

A CRITICAL ANALYSIS OF OKLAHOMA STATE
UNIVERSITY'S SHORT AND EXTENDED DURATION
COVID-19 INCIDENT MANAGEMENT TEAM
OPERATIONS

By

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OPERATIONS

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To my wife I owe it all

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Abstract: The COVID-19 pandemic has had profound effects on Institutions of Higher Education throughout the world. The unprecedented impact on university campuses were diverse and complex as universities shutdown and adapted their operations to address the threat. Many universities mobilized their research competencies to contribute to managing the risk beyond the campus environment. Numerous institutions were unprepared for the consequences and struggled to respond to the demands. To better manage the pressures, crisis response teams were setup overnight. The Oklahoma State University, in the United States, established two incident management teams using the incident command system, to manage the response. The initial short duration response aimed to establish and increase the diagnostic microbiology testing capacity for SARS-CoV-2 in the state of Oklahoma. The extended duration response focused on reopening a college after the lockdown and implementing the pandemic precautions required for the return of staff, faculty, and students. The aim of this qualitative exploratory study is to critically evaluate the IMT member perceptions, attitudes and experiences, and the use of the ICS, during the IMT's response to the COVID-19 pandemic, in the pursuance of providing recommendations for improved IHE usage of the ICS. As a result of the qualitative analysis of both IMT responses, numerous findings contributed to shaping the nineteen recommendations emanating from this study.

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CHAPTER I

I. INTRODUCTION

Background

A novel coronavirus (SARS-CoV-2), known as COVID-19, emerged in China in December 2019, and rapidly spread around the world (Mackenzie & Smith, 2020; Park, 2020; Sohrabi et al., 2020), with a global pandemic declared in early March 2020 (World Health Organization, 2020a). As of July 2022, testing around the world has confirmed more than 530 million cases of COVID-19 globally, with over 6 million deaths (World Health Organization, 2021). The unprecedented impact of the COVID-19 pandemic on university campuses were diverse and complex as universities throughout the world shutdown and adapted their operations to address the threat (Coyne, Ballard & Blader, 2020; Marinoni, Van't Land & Jensen, 2020). In addition, many universities mobilized their research competencies to contribute to managing the risk beyond the campus environment (Furiv, Kohtamäki, Balbachevsky, & Virta, 2021).

On March 13, 2020, the United States (U.S.) Federal Emergency Management Agency (FEMA), issued a nationwide Emergency Declaration in response to the ongoing COVID-19 pandemic. On March 15, 2020, the Governor of Oklahoma, John Kevin Stitt, issued an executive order (2020-

07) activating the State Emergency Operations plan. This compelled state departments and agencies to make resources available in response to the COVID-19 pandemic to protect the health and safety of the public. The urgent need to increase diagnostic microbiology testing capacity for COVID-19 during the pandemic had been a challenge faced by urban and regional pathology services around the world (Binnicker, 2020; Sparks et al., 2021). Through an amendment filed on March 21, 2020, Oklahoma State University (OSU) was requested by the Governor to adapt its capabilities and establish COVID-19 testing capacity for the increasing number of human nasopharyngeal swab specimens that were being taken by health care professionals across the state (Cima, 2020).

To meet the anticipated acute increase in COVID-19 demands and enhance surge capacity, an Incident Management Team (IMT) was assembled to facilitate the ramping up of operations at the university. The IMT, was quickly established, consisting of members from numerous colleges and departments from across the OSU Stillwater campus (AAR, 2020). The IMT's mission was to establish and facilitate immediate support for standing up the testing of human samples at the on-campus Oklahoma Animal Disease Diagnostics Laboratory (OADDL). The response effort included the urgent need to obtain adequate staff, the provision of supplies and equipment, developing structures, and systems to provide sufficient capacity to meet the immediate demands and to enable long-term sustained operations.

Using the principles and features of the Incident Command System (ICS), the operation was completed in 39 days. On June 5, 2020, another IMT was assembled, with a more prolonged mission - to plan, develop, implement, monitor, and maintain the requirements for the reopening of the college and the return of students, faculty, and staff for the Fall semester and beyond.

Rationale for the study

The ICS, primarily utilized by first responders, was used within an Institution of Higher Education (IHE) by an IMT made up of members that were both experienced in its use and those that had no

prior experience or knowledge of the ICS. Two separate IMT's were formed to respond to different missions. Firstly, a statewide need for human specimen testing for COVID-19 and secondly, the preparation and protection of students and staff returning to a large college campus after shutting down for several months. Moreover, the ICS was utilized within both a short and extended-duration despite limited on-campus requirements for the use of ICS for such operations.

In addition to the importance of the two IMT responses in the context of a pandemic and the uniqueness of how the ICS was used, there is a dearth of academic literature on the use of ICS in IHE. The existing literature on the use of the ICS in IHE settings, primarily focuses on its application during active shooter operations by formal responders (Blair & Schiewit, 2014; Myers, 2017). This gap presented an opportunity to develop further research and study the application of the ICS in an on-campus environment, utilizing staff, faculty and students who responded to the short and extended duration operations. Specifically, this study aims to *“critically evaluate the IMT member perceptions, attitudes and experiences, and the use of the ICS, during the IMT's response to the COVID-19 pandemic, in the pursuance of providing recommendations for improved IHE usage of the ICS”*. This qualitative exploratory study focusses on the ICS-related issues, challenges, and successes experienced by the members of the two IMT's that responded. Semi-structured qualitative interviews with key stakeholders will address command, control, and coordination across operations, planning, logistics, and financial and administration functions to determine criteria for the effective utilization of ICS within the broader organizational environment of the IHE. The outcome of the study provides recommendations for the leadership and administrators of IHE's to better prepare for, respond to and recover from crises that have a negative impact on the entire organization. Specifically, the recommendations go beyond the application of the ICS by professional first responders and include all levels of IHE administration from an organizational crisis management point of view.

Research aim and objectives

The overall aim of this exploratory qualitative study is to critically evaluate the IMT member perceptions, attitudes and experiences, and the use of the ICS, during the IMT's response to the COVID-19 pandemic, in the pursuance of providing recommendations for improved IHE usage of the ICS.

The research objectives which support the data collection required to answer the research questions are:

1. Describe and evaluate how the IMT utilized the ICS in response to the COVID-19 pandemic during both the short and extended response operations.
2. Assess the IHE organizational arrangements and management practice that were adapted for the ICS by the IMT during both the short and extended response operations.
3. Investigate the individual perceptions, attitudes, and experiences of the IMT participants regarding the use of the ICS during both the short and extended response operations.
4. Develop recommendations from the findings for enhanced organizational crisis management utilizing the ICS for administrators and leaders of IHE's.

Research questions

The study is comprised of 3 main research questions that elicited the data necessary to accomplish the research aim of this study:

RQ 1 - What are the salient attitudes, experiences, and perceptions of the incident management team members regarding the use of the incident command system during the short and extended responses to the COVID-19 pandemic?

RQ 2 - What are the enablers and barriers associated with the deployment of the incident management team and the related use of the incident command system in response to the demands of the COVID-19 pandemic on the IHE?

RQ 3 – What are the criteria for successful deployment of an incident management team using the incident command system that would enhance organizational crisis management practice for IHE administrators and leaders?

Significance of the study

The threat that the two IMT's using the ICS responded to were not the usual threats that professional first responders at a large IHE would normally respond to. Generally, flu outbreaks are not fatal and don't impact the IHE in a way that requires an organization-wide coordinated response. Influenza inter-pandemic intervals are reported to occur on average every 40 years (Taubenberger & Morens, 2010). The unpredictable nature of pandemic influenza presents a significant challenge for both researchers and pandemic preparedness planners (Taubenberger, Morens & Fauci, 2007). The rapid evolution of influenza in a constantly changing global landscape requires foresight, innovation, and effective solutions in optimizing pandemic response capacity (Taubenberger & Morens, 2010). It is important to investigate and study pandemic responses because of the high likelihood of recurrence (Dodds, 2019).

The complexity and persistence of the challenges that COVID-19 posed for IHEs can best be conceptualized as a “wicked problem” (El Masri & Sabzalieva, 2020). IHE's are particularly susceptible during crisis events because the vulnerability arises at multiple levels within a complex system (Kruse, Hackmann & Lindle, 2020). During the initial stage of the COVID-19 pandemic, schools and IHE's were significantly impacted with closures in 185 countries, affecting over 1.5 billion learners (approx. 90% of total enrolled) (Marinoni et al., 2020). Many of those IHE's closed permanently as a result from the impact (Baker, Moore, Byars & Aden, 2020; Rwigema, 2021).

University crisis management responses were not always executed smoothly and clear communication from university leadership was often lacking (Coyne et al., 2020). Shared governance in decision-making involving input from various stakeholders is a common practice in IHE's (Olson, 2009), however, such practices can delay communication and action in crisis situations.

Compounding the challenges with decision-making during the pandemic was the need to align with local, state, and national government shutdown orders (El Masri & Sabzalieva, 2020). In addition, there was a critical lack of testing capabilities (Bauchner & Sharfstein, 2020) that led to uncertainty about infection prevalence.

The current literature on IHE crisis management responses to the COVID-19 pandemic are limited and fairly generic, lacking in-depth analysis (Furiv et al., 2021). Most of the current literature focuses on the transition to online teaching and learning and the impact of COVID-19 on campus operations (Rashid & Yadav, 2020; Marinoni et al., 2020; Burki, 2020; Ali, 2020; Strielkowski, 2020). Furthermore, there is a dearth of empirical research on the use of ICS in IHE settings and researchers have increasingly started to question the effectiveness of the ICS (Branum, Dietz & Black, 2010). This qualitative exploratory study will provide a critical analysis of how one IHE, the OSU, responded to the COVID-19 pandemic by using the ICS within two distinct operations, namely the:

- 1) Short duration IMT operation (March 19, 2020, to April 27, 2020).
- 2) Extended duration IMT operation (June 5, 2020, to May 7, 2021).

This study used a crisis management framework as a basis to evaluate the inquiry, which is widely used in the literature pertaining to IHE organizational preparedness planning and response to campus disasters and emergencies (Heath & O'Hair, 2009; Hemphill & LaBanc, 2012; Myer, James & Moulton, 2010); Peters, 2014; Zdziarski, Dunkel & Rollo, 2007). The crisis management framework used is based on the foundational work of Fink's (1986) crisis life cycle model which consists of four

stages, 1) prodromal stage, 2) acute stage, 3) chronic stage, and 4) resolution stage. Incorporated into this framework is Bruce Tuckman's (Tuckman and Jensen, 1977) forming, storming, norming, performing and adjourning theory of group formation and development which are necessary for high performance (Figure 1).

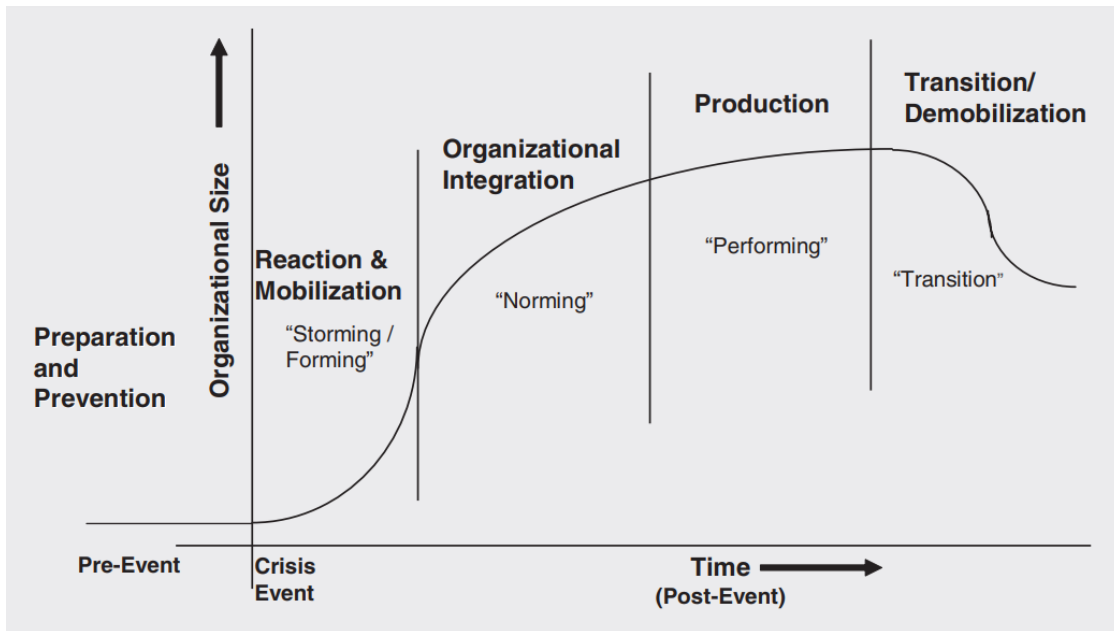


Figure 1: Forming, storming, norming, performing and adjourning model of group development (Tuckman and Jensen, 1977)

The prodromal (pre-event) stage in the model focusses on the events leading up to the mobilization of the IMT. The reaction and mobilization, organizational integration and production stages incorporate the actions during the acute and chronic phase of the response. The transition and demobilization stage focus on the resolution stage (post event) activity. During the acute phase the ICS was utilized by the IMT for a short duration (approximately 1 month). During the chronic phase the IMT was actively using the ICS for an extended duration (prior to and throughout the academic year).

Conclusion

The impact of the COVID-19 pandemic on IHE's and the institutional response required to mitigate the substantial risks, provided an important opportunity for empirical research that may not be available to accomplish again soon. In addition, the incorporation of faculty, staff, and students in the IMT response to both the acute and extended phases, presented the unique prospect of investigating the utilization of ICS in the pursuance of formulating recommendations for ICS use in IHE's.

CHAPTER II

II. REVIEW OF LITERATURE

Introduction

A review of the literature is an essential phase in the research design. This process contributes to developing a theoretical framework which helps to mold the research questions, area of emphasis, theory development and the research design itself (Merriam, 1998). This chapter leads with a short review of several specific challenges that organizations frequently experience during major crisis response. The leading theory in this study focuses on the ICS and therefore this chapter will include a review of the related literature. In addition, the seminal literature on crisis management, particularly as it applies to IHE settings, will be incorporated into the chapter.

Organizational demands and unique managerial problems

In a large-scale crisis response, the goal is to have many resources come together and operate under a common plan, with common goals, and speaking a common language (McEntire, 2015). Different organizations (or departments) represent different areas of expertise, and ideally, these organizations communicate and coordinate seamlessly together. Terms such as “common operating picture” highlight the emphasis on collective action during such extreme events

(Comfort, 2007). However, early foundational literature on crisis response, highlights several coordination, cooperation, and communication challenges that are frequently experienced by those involved in the response (Drabek, 1985, 2003, 2005, 2018; Dynes, 1970, 2000; Lindell, Carla & Perry, 2007; Dynes & Quarantelli, 1975, 1977; Granot, 1997; Rodríguez, Quarantelli & Dynes, 2007; Quarantelli, 1985). Normal relations and interactions between organizations and units in society can be severely disrupted during a crisis, therefore, coordination, cooperation and communication can be expected to be worse than during normalized relations. Several of the most persistent factors are discussed.

“Fragmentation” is such a salient factor in crisis literature that it was discussed in the very first recognized study on crisis response, by Prince (1920) who emphasized fragmentation, conflict, and poor coordination among responders (Scanlon, 1998 cited by Drabek, 2018). The presence of fragmentation was also highlighted as a challenge amongst responding organizations during the 911 terrorist attacks in New York, Washington D.C., and Pennsylvania (Quarantelli, Lagadec & Boin, 2007). Fragmentation, according to Drabek (1985; 2005; 2018) can be vertical or horizontal and intra-or inter-organizational. When different organizations attempt to coordinate, there can be a disparity between organizational structures, including how different positions are titled or where they fall in the organizational hierarchy. The acceptance of authority or “effects of authority” can create challenges (Rodriguez, Donner & Trainor, 2018) especially in more traditional command-and-control type organizations (such as police departments). When these organizations attempt to work together and coordinate efforts, the question, “Who’s in charge?” can be a source of conflict. For example, when the leadership of a team comes from an external source to lead local personnel the legitimacy, or perceived legitimacy, of the assigned authority is necessary for acceptance amongst the personnel. Without the acceptance of the individual or leadership team there will be further additional challenges for a coordinated operation because of a lack of a unifying leader, purpose, or vision. When acceptance of authority is not achieved, members of

participating organizations will look to their own internal leadership for direction resulting in each participating organization acting as an autonomous unit. When values clash, between similar organizations or organizations with different interests, there is often hesitation to take direction from outside of the usual sphere of influence or because of conflicting values.

“Communication” is common barrier to coordination (Sorensen, Mileti & Copenhaver, 1985) as there are many ways communications can be hindered (Quarantelli, 1988). “Barriers to information” include a lack of information due to blocked access, language barriers, poor information interpretation, or organizations not sharing (Dynes & Quarantelli, 1969). Often gathered information is conflicting, and the status of a hazard or situation may come from multiple sources giving conflicting information, or the information from other sources may conflict with actual personal observations or assessments. Also, the assessments that are being conducted to gather information may have a time lag between when they are requested, when they are conducted, and when the information is returned to the requester (McEntire, 2001). Furthermore, unfamiliar, or incompatible systems and processes can hinder coordination efforts. Different organizations may be familiar with handling a certain problem from a certain frame, or with a different outcome as the goal, and use a process or system which is unfamiliar to others or may not be suitable for the task. For example, an organization using processes that work for routine tasks and attempting to apply them to complex crisis responses. The processes that personnel are familiar with using do not always work well on the more complex tasks found during crisis response (Dynes, 1970; Dynes & Aguirre, 1979; Dynes, Quarantelli & Kreps, 1972). Also, resources can be named or typed (classified) differently, or each coordinating organization or department can have its own industry jargon (Lindell et al., 2007). Even if the “language” is common, the information must be transmitted. This means that unless technology is compatible between agencies and organizations, and there is a shared understanding of etiquette and usage, communications will be hindered (McAleavy & Rhisiart, 2019). Additionally, suitable

technology must be available and operating during the disaster response, such as information and communication technologies (ICT).

All variables of an event cannot be addressed in pre-incident plans, meaning that in low frequency, high risk events, “improvisation” is often necessary (Tierney, 2002; Wachtendorf, 2004). Therefore, guidelines are put in place as a rough plan of action, but improvisation may still need to take place to fill in the gaps and adjust to the reality of the situation. Though improvisation may be necessary, it can often lead to duplication or gaps in the response. For example, if personnel are working on the same issue but are not communicating how they are improvising, discontinuous, divergent, or even conflicting actions can result (Drabek, 2005, 2018; Lindell et al., 2007). Some improvisations may even be the wrong action or process and based on limited or inaccurate information, while other improvisations may be completely wasted effort and should not be used at all (Lindell et al., 2007).

Complications can result when “goals, expectations, or interests”, are uncommon or in conflict, resulting in tension and disagreement. Shared goals and an understanding between organizations of what the scope and specific expectations are, has been found to be critical in coordination efforts (Gillespie, 1991). When these are not clear and known, coordination suffers (Weick, 1995). Multiple organizations working towards separate primary objectives, may duplicate or hinder each other’s efforts. Furthermore, when political parties, or political or social interest groups become involved in influencing decision making, the polarization in goals and expectations can expand the propensity for conflict, sometimes resulting in anger.

Finally, the “extreme stress” of the response itself on responders can cause role conflict, ambiguity, and mental strain, resulting in irritability and tension which may arise within organizational units, or between them. Issues such as extreme and intense workload, unclear or

conflicting objectives and methods can exacerbate the tension resulting in further complications (Drabek, 2005; Ellis, Bell, Ployhart, Hollenbeck & Ilgen, 2005; Rizzo, House & Lirtzman, 1970).

Crisis management

Crisis management is the term used within corporates and large organizations such as institutions of higher education (IHE) to refer to “the identification of a threat to an organization and its stakeholders in order to mount an effective response” (Hayes A, 2021). Steven Fink (1986) one of the world's leading authorities on crisis management, developed a four-stage model illustrating crisis management phases. The four stages include the prodromal stage, acute stage, chronic stage, and resolution stage. The value of this model is that it provides organizations with a framework that can be used to plan, prepare, respond and recover from major crisis events.

The prodromal stage represents the period in which managers identify an impending crisis based on a variety of factors that could impact negatively on the organization. The crisis event begins with a trigger, which leads to the acute stage, creating a situation that the organization must now react to. The rapid organizational response during this stage can reduce the negative impact and long-term effects of the crisis. The chronic stage relates to the lasting effects of the crisis which can extend the life cycle of the crisis and the required crisis response. The resolution stage marks the termination of the crisis and the resulting organizational response.

Crisis management in IHE settings

Campus safety has been a significant focus over the past few decades in the U.S., due to the impact of natural disasters and mass shooting incidents. Events such as the Virginia Tech shooting in 2007 have highlighted, amongst others, the need for better coordination and implementation of emergency response across campuses (Kapucu & Khosa, 2013). Preparing for

all conceivable threats and risks can be challenging for IHE's, resulting in many campuses only preparing for the most recent crisis events (Zdziarski et al., 2007). This increases the risk of having to respond to a situation that they have not yet prepared for. The ability of an institution, such as a university, to continue its operations in the wake of a crisis is vital not only for its faculty, staff, and students, but also for the community at large (FEMA, 2003). As result of these many challenges, the Department of Homeland Security (DHS) now requires universities to develop and implement emergency plans that are compliant with the National Incident Management System (NIMS) (Edwards & Goodrich, 2009). Furthermore, all public agencies that want to be eligible for federal funding must use NIMS and implement the ICS as per Homeland Security Presidential Directive-5 (Bush 2003), for managing crisis response (Edwards, 2007; NIMS, n.d.). However, consensus decision making, and shared governance is a common management style in the IHE organization and leaders are accustomed to making decisions after input and "buy in" from various stakeholders (Coyne et al., 2020). These authors declare that this style of leadership and management in expansive administrative structures, typically found in university settings, have been criticized for complicating the process of identifying key leaders to manage the COVID-19 pandemic response resulting in "death by committee" and delaying critical and efficient resource deployment. In contrast, it is argued, that during a crisis, effective leadership entails unilateral decision making, clear communication and empowerment to execute action plans (Coyne et al., 2020).

The incident command system

ICS is a crisis management system designed to efficiently manage personnel and other resources from multiple organizations (FEMA, 2018; Stambler & Barbera, 2011). The significant innovation of the ICS is to temporarily centralize authority and designate specific roles and responsibilities within a single scalable organization, made up of multiple units and personnel

activating the functional units needed to manage the immediate and projected incident demands (Jensen & Thompson, 2016). The ICS management characteristics have been developed with specific features and principles that have been discovered to be fundamental at improving communication, coordination, adaptability, and efficiency during highly volatile time critical events (McEntire, 2015; Stambler & Barbera, 2011). The initial development of the ICS incorporated expertise from forest and wildfire response and management, systems engineering and business management (Stambler & Barbera, 2011).

History of the ICS

The ICS has been in existence since the early 1970's and was developed in response to the command, coordination, and communication challenges that resulted from the massive multijurisdictional extended-day wildfires in the State of California that occurred between September 22 to October 4, 1970 (Auf der Heide, 1989). The historical evolution of ICS in the U.S. can be briefly summarized as three stages of advancement, 1) functional development, 2) voluntary implementation, and 3) mandatory requirement (Moynihan, 2009). In 1971 the US Congress approved \$900,000 (approx. \$6 million today) for the U.S. Forest Service to develop the Firefighting Resources of Southern California Organized for Potential Emergencies (FIRESCOPE) program (Stambler & Barbera, 2011). The two major components of this program included research and development of an off scene Multiagency Coordination System and the on-scene Incident Command System. Following a period of intense research and development by practitioners and consultants, the ICS soon became the de facto standard for organizations such as the fire services, U.S. Forest Service, U.S. Coast Guard, the Environmental Protection Agency, the Occupational Health and Safety Administration and law enforcement agencies (Harrald, 2006; Stambler & Barbera, 2011; Walker, Ducey, Lacey & Harrald, 1994). The September 11, 2001, terrorist attacks triggered a process to firmly embed a single universal system into crisis response

practice in U.S. policy. The adoption of the ICS within NIMS was issued by President George W. Bush through Presidential Directive 5 (HSPD-5) on February 28, 2003, with mandatory nationwide implementation, under the authority of the U.S. Department of Homeland Security (DHS), taking place from March 2004. The ICS has evolved further into an all-hazard system which has now been advocated for use worldwide (OFDA, n.d.; USAID, 2017) and is also used extensively by hospitals (known as the Hospital Incident Command System or HICS) (Backer, Smiley & Schoenthal, 2014; Tsai et al., 2005) and the oil and gas industry (known as the Incident Management System or IMS) (IPIECA-OGP, 2014). The U.S. Agency for International Development (USAID) and the Office of Foreign Disaster Assistance (OFDA) have expanded the adoption of the ICS through various international projects by establishing a network of trained ICS practitioners in disaster response organizations and developing countries globally (USAID 2013; 2017).

Contrasting perspectives of the ICS

Even though there is significant support for the adoption and implementation of the ICS, there is a longstanding argument in the academic literature regarding the benefits and effectiveness of centralization of coordination and decision-making during crisis response and the overall effectiveness of the ICS. The two main crisis response models that are discussed and contrasted are the, 1) human resources / problem solving model (supporting emergence and improvisation), and the 2) centralized command and control model (bureaucratic and militaristic). Much of the critique is aimed at the use of the ICS as a hierarchal command and control, militaristic type system, to respond to large-scale incidents or disasters. According to Chang (2017) the analytic framework which is often used to compare and contrast the ICS with other managerial systems uses organizational theory based on Burns and Stalker's (1972) seminal work. Specifically, comparisons are made between "mechanistic" and "organic" managerial systems which are

viewed as the two extremes along a continuum (Chang & Trainor, 2020). Dynes (1990; 1993) argues that the traditional command model is based on “false assumptions” about human behavior in disaster situations. These include the belief that there will be social chaos and the threat of role conflict and abandonment by formal responders which can only be eliminated through military style command and control. In addition, these kinds of systems reduce flexibility, exclude the decentralized natural social systems (community) or units (volunteers) during response efforts and restrict the potential for improvisation. Dynes emphasizes that “instead of command, the emphasis should be on coordination and instead of control, the emphasis should be on cooperation”. Quarantelli (1988) supports this argument and states that command and control response systems rarely work well and advocates for an open system that “loosens up” the command structure. Dynes elaborates declaring that the flexibility and initiative amongst the various social units should be maintained by merging with existing social structures and proposes the use of an “emergent human resources model”. In agreement, Tierney (2003) finds that the centralized command and control hierarchy is inefficient and incompatible with the actual societal responses of collaboration and informal relationships that positively affect outcomes in a disaster. Specifically, much of the criticism of the ICS pertains to the inability of effectively incorporating emergency organizations and volunteers (Drabek, 1985, 2005; Neal & Phillips, 1995; Schneider, 1992; Trainor, 2004; Wenger, Quarantelli & Dynes, 1990). Academics argue that the ICS can limit the role of inter-organizational relationships and increase the potential for conflict between organizations (Drabek & McEntire, 2003) and that integrating informal volunteers into a formal response system may even be counterproductive and reduce their effectiveness (Whittaker, McLennan & Handmer, 2015). The dismal response to the Hurricane Katrina disaster is regularly used to provide an abundance of critical rhetoric regarding the failure of the bureaucratic and hierarchical control mechanisms used to respond to the tragedy calling for a network and partner-based system (Comfort, 2007; Kapucu, 2009). However, many of the early scholars agree that in large-scale disaster operations where inter-organizational coordination is not an issue and where

the central command has restricted capacities, decentralized coordination structures are more effective (Steigenberger, 2016). In contrast, during small-scale disasters and in complex operations that require a higher level of inter-agency dependence, centralization of coordination is desirable. Wenger et al. (1990), declares that only paramilitary type organizations, such as the fire services and law enforcement, will be able to use command-and-control type systems such as the ICS. Buck, Trainor and Aguirre (2006), state that there will be great difficulties if the organizational system of the ICS is imposed on those not familiar with the system.

However, providing a positive evaluation of the ICS, Bigley and Roberts (2001) state that the ICS is a highly reliable and flexible temporary organization to manage diverse resources in complex and volatile task environments allowing for its use during all types of incidents regardless of size, complexity, and duration, including day-to-day emergencies. Moynihan (2009) finds that the interpretation of ICS as a bureaucratic hierarchy is misleading and suggests that the ICS is a highly centralized mode of network governance that provides a formal mechanism to enhance network coordination. Moreover, Moynihan contends that the ICS does provide the ability to switch between centralized and more decentralized forms of network governance based on the demands of the tasks at hand.

Remarkably, the paradox between academic criticism and practitioner support for the ICS, is based on a very limited body of empirically grounded theory on ICS published in peer reviewed journals (Lutz & Lindell, 2008). Jensen and Thompson (2016) in their comprehensive systematic literature review of ICS, determined that most of the critique is not based on any original empirical research to support the claims. Furthermore, Stambler and Barbera (2011) report that the assumption that the ICS was developed from a military model is unfounded. There may be similarities, however they state that the ICS was developed using recognized management principles, such as Peter Drucker's theory of Management by Objectives (MBO) and designed to accomplish the five basic functions of any successful organization, namely, establish authority

and the functions for planning, operations, logistics and finance. Using a management and organization perspective, Bigley and Roberts (2001), declared that the ICS system provides significant benefits to alternative organizational forms. However, in almost every research paper on the ICS, scholars highlight the dearth of empirical research on the subject and the need for further investigation. According to Jensen and Waugh (2014), many of the assumptions regarding the ICS are unfounded and require further research.

Alternatives to ICS

Inter-organizational, coordination, cooperation, and communication during disaster have long been a major challenge for response agencies as well as other public and private organizations with a duty to respond and protect its community. The ICS is arguably the most developed and persistent system used today. Other systems such as the gold-silver-bronze (GSB) command system, which was originally developed for the police in the UK (Pearce & Fortune, 1995) has many of the same characteristics as the ICS; although GSB is situation based whereas ICS is function based. The Sphere (2018) project was initiated to better coordinate multi-organizational international humanitarian disaster response through the voluntary acceptance of a set of standards. The Health Emergency and Disaster Risk Management Framework (H-EDRM) is an attempt to integrate multiple organizations working collaboratively during a health disaster (World Health Organization, 2019). The Emergent Human Resources type model has been put forward by many of the academics critiquing the ICS (Dynes et al., 1972; Neal & Phillips, 1995) but specific and practical ways of implementing these recommendations remain elusive.

Utilization of the ICS on a university campus

The literature on the use of the ICS in IHE's is sparse and mainly focuses on campus-based active shooter incidents (Fazzini, 2009; Fox & Savage, 2009; Jones, 2012). Therefore, this case study will provide a much-needed contribution to the limited literature on the use of ICS in IHE settings. The following section provides context on the response and use of the ICS at the Oklahoma State University during the COVID-19 pandemic.

The initial (acute stage) response objectives were accomplished by an IMT made up of staff, faculty and students using ICS features and principles, to establish the (1) operational changes required for the expansion of diagnostic testing at the laboratory site, (2) careful management of specialist staff and training and recruitment of additional staff, (3) support to improve COVID-19 PCR test turnaround time, (4) a specimen collection service to rapidly transport samples from regional health clinics across the state, and (5) collaborative co-ordination and support from various stakeholders (AAR,2020). During the return to campus (chronic phase) the IMT objectives were to establish, identify, manage, and execute the requirements for the return of students and employees to campus and reduce the likelihood of further spread of COVID-19 illness amongst the population, whilst maintaining operations within the required Centers for Disease Control and Prevention (CDC) recommended precautions (CEAT IMT Archive, 2020).

The organizational structure included command and general staff positions based on the ICS pre-designated roles and responsibilities as per the NIMS requirements (NIMS, 2019). The organizational structure for both operations consisted of five functional areas: command, operations, planning, logistics, and administration/finance. Within the ICS, and especially during larger incidents, the incident commander (IC) manages the organization and not the incident. The mandatory positions within the command staff structure are filled at the discretion of the IC. The specific benefits within both the acute and chronic operations were that it allowed personnel from different departments to quickly blend into a common management structure; provide logistical

and administrative support to ensure that the lab staff, technicians, and faculty could meet their objectives and facilitate cost effectiveness by minimizing the duplication of effort. However, according to Branum et al., (2010) command staff that are assigned to these roles and serve in a similar capacity in the non-response organization (i.e., finance officer assigned as finance chief etc.) perform worse than those who fulfil the ICS roles as part of their regularly duties. However, most of the current limited research has critically analyzed the emergency responder use of the ICS.

Conclusion

There is much criticism regarding the use of the “bureaucratic” model of command and control during crises, particularly by academics. Practitioners continue to argue that the current ICS is a powerful tool and is well adapted to bridge the gaps and overcome the barriers in inter-organizational coordination, cooperation, and communication. However, there is a dearth of empirical research on the use of the ICS in IHE settings, particular by non-responders.

Accordingly, this study will “critically evaluate the IMT member perceptions, attitudes and experiences, and the use of the ICS, during the IMT’s response to the COVID-19 pandemic, in the pursuance of providing recommendations for improved IHE usage of the ICS”. Considering that IHE’s receiving Federal funding are required to implement the ICS this study will provide a valuable contribution to the limited literature on the use of the ICS in IHE settings.

CHAPTER III

III. RESEARCH DESIGN AND METHODOLOGY

Introduction

The research design and methodology of this study is explained in detail in this chapter. A broad description of the key methodological concepts is discussed including the methods of data collection and analysis. The underpinning epistemological stance for this study uses social constructivism (Fosnot, 2013; Garrison, 1998) for knowledge creation. This foundation for understanding the findings from the study, is based on the pragmatic views, perceptions, and personal experiences of the research participants of the respective Incident Management Team (IMT) responses. An exploratory qualitative case study design approach is used to formulate the two cases that were studied. Qualitative case studies allow for an in-depth, multi-faceted exploration and detailed understanding of the complex issues in a real-world context (Yin, 2018). Semi-structured interviews were utilized as the primary method for data collection. Inductive and deductive analysis methods were applied to examine the raw data and identify themes from which the theories were developed. Content analysis was used to quantify and analyze the meanings and relationships between the words, themes, and concepts. A visual representation of the research design and methodology is provided in Figure 2.

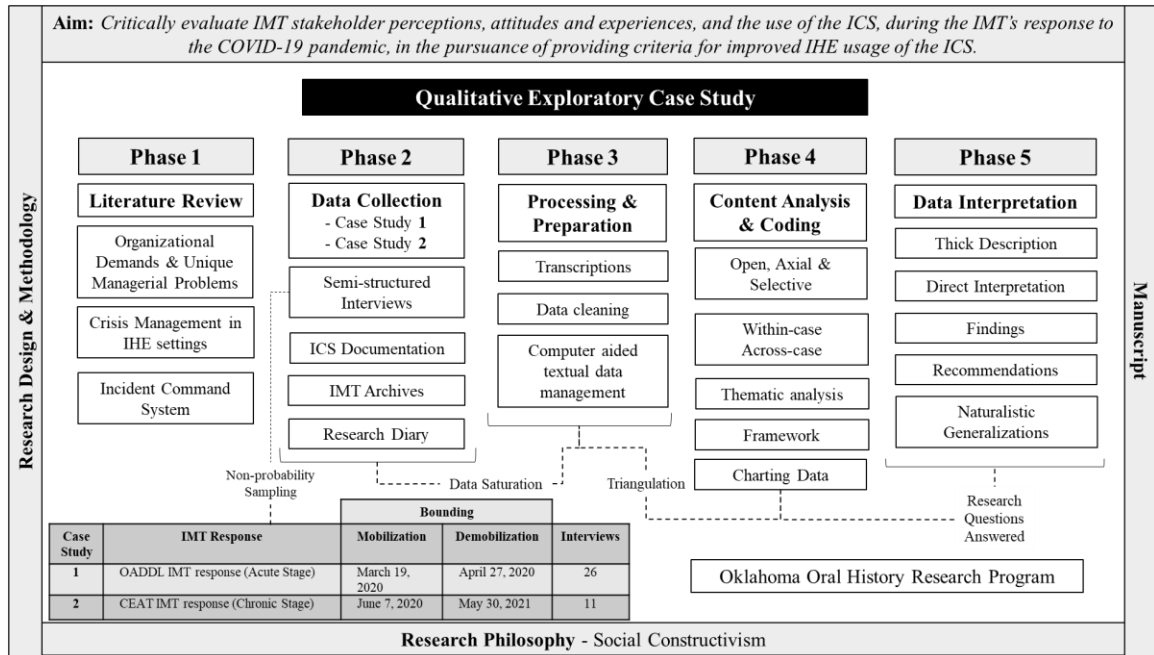


Figure 2: Visual representation of the research design and methodology for this study

Philosophy, ontology, and epistemological perspectives

A good understanding of philosophical perspectives provides the researcher with the self-awareness and theoretical insight required to obtain knowledge about reality (Moon & Blackman, 2014). Guba and Lincoln (1994) posit that a philosophical perspective or paradigm, represents the “world view” or frame of reference that the researcher brings to the study. This view of the world and the position the researcher takes in it, provides the basic tenets of belief that guides action (Guba, 1990). The researchers past experiences, beliefs, and research discipline strongly influence their own perspective (Creswell & Creswell, 2017). Most importantly, the researcher’s view on reality (ontology) and the creation of knowledge (epistemology) is embodied in their philosophical perspective and consequently the methodological approach that they will use (Maxwell, 2013). Ontology can be defined as the “study of being” or the nature of reality (Crotty, 2020) and “what is there that can be known about it” (Guba & Lincoln, 1994). Epistemology

relates to the origins, nature, and construction of knowledge and the relationship between the knowledge holder and what is known (Maykut & Morehouse, 2002). Thus, it can be seen that ontology and epistemology are intimately connected (Crotty, 1998). A range of ontological paradigms exist which can be demonstrated by using the dichotomy between realism and relativism as a continuum. At the one end, realism claims that there is only one absolute truth that exists independently of what is being perceived (Maxwell, 2012). On the other, relativism claims that no one true reality exists, and that the world is comprised of multiple realities that are created in the human mind (Andrews, 2016). Similarly, epistemological positions can be differentiated along a continuum with objectivism (reality is independent) on the one end and moving through constructionism (subject constructs reality of object) to subjectivism (reality is pluralistic) (Moon & Blackman, 2014). Guba and Lincoln (1994) contend that these paradigms are “in all cases human constructions”. Crotty (1998), states that social reality emerges from people’s social practices and is culturally derived. Merriam (1998) declares that reality is constructed by individuals interacting within their social worlds and that there are multiple layers and interpretations of reality and knowledge construction. Thus, people’s perceptions differ, and reality is based on their own personal construction and perception of the world (Searle & Willis, 1995).

These truths can be explained dependent upon the perspective the researcher takes.

Constructivism affirms that the truth is relative and reliant upon the subjective human and social construction of meaning and reality (Baxter & Jack, 2008; Yin, 2018). Maxwell (2012) argues that because no single truth exists, but rather multiple truths, the constructivism approach acknowledges the complexity of this reality. Therefore, the philosophical view underpinning this qualitative exploratory study is informed by relativism, pragmatism, and a constructivist epistemological position.

Research design

Quantitative methods generally provide tools for explanation and control while qualitative methods provide tools for understanding complex interrelationships (Bell, Bryman & Harley, 2018). For example, quantitative studies on risk perception use demographic variables such as gender, age, and income to demonstrate household risk perceptions in multi-hazard environments (Bronfman, Cisternas, Repetto & Castañeda, 2019; Lindell & Hwang, 2008). Qualitative studies, however, reveal deeper factors such as cultural influences, trust in organizations, and past experiences (Sullivan-Wiley & Gianotti, 2017). The main assumption of qualitative researchers is to understand the meaning constructed by people and the way they make sense of their experiences in the world (Stake, 1995). Furthermore, qualitative studies can shed explanatory and predictive light on important phenomena in real life contexts. The limited academic literature on a topic and the uniqueness of a research topic aligns well with the qualities of a qualitative-exploratory research approach (Swedberg, 2020).

Research questions

The most important condition in establishing appropriate research methods is to clearly define the research questions (Yin, 2018) and align the methods for investigation. In qualitative studies research questions usually focus on seeking patterns of expected or unanticipated relationships between phenomena (Stake, 1995). The 3 research questions for this study are:

RQ 1 - What are the salient attitudes, experiences, and perceptions of the incident management team members regarding the use of the incident command system during the short and extended responses to the COVID-19 pandemic?

RQ 2 - What are the enablers and barriers associated with the deployment of the incident management team and the related use of the incident command system in response to the demands of the COVID-19 pandemic on the IHE?

RQ 3 – What are the criteria for successful deployment of an incident management team using the incident command system that would enhance organizational crisis management practice for IHE administrators and leaders?

The questions that were developed to elicit the data necessary to answer the research questions were developed with the intent to probe, explore and uncover how the ICS and associated concepts were applied in the two IMT responses. To achieve this, five levels of questioning were incorporated into each case study protocol as aligned with Yin's (2018) approach. The first level questions were verbalized to each individual research participant; the second level questions represented the line of inquiry about each individual case; the third level questions were concerned with the pattern of findings across the two cases; the fourth level questions pertained to the entire study and called on other reviewed literature and published data; and finally, the fifth level questions related to policy recommendations, conclusions, and inquiry beyond the immediate scope of this study. Examples of specific first level questions during the semi structured interviews included the following:

- Did you have any previous experience or training in the incident command system (ICS) before you were asked to participate in the IMT?
- Were there any other staff positions that you think would have been beneficial to include in the IMT?
- What were the challenges and benefits of using the ICS during the pandemic response?

The semi structured interviews were guided by the research participant and their perceptions of operating within the ICS. The broad fifth level research questions that guided the research inquiry were the following:

- What were the pragmatic implications of establishing the IMT in response to the COVID-19 pandemic?
- How did the establishment of the IMT influence the inputs, process, outputs, and impacts of the response operations?
- What were the relationships between the different members within the IMT that lead to the outcome?
- What were the specific benefits and challenges of incorporating staff, faculty, and students in the IMT?
- What recommendations pertaining to crisis management for institutions of higher education (IHE's) emanate from the study?

Examples of the interview questions for both the OADDL and CEAT IMT's are provided in the Appendices (Appendix C). Variations of these questions were asked dependent on the participants position within the IMT and whether they had previous experience using the ICS. Additionally, probing with follow-up questions were used to further clarify responses, or when answers were vague or ambiguous or when more specific or in-depth information was required.

Case study methodology

Extensive literature on the theory of case study research has been developed (Rashid, Warraich, Sabir & Waseem, 2019) with important seminal work published by Robert E. Stake (1995),

Robert K. Yin (2002), and Sharan Merriam (1998). Yin (2018) defines a case study as “an empirical inquiry that investigates a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident” (p.18). Yin further proclaims that the case study design is most useful in explaining the “how” or “why” and for providing an in-depth description and analysis of a complex social phenomenon. Case studies address these questions through deconstruction and reconstruction of complex phenomena providing the researcher with the means to explore the deeper relationships between these phenomena. In addition, Yin (2018) argues that case study methods have the capacity to explain causal links which are too complex for other methods such as surveys and experiments, to capture sufficiently. Furthermore, case studies can be useful for descriptive purposes (atheoretical), or for using theory to explore cases (interpretive), or developing theory (hypothesis generating), or to build on and refine existing theory (plausibility), and finally to test theory (confirming or infirming) (Kaarbo & Beasley, 1999). Depending on the issues being examined a range of case study designs exist which include exploratory, explanatory, descriptive, multiple case, intrinsic, instrumental, and collective (Stake, 1995; Yin, 2002). Case study research can be quantitative or qualitative. For the purpose of this study, a qualitative exploratory case study design was used to analyze both the initial phase (acute stage) IMT response and the extended phase (chronic stage) IMT response.

Stake (1995) recommends that the case under study should be viewed as a bounded system. Bounding the case within spatial and temporal dimensions designates the depth and breadth of the study and helps to define the scope for data collection (Baxter & Jack, 2008). Specific cases can be bound by duration, place, activity, definition and/or context (Creswell & Poth, 2016; Stake, 1995).

The cases identified for this study (Table 1) were two separate Incident Management Team (IMT) responses that took place during 2020 at the Oklahoma State University (OSU). The cases

include, 1) the initial IMT response (acute stage) to stand up the Oklahoma Animal Disease Diagnostic Laboratory (OADDL) to test human specimens for COVID-19, and 2) the extended phase (chronic stage) which includes the College of Engineering, Architecture and Technology (CEAT) IMT response to plan, prepare and monitor the reopening of the college for the return of staff, faculty, and students.

Table 1: Time period bounding the case studies in the proposed research

	Case	From	To
1	Initial response (Acute Stage) OADDL IMT	March 19, 2020	April 27, 2020
2	Extended response (Chronic Stage) CEAT IMT	June 2020	May 30, 2021

Target population and sampling methods

It is important to directly or purposively select participants who have experienced the central phenomenon (Creswell & Clark, 2017; Maxwell, 2013). Also known as selective or judgement sampling, this form of non-probability sampling allows for researchers to rely on their own judgment when choosing members of the population to participate in a study. Purposive sampling improves the ability for the researcher to obtain better qualitative insights from a small sample population and derive more precise research results (Bloor & Wood, 2016).

To this end, a screening process was used to further define the case and the research participant selection. This included the initial reviewing of archival data for both the OADDL and CEAT IMT. In addition, several meetings with key personnel, such as the researchers committee chairperson and several individuals involved in the IMT response, and staff from the Oklahoma Oral History Research Program (OOHRP). These meetings and discussions guided the selection of participants for the research study. Based on this pre-analysis a purposive sampling method was applied to identify the most appropriate participants to include from the two IMT operation

responses. More specifically, members of the IMT who provided the command and general staff infrastructure required to manage the logistical, financial, planning, operational, media and safety issues related to the responses were selected. The participants selected from the OADDL IMT comprised of 28 members during the expanded organizational structure and the CEAT IMT comprised of 15 members. The target population were a mix of students, staff and faculty from various departments and colleges across two campuses at the OSU.

Ethical considerations

Several ethical requirements needed to be met prior to undertaking this research study. Firstly, the IRB Social, Behavioral, & Educational (SBE) Researcher's course was successfully completed by the researcher prior to the submission of the IRB application. The course was completed on 16 November 2021 and is valid until 15 November 2024 (Appendix A). Secondly, interviews with human subjects, require prior approval from the Institutional Review Board (IRB) before the research can commence (Laydner, Brandao & Kaouk, 2017). The researcher submitted all the requirements necessary to the institutions IRB and approval was obtained to proceed with the study (Appendix B).

In addition, the requirements and conditions pertaining to the American Psychological Association (APA) principles for ethical research practice (APA, 1992) were also applied. This includes the protection of human subjects, such as gaining informed consent, preventing harm, maintaining privacy and confidentiality, protecting vulnerable groups, and ensuring that equity was fulfilled. The informed consent from each research participant was obtained confirming that they fully understood the objectives, purpose, and how the data will be used both in writing and verbally.

Prior to the interviews, each individual research participant was contacted via email and invited to participate in the research study. A letter of introduction and background to the study was provided with the consent form attached. Signed consent forms were obtained from each participant prior to the interviews taking place. On receipt of the signed consent forms, they were immediately secured in a password protected folder or in a locked cabinet. At the beginning of each interview, permission was again requested clarifying any questions related to the study and the informed consent. Permission to record the interview was confirmed prior to recording the interview. The participants were also informed that the researcher would be taking notes whilst they were being interviewed. Participants were reminded that they had the right to terminate the interview if they felt uncomfortable or for any other reason at any time during the process.

Furthermore, the participant's right to not have all or any portion of the data included in the study was reiterated. The right of anonymity of each participant was also rigorously prescribed and all names and personal identifiers were redacted from the interview data to maintain confidentiality. Finally, all the human subject data was stored securely (i.e., password protected) with the appropriate level of anonymity, confidentiality, and de-identification. To maintain data integrity whilst preserving confidentiality of the research subjects, backups of the data were created, with strong passwords used to ensure information security.

Data collection

Multiple sources of evidence and information were identified, collected, and analyzed for the purpose of developing a critical and in-depth research inquiry. Obtaining multiple sources of evidence enhanced the quality of the case studies and provided the means to improve the reliability of the findings. Yin (2018) describes six types of evidentiary sources which include interviews, documentation, archival records, direct observations, participant observation and

examination of physical artifacts. Specific sources of evidence for this study included interviews, observation, and documentation which were collected based on the duration of each IMT response. However, the primary source of data was derived from the semi structured qualitative interviews.

Semi-structured interviews allow for the flexibility required for probing and follow up questions from each participant, providing for further inquiry and exposure of the phenomena within the area of investigation (Kallio, Pietilä, Johnson & Kangasniemi, 2016). The semi-structured interviews for this study resembled that of a guided conversation and were fluid rather than a rigid structured inquiry. Thirty-one separate interviews were conducted. Several IMT members did not respond to the invitations to participate in the study (2 from the OADDL and 1 from the CEAT IMT). Appendix D provides a breakdown of the separate positions within each of the IMT's that were interviewed and the duration of each interview. The interviews were conducted using a virtual video conferencing platform (Zoom). Virtual meeting platforms are an effective method of conducting interviews in different contexts (Archibald, Ambagtsheer, Casey & Lawless, 2019; Tuttas, 2015). This proved to be very effective as most interviewees had a good internet connection. Additional interviews were conducted with specific participants to clarify or contribute further data based on the analysis. Considering that the interview in qualitative research provides the single richest source of data (Gillham, 2000), piloting the interview process and questions was necessary to enhance the quality of the overall study (Yin, 2018). However, due to time and resource constraints piloting of only specific sections of the data collection process was completed. These sections included the interview questions, the interview guide, the video conferencing software, the transcription software, and the utilization of qualitative data analysis tools such as Atlas.ti and Microsoft Excel for data visualization and analysis.

Participants were asked questions based on their role and experiences within the ICS structure. Responses from the interviewees were explored further through probing to elicit deeper and more

detailed answers. There was a process of ‘back-and-forth’ questioning which allowed for a deeper understanding of the issues concerned. All interviews were recorded and then transcribed verbatim using transcription services. Zoom's Audio transcript feature automatically generated a searchable text transcript of the audio using Automatic Speech Recognition (ASR) to transcribe spoken words into written text with approximately 70-80% accuracy (Zoom, 2022). The transcribed data of each individual interview was then reviewed for accuracy and the necessary corrections were made so that the transcribed data matched the spoken word verbatim. The word count of transcribed data for each interview appears in Appendix D.

The video recording of the interviews also provided the ability to visualize facial expressions and body language. Observations and participant inputs often stimulate new insights or ideas for further exploration or validation of subtle inconsistencies that have been revealed (Irani, 2019).

Detecting and noting these nuances provided rich information for further exploration.

Observational evidence such as participant body language during interviews, was also noted and documented.

Documentation analysis is an integral part of qualitative research, improving the quality and validity of the results (Bowen, 2009). The documentation compilation in this study included, agendas, minutes of meetings, reports and progress reports, proposals, evaluations, emails and letters, news articles and other articles appearing in the mass media. In addition, archival data specific to the OADDL IMT response was provided by the OSU Police Department and included the incident action plans, ICS forms and other ICS related documentation. The CEAT IMT archival data was provided by the college and contained minutes of meetings, agendas, meeting recordings, emails, and other records. All the data was made available to the researcher for analysis. The total size and type of documentation for each IMT is illustrated in Table 2.

Table 2: Archival data for the OADDL and CEAT IMT responses (OADDL IMT, 2020; CEAT IMT, 2020)

Case Study	Type	Size
OADDL IMT	Documentation (Incident Action Plans, meetings, briefings, activity logs, ICS forms, reports, photos)	1.22 GB
CEAT IMT	Documentation (meeting recordings, emails, briefings, activity logs, reports, procedures)	2.77 GB

Early interpretations, and critical reflection by the researcher throughout the data collection process was essential (Gale, Heath, Cameron, Rashid & Redwood, 2013). A research diary was an important tool used by the researcher to record reflexive notes, thoughts, and impressions of the data throughout the research process.

Usually, data collection continues until the saturation of data has been reached. According to Guest, Bunce and Johnson (2006) data saturation may be attained in as few as six interviews, depending on the total sample size of the population. However, the most important sign that data saturation has been reached is to recognize when no new data or themes are obtainable (Fusch & Ness, 2015; O’reilly & Parker, 2013). The researcher observed data saturation when no new categories or themes were being developed after about the sixth or seventh interview. However, to capture the nuances and distinctions between each of the IMT positions, the researcher continued interviewing until all the selected participants were interviewed.

Analytical approaches

The research logic refers to how the researcher demonstrates and verifies the inferences in the study (Maykut & Morehouse, 2002). A deductive approach can be used when the themes and codes are pre-determined, for example, when examining the specific research question/s or

previously established literature and theories. An inductive approach can be used through the process of unrestricted coding and the generation and refinement of themes. If the researcher wants to focus on specific issues but also allow for the discovery of other issues, such as participant perspectives and meaning, a combined approach can be used (Gale et al., 2013).

Table 3: Research logic synthesized from Creswell (2009); Fletcher (2017); Lewis-Beck, Bryman, & Liao (2003)

Method	Description
Induction	Verify theory by recognizing patterns supporting the development of categories and themes (perspectives or dimensions) that emerge (Lewis-Beck et al., 2003).
Deduction	Deduce a hypothesis by looking back at the data from the viewpoint of the themes and to gather further evidence to support the theme (Creswell, 2009).
Abduction	Interpreting social phenomena in terms of social actors' motives and understanding by re-describing data using theoretical concepts (Fletcher, 2017).
Retroduction	Analyzing phenomena by continually moving between empirical and deeper levels of reality (Fletcher, 2017).

Table 3 provides a description of the methods of research logic used for reasoning. According to Gale et al. (2013), the researcher can use pre-existing theoretical constructs deductively to then revise the theory with inductive aspects or an inductive approach to identify themes in the data, before returning to the literature and using theories deductively to further explain certain themes. Stake (1995) highlights the importance of progressive focusing as the investigation unfolds and the data is clarified and redefined. The constant comparative method, which was developed as part of grounded theory, uses techniques that systematically make comparisons across cases to refine each theme (Fram, 2013; Rodriguez, 1998). Qualitative content analysis is a common method used to systematically identify and separate the similarities and differences in the various elements of qualitative data. The researcher compares and contrasts the data connecting these individual elements, thereby allowing for the recognition of patterns and themes which provide

for explanatory and descriptive conclusions between the relationships of the different clusters of related data (Gale et al., 2013).

This process of recognizing patterns supports the development of categories and themes (perspectives or dimensions) that emerge from the data analysis process. These generalizations, once established, can then be verified through further analysis or if necessary, data collection, to provide confirming evidence such as new observed instances. Creswell (2014) advocates this process of looking back at the data from the viewpoint of the themes to gather further evidence or data collection to support the theme.

Framework method

A highly structured analytical process in case study research methodology is crucial for consolidating, reducing, and interpreting data which can significantly improve the validity and reliability of the study (Merriam, 1998). The use of an analytic framework provides for such an organized structure for ordering and synthesizing data (Ritchie, Lewis, Nicholls & Ormston, 2013). This helps to organize and manage the original full accounts from participants which aids and supports the answering of the research questions through a systematic examination of the data. The framework method was initially conceived and developed as a flexible tool for the use in large-scale policy research by social scientists in the United Kingdom at the National Centre for Social Research (Pope, Ziebland & Mays, 2000; Ritchie et al., 2013). Its utility has resulted in the method being used extensively in other research disciplines, most commonly as a flexible tool for the thematic analysis of textual data from semi-structured interview transcripts. In addition, the framework method can significantly improve constant comparative techniques and can be used for either inductive or deductive qualitative analysis or a combination of both (Gale et al., 2013). The tool has now been adapted for use with many qualitative approaches and is not

aligned with any particular philosophical, epistemological, or theoretical approach (Ritchie et al., 2013). The framework method provides rigorous and transparent data management that supports the requirements for categorical aggregation (Stake, 1995) by categorizing and organizing data using features that include a clearly defined matrix with units for analysis (Ritchie et al., 2013). This organized structure provides the researcher with the means to systematically reduce the data during all stages in the analytical hierarchy for analysis by case and by code. In-depth analysis can then be accomplished across the entire dataset while preserving the individual participant outputs (raw data) and connections with other aspects of the data in the matrix. In this way the researcher does not lose sight of the individual's views while comparing and contrasting between the different levels of abstraction (Ritchie et al., 2013). The framework method provides an established platform for driving solutions to real problems to enhance the credibility and relevance of the findings (Gale et al., 2013).

Computer aided qualitative data analysis software

Computer Aided Qualitative Data Analysis Software (CAQDAS) can be used to organize, code, and manage the qualitative corpus of data in a digital format as it is very efficient for analyzing large data sets from multiple sources (Gale et al., 2013). On average, a one-hour interview will generate 15 to 30 pages of text which will take an experienced researcher half a day to code and chart. Using a CAQDAS can help to speed up this process by automatically tagging the data and generating framework matrices. In addition, CAQDAS can enable the researcher to integrate and effectively organize, store, search and keep track of a variety of data sources such as field notes, audio files, photographic material, key documents and narratives for easy retrieval and analysis. CAQDAS provides analysis tools, that promote coding, text interpretation, transcription analysis, content analysis and recursive abstraction that supports the provision of rigor and validity in the

data analysis process (John & Johnson, 2000). This can further aid in developing the descriptive features which can be more efficiently extracted from the database.

Data preparation

All interview data collected was transcribed verbatim (word for word). Though time-consuming, the process of transcribing the data word for word is an important practice for the researcher to become immersed in the data (Yin, 2018). After completing the transcription, the researcher started the process of interpreting the data using the transcripts combined with contextual or reflective notes (research diary) and other related documents (archival data). It was also useful to re-listen to parts of audio recordings to further clarify or cross-check specific content.

To aid the process of data analysis, all transcripts were printed with a wider than normal margin allowing the researcher to make analytical notes and jot down any thoughts and impressions of the initial interpretation. References to significant quotations were tagged with an anonymized transcript identifier, page, and line number.

To enhance the analysis process, the raw data was prepared, organized, and categorized using a computer assisted case study database to create an orderly and systematic record of both numeric and narrative data. In addition, the database allows for external scrutiny by other researchers which improves the reliability and trustworthiness of the case study (Yin, 2018). The exerts where also organized using computer software to enable further organization, analysis, quick searching, and verification of the findings with other data sources.

Coding the data and searching for themes

Thematic analysis is a method for analyzing qualitative data derived from interviews that entails examining a data set, identifying, analyzing and interpreting patterns of meaning (Braun & Clarke, 2012) and is best suited for elucidating a given group's conceptualization of the

phenomenon under study. According to Braun and Clarke (2012), the process of thematic analysis includes, become familiar with the data, generating initial codes, searching for themes, reviewing, and defining the themes and then the writing up.

The researcher initially used a top-down approach, constructing a code framework based on the ICS organizational structure and the features and principles. Bearing in mind that the study focus was on how the ICS was utilized during the two IMT responses, this formed the foundation for the analysis. Creating a code schema or framework helps to organize the multiple levels of data, improve coherence, further develop the coding procedure, and maximize the data analysis and theory development process (Creswell, 2014; DeCuir-Gunby, Marshall & McCulloch, 2011). The coding framework enabled the identification of the connections within and between the various cases (Appendix E).

The process of coding the data develops extensive codes capturing as many elements from the perspectives as possible. These codes can refer to values, emotions, experiences, and beliefs (Maxwell, 2013). Three types of coding were applied in this study. Open coding was used to break the data up and develop codes capturing the separate elements of each individual interview transcript. These codes referred to values, emotions, experiences, and beliefs. Axial (focused) coding involved finding the links between categories and subcategories of the framework. Selective coding identified codes belonging to the selected core category.

Coding required the researcher to carefully read the transcript line by line and apply a label or code that connects the data to a concept, paraphrase, or category. Varying levels of detail were used linking specific words, lines, paragraphs, or sections of the text. Each interview transcript was further broken down into units of analysis identifying the presence of specific codes. This process segments or fractures the data in preparation for systematic comparison with other parts of the data set. This also made it easier for the researcher to identify anomalies that may not

otherwise have been detected making the analysis stronger (Maxwell, 2013). The initial code list developed provided a scaffold for the extraction of key concepts and phenomena that represented key aspects of the application of the ICS. The researcher read through the transcribed data of each interview several times to assign the excerpts to the individual codes. The codes pointed to specific areas of the ICS and areas of interest that were identified deductively and inductively. Open coding was utilized to identify concepts or areas that did not fit within the code frame but were significant or important.

The data from the transcriptions were then organized based on the frequencies of keywords using the code list on a variety of data sources from the interviews, researcher notes, and documents. The codes were explored and examined using qualitative content analysis to construct categories, identify patterns and recurring themes, and build the associated explanations and meaning through a process of constant comparison (Creswell, 2014; Pope et al., 2000). Patterns were identified and connections within and between categories were established. Codes were compared using comparative analysis for similarities and variances. In addition, backtracking was applied to ensure that the initial and subsequent codes and concepts were clarified accurately to reflect the connection with the resultant meaning.

This process created a working analytical framework that was applied to the subsequent transcripts. Several iterations of this process were needed until no additional codes emerged. Each code was assigned a specific number or abbreviation for indexing all the data from each individual transcript. These were either written directly onto the transcripts or captured in the appropriate software tools. Additional labels connected to each category were then used to ensure that other or similar data was not ignored.

Interpreting the data

The data interpretation process consisted of several interconnected levels of exploration and in-depth interrogation of the data. Interpretation of the data was applied during both the data collection and analysis phases. Proceeding with the analysis process during the data collection phase, helps to shape the course of the continuing collection of data and allows the researcher to follow emerging areas of inquiry, refine questions, and begin the development of theories (Pope et al., 2000). Starting early with the data analysis provided the researcher with additional insights and strengthened the existing connections and relationships in the data. Additionally, new data was constantly compared with existing data for corroboration and divergence.

To manage more effectively the large volumes of qualitative data for interpretation, charting the data into categories using a visual matrix created from a spreadsheet can help to ‘reduce’ and summarize the data (Saldaña, 2014). Charting requires the researcher to strike a balance between reducing the data while retaining the original meaning of the interviewees. In addition, mapping the data can help to identify common characteristics and differences and elucidate the theoretical concepts that may either emerge from the data or prior theory. Finally, an analytic memo was used to keep a record of specific ideas, concepts or themes that were identified throughout the analysis process and referred to for further exploration and evaluation. Once this ‘system’ for in-depth analysis has been developed, interpretation of the data can become more effective.

According to Pfadenhauer et al. (2017), the use of systems approaches for data analysis and interpretation can highlight the relationships within and across levels that can influence the findings that emanate from the implementation of complex systems, such as the ICS. To better aid the understanding of this relationship and the interactions during the IMT operations, the case studies were measured on four separate but interconnected levels; 1) the individual, 2) group, 3) and the organizational level. According to Beckett, Farr, Kothari, Wye and Le May (2018), the individual level includes the details of the characteristics of the stakeholders; the group level

incorporates the stakeholder relationships within the system; the organizational or institutional level, highlights the culture, structures, rules and norms.

Both inductive and deductive analysis, facilitated the discovery of recurring themes and enabled the determination of whether further excerpts were required to support the narrative development. This strategy helped to identify and build on the emergence of key discoveries from the analysis which supported the findings and the recommendations. The process of analysis continued as further discoveries and connections were made during the writing of the narrative and the findings.

Within case analysis drew out the key themes and patterns contained in the data with that of the literature. A sequential process of analysis continued with comparison of the results of one interview with another and eventually one case with another. Cross-case analysis compared the commonalities and differences of the inputs, activities, outputs, outcomes and impacts between the units of analysis in the two individual case studies. Cross-case analysis enables the refinement and development of concepts and further builds and tests theory (Eckstein, 2000) by expanding, collapsing, merging, and creating categories (Khan & Van Wynsberghe, 2008).

Further development of the findings was accomplished through the contrasting and comparison of data with the published literature on ICS. Findings were cross-checked and compared for both corroboration and divergence. Rival or alternative explanations were presented where possible. The data was re-analyzed in the light of the emergence of new concepts and patterns from the review process. Additionally, member checking (Baxter & Jack, 2008) can be utilized to provide the opportunity for participants to clarify and discuss interpretation of specific data and offer additional perspectives on issues that require further inquiry.

Controlling bias

Ethical research and rigor applied by the researcher to the data collection and analysis is a critical practice to avoid bias (Yin, 2018). Cresswell (2014) recommends several actions to reduce the likelihood of bias in research practice. The researcher must value and strive for high ethical standards avoiding deception and maintain a strong professional competence. Being honest about the limitations and results of the study is paramount. In addition, an honest analysis and narrative of the researcher's cultural background and experience helps to identify any potential personal bias that could influence the study.

To this end, a brief background of the researcher is provided. The researcher has an extensive background and experience as an emergency management practitioner. In addition, the researcher was actively involved in both IMT responses. However, the researcher acknowledges the need to remain consciously aware of any personal bias that may arise throughout the research process. The training and practical application of conducting research has provided the researcher with specific knowledge and skill to place emphasis on the need for the neutral perspective that is required for the current study. The data must be allowed to 'speak for itself' and the researcher must provide the means for the results to reflect this stance.

The interviewer was constantly aware of the threat of reflexivity which can occur because of the interviewer's influence during the research process (Yin, 2018). When conducting the interviews, the interviewer minimized bias by being cognizant of any personal biases and assumptions that may affect the way in which the interviews were conducted. Moreover, the researcher reflected on the entire research process from the point at which the research question was formulated through to the drawing of conclusions.

Data derived from interviews (self-reported data) are potential sources of recall bias (Brutus, Aguinis & Wassmer, 2013). Participants who must rely on memory to recall their experiences or

events and may result in selective memory bias. Telescoping bias can occur when participants recall events that occurred at a certain time as if they occurred at another time. Participants that attribute positive events to outcomes because of their own performance whilst attributing the negative outcomes to external forces is attribution bias. Finally, the act of representing the outcomes as more significant than what was suggested by the data is related to exaggeration bias.

To avoid the bias created from using only one interviewee perspective, all participants linked to the command and general staff organizational structure of the two IMT responses were invited to be interviewed. This provided sufficient interview data to conduct cross-checking of the multiple sources to reduce incompleteness and interpretive bias (Yin,2018).

Validity and reliability

Table 4 illustrates supporting methods to enhance the validity and reliability of qualitative research. Yin (2018) provides an in-depth discussion for establishing the trustworthiness of qualitative research which includes construct validity (appropriateness of design), internal validity (credibility), external validity (transferability) and reliability (data dependability).

Maxwell (1992) contends that the relationship between the research conclusions and philosophy of the researcher (system of reality) are important factors of validity (descriptive validity).

Table 4: Factors pertaining to reliable and rigorous research practice (Maxwell, 1992; Merriam, 1998; Yin, 2018)

	Construct Validity	Internal Validity	External Validity	Reliability
Yin (2018) states that researchers need to ensure validity and reliability	triangulation, multiple sources and chains of evidence,	analytic techniques e.g., pattern matching	analytic generalization	case study protocols and databases

through the following strategies	member checking			
Merriam (1998) proposes strategies to ensure data validation through the following strategies		triangulation, member checks, observation, peer examination, participatory research, disclosure of researcher bias	thick description, typicality/modal categories, multi-site designs	triangulation, audit trail, clarifying researchers' position
Maxwell (1992) developed five categories to evaluate the validity of qualitative research				
Descriptive Validity	Interpretive Validity	Theoretical Validity	Evaluative validity	Generalizability
accuracy and credibility of the data	transparency of subjective inferences (meaning of events etc.) clarified via charting	systematic construction builds on observable evidence (data) illustrating the links & relationships that build theory	assesses the evaluations drawn by the researcher	ability to apply the theory resulting from the study universally

To ensure internal validity, triangulation was used as a main strategy, comparing data between interviewee responses, the data from the transcriptions and other data sources, such as those within the two separate archives (CEAT IMT, 2020; OADDL, 2020). Through the development of convergent evidence amongst multiple sources of evidence, triangulation significantly strengthens validity (Stake, 1995; Yin, 2018). Data convergence or data source triangulation was accomplished in various ways. The four types of triangulation that can be integrated into the methodological framework include, 1) data triangulation of sources, 2) investigator triangulation between different evaluators, 3) theory triangulation of perspectives of the same data set, and 4) methodological triangulation between case studies (Patton, 1990; Stake, 1995). The use of multiple sources of data and the multiple data analysis techniques allowed for triangulation and

the convergence and confirmation of findings which strengthened the connections in the data and simultaneously enhanced the validity and credibility of the study (Baxter & Jack, 2008).

To increase construct validity of the findings a chain of evidence must be derived between the findings, evidentiary sources, and the research questions (Yin, 2018). An auditable trail in the research process provides the evidence necessary to evaluate the reflexivity, rigor, and quality requisite in plausible research (Gale et al., 2013). Thick description allows for in-depth analysis of the complex layers of meaning and understanding (Polit & Beck, 2010; Popay, Rogers & Williams, 1998) which improves external validity (Merriam, 1998). Furthermore, member checking to ensure that the researcher accurately translates participant's responses into the appropriate data can be performed to improve the validity of the interpretations (Morse, Barrett, Mayan, Olson & Spiers, 2002).

CHAPTER IV

IV. FINDINGS: OADDL IMT

Introduction

The interviews provided ‘thick’ and ‘rich’ data for analysis. Accordingly, the next two chapters draw attention to the key findings or themes from the study using the data from the interviews as well as the archival data from both IMT responses. The researcher took a descriptive approach in writing the narrative for the chapters, incorporating many of the interviewee responses from both IMT’s into a precis that includes excerpts from the transcriptions. This was accomplished to aid the readability of the findings but also to draw attention to the individual experiences and views of the participants which were related to the events that were taking place early in the pandemic.

To maintain anonymity of the respondents’, the quotes extracted from the interview data have had references to the names or the ICS position title removed. The frequent use of an anonymized identifier of any specific respondent, even if an alias, could allow for the establishment of a pattern which could lead to the identification of the respondent, especially considering that documentation is publicly available that could be used to identify the participants in the study. Therefore, the data from the transcripts have been used in a pragmatic way that masks personal details while avoiding loss of meaning and context from the data acquired from the interviews.

Where there were context specific concerns or some confusion in interviewee statements, the researcher backtracked to the original transcription, and if necessary, reviewed the audio or video files, to verify the context and accuracy of the data. When specific phenomena were identified during the inductive analysis the researcher attempted to seek further explanation from the appropriate literature deductively. Literature related to the phenomena were cited, and further elaboration provided within the context of this study. Much of the literature cited connected the phenomena identified within the corpus of literature related to organizational theory and emergency management.

The overall aim of this study is to “critically evaluate the IMT member perceptions, attitudes and experiences, and the use of the ICS, during the IMT’s response to the COVID-19 pandemic, in the pursuance of providing recommendations for improved IHE usage of the ICS” while also providing a description of how it was utilized and how the organizational arrangements and management actions were adapted. To illustrate this, the Incident Command System structure, features, and principles are used as an organizational schema for the analysis and presentation of the findings. In addition, the narrative that follows is structured using a crisis management framework (Harrald, 2006). The diagram below illustrates the sequence of activity divided into the associated crisis management phase.

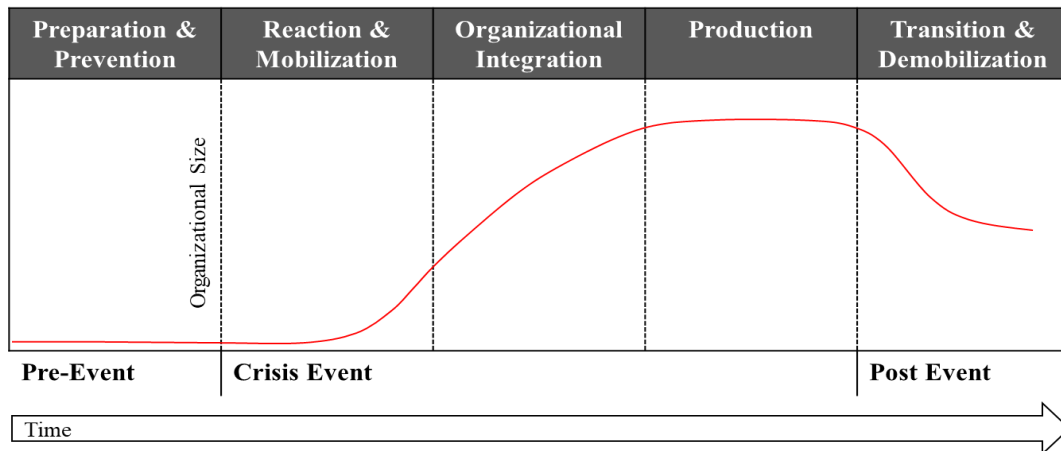


Figure 3: Crisis management phases (Harrald, 2006)

During the interviews, most of the data was not presented in sequence of the actual event as it occurred. However, an attempt is made to replicate the sequence of events followed in the narrative below. Specific areas of interest or issues that were identified during the analysis are further addressed at appropriate points in the sections related to that topic. The findings are discussed and contained within the narrative of each section. Where feasible, a key finding is provided that emphasizes the overall focus of the study and connects to the recommendations that were formulated and presented in chapter VI.

PRE-CRISIS

Prodromal stage

Risk perception of the coronavirus disease

Participants were asked to talk about their thoughts and feelings regarding the Coronavirus disease (COVID-19), as it was called at the time, and when it first became known to them. This was important because most of the IMT members had already taken protective action measures which could have a significant influence on decision making during a pandemic (Cori, Bianchi, Cadum & Anthonj, 2020). Moreover, from a readiness point of view, it was necessary to establish any direct involvement with the response activity prior to the initiation of the Incident Management Team (IMT). In addition, this line of questioning was used as a tool to aid in memory recall about the events immediately prior to the formation of the IMT and to set the scene and prime participants to the next line of questioning. Due to the significant media coverage and the impact that the virus was having globally it was identified as a good starting point to transport participants back two years when the first reports regarding the virus started to appear. Bearing in mind that the IMT response occurred just under two years prior the interviews (AAR, 2020) it was important to provide a means for participants to go back in time and

'connect' with the events that were occurring during the onset of the pandemic. Considering the responses received from the participants, the use of this line of questioning regarding the individual circumstances of the participants before the IMT response, proved to be an effective technique aiding recall. The collective recall regarding participants feelings and events that were taking place at the time were considerably detailed as many openly revealed their personal reactions and false assumptions regarding the virus, and even in certain instances, their own or family members health condition at the time. In addition to asking personal questions about the perceptions on the early stages of the pandemic, it was prudent from an oral history perspective, as described in the methodology chapter, to document and record the interviews as a systematic collection of living people's testimony about their own experiences related to the pandemic in addition to the IMT response.

Prodromal assessment

After analyzing the data, it was clear that most of the participants, particularly those that were or had a background as professional first responders, were not very concerned about the spread and local impact of COVID-19 in their location when they first came to know about it through the media. For example, a respondent with a professional background in the health and emergency medical industry had hoped that there would be little impact, *"I think, in your mind you like 'maybe it'll miss, maybe it won't get here,' just all those maybes that you would typically ask for."* Another respondent with considerable practitioner experience alluded to the general feeling of the study cohort with the response, *"it won't really get here, if it gets here, it won't be any big deal for us, it's not going to actually really impact us like it has the rest of the world"* and then emphasized *"we were wrong, painfully wrong."* One respondent was very concerned, *"it's just a matter of time before it's here in the US ... I remember being very scared ... I was a little overwhelmed I remember."* In addition, the organizations that professionals would normally look

toward for guidance were not providing the information and directives required for higher levels of preparedness and response to the pandemic:

“CDC wasn't providing a lot of great information. State health department was operating blind at that point in time, with a lot of things. It was really just like well, maybe we can just somehow stop it from coming here through travel or other means like a blockade method or something. That's what you're seeing in the media, and that was sort of the response at that time. So, that's initially where we were, I think in January, February of 2020.”

The awareness and response to the potential impact of the virus escalated rapidly soon after this period, as one respondent recalled:

“New York City, it was a mess I remember. I mean there was a lot of casualties and you're seeing these pictures of tractor trailers serving as morgues and things like that. I think it was the first week of March, where the governor in Tulsa did a press conference and there was the first case here in Oklahoma.”

However, there was still little known about the threat and specific transmission characteristics of COVID-19 as illustrated by the response from this respondent:

“At that point we still didn't even know for sure how it spread, how contagious it was, let alone all the different variants that have come along after, but at that time there were so much about literally every aspect of this that was unknown. We knew it could kill people quickly and that was it.”

Once the realization of the situation and the potential impact was determined, one of the respondents remarked, *“it was a bit of panic, I'll be honest”*.

Key finding: Awareness about the impact of the impending pandemic was very low amongst professional first responders and staff. However, several faculty members had higher levels of awareness regarding the potential consequences.

Preparation and Prevention Stage

The need for screening

Once the virus started spreading in Oklahoma and people started experiencing symptoms thousands of nasal swab specimens were being taken at clinics across the state. However, the capacity to process the specimens and test for the presence of the COVID-19 virus at the Oklahoma State Public Health Laboratory and a private lab in Norman, were very limited. A respondent declared that *“the Public Health lab just was not built up to do any kind of flow, of any kind of size”* and struggled to cope during the pandemic as many other commercial labs did in the U.S. (Scheck & Hing, 2020) and diagnostic labs around the world (Das & Dunbar, 2022). People arriving at the state clinics would *“be swabbed but it might be a week or longer or 10 days before they heard anything back.”*

At the time testing capacity was limited and there was a need to ‘flatten the curve’ (Feng, Glasser & Hill, 2020) and quickly identify individuals who tested positive. It was predicted that a ‘surge’ (Barba, Rosado, Pardo-Moreno & Rey-Biel, 2020) would significantly impact on hospitals and therefore screening for the ‘severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2)’ was considered the frontline for defense against the virus (Atkeson, Droste, Mina & Stock, 2020). The need for increasing testing capacity and for quick turnaround times was succinctly illustrated by a response from a respondent who emphasized the sense of urgency in the state at the time:

“The State itself had so many tests, so many positives, our infection rate at the time with the virus was so very drastically high and we had maxed out commercial labs. At the time, even the big

labs that do human diagnostics for a living, were 10 and 14 days out...people were waiting 10 to 14 days to know if they're positive or negative and at that point they either got bored and went on spreading or had been in quarantine and missed two weeks of work when they were negative. It was having a drastic economic impact on the State quickly, not to mention the health effects of hospitals. Doctors were calling constantly 'do we have results, do we have results, and can they get results' because they needed to know how to treat this patient, are they treating SARS-COV-2 or are they treating pneumonia."

Many universities have diagnostic testing capabilities, however, many struggled to get their labs certified and ready to run the diagnostics necessary for human specimen testing for COVID-19 (Maxmen, 2020). Both Oklahoma University (OU) and the Oklahoma State University (OSU) are land grant universities with diagnostic laboratory capabilities. OSU's Stillwater campus is in a relatively secluded rural area surrounded by mostly farmland whilst the OU campus is located near Oklahoma City. A respondent commented on the impact of the infection rates in the more built-up areas:

"It was these large health plexuses and OU; they quickly became overwhelmed with everything spreading and people showing up at the hospitals and we soon realized that it was going to be overwhelming for the healthcare workers in the system itself. So, I think that OSU was in a unique place"

Evaluating testing capacity

It was in early March 2020 that the capability of OSU's Oklahoma Animal Disease Diagnostic Laboratory (OADDL) to be potentially used as a state resource to test for the Coronavirus disease (COVID-19) was identified. The OADDL had been conducting testing for COVID-19 in animals for many years and had several diagnostic machines that could be used to test human specimens

(Bodine, 2021). When the request came in from the governor's office there was an immediate need to conduct a preliminary onsite evaluation of the quantity and suitability of the Polymerase Chain Reaction (PCR) equipment on campus that could be used for testing human samples for COVID-19. An initial assessment (IA) group was formed to verify if there were any suitable equipment available on the campus:

"[The IA group] started with a scurrying around finding every PCR on campus and noting the brand name, the model, because at that time of the COVID 19 pandemic there was only certain pieces of equipment that were actually under an FDA for emergency use authorization. So, we went around in about four or five hours and found every PCR on campus, a real time PCR on campus that could potentially qualify and then started digging through EUA's [Emergency Use Authorization] to see which ones actually could be used and found that we actually had some on campus that were already FDA approved and everything just kind of snowballed from there."

The Emergency Use Authorization (EUA) authority allows the Food and Drug Administration (FDA) who is responsible for protecting the public health in the US, to authorize unapproved medical products or unapproved uses of approved medical products (FDA, 2022). The authorization covers the use of equipment in an emergency to diagnose, treat, or prevent serious or life-threatening diseases or conditions caused by chemical, biological, radiological, and nuclear (CBRN) threats including infectious diseases, by facilitating the availability and use of medical countermeasures (MCMs) when certain criteria are met, including when there are no adequate, approved, and available alternatives during public health emergencies.

In addition to ensuring that the equipment was EUA compliant, Clinical Laboratory Improvement Amendment (CLIA) certification was required to meet the federal standards applicable to all U.S. facilities or sites that test human specimens. The certification was necessary to ensure the provision of accurate, reliable, and timely patient test results no matter where the test is done (see

CLIA, 2022). To achieve this requirement, the OSU Center for Health Sciences in Tulsa provided a CLIA approved doctor on staff to evaluate the laboratory facility and assist with the actions necessary to pass the inspection (AAR 2020; ODL CLIA, 2020).

According to a member of the IA group, the Oklahoma Animal Disease Diagnostic Laboratory (OADDL) was identified as the most appropriate facility to transition and be stood up for human sample testing as the PCR equipment “*that were already approved by FDA were sitting at the animal diagnostic lab.*” In addition, the OADDL was appropriately located “*at the edge of campus, has easy access, has drop off floors already, [and] had some infrastructure there that made a lot of sense.*” Thus, all these factors contributed to the decision “*to say okay let's also make this the human lab.*” Once the capability to test human samples was confirmed the governor issued an executive order (Executive Order, 2020) within a few days to both OSU and OU to stand up research facilities in response to the pandemic.

Although the emergency equipment was identified quickly, a growing body of academic literature on emergency inventory management for disasters, illustrate the need to establish formal systems in preparation for crisis events, especially when susceptible to surge impacts (Ozguven & Ozbay, 2014).

Key finding: There was an absence of a preestablished inventory of emergency related equipment that could be easily accessed electronically.

Establishing the sense of urgency

Having had no experience with the requirements of standing up a laboratory for diagnosing COVID-19 in humans, a member of the IA group emphasized the expectation and initial thinking, declaring, “*we had no idea what we were in for and at the time we thought that maybe the State Department of Health would coordinate everything, handle everything, we would just get samples*

to test". However, the requirements were far more than initially anticipated, *"I never dreamed of what we were jumping into when we said, 'yeah, we'll stand up a human lab' [I] had no idea."*

The events that were taking place across the state and the pressure of overcoming the challenges that were being faced was articulated in the statement, *"it felt very much like the state was on fire"*. The realization that the requirements were more than just standing up a lab, but also significantly increasing the speed at which the tests were conducted, and results made available, was identified as the most immediate challenge that needed to be addressed:

"The Pandemic was spreading very quickly, test turnaround times were a week, 10 days, two weeks, and at that point you're not controlling anything with this virus, everybody's already spread. It needed to be a 24-to-48-hour turnaround"

Initially the expectation was limited, *"we will just be a lab just doing the lab piece of it [but] that was not reality."* In addition to the identified need for quick turnaround times for the testing and availability of results, several additional requirements were realized:

"We had to start a lab from the ground up which meant a lab information management system, requisition to order tests, courier systems to even get specimens from around the state to the lab to test it. It was literally from the ground up in every aspect. It was literally every other piece of business that goes along with running a human lab and we had to stand it up in 12 days".

The realization of the requirements based on the existing resources that were available were overwhelming, *"every day, every hour, every moment was 'what is the newest emergency that has to be handled at this time to be able to take the other steps that we need to move forward.'"*

The IA group member used the analogy of *"the buildings on fire, we need to move now"* to describe the approach used to respond to the governor's request in standing up the lab.

CRISIS EVENT

Reaction and Mobilizing Stage

The call for help

A key member involved in the decision making during the early determination of standing up the lab realized the scale and magnitude of the situation. A more formalized and organized response was going to be needed:

“In the early days [it] felt like the bomb was still going off around us every day. I mean it truly wasn't the storm had moved through [and] we got to pick up pieces, this was, the storm is still throwing things at us, we don't even know what's coming next. It was around day four when we realized this is [an] emergency management response. This is nothing [like] we've ever experienced.”

Acknowledging the existing capacity, the assertion was made that the current laboratory staff had the necessary skills and experience to perform what was required to conduct the actual diagnostic tests using human specimens for SARS-CoV-2 in the laboratory environment:

“We have the scientists and researchers with that knowledge and background that we know and are confident in their abilities. We can run PCR tests; we can follow the protocols that have been developed to test for this virus.”

However, the anticipated demand required going beyond the boundaries of the current capacity of completing a PCR test on a human specimen in the controlled environment of the lab.

Acknowledging the complexity of the full requirements and the realization for urgency in meeting those requirements, the need for additional support was quickly determined:

“This is absolutely an emergency response type of action that has so many more pieces to it than the science and that was really the key deciding factor. If we're really building a lab from scratch, we've got to have that type of response and a structure to it ... we didn't even know where to start and we needed help with people who had some experience with this ... we've got to have someone on the outside that isn't focused on human medicine or lab practices protocols.”

The skills and experience required to effectively address the demand during pandemic conditions were identified to be outside that of those found in the laboratory, prompting the decision to seek for external assistance, *“it was all that outside of the science pieces that we knew we needed addressed and that was when the decision was made to reach out.”* However, the Stillwater campus had already shutdown and students, staff and faculty instructed to stay at home. The IA group responsible for identifying the capability of the lab tried to determine who could provide the required response, *“meanwhile the university is saying ‘everyone go home and stay there.’ And so, us trying to say, ‘who's still around we could even contact, how do we find somebody, who should we even talk to.’”*

It was by coincidence the IA group happened to identify a mutual friend and colleague that they thought could provide support or the guidance they needed. The group made contact, *“hey we're drowning, we need some serious help. Can you help us or help us figure out what needs to happen here?”* The individual that was requested to help had significant experience in managing large responses to major emergency incidents, *“they knew my background and knew that I had been on incident management teams of large incidents”*. In addition to having knowledge and experience in responding to large incidents from a previous profession, the individual was in a senior staff position and had a significant leadership role in a college. Recognizing the urgency of the situation, this individual immediately set out to establish and formalize an Incident Management Team (IMT) using the principles and features of the Incident Command System (ICS).

Although the realization that a crisis response was required, it was by chance that an experienced individual with crisis management experience was contacted to initiate the response. No formal procedure for activating an official crisis management system or response was followed, although the state had formalized the request. An email was sent from a senior member in the IA group to the individuals superior requesting the individual's involvement to head up the response (OADDL IMT, 2020).

Key finding: There was an absence of following a recognized official policy for activating crisis management support during severe impact on a business operation within the IHE as a consequence of a major crisis effecting the state.

Crisis within a crisis

The governor of Oklahoma declared a state of emergency caused by the impending threat of the COVID-19 pandemic on March 13, 2020 (Executive Order, 2020) and official shelter-in-place orders (SIPO) were issued on March 30, 2020, in Stillwater, OK. Whilst the process of getting organized to stand up the lab was underway, everyone that would be involved in the response would also be under constant threat of infection from the COVID-19 virus. This risk was impacted further due to critical global supply shortages of Personal Protective Equipment (PPE) (Cohen & Rodgers, 2020; WHO, 2020b), which would be required to protect those that would need to leave their homes to participate in the response. PPE, such as masks, were in such short supply and the need for medical professionals to know whether patients were positive or not with COVID-19 was elevated, *“doctors need to know immediately, ‘hey is this really COVID or am I wasting a ton of extra PPE that is already in short supply’”*. Healthcare professionals were being severely impacted by the shortages, *“the world was dealing with this toilet paper shortage, while in healthcare, [we] could not get PPE. It was literally impossible.”* In addition, it was noted that *“early on in the pandemic, all the N95 respirators had been used up, in Italy, in Europe and by*

the time that the virus hit in earnest here, stockpiles and supplies were incredibly low.” The fears related to respiratory protection for those working in the lab were a main concern:

“There were two challenges 1) we needed equipment and so that’s part of just leveraging networks and trying to figure out where can we get respiratory protection. Then 2) kind of the real art is when you’re in this kind of crisis mode and you have limited resources, you start getting into issues between the letter of the law and the intent of the law. Were we going to be able to follow every bit of the OSHA respiratory protection standard and how can we get at least as closest as humanly possible, and if we did have to make some kind of exception, that we were making an exception that wouldn’t compromise the health of the workers?”

Besides the respiratory protection and PPE, PCR diagnostic test kits for the PCR machines that were needed to scale up testing in the lab were also in short supply (Ranney, Griffeth & Jha, 2020). The global demand and resulting diagnostic-supply shortages was making it very difficult to acquire sufficient test kits to scale testing (Behnam, Dey, Gambell & Talwar, 2020). This became a significant challenge because, *“a lot of the coastal cities and coastal states were getting huge allotments of test supplies ... we weren’t getting anywhere.”* It was clear that a large quantity of PCR test kits was vital if the testing of specimens were going to be scaled up:

“You had thousands of people around the State of Oklahoma that were sick. They did not know if they had COVID or not because the lab system for processing those samples was inadequate, so it was a public health emergency, the testing part of it.”

The sense of urgency was very clear, *“This was a crisis now. This was a crisis that was long term, but this was a crisis event.”* Often, in situations where the resources of the local response community are overwhelmed, as in this situation, mutual aid can be requested. Mutual aid arrangements are documented agreements between agencies, organizations, and jurisdictions that provide a mechanism to quickly obtain emergency assistance in the form of personnel,

equipment, materials, and other associated services from members of the network (Cohn, 2005: FEMA, 2017a). However, there were a variety of factors inhibiting the activation of this arrangement:

“It would have been helpful to have people come in [however] the University culture is a little bit different, and I don't know if [we] could have taken somebody from Oklahoma City fire and put them in a position to interact with the faculty at OADDL, that probably wouldn't have worked.”

Another respondent claimed that *“when you deal with professional responders there's always an ego”* which could have complicated matters further. Besides the possibility of mutual aid several respondents echoed that *“everybody was up to their eyeballs. Emergency responders, emergency management and the pandemic. I don't know that there were a lot of extra people in the emergency management world to come, help us.”* In a similar vein another respondent stated that *“there was no way that we could have done this just [with] taking our professional responders just the police department or the fire department and trying to do this through the campus.”* Most significantly, there had been very limited experience in managing this type of crisis, *“part of the problem too is we know we didn't have a really well-established pandemic approach leading up to this because we've never been through a pandemic.”*

The needed response was significantly complicated due to the demands resulting from the pandemic outstripping the supply, exacerbating the situation further. This was a significant challenge faced by many organizations during the early impact of the pandemic (Raj, Mukherjee, de Sousa Jabbour & Srivastava, 2022). The needed support and resources could have been mobilized through mutual aid agreements. However, due to several issues the mobilization of those resources, particularly professional first responders, were going to be a challenge. The only choice left was to find more people with the necessary skills and experience within the campus community that would be willing to participate and help standup the lab.

Key finding: There were significant challenges with mobilizing external professional first response personnel and integrating them with faculty and staff during an organization-wide response to a major crisis affecting the entire state.

Organizing the diverse group

Once the decision was made to stand up the OADDL to test human samples for COVID-19, it became clear very quickly that a well-organized response was required using professionals that have the necessary skills and experience in disaster and crisis response from the campus community. An IA member reiterated, *“so the building on fire approach was out of absolute necessity for the state that Oklahoma was in at the time.”* A formal response was essentially initiated by the few individuals from the IA group who identified the need for a crisis management response. The decision to setup an IMT, use the ICS was based on the person who was contacted own professional experience as a first responder using IMT’s and ICS to manage large scale emergency operations.

IMT’s are typically used to respond to a wide range of complex large-scale natural, industrial, or civil emergencies requiring specific skills to stabilize the incident, protect property and the environment and save lives (Hayes & Omodei, 2011; Hayes et al., 2021). The IMT concept has also been used in more unusual events such as the space shuttle Columbia recovery operation (Donahue, 2004; 2006). An IA group member reflected on the impact that this decision had on the operation to stand up the lab, *“the IMT came into play, very quickly. It wouldn't have worked without the IMT.”* Considering that there was no predesignated IMT, and all the members had to still be selected and mobilized, it was still setup very rapidly as one respondent noted, *“it was ridiculously fast to set up that kind of operation.”* It is important to note that the IMT operation was not initiated through any formal university policy or plan requiring an IMT to be activated.

Essentially other management process could have been used if anyone other than the person that was contacted was asked for advice.

Typically, an IMT is mobilized during complex or prolonged emergency incidents (NIMS, 2017) to provide a command-and-control infrastructure using the NIMS incident command system (ICS) which incorporates functions that are predesignated to manage operations, safety, public information, planning, logistics, fiscal and administration issues related to that specific emergency event. The predeveloped organizational structure, systems and the roles and responsibilities are clearly spelled out in ICS and readily available online and other formats.

The standing up of the lab to test human samples was arguably a ‘new business’ operation that required an organization-wide response and not a first responder response to a major incident or sudden natural disaster. However, the actions that were necessary, required the same level of timely management during a crisis and called for the rapid deployment of resources:

“The principles are the same, it could be public health, it could be fire, a law enforcement issue ... the principles of command and control and management are the same for any type of incident. The goals may change, the structure may be different, but I believe that the principles are the same, and if you have people on an incident management team that have some experience and can be flexible in their thinking, you can adapt it to any kind of an event, where you have to manage many resources to achieve a common goal.”

An IMT member described ICS as *“applying people to problems to get them resolved”* and another described its value as *“empowerment of the different people, it is hierarchical but pretty low bureaucracy and that's really what we needed.”* The ‘lower’ level of bureaucracy was reiterated by another IMT member: *“it cut down on some of the traditional bureaucracy, which could have slowed the operation down. It sped things up.”* An IMT member emphasized the importance of the ICS especially when *“everything around you feels so out of control”* and that it

provides “some level of comfort when literally everything else is so out of control and changing every minute”. An inexperienced IMT member commented on the specificity of the system, “I love the clarity of NIMS and its scalability, but I love the clarity” and an experienced IMT member stated, “it was crystal clear. The ICS system laid it out crystal clear.” Another IMT member used the analogy of a storm to emphasize the value of the IMT and ICS:

“The way we had to respond so fast when things were changing so fast, it wasn't the storm had blown through, now we have to pick up the pieces, it was ‘everything [is] still in the air’ and so without having that structure and the added people that knew what needed to be done and knew the structure, it would have exploded.”

Interestingly, one member noted how ICS was used in a unique way during this incident response saying, “usually we're responding to something that's already happened and we're using that structure to be able to recover from that event. This was almost we are responding before the event actually happened.” The IMT member elaborated further on the uniqueness of the IMT response using ICS:

“Yes, we were responding to a pandemic, but we were ... almost setting up a mitigation strategy by utilizing an IMT, which I found to be very outside the box thinking. Utilizing it in a way that I've never seen and I'm not aware of it ever being used before.” Another IMT member had a similar thought regarding how the ICS was used and the ‘out of the box’ thinking:

“What was different about this was that it was not set up to protect against a threat per se but this was really set up to stand up a particular operation ...so that it can actually take care of the threat or the emergency. So, that's a little bit of outside the box thinking.”

These statements highlight the unique application of the ICS within this response, which arguably could be considered as improvisation which supported flexibility at both the organizational and individual level. Improvisation during a disaster response refers to modifications to how the

response actions are normally performed and could include changes to procedures, roles, equipment, and facilities (Webb, 2004).

The establishment of the IMT using ICS may also have promoted the sense of urgency that was required to ensure that the much-needed momentum was obtained to rapidly accelerate towards the desired outcomes. This was succinctly reflected in the following statement:

“I think it was a wise move to bring in the ICS system because it gave an element of uncertainty, an element of urgency and hammered home that this isn't just something that's going to pass.”

IMT members who were either trained in ICS or had military experience, found the system familiar and supportive:

“To me I was very comfortable with that honestly, more so comfortable with that than a lot of other organizational structures that I've been accustomed to, since I got out. So, really it was going back to what may seem very normal.”

However, there were members who were not familiar with the system and initially found it intimidating and foreign:

“I think initially it was kind of intimidating and the longer I had been a part of it, the more I kind of went into it, the more I started realizing that the kind of the hierarchy of the plan, was very like emergency management or with maybe somebody in the army or the navy and that kind of started to make more sense to me as to I'm not any of those things.”

There was no formal requirement to use an ICS approach in responding to the crisis. The application of the ICS was considered unique, even amongst experienced first responders.

Quickly integrating members into a team and expecting high performance from inception is not feasible during a crisis response (Griffith & Yombo, 2015). In the absence of any other crisis management system at the time, the ICS, arguably, provided a framework that supported the five

stages of team development (forming, storming, norming, performing and adjourning) (Tuckman and Jensen, 1977).

Key finding: The IMT and the use of the ICS provided an organizing mechanism with multiple characteristics that enabled a diverse group of people to integrate quickly strengthening group cohesion.

Member selection

One IMT member commented on how large the operation was, *“after our first initial meeting it kind of dawned on me how broad the scope was from different areas across campus.”* According to the AAR (2020), the IMT included members from at least 13 separate colleges and departments across two campuses (Table 5).

Table 5: The various departments and colleges involved in the OADDL IMT response (AAR, 2020)

Departments and Colleges	
1.	College of Arts and Sciences, Air Force ROTC Detachment 670
2.	College of Education and Human Sciences (CEHS)
3.	College of Engineering, Architecture and Technology (CEAT)
4.	College of Veterinary Medicine (Vet Med)
5.	Edmon Low Library
6.	Oklahoma Animal Disease Diagnostic Laboratory (OADDL)
7.	OSU Department of Brand Management
8.	OSU Department of Public Safety (OSUPD)
9.	OSU Emergency Operations Center (EOC)
10.	OSU Environmental Health and Safety (EHS)

11.	OSU Housing and Residential Life
12.	OSU Medicine
13.	OSU Motor Pool
14.	OSU Research, Division of the Vice President for Research
15.	OSU Transit Services
16.	University Health Services (UHS)
17.	University Mailing Services

A concerted effort was made to identify staff within the university that were either trained in the ICS or had some form of ‘command-and-control’ experience. One experienced IMT member highlighted the relevance of including staff, students, or faculty from diverse backgrounds and even from different countries with experience by stating that “*command experience is command experience*”. Command experience in this context can be characterized as the relevant experience working within a highly structured hierarchical organization or system typically found in military and fire service organizations. The selection of personnel that would be amenable to command-and-control management through individual experience, such as in the military, or first responder roles were dominant. An IMT member highlighted this selective emphasis as being one of the key success factors of the response:

“To pull in people that had knowledge of how this type of team and this system works. I think that's what really led us to being successful and the people [the IC] pulled in were people that were willing to do what was needed.”

Another IMT member commented on the advantage of having a college that provides an emergency management program and associated training units stating that “*we have people that understand ICS structure and we were able to pull from that group of people with prior knowledge.*” However, the aim was to find people in the campus community that had “*similar*

experience in the function” within the ICS and not necessarily the authority of their position within the university. An IMT member emphasized the importance of selecting the right ‘fit’ of personnel for the position role and not aligning the title of the position with a similar level of authority from the institution’s organizational hierarchy, “you need to have the people in the seats who are best equipped to deal with the issue, not the person with the title ... pick the people who can fill the roles.”

There were several people on the IMT that did not have any form of ICS training or command experience. An experienced IMT member stated *“as long as you have enough key people that really understand the whole system to kind of keep it between the lines. You can bring in more novices.”* Each section chief had some form of knowledge regarding the ICS structure putting them in a position to lead staff that may not have had ICS experience, but did have significant institutional knowledge and experience:

“So, your incident commander, your deputy commander, your operations chief, logistics chief, all the different chiefs were familiar with ICS. They had a working understanding of the incident command. We had a section chief that had underneath them somebody with institutional knowledge. So, the section chief could be leading that person with institutional knowledge to be able to get done what needed to get done.”

In addition, institutional knowledge also played a significant role in achieving the objectives as one IMT member asserted:

“Institutional knowledge made that a much easier transition than if it would have been somebody that didn’t understand how OSU human resources personnel system worked. We had the same thing on the finance side, the logistic side, on the supply chain”

A senior IMT member validated that those without prior knowledge of ICS accomplished what was necessary, *“once they understood how the IMT functioned and understood their role, people*

performed well". The personnel for the IMT were selected during the response aligning their previous experience and skill with that of the role requirements within the ICS structure.

Key finding: IMT members were selected based on their experience and skill which was aligned to their role in the ICS.

Key finding: There was an absence of an official formalized well-versed crisis management team readily available to respond to the critical needs of the organization.

Relational credentialing

A credentialing system is an important process which can enhance response velocity and team performance particularly under rapidly changing and stressful conditions (see Brogan, Goodier, Nijjar & Rose, 2022; Chandramouli & Schwarzhoff, 2010; Peterson, 2006; Schultz & Stratton, 2007). The Federal Emergency Management Agency (FEMA) provides a guideline, as part of the NIMS for the "Credentialing of Personnel". It provides details on the national credentialing standards and processes to be used to facilitate multijurisdictional coordinated responses supporting interoperability among federal, state, local, territorial, tribal, and the private sector to facilitate emergency responder deployment (NIMS, 2011). Although the procedures in this guideline could not be used for this IMT response for various reasons, including the lack of a formal credentialing system or database, the above evidence suggests that a form of 'relational credentialing' was used to identify and select appropriately trained or experienced staff for the IMT. The selection was therefore based on relational knowledge of the individuals who possessed the desired skills and experience, and not necessarily the required qualifications for a formal IMT deployment based on NIMS requirements. This 'relational credentialing' extended beyond the campus environment and included students from various academic programs. Many of these connections were made through direct relationships with the specific individuals or through

someone knowing of someone with the relevant skills and experience related to the tasks required. However, one member who was ‘outside’ of the relational network was only selected much later, “[they were] really good about strategically placing people but then at the end, they just forgot that [redacted] person, so I kind of came in late, to be honest with you as far as the formation goes.” This delay highlights the importance of having preidentified roles and the specific people that can fulfill those roles prior to activating an IMT, which is usually the case in a formalized crisis response system. An experienced IMT member illustrated the need to identify members that had the necessary experience and skill with the phrase, “we shouldn't take fish and put them in a pasture and think that they're going to be a cow and we shouldn't take a cow and put it in the pond thinking it's going to be a fish”. This depiction underscored the effort that was placed on finding the ‘right’ people early on during the response. Besides the need to have the people with command-and-control experience an IMT member provided these reasons for being selective:

“Keeping people in their knowledge base helps keep them comfortable in somewhat of a stressful situation but also [allows them to] perform the tasks better than what it could be for somebody that doesn't have that previous understanding.”

One IMT member revealed that they were initially “a little intimidated at first” but because of the preexisting relationships with many of the IMT members was able to interact with other team members more easily:

“Having that comfort level of working with people you already are comfortable with, made it ... less intimidating and more easy. It was easier for me to ask questions and say ‘Okay, I am not quite sure what you're wanting here’”.

Many of the attributes identified in the selection of team members can be found in the literature on developing highly effective teams (Delizonna, 2017; Hakanen et al., 2015; Hakanen &

Soudunsaari, 2012; Laiken, 2017). These studies have revealed that ‘conscious’ team selection is considered a key factor for project or operational success indicating that it is “better to have a first-rate team with a second-rate plan, than to have a second-rate team with a first-rate plan” (Hakanen & Soudunsaari, 2012). Team members selected with ‘intent’ provide the cohesion to overcome obstacles and react faster to changing surroundings. In addition, when team members are selected primarily based using pre-existing social networks, the members exert higher effort towards the team task, performing better than do randomly assigned groups, and about as well as those selected based on optimal skill complementarity (Chen & Gong, 2018).

The selection of the IMT members occurred quickly and relatively efficiently. The IMT positions were filled with individuals that were either familiar with command-and-control management or had the relevant institutional knowledge associated with the position. However, there were certain delays that may have resulted in a few individuals joining the team later than would have been desirable.

Key finding: There was an absence of a formal credentialing or a skills inventory system to keep track of individuals with desirable skills and experience for an IMT response.

Key finding: There was an absence of utilizing an official predesignated system to preselect and mobilize the members required for a crisis management response.

Organizational Integration Stage

ICS roles and responsibilities

The specific role and responsibility of each of the command and general staff positions within the incident command structure are pre-determined. The functional nature of the structure is based on

five major management functions which include command, and the general staff functions of operations, planning, logistics and finance / administration (Figure 4).

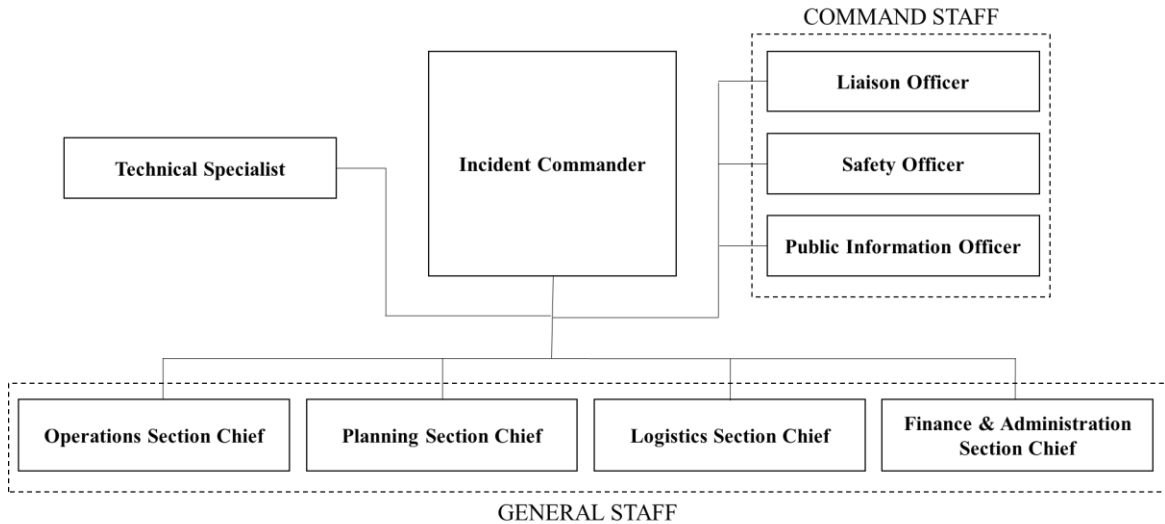


Figure 4: Incident command system organization structure depicting command and general staff positions (NIMS, 2017)

These functions are the foundation upon which the ICS organization operates (NIMS, 2017).

Additional staff functions which can be designated by the incident commander include the command staff functions of public information, liaison, and safety. Integral to this organizational structure is the principle of the ‘chain of command’, which refers to the overall hierarchy of the positions within the organizational structure. The principle of ‘unity of command’ relates to each specific individual within the structure having a single designated supervisor to report to and receive assignments from (NIMS, 2017; Wenzel, 2007). Early studies of organizational theory have revealed the benefits of unity of command (Davis, 1983; Takahashi, 1986). Thus, the individuals who now fulfil their duties within the ICS, no longer report directly to their home department or unit supervisor but only to the supervisor within the IC organizational structure. It is important to note that there is no correlation between the ICS organization and the administrative structure of the individual’s regular day-to-day department. This is to prevent

confusion over the sometimes, very different position titles and responsibilities within the ICS.

An IMT member remarked on the diversity of the professions that made up the IMT:

“This IMT thing was very extraordinary because you had people, in my opinion, from so many different walks of life, with so many different skills. You had accountants, veterinarians, engineers, police officer, I mean it just ran the gamut in terms of different types of people.”

It is important to note that in this new role, the reporting lines will most likely be very different. Reporting lines change from the regular reporting lines in the individual’s day-to-day job, to the immediate supervisor within the ICS structure, who will often be a different person that may be from a different department or organization. However, some of the roles, such as public information, logistics and finance may be very similar to the role in the regular job:

“It was something extraordinary but my piece of it was not. I was doing what I do every single day. I was just doing it for different people on a grander scale.”

In the ICS, the chain of command and unity of command principles (discussed further on) are applied in all incidents, but the actual command structure itself and the responsibilities of the team members can change based on the type of incident or the specific role that is filled. An IMT member emphasized the significance of having predesignated and standardized roles and responsibilities within the ICS:

“[ICS] has the predetermined roles. It gives the training people should have to be able to fill those roles, it tells you the basics of what those roles should do. Now there's still some leeway in there on how you make them function or do whatever, but I think having a pre-determined system that already establishes the basics of what those roles would do, I think it was highly important. I think people coming in, once they realized and knew what those roles were and accepted those roles, I think that was just as important as having the people with the right background.”

The value of having predetermined roles saves time that would have otherwise been used to identify and designate a function:

“The structure allows things to happen more quickly. You don't have to think about it. It's here's the command chart, fill it in and everybody who's familiar with it just goes into that mode automatically. So, I think that's the big strength of why it [standing up the lab] was able to get done so quickly, because there's not this 'okay let's sit down with a blank sheet of paper and figure out how to do it'”.

In addition, the standard roles make it easier for other members within the ICS to be able to quickly identify which section or person is responsible for which tasks:

“You didn't have to stop and think, what is the scope of this individual's responsibilities? The system [ICS] laid out the scope of those responsibilities and the relationships just helped it all work and flow well, but the system answered a lot of the questions that you waste time on otherwise.”

This preestablished organizational design provides a ready-made approach which reduces the time and effort in establishing the organizational structure. It also provides the people in those roles a certain level of autonomy to make decisions.

Key finding: The ICS provided the predeveloped organizational structure and roles which enabled the IMT to quickly assemble into the very specific predesignated functions.

A more detailed breakdown of the position specific functions used in the IMT response are provided below.

Command Functions

Incident commander

The Incident Commander has the overall responsibility for managing the IMT response and for other elements such as establishing the incident objectives. The Incident Commander role is the only position that is responsible for all the ICS management functions until a particular position is delegated to someone else. An IMT member summed up the role of the IC succinctly with this statement:

“The role of an incident commander, in a lot of ways it's like a conductor of an orchestra, and sometimes it's directing, but other times it's just bringing the voices together, the music together and the better the musicians are, the easier it is for the conductor.”

This statement in many ways supports the decision to be selective in choosing the IMT members, especially considering that a designated well-trained and rehearsed IMT did not exist for university-wide responses prior to the establishment of the OADDL IMT. Besides having the staff with the desired skills and experience, a factor which was emphasized by many of the IMT members, was the influence of leadership and credibility. A senior IMT member emphasized that *“leadership abilities are important ... especially if it's a group that you haven't worked together with much, credibility of the incident commander is as important as leadership.”* In addition, *“[the] Section chiefs and others were very experienced leaders and also very experienced followers.”*

The influence of leadership and the credibility of leaders to motivate, direct and manage teams to accomplish the desired results is well documented in the literature (Holmes & Parker, 2017; Posner & Kouzes, 1988; Sweeney, Matthews & Lester, 2011). This is particularly important

when leaders provide “guidance, direction, and momentum across [multiple] organizational lines that develops into a shared course of action and a commonality of purpose among people and units that are doing what appears to be very different work” (Marcus, Dorn & Henderson, 2006). In crisis response there are numerous examples for the need to overcome silos or the “stovepipe” effect which are often created through deeply ingrained bureaucratic cultures, financial processes, continuous narrowly focused operations, self-protectiveness, insularity, independence and allegiance to home agency culture and practice. In addition, long-standing traditions of rivalry and palpable struggles for control create many barriers to enhance performance and efficiency, especially among organizations or units with similar or overlapping missions and scope of responsibility. These barriers when imposed on the response to an unprecedented event, as was experienced during the response to the terrorist attack in New York on 9/11 (Dearstyne, 2007), increase the complexity and ability to achieve an acceptable response outcome. In the ICS a significant emphasis is placed on having a single authority or what is commonly questioned by responders from external agencies, ‘who is in charge?’ before decisions are made or followed. An IMT member emphasized this need:

“Somebody's got to be identified as the leader at that point in time pretty quickly, and that person's got to get out in front of everything and realize that they got to make tough decisions and those tough decisions may not be popular with some but that's okay ... make sure you have the right people in place and clear expectations of who the boss is.”

The IC was well known to most of the team members allowing for a high level of familiarity at the outset of the formation of the IMT. Many of the reporting lines within the IMT organizational structure were the same or very similar as those within the IHE organizational structure (AAR, 2020). For example, one of the PIO’s, the logistics section chief and the finance & admin section chief all had very similar reporting lines to the same person that was the IC in their home department. In addition, there were six IMT members in total that came from the same

department or college as the IC, many of which were subordinates. The IC was well known by at least three other IMT members based on the IC's previous professional background in emergency response. The majority of the IMT members knew the IC through the academic program in emergency management from the college and previous encounters through other programs and projects on the campus. This level of preestablished familiarity between the IC and many of the team members invariably enhanced the groups cohesion and contributed to the speed at which the team was formed and performed. The IC also held a position of authority in the college, was a well-respected leader and understood how the IHE system worked. To illustrate this influence one IMT member declared:

"I knew people working at the Whitehurst [college administration] at the 30,000 foot level that I would let [the IC] know, 'well yeah talk to this person they'll know', sometimes it's easier to pass that on to someone who's already at that level to talk to that person laterally because it's a peer to peer rather than me trying to appeal to them, it would be 'and who are you again?'"

All these factors invariably provided the IC with the relevant institutional knowledge and experience in support of the IC responsibly within the IMT. As one IMT member put it:

"I honestly believe the leadership at the top level, and I specifically mean [the IC] ... having an understanding of the team, knowing the background of people ... knowledge of how this type of team and this system works ... that's what really led us to being successful"

Institutional leadership and influence were a major contributing factor in support of the establishment and operational requirements of the IMT. This influence extended beyond the internal support of the IMT members and contributed to the overall functioning of the IMT within the wider organization of the IHE. An important factor was the IC's ability to recognize and understanding the organization's current culture and align the response accordingly. Leadership

style and culture are considered critical success factors in crisis management response (Bowers, Hall & Srinivasan, 2017).

Key finding: The active participation in the IMT of a senior administrator from the IHE provided a high level of leadership and influence which improved the performance of the IMT response.

Liaison

The liaison officer (LO) served as the single point of contact (PoC) for representatives of Oklahoma State Governor's Office, Oklahoma State Department of Health, the National Guard, the Oklahoma Animal Disease Diagnostic Laboratory OADDL), and others. The LO was also “*in frequent contact with the leadership at our Medical School and with the state ... sometimes daily calls with folks at the state level*”. The individual in this position speaks on behalf of the IC and exchanges incident related information with other relevant parties both internally and externally. Other responsibilities include identifying interorganizational problems and limitations and capabilities of resources (FEMA, 2021).

One of the major accomplishments that the Liaison role had early in the response was the securing of sufficient PCR test kits for the lab. Without large quantities of the test kits scaling up the tests would have been significantly challenging. According to the IMT member most of the kits were in short supply because of global demand. The LO noticed that many of the kits were being provided to coastal cities at the time. During the process of obtaining the supplies the IMT member recalled having to reason with the head of the global affairs division of a large manufacturer and global supplier, stressing the need and the location of the lab as “*being in the heartland*” and asserting that “*we're trying desperately, we need test [kits] as bad as the coastal cities do, help us here*”. The IMT member declared with surprise that “*we were hoping to get 1000 or two, we had placed an order for 10,000 and expected just trying to get pieces in chunks*”.

of that shipment and not the whole allotment.” The efforts proved surprisingly successful in that 10,000 PCR test kits were delivered during the first few days of the response, significantly aiding in the scaling up of the tests.

In addition to liaising directly with the supplier of the test kits, the liaison was communicating with a variety of other people and obtaining critical information for the IMT operations. For example, one of the key sources of information during the first few days was the governor’s office. Critical information was provided through the liaison, *“here’s the numbers we’re seeing, here’s the delay times we’re seeing on turnaround times.”* This type of information was crucial to improving the situational awareness of the IMT and enabling the response prioritization.

Although the operation of the OADDL itself was an integral part of the IMT operation, the lab operated completely outside of the direct influence (command and control) of the IMT. The liaison was also responsible for coordinating activities between the IMT, and the lab:

“While the IMT was getting a lab setup for data entry and getting people trained and doing all the necessary facets there. They were handling those pieces, while we’re furthering things in the [OADDL] lab.”

One of the issues identified in the AAR was that it would have been helpful to have had an additional LO appointed within the IMT (AAR, 2020). The responsibilities of the liaison may have gone beyond the normal ICS role for this position in that there was some level of responsibility for the functioning of the lab as well. The additional responsibilities may have significantly increased the work assignments outside of the specific IMT responsibilities and resulted in extremely stressful situations:

“The first 35 days I didn’t see my kids awake and I was about to have a meltdown like ‘I need time with my children.’ The time and depth of energy that something like this takes, it takes a toll on you as a person, and it takes a toll on those around you.”

Interestingly, according to the AAR (2020), there was another person allocated to the IMT as a liaison, although their role was separate from the lab. In addition, the evidence from the interviews suggests that the two liaisons had limited, if any interaction between each other.

The liaison played a crucial role in communicating and providing critical information between the IMT and external organizations. The role of the liaison in this response may have gone beyond that of the regular role of a liaison officer within the ICS.

Key finding: Having a dedicated liaison to communicate between the IMT and both internal and external organizations and departments was beneficial during the response to stand up the lab.

Public information

The public information officer (PIO) function is responsible for the formulation, dissemination, and release of information about the incident to the media, local communities, and other organizations. The public information function also conducts media monitoring and collects incident-related information to inform the IMT (Hughes & Palen, 2012; NIMS PIO, 2020). The dissemination and release of information often occurs in support of the incident objectives and is approved by the IC for final release.

Although the IMT response to standing up the lab may not have had a lot of media attention at the time, *“there was a problem and a bottleneck at brand management with the release of information.”* This was beyond the control of the PIO assigned to the IMT, who in addition to the ICS procedures for the release of information, had to follow the release of information procedures from the home department. One of the IMT members elaborated on this common challenge regarding the release and dissemination of information during a crisis:

“I ran into this before with large institutions, especially with large loss where decision makers in the government at the local level, they don't want anybody to know anything. Well, in an incident

knowledge to people is everything. That's what will let you get things done - is informing people that this is going on and you may need help, or whatever, because people want to know. They want to know what's going on at the university, what's this thing with the lab."

The release of information to local communities and the media during the IMT response was not a major concern, although there was significant media interest. Later, during the response and soon after, there was a plethora of publicity about the success of the lab. Unfortunately, there was very limited, if any, media reports that included information on the professional response from the IMT. Most media reports focused on the lab and lab staff and did not mention the IMT and the impact that this team had on standing up the lab. An IMT member emphasized, "*what brand management does to market the university is much different communication than communicating with people during a crisis.*" The literature on crisis communication supports the early release and dissemination of information to the public (Coombs, 2015). In situations where high risk and fear of infection are likely, effective public information can significantly enhance appropriate community action and recovery (Reissman, Watson, Klomp, Tanielian & Prior, 2006).

Key finding: The release and dissemination of critical information during the IMT response was hampered by external communications policy and practice that was incompatible with the ICS philosophy on public information.

Safety

While the IC has the overall responsibility for the safety of the IMT members, the safety officer (SO) function is directly responsible for monitoring the safety of the IMT operations and for advising on all matters relating to operational safety. The SO responsibilities included the health and safety of incident personnel and preparations for the necessary actions to be taken in the event of a positive COVID-19 case. According to the NIMS (2017), the SO also has the explicit

authority to immediately suspend any activity or operation when unsafe conditions or situations occur.

Safety was a major concern during the pandemic. Personnel responding to crisis incidents are considered to be high risk for exposure to COVID-19 (Newberry, Gautreau, Staats, Carrillo, Mulkerin, Yang & D'Souza, 2022). Limited information and lack of concern for safety increases this risk (McAlearney, Gaughan, MacEwan, Gregory, Rush, Volney & Panchal, 2022). In addition, a lack of PPE can further lead to exposures and illness (Rebmann, Vassallo, & Holdsworth, 2021). The safety challenges for first responders during the pandemic warranted greater attention (Ellingson, Gerald, Sun, Hollister, Lutrick, Parker & Burgess, 2021).

During the early stages of the pandemic and certainly during the initial IMT response, the wearing of masks was not a major priority for team members, *“in the beginning I don't think we wore masks the first day just because we didn't really understand that threat yet”*. Another IMT member located in a different area declared, *“I think the first couple of months I was just maybe in denial like ‘okay well because we didn't wear masks in that Room’”*. Although many IMT members operated remotely, in certain areas that required in person interactions, social distancing was not a concern:

“Man, we were kind of like sitting in a little petri dish down there in that office, but the numbers that we had down there back in 2020, will we do that again if we had to spin one back up in 2022 - probably not!”

Limited and sometimes confusing information regarding the precautions required for the prevention of the spread exacerbated the issue, *“there was a lack of knowledge on what are the CDC recommendations, and they were changing like every week”*. In addition, the attitudes and behavior amongst many of the IMT members were focused on the response work and not necessary on the precautions and using social distancing and proper masking. A few of the first

responders were not very concerned with their own personal safety, *“I didn't have any overwhelming concern for my personal safety, I mean for us first responders that's probably the last thing we think about, our personal safety.”* However, the practice of COVID-19 precautions seemed to be more of a personal choice amongst team members as one IMT member described:

“Some of them were very conscious about staying isolated when we were in the room. I always wondered, no one said ‘I'm kind of frightened or anything’. I think they just thought we're going to be okay, because I kind of trust these people because we're all in this together. So, I think it was after that that I finally thought ‘man, we probably should have worn mask a little more frequently’, but it was so intense, and you had to communicate effectively, and it was hard to hear with a mask on.”

There were instances where certain individuals were very vigilant with regards to their own personal safety and those of others. For one individual, who improvised several solutions, the precautions were essential:

“These were suggestions that were more widely known, and we were not in school at that point, but we ended up needing to do those very same types of things later, and I saw it in stores like they were putting marks on the floor like where you should separate and directions, you should walk and certainly the mask wearing was encouraged at that point. I wouldn't have thought of that myself, but that was on the news that you should do that, and I thought, even if it doesn't, it's something super easy to do.”

The lack of experience with operating under pandemic conditions coupled with the critical PPE shortages (Ehrlich, McKenney & Elkbuli, 2021), a lack of clear mandated precautions and first responder attitudes may have contributed to increased levels of potential exposure of IMT members. However, there were individuals who were concerned for their own safety and implemented precautions on their own.

Key finding: The ability to apply the necessary precautions to prevent the spread of COVID-19 between IMT members was hampered making those working in close proximity vulnerable to infection during the response effort.

Technical specialists

Technical specialists provide specialized knowledge and information that can be key in developing incident objectives, identifying suitable resources to do the work, helping with the accomplishment of the necessary actions in a safe and efficient manner and enhancing situational awareness (Greenhoe, 2013). Technical specialists are only activated in the ICS when required and can operate anywhere in the organization, including as command staff, as they did during this response. The technical specialists are typically certified in a particular field or profession and perform the same or similar functions as in their everyday jobs (NIMS, 2017).

The technical specialists for the OADDL response were trained in communicable diseases, environmental health and had experience with emergency management related to the SARS and Ebola outbreaks, *“the original SARS outbreak, I was in charge of emergency management ... I kind of had done that, as a fire drill back with the original SARS and so round two is certainly a whole lot more intense.”* There was already an awareness of the impact that an infectious disease could have on the campus, *“we knew that if Ebola ever got here that we would have some challenges with international students and people traveling all over the country at Oklahoma State.”* Both technical specialists were situated on the incident command structure to provide advice and guidance directly to the command staff which, considering the situation at the time, was probably the most suitable placement.

Key finding: Employees within large IHE's provide specialist knowledge, skill and experience that proved valuable during the IMT response, especially when managing this kind of unusual and infrequent crisis event.

General Functions

Operations

The Operations Section Chief is responsible for managing the operations required to accomplish the incident objectives (NIMS, 2017). The operations section consisted of several branches including collection, staffing, data entry and housing (AAR, 2020). Interestingly, several other functions and activities took place that were not included as a function or branch in the organizational chart depicted in the after-action report but were documented in the report and revealed in the interviews. These activities included staff respiratory protection and blood born pathogen training, fit testing, medical physicals, and prophylaxis vaccination determinations and administering, building security at OADDL and the logging of specimens as they were delivered to the lab.

These operations functions that required additional personnel, even in a temporary capacity, could have been included on the organizational chart. Although this may not have impacted on the delivery of these actions, the incident command system does allow for the allocation of individual functional areas called branches or even sub-divisions, called groups for clarity of function (FEMA, 2018a). One of these members, which was relatively isolated, felt 'disconnected':

"I had almost zero communication with anybody, and so I didn't have a clue what was going on. I am involved in this, but I'm really not kept in the loop. There seemed to be somewhat of a disconnect in the communication."

It may have been prudent to indicate this function on the organizational chart so that an assigned supervisor and the associated reporting lines were clear.

Respiratory protection and the proper use of respirators were necessary to protect the health of the people working in the lab. The operations section *“took on that role of doing all of the respirator training making sure they were medically qualified. We had to do their training and then we did their fit test.”* In addition to the respirator training, fit testing was conducted for each person working in the lab to test the seal between the respirator's facepiece and the wearers face. Due to the critical supply shortages at the time, the operations section was able to work with the Department of Chemistry who made the necessary fit test solution as described by an IMT member:

“They were actually able to help us create the saccharin solution that you typically buy from 3M but as the pandemic was going on, 3M was out of the solution. So, we were able to work with them to actually help them make the solution, so we could fit test individuals. Typically, when you fit test, you want to fit test them quantitatively, so you have a number. It's very difficult when you have to do people on a bunch of N95s and when you do, the N95 and you do it quantitatively you take out a respirator because you have to put a port in it. So, now you have a respirator that's not usable and with the shortage of respirators, OSHA had actually allowed you to do it qualitatively, which is a saccharin test. So, we were able to actually have all the solution we needed, working with the chemistry department to be able to make it. I mean we ran through hundreds of people to be fit tested and to be able to do all that.”

Improvisation, relationships, knowledge, and accessibility to resources on the campus significantly supported the delivery of the necessary respiratory protection, even with the challenges of the critical supply shortages.

The nature of the task and distances between personnel and resources have an influence on the span-of-control considerations. According to NIMS (2017), if the same individual can manage all the functional requirements within the section, then no further division in the organization is necessary. If the function requires independent management, then management authority should be provided to an individual assigned responsibility for that function. Including these separate ‘units’ on the organizational structure may have improved the reporting, supervision, and communication lines.

Key finding: Several functions that were provided by the IMT did not appear on the ICS organizational chart.

Data Entry

The data entry branch provided the resources necessary to capture data on the specimens and results of the tests. The branch was setup rapidly in support of the PCR testing at the lab, *“the data component piece of this was just huge which no one thought of that first day when we’re looking for equipment and machines, to see if we can even do real time PCR.”* At one point the data entry branch was initially made up of hired staff which transitioned to mostly full-time university staff that were at home and re-assigned to the operation:

“we’re spending a lot of money on people who work, who we were employing from outside, why not get people who are being paid by OSU that were sitting at home not doing anything to come in here and now do something for that salary they’re getting, and so they shifted to OSU employees.”

Although many of those staff performed well, an IMT member declared that *“there was actually one trained professional in there.”* There were also those that were having difficulty with the assignment, *“there were other people, like you could tell they didn’t want to be there. They were*

being forced to be there, and that was not happy times.” In addition, according to the AAR (2020), the level of skills between the individuals assigned to the function was highly variable. A recommendation in the AAR (2020) suggested including a screening process to select individuals that had the applicable skills required for the task. In addition, there was evidence in the findings of ‘external’ influences that may have unsettled some individuals working in this branch. The branch was also established in a relatively isolated location and the reporting lines within the ICS may have been blurred. There were no ICS trained or experienced personnel working in this branch.

Key finding: The integrity of functional units within the ICS structure may be impeded when there is a high level of improvisation, lack of training or experience in the ICS, and the functional unit is physically located away from the direct control or influence of the IC system.

Collection

The collection branch was established to transport the specimen samples that were being taken at the numerous county health department sites and bring them to the lab. Due to the challenges with the existing courier systems collecting specimens from the clinics, the IMT developed a specimen collection system using resources available at the university. Transit drivers and vehicles from the university fleet services were used to travel across the state and collect nasal swab specimens used for the diagnosis of COVID-19 and bring them safely back (in coolers filled with ice) to the lab for testing and diagnosis (AAR, 2020). Initially the plan was developed as a function of planning then implemented within the operations section. The collection system quickly became a crucial component in the entire testing process advocated by many as one of the most impactful interventions from the IMT:

“The courier piece of it ... was also a huge lift because we had little clinics, little hospitals all over the state coming from rural areas that needed to get samples here and they don't have the time or money or resources. They were all bursting at the seams just trying to keep up with patient care and testing. But also, the state courier system to this day, I will say very candidly is broken, and so when there's only one statewide courier and they were maxed out, they do all human and animal, they were not prepared whatsoever to handle this type of response. Standing up the courier system that the IMT put together was also a drastic lift that brought success to the lab.”

This sentiment about the size and complexity of the operation was emphasized:

“The biggest piece we had was setting up the drivers, the vehicles, the equipment to go around and collect all the samples from I think up to 21 different sites throughout the state ... to bring them back here every day, five days a week. We had to make sure the samples stayed within the time, stayed within the temperature, and that they were analyzed and read on time.”

The plan was developed by two IMT members over a weekend and implemented on the Monday.

An IMT member highlighted the speed at which the plan was developed and then implemented:

“The first version of our plan went out by midnight, of the first day that we were there ... by Saturday we're already starting movements in terms of logistical planning and trying to get vehicles lined up”

Much of the success was based on specialized experience and knowledge that was obtained from past tactics learned in the military:

“I think having the perspective that this plan doesn't need to be perfect, we just need an 80% solution to get people moving and then we'll kind of figure it out as we go before Monday

happens. I think that was kind of a military perspective of let's get something out the door and then we'll kind of refine it from there."

Besides the experience and skill that was acquired from a military background, there was a responsive and collaborative management style that further supported the iterative improvements of the collection system:

"One of the best parts was when the drivers would come and bring issues and recommended solutions, and we can go back and implement those. So, I think that they had a voice in it, and they were able to kind of put their opinion out there because they're the ones actually doing the work. I think those relationships really paid off."

The speed at which the branch developed and implemented the plan demonstrates that issues were most likely expected but could be fixed by iterating on ideas and pivoting away from ones that don't work, *"there were obviously things that we figured out along the way, like some things in week three that we improved on since week one."* Implementation with using good enough data and then iterative corrections based on feedback from the crews in the field significantly increased the organizational performance. The adaptation and continuous learning that occurred during the process allowing for adjustment based on the responses, supports the theory of adaptive leadership and management (DeRue, 2011; Glover, Friedman & Jones, 2002; Heifetz, Heifetz, Grashow & Linsky, 2009; Yukl & Mahsud, 2010).

Key finding: Rapidly developing and implementing a plan with limited data and establishing a feedback loop to improve on each iteration was a very successful tactic at increasing the response velocity.

Housing

The housing branch was established to implement the ‘continuity of care’ plan, “*if we have a full-blown COVID outbreak and needed temporary bed space or hospitals were overrun that we could utilize residential life space for some of that.*” The land grant university was identified as a potential resource to provide quarantine and isolation beds as the infection rates were increasing:

“The University administration saw the success that we [IMT] had had. Then they asked us to do basically the same thing when we were told that within a week and a half really, that we could possibly getting 400 COVID positive patients living on campus.”

Although a comprehensive plan was developed, a decision was made not to implement the project as the needs of the state had changed (AAR, 2020).

Planning

The planning section is responsible for incident documentation and preparing the incident action plans, tracking resources assigned to the incident, conducting contingency planning, displaying incident information, and developing plans for demobilization (FEMA, 2018b ; NIMS, 2017).

The Planning Section has four primary units – documentation, resources, situation, and demobilization.

The planning section during the IMT response prepared the incident action plans, including the housing isolation and continuity of care plan, emergency operations center escalation plan, demobilization plan, an initial draft of the return to campus plan and the after-action report (AAR, 2020).

The planning section did not have a situation unit designated on the organizational chart (AAR, 2020) even though there was some level of forecasting and tracking of the infection rates which were disseminated every week:

“At the very beginning ... there were no statistics, there was no kind of database of what was happening ... so I started doing that in the very beginning. We were gathering the number of positives, the number of hospitalizations, the number of deaths and trying to do that from a statewide point of view. There were lots of people gathering information in a much more sophisticated way than I was doing but it, for me it was 20 minutes every morning, just kind of running down all the data and plugging into a spreadsheet and then, once a week sharing that data with the IMT”

The provision of this type of data to the IMT would normally be a function of the situation unit. This may not have been reflected on the ICS organizational structure because of the limited extent of this function. Similarly, even though a demobilization did occur, there was no demobilization unit reflected on the structure.

Documentation

The Documentation Unit maintains incident documentation and stores incident files for analytical, and historical purposes. ICS uses a series of predeveloped standardized forms or templates that help to convey directions for the accomplishment of the objectives and distribution of incident related information (NIMS, 2017). The completion of ICS forms and documentation is integral for the documentation of activities and actions during an IMT operation.

An IMT member noted that the ICS forms, *“helps organize information and the plan of action”*. In addition, the Federal Emergency Management Agency (FEMA) requires the formal ICS documentation for reimbursements, *“you won’t get reimbursed by the feds and as big a pain as*

the paperwork is, you've got to have the paperwork.” Elaborating on the purpose and need for an efficient system to manage and record the document flow another IMT member declared:

“Federal reimbursement and tax dollars and stuff like that being used and when the governor did a state of emergency, to raise funding for these you have to be meticulous when you start filling out these forms for tracking certain expenditures, time by all people involved with these events, because there's a reimbursement by the Federal Government whether it's come through FEMA or another agency or the state. With a committee you don't have the tracking of the documentation and the forms that are needed to submit to a federal reimbursement for these funds and that's where the IMT and ICS system comes into place. Every aspect of the IMT group has forms that are required to be filled out daily through each operational period. And that's specifically for reimbursement or potential reimbursement depending on if the governor or the Federal Government says, this is a true event and we're going to reimburse the time and efforts and funds that are spent throughout this operation.”

Even though the Federal Government require the forms to be completed for reimbursement there were struggles with collecting and collating the ICS documentation:

“I think some of the challenges for me, would be tracking down documents at the end of the day. we were doing them for every operation period and it's interesting and frustrating to have to stay on top of people to say, ‘hey I need your whatever form for the day’ and kind of understanding who's going to be submitting them and where they're going to be routed through because, are you doing one for your whole section, are you doing one individually.”

The completion and submission of the ICS forms were a burden for most IMT members who found them to be tedious *“for me it's a little bit laborious, especially when people aren't used to it”*. The compilation of the ICS forms can also be a time burden:

“Sometimes the paperwork became a little much. I forget the names of the forms but for me there was a form to do at the beginning of the operation period, there's a form at the end of the operation period. Sometimes those could become overwhelming, because one of the things we don't have is an admin for each one of those tasks. If I had an admin [person] it wouldn't have been as time consuming”

The time burden challenge was reiterated by another IMT member:

“I can tell you at the beginning, I wasn't doing the forms, that I know I needed to do because when you're on that 12-hour period you're not thinking ‘Okay, I just did a form, let me just worry about getting this done’”.

An IMT member declared that the use of the ICS forms had been modified for this specific response, *“we didn't use those forms fully to their potential or, in some cases we really didn't use them as they were meant to be used, but we adapted them”.*

Due to the type of response and the limited experience of most IMT members, there may have been some incompatibility between the purpose of the ICS forms, the nature of the response and the limited ICS training and experience of the individuals using the forms.

Key finding: The standard ICS forms were a challenge to integrate effectively into the IMT operations.

Logistics

The major responsibilities of the logistics section chief (LSC) are to provide all the service and support requirements for the incident operation such as facilities, transportation, supplies, equipment, and food for incident personnel (NIMS, 2017). Although the logistics section provided for many of the urgent needs of the IMT operation, the single most impactful was the

acquisition and provision of PPE, especially considering that PPE was in short supply globally. Securing a steady supply chain of *“masks was the most difficult because those were going fast everywhere ... [and] there was some price gouging”*. Another IMT member emphasized this concern:

“I think the biggest challenge at the beginning was really just making sure we had all the personal protective equipment that we needed ... do we have the stuff and the equipment to keep them safe long term, especially when we took on that role for the state.”

Not having many immediate alternatives at the time, a decision was made to ‘scavenge’ from the various college labs on campus, as one IMT members recalls, *“if there's 10 boxes of nitrile gloves grab five’, and so we went through and got all these gloves and we've donated to the OADDL.”* The team utilized the university police department to transport the supplies *“when we would find local supplies ... OSUPD officers would use patrol cars to go out and collect them and bring them back”*. A lot of supplies were ‘gathered’ in this way providing for the immediate PPE needs, *“it was amazing to see how the university came together and how many resources we were able to pull just from the University and that's before we were able to pull from the state's stockpile.”*

The LSC’s regular job was very well aligned to the role within the logistics function and was based on significant experience in facilities management. This alignment worked very well as their existing knowledge of where to locate resources or who to contact for the necessary resources led to the rapid acquisition of available and other resources.

Key finding: Aligning the person responsible for facilities management in the college to the logistics section chief role within the ICS proved very compatible with the responsibilities of the position.

Finance and administration

The finance and administrative responsibilities include recording personnel time, administering vendor contracts, purchases, claims and tracking and analyzing incident related costs (NIMS, 2017). During normal day-to-day operations purchases can take long to process because of procurement policies and bidding processes. One of the significant changes to the procurement policy that occurred during the response was the support for financial flexibility that resulted from both the governor's executive order and decisions from the IHE leadership:

"We never would have been able to respond if the governor hadn't put in the executive order for spending policies. A change in spending procurement policies was huge because had we had to bid everything out and go through typical state statutes and follow all the typical protocols, there's no way in the world we'd ever been able to respond, because we wouldn't have been able to buy all the supplies and equipment and everything that we needed."

Another IMT member provided further insight into the adjusted procedures:

"The one thing that made this really unique is that during this time we were operating under an executive order from the governor and that executive order relaxed, a lot of our purchasing guidelines. We could order something from some vendor, not a relative that's OSU policy that we can't violate it, but we can order from vendors that we found that had availability and up to certain points didn't have to worry about bidding requirements, because we were operating under an executive order, so that did relieve a lot of pressure and allowed us to get things done much quicker. In addition to the normal bidding and purchasing guidelines, you have the state regents' guidelines, if a purchase goes over \$250,000 you got to send it to the board of regents for approval at their regular meeting. If you can't wait that long you can do an interim approval, so

we had to do that, a few times too. So, everybody along the chain really helped speed things along.

Financial flexibility has been shown to improve organizational performance especially during times of crisis such as the COVID-19 pandemic (Barry, Campello, Graham & Ma, 2022). In addition to the relaxed spending policies, existing positive relationships with suppliers improved efficiency with the supply and delivery of the resources needed:

“I think we developed, really, really strong relationships with a few vendors that were on state contract that really prioritized what we needed and got us the things we needed, as quickly as they could, and that is every different kind of testing supply, I couldn’t tell you what they were; chemicals, tips, equipment, I mean everything. So, I think that piece of it worked pretty well.”

Another IMT member recalled the spending approach during the early stage of the response:

“Right now, just spend, get the stuff here, get going and let's help. That was pretty much the mindset from the get-go. We had established contracts with vendors and suppliers and so long as we operated within the purchasing guidelines of OSU and the state of Oklahoma, we were Okay. We just started ordering stuff left and right.”

There was evidence to suggest that financial record keeping for reimbursement from the federal government (FEMA) was overlooked early during the response, *“it was just always told to me that we'll figure out the reimbursement process later.”* In addition, there was a lack of time keeping documentation and receipts which required backtracking:

“Someone making sure we had the receipts of everything, and all the stuff we were purchasing ... at the end that admin team came in and they were having to backtrack all of that. I think if we would have brought them in a little earlier, it would have made things a little easier because we

did have to do some catch up at the end ... there ended up being timecards we had to track and things like that”.

However, the reimbursement process did change although some additional work had to be done to organize the documentation:

“I thought if I had an invoice for product A, I needed one of those ICS sheets for product A. It turns out that one of those ICS sheets had 20 projects or 20 products, so I would make 19 copies, and I would attach one to every single invoice. I did do some of that organizing ... and was greatly relieved when we were not going for reimbursement from FEMA because I didn't need to do that anymore. That was really a confusing part for me because a lot of this like FEMA reimbursement stuff, a lot of those discussions were happening offline, and I wasn't in the loop on those because it wasn't really my responsibility and then whenever I got put in the loop, it was just confusing because I hadn't had all the backstory.”

The increased flexibility with the financial processes helped to speed up procurement which in turn improved the performance of the IMT. However, documentation such as the required ICS forms for FEMA reimbursement, receipts, and timecards, were understandably an additional burden on the IMT during the early stages of the response. This responsibility may have been overlooked, due to a lack of familiarity and the attention dedicated to the immediate needs on obtaining the necessary resources to standup the lab.

Key finding: The flexibility in financial procedures significantly enhanced the performance of the IMT.

Production Stage

Management of the response

The NIMS ICS is comprised of management principles that have been shown to improve organizational performance at different levels (EMSI, 2018, NIMS, 2017). The principles that the ICS are built upon originated decades ago (Bigley & Roberts, 2001). The ICS is originally based on organizational theory that supports the efficiencies inherent in hierarchical systems with each unit in the structure reliant on one head for communication (Ahmady, Mehrpour & Nikooravesh, 2016; Lunenburg, 2012). The object of hierarchical systems is to minimize the time it takes to identify the actions necessary to increase productivity. By way of comparison with the ICS, this is accomplished through the authority of the head (IC) and the preparation of instructions (objectives) that direct activities of the productive units (sections) based on information received from various sources (situational awareness) in discrete time intervals (operational periods) (Keren & Levhari, 1979). The additional levels between the head (IC) and the productive units aid in shortening the time it takes to collect information and prepare the instructions. The productive units (sections) continue the previous periods course of action until they receive new orders (Keren and Levhari, 1979). The process is known as the “decision making superstructure” which enables the rapid coordination of interrelated plans. Furthermore, the flexibility required when incident complexity increases allow for the organization to expand and for more functional elements to be established. This division improves internal organization management and external coordination by delegating more functional responsibilities (EMSI, 2018, NIMS, 2017). An illustration of the productivity and speed at which the IMT was operating is provided in a timeline in Appendix F.

Common terminology

NIMS (2017) establishes a common framework and terminology, including standard titles for positions within the organization, that allows for diverse incident management and support organizations to work together across a wide variety of functions (Lipskiy, Tyson, Zarecki & Burkholder, 2019). The IMT response to standing up the lab, was made up of a diverse community of people, some of which had never been exposed to the ICS before.

One of the IMT members who had received training but had not had much experience using ICS recognized immediately that the ICS was being used when entering the EOC and first seeing the ICS organizational structure displayed on the board, *“I walked in that day and immediately recognized when I saw the board, the division and who it was.”* Although there was a common understanding of the ICS for trained or experienced members, the terminology can make certain aspects difficult to understand for those not familiar with the system, as an experienced and senior IMT member confirmed:

“I think the terminology, the paperwork, structure is logical, it's well formed but that knowledge can also be a barrier. The terminology can be a barrier. There were terms being thrown around that there was not universal, that's understandable, it's not a criticism. That's going to happen, because of the diverse number of people, you need.”

An inexperienced IMT member who was not familiar with ICS at all, illustrated the terminology challenges and compared it to a biological process:

“But if you're not familiar with that terminology it just goes whoop. It's like what if I sat down and talked to you about photosynthesis or cellular respiration and everything that was going around. So, if you didn't get those terms, then it just kind of ‘Okay, I see it’, on the picture, but it doesn't really make sense.”

The ICS terminology and systems were familiar to those that were trained or had command and control experience in the military. Even though the terminology is relatively simple, the way that it is used can be complex, especially for those that are untrained and unfamiliar with the system.

Key finding: The ICS structure and terminology created a barrier for personnel who were not familiar with the system.

Delegated authority

Understanding the administrative complexity and decision-making processes inherent in large IHE's was a key factor in clarifying the authority of the IMT. The experience in both the academic and incident response world provided the forethought to obtain delegation of authority for the IC *"to make decisions, spend money, deploy resources, direct people"*. Authority was provided in writing and the necessary administration within the organization were informed that an IMT was being formed and that the IC *"was vested with the authority to make decisions on behalf of the university for the IMT."* It was deemed essential because the *"authority to take action in an emergency in an IMT is critical."* Another IMT member confirmed the support for the IMT's authority in decision making, *"one of the most remarkable things is that anytime the question was asked the leadership said yes. So, they imbued the IMT with the power to get stuff done"*. In addition, *"It's easy to go to one person to get approval than go to five to get an approval"*. Decision making authority at the tactical level was necessary for several IMT members, *"to me, is really finding my left and right limits in terms of when I had approval authority, and when I didn't have approval authority."* Authority was distributed throughout the ICS:

I would bounce things off of [IC] to say “hey are we allowed to do this”, and I think after probably the third time I bugged [IC] with a question, [IC] said ‘hey you're allowed to make these decisions’, I said ‘okay now I understand kind of where I sit with that command authority’.

Hierarchies of authority in IHE’s can include several levels of approval before any action on a decision can take place. Having one level of authority to approve key decisions can increase the speed at which the necessary actions can be implemented, as was the case within the OADDL IMT.

Key finding: The delegated authority that was provided to the IMT to make decisions on behalf of the IHE significantly improved the IMT performance.

Span of control

The span of control is ordinarily regarded as a measure of the limits of hierarchical authority exercised by a single manager with the optimum range of three to seven, with five being most optimal (NIMS, 2017). This measure is repeatedly cited as the ideal size for supervisors’ span of control in many disciplines (Bell, 1967; Davison, 2003; Keren & Levhari, 1979; Ouchi & Dowling, 1974). Span of control is based on three key organizational variables, 1) diversification of function, 2) time, and 3) the space allocation (Meier & Bohte, 2003).

As the IMT response progressed various positions were created and filled rapidly. One IMT member felt that there were more people involved than were necessary, *“to some degree we wanted to make sure everybody had a job, so I think we were giving some people jobs [that] probably we didn't need that position filled.”*

The collection branch supervisor coordinated about 10 drivers per day (AAR, 2020) but was provided with several staff to assist with the monitoring and tracking. The Data Entry branch supervisor had about 15 staff, but they were all located in the same area doing the same type of

tasks. However, the relatively isolated location of the unit may have contributed to impediments with span of control:

“I think if someone had made a stronger effort to say “okay let's all get in a room, six feet apart, and that was probably part of it, nobody wanted to group up, but I know people did, and maybe say let's put names to faces, let's talk about what each person is going to be responsible for... that would maybe build it a little stronger than just, seeing it on a chart.”

Several factors may have influenced the exclusion of this unit from the span of control, such as, spatial separation and poor communication between the unit and that of command.

Modular organization

The ICS structure is composed of levels of separate and sub divided sections or modules connected through a vertical hierarchy. An IMT member spoke about the flexibility of ICS and the ability to expand and contract the structure as needed *“I felt like anytime there was a need, the structure allowed for that need to be filled”*. Another IMT member agreed with this sentiment highlighting the flexibility of the ICS, *“we had to expand, beyond what we had originally thought. So, it showed that we were able to adapt to a changing situation.”* The ICS structure provided the agility to continuously support the needs of additional functions as the situation developed and additional units were necessary. An IMT member elaborated:

“It seemed like anytime we realized ‘oh man we've got a hole here, the structure still allowed for that hole to be filled’, that to become a new priority, if need be, and respond to that versus being so rigid in its structure that we know we're already set up, that we don't cover that, that was never ever a feeling I got. It was absolutely ‘okay we'll add that piece to this structure’, and so I don't feel like we missed any piece of it.”

An IMT member who was relatively isolated from the EOC and who was unaccustomed with the ICS found the organizational chart with the modular levels to be very complex:

“My initial reaction was ‘wow there are way too many people here for this to work’. There were just like so many levels and branches, I thought and that comes from me like not having any experience with that. I’m like how does this work. I mean this is complex, and I can make a flow chart of a biological process that looks just like that and it’s very complex. So, thinking about how it would fit together and so that’s what amazes me. I think I’m kind of intelligent, but I know science and then, when I start branching out and go wow how do they sort that out. I looked at it and I thought Okay, good luck ... It is such a foreign concept for me, whereas for someone who’s had courses in that field, it would have made a lot more sense.”

Although the ICS organizational structure provides for modular expansion and contraction, it may not be obvious unless individuals have been trained in how and when to use this feature.

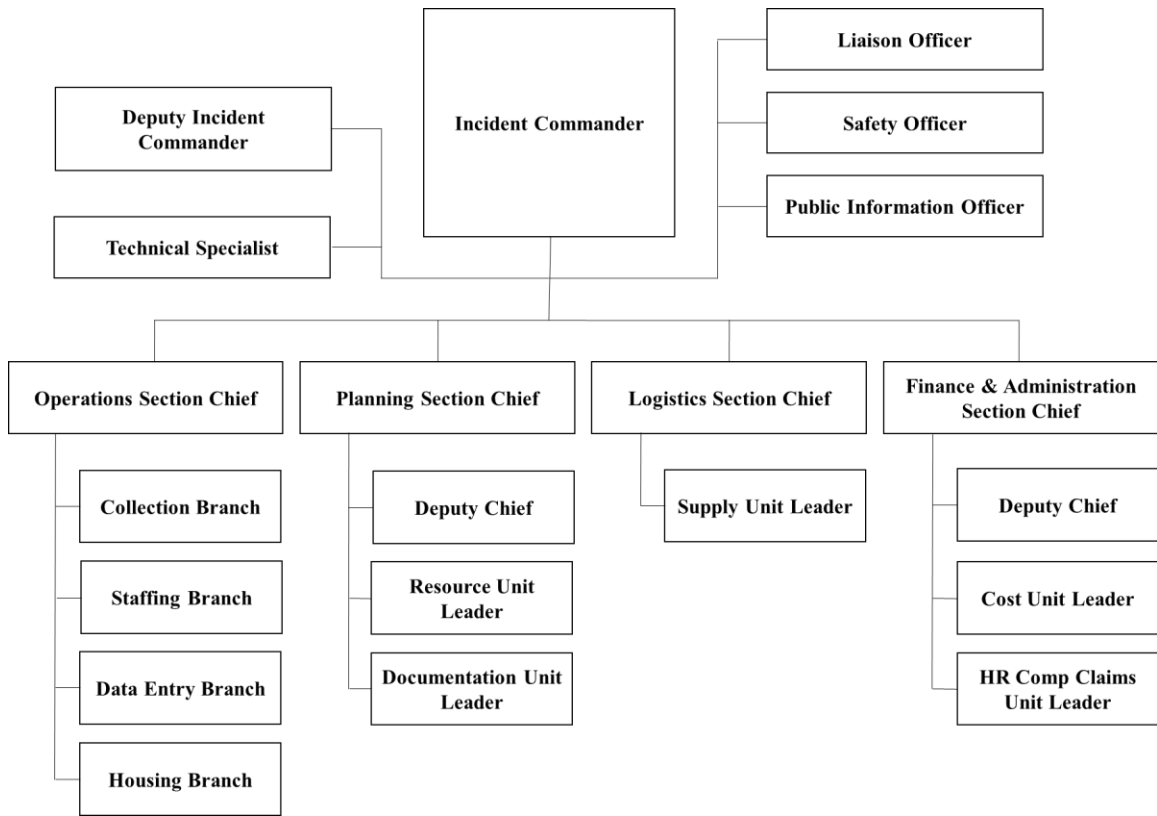


Figure 5: The fully expanded organizational structure of the OADDL Incident Management Team (AAR, 2020)

The organizational structure of the OADDL IMT expanded and contracted as the complexity of the response increased. Figure 5 illustrates the ICS structure when it was fully expanded (AAR, 2020).

Key finding: The ICS organizational structure was able to efficiently expand and accommodate the necessary functions that were required during the operation.

Chain of command

The principle of chain of command and unity of command have implications for decreasing role conflict and ambiguity in complex organizations (Rizzo et al., 1970). The chain-of-command principle provides a clear and single flow of authority from the top to the bottom in hierarchical

relationships and supports efficient performance and goal achievement providing top management with control and coordination. The above principle also supports the principle of unity of command which states that for any action a subordinate should only receive orders from one supervisor. This principle strengthens the need to support one plan with the same objective. Consequently, this clear reporting path is considered more satisfying for subordinates in that there is less confusion and distress from interference from more than one supervisor and incompatible orders and expectations.

During the IMT response there were external influences that impacted on the established chain of command within the IMT, as pointed out by one of the members:

“Then, when you're getting all these outside sources, where you don't know who these people are kind of making different decisions than where we're going that would pull you off track.”

An IMT member, that was located in an isolated area, and had not participated directly in briefings remarked, *“I was getting emails for this management team, but it wasn't clear who I was supposed to ask if I needed something.”* This same unit which was spatially isolated from any of the other units was disconnected from the ICS. The following statement describes an IMT member from the unit who used the ICS organizational chart to determine who to communicate with:

“So, it was just wading through, me trying to figure out who's the best person to solve this problem for me and those are things as a college Professor you don't really know. You have a limited few people that you're in touch with, and so, for me, I had to sort through that little flowchart and figure out where do I go on here to get what I need.”

This situation was exacerbated by not having any knowledge or experience with ICS, although the ICS organizational chart was useful for the individual in determining what linkages there were in the chain of command. Studies show that project delivery risks with distributed teams,

such as in this case, tend to be greater when compared to co-located teams. (Daim et al., 2012). In this instance colocation within or near the EOC may have been more beneficial (Kahn & McDonough, 1997; Van den Heuvel, De Langen, van Donselaar & Fransoo, 2014). Integrating the unit into the ICS may have been lacking resulting in the disconnect from the ICS which could have also contributed to the challenges from external influences:

“OADDL wanted total control over that data, they wanted to control how it was put in, they wanted to control spot checking it, they wanted to control all sorts of things, and that created a whole level of tension where some days I thought “man I don't want to call that person”, because it was just like kids fighting over this is mine, you're not taking this away.”

Several factors were possibly involved in the weakening of the reporting lines. These include lack of ICS training and experience, branch level meetings, supervisor interaction or intervention, and the influence from an organization outside of the ICS organizational structure.

Key finding: The lack of clear and well-maintained reporting lines and procedures increased confusion and distress from incompatible directives and expectations in one branch.

Management by objectives

In ICS incidents are managed using clearly formulated objectives that are specific, measurable, achievable, relevant and time bounded (NIMS, 2017). Objectives are prioritized and communicated throughout the entire ICS organization using the Incident Action Planning Process. Identifying strategies, tactics, tasks, and activities to achieve the objectives are then carried out through developing and issuing assignments, plans, procedures, and protocols for various incident management functional elements to accomplish. Results are then usually

documented, and performance measured against the objectives to facilitate corrective actions and inform development of incident objectives for the subsequent operational period. Several studies indicate that using MBO can significantly improve productivity (Antoni, 2005; Greenwood, 1981; Rodgers & Hunter, 1991, 1992; Roth, 2009)

At the beginning of the response there were many demands on the IMT, and it was difficult to determine what to prioritize as one IMT member declared, *“at the beginning it's really hard sometimes to get your objective, because there was so much to do.”* The MBO approach provided a clear task orientated method that was time bound within the designated operational period and offered the opportunity to report back on task accomplishment as one IMT member noted:

“I think it was easy we went down the list, this has been met this hasn't been met, or we don't think we need to do this anymore, and what else do we have to discuss, very clear cut. We got a lot done.”

An IMT member elaborated on the ‘interference’ from external sources which conflicted with the IMT’s set objectives:

“I think our objectives did keep us on point, but somethings interfered with things that weren't quite the objectives that the IMT thought we needed to move forward with. You still had these other players at the university that were still out there, kind of poking and trying to make different decisions. You still had other people that were brought in from different areas to help with parts, maybe to the run the laboratory, but they weren't part of the IMT, and they didn't understand how that team functioned, or what it would do, so they were doing different things.”

The management by objectives approach that was used made it very clear for the IMT members to prioritize actions. In some cases, the clear objectives helped members to prevent external influences and other issues from deviating their actions away from the set objectives.

Key finding: The operational objectives provided the clear directives for the IMT to remain focused on accomplishing the priority tasks during the IMT operation.

Operational periods

Operational periods are designated to provide a clear time frame for completing a planning cycle and achieving the incident objectives. The cycles consist of short periods of 12 to 24 hours and are extended when the response matures, strategies are refined, and the incident becomes more stabilized. Maturity of the incident occurs when fewer strategic and tactical changes are needed for the response (FEMA, 2018; NIMS, 2017). During the IMT response the operational periods provided the opportunity to divide the work assignments into time-based segments allowing for frequent progress updates:

“Everybody knows what their next step is because we broke it down in operational periods. We were reporting back of what the progress is on those steps, so everybody knew what their task was. Then making sure that they have the resources to accomplish those tasks.”

An experienced IMT member elaborated further on the process that was used:

“So, once that period is completed, you come back and you have another operational meeting and you discuss either what was accomplished or what was not accomplished, how can we accomplish that in the next period, or do we need to change gears and figure out a totally different stance on getting from point A to Point B to C through a different means. And the only way to do this is to have these meetings, after each operational period to discuss either what I consider successes or failures, because in every operation you're going to have successes and failures. If you don't talk about them, then you're going to repeat them ... determine how long an operational period is, whether its 12 hours, 24 hours, whatever, and then you reconvene a

meeting at the end of the operational period to go over what happened in that operational period.”

The ability to work long hours during the operational periods, with little or no supervision was a characteristic of many of the members of the IMT:

“There were times where you're here at six in the morning. You're doing your things and you're still on the phone or talking to people at 11, 12 o'clock at night trying to complete what your tasks were for that 24 operational period. Then I think everybody embraced that and it wasn't one of those ‘hey that's not my job, that's not what I'm here to do’”.

As there was not sufficient staff to operate a second IMT during consecutive operational periods some of the IMT members were *“getting calls around the clock”* which may have contributed to fatigue and stress. The operational periods were 24 hours long as there was no second team to take over from the initial IMT. Therefore, team members were working very long hours:

As those things go on, you're supposed to have periods, where you give people the downtime because it is such a fast pace. When it started, we didn't have as many people. We didn't have a second OPS person, so you didn't have your down periods, where “okay hey I'm off shift here's where we're going”.

A senior IMT member acknowledged that during, *“the operational periods we had a lot of people that ended up 6, 7, 8 days [working] and that's not healthy.* Rotation of IMT members occurs at the end of regular cycles relieving those that have been working for a long period. Unfortunately, there was not sufficient staff to enable an additional team as *“we didn't have the depth to call up the B team. Normally you switch at operational periods, so we didn't have that luxury.”* The IMT had night off so if there was a rotation team for the next operational period more could have been done quicker and day shift would have had a chance to rest. In addition, many of the IMT members continued to perform the usual work required in their regular jobs, often juggling the

time between IMT tasks to fulfil academic duties as one IMT member declared, “*the biggest reservation was being able to keep my [regular work], so the students didn't feel any impact whatsoever*”. As there was only one IMT and no other team to take over at the end of an operational period there were some delays in communication, “*that weekend when there wasn't much communication because people weren't at work*”.

There were occasions where it may have been beneficial to have additional staff to provide relief to those that may have been suffering from fatigue of working excessively during the operation.

Key finding: Due to the prolonged work periods and the high intensity of the operation there was a need for additional staff at peak times or at the end of the operational periods.

Meetings and briefings

During each operational period, meetings and briefings are facilitated to develop the Incident Action Plan (IAP) and provide opportunities for information sharing. Meetings and briefings include staff level, field level and section-level meetings and briefings, operational period and situation update briefings, and transfer of command briefings (FEMA, 2018; NIMS, 2017). Field level meetings/briefings would take place with a supervisor and those assigned to specific tasks, such as the collection branch. Staff level meetings/briefings would typically take place with non-operational support staff such as those located in the EOC. The section level meetings/briefings include the entire section and the operational period briefing.

The planning cycle integrates the core meetings and operations briefing into a continuum of action planning depicted visually by the ‘Planning P’ (NIMS, 2017) (Figure 6). The process is continuous and based on the length of the operational periods using the best information available at the time and should not be delayed because of anticipation of future information or events.

Prior to executing the plan, the operational period briefing takes place, “*the briefings are*

structured so that you have a set order of directives that need to be followed for each operational period.”

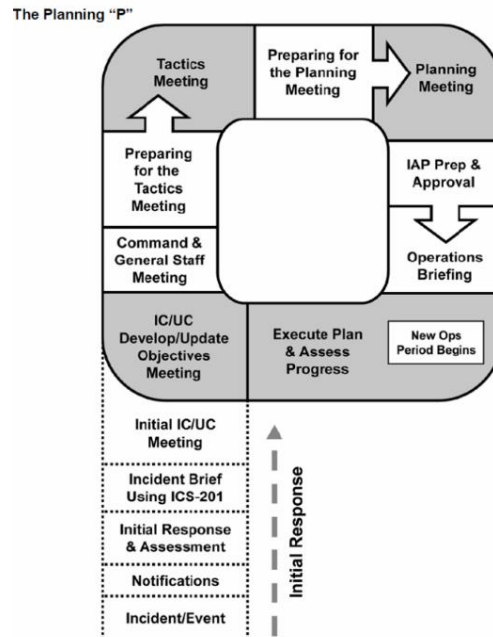


Figure 6: Planning P (FEMA, 2018; NIMS, 2008)

The meetings and briefings during the IMT response were very structured using the ICS format for meetings and briefings. They were concise and did not include long discussions or complex decision-making. Rather, they allowed the managers and supervisors to communicate specific information, ask or respond to questions and confirm the expectations for the operational period:

“It wasn't a typical meeting where people set aside an hour and some people that run the meeting are going to talk that whole hour, no matter if something's needed to be said, or not. I think these meetings were ran very appropriately. It was 'okay here's what you were responsible for, it gave the commander a chance to say what he needed in the next operational period.' Now there are

obviously times where you're sitting in there, where you're like 'wow you just added 10 more things to my list, I haven't finished these others and that feeling of okay I'm sitting here in the meeting when I need to be doing these other things.' But if you weren't getting that information, how are you going to be able to move forward. I also think the key to that was knowing that you had the people under you to run the other programs or things, the tasks that you needed to do ... I wasn't the only one doing that, I had appointed people under me to run different things. So, I do think that the meetings were appropriate so that way you got the information, and you knew exactly the direction you needed to go."

An IMT member highlighted the importance of receiving the communication directly from the IC:

"You needed to hear the information from the commander directly, because I think sometimes if we do it by email and send things out there can be too much miscommunication. Then you can sometimes see where your stuff may overlap, because there was a lot of times where the operations and some of our stuff would fall into somewhere else and be like 'Okay, what are you doing on that part all right, you can take that and then we'll move forward.' Everything going together, I mean things don't just stay in their own little columns, some things mix. So, if you don't know what the other people are doing, then you're both spinning your wheels doing the same thing. So, even though I'm not a fan of meetings I think they needed to take place."

Additionally, a member elaborated on the importance of attending the briefings to identify what the other sections were responsible for and how that impacted on their own responsibility:

"One of the purposes of the briefings is exchange of information, because you may not know what's going on in logistics, but it has a direct impact on operations. So, the sharing of information and updating, especially in a fast-moving event where a lot of information, a lot of operations are going on, is critical."

A member recalled the impact of having to attend the daily meetings during the time constraints of the response:

“I remember being very frustrated ‘I don't have time to sit through a meeting. I can't do one more thing and I can't stop and provide this information because I've got to get these decisions made’, but that was a vital component. If we hadn't had the forced communication and that seems a little harsh to call it that, but that structured communication every day, that was very huge, again as things were changing so rapidly.”

An IMT member who was responsible for informing the university leadership about the actions and progress of the IMT found the meetings useful in obtaining the information necessary for feedback:

“With the IMT everyone was together for the briefing meeting every day and everybody gave a status, update and I felt like I had all the needed information to brief leadership, if necessary, to understand where we were, what the problems were, and what we had accomplished. It was incredibly efficient. It was incredibly efficient because we had a meeting every day for weeks like you heard every day what's happened, what didn't work well, where we are with this, some of the information was repeat information but that's okay, that's where we were that day.”

An IMT member asserted that the meetings were also an opportunity to “*work out the wrinkles that we may have in getting the objectives done*” whilst another declared that there were “*daily updates and briefings and then there's the sub-team meetings*”. The ‘sub-team’ meetings or meetings between the supervisors and their subordinates were necessary to ensure that the new information was relayed, and communication was occurring on a regular basis. However, an IMT member located in an isolated area reported that they felt ‘disconnected’ from the main group:

“If I saw their faces and I'd actually perhaps gone to a meeting and watched, I would have gone okay that's so and so and they're in charge of this and that's so and so and they're talking about

this, and so that type of thing ... would for me make the process probably a little bit easier. I felt like sometimes I was just living in a hole in the ground, running a computer. So, I didn't have any energy left to go and figure out who's doing what ... but when you're in like fight mode where you're trying to establish something and survive the system your brains not going to waste any energy on that, I think. So, for me, I was just getting the job done that I needed to get done and sometimes I screwed up trying to figure out who's going to help me.”

In addition to the briefings and meetings there was a significant amount of email information, *“the emails were just flying and sometimes I thought I don't have time to read that email”*.

Based on this evidence the meetings and briefings were short and to-the-point providing an important opportunity for the IMT members to both share and obtain critical information regarding the response progress, priorities and actions that were necessary. However, they provided opportunities for intense communication which led to the construction of shared representations or awareness that enhanced the shared mental model (Weick and Roberts, 1993).

Situational awareness

Situational awareness was first described as an aviation concept to emphasize the need for high levels of awareness during combat flight situations (Harrald & Jefferson, 2007). Similarly, in emergency management it is essential to understand a complex, dynamic and rapidly changing conditions. In uncertain situations a high level of comprehension of the changing conditions is critical for responsive and informed decision making. To support this, a common operating picture (CoP), also known as a shared mental model (SMM) (Farcas et al., 2021) must be continuously maintained through effective collaboration and understanding of each units' tasks

and responsibilities. This can be enabled through information sharing and communication throughout the incident's life cycle. High quality planning facilitates a CoP or SMM and can unify efforts of the interdependent parts of a team, especially when tasks need to be achieved through independent work (Danielsson, Alvinus & Larsson, 2014; Li, Yang, Ghahramani, Becerik-Gerber & Soibelman, 2014; Seppänen, Mäkelä, Luukkala & Virrantaus, 2013; Steen-Tveit & Munkvold, 2021; Rosenman et al., 2018).

Many IMT members discussed the benefits of obtaining information related to establishing a CoP for the IMT response. Referring to both understanding the overall response effort but also the individual's responsibility a member highlighted, *"it's really important that everybody see the big picture and also understand their part of the big picture."* Another member, understanding the importance of the overall response purpose and the various elements required stated that, *"we've got to look at the big picture, look at a structure to help us make the decisions, each decision to move forward and to add structure to each of the pillars that have to be addressed."* Emphasizing the importance of attending the meetings to obtain and maintain the common operating picture, an IMT member declared:

"It ramped very, very rapidly and so having the daily communication was absolutely key to knowing what all the other pieces were doing. I think one thing, looking back on it, if you didn't have the big picture that would come out of that meeting, I know I've worked on other projects where you get so kind of keyed in on what this piece does, that you forget the big picture, or maybe everybody doesn't know the big picture and so having the daily structured communication gave everybody a reminder of the big picture, but how all of these other pieces absolutely have to happen to fit into it to make the big picture happen. So, the constant communication was huge."

There were a few significant reports about the 'disconnect' between the lab and the IMT which was well summed up in the following statement: *"there's a subset of situational awareness called*

common operating picture, and that's what we didn't have between the lab and the IMT.”

Similarly, an IMT member who was situated in an isolated location experienced a disconnect with the overall operational picture:

“I'm pretty certain I was invited to those meetings, but the problem was for many weeks; I went into that room at 7:30 in the morning and came out earliest anywhere between like at three or four and some nights I worked until eight, and so I thought I don't have time to go. I couldn't stop and go; I think that probably would have helped if I could have done that. I did finally just try to get most of my information from [another IMT member] or someone else like say ‘Okay, so what is it that's happening now’, but there were a lot of moments where I felt really out of touch but that could be simply because I was just too busy doing other things.”

In another response, which supports the evidence for a ‘disconnect’, indicating a potential lack of situational awareness within the IMT related to this unit:

“It would have made a difference to me, if I heard that person say this is what I am doing for this. If there had been that initial couple of meetings where people sat around and we're going to form this group that's going to be doing X, Y & Z and chit chatted about what that really meant ... so that may have solved some of the issues but, again, did the system have time for that? No, maybe it was rushed a little bit. I sometimes feel like I jumped on it really quick and maybe there could have been another week just trying to get it all lined up.”

For most members within the IMT the CoP was maintained, however, there were a few entities that were ‘disconnected’ from the ICS impacting negatively on the situational awareness.

Key finding: The formal meetings and briefings within the operational period planning cycle provided the critical exchange of information needed to establish and maintain a common operating picture for those that participated.

Key finding: The functions that were ‘disconnected’ from the ICS inhibited the establishment of a common operating picture.

Emergency operations center

An Emergency Operations Center (EOC) is a facility that provides co-located resources in a centralized location for planning, emergency response and recovery support during incident operations (Militello, Patterson, Bowman & Wears, 2007; Ryan, 2013). The EOC at OSU played a critical role in the OADDL IMT operation (STATE, Spring 2022, p12-14). One member pointed out the successful integration between the EOC and the IMT during the operation saying that the EOC *“was able to interface and really connect the two ... they were almost one and the same, which worked well.”* However, the need for more higher-level decision makers from the university administration to be part of an integrated IMT/EOC was emphasized, *“[the] EOC needs to have the people that makes decisions for the university”* failing which, *“if we ever have a tornado or go through something like that, that will be problematic for us.”* Another IMT member commented, *“that co-location element is challenged under pandemic kind of operational requirements”* highlighting the need for the facilities to incorporate and support social distancing and a virtual EOC environment.

The majority of IMT members felt that the virtual meetings were not a major hindrance, but in many cases enabled higher levels of performance as one IMT member described, *“it was actually a force enabler given that you don't want people to be within close proximity.”* In contrast another IMT member commented saying, *“I could see that the crisis could start to become less tangible, if all the meetings are virtual.”* An experienced IMT member commented on the effect that virtual teams can have on interpersonal connections:

“Sometimes that interpersonal connection is lost which can be very important in an emergency response standpoint. I’d say probably more for the folks that are actually on the front line to the response, rather than those that are in a command situation.”

However, an IMT member felt that the only additional position that would have been useful was someone to focus on the IT in the EOC, *“there were times we had technical difficulties and getting meetings going virtually so having somebody that could focus on that task, I think would have helped”* a statement that was corroborated in the AAR (2020).

Key finding: The EOC was a critical resource supporting the functioning of the IMT operation.

High performing team

The utilization of the ICS and the systems various features and principles arguably provided a platform to integrate a diverse group of people into a high performing team. The various positive attributes identified in high performing teams (Figure 7) can be seen operating in the IMT (Hakanen et al., 2015). This was illustrated by one IMT member:

“There’s a time for process and there’s a time for action. I think the team did a really good job of coming together and staying action oriented. They’re not getting their personal feelings involved with their personal struggles. It’s like ‘let’s just get to business and we have to deal with things in a very pragmatic non emotional way.’”



Figure 7: Framework and dimensions of high-performing teams (Hakanen et al., 2015)

From the analysis of the individual components of the ICS, how it was applied, and how it supported the urgent needs, the ICS provided the necessary structure and systems to achieve the successful resolution of the critical demands.

Key finding: The selection of IMT members along with the application of the ICS management principles and features enabled many of the attributes of high performing teams.

POST CRISIS

Transition and Demobilization Stage

Demobilization

There is a dearth of literature on demobilization within the context of emergency management. Much of the existing literature focusses on military demobilization during conflict and other forms of political influence. Major considerations from such studies indicate the occurrence of significant problems with rate, personnel, and mechanism of demobilization. Studies on humanitarian response and relief offer some insight into demobilization theory (Bastos, Campos & de Mello Bandeira, 2014). Essentially demobilization is the process of restoration to normality and commences as soon as the management of the situation is no longer in crisis mode to the extent that the incident objectives are achieved, and the situation stabilized. Additionally, the risks and complexity of operations are reduced, and the necessary tasks require fewer resources to complete. To reduce transaction costs, the IMT demobilization needs to start early, and the processes need to be transferred by decreasing gradually the number of resources required for the actions and activities such that will make them sustainable. The demobilization decision is ultimately made by the IC.

As the response velocity started to scale down and the operation of the lab became more routine, the decision was made to demobilize, “*it became a normal operation, there was less of a need for the IMT.*” In addition, there were specific ‘signs’ that were identified requiring a scaling down on the IMT:

“We started getting to the point where everything was just repetitious. The briefing was the same stuff. There wasn’t an urgency. There wasn’t a need for a lot of coordination amongst a lot of

different people. People are tired. It really needs to get down to local control as quickly as you can.”

The demobilization and transfer of operations process was established through consultation with the various units receiving the responsibility for taking over each specific function that the IMT had established and operationalized (AAR, 2020). However, an IMT member emphasized the positive impact that the IMT response had on testing for COVID-19 in the state and was reluctant to have the IMT demobilize, *“what we had to fall back on when they were de-mobilized was the existing state infrastructure which we had already proven couldn't handle this.”* After demobilization there were *“a lot of missteps and a lot of frustrations.”* The demobilization of the IMT significantly decreased the efficiency of some of the operations, in particular *“the two key pieces that were just a huge lift, from my perspective was managing the data entry group and getting all that set up and then the courier routes and the drivers.”* Several interviewees emphasized the efficiency and effective management of the specimen collection branch with one highlighting that *“the courier piece would have been huge at demobilization time if we could have kept that going. The IMT had a far more efficient system, than what I dealt with the entire rest of the lab”*. The efficiency of the specimen collection operation was so great that the inefficiencies after demobilization resulted in some significant challenges, *“I would put that courier group up against any in the country because what I dealt with after demobilization was a nightmare.”* In addition to the limited capacity of the state medical specimen system the handing over of the system that the collection branch had developed to the National Guard resulted in some unfortunate incidents:

“I dealt with National Guard for a few months, and I had guardsmen leave 192 specimens from a long-term care facility in the trunk of their car over Memorial Day weekend. Those are trash, they had to go collect and use more resources, but also the discomfort it causes those patients to go recollect all of those. That was just one example versus I mean, there was a lot of that and a

lot of missing specimens. Who knows, people are still probably finding specimens in the trunks of their cars at this point.”

This could be considered an example of a critical operation occurring outside of the control of the core business which is reliant on an independent organization resistant to integration or control by the other. However, there is significant evidence to indicate that even in organizations that provide this type of courier service there are incidences of specimens going missing (see Nakhleh, 2003).

The other critical component that was negatively affected post demobilization was the data entry branch although this was resolved with a technology solution, as described by an IMT member:

“The data management piece was huge as well. In the meantime, we were building an online portal so that we could shut down the day-to-day, based upon human error and space and resources and people trained to sit there and that's not a fun job. And so that, one we were able to kind of change the approach. We took a non-human approach and added technology and we were able, by July 1 to change that and make it more streamlined.”

Probing further as to why there seemed to be challenges with the demobilization process an IMT member commented:

“I think we went by the information we were given and demobilized and did the things and assumed that everything was handed over. That's kind of the feedback that we were given or like that I know I was given, where I don't think they quite took full control over it.”

However, another IMT member described the general feeling of the lab after demobilization:

“I do think that the one area that I said we had communication issues in was between us and the laboratory. I think that led to, even though they felt invaded, I think when we left, they felt abandoned.”

The resulting challenges faced after demobilization probably stemmed from early in the response with the ‘disconnect’ and issues related to communication:

“At least some of the feedback I got from the contacts that I knew over there, and it was one of those where it's like ‘okay you feel invaded, you didn't want people there, but then, when we tried to slowly and properly bring the team down, they felt more abandoned.’ I think that the one thing that would have helped us is if we could have broken through that communication barrier. I think then people could have been more honest about what they need, and I don't think at the time it really happened. So, I think we went by the information that we were given. We thought we had them all set up, they were ready to go and I don't think they truly were completely set up and ready to go.”

Even though there were several challenges there were IMT members that felt that the demobilization process took too long and should have taken place more rapidly:

“It was a little longer than I wanted it to be transitioned for demobilization. I don't remember exactly the length of time it was a couple of weeks. Usually in an incident, thinking about ICS and demobilization, I'm used to that being a fairly quick process. I mean really when it starts it happens, so this was a little bit different. It was another anomaly of typical ICS, that demobilization took quite a while really for it to fully take place.”

The detailed demobilization plan listed all the individuals, who were originally responsible for the operational units and the receiving units who would be taking over the responsibility after transfer (AAR,2020; OADDL IMT, 2020). The demobilization process may have resulted in a handing over of the IMT tasks to other entities that may not have been ready or willing to receive the new responsibility. Considering that there were obvious problems with maintaining the level of efficiency that the IMT established, statements were made about how this process could be more effectively achieved, *“if there was a way to take sections of that IMT response and turn it into*

more operational, I think that would be extremely helpful". In a similar vein but alluding to the plan to transfer the functions and demobilize, *"I'm not sure that initially we developed a very good exit plan. I think and I don't know, maybe the nature of it kind of made it difficult to look at an exit plan."* The big question then, as succinctly stated by an IMT member, was, *"how can you take some of the IMT and turn it into something long term operational. I don't know if that's a piece of ICS that exists."*

Key finding: After the demobilization of the IMT there were difficulties with integrating the functions and maintaining the same level of performance that the IMT had established.

Reflection and Evaluation Stage

Laboratory disconnect

The IMT response was to provide support for standing up the lab to test human specimens for COVID-19 but not take over control of the actual labs operations which included the diagnostic testing procedures inside the lab. This would be handled by the existing staff that were responsible for OADDL and a group of volunteers working in the lab. However, this arrangement seemed to pose a problem, *"One of the communication areas that I think we lacked, and which seems very strange to me, was with the laboratory itself."* Discussing the lab further an IMT member commented, *"unfortunately, that would be where I thought the communication kind of struggled a little bit, which is the place that we didn't need it to struggle."* Another IMT member declared:

"I think, honestly, the one area we did struggle with was with the lab itself which to me was really shocking. I mean looking at it from the PPE side when we were trying to get them what they needed, you couldn't really get them to tell you what they had, and we finally got to a point where we would send somebody over to go look at the stuff ourselves. It's like 'you got to have a

little more open communication, so we can get you what you need and help you.' I think it was more of that kind of turf type struggle which I didn't really know why we'd had it."

Several statements were made regarding the difficulty in communicating, with obtaining information and relationships with certain individuals from the lab, for example, *"I was not pleased with the relationship with the people in the lab. I think at the best they were obstructionist; at the worst they were fighting against the cause."* An IMT member acknowledged the 'turf' struggles that could take place, especially during emergencies:

"Butting heads over it repeatedly and you're right, we know it's your home turf so you're going to protect it. I suspect that happens in a lot of emergency situations where outsiders come in and the insiders are like "this is my house, you're not going to do that."

Another IMT member elaborated further:

"It was like 'Okay, we want to get you what you need, that's what we're here for, we're not here to tell you what to do, but we need to make sure you have the resources, because we did put this on you when the university decided this is what was going to happen, we're going to run through here, we need to make sure you have what you need.' Just by knowing the people that I know there and our personal interactions there seem to be that struggle and I don't know if others felt that, but that was the one area that I think the communication didn't quite go as well as it could have gone."

The following incident describes one of the interactions that took place between an IMT unit and a representative from the lab:

"Some personalities that are very difficult to deal with in a good situation, and I mean there was one day, where somebody from OADDL came over because they felt like we weren't doing our things properly and that person had been in the room for two hours, when I would go around the

room and they said, 'if they don't leave, I'm going to quit.' So, it was like that kind of strong protecting their turf, and so I just texted someone like this person has to go or I won't have anybody and so finally someone retrieved them. So, I said, I will be one of the persons that won't be here tomorrow if that person comes back. It's just a normal human reaction, but sometimes it gets overblown. I can imagine that happens, like in a situation where you have a tornado, some type of natural disaster in a small little town and all of a sudden, this emergency response team shows up and doing things and the mayor and the City Council are freaking out because it's not the way they would have done it so I'm sure that's pretty common."

In addition, the following statement provided further clarification of the 'disconnect':

"Several people I felt were a little negative toward me and they were all over in OADDL and sometimes there was one person in Vet Med, but I think they just felt they were overburdened by the whole situation there. They were one of the people, probably being forced. So, what would happen is you send an email at 10 o'clock at night, and that's when I got my stuff, and so it was just like people wanted to keep their regular eight to five jobs, but in this situation, it didn't run eight to five and stuff happened in the middle of the night, stuff happened early, some stuff happened late. There was a lot of disconnect also with the actual running of samples in the OADDL lab. They would make a decision at seven in the morning, that they weren't going to enter data that day. Well, I had people who live in Edmond that took them an hour to get here, they had already left home and they get there and there's no data entry that day. For me, I'm on campus, it's okay I just walk from this building over to engineering. There was that kind of perhaps sometimes information was not passed along as it should be, and that was all on the Vet Med OADDL side, that power play thing, like I'm going to jack you around today. I don't want to do it."

This situation illustrates the “the silo effect” (Tett, 2015), which in this case relates to the isolated nature of the separate academic neighborhoods which have an internal focus. Consequently, this can result in minimal interaction with other colleagues or colleges. One IMT member illustrates this by emphasizing the importance of proactive communication through having “*discussions with the leaders and the deans and unit directors, so that they understand if an emergency or crisis hits*” and that the “*culture they work in everyday won’t work for resolving a crisis, for addressing an emergency. That culture is dysfunctional during a crisis, and you have to be able to accept a different cultural approach to solving that problem.*”

The self-identity of IHE’s as being different from other organizations was brought into question with the statement:

“My big advice would be centers of higher education really need to stop looking at themselves as they are different than other organizations ... stop seeing ourselves as an exception, because obviously COVID didn’t see us that way, and it hit us just as bad as a hit everybody else.”

The communication disconnect may have been reflective of certain individuals feeling threatened and perhaps trying to protect their turf as an external unit such as the IMT were suddenly involved in operations related to the lab. Several factors invariably contributed to these issues, such as ineffective communication, fragmentation and poor information exchange and cross-functional control. These factors may have been reduced if the lab was integrated into the ICS.

Key finding: The lack of integration into the ICS of a critical function of the operation resulted in significant challenges for the IMT on several levels.

Policy implications

Organizational silos and poor communication often result in “turf wars” making it challenging for cross-functional cooperation between departments in an IHE. This kind of separation often occurs

between departments and colleges, *“leadership teams they're over different departments or different colleges. So, in these places they're vulnerable to operating in silos.”* Consequently, silos were a common challenge throughout the institution early in the pandemic, *“we were somewhat siloed on campus with our own functional areas and now we're having to really work together on some of these things that we haven't otherwise had to.”* A senior IMT member described this typical organizational culture, *“there is within the university huge conflict with ‘my piece of the pie, my area, stay out of my area, protecting my piece of the turf’ and that has to go away in an emergency operation.”* Although most respondents were impressed with how the diverse group of people from across different departments within the university were integrated into the IMT and worked efficiently together, there were some reports of tension between certain individuals from the lab and individuals on the IMT. An IMT member declared:

“So, I think since the university as a whole doesn't really understand how that team works and who to contact and who to function through, sometimes that would pull you from the objectives that we had, and it would pull you sometimes in a different direction. So, even though we might have had objectives that were well thought out, very tangible and you're supposed to go and do here, the same as you would always have, you're going to have these other outside people pulling your attention which sometimes got you a little off track. I know I would be hit from people that you're like ‘who is that and where did you come from and why are you out there, you're pulling this type of equipment or doing this’ and you're just like ‘whoa where'd this come from.’”

To overcome this problem, the need for policy related to emergency operations on campus was emphasized *“we need to develop emergency operations policies, that clearly define authority, chain of command, the role of the IMT, the role of the EOC ... that identifies who's responsible for the EOC, what the responsibility and authority is of the incident manager or the incident commander and spells all that out in policy and then administrators sign off on it.”* The IMT member further elaborated, *“and that needs to be communicated to the deans, the Vice*

Presidents.” Policies that promote overriding authority during times of crisis may not be widely supported by university leadership, highlighted by an IMT member who said:

“I think by their nature, college administrators do not like that kind of authority being spelled out in policy over their Kingdom but that's if you want it to work, that's how it works. And industry, there's a fire in the refinery well, the plant manager becomes the incident commander and people do whatever has to be done or are told to do.”

The IMT member declared that if there had been emergency operations policy in place and staff had been informed or were familiar with such policy then there would have been the likelihood of other departments and personnel accepting the group’s efforts:

“I think if the department had that general knowledge when something like this happens, they know what's going to come into play, what's going to happen. Maybe personalities lead a lot to this, but I don't think you would have that much feeling of invasion if people understood and if those people can help give that briefing to their team that “hey this is what's going to happen, and this is why they're coming in.”

The importance for organizational policy in responding to crises is underscored in the business continuity literature (Herbane, 2010; Speight, 2011; Tammineedi, 2010).

Key finding: There was an absence of a preestablished organizational policy that supported the application and mandate of a crisis response team such as the IMT within the IHE during the crisis response.

Decision making

Typically, academic institutions make decisions through a process of engaging with all the stakeholders to enable agreement on decisions. Consensus decision making can be a very slow

process resulting in unnecessary time delays in times of crisis. Decision making is a complex process that takes place on a conscious as well as an intuitive level (Khorram-Manesh, Berlin & Carlström, 2016). One of the key success factors that was consistently reiterated by every IMT member, was the focused and rapid decision making:

“There was just a certain intensity to the approach, and I think that in an academic setting there is maybe more of collegial ... approach, where there's maybe more debate and discussion. This felt more like ... just very, very direct. There wasn't a lot of fluff in the conversation, and there was like 'let's go to the functional areas, what are you working on, where are we with this, where we were with this', and it almost reminded me of I don't know, maybe like a military type of approach or a corporate approach or something just didn't feel like true academic setting where you might have more engagement type of the thing.”

Individual IMT members were empowered to make decisions and supported in doing so, *“there was a lack of indecision. I think that was one of the most powerful things. Decisions were made and authority was given to make those decisions.”* An experienced IMT member emphasized the need for rapid decision making during the IMT response:

“When you're managing this kind of an event you don't need a lot of debate, you need decisiveness and you need a small group of people that have experience, that in a period of five minutes you can discuss an issue and make a decision and move forward.”

People accustomed to making decisions in complex and rapidly changing conditions develop considerable skill and experience with making intuitive decisions as one IMT member elaborates:

“One thing about an emergency responder, is you get very comfortable making very important decisions with very little information which is not typically how leadership is going to do things ... when you're talking about this kind of crew of people that are used to crisis decision making,

they don't get as much analysis paralysis, about being wrong. A lot of times just not making a decision is worse than just going forward and trying.”

Many of the respondents had prior training and experience in responding to crisis events in different capacities, using both crisis management and consensus driven decision-making approaches. One IMT member declared, *“quite frankly, I think at least here in Oklahoma State, committees have demonstrated that they're absolutely ineffectual in managing emergency events and disasters.”* When asked about the value of establishing a more traditional form of decision-making such as a committee to be responsible for standing up the lab, one respondent said:

“My experience has been that the people on the committee are very reluctant to make decisive decisions to say, 'here's what we're going to do, now let's go do it.' They're good at debating issues and thinking way outside the box.”

An IMT member argued that when being a member of work groups, committees and task forces they were discussion orientated and did not provide the task orientated approach of ICS:

“I have been a part of numerous meetings of those type of groups and you come out of the meeting at the end of it, and nobody has a task to get to accomplish before the next meeting. You leave those types of groups and you're like 'Okay, that was a good discussion, but what's the next step'”.

An IMT member elaborated further about decision making comparing a committee with ICS:

“At the beginning you're expected to in that operation time [24 hours] complete those tasks that you're given. So, I don't think we would have been able to accomplish what we did, if we went to use the other systems that higher ed typically uses. The committees are more used to debating and discussing and if they take a month or a week or whatever to come up with a decision, they can

do that, during this, we were required to set up very complicated processes in a very short period of time.”

An IMT member alluded to the complexity of the incident response and how the ICS provided a platform for enhanced decision making:

“We couldn't have actually got it stood up and been as successful as we were because there were just too many things that were the emergency of the moment and having a group that understood the structure and what decision points lead to the next decision points was a huge benefit. Again, I don't know how to explain it other than the fact that it brings structure to utter chaos.”

Decisions result from an interaction between multiple functional systems acting in parallel to process information in very different ways, each with strengths and weaknesses. An IMT member identified the distributed decision-making ability of ICS:

“Setting up the IMT was brilliant. It was sheer brilliance. It eliminated assigning ownership. Half of your decisions are already made because, once you get the people in the right places, they have ownership and then you know who to go to as the decision maker.”

An IMT member who had served on the university-wide pandemic response committee compared the two different approaches:

“There was a lot of debate and second guessing and ‘why did you do what you did’, and I still don't know that we've ever reached any form of consensus, but we made the best decisions off the information you had and what you feel is best for the university at that time. I think we're fortunate in this situation, we had people that were really good at leading that type of approach”

Quick and focused decision making during a crisis has been identified as a critical success factor in crisis management and response (Hart, Rosenthal & Kouzmin, 1993; Sayegh, Anthony & Perrewé, 2004; Sommer & Pearson, 2007; Uitdewilligen & Waller, 2018).

Key finding: The application of the ICS provided a suitable platform to enable rapid decision-making processes during the IMT operation.

Training

ICS training is considered as one of the most important elements to successful implementation of the system and utilization of the features and principles (Bahrami, Ardalan, Nejati, Ostadtaghizadeh & Yari, 2020; Bigley & Roberts, 2001; Jensen & Thompson, 2016; Jensen & Waugh, 2014). IMT members that had received prior training but may not have had much if any experience using the ICS, were very familiar with the processes. Those IMT members with a military background that had not received any ICS training but were very familiar with the command-and-control concept, were comfortable with the ICS process. IMT members without any ICS training were either initially intimidated, felt isolated and were initially confused by the system.

The need for regular ICS training and having more trained IMT members was frequently reported by most respondents. Many of the IMT members did not have any ICS training and many of those that had been trained in ICS did not have actual field experience using ICS in a response capacity as one respondent acknowledged, “*exposure to ICS has been in the classroom and not in the field*”. Referring to the organizational structure and ICS positions a respondent emphasized that “*it's one thing to know what the names of the boxes are in class, it's another thing to be assigned to that role.*” Additionally, an IMT with a professional first responder background who had received training in the past declared, “*I just never thought I would have to deploy it, to be honest*”

with you, so I wasn't extremely familiar with the process, and I had to quickly re-teach myself some of the terms and the way things flow."

There was evidence that on-the-job ICS training was conducted by several IMT members, and one respondent indicated that they *"had to coach [another member] along the way, but [that member] eventually very quickly picked it up [ICS role] and did a great job."* However, one experienced IMT member noted, *"there was very little what I considered on-the-job-training of the faculty and staff."* However, the most significant training related issue that was identified, as one IMT member put it, *"systemic lack of training and experience."* Table 6 provides a breakdown of the ICS training and command and control experience of the individual IMT members.

Table 6: OADDL IMT member ICS training and command and control experience

IMT member	Regular job	ICS training	Command and control experience
OADDL IMT			
25	Staff	<i>"I had taken some very basic ICS classes"</i>	Nil
13	Staff	<i>"fire service"</i>	<i>"I do have background in command and control and being on incident management teams of large incidents."</i>
31	Staff	Nil	Military experience
35	Staff	<i>"we dealt a lot with the NIMS system"</i>	Military experience
6	Faculty	Nil	Nil
37	Faculty	<i>"I initially took the course as a student ... level 100 and 200 ... the 300 Level one."</i>	Nil

36	Student	<i>"I had a class on it, it was more of the academic side of things it wasn't necessarily the hands-on this is what you do"</i>	<i>"the first time I had done incident command...it was at a major sporting event."</i>
12	OSUPD	<i>"three of the basic ICS, the three kind of entry level."</i>	<i>"I hadn't been involved ... I had been taught that many years ago."</i>
19	OSUPD	<i>"I was familiar with NIMS and ICS structure."</i>	<i>"for me it always been in some kind of emergency response event."</i>
16	Staff	<i>"I have taken NIMS training, different online pieces of it."</i>	Nil
30	Faculty	<i>"10-year emergency management practitioner"</i>	<i>"dealt with 30 or 40 of those incidents in my career"</i>
24	Staff	Nil	<i>"prior military and I was a first responder"</i>
22	Staff	<i>"Trained in ICS "</i>	<i>"Every response that I've ever been on has been a whole different eye-opening experience"</i>
17	OSUPD	<i>"I've been to a variety of ICS courses."</i>	<i>"it's been minimal practical experience"</i>
21	Staff	<i>" we had done some advance type of FEMA training"</i>	<i>"did a tabletop exercise"</i>
27	Staff	<i>"fire service training classes "</i>	<i>"volunteer firefighter"</i>
23	Staff	Nil	Nil
33	Staff	Nil	Nil
7	OSUPD	<i>"I have everything from 100 up to I think 801 or 802"</i>	<i>"through the fire department."</i>
34	Staff	<i>"I had gone through the basic training that's required"</i>	<i>"tabletop walkthroughs"</i>
8	Staff	Nil	Nil
3	OSUPD	<i>"40 to 50 hours of training on different ICS levels."</i>	<i>"Not really very much actual experience"</i>
1	OSUPD	<i>"I've been through the NIMS training, ICS and all that but I don't remember how many years before this I've been through it."</i>	<i>"the previous things that I've been involved with are kind of on a much smaller scale"</i>

2	Faculty	<i>“NIMS ICS, with a particular view towards business.”</i>	<i>“experienced in wilderness search rescue wildland fire.”</i>
4	Staff	Nil	Nil
5	Staff	Nil	Nil

Over half of the IMT members had received ICS training at some point (18 out of 30) with most of them receiving the training in a first responder capacity. Most of the staff members involved in the IMT had extensive institutional experience and were selected to fulfil a similar role within the IMT. Many of those with first responder experience had never fulfilled their role in the IMT before, and those that had, not to this scale.

When asked about who should receive ICS training within the IHE an IMT member emphasized that *“It would have been very helpful if we would have had more people, especially at the administrative level that had been trained”* whilst another stated that *“anyone that has the authority ... at least from the director level down.”* ICS training for the IHE leadership was consistently stressed indicating that *“some of our top leaders really need to have a little more training in the way these systems work ... I’d heard a lot of times [that] ‘oh that system doesn’t apply to higher ED.’”* Alluding to the growing nature of modern complex and ‘wicked’ problems that could affect an IHE, another IMT member highlighted that *“we may need to lean on a different group of professionals and faculty and staff throughout the campus to have the knowledge [for a] particular event.”* The consensus regarding ICS training amongst the majority of IMT members, was the need of ICS training and awareness amongst decision makers within the IHE:

“I think pretty much anyone who could be in a decision-making capacity for an organization as large as this one should have a basic working knowledge of NIMS and you absolutely need to make sure that your primary people responding do have a basic knowledge.”

In addition to training, most participants recommended the establishment of a formal IMT made up of selected key members from the campus community:

“I think it would be very, very smart if higher ed, each entity had an IMT group that gets mobilized obviously, but a pre-identified group that have gone through ICS training, have certifications, maybe it's an annual bonus on their salary or something to be part of a group and they meet once or twice a year, just to say ‘hey is everybody up on certifications and special trainings or hey globally, these things are happening out there, how can we prepare for this’”.

Training leaders and managers in crisis management has been identified as a critical success factor in organizational response to crises that impact on the business (Robert & Lajtha, 2002; Simola, 2014).

Key finding: ICS training is essential to improve crisis management response and performance particularly amongst decision makers within the IHE.

Relational and trust

Preexisting relationships between team members have generally been found to create greater levels of intrateam trust (Chang & Trainor, 2018) and higher levels of trust is positively related to increased team performance (De Jong, Dirks & Gillespie, 2016). In addition, relational factors have been shown to improve team members ability to exchange information, provide higher levels of group cohesiveness and satisfaction with the assignment outcome, as well as in virtual settings (Beranek & Martz, 2005).

One IMT member reflecting on their experience of working in type 1 IMT's, emphasized that *“there was a value to knowing the people you're working with”* which often occurs through working together during previous IMT operations. Although the members that made up the OADDL IMT had not worked together before in an IMT response, the respondent acknowledged

that *“by and large, we knew each other, which is a big advantage.”* Most of the IMT members knew each other through various interactions during their regular jobs at the university or socially. In contrast another experienced IMT member said the following about relationships and people that are familiar with ICS:

“Anytime you have relationships, it certainly greases skids and move things along faster, mainly because you know each other's capabilities and you know who's most appropriate to assign things to. But, flipping that around, as long as you're dealing with professional people that understand the system, I don't think it's absolutely essential.”

Most respondents were very satisfied with how team members worked together and one senior IMT member compared the experience with previous IMT responses reflecting that on the challenges experienced *“it was like trying to piss up a rope with anybody and everybody fighting within the command center, but this one, I just don't see many challenges.”* In contrast, for one IMT member who did not know most of the people involved said that it was initially very difficult to manage people without having a prior relationship:

“It was extremely chaotic and trying to manage people that I never had met before and then various backgrounds. Then it got smoothed out where I said, ‘if I need this, I’m going to person X, if I need this, I’m going to be person Y’ trying to sort it out.”

Several IMT members used the word ‘family’ to describe the connection between the members on the IMT, *“when we form those teams it’s a lot of work, but you develop very quick relationships and it's more of that family team working together.”* Similarly, another IMT member referred to the members as family:

“We had to get in our structure. We had to get in our family, if you will, it's almost like a family, the way that worked. We all had to get in our role, to accept that role to make it happen. I’m a

believer after seeing that it can be utilized, it can function, it can be successful, and it can be utilized outside of its normal prescribed uses.”

Important factors enhancing crisis response include trust and relational influences (Huang, 2008; Kapucu, 2005).

Key findings: Preestablished relationships had a significantly positive effect on the functioning of the IMT members within the ICS structure.

Organizational Culture and Sense of Belonging

The sentiments regarding the success of the IMT response effort were shared across the 26 members of the Command and General staff that were interviewed. The following statements reflect that sentiment (Table 7):

Table 7: Statements regarding the success of the IMT operation

<i>“I’ve had other people that were a part of the group or on the outside looking at the group and just couldn’t believe how things were being accomplished through the structure and how well it was working.”</i>
<i>“Looking back, it [IMT] made things easy for us. I mean it made it almost seamless.”</i>
<i>“You talk about improvise, adapt, and overcome that’s what that group did, and it was impressive.”</i>
<i>“I would say it’s probably one of the best ones I’ve been on, and I’ve done a lot. I think we had one of the most efficient groups that I’ve ever been a part of, and I’ve been a part of a lot over the last 22 years”</i>

An IMT member highlighted the difficulties and stress related to the response:

“Lots of people have asked me, would you do it again and part of me wants to say, no! I’ll do it all over again, it had to be done.” It’s hard to say and it’s really hard to answer that because so much was such an emergency every minute of every day. It was hard, it was very hard. I have to

say I feel like it was a success, and I feel like for as painful as it felt at the time looking back on it with hindsight, it feels successful and it feels like a lot of the right people were put in leadership roles to make things happen, with the right time to where it did function pretty well. I'm sure there were situations and personal interactions that could have been handled differently during the stress of the response, but overall, I feel like it was handled really well."

Several statements regarding the success of the IMT response were associated with what it meant to be a land grant university:

"I think it's that everyone that was involved with the IMT they were vested in making sure that OSU gave the best product, best information, best results that we could give the state of Oklahoma. I mean because if you look at it, we were kind of thrown up on a stage and say, 'this is the biggest land grant school, this is what they do, we're going to lean on these guys to be successful', ... to show the world that it can be done, and easily and without much effort, because that's what we do every day."

An IMT member saw the university portrayed in a new light based on the support that was provided for the response:

"It gave me a greater appreciation of OSU in general. Just going in and seeing the level of care that people had. No one really cared about who got credit for what or anything like that. All they cared about was trying to help the state and help the people and to me, understood what the land grant mission was. But I think for me that operation and body, that OSU definitely earned my loyalty during that period because I saw what a commitment that they had. In terms of impact as I said that the loyalty to OSU, I think it just kind of set that in stone, this is a place that takes care of people and somewhere, I want to be."

An IMT member emphasized the importance of being an employee within the organizational response to the crisis:

“Every person on our team were vested in the success of OSU and I tell you that when you start talking about operation across state of Oklahoma and [if] you're pulling in agencies from all over the state, far and wide, I don't wanna say they're not vested but they're not vested as long as our IMT was because they they're going to go home. They're going to leave that response area, and then they lose that investment that they put in, whereas we didn't. We came to work every day; this is where we worked.”

Organizational culture has been shown to have a positive significantly effect on team performance by supporting a cohesive, high performing teamwork environment resulting in improved project and business performance (Erkutlu, 2012; Paais & Pattiruhu, 2020; Petty, Beadles, Chapman, Lowery & Connell, 1995). The university culture was mentioned on several occasions in two ways. Firstly, in a very positive frame with reference to the ‘Cowboy Culture’ of hard work as one IMT member put it, *“Let's go cowboys, saddle up! We went and did it so yeah there's definitely a little bit of pride there, and school spirit and things like that”* and similarly, *“I'm proud to be an Oklahoma State employee. I'm proud to be a cowboy”*

Key finding: The organizational culture of the IHE supported the cohesion of the IMT members.

Legacy

The formation of the IMT using ICS had a positive impact on standing up the OADDL. Even though very little is mentioned in the media regarding these efforts, the impact of this diverse team was instrumental in establishing the capacity to test human samples for COVID-19 for the entire state during the first pandemic surge in early 2020. One IMT member remarked:

“Personally, it's probably one of the most significant events of my life...It was just the satisfaction of what we accomplished and the fact that not only [did] we accomplish a lot on campus, but if

you think of the 10s of thousands of lives, we impacted around the state [through] being able to turn tests around in a day.”

The OADDL IMT established new operations for the university in a very short amount of time. This can be likened to a new business startup or new business division of a company. Considering that these early efforts arguably established the groundwork for what was to come and for the new state public health laboratory (Covid lab, 2020), to be officially relocated from OKC and be operating in Stillwater, *“the governor had decided to move the public health lab to Stillwater”*. Not only did the governor officially establish the Oklahoma Diagnostic Laboratory at the Oklahoma State University but the Oklahoma Pandemic Center of Innovation and Excellence was also established to serve as the state’s frontline of defense against any future biosecurity-threatening diseases (OSDH, 2020).

During the pandemic the lab also provided for much needed rapid turnaround testing for several production companies to continue to operate under the current constraints at the time:

“One of my now closest friends used the lab. She runs a set medic for movie sets and Oklahoma saw a huge rise in revenue from movie sets and TV shows move their filming here because we were able to respond. So, they fall under Union rules and Oklahoma was one of the few states in the country that could keep filming because we were able to turn our tests around it fast enough. I would love at some point for somebody to go back and look at how much revenue was increased because we brought major movies here. Reagan was filmed here, American underdog got moved and filmed here and our lab did all the testing for those movies.”

The new public health lab has not been without controversy though, as a surprise inspection and report by the Feds and media reports indicate that there are delays in COVID-19 testing, incorrect temperature of storage of samples, incorrect processes for couriers bringing samples to lab, not

keeping up with the training of new staff starting at lab, much turmoil, and high staff turnover (Lenz, n.d.).

Summary of key findings for the OADDL IMT

The summary containing a list of 38 key findings from the OADDL IMT analysis are provided in Table 8 below. Abbreviations are used to indicate the specific crisis management stage associated with each finding (PP – preparedness and prevention; RM – reaction and mobilization; OI – organizational integration; P – production; TD – transition and demobilization).

Table 8: Summary of Key Findings from the OADDL IMT Operation

OADDL IMT	Stage
1. Awareness about the impact of the impending pandemic was very low amongst professional first responders and staff. However, several faculty members had higher levels of awareness regarding the potential consequences.	PP
2. There was an absence of a preestablished inventory of emergency related equipment that could be easily accessed electronically.	PP
3. There was an absence of following a recognized official policy for activating crisis management support during severe impact on a business operation within the IHE as a consequence of a major crisis effecting the state.	PP
4. There were significant challenges with mobilizing external professional first response personnel and integrating them with faculty and staff during an organization-wide response to a major crisis affecting the entire state.	RM
5. The IMT and the use of the ICS provided an organizing mechanism with multiple characteristics that enabled a diverse group of people to integrate quickly strengthening group cohesion.	RM
6. IMT members were selected based on their experience and skill which was aligned to their role in the ICS.	RM
7. There was an absence of an official formalized well-versed crisis management team readily available to respond to the critical needs of the organization.	RM
8. There was an absence of a formal credentialing or a skills inventory system to keep track of individuals with desirable skills and experience for an IMT response.	OI
9. There was an absence of utilizing an official predesignated system to preselect and mobilize the members required for a crisis management response.	OI

10. The ICS provided the predeveloped organizational structure and roles which enabled the IMT to quickly assemble into the very specific predesignated functions.	OI
11. The active participation in the IMT of a senior administrator from the IHE provided a high level of leadership and influence which improved the performance of the IMT response.	OI
12. Having a dedicated liaison to communicate between the IMT and both internal and external organizations and departments was beneficial during the response to stand up the lab.	P
13. The release and dissemination of critical information during the IMT response was hampered by external communications policy and practice that was incompatible with the ICS philosophy on public information.	P
14. The ability to apply the necessary precautions to prevent the spread of COVID-19 between IMT members was hampered making those working in close proximity vulnerable to infection during the response effort.	P
15. Employees within large IHE's provide specialist knowledge, skill and experience that proved valuable during the IMT response, especially when managing this kind of unusual and infrequent crisis event.	P
16. Several functions that were provided by the IMT did not appear on the ICS organizational chart.	P/OI
17. The integrity of functional units within the ICS structure may be impeded when there is a high level of improvisation, lack of training or experience in the ICS, and the functional unit is physically located away from the direct control or influence of the IC system.	P
18. Rapidly developing and implementing a plan with limited data and establishing a feedback loop to improve on each iteration was a very successful tactic at increasing the response velocity.	P
19. The standard ICS forms were a challenge to integrate effectively into the IMT operations.	P
20. Aligning the person responsible for facilities management in the college to the logistics section chief role within the ICS proved very compatible with the responsibilities of the position.	P
21. The flexibility in financial procedures significantly enhanced the performance of the IMT.	P
22. The ICS structure and terminology created a barrier for personnel who were not familiar with the system.	P/OI
23. The delegated authority that was provided to the IMT to make decisions on behalf of the IHE significantly improved the IMT performance.	P

24. The ICS organizational structure was able to efficiently expand and accommodate the necessary functions that were required during the operation.	P
25. The lack of clear and well-maintained reporting lines and procedures increased confusion and distress from incompatible directives and expectations in one branch.	P/OI
26. The operational objectives provided the clear directives for the IMT to remain focused on accomplishing the priority tasks during the IMT operation.	P
27. Due to the prolonged work periods and the high intensity of the operation there was a need for additional staff at peak times or at the end of the operational periods.	P
28. The formal meetings and briefings within the operational period planning cycle provided the critical exchange of information needed to establish and maintain a common operating picture for those that participated.	P
29. The functions that were 'disconnected' from the ICS inhibited the establishment of a common operating picture.	P/OI
30. The EOC was a critical resource supporting the functioning of the IMT operation.	P
31. The selection of IMT members along with the application of the ICS management principles and features enabled many of the attributes of high performing teams.	P
32. After the demobilization of the IMT there were difficulties with integrating the functions and maintaining the same level of performance that the IMT had established.	TD
33. The lack of integration into the ICS of a critical function of the operation resulted in significant challenges for the IMT on several levels.	OI
34. There was an absence of a preestablished organizational policy that supported the application and mandate of a crisis response team such as the IMT within the IHE during the crisis response.	P
35. The application of the ICS provided a suitable platform to enable rapid decision-making processes during the IMT operation.	P
36. ICS training is essential to improve crisis management response and performance particularly amongst decision makers within the IHE.	PP
37. Preestablished relationships had a significantly positive effect on the functioning of the IMT members within the ICS structure.	PP
38. The organizational culture of the IHE supported the cohesion of the IMT members.	PP

CHAPTER V

V. FINDINGS: CEAT IMT

Introduction

In early June 2020, an IMT was formed to prepare for and support the requirements for reopening a college and the return to campus of staff, faculty, and students after months of lockdown. The IMT was made up, primarily of members from the College of Engineering, Architecture and Technology (CEAT) and operated separately from the OSU Pandemic Response Committee, which was formed to manage the university-wide response to the pandemic. The decision to use an IMT within the college to manage the reopening was based on the positive impact that using the IMT system provided for the standing up of the OADDL to test human specimens for COVID-19.

Reaction and Mobilizing Stage

Reopening of the college campus

Although the reopening of the university for staff, faculty and students were not necessary a crisis

and did not require the level and speed of response that the OADDL IMT delivered, there were significant “unknown unknowns” (Luo, 2021) at the time.

In addition, zero-risk reopening was not possible as there were no vaccines or effective treatment for victims of COVID-19 during that time. Bringing together staff, faculty, and students amidst a highly contagious and deadly virus, increased the complexity and potential for life threatening consequences (Bradley, An & Fox, 2020; Felson & Adamczyk, 2021; Wrighton & Lawrence, 2020). The response required a multifaceted approach leveraging on a range of strategies based on the specific resources and requirements of the college:

“During that very beginning it was critical. There was just a vacuum, with no real guidance out there and really not a lot of knowledge and experience of what other people have done in similar situations ... we just didn't know. So, it was a lot of problem solving using the abilities we have in the college to structure a plan to help us be successful.”

The response from the IMT preceded any detailed guidance on the specific operational requirements for opening a college during pandemic conditions.

“We didn't have good information, or we had conflicting information or things would change or the CDC and the state health department and the deployment of resources, all those things. I mean looking back it was a mess. I mean honestly, it was like ‘wow we're trying to figure this out on our own and that's what we did’ with some of these things.”

The need for planning and identifying the priorities, developing pandemic related policy, acquiring the necessary resources, and implementing and monitoring the plan, supported the decision to use the IMT approach:

“Even though we're really out of crisis mode, we were managing multiple resources to accomplish college wide goals. I still think that in that kind of a situation an incident

management team is the most effective way to do that. Now the task is a little bit different. You still have the planning tasks and that was critical, especially with records and policies. You have logistics and you have operations but it's still the best way to get it done.”

An IMT member that had experience with disaster recovery in a corporate environment, highlighted the need to have business systems operational after the campus had been shut down for several months:

“We needed the rest of campus to return so that things could function. Finances, administrative pieces, that will normally take you a couple of days, were taking weeks, sometimes months and that starts impacting more than just your internal operation, that starts affecting your vendors and you see that snowball effect.”

In addition to restoring the required day-to-day business operations of the college, there were a multitude of other requirements specific to the needs of the college, that needed to be managed under constantly changing conditions:

“Once [we] formed the actual team we literally had to spend about a month and a half figuring out what we were going to do, how are we going to do it, what information sources we were going to rely on, and do this all while the information was constantly changing underneath our feet.”

An IMT member elaborated on the overwhelming task that lay ahead describing the level of diversity in the actions that were necessary across the college (Table 9):

Table 9: A description of a portion of the diverse actions that were necessary as described by an IMT member

Task	Description
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1	<i>“Figure out how to get information out to the college stakeholders, particularly faculty, staff, and students”</i>
2	<i>“A much higher level of on-campus staffing”</i>
3	<i>“The messaging in advance of that”</i>
4	<i>“Having to set up all the rooms, to be able to handle the students on the first day of class.”</i>
5	<i>“Trying to figure out what needed to happen with facilities.”</i>
6	<i>“What needs to happen with the course planning.”</i>

A major area that required significant attention included the preparation of the facilities (classrooms, laboratories etc.) for the prevention, control and monitoring of COVID-19. In addition, there was a need to develop and administer guidelines and specific procedures that would support the implementation of the pandemic precautions required to minimize the risk of spreading COVID-19 infection (testing, quarantine, isolation, travel etc.). This was a priority emphasized by an IMT member who revealed that the college had initiated their response before the university had published any policies or specific guidance:

“The other main thing that IMT did within CEAT is at that point there was no policy anywhere about how you dealt with situations and there were 1000 things that you could do, ‘Can we do this? Can we do that? What if students want to do this kind of thing?’ There was no guidance from above, from OSU on that.”

The development and administration of procedures for the implementation of policy during a pandemic for the college became a significant priority:

“The IMT became a vetting group to try to set some of this policy ... we would identify topics where we need policy. I remember very few times, where he said, ‘no we can't do that, we've got to do something else’. So, it was a way for us to set some basic policy to help faculty and staff

know how to navigate, especially in that first fall semester. Later on, OSU started setting policy that kind of superseded that and actually later on the state of Oklahoma started setting policy that superseded everything.”

The immediate challenges posed by the COVID-19 pandemic on the reopening of the college to staff, faculty and students and the requirements necessary to protect this population, were encapsulated in the mission of the CEAT IMT (Figure 8).

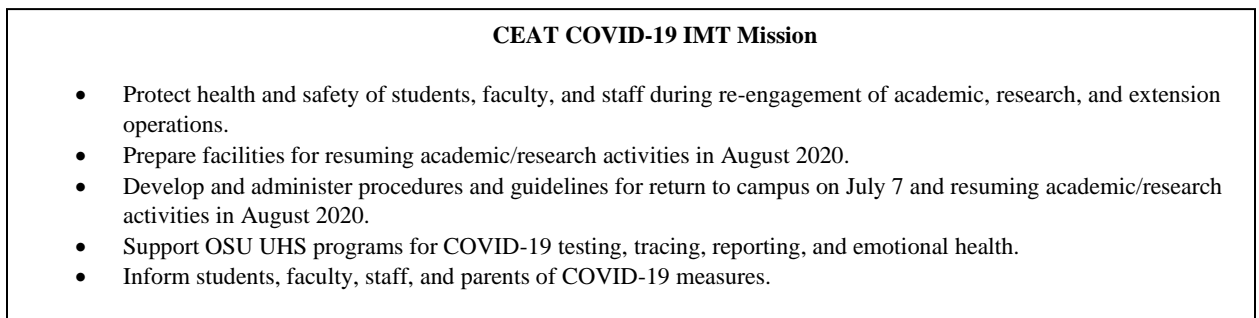


Figure 8: Mission of the CEAT IMT (CEAT IMT, 2020)

The immediate priorities were to formalize and establish the IMT, focus on the communications, and establish procedures and guidelines. These priorities are encapsulated in the main objectives of the CEAT IMT listed in Figure 9.

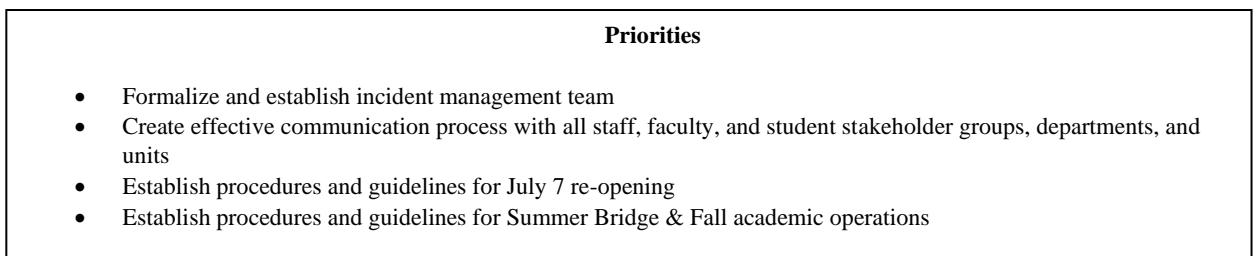


Figure 9: The immediate priorities of the CEAT IMT (CEAT IMT, 2020)

Even though the notion of an IMT may not have been familiar with staff, faculty, and students, the IMT acted as a representative decision-making body for the entire college:

“Most people would be very supportive of the idea that there should be some kind of group, like the IMT, it's not just the Dean, making all the decisions. But that there is an informed group that represents all of the constituencies across the College that's giving information and helping make those decisions. I think that's very much supported.”

The need for a well-organized approach to managing the requirements for reopening the college under rapidly changing conditions and ensuring that the necessary protection for employees and students was identified by the college leadership. Based on recent experience with using an IMT to respond to the pandemic crisis in a decision was made to use a similar approach and to select members from the within college to form the IMT.

Key finding: The decision to establish an IMT using ICS was based on the positive impact resulting from the OADDL IMT response.

Selection of IMT members

The Dean of the college requested a senior member of the leadership team, who had a background and the necessary experience in responding to major emergencies from a previous career, to lead the formation of an IMT to respond to the needs of reopening the college. The IMT members were selected based on their roles within the college which were then aligned to their substantive positions within the ICS organizational structure. They were identified as having the necessary *“skills to perform the task.”* The IMT members were made up of senior administrators, faculty, and key individuals from the college leadership, *“two of the department heads ... two Associate Dean's and the Assistant Dean.”* The majority of the IMT members had no formal ICS training or experience working in an IMT:

“I never heard of an IMT. I’m not familiar with that that line of business...I said “I don't know ... you describe to me what basically the duties would involve ... I was completely ignorant of this notion of IMT. I’ve never worked in the business of first responders.”

However, it was determined that it was necessary for leaders within the main functionary areas of the organizational structure within the college to have a role within the IMT:

“We needed co-ownership from academics and research and I’m sure it would have been alright, without that but having them on the team in a leadership role, I think added credibility to the decisions and certainly to how we implemented them.”

In addition to the leadership and administrative roles within the college, the members were selected based on a variety of specific attributes known to the person inviting them to participate in the IMT. The attributes that were identified as valuable included specific skill sets, technical expertise, and individuals with established relations with other key faculty and student bodies.

The IMT member recalled the following considerations in the selection:

“Very good communication set of skills with department heads ... meets with them weekly, as well as with the student organizations ... was ideal to serve as that conduit into the faculty; well organized ... a real detail guy and is very good with follow through of assigned tasks ... also is very good at seeing bumps in the road ... can see alternatives, as well as issues that may arise.”

Military experience was identified as another important attribute for IMT participation because of the command-and-control structure of the ICS. One of the IMT members who had past military experience alluded to one of the reasons for their selection as being based on military experience, and compared it with ICS:

“Obviously military command and control during a field exercise or an operation are very similar although more of a continuous operation, not as drawn out. But in the military, you do a lot of planning, a lot of logistics and so forth, but I didn't specifically have that [ICS training].”

For the IMT members who did not have any prior experience with a command-and-control system, particularly with the ICS systems, a brief training session was provided at the outset:

“I had position descriptions drawn up for all the positions. I drew those up and gave those to them. We actually had a training session and went over what their roles were. So, we had a written document that had the role and the responsibilities for all of the positions, so they had something in their hands.”

There were only two members of the IMT that had prior ICS training and five that had some form of command-and-control experience. Most of the IMT members held staff positions and had a role within the institutional operations and administration of the college. Only two members of the IMT were from faculty and another two were from an external department associated with health and wellbeing (Table 10).

Table 10: Breakdown of CEAT IMT members respective roles within the college, ICS training and command-and-control experience (Data extracted from interviews)

IMT member	Regular Role	ICS Training	Command & Control Experience
1	Staff	ICS training in the fire service	<i>“I do have background in command and control and being on incident management teams of large incidents.”</i>
2	Staff (external)	<i>“I had gone through the basic training that's required”</i>	<i>“Tabletop walkthroughs”</i>
3	Staff	Nil	<i>“Prior military and I was a first responder”</i>

4	Faculty	Nil	<i>“Military command and control”</i>
5	Staff	Nil	<i>“Military.”</i>
6	Staff	Nil	Nil
7	Staff	Nil	Nil
8	Staff (external)	Nil	Nil
9	Staff	Nil	Nil
10	Staff	Nil	Nil
11	Faculty	Nil	Nil

The IMT members from the administrative side of the college already had considerable exposure working with each other, *“so we already had that relationship built, so I think that helped.”* An IMT from the faculty side was more specific, *“most of us I’d say at least 60 to 70% of us were used to working with each other on a fairly regular basis before it was put together.”* There was a strong connection between positions of authority in the college and the selection of IMT members, *“I think that it was set up strategically and I think it was set up with a purpose, and I think that each person was asked to serve on the team for a reason.”* Pre-established working relationships had a significant influence on IMT member selection. The individual’s role within the college (leadership and function), their specific skill sets, and military experience were all factors in the selection. Unlike the OADDL IMT, all of the members of the CEAT IMT were from the same department and were well known to each other.

Key finding: The integration of the administrative leadership and several key department heads into the roles of the command and general staff positions in the IMT proved beneficial.

Organizational Integration Stage

ICS organizational structure

The ICS organizational structure of the IMT was based on a unified command approach (Figure 10). Each of the functionary areas of the college were represented within this approach (academic, research and extension). The organizational structure was expanded to include positions for command staff responsible for public information, liaison, and health. The operations section was expanded to incorporate the three individual functions of the college (academic, research and extension) and separated on the same level as the general staff. The positions for planning, logistics and finance/admin were included and aligned to those same functions in the college.

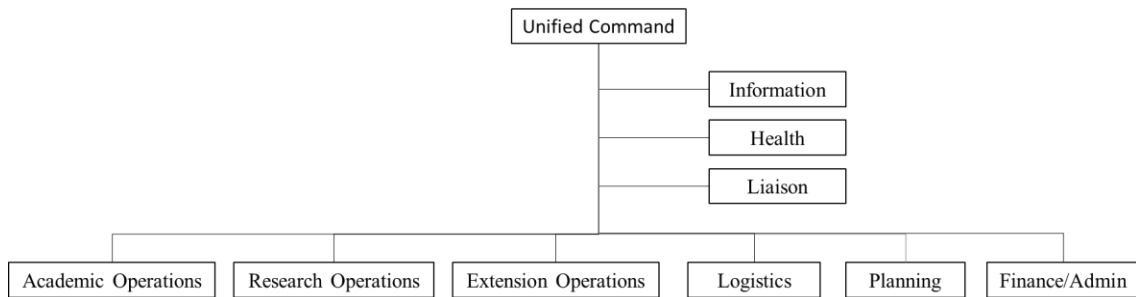


Figure 10: Hybrid Incident Command System organizational structure used for the CEAT IMT response (CEAT IMT, 2020)

The ICS organizational structure provided a system to organize the individuals that were tasked to perform the added role, under the authority of the Dean of the college:

“The value of the IMT more was about giving the Dean a mechanism for managing the crisis ... we effectively provided a structure by which decisions could be made, by which information could be provided, a one-stop-shop.”

The individuals that filled the specific positions within the structure were seen as individuals with the authority to make the decisions necessary and to act on them, *“if we have to come down and say bottom line, what are we going to do, it's going to fall to this person.* The organizational structure of the IMT provided for a unified command approach in that each of the different ‘heads’ were acting as a single authority for the respective departments in the college, *“We were always sort of speaking from the same script and dealing with this as a uniform voice. I think that really was the ultimate value.”* The leaders within the unified command approach were all already well-respected individuals within the college which was identified as a key success factor:

“The thing that was positive is that we had excellent leadership at the top. We had people whom I respect as colleagues, people who I know are very capable, diligent workers and for me that says everything about what we as a team can do. In other words, having the right people will always get the job done the right way. But the biggest mistake that we would have made, would have been to populate the boxes, the org chart, with different people.”

The value of having at least one person that was ICS trained, with the necessary experience in IMT’s was highlighted by an IMT member:

“I think you need at least one person, the chief or whoever you call the person who is high up the food chain, who is highly educated, highly trained, who really understands how this is supposed to work, someone who has done this before, is not trying to learn on the spot.”

The ICS organizational structure that was used represented all the necessary departments within the college:

“One of the strengths of what it did for us, is it had leadership of a lot of different areas within CEAT from HR to facilities to faculty to administration to staff to health services, we had them represented on there [organizational chart]. Mental health services, so we had reps from a lot of

different areas that brought a lot of good information, so they all had contact and heard and talk to different people and so bringing all of that information together really helped us make some decisions.”

An IMT member commented on the various areas that were represented on the IMT:

“We had Deans, we had administrators, we had faculty, we had staff. So, there wasn't a group that was really left out of that. I mean even though it was on an administrative side, there was a representative in there for students that understood it from an academic standpoint, so we had a business perspective, we had an academic perspective, research was a piece of that, so I think as a whole, we did really good in whoever made those decisions.”

The majority of the IMT members were satisfied that the organizational structure incorporated all the positions necessary to perform the function that was required:

“Organizationally our IMT was a complete structure. I don't think we were lacking in any particular functional position nor were we lacking in any one person who is filling that functional position ... they have their network such that they were getting information from a wide variety of sources.”

However, whilst the IMT had good representation of the various areas within the college, there may have been a need for more direct representation from students or student organizations:

“We didn't have a student Member on the group. We consulted with students, each one of us individually got input from students but there wasn't a designated student member. In hindsight we should have changed that too. On the other hand, if some of the discussions we had probably needed to be confidential and so getting a student member would have changed the way we've talked about some things or not, I don't know. But having someone that would be okay with understanding that we said a lot of things in the meeting that we may or may not want repeated

outside, but that there would be a policy that might come out on that, but we needed to be able to speak frankly about things in discussions.”

Besides having the necessary representation on the IMT, the number of members participating was limited, which provided for a relatively optimum level of personnel to manage:

“We were kind of at a sweet spot between having a good representation of different areas ... we have people from all of these different areas but not being so big and unwieldy that it was a sea of people on the zoom.”

Keeping the organizational structure lean, and not having a large group was seen as a significant advantage by several different IMT members. The management of a large group would have made it very difficult, *“There's also the danger of which you don't want too many people on, and you get bogged down with trying to coordinate with too many people”*. The minimum number of IMT members on the structure made decision making more efficient, *“there was also a value of keeping a little lean too, so that it didn't become decision by committee that we could never agree on anything.”* An experienced IMT member emphasized that, *“adding more people to the team for more diverse views doesn't necessarily make the team more efficient or effective, especially if one of the positions can already perform that task.”*

All interactions between the IMT members took place using a virtual platform. The limited number of IMT members allowed for more connected virtual team meetings, *“You always felt like there was a personal relationship with everybody on the screen.”* All of the section chiefs had previously worked together in the regular work environments and were therefore very familiar with each other. This was identified as a key factor that contributed to the working relationship between the members, *“The parts that had prior relationships built in worked the best. I think the people that we had involved who are actually outside the College ended up not being as useful, particularly as time went on.”* The two members that were from outside of the college, were

arguably 'disconnected' from the group. The two members had university-wide responsibilities that extended beyond the IMT and may have been a factor that eventually reduced their active participation in the IMT response. Another IMT member elaborated further on the potential for integrating IMT members from outside of the dominant organization:

"I think, to try to virtually put together a bunch of people who don't have a history of working together, would probably not work well and that maybe is an argument for having a standing IMT primarily to occasionally do a tabletop exercise, but just so people know each other. I think that for people that we have not met with before physically, I'm going to say, for example, the folks are outside the College, [are] tougher to integrate and involve them, but obviously the nature of this particular thing meant that if there was work for us to do, it had to be done virtually."

The ICS organization provided a network to source information, process that information and then formulate the information for dissemination to a variety of recipient groups within the college:

"Each position has a purpose ... I honestly think that if we didn't have that, we would have a lot of scared students, we would have had a lot of scared faculty and staff and angry, because they weren't getting the information. I think there were times some miss or mixed communications, but we addressed it and we were able to address it because of these intertwining committees and working together. So being this communicator for the College, we set up an email account for COVID and honestly, we didn't hardly have a whole lot of questions, because I think we were getting the information that they were needing. We were getting that to them, and so I think that if we didn't have these groups, I honestly think that it would have been ugly."

The college ‘recognized’ the IMT as the group that was responsible for providing the information that was necessary within the college, “*we had a structure in place for decisions to be made because they [staff and faculty] saw us as a collective whole, I think that was very helpful*”

The structure provided the means for collaboration and problem solving:

“When CEAT was doing the things trying to make a difference in solving these problems, we were bouncing these ideas through the IMT, like ‘this is what we’re thinking, what do you guys think’, and they would give us input of what they were hearing from other points around campus. So, I think it was a very good, very positive structure on helping us make decisions.”

However, the organizational structure that was developed was atypical from the standard ICS organizational structure. There were modifications made to the ICS organizational structure that aligned the structure, with that of the college’s organizational structure. The operations section was expanded to incorporate the three individual functions of the college (academic, research and extension) and separated on the same level as the general staff. Typically, there is no association between the individual’s role in their regular job and that of the position within ICS.

Key finding: The ICS structure functioned as a replication of the existing administrative structure within the college.

Position specific roles and responsibilities

Each of the positions within the CEAT IMT organizational structure are discussed in further detail. Understanding each positions responsibilities provide a deeper understanding of how the role was established in relation to the generic or standardized ICS structure. Considering that

there was a level of alignment between the designated position prescribed by the ICS and that of the role within the college itself, it is valuable to explore further.

Incident command: The unified command provided for a forum linking the three different departments within the college together in support of consensual decision making and unified effort. Typically, the members of a unified command structure work together to develop a common set of incident objectives and strategies and maximize the use of available resources, enhancing the efficiency of the entire effort (NIMS, 2017). This system is usually utilized during large incidents that involve several different agencies or jurisdictions that need to work together. The role of incident command was shared by the three Deans of the college (two Associate and one Assistant Dean). In a unique adaptation to the standard application of unified command, the operations section leaders were also the same members of the unified command. Although the organizational structure reflected the unified command position, there was only one person that had the appropriate training and experience to manage that role effectively, *“I served a dual role. I served the role as the incident commander, and then the three of us shared operations, I guess within the management team.”* The initial idea was to provide a platform that would place the three Deans on an equal footing on the same level as the IC. At the same time, they were also the operations section chiefs responsible for the operations within their individual areas of responsibility within the college. However, there was a high reliance on the one individual that had been trained in ICS and acquired considerable command and control experience from incident response in previous employment within that industry. Although there may have been “unity in command”, the unified command role, was mostly facilitated by a single ‘incident commander’.

Key finding: A unified command approach was used although the majority of the IMT recognized only one individual as the IC.

Liaison: The main role of the Liaison was to communicate with the various college stakeholders, particularly faculty, staff, and students:

“At some point we decided that we needed to reach out to explain what my role is and set up a couple of zoom meetings and I’m going to say that probably the best attended zoom meetings which were just towards the beginning were maybe a couple dozen people I don’t know that ever went more than two dozen people. Sometimes it was just to take calls and emails from individuals who had concerns and we provided my information for that. So, that was how it was set up.”

Health: There were two individuals from outside of the college that were assigned to the ‘health section’ of the IC structure. They were responsible for providing information and guidance on the specific requirements and factors related to implementing the appropriate precautions as well as for mental health issues, *“having people who are plugged into the university in other ways in their other responsibilities was very useful in knowing what was happening outside of just our group.”* The need for and importance of the specific guidance from technical experts on the health and wellbeing of staff, faculty and student’s requirement was underscored by a statement from one of the IMT members:

“At the time we were so worried, we had so many students to deal with. I think everybody still just didn’t really know what to do, we didn’t know what COVID was going to do ... we didn’t have the vaccine yet and we were all very nervous. It just took everybody off guard, took you out of your comfort zone.”

Information: The information function was focused internally and not on providing critical information to the public as in a typical emergency response. The PIO was responsible for gathering information and for disseminating the information that was ‘processed’ through the IMT to staff, faculty and students. As the process advanced the amount of information became overwhelming, *“we quickly learned that things change really quick, and we quickly learned that*

we're sending out too much communications and so it's just adjusting I guess and just trying to keep up with everything.” A significant challenge was the contradictory and confusing information that was disseminated from multiple sources:

“Another challenge, I think that I personally faced is the mixed communications that we were getting from CDC, from OSU, from marketing, so that was I guess, to be expected, this was brand new to all of us, so unprecedented, so we were all just kind of trying to roll with the punches.”

In addition, information university-wide was contained within segmented areas, resulting in fragmentation, *“I would draw a lot of my information from the OSU communications group to bring back to the IMT ... one thing I think that I realized [is] that these groups weren't talking to each other.”*

Operations: The unique setup of the organizational structure provided for three separate operation sections representing the three main functionary departments within the college (academic, research and extension), *“Operations were the three Deans and the reason that I chose the three Deans really to be in operations, each of us we're in charge of a unit within the College, the three units.”* Each of the operation sections was managed by the relevant person that was normally responsible for that role within the college. Although the terms ‘section chief’ was not used in the organizational chart or in the interview data, this role aligned with the position title of ‘operations section chief’ in the ICS structure. Each of the operations general staff were then responsible for implementing the decisions from the IMT within their respective areas of responsibility. For example, the academic operations were mainly responsible for academic affairs such as classroom social distancing requirements and using barriers to reduce the potential spread from a positive infection:

“I did a lot of the research and development into doing it... the idea [was to] use plexiglass to create barriers. This was being done in restaurants, it was being done in lots of places. We

looked at the idea ... [to] quickly fabricate something using our ... lab facilities ... to create more capacity in classrooms. We set up six test classrooms and OSU approved that. I had a whole team of people at North campus labs that went through several prototypes of fabrications of how to join the plexiglass.”

Interestingly this plan was presented to the greater institution, which was then adopted university wide:

“We were the first people that did that kind of reset with the social distance limit in each one of the classrooms. Then we presented that to OSU and they said ‘wow, we need to do that, for all the classrooms”.

Key finding: The adaption of the operational section chief positions within the ICS accommodated the role of the associate/assistant deans responsible for the three main functions of the college.

Logistics: The logistics section was responsible for the provision and distribution of PPE, setting up classrooms and labs with appropriate social distancing measures and many other related tasks. The logistics section role within the ICS structure, was fulfilled by the facilities management function within the college. The logistics section role requirements were very similar to that of facilities management (FM) within the college and therefore aligned well with that function. Although several of the assignments and responsibilities of the logistics section could be considered an operations function, the resources that were already available within FM were easily deployed to serve the needs of the operations. In addition, the individual serving in this position already had the required knowledge of the various facilities within each of the operation’s functional areas. For example, the logistics section was quickly able to provide a new misting and cleaning service for classrooms and research laboratories very quickly:

“I saw on TV how they were misting and cleaning the inside of passenger airplanes instead they were misting the classrooms at night to kill any viruses on the surface. But it would also fog up all these plastic screens, so the next day, we had to come in before class or stay after class, wipe them down. So, that was a real pain, but it was a necessity and to that point CEAT also invested. I asked, ‘well what kind of misters are our (OSU) FM using, what’s the actual chemical solution they’re using’, so we bought the same products. So, we can clean and disinfect our labs and our offices and our particular CEAT classrooms. FM was only doing the general university classrooms, so we followed FM’s lead, and we did that too. CEAT research had to continue. And we all wore masks at first start, we all wore gloves every time we walked out our offices. Many people could work easily from home, you cannot work a lab and help build a lab remotely, you have to be on site and do that if a researcher needed something done.”

Planning: The planning section was led by a faculty member and incorporated a documentation unit that was responsible for several planning related tasks as described in Figure 11.

<p>Overall responsibilities:</p> <ul style="list-style-type: none">• Collect all relevant information and data necessary for planning.• Supervise preparation of the weekly incident action plan (IAP).• Provide input to Unified Command on IMT goals and objectives.• Develop and disseminate, in cooperation with the Information Officer, guidelines, procedures, and informational bulletins related to IMT operations and overall goals.• Ensure all guidelines, procedures, and information prepared is consistent with university policies and guidelines.• Determine need for specialized resources to support IMT operations.• Assess changing social, cultural, and organizational conditions that may affect IMT goals and operations.• Anticipate future needs and tasks required to accomplish IMT goals, and address those needs and tasks through the IAP.• Maintain communication with academic department heads to ensure needs and concerns are addressed by the IMT.

Figure 11: CEAT IMT Planning Section responsibilities (CEAT IMT, 2020)

The focus of the planning section was on developing procedures and guidelines for a variety of priority issues that needed to be addressed in a way that made the expectations very clear for staff, faculty and students, *“there was so much information coming out again, contradictory, hard to understand, that part of our role was to establish operating procedures so that those would be applied consistently across the College.”* These operating procedures were vetted by the IMT then disseminated and used as the main source of ‘approved’ information to be implemented by staff, faculty, and students within the college:

“To make sure that people had a ready source, if we got a lot of questions; “what do I do if? what do I do when?” The written policies and procedures gave people a step-by-step answer, ‘if this happens, do these steps, if you're a supervisor and someone is symptomatic, do this.’ So, it was really to try to operationalize procedure, or the steps people had to follow to meet the university guidelines and CDC. There was just so much confusing information. We tried to take the confusion out and put it in a written form that people could apply to situations.”

However, there were occasions where the university-wide policy would eventually be posted on a particular issue, requiring the IMT to review their procedures and make the changes necessary:

“The university did sometimes however write a policy and it would come out and it would basically either negate or detract from what we did, and therefore we would have to go back and get our policies more in line with theirs.”

Besides the team leader (planning section chief), there were three additional members that made up a documentation unit (not reflected on the structure in the OADDL IMT archive) (OADDL IMT, 2020). Each of the individuals were administrative staff within the college and were responsible for different elements that were required to produce the documentation (Figure 12).

Assigned duties:

- *Document Manager* (check compliance with OSU COVID plans to avoid redundancy or inconsistencies; assemble and archive documents; devise general format of guidelines, procedures, or policies; provide interpretations of policies)
- *Writer* (draft, edit and finalize all guidelines, procedures, or policies)
- *Reviewer and Researcher* (review guidelines, procedures, or policies; acquire guiding documents from Whitehurst, Health Services, CDC, etc.; suggest language for guidelines, procedures or policies)

Figure 12: CEAT IMT Planning section staff duties within the documentation unit (CEAT IMT, 2020)

Finance and administration: The finance/admin section was mainly responsible for allocating funds for implementing the IMT plans and facilitation of purchasing of the much-needed resources. The acquisition of PPE and other resources remained a challenge, although the funding required to purchase was not:

“We didn't really have to scrounge for any additional funding. We had it. So, it was kind of an offset because travel was stopped, so it was kind of funds that would have been used for travel and just moved to buying masks and Plexiglas that now we can re-use in other places, so in the labs and stuff.”

Cares team: This operational branch was tasked with providing support to students within the college who tested positive for COVID-19 and were directed to isolate:

“We had decided in our college that we were going to take food items to students who tested positive, because at that time, some students who lived on campus we're actually taken out of their housing on campus and put into either hotels, or a building on campus where they were housing COVID positive students, and they weren't supposed to leave their rooms.”

The assignment involved the provision of emotional support as well as the supply of comfort items and food to the students who were located both on and off campus:

“[We] took those bags around all over Stillwater and deposited them on the doors, listened to the students, what they had to say and, trying to do what we could do between faculty and students. We just tried to take care of everybody really like a family, the best we could, and some of our students were freshman and sophomore hadn't been away from home very much and now they were pretty sick, it was kind of scary. It was a little over 525 for the first year”

The plan that was developed by the IMT was also adopted university-wide:

“[We] came up with a plan, and then the [IMT] looked at it as well and made some tweaks ... then that was floated up to OSU academic affairs and they adopted quite a bit of the language that [we] wrote for the CEAT plan.”

The plan was then implemented within the college and then later, by the university in other departments, *“Our cares team was up and running, before the university's and I believe ours was a model for what the university did.”*

Production Stage

All the objectives that were formulated were achieved within the first three months of the IMT operation. The timeline below illustrates where the effort was concentrated during the CEAT IMT response (Figure 13). After this initial “production” stage, the IMT operation transitioned into a monitoring platform.

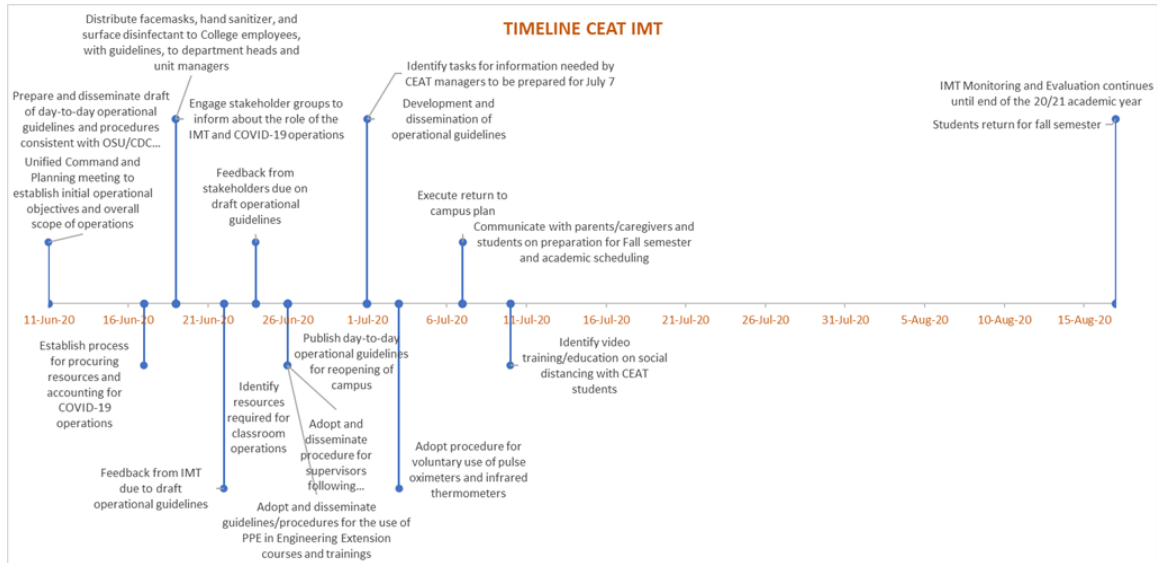


Figure 13: Timeline of where the effort was concentrated during the CEAT IMT response (CEAT IMT, 2020)

Meetings and briefings: The meetings and briefings during the IMT response were integrated within an operational period of initially one week then every two weeks. The briefings took place on a Friday, so that the operational objectives could be adjusted for commencement on the Monday. Meetings to discuss progress took place every Wednesday between the unified command (the three Deans) and the planning section. All meetings and briefings were conducted virtually using Zoom. All documentation and communication between the IMT members were archived, including several recordings of the meetings and briefings. The standard ICS forms were not used for any of the ICS processes. Instead, a series of documents were designed to provide the necessary information and facilitate communication. The IMT meetings provided a platform to identify new matters for action, *“at the beginning, there were always a lot of new issues brought up that we had not necessarily thought about in advance and had to act on.”* The briefings provided a communication platform for obtaining information for decision making from multiple sources:

“Communication in both knowing what's happening and trying to set policy. Communication and feedback and what they're hearing from students, from faculty, from staff, from the world and, so it was a great way to facilitate understanding and communication.”

The extended duration of the IMT response and the regular meetings and briefings may have contributed to some level of fatigue after several months:

“Everyone on the IMT had what we call, our day jobs and so, this was an added duty on top of what we normally do. I think there is a certain level of burnout that could happen and did happen. I think, eventually, what does happen in these weekly meetings is that you tend to tune out a little bit after a while, and so you may have been doing this for seven, eight weeks, and certain parts of me might just start tuning out because of like an informational overload or you recognize you got another job was sitting on your desk that can't get done because of this.”

Each operational period consisted of the meetings between the unified command members and planning and the briefings with all command and general staff every week. Documentation initially included a basic Incident Action Plan (IAP) and other documents developed for the purpose of recording decisions, enhancing communication and record keeping.

Situational awareness: One of the most significant challenges for the IMT and the college, was the confusion created by lack of information. When information did start to become available, it was often in conflict with much of the other information that was disseminated, *“during almost all that time period was a fog because of how the information was managed and disseminated by the University, it was awful.”* The information scarcity and then the information overload resulted in the IMT serving as a platform to collect, sift through and resolve conflicting information for decision making and dissemination:

“There was such confusion with the information that was coming out from the University. It was confusing as hell. It was inconsistent at times, contradictory, and we needed a way to synthesize

all that was coming from the University, so that it was really usable and practical for the College.”

Multiple streams of information were integrated into the IMT which acted as a hub for information and then analyzed for planning the necessary actions that were then required:

“Just getting the information from this group and taking it to this group, and then vice versa, and I think in doing that you're able to run things a lot more smoothly and effectively, and if there's a question or if something didn't seem right or if there was conflicting information that would allow us to address it and figure out the plan moving forward.”

The multiple sources of information were aligned with the functional positions within the ICS structure as each member of the IMT was also participating in other forums associated with their respective roles in the college:

“With Instructional Council, Outreach Council, and the Research Council, we would get information through those meetings ... with Brand Management ... and all the fiscal administrators. So, we had almost too much information coming in but when we met, we could sort through it and decide properly what the most common picture was, again the common operating picture.”

One of the main functions of the CEAT IMT was to establish ‘shared operational representations’ through the constant flow of information, gathering, collating, synthesizing, and dissemination to all appropriate parties within the college. The ICS provided a platform for the IMT members to communicate, and then develop and connect their individual understandings of the situation and how to proceed. This function is a fundamental component of situational awareness and developing a common operating picture within the ICS (NIMS, 2017).

Key finding: The main functions of the IMT were as an information management hub used to collect information, prioritize actions, and ensure college-wide implementation.

Communication breakdown: In a large institution such as a university, communication during a crisis is essential for maintaining relations with staff, faculty, and students (Olsson, 2014; Ulmer & Sellnow, 2000). The longer an organization takes to respond to a crisis, the more it suffers in the eyes of the employees (Marsen, 2020). The risks of information delivery and communication breakdown are increased during conditions where distributed teams are required compared to co-located teams, such as when using virtual communication platforms and tools (Daim et al., 2012). During a crisis employees are communicatively active and feel frustrated and insecure when there is a lack of information or information is in conflict (Johansen, Aggerholm & Frandsen, 2012).

The most frequent problem described by many respondents, during the pandemic crisis, from an organizational point of view, was the breakdown of internal communication within the larger organization. Table 11 provides a list of a range of responses related to the communication issues or problems experienced.

Table 11: List of communication problems and perceptions of the effects amongst the CEAT IMT members

Effect	Communication issue or problem
Changing information	<i>“The one biggest challenge, I think that we faced throughout the IMT experience was simply whether or not we should get in front of the information, whether or not we should lag behind the information, whether or not we should be constantly updating, because the information is changing on us.”</i>
Lack of clear directives	<i>“There were times that very clear-cut directions for the university should have been given, more so than just a here's an idea or here's a suggestion ... more clear-cut directives on ‘this is going to happen or, this is not going to happen’, instead of, ‘it might happen’ or ‘the maybes.’”</i>
Information overload	<i>“There was a continual barrage of information, much of it contradictory.”</i>

Inaction	<i>“In an environment of confusing information coming from university leadership, federal authority, state authorities, I kind of get the feeling that people thought there was probably only so much we could do.”</i>
Conflicting	<i>“Sometimes that was conflicting information, because we would get one piece of information from the University and by the time the committee got that into an engineering form and got it out, now all of a sudden, the university changed something.”</i>
Disregarding information	<i>“The university was posting their own memos and more often than not those memos became the documents most effectively everybody would turn to, rather than turning to the ones that the IMT had developed.”</i>
Assumptions	<i>“The university didn't completely spell out something and the faculty probably made up their own response relative to not really consulting with what we did.”</i>
Delays and complexity	<i>“The overall challenge was trying to take all the different sources of information, and a lot of waiting for somebody else to make a decision, which is always very frustrating and then try to distill it down for the faculty, staff and maybe students in the CEAT.”</i>
Misdirected	<i>“The other challenge was a lot of times we would put a lot of time and effort into planning something and then almost immediately have whatever we planned to do vetoed or contradicted or undermined by higher administration.”</i>

The provision of timely, frequent, accurate, consistent, clear, and concise information was identified as the most significant challenge throughout the response from the CEAT IMT.

Key finding: The IMT was inundated by conflicting and contradictory information from multiple sources within the IHE which increased the complexity of decision making significantly.

Management by objectives: The actions of the IMT were measured against very clear and structured operational objectives, which were formulated during the planning meetings between the unified command and the planning section.

Operational Objectives

- Engage stakeholder groups to inform about the role of the IMT and COVID-19 operations by June 19.
- (UC/Liaison) In-progress
- Feedback from IMT due to draft operational guidelines by June 22.
- (Planning/Unified Command)
- Feedback from stakeholders due on draft operational guidelines by June 24.
- (Planning/Liaison)
- Publish day-to-day operational guidelines for reopening of campus by June 26.
- (Planning/Information)
- Adopt and disseminate guidelines/procedures for the use of PPE in Engineering Extension courses and trainings by June 26.
- (Planning/Extension Operations)
- Adopt and disseminate procedure for supervisors following notification that an employee has tested positive for COVID-19 by June 26.
- (Planning/Health/Finance/Administration)
- Identify resources required for classroom operations, e.g., renovations, microphones, software, etc. by June 26.
- (Academic Operations/Logistics/Finance/Administration)
- Adopt procedure for voluntary use of pulse oximeters and infrared thermometers by July 3.
- (Planning/Unified Command/Health/Logistics)

Figure 14: The list of additional operational objectives formulated by the CEAT IMT (CEAT IMT, 2020)

The MoB approach used by the IMT as is commonly used within the ICS, enabled clear stated actions that were very specific, measurable, achievable, relevant and time bound (Figure 14).

Scaling down operations: The IMT was in operation for two years. However, the study period only focused on the first academic year of the operation (June 2020 to May 2021). However, before the end of this period of the IMT operation, the level of new information and actions were significantly reduced allowing the operational periods to be extended and the IMT to remain in effect for monitoring purposes, “*we were very busy for probably the first six or eight months. The meetings became almost well, they were routine and there wasn't a lot. You just have to scale*

down.” The pandemic was far from over during that period, so the IMT scaled down but remained operational, “*when we got to a period where, after two or three meetings, no decisions were required, there was no change in information, we're in the steady state.*”

Key finding: Due to the prolonged nature of the response over the full academic year the IMT transitioned operating as a monitoring mechanism.

Transition and Demobilization Stage

After action report: Although an official after action report (AAR) was never prepared for the CEAT IMT response, there were comments that emphasized the need.

“I don't know that this particular IMT ever did, what we would have called an after-action review. That's a common thing with a military exercise where you go through the drill you've had and then you sit down, and everybody just talks through what happened, what could have been done better ... to collect lessons learned.”

In a similar vein another IMT member highlighted the necessity for some form of debriefing to document the lesson learned and prepare for future crises:

“There is a time of which we do retrospection and look over the last two years and we say ‘what did we do right, what did we do wrong, what should we be doing differently, what should we have set up and plan for going forward’, but typically we just tend to hop from emergency to emergency to emergency and try to deal with every crisis as a new crisis without really trying to learn from our mistakes and our experiences and be in a much better position and more prepared to going forward.”

However, an IMT member was not optimistic about IHE's learning from the experience and stated, *"I doubt any university will now stop and say, 'what did we learn over these last two years and what do we now need to do, going forward differently.'"* In conclusion to the response by the CEAT IMT a member provided their insight and declared that *"right now we have probably the very dangerous impression we're not going to have to do anything of this nature again. I'd like to believe that, but I don't."*

Key finding: An after-action report or evaluation of the organizational response would have been a valuable tool for the IHE to implement lessons learned throughout the IHE.

Reflection and evaluation stage

At the same time the CEAT IMT was in operation, the university-wide pandemic response committee was in place to manage the demands of the pandemic on the university. Several of the IMT members also participated in the committee driven approach:

"There were a lot of people at one point in time on the pandemic committee so focuses sometimes went to things that were more opinion or emotionally charged and we didn't get as much work done with the large group virtually. So, access to meetings was great but large group meetings or tabletop walkthroughs were a little bit more challenging."

Another IMT member elaborated on the pandemic committee approach:

"There was a little bit of ambiguity, I think in our approach that caused some issues, as far as who's making these decisions for campus and who's the ultimate decision maker, and who is the pandemic committee, and especially being called out by your peers across campus faculty, staff who were concerned. A very large pandemic committee of key directors across campus. We had a

public health specific one that was working on certain things, and then we had to what we call our senior pandemic committee, if there was a decision that needed to be made, we kicked it up to them. There's pretty I'd say high ranking type of people, elevated titles within that group that ultimately said to senior administration 'well here's some options and here's what we think 'and then ultimately, they make the last decision.'"

Understandably there were differences in opinion amongst the leadership that affected decision making:

"So, you're trying to do certain things and there's not buy-in with those certain things. Then, on the other side of that there's people who are just terrified by the fact that the campus is even open. There is this real big spectrum. It felt politically, that's pretty well known that there was political divide on certain things and trying to just deal with the fear and anxiety and just the uncertainty of it all was probably the most challenging thing and trying to effectively communicate, why we're doing what we're doing and in knowing that we're not going to make everybody happy, that was probably the most stressful part was the constant uneasiness that campus presented during that time."

An IMT member commented on the challenges of using a committee driven approach:

"A committee typically isn't organized around functions that are required to assign and evaluate and administer resources. A committee is more of an advisory group or discovery group, that's not what you need when you're trying to manage an incident or crisis or an event."

Another senior IMT member elaborated on the typical academic or collegiate decision-making process:

"Academics are known for long and torturous deliberations and an IMT can't operate in that kind of environment ... but consensus is not necessarily the operative word in an IMT. What you

need in an IMT is you need information, and you need decisions. You can't afford to say, 'well, let's think about this for three more weeks, get back and form a subcommittee, let's have further investigations, write a report, and then we'll get this thing solved in a year or two', which is much more of an academic model if I can make a parody the academic model."

A member that was active in several pandemic response groups commented about the impact of the IMT approach:

"And there were times that I wish that it would have been university wide. I just have to be honest ... the response that [the IC] had with these specific [IMT members] and how they were each given a small piece of the pie, made sure that no student fell through the cracks."

Emphasizing the need to integrate the different groups that were responding to the pandemic crisis on campus, an IMT member declared:

"I do think that the incident command system works. I think that maybe where we could have improved is we needed to mesh those three together if that makes sense. So, the university health and the university wide pandemic [team] and then the animal lab and the CEAT, I think should have been meshed together as one big incident command system and I'm probably unique and that I think I'm one of the only people that sat on all three."

There was significant support for the use of the ICS from the academics that participated in the IMT response, *"how it could bring organization and structure to a response, rather than a haphazard shoot in the dark, a shotgun approach which academics will naturally do simply because they're not trained to think in terms of emergency response."* Elaborating further on the importance of using a predeveloped system like the ICS, an IMT member stated:

"I don't want to lose sight of what we never want to do in society or in engineering is, we never want to reinvent the wheel. So, had I never known about an IMT and there's no reason for me to

know, I would immediately try to invent one, call whatever I want to call it. Put together a structure, I think makes sense and basically go through the whole learning curve because of my ignorance. But if we know that these things have already been well thought out and well utilized, honed over many, many decades of practice and we find out what works, what doesn't work, and we continually improve upon that, that's where we as an institution and as a culture should say, 'okay, we don't need to reinvent this wheel'. At least we know we can do this much ahead of time and then whatever the crisis is, we fill in the blanks based upon the uniqueness of that crisis."

Acknowledging the positive experience of using the ICS, IMT members elaborated on the next steps for the university:

"So, now that we've gone through this exercise, I would say it would be very valuable for the university to go to the next level and say for future crises, we would have at least a shell IMT structure that we know person A, B, and C and will fill these particular positions to be able then to do whatever we need to do. At least get that much going, can be very helpful."

An IMT member commented on the value of having a predeveloped system in place:

"If you have the structure and the people in place before the incident, it's much easier and quicker to respond. The relationships, the roles are already there. They're already known, you don't have to, for example like we did this time, put together a job description and start looking around for who fits those job descriptions."

The use of the IMT approach university-wide was emphasized, *"I think each college needs their own IMT but all of the IMTs need to be coordinated by or with an overall IMT for the organization."* Having a plan and providing the IMT with the necessary authority to management the crisis was reiterated:

“I think, colleges and universities need to have an emergency operations plan established and have a plan about using an IMT, who's going to be in those roles, authority granted to those individuals or that team authority to do certain things, whatever it is.”

An experienced IMT member elaborated on the importance of planning and preparedness:

“I think now I appreciate planning so much more than I ever did. I appreciate drills so much more than I ever did. I think the aspect of incident command where you're being proactive and you're talking about things that could potentially happen you never know how big they could be, and that is invaluable. So, I really think that people should have policies, procedures, and planning to be prepared for what might happen.”

Similarly, an IMT member with military experience emphasized the need for preparing for the next crisis:

“I don't think this will be our last pandemic. It might my last pandemic while I work at OSU, but it won't be for other people, and what if the US is invaded or there's bombings, or more or terrorist activities. What are we going to do? We can't if there's a terrorist activity, we can't just say immediately we're going to pull this team together again. I think that it would have helped if we'd had something in place before it happened.”

In conclusion, one IMT member stressed the value of the IMT in supporting the unity within the response, *“If there's good things that come out of the pandemic, for me, one thing is an understanding that we can connect with people successfully in ways that I wouldn't have thought we could before.”*

Summary of findings from the CEAT IMT

The summary of the 9 key findings from the CEAT IMT analysis are listed in Table 12 below.

Abbreviations are used to indicate the specific crisis management stage associated with each finding (PP – preparedness and prevention; RM – reaction and mobilization; OI – organizational integration; P – production; TD – transition and demobilization).

Table 12: Summary of key findings from the CEAT IMT operation

CEAT IMT	Stage
1. The decision to establish an IMT using ICS was based on the positive impact resulting from the OADDL IMT response.	RM
2. The integration of the administrative leadership and several key department heads into the roles of the command and general staff positions in the IMT proved beneficial.	OI
3. The ICS structure functioned as a replication of the existing administrative structure within the college.	OI
4. A unified command approach was used although the majority of the IMT recognized only one individual as the IC.	OI/P
5. The adaption of the operational section chief positions within the ICS accommodated the role of the associate/assistant deans responsible for the three main functions of the college.	OI
6. The main functions of the IMT were as an information management hub used to collect information, prioritize actions, and ensure college-wide implementation.	P
7. The IMT was inundated by conflicting and contradictory information from multiple sources within the IHE which increased the complexity of decision making significantly.	P
8. Due to the prolonged nature of the response over the full academic year the IMT transitioned operating as a monitoring mechanism.	P

9. An after-action report or evaluation of the organizational response would have been a valuable tool for the IHE to implement lessons learned throughout the IHE.	TD
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CHAPTER VI

VI. DISCUSSION AND RECOMMENDATIONS

Introduction

This qualitative exploratory study provided a critical analysis of the OADDL and CEAT IMT operations using the ICS within an IHE to respond to a crisis during the COVID-19 pandemic.

This chapter provides a discussion which draws from the findings and provides several recommendations for IHE's to improve crisis management and enhance organizational resilience and responsiveness.

The frequency and intensity of crises events impacting IHE's are increasing, requiring institutions to more effectively evaluate their capability to prepare for, prevent and respond to crisis events (Carmeli & Schaubroeck, 2008; Fowler, Kling & Larson, 2007; Liu, Blankson & Brooks, 2015; Wang & Hutchins, 2010). When crisis situations occur, they can 'shine a spotlight' on the strengths and weaknesses in the organizations ability to manage the impact. Using the findings from the critical analysis of both the OADDL IMT (short) and the CEAT IMT (extended) response, the discussion focusses on the salient issues that were identified in the study, and that can be addressed through the recommendations. Specifically, the issues that are concerned with enhancing IHE response to major business disruptions or extreme events that may require an emergency response approach to resolve. These events would be those that go beyond the

primary response from first responders, and that would require a crisis management approach from the wider IHE community.

The recommendations which emanate from the findings, are supported by citing literature that addressed the existing evidence for that specific recommendation. The recommendations are generalized statements and do not relate to any specific causal relationships. The recommendations are focus on the circumstances emanating from the two specific IMT responses that took place at one IHE during the COVID-19 pandemic.

Risk perception

Although this was not a study on risk perception, the opening questions in the interviews focused on IMT members perception on the personal impact of the virus early in the pandemic. Most of the participants were not concerned that the virus would impact on them personally or spread to their location. It would be beyond the scope of this study to determine how this affected the IMT response. However, becoming aware of a developing crisis early on, can provide additional time to prepare for a response that may be required at a later point in time.

During the initial assessment (IA) groups response to determining the requirements for standing up the OADDL to test for human samples, a critical decision point was reached where a discussion occurred between a small group of people. There was a realization amongst the group that a more formalized professional crisis response was required. Not having the specialized training or experience or the resources necessary, they coincidentally identified and reached out to a mutual friend who they knew had crisis response experience, for guidance. Although this worked out particularly well for them, in that an organized response was quickly setup, the process used was not a preestablished system. The two issues that stand out from the findings are,

1) the determination that a crisis response was required, and 2) reaching out to a mutual friend to organize the response.

The early determination that a formal crisis response was required, was no doubt, a key turning point in the OADDL operation. To further elaborate on the detailed implications of this decision, go beyond the scope of this study. However, the process used for determining and requesting the crisis support was very precarious and could have implications for future crisis responses. There was no official procedure and process in making this decision, and by chance, resulted in a rapid chain of events that led to the formation of the IMT. However, considering that the campus had already shutdown, a more formalized process, involving IHE leadership may have resulted in an even quicker response. For example, whilst the IHE leadership were deciding on a university-wide strategy, a decision could have been made to activate a general crisis support plan.

Acknowledging that the looming pandemic would have a broad impact on the IHE, in comparison to an isolated incident on campus that would normally be managed by professional first responders, the crisis support plan would cater for a university wide response. Such a plan could allow for specialized resource allocation, such as an IMT to be placed on standby for any eventually resulting from the shutdown or impending crisis impact. This would allow for a pre-established team made up of members from a diverse campus community, to organize and position themselves for a potential response when required. In addition, knowledge of the IMT or how to request for assistance, could be established university wide through some formal channel or processed through the EOC, for example.

Recommendation: IHE's should develop a preemptive crisis management system that provides for the determination of organizational specific demands in anticipation for a business-wide impact requiring the deployment of organization-wide resources in anticipation of the impact.

Incident management team selection

Once the need was identified and the decision was made for a formal crisis management response, members of the team were selected based on the general knowledge of their specific skills or experience that were deemed useful for team membership. Both the OADDL and the CEAT IMT were formed based on this informal process which was described as ‘relational credentialing’ in the findings of the study. Although the IMT was formed very quickly, it still took time to select and invite all of the members required to participate, some of which started after the response was already initiated. In addition, most of the IHE’s facilities were in lockdown and employees were informed not to return to campus, making the search for members more complicated.

There are numerous factors that could impede on the process for selecting members for establishing an IMT as and when the need calls for it. A credentialing system provides for a process where documentation that validates an individual’s capabilities, qualifications, level of training and experience can be obtained long before mobilizing the individuals necessary for a crisis response. The system also allows for quick retrieval and identification of individuals with specific skills, experience or qualifications that may be necessary for a specialized response, such as what was required for the OADDL IMT. Such skills inventories can help to quickly align the desired employee performance with IHE goals during business disruption (Winch, 2001).

Furthermore, several IMT members emphasized that there is a lack of recognition in IHE’s of the value of the many individuals who have specialized knowledge and experience that would be useful for crisis response.

The inventory would be useful to maintain records of individuals with specific skills and experience, especially ICS qualifications and experience. In addition, the system could be used to monitor the level of skill available across all individuals within the system as a means to identify and support the need for further training or availability of trained individuals. Furthermore,

technical specialists with expert knowledge in specific areas, such as pandemic response, should be included to identify specialists that may be needed dependent on the nature of the crisis.

Recommendation: IHE's should establish a credentialing system, specific to the business operations needs of the IHE, to provide a means to maintain records and manage personnel that are willing to be deployed during crisis response.

Incident management team formation

Although mutual aid agreements are beneficial, integrating with external agencies can pose significant challenges, especially in IHE's. The findings revealed that there was a perception that professional response personnel from external response agencies would not be compatible with the university organizational culture. This disparity could create significant tension between the members from the external agency and the faculty of the university. More importantly, during the early stages of the pandemic, emergency workers were overburdened, and the likelihood of external assistance would have in any case been very limited, if not impossible. This constraint could be experienced during many disasters impacting on a large population.

IHE's have a substantially large and diverse pool of resources that can be utilized in response and recovery operations. A significant capacity exists within IHE's to effectively mitigate the effects of crises in the workplace and within the surrounding communities (Aoki & Ito, 2014; Dunlop, Logue, Beltran & Isakov, 2011). When an organization is impacted by disaster, involving members of the workforce to effectively implement crisis management plans, can contribute to accelerating the recovery of both the employees' involved in the response and the entire work force (Schouten, Callahan & Bryant, 2004).

The findings revealed that the staff, faculty, and students were very willing to get involved and volunteered to participate in the IMT response. Amongst all the team members that participated

in both the IMT responses, the experience was found to be very positive and enhanced their relationships with other members of the team. Several members indicated that their involvement in the IMT provided them with an opportunity to be involved in making a positive difference, and not just isolating at home, which may have increased their concern and paranoia about the impact of the pandemic. Many of the members in the OADDL IMT felt that their perception of the university had significantly improved because of the decision to stand up the lab for the state. However, several CEAT IMT members were disappointed with the university's overall communication during the reopening. Overall, the participation of staff, faculty and students in both of the IMT responses was very positive and demonstrates the value in actively involving a diverse group within a campus community in crisis management operations.

Recommendation: IHE's should select IMT members from the broader campus community and provide them with the support necessary to be involved in crisis management events.

Member selection and role alignment

The purpose of selecting the specific members for the IMT, especially the OADDL IMT, was to ensure that the members were familiar with the concept of the ICS or command-and-control systems. Many of the members had already attained significant training and experience in the ICS whilst others had obtained 'command and control' experience from previous employment in the military. These members formed the 'core' of the IMT with the additional members selected based on the alignment between their role in the IHE and the role requirements within the ICS (e.g., finance and human resources). Although the individuals selected for both IMT responses were well aligned to the function, there is evidence that demonstrates that variability in role alignment within teams can lead to role ambiguity and negatively impact performance and coordination during a crisis response (Jobidon et al., 2017).

Recommendation: IHE's should ensure that individuals allocated to the incident management team have the necessary ICS skills and experience required and be in close alignment with the roles required.

Many of the members selected had 'institutional' knowledge and experience that contributed significantly to improving the IMT performance. The ICS functions such as logistics, public information and finance and administration were occupied by individuals who had a similar role within the college. They were able to integrate their institutional knowledge and experience into the ICS procedures which had a very positive impact on achieving the objectives. Although the alignment worked very well, the institutional knowledge and experience would not be a substitute for ICS training. Rather it would be a force multiplier to integrate and align the trained individual's role in the college with that of the IMT if possible.

Recommendation: IHE's should consider aligning the role of the individual within the IHE to the function within the ICS to provide efficiencies in the IMT responses to crises within the IHE.

The findings revealed that many of the members who were invited to participate, did so voluntarily. Several were also referred by others who had knowledge of their individual backgrounds and experience. Contacting these individuals was a process in itself, in that contact information was not readily available. In some cases, authorization from the individual's immediate supervisor to participate in the IMT was also necessary. Many of the individuals continued with their normal duties in between IMT responsibilities. These and other factors indicate that the process for establishing the team may have resulted in some delays with team formation. Many of the IMT members emphasized their desire to have had more time prior to their task assignment to prepare. Having a preestablished IMT in place with preselected members can cut down on the time that it would take to setup a team when one is required.

Recommendation: IHE's should establish incident management teams with individuals you have already been assigned to specific roles well before deployment is required.

Preestablished relationships

Preexisting relationships played a significant role in the functioning of both IMT's. Many of the members in the OADDL IMT were familiar with each other. In the CEAT IMT every member already had a strong preexisting work relationship. Pre-response established trust and relationships have been found to be important factors that influence the successful implementation of the ICS (Chang & Trainor, 2018) and contribute to increased team performance (De Jong et al., 2016). The establishment of relational connections between team members prior to team formation, have demonstrated stronger levels of team cohesion and exchange of information between team members. These improvements have also been realized when the team members primarily interact through virtual platforms (Beranek & Martz, 2005). Many of the IMT members perceived that the relationships between the members prior to the IMT formation, improved the team's functioning and performance. It would be more beneficial to strengthen the bonds between IMT members, especially if the members are from different departments or diverse backgrounds. Integration between staff, faculty and students who become familiar working with each other can provide for many positive benefits.

Recommendation: To strengthen group cohesion and improve the crisis response teams performance, IHE's should organize activities that build and foster positive relationships between team members.

ICS training

In the ICS there are specific position titles for each member within the organizational structure. Each position has very clear roles and responsibilities to ensure clarity of function. There are also various features and principles within the ICS that, if used effectively, can improve efficiencies within the system. In order to take full advantage of the system, team members need to understand the various system attributes, to avoid delays and enhance performance.

The roles and responsibilities within the IC organizational structure were well aligned with the existing skill and experience of each of the individuals assigned. However, it was very clear from the findings that the team members that did not have any ICS training or experience were initially very confused or intimidated with the ICS organizational structure. There were also many instances where system attributes were not used fully or in a way that they were designed to be used. During a crisis response it is essential to have all team members familiar with the system used prior to deployment. ICS training has been identified as a key to successful implementation of the ICS during a pandemic response (Branum et al., 2010). In addition, many of the IMT members that did not have any ICS training or experience, indicated that familiarity with ICS would have been a benefit for them, and would be willing to participate in future IMT responses, and would want to obtain the necessary ICS training and experience beforehand. In addition, many of the IMT members emphasized the need for the leadership and department heads of the IHE to receive ICS training.

Recommendation: The IHE must make provision for the various levels of ICS training on a regular basis for all crisis response members, including key managers and decision makers in the IHE.

Contingency planning

The importance of planning in advance for extraordinary, complex, unpredictable and adverse events that can impact negatively on an organization cannot be overstated. Contingency planning has been documented as an effective and efficient strategy to help organizations, at both the operational and political levels, to shift gear, apply crisis management procedures and quickly move beyond 'business as usual' (Eriksson & McConnell, 2011; Hutchins & Wang, 2008; Lalonde, 2007a; Nunamaker, Weber & Chen, 1989; Simola, 2005). Unfortunately, administrators frequently continue to repeat the same errors when a crisis does occur.

The inception and formation of the OADDL IMT resulted by sheer chance and not because of any organizational contingency plan that had been previously developed. The same can be said about the inception of CEAT IMT, which was formed on request by the dean, and not as part of a predeveloped plan. In both instances the 'signs' of the impending crisis were detected months before. Although the impact and the resulting requirements to mitigate the potential negative consequences may have been difficult to predict at the time, an IMT could have already been active, planning for the inevitable consequences. The findings from this study clearly reflected the need for prior crisis management planning that involve the organizations leadership and go beyond the disaster plans developed for execution by first responders. The development and implementation of these contingency plans must cut across all levels of the institution including the individual colleges to minimize the effects of unexpected circumstances resulting from a crisis.

Recommendation: The leadership and administrators of IHE's and the associated colleges must develop and incorporate contingency plans into the organizations strategic planning that integrate every level of business.

Crisis management policy

The development and implementation of organizational policy related to the organizations response to a crisis event is essential to ensure the efficient and effective implementation of crisis management procedures and the long-term survival of the organization (McConnell, 2011; Mitroff, Shrivastava & Udvardia, 1987; Taneja, Pryor, Sewell & Recuero, 2014). For example, the policy could provide support for the utilization of diverse organizational resources to mitigate, prepare for, respond to, and recover from a crisis. Furthermore, establishing policy helps to institutionalize aspects of how crisis responses are implemented. For example, policy could require the use of the NIMS ICS for all major response activity.

The findings from the study revealed numerous challenges and problems that both the OADDL and CEAT IMT experienced that could easily have been resolved with the provision of clear directives established in mandated policy applicable to the entire organization. For example, the tension between the lab and the OADDL IMT have been comfortably resolved if policy had been in place beforehand which made the requirements during an IMT response clearly mandated and known.

Recommendations: IHE's must formulate policy that supports and clearly articulates the organizational procedures, protocols, guidelines, administrative actions and principles to be followed prior to, during and after a crisis management response.

Reporting lines

The IMT members that participated in the response were from different departments and units within the IHE and had their own reporting lines and supervisors. The 'new' organizational structure using the features and principles of the ICS, provided a framework for this diverse group of people to integrate into the IMT. Many of the responsibilities were similar to several of the

IMT members 'home' unit, such as public information, finance and admin. Other team members responsibilities, within the IMT were very different from their regular day-to-day duties.

However, there were several challenges based on the generic reporting lines and procedures, home unit supervisors providing information release authority, and regular work responsibilities of the members that needed to be released.

Firstly, the release and dissemination of information during crises events is essential for providing the public with important information regarding the crisis, how it impacts them, and information related to the incident objectives that may improve the actual IMT response effort (Lee, 2008).

The public information officer within the IMT is responsible for this role and reports directly to the incident commander. Unfortunately, during the OADDL IMT response, there were delays and restrictions to the release of information caused due to the different reporting lines between the regular university channels for the release of information and that of the IMT. This resulted, in part, because of the regular reporting lines being in conflict with those of the ICS organizational structure. To enhance the efficiency of the ICS, the reporting lines need to remain within the ICS, regardless of the home unit of the member. This conflict can cause significant confusion reducing the overall performance of the ICS and IMT response organization. It is imperative that all members, regardless of the reporting lines in their respective regular day-to-day jobs, report to only one supervisor, for their specific function within the ICS organizational structure only.

Supervisors and department heads of individuals that participate in IMT responses, need to understand that those individuals will be reporting to a new supervisor for the duration of their involvement in that response.

Secondly, there was a need to obtain authorization from several of the IMT members department heads for them to participate in the IMT response. This created additional tasks and potential challenges for the IC outside of the responsibilities within the IMT. When the IMT is activated, the process for releasing employees to participate in the response must be enabled without adding

this additional burden to the IC. The authorization for releasing employees to perform the necessary tasks within the IMT should be preestablished. In addition, the responsibility for mobilizing and informing employees of the need to participate in an IMT response should be the responsibility of an entity outside of the IMT.

Thirdly, several of the IMT members had to continue with their roles and responsibilities of their respective 'home departments', performing these additional tasks in-between IMT assignments. These conditions add to the individuals already stressful situation and workload which could impact negatively on both responsibilities. The head of the individuals home department and supervisor, needs to make the necessary arrangements for the individual to be released of their duties, until the temporary assignment within the IMT is completed.

Recommendation: IHE managers from the IMT members regular department, need to release the individual IMT member from their usual role and responsibilities, and provide them with the autonomy in their new role and reporting line within the IMT.

The use of the ICS

Although the NIMS ICS is mandated to be used by IHE's (Edwards & Goodrich, 2009) and any public entity that receives federal funding (Edwards, 2007), there was no requirement to use NIMS ICS during both the OADLL and CEAT IMT response. A formalized university-wide pandemic response committee had been in operation to 'respond' to the needs of the institution which met "weekly to navigate the rapidly changing landscape of the pandemic" (OSU PRT, n.d.). The committee did not utilize the NIMS ICS and there was very little, if any, integration between the two IMT responses and the pandemic response committee.

The use of the ICS in the two IMT responses, arguably demonstrated the resilience and adaptability of the system to adjust in response to the dynamic and changing situation and the

specific needs at the time. IMT members that had ICS training and those that did not, articulated the many benefits that the system provided. Whilst this study did not include an in-depth investigation beyond the IMT responses, there were members that had interactions with the committee style, consensus driven approach of the pandemic response committee. The consensus was that the ICS system would have been of great benefit to have been used for the university-wide response and its use should also extend to each of the colleges.

Recommendation: IHE's should adopt and implement the integrated organizational structure, features, and principles of the ICS at every level throughout the organization for all crisis management responses.

Leadership support

The value of having strong leadership during a crisis is well documented (Deitchman, 2013; Garcia, 2006; Jaques, 2012; Mitroff, 2001; Muffet-Willett & Kruse, 2009; Wu, Shao, Newman & Schwarz, 2021). It was no coincidence that the book, *Crisis Leadership in Higher Education* (2019) was published in the same year that the COVID-19 pandemic was beginning. The following statement extracted from the book illustrates the importance of leadership during a crisis, particularly in IHE's (Gigliotti, 2019):

“In this time of rapid change in higher education, it is incumbent upon every academic leader to know how to act effectively in a crisis. Sound crisis leadership saves careers, keeps academic institutions from being weakened or destroyed, and helps protect the students those institutions serve.”

The effective leadership that was demonstrated in both IMT responses was acknowledged by almost every single IMT member. Besides the display of great leadership during the crisis, many of the IMT members confirmed that having individuals with the authority associated with their

substantive positions in the college (outside of the IMT authority), was very beneficial for the success of the IMT operations. The reason being that by virtue of their position in the college certain arrangements could be made that members felt would have been difficult otherwise. In addition, in the case of the CEAT IMT, all the senior IMT members held leadership positions in the college. This alignment was very influential in the decision making and with the directives provided throughout the college. Furthermore, there was no leadership representation from the OADDL involved in the IMT, which may have contributed to the tension experienced between members of the IMT and representatives from the OADDL.

The unified command philosophy provides for a shared leadership approach incorporating more than one IC representing different agencies in an integrated IMT response (NIMS, 2017). This approach may have helped to overcome some of the challenges faced with communication challenges that were experienced between the IMT and the OADDL. In the case of the CEAT IMT, the initial aim was to include the three associate/assistant deans responsible for the three main functions within the college to share the IC role within a unified command structure. However, there were indications from the findings that revealed a higher reliance on a single IC, probably due to the lack of ICS training and experience amongst the other members. The support and involvement in a crisis response from individuals in leadership positions, is no doubt important for the success of any crisis response team.

Recommendation: Individuals that occupy positions of authority and have leadership roles within the IHE, should actively participate in the crisis response in a command capacity on the ICS organizational structure.

Delegated authority

The autonomy and authority of those tasked with managing a crisis, is arguably a major key for successful response and recovery. Delegation of authority enables the responsibility and decision-making ability of those tasked with managing the crisis and is an indispensable ingredient for improving crisis management performance (Evans & Bahrami, 2020). The allocation of formal authority enables the individual who is tasked with managing the crisis - the right to decide. This allows for the effective control over decision making, enabling the autonomy and authority necessary to accomplish the tasks in the way they see fit. Delegated authority can operate effectively within a clear framework, such as the ICS, where decisions are clearly defined and focus on the specific goals of the incident action plan. The findings indicated that the delegated authority provided to the IC from the OADDL, by the IHE leadership, to make decisions on behalf of the university, significantly improved the IC's decision-making ability and the resulting IMT performance. In the CEAT IMT, by virtue of the authority of the Dean, in addition to the authority that the three associate/assistant deans already had in their substantive administrative positions, were enabled to make decisions collectively and act on them, on behalf of the college. This level of authority is essential for whom ever is tasked to lead the IMT response.

Recommendation: IHE's must ensure that the command positions within the IMT have the necessary delegated authority to act for and on behalf of the organization to manage the crisis as deemed necessary by the command staff.

Financial flexibility

IHE's are increasingly laden with regulation and bureaucratization repressing innovation university-wide and within sub-units (Terjesen, 2022). Fortunately, during the early response to the pandemic, the governor of the state of Oklahoma, Kevin Stitt, issued an executive order

(Executive Order, 2020) that relaxed spending policy, improving the financial flexibility of state enterprises. In addition, the OSU leadership made allowances in support of financial flexibility for the OADDL IMT response. This decision had a very favorable impact on the ability of the IMT to make immediate purchases, without having to be burdened with the usual processes that would have slowed down the progress. During the CEAT IMT response, funds became available because all travel had been suspended, making a significant sum available for purchasing the resources required for the reopening of the college. Studies show that budget allocation for crisis response and recovery (Smith, 2006) and changes to financial policies that allow for increased flexibility during crisis response (Barry et al., 2022) improve organizational performance. Budget allocation and the relaxing of spending procedures for crisis response teams are crucial in improving response success.

Recommendation: IHE's should consider a specific budget allocation for responding to and recovering from crisis impacts and make allowances for flexible spending procedures when responding to such events.

Additional staff

Considering the extent and impact of the COVID-19 pandemic, specifically on the disaster response workforce job demands, it is hard to imagine that burnout or fatigue did not have a significant impact on many of the IMT members. This occupational phenomenon of burnout is defined as a “syndrome resulting from chronic workplace stress that has not been successfully managed” (Merlo et al., 2021). Even though the findings from this study do not propose that any individuals suffered from burnout due to the IMT response, burnout was a significant factor affecting a wide range of occupations and individuals in the workforce during the pandemic (Queen & Harding, 2020). However, several of the IMT members declared that there was a need

for additional staff to provide relief to those that were working long hours. At the very least, fatigue was a factor that impacted several members of the IMT during the response. Interestingly, although the OADDL IMT response was a lot shorter, in comparison to the CEAT IMT response, which continued for two years, several members from the OADDL IMT declared that they required relief due to the long working hours within each operational period. This may have been due to the intensity and speed at which the OADDL IMT was operating, whereas the CEAT IMT was a prolonged more sustained operation that was in a stable state to begin with. For the OADDL IMT there was evidence that additional staff did become necessary to provide relief to individuals who were overburdened. Nevertheless, burnout and fatigue are significant factors that need to be considered during crisis management.

Recommendation: IHE's need to ensure that additional trained workers are available to relieve IMT members during high intensity and prolonged crisis management operations.

Routine exercises and practice drills

Conducting routine exercises and drills in preparation for crisis response is an invaluable tool that tests and reinforces crisis management plans helping to identify weaknesses and gaps before implementation during a crisis (NIMS, 2017). Testing crisis management plans in higher education is of particular importance due to the nature and impact of the possible threats (Farris & McCreight, 2014; Holzweiss & Walker, 2018; Sullivan, 2012) and particularly in the context of the COVID-19 pandemic (Izumi, Sukhwani, Surjan & Shaw, 2020).

For many of the IMT members who had training, many had not had the opportunity to apply their skills and knowledge or had only used the skills many years before and on smaller scale incidents. Other non-ICS trained IMT members indicated the need for simulation exercises and drills to reinforce skills but also establish and strengthen relationships between IMT members.

Recommendation: The IHE should support and ensure that regular practice drills and exercises are conducted and evaluated to improve individual experience, team cohesion and crisis management plans.

Demobilization and transfer of operations

The success of the OADDL IMT at implementing numerous initiatives in support of the testing of human samples for COVID-19 was astonishing, to say the least. So much so, that when the OADDL IMT determined that their role was no longer required, and the decision was made to demobilize the IMT, the transition of transferring the operations posed many challenges to the receiving units. These challenges were based on numerous factors, many of which have most likely already been addressed in the recommendations made previously. However, the impact that the IMT had, has no doubt led to many opportunities for the IHE. For example, the official establishment of the Oklahoma Diagnostic Laboratory at the Oklahoma State University and the Oklahoma Pandemic Center of Innovation and Excellence (OSDH, 2020).

The important point is that the impact of a well-organized, innovative, and productive IMT response can provide benefits to the larger organization which go far beyond the immediate goals of the IMT. Thus, the transition and sustainability of the systems developed by the IMT need to be carefully management in a way that ensures that the departments or units that are then responsible for those specific activities, are in a position to do so effectively. This task goes beyond the responsibility of the IMT and would need to involve the leadership and/or administration of the organization.

Recommendation: The leadership of the IHE must be actively involved in the decision to transfer operations and the demobilization of the IMT.

Organizational learning

Crisis events are a significant learning opportunity that can strengthen organizational resilience and adaptation to the uncertainties and complexity affecting the organizational environment. (Lalonde, 2007b; Wang, 2008). The challenges that organizations are facing and will face in the future, the so-called wicked problems (Head & Alford, 2015; Skaburskis, 2008), increase the need for organizational learning from managing past crisis events. IHE's are more vulnerable than ever to the impact from crises and the long-term consequences, especially if little effort is applied to enhance the knowledge about the institutional response through learning from the successes as well as the mistakes (Booker Jr, 2014).

According to the U.S. Department of Education (USDE, 2007), after-action reports (AAR) are a useful tool to use to evaluate an IHE's response to a crisis incident. AAR's provide a means to identify areas for improvement and capture key lessons learned. After the OADDL IMT demobilized, an effort was made to compile an AAR that provided several recommendations (AAR, 2020). One of the issues identified in the AAR was the need to upgrade certain sections of the EOC due to problems experienced during the IMT response. The EOC has since received \$50,000 from the from the Office of the Vice President for Research for these improvements (Burke, 2022). Unfortunately, there was no AAR for the CEAT IMT response, although several members did declare that they thought that it would be beneficial.

Recommendation: IHE's should initiate and support efforts to evaluate the organizations response to crisis events and actively review and support the recommendations emanating from the evaluation.

Summary of recommendations

The recommendations based on the findings that are specific to IHE's are summarized in a list provided in Table 13 below. Abbreviations are used to indicate the specific crisis management

stage associated with each finding (PP – preparedness and prevention; RM – reaction and mobilization; OI – organizational integration; P – production; TD – transition and demobilization).

Table 13: Summary of the 19 recommendations for IHE’s emanating from the study

Recommendation	Phases
1. IHE’s should develop a preemptive crisis management system that provides for the determination of organizational specific demands in anticipation for a business-wide impact requiring the deployment of organization wide resources in anticipation of the impact.	PP
2. IHE’s should establish a credentialing system, specific to the business operations needs of the IHE, to provide a means to maintain records and manage personnel that are willing to be deployed during crisis response.	PP/OI
3. IHE’s should select IMT members from the broader campus community and provide them with the support necessary to be involved in crisis management events.	PP/OI
4. IHE’s should ensure that individuals allocated to the incident management team have the necessary ICS skills and experience required to be in close alignment with the roles required.	PP/OI
5. IHE’s should consider aligning the role of the individual within the IHE to the function within the ICS to provide efficiencies in the IMT responses to crises within the IHE.	P
6. IHE’s should establish incident management teams with individuals you have already been assigned to specific roles well before deployment is required.	PP/OI
7. To strengthen group cohesion and improve the crisis response teams performance, IHE’s should organize activities that build and foster positive relationships between team members.	PP/OI
8. The IHE must make provision for the various levels of ICS training on a regular basis for all crisis response members, including key managers and decision makers in the IHE.	PP/OI
9. The leadership and administrators of IHE’s and the associated colleges must develop and incorporate contingency plans into the organizations strategic planning that integrate every level of business.	PP

10. IHE's must formulate policy that supports and clearly articulates the organizational procedures, protocols, guidelines, administrative actions and principles to be followed prior to, during and after a crisis management response.	P/OI/TD
11. IHE managers from the IMT members regular department, need to release the individual IMT member from their usual role and responsibilities, and provide them with the autonomy in their new role and reporting line within the IMT.	OI
12. IHE's should adopt and implement the integrated organizational structure, features, and principles of the ICS at every level throughout the organization for all crisis management responses.	OI/P
13. Individuals that occupy positions of authority and have leadership roles within the IHE, should actively participate in the crisis response in a command capacity on the ICS organizational structure.	OI/P/TD
14. IHE's must ensure that the command positions within the IMT have the necessary delegated authority to act for and on behalf of the organization to manage the crisis as deemed necessary by the command staff.	P
15. IHE's should consider a specific budget allocation for responding to and recovering from crisis impacts and make allowances for flexible spending procedures when responding to such events.	P
16. IHE's need to ensure that additional trained workers are available to relieve IMT members during high intensity and prolonged crisis management operations.	P/TD
17. The IHE should support and ensure that regular practice drills and exercises are conducted and evaluated to improve individual experience, team cohesion and crisis management plans.	PP
18. The leadership of the IHE must be actively involved in the decision to transfer operations and the demobilization of the IMT.	P/TD
19. IHE's should initiate and support efforts to evaluate the organizations response to crisis events and actively review and support the recommendations emanating from the evaluation.	PP

Conclusion

The specific interventions or strategies suggested in this chapter address the issues and constraints identified in both of the IMT operations. The recommendations respond to the key findings derived through the analysis of the data collected from the interviews and archival data of both

the OADDL and CEAT IMT response. Several of the recommendations expressed were also based on actual participants suggestions. The researcher substantiated the recommendations by citing the relevant literature related to the specific issue addressed.

CHAPTER VII

VII. CONCLUSION

The impact of the COVID-19 global pandemic on Institutions of Higher Education (IHE) has been immeasurable. However, this distinctive period in time, provides the opportunity to explore, describe and explain many unique and perhaps even rare occurrences of how we responded. The aim of this qualitative exploratory study, was to, “critically evaluate the IMT member perceptions, attitudes and experiences, and the use of the ICS, during the IMT’s response to the COVID-19 pandemic, in the pursuance of providing recommendations for improved IHE usage of the ICS.” The purpose of which was to inform action and contribute to the limited knowledge in this field of study. This chapter provides the concluding remarks of the study which include the significance, contribution to knowledge, limitations, and forwards recommendations for future research.

Significance of the study

The findings of this study revealed a unique application of the ICS, which provided the organizational structure necessary to respond to the immediate needs of the IHE. The land grant university, the OSU, was uniquely placed to provide a diagnostic screening service to test human specimens for the deadly SARS-CoV-2 virus that causes COVID-19 for the entire state of Oklahoma. However, the full capacity to do so had not yet been established and had to be achieved within a very short time, because of the rapidly increasing demand in the state. An

incident management team (IMT) was established that rapidly provided the necessary operational support to establish the requirements for scaling and testing specimens from throughout the state. Additionally, in preparation for the reopening of a university college after the pandemic lockdown, an IMT using the ICS was formed to respond to the requirements of the return of staff, faculty, and students.

The findings from both applications of the ICS suggested that the system was utilized as an organizational structure to bring together a diverse group of staff, faculty, and students, many of which were unfamiliar with ICS, to successfully achieve the emergent needs at the time. The ICS was, however, used in a non-conventional way, providing many attributes which helped to improve organizational performance in achieving the numerous objectives. The many nuances in the way that it was applied, which transpired from a variety of unchangeable circumstances at the time, indicated that both the system and the individuals assigned to the various roles and responsibilities performed very well.

The use of the ICS was not without its challenges, as revealed in the findings. For example, the lack of ICS training and experience amongst the majority of the members, the limited use of the standardized ICS forms, the challenges faced with having the diagnostic laboratory excluded from the ICS organizational structure and the complications that resulted post demobilization of the IMT. Many of the issues that were identified in the findings, arguably may have been outside the limitations of the ICS and the individual IMT members' area of influence. However, these issues emphasize the need to integrate and institutionalize the ICS throughout the broader IHE organization, with support from the leadership and the administration of the IHE. The conditions of which were extensively addressed in the discussion and recommendations chapters.

Contribution to knowledge

The utilization of the ICS during this event was significant in and of itself. There is currently an absence of literature that provides evidence of how the ICS can be used to standup a diagnostic laboratory to test for a deadly virus, let alone during a pandemic. Similarly, there is limited evidence in the current literature on how the ICS was used for reopening university colleges after the lockdown due to the pandemic. One of the challenges faced by IHE's early in the pandemic, was a dearth of literature on evidence-based interventions for dealing with the many unique conditions that the pandemic presented. This study provides several findings and recommendations based on the selected two cases related to IHE response during the pandemic. These contributions add to the limited literature on the use and application of the ICS, as well as the literature on crisis management specifically within the context of IHE's. This study also adds to the literature on public health science and animal disease diagnostic practice during a pandemic.

The critical analysis of this study provides an in-depth exploration of the two IMT responses. This narrative itself, is useful to those wanting to further understand how the individuals in the case studies approached and responded to time dependent and complex challenges. This is beneficial to both emergency managers and administrators in IHE's. Emergency managers responsible for planning and preparedness within IHE's will find how the ICS was applied useful, supporting implementation and practice in IHE's. Administrators responsible for crisis management in IHE settings will better understand how the application of the ICS can benefit the organizational response to major crisis events, such as a pandemic which requires actions beyond the professional first responder role. Similarly, public health officials and those involved in animal disease diagnostics will find the OADDL IMT response particularly informative for similar reasons.

Finally, this study makes an important contribution to oral history, as many of the IMT members from both case studies, gifted their interview recordings for permanent archiving at the Oklahoma State University as part of the Oklahoma Oral History Research Program (OOHRP). The firsthand experiences of the individuals involved in the IMT response during the COVID-19 pandemic, will be preserved and made available to the general public and researchers for analysis of interview-based research. In addition, these interviews will become part of the collection for the “Impressions from the Pandemic: Oklahomans Reflect on COVID-19” project (OOHRP, n.d.), which will collect, preserve, manage, and interpret documentary sources representing aspects of the COVID-19 pandemic experience in Oklahoma. The project was made possible with support from the Institute for Museums and Library Services American Rescue Plan Grant. OOHRP researchers will further analyze and interpret the gifted interview data, making available a variety of representations and aspects of the COVID-19 pandemic experience in the state of Oklahoma.

Limitations of the current study

This qualitative research required gathering extensive data from personal opinions, perspectives, and experiences from thirty-seven separate IMT roles and an extensive archive of documentation from each IMT operation (CEAT IMT, 2020; OADDL IMT, 2020). Qualitative research has several limitations (Ochieng, 2009), with limits in extrapolating the findings to the wider population, as being most significant. Although generalization or transferability can never be made with absolute certainty, qualitative studies can provide reasonable extrapolation when using appropriate methods and providing suitable evidence when making claims of inference to a wider setting or population (Firestone, 1993; Maxwell, 2013; Patton, 1990; Polit & Beck, 2010; Yin, 2018).

The most significant limitations of this study were the effect from recall bias. The potential for imprecise data always exists whenever historical self-reported information is elicited from respondents who must rely on their memory to recall events and actions (Raphael, 1987).

Considering that the case study events occurred almost two years prior to the interviews there was a significant possibility of recall bias. Consequently, there were instances where interviewees clearly struggled to recall certain aspects of the IMT operation. Understandably, a lot was going on at the same time as the events were taking place. There were also instances when interviewees presented inaccurate information, mostly related to dates and names. To counter the effect of recall bias, triangulation was used to extend the analysis beyond any single interviewee's recollection (Yin, 2018). Key statements were corroborated with several other interviewee statements to compare and verify the data. In addition, a vast amount of archived documentation was made available to the researcher for analysis which was used to triangulate and verify the validity of the data.

In addition, there may have been some contamination of the data through 'mixing' of events that took place outside of the boundaries of the study. In other words, some of the interviewees may have incorporated events that took place after the specific time period bounded for the study, that influenced their views and opinions. This could have been the case especially with the CEAT IMT response. Although the study focused on the first year of the extended operation, the IMT continued to operate for another year afterward. During the second year there were significant changes in the circumstances that the IMT was operating due to the mandates being lifted after vaccines became available. Triangulation was again used to corroborate the data.

Reporting bias (Gordon & Van Durme, 2013) may have also been a factor, in that interviewees may have wanted to reflect a positive impression of the IMT operation, resulting in expectancy effects that may have distorted some of the data. However, a counter to this would be that the interviewer was known to most of the interviewees. There was already a prolonged engagement

with most participants before interviews took place. This rapport builds trust and allows interviewees to feel comfortable with providing openly critical opinions and detailed information (Al-Yateem, 2012). This was certainly the case with many respondents who were very open about specific aspects of both IMT responses. In addition, interviews were conducted with the full understanding that their anonymity would be secure, and any controversial statements would not be traced back to the respondent who provided the information. In, addition, if they did wish to gift their interview, they could remain anonymous or sensitive data could be redacted from the transcripts.

Time limitations were a significant factor because the volume of data that was collected was extensive. Almost every member of both IMT responses were interviewed. Transcribing all the data was very time consuming and the sheer volume of data available for analysis once the archived data was included was overwhelming. However, data saturation was reached when the ability to obtain additional new information was attained and no further coding was feasible for theme development (Guest et al., 2006) and all documentation was available electronically which made analysis and verification more efficient.

Finally, the aim of this qualitative study was not to determine cause and effect relationships between phenomena that could be generalized to the wider population; rather, to critically evaluate salient perceptions, attitudes, and experiences using interpretivism (Maxwell 2013). The IMT operations were unique cases that provided rich, contextualized understanding of the human experience of the operations in a particular setting which aligned with the selected research philosophy. Due to the distinctive individual perceptions, actions, and responses of each participant within this study, replicability of the findings is likely, impossible. However, in such qualitative studies limited replicability, in terms of the research design and philosophy, can be found (Maxwell 2013). In addition, the findings are not tested to discover whether they were statistically significant or due to chance as this was not a philosophical requirement of this

qualitative study. Rather, the aim was to facilitate ‘thick’ description allowing for the transferability and generalization of the research results to other similar contexts or settings. Transferability in qualitative research can be defined as the degree to which the results of a research study can be applied or ‘transferred’ beyond the bounds of the study (Polit & Beck, 2010). Transferability or “proximal similarity” or “fittingness”, is a collaborative approach in which the researcher’s role is to provide the means (high quality description information) to which the reader or consumer of the research can evaluate the extent to which the findings can apply to other situations. In other words, it is the reader and user of the research who is responsible for ‘transferring’ the results.

Recommendations for further research

This qualitative exploratory study illustrates the critical need for additional research into IHE responses to crisis events. The impact of the pandemic on IHE’s has been significant. Media and other reports have confirmed that many colleges closed permanently as a result of the pandemic causing the largest disruption of education in history (Baker et al., 2020; Rwigema, 2021). The dearth of current literature on the topic opens the way for future research. However, areas of significance would be how IHE’s responded to the crisis, specifically the leadership and administrators of these institutions, who are not usually experienced in crisis management on any level. Analysis on specific systems used in successful responses would be of most practical value. This brings us to the use of the ICS within crisis management at IHE’s. There is significantly limited research on how the ICS is used in IHE settings. It is important to develop our understand of how the ICS can be used by the leadership and administrators from an organizational perspective going beyond the first responder scenarios. Unfortunately, the reason there is so little research in this area, is likely because so few IHE’s use ICS to begin with. Certainly, it may be argued, that the COVID-19 pandemic presented a significant opportunity for research into how

one IHE's did respond, and what the attributes of both the successful and unsuccessful interventions were. For this will expectantly provide the foundation we need to better prepare for future wicked problems that may be looming on the horizon.

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APPENDICES

Appendix A: IRB social, behavioral, and educational certificate of the researcher



Completion Date 16-Nov-2021
Expiration Date 15-Nov-2024
Record ID 44183317

This is to certify that:

Rodney Eksteen

Has completed the following CITI Program course:

Not valid for renewal of certification through CME.

Human Research
(Curriculum Group)
IRB Social, Behavioral, & Educational (SBE) Researchers
(Course Learner Group)
2 - Refresher Course
(Stage)

Under requirements set by:

Oklahoma State University



Verify at www.citiprogram.org/verify/?w4f84810c-52c7-4803-bf5b-87d2076a5b70-44183317

Appendix B: IRB approval to proceed with the study



Oklahoma State University Institutional Review Board

Date: 01/04/2022
Application Number: IRB-22-3
Proposal Title: A Critical Analysis of Oklahoma State University's Short and Extended Duration COVID-19 Incident Management Team Operations

Principal Investigator: Rodney Eksteen
Co-Investigator(s):
Faculty Adviser: Tony McAleavy
Project Coordinator:
Research Assistant(s):

Processed as: Exempt
Exempt Category:

Status Recommended by Reviewer(s): Approved

The IRB application referenced above has been approved. It is the judgment of the reviewers that the rights and welfare of individuals who may be asked to participate in this study will be respected, and that the research will be conducted in a manner consistent with the IRB requirements as outlined in 45CFR46.

This study meets criteria in the Revised Common Rule, as well as, one or more of the circumstances for which continuing review is not required. As Principal Investigator of this research, you will be required to submit a status report to the IRB triennially.

The final versions of any recruitment, consent and assent documents bearing the IRB approval stamp are available for download from IRBManager. These are the versions that must be used during the study.

As Principal Investigator, it is your responsibility to do the following:

1. Conduct this study exactly as it has been approved. Any modifications to the research protocol must be approved by the IRB. Protocol modifications requiring approval may include changes to the title, PI, adviser, other research personnel, funding status or sponsor, subject population composition or size, recruitment, inclusion/exclusion criteria, research site, research procedures and consent/assent process or forms.
2. Submit a request for continuation if the study extends beyond the approval period. This continuation must receive IRB review and approval before the research can continue.
3. Report any unanticipated and/or adverse events to the IRB Office promptly.
4. Notify the IRB office when your research project is complete or when you are no longer affiliated with Oklahoma State University.

Please note that approved protocols are subject to monitoring by the IRB and that the IRB office has the authority to inspect research records associated with this protocol at any time. If you have questions about the IRB procedures or need any assistance from the Board, please contact the IRB Office at 405-744-3377 or irb@okstate.edu.

Sincerely,
Oklahoma State University IRB

Appendix C: Interview questions directed at various research participants of the study

- What is your current position at OSU?
- How long have you been working at OSU?
- What was your position within the IMT? (March 19 to April 27, 2020 / June 2020 to May 2021)
- Talk about what you were doing during the initial stages of the COVID-19 outbreak. How did you learn about it?
- Do you remember when you were asked to participate in the IMT response? What was your initial response?
- How did you feel when you were asked to work in the IMT when others were being told to stay home, or isolate?
- What was your responsibility in the IMT response? Did you have any reservations?
- How did you evaluate the risk when you first participated in the IMT?
- Did you have any previous experience or training in ICS before you were asked to participate in the IMT?
- Did you have problems accessing PPE? Where there any challenges related to your safety?
- Were you involved in any type of similar response or pandemic planning prior to the initiation of the IMT response?
- How did the establishment of the IMT influence the inputs, process, outputs, and impacts of the response operations?
- What were some of the challenges for you working in the IMT during the pandemic?
- How did having to meet virtually effect your decision making or interaction with the team?
- Did you have any difficulties in achieving the tasks you were required to perform?
- Did the specific position assigned to you within the ICS help you to achieve the objectives?
- Did you know what was expected from you in the role / position?
- Did the position help you differentiate between your normal daily tasks and responsibility and those of the IMT? Where the duties the same as your normal day to day responsibilities?
- Where all the plans and efforts of the IMT fulfilled in the way they were intended to be?
- Do you think that your knowledge and experience at OSU helped you to achieve the objectives?
- Did the institutional knowledge and experience of other IMT members play a role in success?
- Did the relationships between the different members within the IMT affect the outcome?
- What were the benefits and/or challenges of incorporating staff, faculty, and students in the IMT?
- Do you think that the organizational structure and the Five Primary ICS Management Functions were sufficient?
- Were there any other staff positions that you think would have been beneficial to include in the IMT?
- Was the Management by Objectives useful for you to determine what you needed to achieve at any given time? Briefing / meeting frequency?
- Were the IAP's and documentation related to the ICS/IMT operation useful and easy to use?
- How did the efficiency and effectiveness of this IMT compare with previous IMT operations that you have been involved in?
- What were the factors related to the success of the operation? (Compare with previous IMT operations)
- Did you feel that the IC was in charge? Would you have preferred a committee?
- Do you think that a different system, other than ICS, would have been better?
- How comfortable were you being part of the IMT? Did you feel that you were part of the larger IMT response?
- Were all the relevant issues that needed to be addressed discussed in the IMT meetings?
- How did this IMT operation compare with previous IMT operations?
- Did the formation of the IMT and use of ICS enable the achievement of the objectives in any way?

Appendix D: Breakdown of the data collection from the interviews

OSU Department	ICS Position	Interview Length (hh:mm:ss)	Transcription		Video (KB)	Audio (KB)	Total Size (MB)
			Word Count	Size (KB)			
OSUPD	Operations Section	47.04	8420	52	297026	43890	515
Research Office Operations	Liaison	1:03:13	11849	67	585201	58954	967
CEAT Special Programs	CARES Team	46.31	8922	51	312813	43379	541
Fire Service Training	Finance & Admin Section Chief	1:02:00	11884	63	936295	57826	1.56 GB
University Health Counseling	Liaison	43.43	8454	54	283096	40778	485
OSUPD	Logistics Section Chief	36.03	6210	54	338909	33632	576
Fire Protection Publications	Finance & Admin Section	46.41	8987	56	312862	43532	540
OSUPD	Planning Section/Resource Unit	1:00:56	9333	60	118925	56830	171
OSUPD	Deputy Incident Commander	1:18:51	13113	76	484691	73538	825
FEMP Student	Planning - Documentation	23.05	4108	35	128853	21533	229
CEAT Extension & Outreach	Incident Commander	1:00:00	10318	69	386937	55951	679
CEAT Extension & Outreach	Incident Commander	35.16	5734	48	242932	32900	419
Research Office HR/Finance	Finance & Admin Section	54.04	8709	61	348325	50421	595
CEAT Fiscal Operations	Finance Chief	38.28	5879	45	315889	35879	547
Faculty Architecture	Collection Branch	1:02:17	11045	64	394489	58092	680
CEAT HOD	Planning Chief	48.29	9787	62	470156	45225	789
HR/Business Operations	Operations Section	58.1	11589	57	532369	54251	907

Environmental Health & Safety	Operations Section Chief	1:00:28	13603	69	473806	56397	819
CEAT Marketing/Communications	Public Information	44.41	8270	53	444343	41671	755
OSUPD	Planning Section	29.44	5871	41	218668	27730	377
Faculty Integrative Biology	Supervisor - Data Branch	57.28	10616	72	550448	53601	943
OSUPD	Safety Officer	45.37	8992	55	366300	42549	609
CEAT HR/Business Operations	HR Comp Claims Unit Leader	57.27	10668	64	525393	53585	897
CEAT HOD	Liaison	44.09	7717	52	261981	41175	452
University Health Services	Technical Specialist	44.24	9308	51	369938	41416	636
CEAT Facilities Management	Logistics Section Chief	1:03:41	11679	71	418971	59392	731
CEAT Academic Affairs	Planning	41.42	8749	49	293366	38891	519
Faculty-FPST	Technical Specialist	47.35	8922	59	743996	44379	1.22 GB
OSU Public Information	Public Information	45.05	7478	50	274371	42040	473
University Health Services	Employee Assistance	39.13	7054	43	387960	36582	640
College of Education and Human Sciences	Operations Collection Branch	29.07	6394	39	158342	27153	278
Faculty FEMP	Planning Section Chief	1:10:29	13612	84	429844	65731	724

Appendix E: Categorization of the codebook

Codes	ICS subcategories	Crisis management categories
PRE-CRISIS		
COVID-19 awareness	Risk perception	Prodromal Stage
Fearful		
Indifferent		
Hopeful		
Personal impact		
Evaluation and risk assessment		
Realization	Situation in state	Preparation & Prevention Stage
Screening for COVID-19		
Inadequate sample testing		
Flattening the Curve / Surge		
Sense of urgency		
Testing capacity	Situation at OSU	
Staff experience		
Campus shutdown		
Need for help		
CRISIS EVENT		
Crisis within crisis		Reaction & Mobilizing Stage
PPE Crisis	Constraints	
Test kit shortage		
Equipment needs		
Mutual Aid		
Mobilizing IMT / Crisis Management Response		
Decision to use ICS	Delegated authority	
Support for decision		

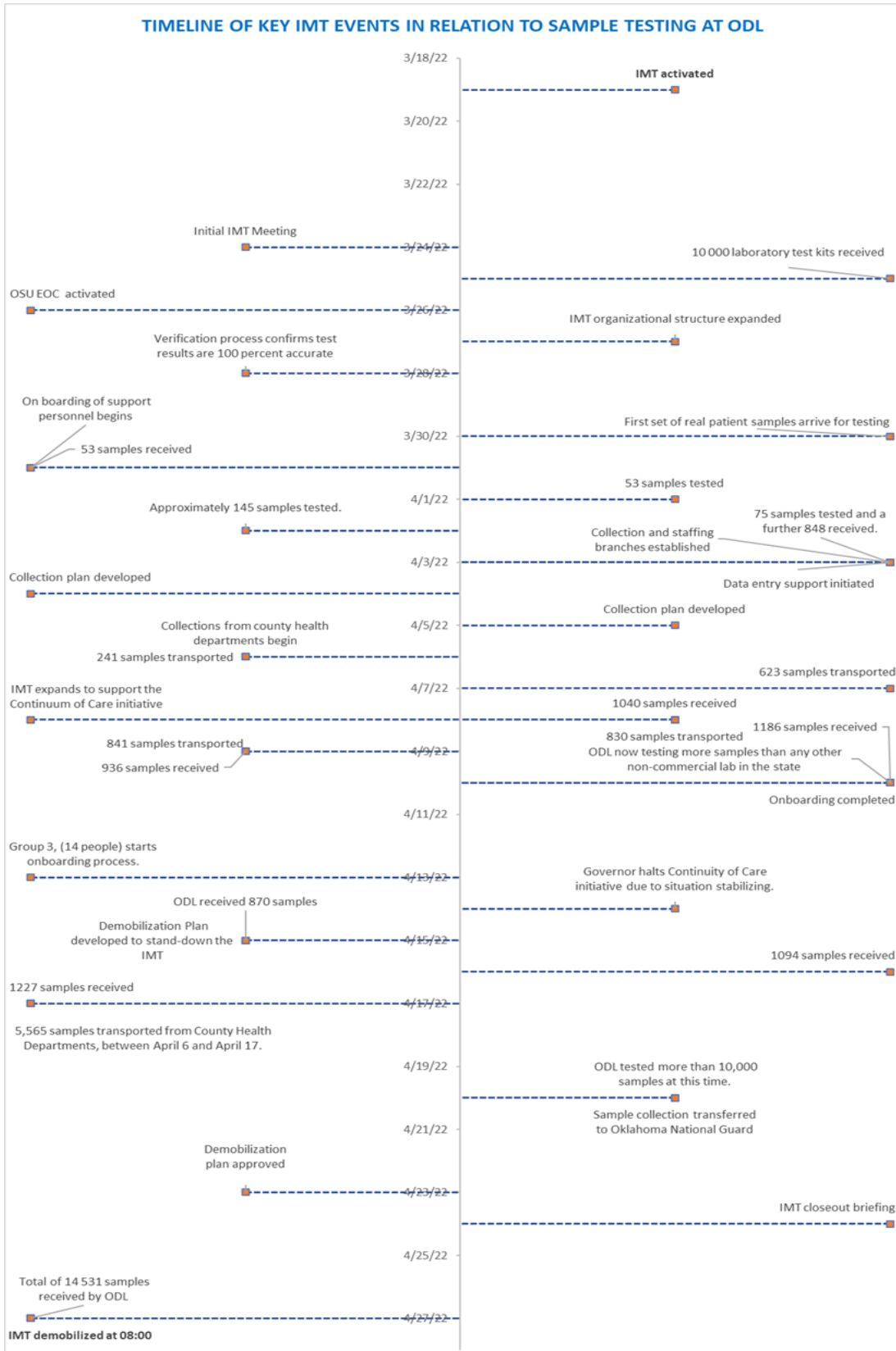
Position in OSU	Member selection: Aligning skills with role Relational credentialing	
Work experience		
ICS experience		
Military experience		
Preestablished relationships		
Organizational Functions / ICS Roles and Responsibilities		Organizational Integration Stage
Incident Command System	Integration system	
Incident Commander	Command Functions	
Liaison		
Public Information		
Safety		
Technical Specialists		
Operations Section	General Functions	
Planning Section		
Logistics Section		
Finance and Admin Section		
Data Entry branch	Branches / Divisions	
Collection branch		
Housing branch		
Security branch		
Training/Fit testing/Medical branch		
ICS forms		
ICS Organizational & Management Features		Production Stage
ICS familiarity	Critical Business / Mission-critical systems	
Terminology		
ICS attributes	ICS Organizational structure	
Authority		
Leadership influence		

Task assignment	Delegated authority Span of control Modular organization Chain of Command Management by Objectives Incident Action Planning Meetings and Briefings Situational awareness / common operating picture Emergency Operations Center (EOC)	
Communication		
Supervision		
Relational		
Sense of urgency		
Emerging issues		
External influences		
Reporting lines		
Focus areas		
Integration		
Cohesion		
Improvisation		
Relational		
Communication		
Emergency Operations Center	POST CRISIS EVENT	
Virtual platform		
Transition to sustainable operations / Monitoring		Transition & Demobilization Stage
Stable state	Return to normalcy	
Decision/planning to demobilize	Demobilization	
Continuity of IMT established operations		
Impact of Demobilization		
After Action Report	Evaluation	
Reflection & Evaluation		Post Event Analysis Stage
Flexibility	Strengths	
Integration		
Rapid deployment / Velocity		
Decision making		

Sense of belonging/purpose		
Financial procedures and flexibility		
Institutional knowledge		
Preestablished relationships		
Task orientated		
Scalability		
Procedures / directives		
Objectives		
Low bureaucracy		
Communication		
Teamwork		
Laboratory disconnect	Weaknesses	
ICS Training		
Policy		
Disconnected		
Lack of supervision		
Fragmentation		
Decentralized		
Documentation		
Imposter syndrome		
Transition		
Respect	Success Factors	
Relational		
Trust		
Cowboy culture		
Leadership		
Colocation		
Volunteers		

Delegated authority		
Institutional knowledge		
Skill alignment		
Specialist skills		
Pandemic Response Committee	Challenges	
Organizational culture		
Bureaucracy		
Additional duties		
No policy		
Conflicting information		
Information changing		
Rapid changes		
Relationships developed	Personal impact	
Long working hours		
Stress / burnout		
Safety		
Positive		
Negative		
Legacy		

Appendix F: Timeline illustrating key IMT events in relation to the testing at the OADDL



VITA

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