

Coordination of Public Health Response: The Role of Leadership in Responding to Public Health Emergencies

Peter J. Fos, Peggy A. Honoré and Russel L. Honoré

Abstract

Public health emergencies are becoming more commonplace every year. Naturally occurring public health emergencies, such as hurricanes, typhoons, tsunamis, and floods cause significant devastation to property and people. Although these emergencies are becoming more and more common, response is still very challenging. A root cause of failed response is a lack of coordination between national, regional, and local public health agencies. These failed and unsuccessful responses are seen with naturally occurring public health emergencies, including pandemics. This chapter addresses coordination, its barriers and challenges, with a focus on the role of leadership in response to public health emergencies. Coordination leadership is a critical aspect of successful and effective response to emergencies. Leadership styles will be discussed and examples of effective leadership. Lessons learned will be presented, as well as research findings. Examples discussed include Hurricane Katrina, the tsunami of 2004 in Thailand, the COVID-19 pandemic, and the Sendai Framework for Disaster Risk Reduction, Sustainable Development Goals.

Keywords: leadership, emergency preparedness and response planning

1. Introduction

The nature of public health emergencies demand coordination and collaboration between local, state, regional and national capabilities. Local authorities do not have the capability, alone, to address these catastrophic events. In a Federalism system of governance, such as what exists in the US, the Constitution mandates divisions of power between federal and individual state governments [1]. Consequently, agencies at these different levels are not always naturally aligned to work collaboratively. Other models of government where authoritative territory issues are present also complicates coordination of efforts. A challenging issue is determining who is in charge of the response to emergencies when agencies from different levels are involved. The current COVID-19 pandemic emergency in the US with its lack of national coordination and state testing, consistency in data reporting, and vaccine distribution and public dispensation serves to illustrate this point. To successfully plan, mitigate risk, and respond to the effects of public health emergencies requires

leadership to manage the coordination at all levels. This chapter focuses primarily on the role of leadership in planning for and coordinating a response to a public health emergency. Among many other sources, evidence in the chapter is drawn from research conducted by Preparedness and Emergency Response Research Centers (PERRCs) funded through the Centers of Disease Control and Prevention (CDC) in the 2006 Pandemic and All-Hazards Preparedness Act (PAHPA). In the reauthorization process for PAHPA, the US Senate Subcommittee on Bioterrorism and Public Health Preparedness convened a Roundtable to gather recommendations from national experts on how to strengthen US capacity for an all-hazard public health response. Some recommendations by the panel included increases in preparedness and response research funding, development of performance metrics, and implementation of system capacity assessments [2].

Following the events of September 11, 2001, the importance of integrating and coordinating public health resources with first-responding agencies for planning, training, risk mitigation, and response to public health emergencies was formally recognized. However, the disconnect between these agencies resulted in barriers and conflicts culturally and jurisdictional. In an effort to facilitate this integration, in 2003 public health was included as a first-responder agency by the federal government [3]. This effort was less than successful because federal agencies are organized according to federal guidelines, while public health agencies follow state laws and regulations. This disparate organizational structure is a hindrance to coordination and collaboration. This situation begs for strong, effective leadership.

There are two classic examples of the challenges to coordination from which many lessons can be learned. The first is Hurricane Katrina and the second is the COVID-19 pandemic. These events required a high-level of coordination of international (in COVID-19's case), federal, state, and local public health agencies. These events, on the surface, seemed to be similar to those which have occurred in the past, but the enormity of the required public health response was unexpected.

2. Coordination

Coordination can be simply defined as the act of making different people or things work together for a goal or effect [4]. Coordination has been defined in terms of positive and negative. Negative coordination is when decisions are made in one public health agency considering decision of other agencies, while attempting to avoid conflict. Positive coordination involves agencies not focusing on conflicts, but on finding ways to work together in a manner that each agency benefits [5]. Coordination problems usually are due to redundancies and gaps in services across agencies. Positive coordination is preferred because it results in better services.

Strategic coordination is what is needed for public health response. Strategic coordination involves countries through their public health agencies working together based on strategic goals. Examples of such goals can be found in the CDCs Public Health Emergency Preparedness and Response Capabilities developed as National Standards for State, Local, Tribal, and Territorial Public Health [6]. Another is the World Health Organization's (WHO) Joint Evaluation Tool as a mechanism to assess country capacity to implement the International Health Regulations as mandated by the 48th World Health Assembly [7]. A common feature of these goals is to move toward standardization of practices across all jurisdictions for activities such as detecting, preparing and responding to threats, improving the health status of a population, delivering COVID-19 vaccines to the population, or creating a coordinated public health response program [8].

Coordination levels have been delineated in the form of a scale from total independence of top-level decision makers to a very coordinated governmental strategy [9]. It is not common for agencies to be at the top level of the coordination scale, but it does illustrate possible coordinating goals.

3. Leadership theory and styles

Leadership has been defined in several ways. One definition is leadership is a process by which a person has influence over others to accomplish an objective and directs an organization that makes it more cohesive and coherent [10]. Another definition is leadership is a process by which an individual influences a group of others to achieve a common goal [11]. These definitions are describing “process leadership” which is the process of leaders applying their leadership knowledge and skills to situations. Leadership is learned, but it is influenced by leaders’ beliefs, values, ethics, and character [12].

It is important that the effects of leadership are sustainable. Sustainable leadership has the following characteristics: sustainable leadership 1) creates opportunities for training and learning, 2) ensures success over time, 3) maintains the leadership of others, 4) develops human resources, and 5) develops diversity and capacity [13]. Sustainable leadership is often characterized by distributive leadership throughout an organization [14]. Successful leaders facilitate people’s learning from other’s diverse practices. Other’s practices and approaches may be enlightening and informative [15].

Several theories have been postulated concerning leadership. Bass’ Theory of Leadership states: a) personality traits lead people into leadership roles, b) events cause people to rise to the occasion, c) people can choose become leaders, and d) people can learn leadership skills [16]. Behavioral theories have stressed the role of how leaders’ behavior impact their effectiveness and followers [17]. Behavioral leadership theory styles are autocratic, democratic, and laissez-faire. Behavioral theory states that leaders adopt one of these styles and that leaders are made and not born [18]. Contingency theory suggests that a leader’ behavior is dependent on the situation. This theory is based on the proposition that successful leaders must align their approach to the specific situation, and there is no one optimal approach to leadership [19].

Transactional leadership theory states that a two-way relationship between a leader and followers is essential in meeting success. This theory is based on rewards and incentives for followers [20]. The servant leadership theory suggests that leaders serve first, then lead. The theory advocates patience, kindness, humility, respectfulness, honesty, and commitment. Following this theory, the leader must overcome self-interest to serve others [21]. Dominant leadership theory posits influencing others by being assertive and using one’s power and formal authority [22]. Research has shown that dominant leaders are preferred in times of uncertainty. This is based on the assumption that dominant leaders are decisive and action oriented [23].

There are two major leadership styles, directive and participative. Directive leadership style involves giving clear directions, expectations, and objectives to followers. This style is most effective when a situation is complex, novel, or unexpected. Leaders using the directive style making decisions independent of input from subordinates [24]. Using this style leaders have a tendency to control discussions, dominate interactions, and direct tasks to their completion [25]. Directive leaders motivate subordinates to act to support the leader’s strategy to address situations [26]. A result of directive leadership is achievement of high

levels of performance by providing clear goals [27]. Directive leadership has shown to improve exchange and processing of knowledge, which is another result for performance improvement [28].

Participative leadership is the process of jointly making decisions by a leader and subordinates [29]. The focus of this leadership style is on interpersonal behavior and interactions. This leadership style has been shown to be beneficial for effective overseeing of teams [30]. Participative leadership allows for sharing of knowledge, and professional development of team members [31]. Studies have shown that participative leadership increases team members' commitment, and allows for acceptance of change and effectiveness [32]. This style is associated with improved team motivation and attitudes toward the tasks at hand [33].

Leadership has a profound effect on managing the response to routine public health events, as well as those that are catastrophic. Weak leadership can magnify the effects of public health emergencies. Strong leadership will significantly reduce the effect of emergencies [34]. What is often the case, strong and effective leadership is not seen because its success reduces the awareness of its effect [35].

4. Coordination challenges/barriers

Public health emergencies require coordination, but challenges exist. In fact, coordination is a fundamental problem for public health agencies. A challenge for public health agencies is to work with new partners, as well as the challenge to work differently with regular partners. Beginning with the events of 9–11, in addition to providing health services on a routine basis, the federal, state, and local public health agencies are expected to be prepared for natural disasters, terrorist attacks, and pandemics. Public health agencies are well prepared to respond to recurring events, such as food-borne outbreaks. The same can be said for seasonally occurring infectious disease outbreaks of flu and pneumonia. Both of these outbreaks have serious health outcomes, but their occurrence is expected and strategies to manage them are programmable. Once these outbreaks are identified, public health agencies mobilize personnel, following well-established and longstanding plans and procedures, to stop the outbreaks and coordinate treatment of those who may have been affected.

Hurricane Katrina has been identified as the worst natural disaster to ever occur in the United States. To classify it as a major disaster is an understatement. Hurricane Katrina attacked the United States over a five-day period, from August 25th to August 29th in 2005. The storm first struck Florida, then intensified and made landfall in Louisiana. Its devastation was spread over several Gulf Coast states, but its primary affect was felt in the City of New Orleans. The failure of the levees in New Orleans resulted in floodwaters over 80% of the city and over 1,500 deaths [36].

Shortly after Hurricane Katrina passed through New Orleans and downgraded to a sub-tropical disturbance, it became clear that the storm had overwhelmed public health agencies. Lt. Gen. Russel Honoré testified to the U.S. Senate that Hurricane Katrina “beat us” [37]. A coordinated response was not implemented at first, because of the lack of communications, which were eliminated by the storm. Coordinated responses required command and control functions, which did not exist in the first few days after Hurricane Katrina made landfall. Results of this included: delayed and duplicate efforts by public health and governmental agencies, uncoordinated search and rescue efforts, confusion over delivery of needed supplies, lack of clarity as to who was coordinating hospitals' evaluation of patients, lack of local police protection, and confusion over who was in command [38].

The absence of command and control was the greatest challenge for the Hurricane Katrina response because it is essential for emergency management. Again, in his testimony to the US Senate, Lt. Gen. Honoré stated that the art of command is to arrive at a situation and unconfuse the people [37]. The effects of the storm eliminated local command centers, either due to facility destruction or loss of communications. Successful coordination occurs when there is a singular command and effort, as well as a well-defined chain of command. There must be one person in command with a clearly defined line of command and control. The different federal, state, and local agencies must be guided by a jointly agreed set of objectives. Coordination is manifested by all agencies working to achieve the same objectives.

To alleviate many of the outcomes of Hurricane Katrina, a Joint Task Force Katrina (JTF-Katrina) was quickly established and led by Lt. General Russel Honoré, a co-author of his chapter. JTF-Katrina consisted of federal and state military, local law enforcement, and federal, state, and local agencies. Establishing JTF-Katrina resulted in regaining command and control. JTF-Katrina assisted federal, state, and local agencies to provide immediate assistance in search and rescue, emergency medical care, evaluations, restoring infrastructure, damage assessment, and resupplying food and water. The assistance was successful due to a high level of coordination and collaboration.

On January 6, 2021 insurgents rioted and assaulted the US Capitol and American democracy. This insurrection was fueled by falsehoods of unfair election processes and ultimate confirmation of the Electoral College votes for President and Vice President of the US. Uncharacteristically, security at the US Capitol was overwhelmed and resulted in significant property damage and six deaths. Speaker of the House of Representatives, Nancy Pelosi, appointed Lt. Gen. Russel Honoré to lead a review of US Capitol security. A significant part of Lt. Gen. Honoré's review will be to evaluate the coordination of the various federal and local law enforcement agencies with respect to command and control [39]. The reason for his selection was based on past successful leadership in coordinating public health emergency response.

The COVID-19 pandemic is the worst public health emergency in the world since the Influenza Epidemic of 1918. The Influenza Epidemic lasted two years and resulted in 500 million infections worldwide (one-third of the world's population at that time) and 50 million deaths. Nearly 25% of the US population was infected and 675,000 people died [40]. COVID-19 first emerged in late 2019 in Wuhan, China and, at first, seemed to be a problem far away for the other parts of the world. In early January 2020, China announced that Wuhan and other cities were locked down in attempt to stop the spread of the virus. Many countries, including the US, deemed it a China problem and travel to and from China was prohibited. It was thought that this would reduce the risk that the COVID-19 would not become a problem outside of China. This assumption was based on historical information from the severe acute respiratory syndrome (SARS) pandemic of 2003. SARS is a coronavirus which caused respiratory illness, and cases were first seen in Asia. SARS spread to more than 12 countries. In total, across the world, 8,000 people showed symptoms, and 774 of the symptomatic patients died. In the United States eight people who had traveled to infected areas became ill. However, there was no community spread in the United States [41]. But, despite travel restrictions, it soon became evident that the COVID-19 differed from SARS and was spreading throughout the world.

As was seen with Hurricane Katrina, the COVID-19 pandemic found the world unprepared to address its rapid, deadly, and wide-spread effects. An infectious agent with such high levels of infectivity, pathogenicity, and virulence was never seen before across the world. Majority of COVID-19 deaths (80%) in China was

observed in people 60 years of age and older. Early in the pandemic, most deaths in the United States (80%) occurred in individuals 65 years of age and older, with the highest percentage in those 85 years of age and older [42]. Hospitalization rates were high in the United States, to the point of overcrowding of intensive care units. Hospitals were challenged because they had not planned for the bolus of severely ill patients, and rapid modification of strategic and business plans were mandated. Elective surgeries were eliminated and re-assignment of surgical staff to intensive care units resulted. Additionally, supplies and resources acquisition and supply-chain management was a challenge [43].

In March 2020, the Italian National Healthcare Service in COVID-19 hotspot areas was overwhelmed. This was due to years of budget cuts and fragmentation of services. The National Healthcare Service is regionally organized and as a result the national government had little control. This led to no coordination between national, regional and local agencies [44]. For example, in Milan the COVID-19 pandemic response was based on a rapidly developed algorithm for identification of cases and referral for treatment. The algorithm consisted of determining individual's residence, if they had been in close contact with cases or suspected cases, and close contact with anyone with respiratory symptoms who had traveled to Asia. Individual who were screened were triaged to a hospital or home for isolation. The algorithm is continually outdated to align with local directives. This algorithm is now used nationally [45].

The response to the COVID-19 pandemic in Spain also faced many challenges. Spain has been one of the worst affected countries in the world. There was a lack of pandemic preparedness. Spain had insufficient surveillance systems, inadequate supplies of personal protection and critical care equipment. Poor coordination among national and regional agencies resulted in delayed response and slow decision making. The lack of preparedness was also evident in nursing homes [46].

5. Lessons learned

Coordination is a major problem because of the complexity of health-related activities. The lack of evaluations to assess capacity to meet strategic goals, lack of coordinated resources and infrastructure including essential data, and disasters lacking the necessary attention of interagency coordination are major barriers. A systematic focus on public health emergencies and the understanding of the need for managing resources and information must be similar across agencies. Establishing a timely and rigorous evaluation process is needed to have successful continuous quality improvement. Leadership is the essential ingredient for successful coordination. Public health response varies based on the events, so leadership needs to have the ability to be flexible. Command and control must be agile to adjust to the changing circumstances within, and across, public health events [47]. Leaders must be decisive, while being flexible. Leaders also must be a) knowledgeable in public health practice, b) able to maintain situational awareness, c) provide continued situational assessment, d) inspire trust, e) coordinate diverse members of the response team, and g) lead and manage effective, timely communications [48].

Because hurricanes are annual events, federal, state, and local agencies have an opportunity to develop a unified plan. In Louisiana, federal and state military have established a coordination plan in the event of a major storm. The plan consists of: establishment of a pre-event united command and control organizational structure, pre-positioning of unified disaster assessment team, designation of a single point

of contact for the federal coordinating officer to coordinate activities, implement a local or state employee disaster clause to reassign personnel to fill disaster support gaps, pre-position interoperable communication systems, identify external sources to mitigate common resources shortfalls, pre-assign space in state emergency operations center for integration of federal agencies, develop a plan to sustain governmental operations, pre-arrange support contracts for needed resources, acquire an uninterrupted power supply, and collaborate with industry to receive commitments to re-establish critical services post-storm. This coordination plan requires a dominant and directive leadership style to be successful.

The effects of a pandemic have similar response needs. Coordination is essential to successfully address pandemics. Decentralized and fragmented public health agencies need better coordination and establish a plan for command and control. Capacity for surveillance must be increased to a level at which the magnitude of pandemics do not take countries by surprise. Coordination between private, public, and governmental agencies must be formalized. An example is the initial distribution of the COVID-19 vaccine in the US, which has been less than successful. This is due, in part, to the decentralized, state-controlled distribution strategies, which differ from state to state. Agreements among these entities, as well as industry, must be developed and maintained. Adequate and appropriate resources, including human resources, must be planned and financed for long-term periods. Consistent command and control arrangements are requisite, as well as a firm commitment from political leaders to sustain preparedness over time. It is essential that coordination leadership must be participative, while being decisive, but flexible at the same time, due to the uncertainty of the COVID-19 pandemic.

The National Association of County and City Health Officials summarized the proposed response to pandemics [49]. The response recommended the following measures: isolation of infected and exposed individuals, travel restrictions, prohibiting social gatherings, school closures, rationing of medical supplies, and cancelation of elective surgeries. These recommendations were prophetic because these same measures are being used in the COVID-19 pandemic. An important adjunct to this response is community engagement, which is included in the coordination effort to address the effects of pandemics. Preparedness, response, and recovery capacity on the community level can help to optimize pandemic contingency planning [50].

The United Nations has developed a disaster risk reduction model that aims to align policies across the world. The Sendai Framework for Disaster Risk Reduction, Sustainable Development Goals is a global agreement to assist in risk reduction efforts. The Sendai Framework's core priorities are a) understanding disaster risk, b) strengthening disaster risk governance, c) investment in disaster risk reduction, and d) enhancing disaster preparedness [51]. The Sendai Framework's goal is to reduce the loss of life, injury, health impacts, and the effect of the social determinants of health.

6. Research findings

The PERRCs, presented in the Introduction of this chapter, were created specifically by US Senate authorization to conduct public health systems research for preparedness and response purposes [52]. A sample of significant findings from the research conducted at nine university-based centers included:

- ensure surge capacity through mutual aid agreements between jurisdictions for epidemiology and surveillance functions

- build community leadership capacity capable of coordinating mental health and psychological needs
- increase capacity for communicating information during emergencies to vulnerable residents and health care providers
- communication inequities hamper the ability to sufficiently prevent and respond to disasters, and
- assess inter-organizational coordination to assure a resilient public health system during disasters.

In summary some of the most important findings are the need for adequate surge capacity, communication and information sharing, and closing inequity gaps. Communication is a basic element of coordination and is dependent on strong working relationships between agencies. Research studies have found that institutional relationships are not enough; personal relationships and trust enable effective communication and coordination [53]. Information when responding to public health emergencies is ever-changing, resulting in fragmentation and misalignment of response resources and an absence of coordination. Information must have integrity to adequately assist decision making and coordination. Another study found that stable, accurate, and consistent methods of communication and information sharing is essential [54].

In a case study of challenges in sharing and coordinating information the researcher learned that sharing is dependent on agency, community, and individual factors. Individual responders have been found to be more willing to receive information than to share information with others. This has been related to information overload among those individuals who are responding to the effects of a public health emergency [55]. The following strategies have been proposed to enhance information sharing: a) establishment of institutional incentive mechanisms for interagency information sharing, b) ensure fair distribution of benefits from interagency information sharing, c) knowledge of the operations of other agencies will improve information sharing, d) establish agency norms and standards for information sharing, f) establish an inter-agency information sharing system, and g) integrate the inter-agency information sharing system into the daily operations of agencies [56].

A study of the tsunami disaster of 2004 in Thailand evaluated the response of the health care system [57]. Study findings included that the most factors important for disaster response is: information flow, overall coordination, and leadership. The information flow is critical between public health and governmental agencies, and the population. The study learned that information flow between agencies was not consistent, and was the cause of ineffective response activities. Coordination during the response was adequate, but the health care system was not prepared for the magnitude of the event. Leadership was effective at most levels, except for hospitals where physicians made the decisions without quality information.

It is important not to overlook those who are most severely affected by public health emergencies. Populations, and subpopulations, that are most vulnerable are affected disproportionately. As was mentioned above, one of the foci of the Sendai Framework is to reduce the effect of the social determinants of health. Those that are poor, uneducated, living in substandard housing, lacking access to transportation are the most vulnerable [58]. Those who are vulnerable are marginalized in society [59]. During naturally occurring public health emergencies minority groups in the US experience the greatest negative impact [60]. Poor coordination among

governmental agencies, non-profits, and private sector entities, as well as unequal disaster risk, worsens the effect within these vulnerable populations [61]. Health equity issues, created by unjust governmental and health policies, cause unequal negative impacts, as have been seen with the COVID-19 pandemic [62].

Public health, particularly in the US, has established policies and procedures to prepare leaders to respond to public health emergencies. The Association of State and Territorial Health Officials (ASTHO) published preparedness policy and position statements [63]. In preparedness guiding principles, ASTHO recognizes the role of state and territorial agencies in preparation and response to public health emergencies. The guiding principles include a) prevention, mitigation, resilience, and recovery; b) sustained funding; c) optimal preparedness for all populations; d) preparedness science and recognition of emerging emergencies; e) importance of partnerships; f) continual evaluation of preparedness. ASTHO outlines the importance of a collaborative national preparedness response, as well as the roles of federal, state, local, territorial, and tribal agencies.

Healthy People 2020, as a response to the COVID-19 pandemic, created policies for preparedness [64]. The National Health Security Strategy (NHSS) guides objectives for preparedness focused on community resilience, public health emergency response systems, capabilities, and resources. Five strategic objectives are the hallmark of the preparedness policy. Community resilience is the first objective and focuses on local coordination of health and public health agencies. The second objective is the development of countermeasures to address public health emergencies of all types, including infectious disease epidemics. The third objective is focused on continual situational awareness for early detection and coordinated response. The fourth objective establishes the importance of coalitions, and partnerships, of public health and emergency management agencies. The final objective involves global health security. This objective is focused on world-wide public health emergencies, specifically the COVID-19 pandemic.

7. Conclusions

Leadership is essential in coordination of response to public health emergencies. Work leadership is not only ineffective, it results in worsening of the effects of public health emergencies. A characteristic of public health emergencies is uncertainty. In uncertain situations dominant and directive leadership is required. Due to the ever-changing nature of public health emergencies, the dominant and directive leader must be flexible to adjust to changes. Effective leadership is dependent on quality data-sharing and communications. Public health response must be carefully and thoroughly planned, considering the need for managing resources across all responding agencies, public and private.

Acknowledgements

Support for development of this chapter was funded, in part, by the National Institute of Minority Health and Health Disparities of the National Institutes of Health under grant S21MD1007136.

Conflict of interest

The authors declare no conflict of interest.

Author details

Peter J. Fos^{1*}, Peggy A. Honoré² and Russel L. Honoré³

1 Minority Health and Health Disparities Research Center, Dillard University, USA

2 LSU Health Sciences Center, School of Public Health, School of Medicine, USA

3 U.S. Army Retired, USA

*Address all correspondence to: pfos@dillard.edu

IntechOpen

© 2021 The Author(s). Licensee IntechOpen. This chapter is distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/3.0>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited. 

References

- [1] Cornell Law School. Federalism. [Internet]. 2020. Available from: <https://www.law.cornell.edu/wex/federalism>
- [2] Statement of Peggy A. Honoré Before the United States Senate Subcommittee on Bioterrorism and Public Health Preparedness Roundtable on Public Health Preparedness in the 21st Century. March 28, 2006. Available from: http://web1.sph.emory.edu/PHSR/PHF_Archive/Senate/HonoreSenateRoundtable.pdf
- [3] The White House. December 17, 2003. Homeland Security Presidential Directive/Hspd-8. Available from: <http://www.whitehouse.gov/news/releases/2003/12/20031217-6.html>
- [4] Your Dictionary [Internet]. Available from: www.yourdictionary.com/coordination
- [5] Sharp FW. Games real actors could play: positive and negative coordination in embedded negotiations. *Journal of Theoretical Politics*. 1994;6:27-53. DOI: 10.1177/0951692894006001002
- [6] Centers for Disease Control and Prevention. Center for Preparedness and Response. Public Health Emergency Preparedness and Response Capabilities. National Standards for State, Local, Tribal, and Territorial Public Health. [Internet]. 2019. Available from: <https://www.cdc.gov/cpr/readiness/capabilities.htm>
- [7] World Health Organization. Joint External Evaluation Tool – 2nd Edition. IHR 92005) Monitoring and Evaluation Framework. [Internet]. 2018. Available from: https://www.who.int/ihr/publications/WHO_HSE_GCR_2018_2/en/
- [8] Peters BG. The challenge of policy coordination. *Policy Design and Practice*. 2018;1(1):1-11. DOI: 10.1080/25741292.2018.1437946
- [9] Metcalfe L. International policy coordination and public management reform. *Internal Review of Administrative Sciences*. 1994;60:271-290. DOI: 10.1177/0020852394060000208
- [10] Sharma MK, Jain S. Leadership principles, models, and theories. *Global Journal of Management and Business Studies*. 2013;3(3):309-318. Available from: https://www.ripublication.com/gjmb_spl/gjmb_spl_3n3spl_14.pdf
- [11] Northouse G. *Leadership theory and practice* (3rd ed.). Thousand Oaks, New Delhi, Sage Publications, Inc. 2007.
- [12] Jago AG. Leadership perspectives in theory and research. *Management Science*. 1982; 28(3):315-336. DOI: 10.1287/mnsc.28.3.315
- [13] Hargreaves A, Fink D. The seven principles of sustainable leadership. *Educational Leadership*. 2003;61(7):8-13.
- [14] Spillane JP, Halverson R, Diamond JB. Towards a theory of leadership practice: A distributed perspective. *Journal of Curriculum Studies*. 2004; 36(1):3-24. DOI: 10.1080/00220270332000106726
- [15] Capra F. Creativity and leadership in learning communities. A lecture at Mill Valley School District [Internet]. 1997. Available from: <http://lebendig.org/creativity.pdf>
- [16] Bass BM. From transactional to transformational leadership: Learning to share the vision. *Organizational Dynamics*. 1990;18:19-32. DOI: 10.1016/0090-2616(0)90061-5
- [17] Bolden R, Gosling J. Leadership competencies: Time to change the tune?

Leadership. 2006;2(2):147-163. DOI: 10.1177/1742715006062932

[18] Ayman R, Korabik K. Leadership: Why gender and culture matter. *The American Psychologist*. 2010; 65:157-170. DOI: 10.1037/a0018806

[19] Verkerk PJ. Fiedler's contingency model of leadership effectiveness: Background and recent developments. OCTO-Report, 9002. 1990. Eindhoven University of Technology.

[20] Yahaya R, Ebrahim F. Leadership styles and organizational commitment: Literature review. *Journal of Management Development*. 2016;35(2):190-216. DOI: 10.1108/JMD-01-2015-0004

[21] Wooi CT, Salleh LM, Ismail IA. Lessons from the major leadership theories in comparison to the competency theory of leadership practice. *Journal of Business and Social Review in Emerging Economies*. 2017;3(2). DOI: 10.26710/jbsee.v3i2.86

[22] Kiazad K, Restubog SLD Zagenczyk, TJ, Kiewit C., Tang R. In pursuit of power: The role of authoritarian leadership in the relationship between supervisors' Machiavellianism and subordinates' perceptions of abusive supervisory behavior. *Journal of Research in Personality*. 2010;44:512-519. DOI: 10.1016/j.jrp.2010.06.004

[23] Hemant K, Sirvanathan N. When the appeal of a dominant leader is greater than a prestige leader. In: *Proceedings of the National Academy of Sciences of the United States*, 2017;114(26):6734-6739. DOI: 10.1073/pnas.1617711114

[24] Mroz JE, Yoerger M, Allen JA. Leadership in workplace meetings: The intersection of leadership styles and follower gender. *Journal of Leadership and Organisational*

Studies. 2018;25(3):1-14. DOI: 10.1177/1548051817750542

[25] Clark KD, Waldron T. Predictors of leadership behavior in early career white-collar professionals: The roles of personal characteristics and career context. *Journal of Leadership and Organisational Studies*. 2016;23(1):37-38. DOI: 10.117/1548051815587759

[26] Haar SV, Koeslag-Kreunen M, Euwe E, Segers M. Team leader structuring for team effectiveness and team learning in command-and-control teams. *Small Group Research*. 2017;48(2):215-248. DOI: 10.1177/104649641789897

[27] Ceri-Booms M, Cureu PL, Oerlemans LAG. Task and person-focused leadership behaviors and team performance: A meta-analysis. *Human Resources Management Review*. 2017;27(1):178-192. DOI: 10.1016/j.hrmr.2016.09.010

[28] Burke CS, Stagl KC, Klein C, Goodwin GF, Salas E, et al. What type of leadership behaviours are functional in terms? A meta-analysis. *Leadership Quarterly*. 2006;17:288-307. DOI: 10.1016/j.leaqua.2006.02.007

[29] Benoliel B, Somech A. The health and performance effects of participative leadership: Exploring the moderating role of the big five personality dimensions. *European Journal of Work and Organisational Psychology*. 2014;23(2):277-294. DOI: 10.1080/1359432X.2012.717689

[30] Newman A, Rose PS, Teo ST. The role of participative leadership and trust-based mechanisms in eliciting intern performance: Evidence from China. *Human Resource Management*. 2016;55(1):53-67. DOI : 10.1002/hrm.21660

[31] Buengeler C, Homan AC, Voelpel SC. The challenge of being

a younger manager: The effects of contingent reward and participative leadership on team-level turnover depend on leader age. *Journal of Organizational Behavior*. 2016;37:1224-1245. DOI: 10.1002/job.2101

[32] Fatima T, Safdar S, Jahanzeb S. Participative leadership and employee creativity: Moderating role of need for achievement. *International Journal of Business and Management*. 2017;12(1):1-14. DOI: 10.1108/LODJ-07-2019-0319

[33] Bouwmans M, Runhaar P, Wesselink R, Mulder M. Fostering teachers' team learning: An interplay between transformational leadership and participative decision-making? *Teaching and Teacher Education*. 2017; 65:71-80. DOI: 10.1016/j.tate.2017.03.010

[34] Kweit MG, Kweit RW. A tale of two disasters. *Publicus*. 2006;36(3): 375-392. Available from <https://www.jstor.org/stable/4624754>

[35] Kapucu N, Van Wart M. (2008). Making matters worse: An anatomy of leadership failures in managing catastrophic events. *Administration & Society*. 2008;40(7):711-740. DOI: 10.1177/0095399708323143

[36] Shrum W. What caused the flood? Controversy and closure in the Hurricane Katrina disaster. *Social Studies of Science*. 2013;14(1):3-33. DOI: 10.117/0306312713498654

[37] U.S. Senate Committee on Homeland Security and Governmental Affairs. Hurricane Katrina: The Defense Department's role in the response. February 9, 2006. S. Hrg. 109-813.2007. Available from: <https://www.govinfo.gov/content/pkg/CHRG-109shrg27028/pdf/CHRG-109shrg27028.pdf>.

[38] U.S. Congress. House of Representative Report 109-377 (2006).

A failure of initiative final report of the select bipartisan committee to investigate the preparation for and response to Hurricane Katrina. 2006. Available from: <https://www.congress.gov/109/crpt/hrpt377/CRPT-109hrpt377.pdf>

[39] Kavi A. New inquiries into the Capitol assault aim to address security lapses before Biden's inauguration. *The New York Times*, January 16, 2021. Available from: <https://nyti.ms/3swcPVh>

[40] National Archives. National Archives News. The flu pandemic of 1918. [Internet]. 2021. Available from: <https://www.archives.gov/news/topics/flu-pandemic-1918>

[41] Centers for Disease Control and Prevention. SARS basic fact sheet. [Internet]. 2021. Available from: <https://www.cdc.gov/sars/about/fs-sars.html>

[42] Centers for Disease Control and Prevention. Severe outcomes among patients with coronavirus disease 2019 (COVID-19): United States, February 12 – March 16, 2020. *Morbidity and Mortality Weekly Report*. 2020;69(12):343-346.

[43] Ehrlich H, McKenney M, Elkbuli A. Strategic planning and recommendations for healthcare workers during the COVID-19 pandemic. *American Journal of Emergency Medicine*. 2020;38(7):1446-1447. DOI: 10.1016/j.ajem.2020.03.057

[44] Armocida B, Formenti B, Ussai S, Palestra F, Missoni E. The Italian health system and the COVID-19 challenge. *The Lancet Public Health*. 2020;5(5). DOI: 10.1016/S0468-2667(20)30074-8

[45] Spina S, Marrazzo F, Migliari M, Stucchi R, Sforza A, Fumagalli R. The response of Milan's medical system to COVID-19 outbreak in Italy. *The*

Lancet, 2020;395:e49-e50. DOI: 10.1016/S0140-6796(20)30493-1

[46] Garcia-Basteiro A, Alvarez-Dardet C, Arenas A, et al. The need for an independent evaluation of COVID-19 response in Spain. *The Lancet*, 396, August 22, 2020. Available from: <https://www.thelancet.com>.

[47] Wise CR. Organizing for homeland security after Katrina: Is adaptive management what's missing? *Public Administration Review*. 2006;66(32): 302-318. DOI: 10.1111/j.1540-6210.2006.00587.x

[48] Deitchman S. Enhancing leadership in public health emergencies. *Disaster Medicine and Public Health Preparedness*. 2013;7(5):534-540. DOI:10.1017/dmp.2013.81

[49] National Association of County and City Health Officials. Local health department guide to pandemic influenza planning. [Internet]. 2006. Washington, D.C.: NACCHO. Available from: <http://www.naccho.org/topics/infectious/influenza/documents/NACCHOPanFluGuideforLHDsII.pdf>

[50] Schoch-Spana M, Franco C, Nuzzo JB, Usenza C. Community engagement: Leadership tool for catastrophic health events. *Biosecurity and Bioterrorism: Biodefense Strategy, Practice, and Science*. 2007; 5(1). DOI: 20.1089/bsp.2006.0036

[51] Reifels L, Arbon P, Capon A, Handmer J, Humphrey A, Murray V, Spencer C, Wong DF. Health and disaster risk reduction regarding the Sendai Framework. *Australian Journal of Emergency Management*, 2018;33(1). Available from: <https://knowledge.aidr.org.au/resources/ajem-jan-2018-health-and-disaster-risk-reduction-regarding-the-sendai-framework/>

[52] Leinhos M, Qari SH, Williams-Johnson M. Preparedness and

Emergency Response Research Centers: Using a Public Health Systems Approach to Improve All-Hazards Preparedness and Response. *Public Health Reports*. 2014;129(6-Supplement 4):8-18. DOI: 10.1177/00333549141296S403

[53] Waugh WL, Streib G. Collaboration and leadership for effective emergency management. *Public Administration Review*. 2006; 66: 131-140. Available from: <https://www.jstor.org/stable/4096577>

[54] Comes T, Van de Walle L. The coordination-information bubble in humanitarian response: Theoretical foundations and empirical investigations. *Production and Operations Management*. 2020;29(1): 2484-2507. DOI: 10.111/poms.13236

[55] Mendonca D, Jefferson T, Harrauld J. Collaborative adhocracies and mix-match technologies in emergency management. *Communications of the ACM*. 2007;50(3):45-49. DOI: 10.1145/1226736.1226764

[56] Bharosa N, Lee J, Janssen M. Challenges and obstacles in sharing and coordinating information during multi-agency disaster response: Propositions from field exercises. *Information Systems Frontiers*. 2009;12: 49-65. DOI: 10.1007/s10796-009-9174-z

[57] Peltz R, Ashkenazi I, Schwartz D, et al. Disaster healthcare system management and crisis intervention leadership in Thailand: Lessons learned from the 2004 tsunami disaster. *Prehospital and Disaster Medicine*. 2005;21(5): 299-302. Available from: <http://pdm.medicine.wisc.edu>

[58] Ferreira RJ, Buttell F, Ferreira SB. Ethical consideration for conducting disaster research with vulnerable populations. *Journal of Social Work Values and Ethics*. 2015;12(1):29-40. Available from: <https://www>

researchgate.net/profile/Reggie_Ferreira/publication/277596673_Ethical_Considerations_for_Conducting_Disaster_Research_with_Vulnerable_Populations/links/556e09c308aefcb861db972e/Ethical-Considerations-for-Conducting-Disaster-Research-with-Vulnerable-Populations.pdf

[59] Gaillard JC. Vulnerability, capacity, and resilience: Perspectives for climate and development policy. *Journal of International Development*. 2010;22(2):218-232. DOI: 10.1022/jid.1675

[60] Cupples J, Glynn K. The mediation and remediation of disaster: Hurricanes Katrina and Felix in/and the new media environment. *Antipode*. 2014;46(2):359-381. DOI: 10.1111/anti.12060

[61] Collins TW. Marginalization, facilitation, and the production of unequal risk: The 2006 Paso del Norte floods. *Antipode*. 2010;42(2):258-288. DOI: 10.1111/j.1467-8330.2009.00755.x

[62] Fos PJ, Honoré PA, Kellum KP. The relationship of diabetes and COVID-19: A health disparity. *Diabetes & its Complications*. 2020;4(1):1-5. DOI: 10.33425/2639-9326.1065

[63] ASTHO. Policy and position statements: Preparedness guiding principles. 2017. Available from: <http://www.astho.org/Policy-and-Position-Statement/Policy-Statement-on-Preparedness>

[64] HHS Office of Disease Prevention and Health Promotion. Healthy People 2020: Preparedness. 2020. Available from: <https://www.healthypeople.gov/2020/topics-objectives/topic/preparedness>