloff, *Managing Spontaneous Community Volunteers in Disasters* (Boca Raton, FL: CRC Press, 2011).

[57] "Emergency Operations Centers: Developing Just-in-Time Training on Information Management Systems," Lessons Learned Information Sharing, November 12, 2009, https://www.hsdl.org/?view&did=770431; "Operations Centers: Integrating Amateur Radio Personnel into Operations," Lessons Learned Information Sharing, August 27, 2010, https://www.hsdl.org/?view&did=772586.

D.   RESEARCH DESIGN

This thesis uses a case study method to examine several JITT programs with varying levels in order to answer the research questions: How can operational continuity of the ICS be maintained in rural EOCs during large-scale activations? How can a redundant JITT system serve to maintain continuity, and what are the considerations for implementing it?

Using Yin's linear-analytic design structure for the case studies, the thesis employs pattern-matching to examine other training programs in order to extrapolate and analyze how certain elements could serve to maintain operational continuity in an EOC when trained staff is needed yet unavailable.[58] It does so by exploring what led developers to identify the need for the programs, how they approached design, the structures that evolved, metrics that were built into the framework, and outcomes as evidenced by examples in which the program was utilized to inform analysis.

Chapter II analyzes the current environment affecting rural emergency operations centers. It surveys the current federal guidance with regard to NIMS and ICS, discusses special considerations and challenges for rural EOCs, and introduces examples of ways to mitigate those challenges. A discussion of spontaneous volunteers is followed by examples wherein JITT has already been implemented in emergency environments. This chapter ends with an examination of several historical events to illustrate the ideas that provide basis for the current environment discussion.

Four case studies of different training programs are presented in Chapter III. By better understanding how each program served to address a need in emergency planning, the thesis develops an analysis of how something similar could address a gap to maintain operational continuity and enhance EOC operations. The case studies, followed by an analysis of the applicability of relevant programs, ultimately informs a set of conclusions and recommendations around implementing a redundant or JITT program that applies to EOC operations and the incident command system.

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[58] Ibid., 164–167.

The first and most robust case is a training program called iJITT created by and for public health practitioners in 2010.[59] The program was sponsored by the Advanced Practice Center division of the National Association of City and County Health Official and consists of several components for analysis. The project is documented in a white paper.[60] Project outputs included a toolkit to assist jurisdictions in implementation and several accompanying training modules that apply to specific operational environments found in the public health realm such as mass-prophylaxis. Even though the iJITT program is limited in its original application to a public health setting, the program is useful to this research because it addresses local government response to an emergency and provides a fully-developed product for analysis. The iJITT program is unique because it takes aim at the stressors and cultural considerations associated with emergency response, addresses the learning styles and needs of participants, and relies on a framework consistent with the organizational model for many rural EOCs—the ICS.[61]

The second case examines a hospital network that implemented a just-in-time knowledge management system intended to improve services and save lives. The Partners Health program was developed to provide doctors with just-in-time information to assist with diagnoses and patient records. Knowledge management and time-dependent decision-making are key features of both hospitals and EOCs. The program has fewer components than the iJITT but offers lessons on implementing a just-in-time system within an existing organization. Like the tactical first-responder environment, the public health scenarios that utilize JITT are operational in nature and present a different work environment than the EOC, where center operations tend to focus alternatively on communications and coordination with other agencies. Both share some unique qualities present in emergency conditions; additionally, the iJITT incorporates NIMS principles

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[59] National Association of City and County Health Officials, "Inclusive Just-in-Time Training (iJITT) for Mass Prophylaxis/POD Operations."

[60] Christine Cress, James Spitzer, Aron Stephens, and Gary Oxman, *Enhancing Training During Public Health Emergencies: An Inclusive Just-in-Time Training Approach* (Portland, OR: Advanced Practice Centers), November 15, 2010, https://multco.us/file/26008/download.

[61] National Association of City and County Health Officials, "Inclusive Just-in-Time Training (I-JITT) for Mass Prophylaxis/POD Operations."

and ICS training considerations into programmatic elements that create a ready tool for EOCs using the same.

The third case study is a JITT program from the Medical Center of Louisiana. This program created a web-accessible database to provide training opportunities across several platforms and to address a variety of challenges in the hospital setting. All hospital staff can access the system to schedule training or access online refresher courses for previously delivered training and seldom-performed procedures. The final case study is less technical in nature and highlights a program that was not intended as a just-in-time system. The Lincoln County EOC-ICS position task folders are considered, nevertheless, because they were developed specifically for use in a rural EOC. The folders were initially developed as physical job aids to serve as a refresher tool or as a redundant measure when computers are unavailable; both the intent and content of the folders are directly relevant to EOC operations.

A considerable number of JITT examples exist in the private sector perhaps because the theory is rooted in manufacturing.[62] In general, private-sector case studies fail to address critical considerations of the emergency response environment. After an extensive search for just-in-time training programs with relevance for an emergency operations center environment, the iJITT programs in the hospital and public health settings stood out because of the way each considers public safety and emergency environments. Each program analyzed in this thesis offers a way to look at JITT that is relevant to the ICS, an EOC, or a combination thereof.

In the final chapter, information is drawn from the preceding chapters to form a conclusion and recommendation regarding the applicability of JITT principles to an EOC environment, and it explores the possibilities and limitations for a rural EOC implementing a redundant JITT program.

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[62] The hospitality and information technology are two job markets that utilize just-in-time training to accommodate workplaces characterized by rapidly changing technology, work environment, and/or staff.

E. CHAPTER OVERVIEW

Following the introduction in Chapter I, which states the problem and explains how the thesis addresses it, Chapter II analyzes the current environment affecting rural EOCs and examines historical events to better understand how they are likely to be impacted following a catastrophic disaster. It surveys the federal guidance with regard to NIMS and ICS, discusses spontaneous volunteers, and introduces ideas for mitigating inherent challenges for rural EOCs.

Chapter III includes case studies that examine several training products and programs, each developed in response to the challenges of relying solely on JITT. One specifically addresses surges in the public health environment, two others tackle knowledge management issues associated with an emergency medical setting, and the fourth is a standalone training tool developed specifically for rural emergency operations center staff. Using different techniques, this chapter surveys the case study programs comparatively alongside the training needs of a rural EOC in order to identify relevant pieces that may apply to a similar program aimed at addressing a surge in disaster activity.

Finally, Chapter IV draws conclusions and offers recommendations regarding the applicability of JITT principles to an EOC environment. The concluding chapter also explores the possibilities and limitations for a rural EOC implementing a redundant JITT program. It addresses potential areas of improvement and identifies anticipated criticisms that a program of its kind might elicit. The final recommendations include additional considerations not discussed in the body of the thesis and tangible suggestions for implementation.

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II. ANALYSIS OF THE CURRENT ENVIRONMENT

"All disasters are local."[63] These words, typically spoken from a state or federal perspective, have become a familiar maxim in emergency management. They are a reminder that, despite assistance provided to small jurisdictions by state/federal partners, local responders will be the first on scene. Local communities are responsible for identifying, requesting, and managing outside resources when their own have become overwhelmed. Even when outside resources consist of subject matter experts because none exist locally, the officials of the impacted region are still most familiar with the initial situation and environment. And local government will manage the recovery process long after outside resources have returned home.

The purpose of this chapter is to introduce the current working environment of local emergency management organizations and offer a general analysis of the working environment. An important piece of this examination includes solutions and actions for mitigating the challenges of training EOC staff in rural communities. The chapter includes historical accounts from Hurricane Katrina and the Chilean earthquake of 2010, as well as findings from Cascadia Rising—a regional catastrophic exercise from 2016—to illustrate the impact of large-scale events on personnel and operational continuity in emergency operations centers.

A. LOCAL EMERGENCY MANAGEMENT, EOCs, AND THE ICS

City and county emergency managers are typically responsible for the day-to-day operations of their agencies as well as for managing, maintaining, and activating local EOCs. Whether the EOC is a standalone facility or a shared space depends on its intended function when activated for an exercise or real event. Day-to-day emergency management responsibilities generally consist of preparedness and strategic planning efforts, but the focus shifts drastically when an EOC is activated. An EOC is activated when a local event has occurred that threatens to overwhelm local resources. The specific

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[63] Elaine Pittman, "Remember: All Disaster Are Local, Says FEMA Deputy Administrator," *Emergency Management*, November 14, 2011, http://www.govtech.com/em/disaster/Remember-All-Disasters-Are-Local-Says-FEMA-Deputy-Administrator.html.

nuances of EOC operations may vary depending on jurisdiction or level of government, but generally, EOCs coordinate with other agencies, organizations, and on-scene personnel to:

- acquire, allocate, and track resources

- manage and share information

- establish response priorities among incidents

- provide legal and financial support

- liaise with other jurisdictions and levels of government.[64]

Rural emergency management departments tend to be small and rarely consist of more than one full-time employee, so they necessarily rely on outside help during EOC activations. For this reason, the people who staff an EOC usually come from another department in the city or county. Some of the staff have worked in the EOC environment before while others are completely unfamiliar. They may have varying degrees of previous training or have received no training at all, which presents challenges for the EOC since it is an environment intended to rely on standardized, trained personnel. Finally, some of the same staff mentioned here may also be unfamiliar with an emergency setting, which can be challenging.

Multiple challenges exist for the rural EOC striving to maintain a cadre of trained staff. First, the position-specific courses require a significant time commitment. Second, because they are seldom activated for emergencies, EOCs typically draw staff from other municipal and county departments who often have responsibilities unrelated to emergency management. Additionally, staff borrowed from other county departments likely has their own standard training requirements related to their regular positions, so further required training for EOC operations may be met with resistance. Finally, even in jurisdictions where ICS training is highly encouraged and supported, employee turnover poses a constant challenge for maintaining a cadre of trained people.

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[64] "IS-775 EOC Management and Operations, Lesson 2: EOCs and Multiagency Coordination," Federal Emergency Management Agency, August 2008, https://emilms.fema.gov/is775/EOC0102000.htm.

There is some evidence that local emergency managers in Oregon are already attuned to the challenges of maintaining an adequate number of properly trained staff for EOC operations. A tool informally referred to as "ICS position folders" was originally developed by a local coastal emergency manager to provide a redundant method for maintaining the ICS in an austere environment when electronic solutions are unavailable.[65] Although the folders are not intended to serve as a standalone training method, they serve as one tool for untrained staff as they provide a general overview of the ICS as well as checklists for specific positions. Additionally, they are a useful tool for EOC workers who may have had some degree of formal training or even served in the role previously but need a refresher. They are one attempt to address the inherent challenges of maintaining trained staff to serve during EOC activations. A folder created for each of the 32 positions that make up the ICS organizational chart serves as a tool for staff working in the EOC. Each folder contains the same basic elements: check-in instructions, an organizational chart identifying the activated roles, a checklist of the position responsibilities, and several standard ICS forms shared by all positions throughout the planning cycle. The folders were created to address training gaps repeatedly identified during local exercises by serving as a refresher for participants who had received training but lacked the necessary recall to perform effectively. Because EOC activations for real events occur infrequently in rural communities, FEMA recommends regular exercises to practice skills and test capabilities—clearly a best practice yet one not applicable to ad hoc staff, particularly spontaneous volunteers.

There are different—though not necessarily competing—schools of thought regarding spontaneous or unaffiliated volunteers. The first is that they pose a nuisance to local officials who lack the resources to manage them and are, therefore, seen as little more than potential liabilities. A second is that volunteers can (and do) self-organize to meet disaster needs. Yet another view is that, while they present challenges, volunteers can also serve as invaluable resources during events when personnel resources are scant—but only when there is an established system in place with which to manage them.

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[65] Virginia Demaris, "EOC-ICS Position Folders" (lecture, OEMA/WEMA Joint Conference, Vancouver, WA, September 23, 2015), http://www.oregonemergency.com/media/2_2015-OEMA_WSEMA-Conference-Block-Schedule_090415.pdf.

This idea is supported by federal guidance, which emphasizes the importance of creating a local volunteer management system during disasters. This thesis builds on the latter approaches but recognizes the challenges associated with matching untrained personnel to established positions.

In many rural communities, volunteers affiliated with traditional disaster response organizations are required to take ICS courses as part of their certification.[66] In some cases, volunteers represent a significant cadre of ICS-trained individuals though most have received only the basic training and have not served in a formal EOC role. From the standpoint of maintaining operational continuity, volunteers with a general understanding of ICS can serve as an invaluable resource for an EOC. While they may not have the prior knowledge needed to serve in specific positions, their foundational understanding of ICS primes them to more readily engage a position than someone with no previous knowledge of the system. Regardless of previous experience and training, personnel reporting to an EOC during a disaster can utilize JITT to increase their level of knowledge and serve more effectively.

Events like 9/11 and Hurricane Katrina signaled a demand for improved coordination within and across jurisdictional boundaries. In response to these events, the Bush Administration issued *Homeland Security Presidential Directive-5* (HSPD-5). The purpose of HSPD-5 was to direct the U.S. Department of Homeland Security to develop and administer NIMS, a "single, comprehensive national incident management system."[67] At the time it was introduced, former Homeland Security Secretary Tom Ridge described NIMS as a system developed to "provide a consistent nationwide approach for Federal, State, local and tribal governments to work effectively and efficiently together to prepare for, prevent, respond to, and recover from domestic incidents, regardless of cause, size, or complexity."[68] The standardized system described

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[66] In Oregon, Community Emergency Response Team (CERT).

[67] United States Office of the Federal Register, "Homeland Security Presidential Directive 5: Directive on Management of Domestic Incidents," February 28, 2003, https://www.hsdl.org/?view&did=439105.

[68] Thomas J. Ridge, "NIMS Implementation Letter to the Governors," Federal Emergency Management Agency, September 8, 2004, https://www.hsdl.org/?view&did=449581.

by Ridge in 2004 fulfilled a need for broader collaboration across jurisdictional boundaries. Since the implementation of NIMS, FEMA officials have relied heavily on collective input from community stakeholders at all levels of government and the private sector to ensure that its guidance remains vital, relevant, and reflective of best practices.

The core concepts underlying NIMS are "flexibility" and "standardization."[69] "Flexibility" is a key principle because the system is "designed to manage incidents regardless of their cause, size, location, and complexity."[70] "Standardization" is a critical aspect of NIMS because it fosters among participants unity of effort aimed at supporting primary outcomes, specifically effective inter- and intra-jurisdictional coordination. Local disasters present a diverse range of hazards with varying levels of severity, which warrant a more nimble approach to staffing when feasible. While it would not be considered prudent (or legal) to enlist untrained personnel to serve as a law enforcement officer or firefighter—roles where life safety and direct contact with the public are a constant factor—there are roles within an EOC more conducive to JITT. A rural EOC director faced with a large-scale event yet who remains steadfast in turning away anyone without previous experience will find themselves critically shorthanded. NIMS is a standardized system with regard to its framework and training curriculum, but beyond that, and particularly in the EOC environment, if also offers a degree of flexibility in terms of how that framework and curriculum are administered.

The ICS is a scalable approach that exemplifies the agile yet consistent approach of NIMS for an EOC. It is consistent in its use of terminology and core organizational structure while flexible to a user who may need only parts of the system to operate effectively. The ICS was initially used in the 1970s by first responders in the California wildfire environment and has become a common tool for managing disasters in the field and in EOCs at all levels of government and across the nation.[71] The ICS supports the NIMS principles as outlined by FEMA, which states that the "Incident Command System

[69] Federal Emergency Management Agency, "National Incident Management System," 3.

[70] Ibid., 6.

[71] "What Is an Incident Command System?" United States Department of Labor, accessed June 2, 2017, https://www.osha.gov/SLTC/etools/ics/what_is_ics.html.

(ICS) is … designed to enable effective and efficient … incident management by integrating a combination of facilities, equipment, personnel, procedures, and communications."[72] The standardized ICS has been implemented in jurisdictions across the country to ensure that agencies can assist one another during large-scale events.

At a minimum, training for EOC staff consists of a general introduction to the NIMS and ICS, both of which are typically administered by way of online classes. The "EOC Management and Operations" online course offers a comprehensive overview of the form, function, and responsibilities associated with EOCs.[73] Advanced courses pertaining to administration and specific ICS positions are more time intensive and delivered exclusively in classroom settings by certified instructors. At one end of the position-specific training spectrum, someone serving in an informal (or non-ICS) role such as call-taker or greeter may need little more than a general understanding of where he or she fits into the ICS along with instructions for the specific task at hand. At the other end, a person filling an identified ICS position (e.g., planning or finance/ administration section chief) requires an understanding of the overall system as well as that of the specific position to understand the associated objectives and responsibilities.

Four online courses provide an overview of the foundation and key principles of NIMS and ICS, and they are required training for those expected to serve in a disaster environment in any capacity.[74] The ICS is a management system that comprises 32 positions broken into five major functional areas; for each of the positions, there is a corresponding course curriculum. It is FEMA's intent that EOC staff train for a position in advance of serving during an event. However, FEMA courses required for individual ICS positions are only offered on a limited basis in classroom settings, creating an obstacle particularly for small communities with limited personnel.

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[72]Federal Emergency Management Agency (FEMA), "The Incident Command System," 1.

[73] "IS-775 EOC Management & Operations," Federal Emergency Management Agency, updated August 6, 2008, https://training.fema.gov/is/courseoverview.aspx?code=IS-775.

[74] Basic Required Courses include IS-100: Introduction to the Incident Command System; IS-200: IS for Single Resources and Initial Action Incidents; IS-700: National Incident Management System: An Introduction; and IS-800: National Response Framework: An Introduction.

Other FEMA courses further illustrate the differences between EOC and field operations by way of scenarios and organizational approaches. One example is a modified tool taken from the original ICS planning guidance called the "Planning P."[75] The Planning P serves as a timeline to manage operational planning periods during an event. Both EOC staff and first responders use the tool, but it must be modified depending on the operational environment. The Planning P was used and developed originally for field operations; it outlines a traditional planning cycle based on the *tactical* objectives of first responders. A modified Planning P was created for the EOC that is identical in almost all respects except that it outlines *strategic* (as opposed to tactical) objectives typically established in the field.[76] The two types of objectives are closely related since the strategic objectives of an EOC are established to support the tactical objectives in the field, but in practice, depending on the field versus EOC environment, they are distinct from one another in critical ways.

The NIMS guidance issued in 2008 identified one incident command structure to be utilized in emergencies, but it made little distinction between field versus EOC operational environments. The single-focus approach supported the NIMS features of standardization and flexibility because the organizational system was intended to work in both settings. The problem was that, although ICS is an adaptable system, the initial document and subsequent training products provided no formal suggestions for how to modify the system for EOC use.

The ICS was born of field operations and remains applicable in that setting; however, implementing it in an EOC environment warrants different considerations. The idea that ICS works differently in an EOC has been acknowledged at the federal level. A 2009 memorandum to FEMA Director Fugate from the National Advisory Council recommended "separate and specific training that explains the Emergency Operations Center's role in NIMS and how it should interface with the ICS."[77] Attempting to

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[75] "Planning P," ERI International, August 2012, http://www.eri-intl.com/eoc_planning_p.pdf.

[76] Skamania County Emergency Management, "EOC Operational Period Planning Cycle."

[77] G. Kemble Bennett, "Recommendations on the Emergency Operations Center's Role in NIMS" (official memorandum, Washington, DC: National Advisory Council, 2009).

address this recommendation, FEMA created EOC operations course IS-775, EOC Management and Operations. The online course outlines the fundamental differences between an EOC and an incident command post and illustrates the special circumstances impacting the ICS–EOC interface.[78]

In October 2017, FEMA updated the NIMS guidance during a process referred to as NIMS Refresh. The core principles remain unchanged, but it is worth mentioning that one of the changes takes a substantial step in differentiating the field from EOC environments by devising distinct nomenclature to describe ICS roles and the respective environments. For example, the traditional ICS position responsible for heading the command structure is the "incident commander," a title that remains relevant in field operations; but with respect to an EOC, "incident commander" has been replaced with "EOC director." Furthermore, the four section chief roles, which traditionally make up the general staff, are also revised titles from the original versions, suggesting that the distinction is important.

A difference between personnel in the field and in the EOC is that first responders have more natural opportunities to test their ICS capabilities because their day-to-day functions are similar to those they would perform in a disaster environment. On the other hand, staff trained to serve in an EOC typically consists of more varied membership less accustomed to working in an emergency environment or with one another. Unlike those who respond to emergency situations in the course of a regular day, many appointed to work in the EOC do not serve in an emergency capacity any other time; therefore, their understanding of the ICS and EOC operations may be limited, untested, or nonexistent.

Maintaining the cadre of trained EOC staff needed for an extended event is challenging for several reasons. Although FEMA makes free training available to local jurisdictions, no-cost opportunities necessarily require that participants travel or the hosting agency guarantee a minimum number of attendants, which can be challenging for smaller, rural agencies. In addition, the expense of hiring an instructor can be significant; therefore, position-specific training can be cost-prohibitive for small counties that lack

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[78] "IS-775 EOC Management & Operations," Federal Emergency Management Agency, updated August 6, 2008, https://training.fema.gov/is/courseoverview.aspx?code=IS-775.

resources. Some cities and counties find themselves simply unable to justify the expense because the skills are underutilized and undervalued compared to other needed training. From a time-management perspective, the four-day courses generally pose a hardship for rural county employees, particularly those for whom emergency management is not a routine responsibility.

An analysis of how time is spent during ICS courses suggests that the information could be delivered in a much faster time period. Traditionally delivered FEMA courses vary in length, but those related to EOC positions generally include a minimum of 16 hours class time, more often upward of 32–40 hours. Every FEMA-endorsed ICS class devotes an entire unit to reviewing general NIMS and ICS principles, which is important but providing participants a much briefer, cursory review of the ideas most relevant to an EOC would suffice in an emergency. Finally, significant course time is dedicated to practicing the skills and modeling the role, but since a proposed redundant system is intended for emergency use, participants are provided an opportunity to practice what they have learned in real time.

B. HISTORICAL EVENTS

A survey of literature describing how catastrophic disasters and other large-scale events typically affect rural EOCs operations reveals familiar, recurring themes of untrained officials, first responders unable to respond, and the role adaptability serves in chaotic environments. Hurricane Katrina, the 2010 Chilean earthquake, and Cascadia Rising 2016 (a regional exercise designed to test EOC capabilities following a large-magnitude earthquake/tsunami) provide examples of the challenges EOCs face during large-scale events though each highlights those lessons in a different way. Katrina illustrates some of the consequences of untrained staff responding in a disaster, while the Chilean experience demonstrates how maintaining an agile framework for response can speed recovery. The Cascadia Rising after-action review provides a glimpse of the anticipated challenges EOCs will face following a large-scale event including participant suggestions for improvement.

1. Hurricane Katrina

In August 2005, one of the deadliest hurricanes in the history of the country hit the Gulf Coast of the United States. Though Gulf residents are familiar with how to respond to hurricanes, an inadequate levee system and unanticipated flooding posed the greatest risk to life and property during Hurricane Katrina. At least 1,500 people died during the hurricane and subsequent flooding that impacted cities and large tracts of neighboring parishes, while tens of thousands others went without having basic needs met for nearly a week.[79] Subsequent efforts to identify ways in which death and suffering could have been mitigated more effectively resulted in reports like that issued by the Committee on Homeland Security and Governmental Affairs.[80] Damaged property and displaced residents marked slow response and recovery processes. Jurisdictions at all levels of government were overwhelmed, many were criticized, and an investigation of responses from federal, state, and local governments ensued, ultimately resulting in the resignation of FEMA Director Michael Brown and New Orleans Police Department Superintendent Eddie Compass. Lack of coordination was thematic throughout Hurricane Katrina, but the failure to communicate and coordinate effectively reinforced the importance of the NIMS principles and ICS organization that had been implemented following 9/11. Whether motivated by a desire for continuous improvement or simply to comply with requirements set forth by state and local governments, local responders today have better plans, more training, and have begun to engage more diligently in disaster training with state and federal officials than they did in 2005.[81]

Although many local jurisdictions were overwhelmed and extensive analyses of the Katrina response exist, open-source documents are mostly state- and federal-issued reports that contain few specific accounts of the impacts to local EOCs. A report prepared by the North Carolina Health & Human Services Department on behalf of the state of

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[79] Committee on Homeland Security and Governmental Affairs and the United States Senate, *Hurricane Katrina: A Nation Still Unprepared* (Washington, DC: Committee on Homeland Security and Governmental Affairs and the United States Senate, 2006), 2, https://www.hsdl.org/?view&did=34000.

[80] Ibid.

[81] Dave Phillips, "Seven Hard Lessons Federal Responders to Harvey Learned from Katrina," *New York Times,* September 7, 2017, https://www.nytimes.com/2017/09/07/us/hurricane-harvey-katrina-federal-responders.html.

Mississippi following Katrina illustrates some of the challenges previously identified in this thesis.[82] The report revealed that less than 40 percent of responders surveyed believed that the EOC staff was adequately trained.[83] It further notes that the city of New Orleans had to request emergency management support to run the EOC due to a staff shortage, and that even when personnel reported for duty later in the event, city staff was unfamiliar with ICS and with how to set up an EOC.[84] Participants later reported that ICS was often circumvented during the disaster due to a lack of framework in place or by those who were entirely unfamiliar with the system. These accounts suggest that people who report to work in an EOC will improvise when an established training program is not provided.[85]

Anecdotal examples of staff shortages and untrained personnel at the local level after a disaster are limited in the available literature, but similar accounts reported at higher levels of government are more plentiful. While many differences and considerations come into play when considering a local versus state EOC, the information merely underscores the challenges of maintaining trained ICS staff and further suggests that the challenges are not exclusive to small communities. Staff shortages and untrained staff have been persistent issues throughout a number of disasters and at all levels of government. Findings from Katrina reflect that key officials were unfamiliar with the principles of NIMS, and many responders failed to report for work either because they were personally overwhelmed by the circumstances or stranded and unable to report.[86]

While one might argue that ICS was still in its infancy at the time of Katrina, another view is that the problems addressed in this thesis have always been present and are perhaps an inherent challenge of maintaining ICS in an organization. The focus of

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[82] "Hurricane Katrina After Action Report and Recommendations," Department of Health & Human Services, June 1, 2006, https://www.hsdl.org/?view&did=476350.

[83] Ibid., 23.

[84] Ibid., 15.

[85] Ibid., 24.

[86] Committee on Homeland Security and Governmental Affairs and the United States Senate, *Hurricane Katrina: A Nation Still Unprepared*, 8.

this thesis is rural county EOCs, but Katrina highlighted some of the general issues concerning availability and maintenance of trained staff and officials after a disaster, which suggests that the issues at hand are not specific to small jurisdictions. From Katrina also emerged accounts of ad hoc training for key stakeholders, decision makers, and other government officials, which implies that people will produce something where nothing is available, suggesting merit in creating JITT resources in advance.

2.   Chilean Earthquake

In February 2010, several coastal towns were devastated when an 8.8 magnitude earthquake off the coast of central Chile triggered a large tsunami. As a result, there was a 93% blackout lasting several days, around 525 people lost their lives, and approximately 9% of the population lost their homes.[87] The death toll was considered relatively low by some for an event of its kind, which is not surprising since Chileans are accustomed to earthquakes. Like many regions prone to specific hazards, local residents in Chile are better attuned to their role in a disaster than perhaps citizens living in less frequently impacted areas, like the Pacific Northwest. Effective evacuation measures aside, in Chile, as in other large-scale disasters, the primary lessons learned for the purpose of this analysis were that local responders were in short supply and that local jurisdictions lacked a system for organizing the help that did arrive. In a report highlighting their visit five months after the 2010 earthquake, the U.S. Geological Survey and American Red Cross made 10 recommendations to the state of California, but it is the sixth recommendation that gets at the heart of staffing issues discussed here: "Recognize the competing personal and professional demands that will be made on an organization's staff after a disaster and include them in emergency plans."[88] The report also noted that Chile lacked a system for organizing volunteers and that a large number of spontaneous volunteers were turned away as a result. In other instances, JITT appeared sporadically as the need arose, so that communities were better able to utilize volunteers.

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[87] Hinrichs et al., *Report on the 2010 Chilean Earthquake and Tsunami Response*, 2.

[88] Ibid., 2.

The Chilean earthquake provides other lessons regarding the merits of creating redundant systems and maintaining a degree of flexibility during disasters. Another account captured at a U.S. hearing in September 2010 highlights testimony by the U.S. Director of Western Emergency Management and Homeland Security Services, Ellis Stanley. In his statement, he emphasizes repeatedly the importance of "alternative options in case primary plans are unable to be executed," redundant resources, and the "backup to the backup to the backup."[89] Because local EOCs are not sufficiently addressed in open-source literature, it is perhaps less noteworthy that ICS was utilized during the 2010 Chilean response. It is however relevant to mention that the response is widely credited by experts as one characterized by speed and agility despite lacking a viable system in place at the time for managing volunteers.[90] Though the country relies on a centralized government, officials credit their own willingness to swiftly delegate regional authority and utilize local communities as well as private sector partners after the earthquake and tsunami to facilitate speedier recovery.[91] While these examples do not lend themselves to the EOC environment specifically, they reinforce the critical role that innovation and redundancy play in effective response and recovery. Just-in-time solutions are but one example of "backing up the backup" with an alternative solution.

3.   Cascadia Rising Exercise

In 2016, agencies representing all levels of government from FEMA Region X participated in Cascadia Rising, a regional exercise that tested the capabilities of emergency operations centers using the scenario of a Cascadia Subduction Zone (CSZ) earthquake and tsunami. In 2017, both FEMA and the state of Oregon released separate after-action reports that outlined findings gathered from region- and statewide

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[89] *Earthquake Preparedness: What the United States Can Learn from the 2010 Chilean and Haitian Earthquakes: Hearing before the Senate Committee on Homeland Security and Governmental Affairs,* 109th Cong., 2nd sess., September 30, 2010 (testimony of Ellis Stanley, Director of Western Emergency Management and Homeland Security Services), 18, https://www.hsdl.org/?view&did=489206.

[90] Michael Warren, "Disaster Experts Praise Chile Earthquake Response," Associated Press, March 10, 2010, http://www.cleveland.com/world/index.ssf/2010/03/disaster_experts_praise_chile.html.

[91] Arturo Fermandois, "Chile and Its Earthquake: Preparedness, Response and Lessons," Chilean Government, March 2011, http://dels.nas.edu/resources/static-assets/materials-based-on-reports/presentations/AmbassadorFermandois.pdf.

participants.[92] In Oregon, coastal counties were among the jurisdictions that provided data for a state after-action review, and within it, several themes emerged. The bulk of participating agencies reported challenges surrounding adequate training opportunities and depth of experienced staff or volunteers. Many counties reported challenges around effective communication and coordination, and in many instances, those challenges were compounded by a lack of adequate (in numbers of trained) personnel able to effectively maintain operational continuity or help develop situational awareness.[93]

The federal report for Cascadia Rising addresses region-wide staffing issues to include EOC-specific personnel shortages and training deficits.[94] Certainly, EOC staffing issues are considered a challenge and an aspect of emergency planning to which this guidance is applicable. Generally, the findings suggest an overall lack of adaptive solutions among participants and suggest that "emergency managers and their partners will need to employ creative and innovative solutions to address overwhelming shortfalls and challenges."[95] Later in the report, it was noted that participants even identified a need for JITT for spontaneous volunteers, though no specifics beyond that are mentioned.[96]

C.   SUMMARY

Each of the aforementioned events provides a different lens through which to consider the potential and utility of JITT in EOCs as a tool to maintain operational continuity when more proactive approaches fail or are unavailable. The effective response and efficient recovery during the Chilean earthquake reinforces the notion that trained personnel will be unavailable to serve and that redundancy and flexibility are

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[92] "Cascadia Rising 2016 Exercise Statewide After-Action Final Report," Oregon Office of Emergency Management, February 2017, http://www.oregon.gov/oem/Documents/CR16-AAR-Final.PDF; Federal Emergency Management Agency, "Cascadia Rising 2016 Exercise Joint Multi-State After Action Report."

[93] Oregon Office of Emergency Management, "Cascadia Rising 2016 Exercise Statewide After-Action Final Report," 35.

[94] Federal Emergency Management Agency, "Cascadia Rising 2016 Exercise Joint Multi-State After Action Report," 6.

[95] Ibid., 9.

[96] Ibid., 17.

critical aspects of community resilience. Insights gleaned from Katrina reveal that JITT needs for ICS may exist outside the realm of traditional EOC staff, a volunteer management plan is critical to utilizing volunteers efficiently, and maintaining trained staff is a common struggle for jurisdictions of all sizes. Finally, Cascadia Rising provided a catastrophic scenario to help emergency managers better understand the impacts to community EOCs, and the after-action findings echo what this thesis asserts: local jurisdictions throughout the Pacific Northwest lack the ability to maintain sufficient EOC staff and that maintaining a cadre of trained personnel is a constant challenge.[97]

The survey of these disaster environments reflects a common challenge to maintain adequately trained personnel familiar with ICS across jurisdictions regardless of size. It also suggests that people tend to develop ad hoc systems that may or may not incorporate NIMS and ICS when they are not established in advance. If the traditionally recommended methods for building a solid ICS program are generally unsustainable for the typical rural agency, perhaps a redundant just-in-time component to augment existing training efforts can effectively address training gaps associated with EOCs during large-scale events.

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[97] Ibid., 30.

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III.   MODELS OF JUST-IN-TIME TRAINING

By the definition of disaster, the event's magnitude exceeds a jurisdiction's resources and ability to respond. While the word "resource" tends to conjure images of medical facilities, heavy equipment, and other items associated with first-responders in the field, resources are no less important to an EOC because of the critical role they serve in large-scale events. A county EOC serves as the conduit for jurisdiction-wide situational awareness, a place for the media and elected officials to gather to receive information, and the entity responsible for moving resource requests from impacted jurisdictions to the state officials who receive and process them.

Rural EOCs in particular share a common operational gap. By virtue of their size and limited resources and based on historical accounts, they necessarily face staffing shortages when encountering unexpected events that overwhelm community resources such as catastrophic disasters. Unlike more tactical responders—such as individual fire and medical units—that can plug into a response, there are rarely trained cadres of local personnel who can augment an EOC. Therefore, the ability to rapidly train and integrate personnel is a challenge. An EOC lacking trained staff threatens operational continuity, which is critical to meeting the needs of the community and saving lives. JITT may be a way to address the inevitable staff shortages and training deficiencies that traditional training methods fail to alleviate.

Within the context of an EOC environment, there are few open-source examples of JITT; of those, most consist of system- or equipment-specific training, such as data entry or non-ICS positions such as call-takers.[98] FEMA is inconsistent with its exclusive promotion of advanced training and has yet to develop a just-in-time version of the ICS training programs. Therefore, the challenge of addressing ICS in an EOC environment through a JITT lens is that so few specific and relevant confluences of information currently exist on the topic.

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[98] Federal Emergency Management Agency, "Emergency Operations Centers: Developing Just-in-Time Training on Information Management Systems"; and Lessons Learned Information Sharing, "Emergency Operations Centers: Integrating Amateur Radio Personnel into Operations."

This chapter examines several training programs with just-in-time elements, each of which was developed to address an identified gap. As reflected in the literature review, there is a paucity of information on applying just-in-time training to emergency operations; so although none of the analyses directly identifies a single, specific solution for EOCs, the primary aim is to piece together specific lessons from each example to build a foundation of best practices to apply moving forward.

A.   INCLUSIVE JUST-IN-TIME TRAINING (iJITT)

The Inclusive Just-in-Time Training (iJITT) program was created to train surge staff and volunteers for and during a public health emergency or investigation. It was developed by a group of local public health officials who wanted to ensure organizational readiness for any event. Like the unplanned emergencies that typically overwhelm an EOC environment, public health emergencies often result in patient surges that overwhelm ordinary resources and require additional staff. The iJITT program was developed by a group of Oregon practitioners and offers a solid example of JITT principles applied to emergency operations in a public health setting. The program addresses the issue of having an inadequate number of trained staff available to serve along with the unique considerations of working in an emergency environment.[99] Unlike more traditional JITT programs found in other disciplines, such as the hospitality industry or sales, iJITT considers the stressful work environments often associated with emergency work. It recognizes that those who serve in an emergency setting may be unfamiliar with the role and environment to which they have been assigned and that the work tends to be fast-paced and unpredictable to some extent.

1.   Program Need

The idea first surfaced in a white paper written in 2010 by Multnomah County Health officials, identifying a need for a new training program to address staff training gaps during patient surges in public health emergencies.[100] The group had previously

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[99] National Association of City and County Health Officials, "Inclusive Just-in-Time Training (iJITT) for Mass Prophylaxis/POD Operations."

[100] Cress et al., "Enhancing Training During Public Health Emergencies."

identified a need for JITT for healthcare professionals and volunteers to accommodate patient surge response, but when attempting to find a suitable training program, the group was ultimately dissatisfied with traditional JITT programs. They concluded that the existing programs did not offer adequate opportunities to practice procedures or demonstrate knowledge to retain information. The programs had failed to acknowledge or address the limited capacity of learners to recall and apply information. They had also fallen short of preparing staff to work with others from different backgrounds or supporting the affective needs of learners "potentially leading to a lack of motivation or sense of duty to continue in one's response role."[101] The Multnomah County team created the iJITT program after concluding—in addition to the aforementioned challenges—traditional approaches to JITT were commonly misunderstood by local health departments, often applied in an ad hoc manner, and were of variable quality.

As the group began to develop the program, it considered program objectives from both leadership and learner perspectives. It recognized the importance of providing assurance to administration that the program could adequately train staff as intended since training would be a key leadership objective. Additionally, the developers wanted to ensure that the program was flexible enough to be relevant in a number of incidents, that training time would be used efficiently, and that it was based on best practice and educational theory guides.[102] An emphasis of the program was to ensure that program participants were comfortable with their job assignments, possessed greater confidence under pressure, improved their competence in performing tasks, became more knowledgeable regarding the response organization, and were culturally and emotionally sensitive in relating to clients.[103] Based on lessons learned and current research on adult learning, the developers incorporated elements to address learning styles, cultural

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[101] Ibid., 4.

[102] Ibid., 10.

[103] Ibid., 8.

context, and the stress associated with emergency environments and made it a priority to address those dimensions consistently throughout program development.[104]

The public health group addressed shortcomings it had seen in other programs by incorporating three elements into the curriculum—learning styles, learning dimensions, and cultural context—to better equip learners with the tools for success. A "learning style" is the manner in which someone best receives instruction and often refers to whether a person is a visual, auditory, or hands-on learner.[105] A "learning dimension" addresses the importance of intellectual needs (knowing), behavioral needs (doing), and emotional needs (feeling).[106] "Cultural context" encourages cultural competence, which may refer to better understanding a person from another culture or recognizing how a public health environment changes throughout the course of an emergency. The group also addressed the factors unique to an emergency response environment that affect workers. It took into account that those serving in an emergency environment may not be accustomed to the pace or stress associated with an event. It considered the specific type of stress associated with the work specifically because of the manner in which adrenaline can paralyze critical thinking in times of crisis, thus serving as a barrier to learning and performance.

2. Program Design

The Oregon practitioners submitted their white paper to the Advanced Practice Center and received funding to develop a JITT program that incorporated the priorities they had identified: learning styles, learning dimensions, and cultural context. The project outputs consisted of a training module for iJITT in print and video versions, a staff allocation decision guide, and two separate toolkits to assist local health departments train staff during emergencies.[107] Each toolkit was customizable in a number of ways, giving an agency the ability to edit tasks, incident names, and logos using resources available on the National Association of County and City Health Officials' website.

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[104] National Association of City and County Health Officials (NACCHO), "Inclusive Just-in-Time Training (iJITT) Module."

[105] Cress et al., "Enhancing Training During Public Health Emergencies," 5.

[106] Ibid., 5–9.

[107] The Staff Decision Allocation Tool is not discussed here.

The program founders considered learning styles, learning dimensions, and cultural context when developing iJITT to effectively provide information to a potentially diverse group of participants. The program recognizes that people have different learning styles (visual, auditory, and experiential) that are satisfied by way of different training delivery platforms. For instance, iJITT offers video training for visual learners and audio-only recordings of lectures for auditory learners. The program also satisfies the experiential needs by incorporating hands-on application of skills into the curriculum.

The program focuses on three learning dimensions: cognitive, behavioral, and affective (otherwise described as the application of "knowing," "doing," and "feeling," respectively), and each are addressed at different phases of the program. The needs around the cognitive (knowing) dimension are met in the initial briefing, training, and orientation. Hands-on opportunities to practice skills meet the behavioral (doing) needs of participants. Program elements that encourage continuous feedback to and from participants validate the affective (feeling) dimension. While each dimension possesses value, "the highest quality training, and retention of training occurs where learning dimensions overlap and reinforce one another," according to the white paper.[108]

Both toolkits possess similar components but address different environments. The iJITT Toolkit for Public Health Investigations presents a framework for building an investigative team for matters such as disease outbreaks or food contamination. The toolkit consists of the materials needed by experienced staff to lead operations, conduct an operational briefing, and deliver JITT to participants. A briefing checklist and field-training guide help leaders meet their objectives, and similar products intended for learners include job action sheets, a go-guide, and a participant evaluation form. The iJITT Toolkit for Mass Prophylaxis/Point of Dispensing Operations is a similar product but is geared toward a clinical setting as found during disease outbreaks or other medical emergencies. The toolkit is designed to address needs that arise during patient/staff surges and includes a series of guides for the roles and responsibilities involved in mass prophylaxis or point of distribution operations.

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[108] Cress et al., "Enhancing Training During Public Health Emergencies," 6.

Both guides use the same format and contain basic information common to all new learners in addition to the specifics associated with each role. They provide guidance for an entire operational period, beginning with an initial briefing and ending with an evaluation form. The guides are intended to accompany a worker throughout one's shift and are printable in booklet size, so they can be worn around the neck or carried easily, especially in a dynamic, mobile work environment. The allocation tool, briefing checklist, and leaders' guides are intended specifically for those responsible for managing clinic operations. Unlike the user guides for new learners, leaders should comprise staff previously acquainted with the tools before delivery.

3.   How It Works

The iJITT program is activated when a public health emergency has overwhelmed a jurisdiction's existing resources, thus creating a need to train additional staff just in time to meet the demands of the current environment. In some cases, staff may have previously been introduced to iJITT by way of previous events/exercises, but the program is built to accommodate the volunteer who has little to no practical experience serving previously in the assigned role. In any case, the program identifies a set procedure for intake, orientation, and demobilization for every volunteer.

Upon arrival, volunteers are asked to complete an application that is used to assess their skills and identify a suitable placement within the operations. Once a role is identified, the participant takes part in an orientation regarding the general working environment and the position. The *Field Training Guide for Leaders* assists those delivering orientation and training, and videos are used in a few cases to demonstrate specific tasks. Upon completion of the initial training, participants receive a "go-guide" that reinforces the information from the orientation.

Generally speaking, volunteers immediately fold into operations, providing a timely opportunity to practice what they have recently learned, thus reinforcing their knowledge. A prescriptive shift schedule includes orientation and demobilization periods, the latter functioning as a mechanism to elicit participant feedback as part of the continuous cycle of improving upon the learner experience.

B.   PARTNERS HealthCare

The just-in-time system created by Partners HealthCare in Boston is a knowledge management system intended to provide doctors timely access to a vast amount of complex information for treating patients.[109] The problem, and that which spurred development of the program, is one shared by all physicians: There is too much information available for one to absorb it all. To further complicate the issue, the information sought by healthcare providers is constantly changing, so continuous access to data sources is critical, often lifesaving.

1.   Program Need

Looking no further than their own institution, Partners identified a tangible and compelling reason to seek solutions. Analyzing ten years of data gathered in-house by the Harvard School of Public Health and Harvard Medical School, researchers identified an alarming number of medical errors and adverse drug reactions at Partners' hospitals. Hospital officials undertook the project of building an information system in an effort to remedy similar problems moving forward, but the task at hand was daunting, even risky. On one hand, the project had the potential to improve decision-making by healthcare professionals, thereby increase the quality of patient care; on the other hand, the idea of capturing everything necessary to equip doctors with the tools they needed to make complex treatment decisions was daunting because the root problem that existed was constantly changing data from a number of sources.

2.   Program Design

Partners HealthCare began by assessing the idea through both administrative and technical lenses. The proposed system was innovative, so managing implementation effectively and getting leader buy-in was critical. Technically speaking, they found that existing off-the-shelf software lacked the capacity and framework for their specific needs. Recognizing the challenges of implementing a new system, the group decided to start

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[109] Davenport and Glaser, "Just-in-Time Delivery Comes to Knowledge Management."

small by identifying one specific issue to address. To encourage use, they embedded the new system into existing technologies already used by employees.

An ongoing problem at the time was the propensity for errors in an essential work process called "physician order entry," which a provider uses to write prescriptions and order lab tests. The gap had been long identified as an issue in the Partners' facilities because on occasion it had resulted in medical errors and adverse drug reactions. The just-in-time system was initially programmed to deconflict drug interactions and lab testing procedures within the physician order-entry process.

3.   How It Works

The Partners' knowledge management system was set up to provide physicians with just-in-time information regarding patient care. It was embedded into an existing hospital computer network, and because the underlying system framework was already used in other hospital applications at the time, even new users enjoyed a certain level of familiarity with its functionality. The system was designed to accommodate new and/or unfamiliar users and intuitively prompt users to enter key data. Relying on patient records and a clinical database, the system then utilized a logic engine and knowledge base to assist with decision making. For example, when a doctor wants to treat patient symptoms for acute bronchitis with codeine cough suppressant, he logs onto the system to order the drug. The system automatically checks the patient records for allergic reactions and alerts the provider if any other concerns exist. The system allows the provider to override its recommendations, but not without requiring a written explanation for doing so.[110]

In this example, the physician has not received new training but instead has used a knowledge management system just in time to perform a safety check of sorts. The doctor does not need training or even a refresher, but he needs context to inform what he already knows. The Partners' program is little more than a database (as opposed to a training system), but it is useful in considering how a database could address information gaps for untrained EOC staff who need only a refresher or must access seldomly used

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[110] Ibid.

information. A knowledge management system could serve as a component of a JITT program in several ways.

C.   MEDICAL CENTER OF LOUISIANA JITT PROGRAM

This hospital's JITT program was developed with a single purpose in mind but grew more broadly in application over time. The Medical Center of Louisiana initially developed their JITT program to provide computer-based refresher trainings for infrequently performed procedures. At first, the users were solely employees who had trained previously but lost the knowledge due to lack of use. However, in response to positive employee feedback, the hospital ultimately added a number of courses that were more universal to all workers such as matters around occupational safety. Although this example occurred in a hospital setting, a number of similar programs taking aim at employee development are found across other work environments prone to rapidly changing information and populations (e.g., universities and other large institutions).

1.   Program Need

The Medical Center of Louisiana implemented a JITT program in 2003 to address an identified training gap. Rather than setting out to address errors as the Boston group had, the administration at the Medical Center of Louisiana had identified certain tasks that, for one reason or another, warranted a refresher following initial training. Upon discovering that JITT was "especially appealing to the rarely needed, complex topics or those topics that only a few people to need to reference," the decision seemed clear to develop a program to address the issue.[111] Like other hospitals, they had relied solely on just-in-case training but had found that staff was challenged in recalling information when too much time had passed. The new approach was to provide JITT in order to augment training which had been already been provided.

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[111] Leach and Haun, "Deliver the Lesson Now," 42–46.

2.   Program Design

The Louisiana program proved extremely cost effective and easily accessible to all staff. The group admittedly lacked presentation skills and resources, so they created training presentations using off-the-shelf software like Microsoft PowerPoint. Citing extensive studies regarding adult learning, they recognized the value of visual imagery for effective learning and implemented video and visual aids when possible. A frequently asked questions page and links to external references rounded out the experience for users.

3.   How It Works

This program relies on internal digital as well as web-based resources to deliver JITT modules to employees. A JITT homepage on the hospital intranet can easily be accessed any time of day or night by multiple users, and because of the ease of use and relevant information provided, the program was well received by employees who said they would be open to other JITT opportunities in the future. Like the Partners' program, it was developed to provide JITT to medical professionals who needed specific guidance about unique topics. The program was considered a success in that it improved performance while relying primarily on existing resources. From a customer perspective, it freed up time traditionally spent on classroom training by creating more opportunities to focus on patient care.[112]

D.   LINCOLN COUNTY EOC-ICS POSITION TASK FOLDERS

This final example is another training tool initially intended to provide participants with a refresher and one that grew past its intended use over time. Though the Lincoln County EOC-ICS Position Task Folders are not formally identified as a JITT product, in essence, they possess elements that could serve to perform in a JITT fashion. They are perhaps most useful in that they deal specifically with the EOC environment and associated positions.

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[112] Ibid.

1. Program Need

In 2013, a local emergency manager developed a job aid and training tool called the Lincoln County EOC-ICS Position Task Folder in an effort to address the inherent staffing challenges she had encountered in running a rural county emergency operations center.[113] Demaris had been tasked with running a county EOC for just a short time when she recognized that maintaining an adequate cadre of trained personnel to serve, in accordance with the FEMA-recommended training guidelines, was a nearly impossible feat for her jurisdiction. For many of the same reasons cited in the first two chapters, Demaris came to the realization that she would be unable to staff her county EOC within the confines of the prescribed method for developing staff. In response, she bridged the gap by devising a folder that could be used in a fixed or mobile EOC setting for persons with only a general understanding of EOC response.

2. Program Design

The EOC-ICS Position Task Folders were developed initially as a job aid for staff serving in EOC roles and who had previously received ICS training. They are assembled using two prong–style classification folders with three dividers, which provides eight sections per folder. Each of the sections includes five sets of prepared job aids to allow for multiple operational shift periods before a resupply is needed and include the following:

1. Position Checklist (position tasks/requirements and reporting relationship)

2. Position Specific Information (required position forms)

3. Note Paper (pre-document prior to use of the formal Activity Log)

4. Activity Log (Form ICS 214)

5. Organization Chart (Form ICS 207) and Maps

6. Resource Ordering Information (instruction and forms)

7. General Message (Form ICS 213)

8. Pocket Folder (for storing received information or other job aids)

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[113] "Emergency Response Agencies Further Improve Disaster and Incident Response Capabilities with Command Position Folders," Lincoln County Sheriff's Office, May 30, 2014, http://www.co.lincoln.or.us/sites/default/files/fileattachments/sheriff039s_office/page/796/lcso_media_release_-_eoc-ics_command_folders.pdf.

3.   How It Works

Upon arrival at an emergency operations center, volunteers are assigned a role and given a position folder containing general information regarding EOC operations and forms pertinent to the position. Instructions for immediate actions are posted prominently on the front of each folder: they direct staff to don an identifying vest or nametag tucked inside the front cover, identify where they fit into the organizational chart, and locate their supervisor. The volunteer then participates in a briefing prior to beginning the shift. For a new worker, the shift briefing will provide a broader insight to emergency operations than they will likely experience within the scope of their position. Operational briefings are of tremendous value to anyone working in an EOC environment, because they are an important time to gather situational awareness and develop a common operating picture, which cannot be achieved by utilizing job aids.

The position folders provide a number of job aids and resources for EOC staff. In addition to listing the position responsibilities, the folder also contains a number of ICS forms commonly used in an EOC. Standard checklists created by FEMA are replaced in some instances with Job Action Sheets, which describe tasks more granularly, meaning they identify time-sensitive considerations and note any specific partners with whom one might interface to achieve the mission. At the end of a shift, participants are asked to remove the completed forms from their folders and submit them to the documentation leader.

Early on in product development, and as a side note in her presentations, Demaris added that the folders could also serve as a JITT tool for untrained volunteers; however, as she continued to utilize the folders for training and real events, she began to recognize the limitations.[114] The checklists, she maintained, were an effective tool for someone familiar with EOC operations but less so for someone who had not previously worked in that environment. Specifically, Demaris reasoned that those relying on a checklist of responsibilities yet who are unfamiliar with EOC operations would not necessarily

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[114] Virginia Demaris, "EOC-ICS Position Folders" (lecture, OEMA/WEMA Joint Conference, Vancouver, WA, September 23, 2015), http://www.oregonemergency.com/media/2_2015-OEMA_WSEMA-Conference-Block-Schedule_090415.pdf

understand if an item was to be completed at the beginning, middle, end, or throughout a shift. She also felt the checklists fell short of providing context regarding how the task fit into the entirety of the event.

The product is examined here for the properties that lend themselves to a JITT job aid, despite having been intended for another purpose. Demaris replaced the traditional FEMA checklists with *Job Aid Guides*, which provided greater clarity regarding the tasks at hand. She concluded, nevertheless, that without the benefit of a trained person to provide oversight, untrained volunteers with no previous ICS experience would be challenged to competently fill a role by simply relying on the position folders.

Instead of setting out to accomplish the impossible task of developing an adequate bench of ICS users for the rural EOC, Demaris concluded that rural counties were best advised to focus on developing a small group of trained personnel (i.e., NIMS "superusers") that could perform as EOC staff while shepherding untrained users in an event.[115] In this environment, spontaneous or credentialed volunteers showing up to serve in EOC positions could do so under the supervision of experienced personnel unless and until ready to work independently.

E.   CONCLUSION

The case studies selected for analysis in this chapter provide a breadth of guidance for implementing a successful JITT program in an emergency environment. Collectively, they suggest that a JITT program can enhance operational effectiveness within an organization. Individually, each offers a unique perspective into setting up and maintaining a training or knowledge management system. In the next chapter, those lessons will be discussed in order to develop considerations and applications to an EOC environment.

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[115] Virginia Demaris, "ICS/EOC/ESF Position Job Folders: A User Friendly Approach" (lecture, California Emergency Services Association Conference, Yosemite National Park, October 9–12, 2017), https://www.regonline.com/builder/site/speaker.aspx?EventID=1951276.

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IV.   APPLYING LESSONS TO EOCs

The threat of catastrophic events is a good reason to consider alternate approaches to the formalized ICS training programs established by FEMA. One possible approach is to implement JITT for untrained workers to augment ICS-trained personnel. This solution maximizes resources by utilizing available personnel to maintain effective EOC operations despite limited staff. This thesis does not suggest replacing the ICS with a different organizational system neither does it condone the use of JITT, except when traditional ICS training methods are not practical or possible. No one would choose to run an EOC with untrained staff, but given scenarios like a Cascadia event, examining how to best utilize inexperienced volunteers is an important piece of disaster planning. Chapter III examined several JITT applications in various settings to glean lessons learned as they apply to an EOC program. After conducting an analysis of those findings, this chapter concludes with implementation recommendations for rural agencies considering a JITT program to augment staffing shortages.

Chapter I set up the challenges associated with maintaining operational continuity for rural EOCs after a catastrophic event while Chapter II provided a general overview of rural EOCs in order to establish a need for JITT. Having identified the need for a redundant training solution, Chapter III highlighted several just-in-time systems developed to address challenges associated with maintaining continuity in the face of operational surges. A dearth of just-in-time programs in the field of emergency management, specifically rural EOCs, steered the research to case studies found in other industries and public environments that provide emergency services.

This chapter offers a path forward for rural communities that are considering a JITT. It summarizes and synthesizes case findings to identify effective elements and important considerations, then offers tangible suggestions for program execution. The cases showed that certain industries are using JITT to address gaps and improve performance, and it has proven an effective method in certain environments for improving response. The elements and considerations extrapolated from those examples suggest the same could be true for county emergency operations centers, but it must be

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further explored and tested since the concept has not been explicitly applied in that setting.

A.   ANALYSIS AND FINDINGS

1.   JITT Systems Can Be Developed with Existing Resources

The Medical Center of Louisiana and Partners HealthCare JITT programs served as knowledge management systems and illustrate the value of building a JITT program that leverages existing resources both to reduce costs and to streamline use. From a business standpoint, using existing systems to launch a JITT saves money because no investment in new equipment/services is required. From an end-user perspective, the fluidity of using a system already accessible to employees helps to create buy-in. From a system administration standpoint, the endeavor to develop and maintain the program can be more easily shared by staff because they are also accustomed to operating and collaborating within using other applications.

2.   Successful Programs Focused on Specific, Repeated Problems

Both companies credit the success of their respective programs to one factor: the programs were built to address a very specific problem that had been identified repeatedly by staff and administration alike. By the time the companies considered JITT, the issue or gap they were attempting to fill had become an increasing concern and for this reason, hospital staff was more engaged in solving the problem and, therefore, more receptive to trying a new training program. While one can argue that a hospital is unlike a county EOC because it directly serves the public, operates at all times, and is generally a for-profit entity, the lessons are relevant because of the emergency nature of the mission. The hospital programs were designed to provide information to healthcare professionals in the moment they need it most, typically to make a critical decision. In rural counties, an EOC represents the hub of community-wide decision making after a disaster, and those who come together to make critical decisions are in constant need of information because both the situation and information are constantly changing.

The iJITT program piloted by the Multnomah County public health partners was also developed to address a gap, specifically in response to staff deficiencies during public health emergencies. The iJITT program is applicable to an EOC setting in a number of ways because there are similarities between public health emergencies resulting in patient/staff surges and emergency operations following unanticipated events. First, the shift schedule incorporated into iJITT fits nicely into the operational periods established in an EOC, and the framework is consistent with NIMS and ICS in other ways. Second, iJITT addresses the unique considerations of working in an emergency or disaster environment, specifically the cognitive impacts of stress on learning/performance and a better understanding of the cultural context created by the event. Finally, the program introduces positions not included in ICS that certainly apply to an EOC. Positions such as call-takers, greeters, and set-up roles are often critical roles, depending on the environment, and are considered enhancements to the traditional ICS.

3. JITT Programs Can Supplement Existing Systems

The iJITT program was created as a tool to address patient surge, but it does not suggest replacing or precluding traditional training approaches for ICS or for any other program it is used to augment. In fact, just-in-time best practices suggest that keeping traditional mechanisms in place is important since a foundational training program is the very underpinning needed for an auxiliary program like iJITT to be effective.[116] It reinforces how important agency and leader buy-in is to its success. Guided by previously established objectives, which are specific to an EOC environment, leaders can develop training materials, volunteer applications, skills assessment questionnaires, and post-assessment tools to complement their programs.

Many of the pre-identified iJITT roles used for the go-guides do not precisely reflect the traditional ICS titles or the NIMS updates issued in 2017. Modifying ICS position titles to better accommodate specific disciplines/environments is not new and should not detract from the fact that the overall framework of iJITT remains rooted in ICS and consistent with NIMS principles. The system is scalable and standardized and

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[116] Tiernan, "Examining the Use of Interactive Video." 1

provides users a tool to scope operations effectively using the *Staff Allocation Decision Guide*, which assists agencies in deciding which positions to deploy and in what numbers. The adaptable program also employs a system of continuous improvement that asks users to evaluate the program after each shift, emphasizing the principles outlined in the Homeland Security Exercise and Evaluation Program.[117] It is flexible in that it can be modified for different scenarios and events.

4.   Cultural Context Is Important

Cultural context is an important piece of iJITT because public health responders tend to deal directly with citizens who represent a diverse range of backgrounds and experiences and because of the diversity that exists among responders themselves. Public interface is not commonly associated with a county EOC, so it is perhaps less important here than in the setting for which the program was developed. Nevertheless, EOCs are frequented by a broad range of disciplines (e.g., police, fire, public health, and elected officials), so perhaps maintaining awareness around the cultural differences among agencies or regions is more helpful in this context.

5.   Some Modification of Existing Systems May Be Needed

The guides are a job aid that could be modified for use in an EOC, though the professional roles would need to be changed and relevant EOC positions added. Although the lanyard-style guides make sense for the public health environment due to its dynamic nature, an EOC is a more fixed work environment with assigned work stations, so regular-sized guides would work best. Just as the guides aim to describe the anticipated public health work environment, they, too, could they provide basic information about an EOC.

The guides are effective tools for simple tasks, but they would not be adequate to teach more complicated EOC positions or those that require extraordinary or specific technical ability. Higher-level ICS positions, such as the incident commander or section

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[117] "Homeland Security Exercise and Evaluation Program (HSEEP) Volume 1: HSEEP Overview and Exercise Program Management," United States Department of Homeland Security, revised February 2007, 1, https://www.hsdl.org/?view&did=47061.

chief, require extensive training and experience to understand the position and effectively manage the subordinate positions. On the other hand, amateur radio operators and geographical information systems specialists are highly technical positions that require specific training and licensing not available in an impromptu setting. One could also argue that the training is not a good fit for positions that rely upon critical communications or on pre-established relationships (e.g., liaisons or public information officers), since they are positions that maintain tremendous responsibilities contingent on experience and prior connections.

The remaining positions—the task-specific roles that fall below managers in the organizational chart—are perhaps a more relevant consideration since the responsibilities tend to be smaller in scope rather than a host of tasks like those managed by supervisors. One example of a simple, single task-oriented position is that of the food unit leader who provides meals for the EOC and other response staff during an emergency. The objectives for the position are relatively straightforward and limited in nature, meaning that, provided proper tools and guidance, someone new can grasp the responsibility at hand without necessarily understanding the larger environment.

6.   **JITT Is Potentially Applicable to All EOC Workers Since "Trained" versus "Untrained" Is Largely a Matter of Degree**

Although this thesis set out to address JITT programs for completely untrained volunteers, it is more likely that EOC personnel will be more diverse and possess varying levels of training and experience. Unanticipated volunteers take many forms, so with this in mind, it is worthwhile to view untrained staff on a spectrum instead and consider implementing a JITT program that accommodates varying levels of experience. Beyond completely untrained individuals, some volunteers may have general ICS training, needing mainly position-specific information. Others may be position-trained but find themselves one of several trained for the same position, thus having to fill an unanticipated role. Another common scenario is that someone has received the necessary training in the traditional environment, but because of disuse, needs a refresher. In some cases, an EOC may receive assistance from outside agency representatives who bring a

high level of ICS skills yet need center-specific orientation to better understand how ICS is utilized in that particular setting.

The Lincoln County EOC-ICS Command Folder model is a departure from the previous three examples in that the training system was never identified explicitly as a JITT tool; rather, it was intended to serve as a tool for staff that had already received some level of ICS training. At a glance, the folders bear no resemblance to the computer- and web-based hospital programs because they were created organically using common office supplies; however, the EOC-ICS command folders are strikingly similar to the hospital programs based on their intent and content. Like the hospital JITT programs, the command folders are geared toward persons who are already part of the system and have received some degree of prior training but need job aids, prompts, and refreshers to perform sufficiently. Unlike the iJITT program, the remaining three are not aimed at someone hearing the information for the first time.

An EOC's primary function is to support overwhelmed jurisdictions in an emergency by coordinating resources and providing communications, which is why its objectives tend to be more strategic in nature than those of its tactical-field counterparts. Operational emergency public health environments provide a glimpse into how establishing a JITT program in an emergency environment can effectively address an unexpected need for workers.[118]

This thesis has referred largely to completely untrained staff, but it is more realistic that workers reporting to an EOC during a disaster will possess a broad range of experience and familiarity with local operations. Some will be trained in specific positions yet be unfamiliar with the facility, only requiring an introduction to the environment. Others may have received previous training but need a review. In these instances, iJITT can be used to provide jurisdiction-specific information to new users as well as a refresher tool.

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[118] Centers for Disease Control and Prevention, "Radiological Terrorism: Just in Time Training for Hospital Clinicians."

B.   CONSIDERATIONS FOR IMPLEMENTATION

This thesis suggests that rural communities can increase their resilience to catastrophic events by implementing a redundant JITT program to teach roles and essential elements of the ICS to untrained EOC workers and spontaneous volunteers. It began by posing two questions for research: How can operational continuity of the ICS be maintained in rural EOCs during large-scale activations? How can a redundant JITT system serve to maintain continuity, and what are the considerations for implementing it?

The discussion in the first two chapters established the vulnerabilities of rural disaster environments and the inherent need within those environments to fill training gaps during an emergency. The case studies conducted in Chapter III examined JITT applications to identify criteria that would be useful for a system in an EOC, and this chapter began with an analysis of those examples. Because the primary goal is to develop an application of JITT for an EOC, it is useful to summarize the key elements of successful programs along with the important considerations of implementing a program system. The following program elements are those extracted from the previous analyses and have a significant impact on program effectiveness as deemed by developers, operational stakeholders, and researchers. They

- identify and address an outstanding issue, specific need, or unsolved problem

- consider critical positions not identified in traditional ICS organizational systems

- recognize certain positions are too complex to apply JITT

- support NIMS/ICS: scalable and flexible to meet the demands of any event

- standardize development and implementation built on agency need and objectives

- consider the cognitive impacts of stress on learning performance

- incorporate existing frameworks and systems when possible

- orient the user to any relevant cultural considerations as related to the event

- provide opportunity for feedback and an improvement cycle

- consider different types of learning styles (visual, auditory, and experiential) and learning dimensions (thinking, doing, and feeling)

In order to implement a program to effectively augment existing training programs, EOCs must bear in mind local objectives as well as those of the NIMS, ICS, and JITT theory. Jurisdictions interested in implementing any training program for their communities' EOC should encourage planning assistance from a variety of community partners to ensure that stakeholders' needs continue to be met and to foster buy-in from those included in the development process.

C.   CHALLENGES

Particularly for those familiar with the staffing issues facing rural EOCs, justifying time and resources to develop a JITT program seems like a straightforward solution to a persistent problem, but applying a JITT to ICS principles is a new concept, which may be met with skepticism. Agency leaders or others who subscribe to FEMA's recommendation to teach ICS in advance of an event may disagree with the just-in-time approach. Staunch users of ICS may have concerns around maintaining standardization in a JITT environment, believe that staff should receive nothing less than the comprehensive training provided by FEMA, or question the practicality of giving/receiving training during an event. Some may be reluctant to engage untrained people in emergency operations since it represents an additional obstacle in an already challenging environment.

These are legitimate concerns validated by articles written about JITT. In a section of their article discussing behavior and attitudes concerning JITT, Globerson and Korman provide the following caveat: "We begin here with a paradox and a warning … JIT-T may be most effective and most needed in those settings where it will be hardest to implement."[119] They also echo sentiments of the iJITT developers when they state the importance of "designing a … program which does not increase anxiety and

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[119] Globerson and Korman, "The Use of Just-in-Time Training In a Project Environment," 283.

dysfunctional behaviors that result [and is] structured to fit the particular characteristics of a particular work setting."[120]

Other concerns may be security related. Spontaneous, especially unaffiliated, volunteers present a challenge in any emergency environment particularly when agencies lack an effective volunteer management system. In an emergency, agencies do not have the luxury of time typically afforded to conduct background checks and likely seek an alternate, more expeditious method. An EOC that relies on security features embedded into access and computer systems needs to develop a just-in-time solution for integrating unanticipated staff with existing systems by creating in advance general access cards that can be used for spontaneous volunteers or unanticipated staff.

Others may worry that iJITT will become the norm, phasing out traditional, more time-consuming training approaches, which are also considered more comprehensive. The suggestion for a JITT program does not question the value of training in advance or does it disregard the remaining concerns. It simply supports the notion that a contingency plan to address staffing challenges at an EOC is prudent and that concerns around implementing JITT can be adequately addressed by establishing a comprehensive program.

With respect to the models used here for analysis, some might argue that an EOC environment is too different from the public health and hospital settings described herein to be relevant. The examples in the iJITT resources are aimed at teaching very specific operational duties (mass prophylaxis dispensation and investigations) within the public health realm, and it is accurate to say that an EOC is comprised of a far greater number of duties performed by a larger breadth of disciplines. On the other hand, certain functions within an EOC can be broken into smaller responsibilities more easily tackled by novice volunteers. The needs that spurred development of the Partners HealthCare knowledge management system do not specifically parallel the needs of a rural EOC during a disaster, yet both environments share a critical need: to provide end users with knowledge

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[120] Ibid.

that will enable them to address an issue, make a decision, or avert a needless catastrophe.

D. PROGRAM EXECUTION

With some of the aforementioned guidelines in mind, the final goal of this thesis is to outline first steps and a framework for JITT implementation in a rural EOC. The first step is to identify a position or task that is a good fit for JITT by way of complexity and need. The previous example of a food unit leader is a sound start since it involves the straightforward task of providing meals to staff while gathering and implementing the relevant documentation. It additionally meets a critical need since keeping people fed is integral to effective operations. Another approach is to consider a position of slightly greater complexity and that affects critical operations more directly, such as a situation unit liaison. Developing situational awareness is one of the most critical tasks at hand for an EOC, yet maintaining it is one of the most persistent challenges. While overseeing the situation unit requires a broader knowledge than typically found in untrained volunteers, breaking it down into more specific, smaller positions responsible for maintaining communications with a single jurisdiction could be something more applicable to JITT.

Identifying and developing training tools is a key step once a decision has been made to implement a program. With the targeted position(s) in mind, the next step is to create tools that address both general and position-specific learning objectives. Different types of traditional JITT tools include "job aids, templates and macros, audiotapes, videotapes, computer- web-based training."[121]

The iJITT task books and Lincoln County ICS-EOC command folders are examples of job aids built to provide general organizational information and specific position information to learners in an emergency environment. The former product was created specifically for a JITT environment while the latter was built to reinforce previously learned material, but both products offer a starting point for building a JITT for an EOC. Both are visual learning aids, portions of which could easily be

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[121] Robin D. McClure, "Just-in-Time Training," Academia.edu, September 2002, http://www.academia.edu/718759/JUST-IN-TIME_TRAINING

complemented by videos. Both examples offer elements of a base to serve as a vehicle for all written material given to and gathered from staff.

As previously mentioned, video, audio, and media products are considered markedly successful methods for training delivery or augmenting existing programs. The notion is further supported by the iJITT developers who posited that utilizing a variety of delivery platforms was an effective way to approach different learning styles. While the task of creating a training video may sound daunting, off-the-shelf presentation software (like that used by the Louisiana group) and recent technology has made it simple for almost anyone to develop video products. Since the overall recommendation of experienced JITT users is to start on a small scale, the approach to video production should be viewed similarly. Jurisdictions who find themselves overwhelmed with the prospect are advised to seek internal resources, namely staff or volunteers with an interest in videography.

A great number of videos highlighting local training efforts can be found online and serve as simple exercises in putting local training to film, especially to better serve those who tend to learn more visually. While the food unit leader and situation unit leader may or may not benefit from a training video outlining their role-specific responsibilities, opportunities to utilize video could exist in highlighting more general features of what they might come to expect. A video showing EOC procedures or providing a brief overview of the ICS could serve to train in a more engaging manner than as provided in the folders or task books while freeing up staff time that might otherwise be used to share the information. Depending on the experience of the overall staff, general orientation information might be shared across all levels of trained/untrained volunteers during routine briefings, reducing the need to incorporate general information in the JITT training tools.

Once the positions have been identified and the curriculum developed, the next step for an adopting agency is to assess the current volunteer management program in order to address JITT considerations for volunteer intake. It is no less important in a JITT environment that volunteers complete an application prior to service, and it is assumed that most county jurisdictions have a current mechanism in place for registering

volunteers. Modifying existing volunteer applications and agreements to include JITT considerations is a simple first step toward implementing a program. By considering specific EOC volunteer needs and using the application process to actively seek relevant skills or personality traits, EOCs can effectively vet potential volunteers for suitability. Agencies that typically utilize one method for conducting background checks may need to establish modified or expedited methods for obtaining security information for applicants. Agencies can rely on templates like those found in Lisa Orloff's *Managing Spontaneous Volunteers During Disasters: A Field Guide* for guidance on interviewing and vetting potential volunteers.[122]

Once the application process is completed, volunteers should immediately be assigned a position and supervisor. While there is flexibility in how training evolves into serving a role and the degree of supervision (Is a supervisor someone who shadows or merely checks in periodically?) may vary from location to location or event to event, it is critical to capture volunteer feedback, ideally during the demobilization process or towards the end of shift. The overall contributions and activities must be assessed first by participants and then by those in charge of implementation to ensure efficacy, engagement, and continued improvement required for program success and sustainment.

Echoing advice cited early in the paper by a workplace learning expert, a just-in-time program must be introduced and accepted in advance by existing staff to be effective. While it may sound counterintuitive to the bigger goal of developing a program to be used spontaneously, it is important to exercise JITT positions during regularly planned exercises to provide continuous improvement to its general incorporation.

E.   CONCLUSION

Redundancy is one of the tenets of emergency management because it helps to promote resilience. Agencies create redundant plans, communication methods, power systems, and locations with which to manage emergencies, mitigate natural hazards, and plan for catastrophic threats. Even though ICS training guidance indirectly discourages implementing JITT for the ICS by exclusively encouraging advanced training, this thesis

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[122] Orloff, M*anaging Spontaneous Community Volunteers in Disasters, 164–165.*

puts practicality before protocol to consider the use of ICS in a rural emergency operations center in a rural region prone to severe weather events and natural hazards, and it suggests that a redundant training system can increase resilience. By implementing a JITT for times when traditional ICS training is not a practical solution, an EOC manager can maintain continuity for the ICS while utilizing personnel resources effectively. A carefully considered JITT program can effectively augment traditional ICS training within EOCs to increase resilience, particularly for rural emergency operation centers prone to catastrophic events and ensuing staff shortages.

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