

How Did South Korean Governments Respond during 2015 MERS Outbreak?: Application of the Adaptive Governance Framework

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This study examines how South Korean governments responded to the outbreak of Middle East Respiratory Syndrome Coronavirus (MERS) using the adaptive governance framework. As of November 24, 2015, the MERS outbreak in South Korea resulted in the quarantine of about 17,000 people, 186 cases confirmed, and a death of 38. Although the national government had overall responsibility for MERS response, there is no clear understanding of how the ministries, agencies, and subnational governments take an adaptive response to the public health crisis. The paper uses the adaptive governance framework to understand how South Korean governments respond to the unexpected event regarding the following aspects: responsiveness, public learning, scientific learning, and representativeness of the decision mechanisms. The framework helps understand how joint efforts of the national and subnational governments were coordinated to the unexpected conditions. The study highlights the importance of adaptive governance for an effective response to a public-health related extreme event.

Keywords: MERS, public health crisis, adaptive governance

Introduction

South Korean society suffered from the MERS outbreak that occurred in May 2015. Since May 20, 2015, the first patient was identified, the virus was transmitted to other people. The national disease control and prevention agency was not successful in controlling the transmission from the first patient. As of November 24, 2015, the virus outbreak resulted in the quarantine of 17,000 people, 186 cases confirmed, and a death of 38 (Ministry of Health & Ministry, 2015a). Medical doctors and hospitals did not have knowledge about the virus, and the national and subnational governments did not have clear understandings about how to respond to the new virus during the initial response. When there was great anxiety of infection among people, about two thousand schools canceled the classes and people avoided visiting hospitals, shopping malls, and amusement parks (Kim, 2015a). One month after the outbreak started, government-wide efforts were able to

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effectively address the response needs, and since July 4, 2015, no more case reported (Ministry of Health & Ministry, 2015b; the World Health Organization, 2015). On November 24, 2015, the national government reported that there was no MERS patient in the country after the last patient died.

How did South Korean national and subnational governments respond to the MERS outbreak? While the Korean national government and agencies had overall responsibility for MERS response, there is no clear understanding of how the ministries, national agencies, and subnational governments make joint efforts in responding to the public health crises. Using the adaptive governance framework, this study examines how South Korean governments create an adaptive governance in responding to the unexpected event. The framework guides that joint efforts among multiple organizations can be effective when the following challenges are addressed: responsiveness, public learning, scientific learning, and representativeness of decision mechanisms (Andrew & Kendra, 2012; Scholz & Stifel, 2005). The adaptive governance framework will help understand systematically how joint efforts of the national and subnational governments were coordinated for planning and implementation of the MERS outbreak response. The investigation will provide important understanding of adaptiveness of the governmental response system to an unexpected extreme event, especially a biohazard-triggered problem.

This paper is organized as the followings. First, the paper introduces the relevant literature and theoretical framework. The section provides a literature review that covers the arguments that stress adaptiveness in a disaster response and presents a theoretical framework of the adaptive governance that elaborates the challenges in coordinating joint efforts among multiple organizations. Second, the study introduces the case of the 2015 South Korea MERS case. The section describes how the virus outbreak was started, developed, and controlled. Third, the paper analyzes the MERS case through the adaptive governance framework. The section provides discussion regarding four types of challenges: responsiveness, public learning, scientific learning, and representativeness of decision mechanisms. Finally, the paper concludes with the summary of the study and implications.

Adaptive Emergency Management

Adaptive response is critical for mitigating the unexpected impacts of disasters or mass emergencies while bureaucratic approach can help address repeated damage of disasters and mass emergencies. The traditional bureaucratic approach assumes that a responsible authority can address the response needs through formal procedures. According to Schneider (1992), the responsible authority should have explicit objectives, formal structure, clear division of labor, and formal sets of policies and procedures in responding to emergency or crisis. Formal procedures help public organizations to prepare better for emergency or crisis. The approach contends that the responsible authority can do better-organized response through formal procedure rather than contingent response (Siegel 1995).

In contrast, disaster sociologists argue that government cannot anticipate unusual situations and address the response needs with predetermined means. Disaster response requires massive restructuring of the government response system along with emergent groups (Dynes 1994; Quarantelli & Dynes 1970; Mileti, Drabek, & Hass 1975). The adherence to the formal rules may discourage responsible organizations and responders to exercise creativity to deal with unmet needs during the crisis response. Formal procedures do not specify all possible situations, and the adherence of the rule can lead to inadequate response to an extreme event. Public organizations or employees may need to respond flexibly to the given crises or emergency through improvisation (Kendra & Wachtendorf, 2002; Webb & Chevreau, 2006). During 9/11 terror attack, the Coast Guard evacuated more people because the agency did not stick to the standard operation procedure but adapted to the response situation (Kendra & Wachtendorf, 2003; Wachtendorf 2004). When a disaster has catastrophic has broad impacts over multiple bureaucratic or administrative jurisdictions, governmental organizations need to work with new organizations to meet the response needs because the existing plan does not expect such impact (Neal & Phillips, 1994).

Adaptive governance

Adaptiveness of the emergency response system is critical for an effective disaster response. When the response system is composed of interdependent elements, shared the understanding of the threat among the members of the community is the basic foundation for an effective for the response (Comfort, 1999). A disaster management system that involves multiple organizations should tackle with coordination problems, such as difficulty in communication, unclear authority, poor resource use (Drabek et al., 1981; Drabek, 1985).

Adaptive governance is helpful to address the uncertainty of the nature of the problems and the operation of the response system that involves multiple organizations (Andrew & Kendra 2012). Adaptive governance refers to the emergence of governance institutions for resolving collective action problems across multiple jurisdictions (Scholz and Stifel 2005). Adaptive means flexible and less rigid (Holley 2010), and governance is “polycentric and multi-layered, interdependence for problem-solving” (Stein and Edwards, 199, p244). Adaptive governance is an emerging structure to address the unmet needs of response that the existing structure could not do. The theoretical framework of adaptive governance focuses on the emergence of a new governance institution that generate long-term policy solutions to tackle with wicked problems through coordinated efforts among public authorities and private entities (Scholz & Stifel 2005, p. 5).

Collective efforts for emergency response across jurisdictions and entities need to address the following challenges to adaptive governance: responsiveness, scientific learning, public learning, and representativeness in the decision process (Andrew & Kendra, 2012; Scholz & Stifel, 2005). First, responsiveness refers to how well emergency/crisis management systems meet the needs of the changing situations. An emergency management system should have structured response as well as flexible systems that allow the public authorities to adapt to the changing situations. Because the existing procedure does not fit to respond to a new situation, public organizations should be flexible to meet the needs of the changing situation (Kendra & Waschtendorf, 2002).

An emergency management system needs to redefine the scope of involvement of specialized authorities or stakeholders in response to the unexpected impacts of a disaster (Neal & Phillips 1995).

Second, scientific learning is important for emergency response system to identify the best solution in addressing a wicked problem. The inclusion of scientific experts in the policy process may advance scientific knowledge that policy makers can use in developing policies (Scholz & Stifel 2005). A lack of scientific evidence in the response planning will lead to frustration of emergency response and may complicate adaptive governance (Andrew & Kendra 2012).

Third, public learning is critical for those who involved in implementing the emergency response system. While a policy planning process involves relatively a few specialized authority or stakeholders, the policy implementation requires an understanding of a broad range of national level agencies and local governments, and private entities (Scholz & Stifel 2005). With the timely and accurate information, the organizations of the response system can implement the response plans effectively (Comfort 1999). When those involved in the policy implementation have clear understandings about the nature of emergency as well as emergency response, the policy implementers would be better able to respond better to the emergency situations (Andrew & Kendra 2012). Training and exercise improve public learning that allow the involved entities to develop a sense of how the plan works.

Fourth, representativeness of the decision-making process is critical to creating successful adaptive governance. While specialized public authority may directly influence a plan, planning process requires a combination of technical expertise, those who are not established part of the planning process, and those who are influenced by the plans (Scholz & Stifel 2005). In a policy development process, information sharing among stakeholders helps develop innovative solutions to address a wicked problem. On the other hand, in spite of high transparency, the policy process can be seen as not trustful when there is high technical uncertainty and does not respond to a new situation well. Adaptive governance of emergency response will require a good mix of those who have specialized authority, technical experts, and other stakeholders in emergency response.

In sum, governmental organizations should address challenges in creating an effective adaptive governance. When a government response system enhances the responsiveness, inputs of scientific knowledge, public learning and representativeness of decision mechanism, the system will be effective in responding to the unexpected event. The following section introduces the 2015 South Korea MERS outbreak that requires the governments to adapt creatively to the unexpected response needs.

Case of 2015 South Korea MERS response

In 2015, South Korean society suffered from the Middle East Respiratory Syndrome (MERS) outbreak. MERS is caused by a virus called MERS Coronavirus. The virus affects respiratory systems, such as lungs and breathing tubes. Common symptoms of MERS patients include severe shortness of breath, fever, and cough. After the disease was first reported from Saudi Arabia, 2012, other cases were identified in the nearby countries. The virus is transmitted to people through close contact (CDC, 2015).

South Korean governments and people did not have adequate understandings of the new virus, and the governments did not anticipate the virus outbreak. In the country, the first patient was tested positive for MERS on May 20, 2015 after the 76 years-old man visited four hospitals seven days after his return (Ministry of Health & Welfare, 2015a). At the three hospitals, medical doctors who saw him did not have knowledge of the cause of the sickness, and his symptom at the fourth hospital was reported to the South Korea Centers for Disease Control and Prevention (CDC), which is the national disease control agency. Epidemic investigators from CDC applied usual quarantine rules (i.e., 2m distance and 1 hour with the patient) proposed by the WHO to identify who should be under quarantine (Chosun 2015a). After the investigation, the South Korea CDC isolated the patients' family members and 64 clinicians.

The initial government response was not effective to control the transmission of the disease. The quarantine range was not comprehensive to cover the whole people that can be infected from the first patient (the National Assembly Special Committee, 2015). The initial quarantine excluded people who can be infected, and the virus was transmitted from the untargeted people to hospital patients or visitors. A high density of people at the mega-hospitals contributed to the spread of disease across people (Choe, 2015). The continued transmission led to an increase in the number of MERS infection over time (**Figure 1**). As of July 5, 2015, the outbreak caused the quarantine of around seventeen thousand people and 186 cases and confirmed as MERS infection. The MERS outbreak affected three metropolitan regions and five provinces.

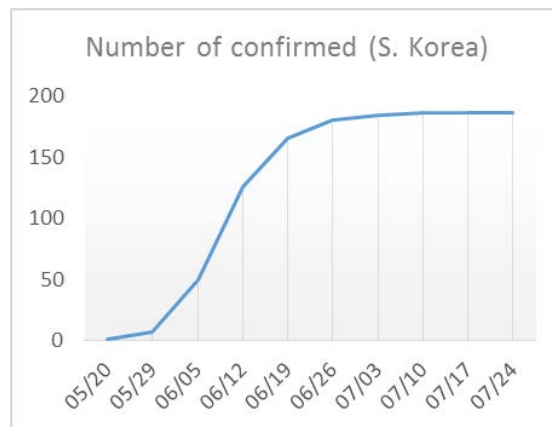


Figure 1. Trends of MERS infection (as of July 27, 2015)

After government-wide intensive efforts, the transmission of the virus became under control. The Ministry of Health and Welfare (MWS) coordinated the MERS response, and other ministries and agencies supported the health ministry and the disease control authority. Since July 4, 2015, there was no new patient was identified (Ministry of Health & Welfare, 2015). The national government began to take the follow-up measures based on experts' consensus that the country would not have no more new case (the World Health Organization, 2015). On November 24, 2015, one last MERS patient died, and the total number of death from the outbreak became 38 (Kim, 2015).

How did South Korean governments respond to the MERS outbreak by addressing challenges to create an adaptive governance? The country has a centralized system that the responsible national ministry (i.e., Ministry of Health & Ministry) and agency (i.e., CDC) plans for overall response to a new virus outbreak and other ministries and subnational governments implement the plans. Although the national and subnational governments are responsible for the MERS response, there is no systematic understanding about how the South Korean governments adapted to the unexpected event. The following section provides a systematic analysis of how South Korean governments addressed challenges to create an adaptive governance for the MERS outbreak response.

Challenges for Creating an Adaptive Governance during South Korea MERS Outbreak

This section provides an analysis of the 2015 South Korea MERS case based on the adaptive governance framework. Based on government documents and newspaper reports, the paper examines how the national and subnational governments create an adaptive governance to respond to the outbreak addressing the four types of challenges: responsiveness, scientific learning, public learning, and deliberation process.

Responsiveness

The MERS outbreak highlights the importance of adaptiveness of the national emergency response system. The MERS outbreak was an unexpected event to the South Korean governments. The existing response system required the MWS or the Center for Disease Control and Prevention (CDC) to be solely responsible for addressing the needs of the outbreak unless the transmission occurs outside the hospitals (Ministry of Health & Ministry, 2015c). While the virus was transmitted within the hospitals, the existing response system was overwhelmed by the broad impact of the virus outbreak. The public health ministry and the disease control authority did not have adequate capacity to address the needs of the eight MERS-affected metropolitan regions and provinces. After experiencing the massive spreads of MERS across hospitals and regions, the South Korean government changed the response procedure in a more proactive way and requested cooperation of other ministries (i.e., MPSS), national agencies, and subnational governments.

However, the initial cooperation for the outbreak response among ministries, national agencies, and subnational governments was not smooth. During the earlier time of the MERS response, the

relevant ministries did not share information with each other. The problems of cooperation are illustrated by the following examples. Ministry of Education ordered schools to cancel classes while the health ministry did not agree to the cancelation. Although NPSS, the main supporting ministry informed what actions lower level governments to take in responding to the outbreak, the local governments did not seem to have clear understandings of their roles in responding to the virus outbreak. NPSS minister did not attend a meeting with the low-level governments even though the ministry needed to provide further information and be reported (the National Assembly Special Committee, 2015). A few subnational governments did not collaborate with each other for responding to the virus outbreak. Although Gangnam District government requested assistance to the Seoul Metropolitan Government, which is the upper-level subnational government, the metropolitan government did not respond to the requests immediately but later supported the local government response by sending vehicles and treatment equipment to the district (the National Assembly Special Committee, 2015).

One month after the outbreak started, the governments were better able to understand the nature of the outbreak and each role in the outbreak response. According to Hyng Pyo Moon, Minister of the Public Health and Welfare, the national emergency response system did not have adequate understanding of the nature of the virus outbreak and the capacity to address the unexpected needs of virus outbreak, and there was no effective cooperation among relevant ministries until one month after the outbreak began (the National Assembly Special Committee, 2015). The national and subnational governments need time to understand how the national response system work effectively in response to the outbreak.

Scientific Learning

The MERS case demonstrates that a lack of scientific learning could lead to tardy response and aggravation of the virus impacts on the country. Before the outbreak, the South Korean government had little understanding of the novel virus. While the scientific experts had urged the South Korean government to invest for responding to the outbreak of such a novel virus even after such as 2003 SARS and 2004 the country experienced, the national government did not pay attention to the expert recommendations (the National Assembly Special Committee, 2015). The South Korean Infectious Disease Association, which represents a medical profession, argues that the medical experts continued to study about in-hospital epidemics and disaster prevention and control. The study findings from the scientific experts were not implemented in the policy development.

At the beginning of the MERS outbreak, the CDC was not able to investigate the epidemics of the virus disease because of lack of scientific experts and budget (the National Assembly Special Committee, 2015; Kim, 2015c). The chief of CDC was a general public servant who did not have scientific expertise in the control of infectious disease. CDC did not have sufficient authority and personnel to investigate epidemics of the virus and implement the direction of disease control over the sites that had a virus infection. The CDC had 34 epidemic investigators, and only two of them had professional expertise in an epidemic investigation.

About two weeks after the outbreak began, the national ministries and agency that coordinated and supported the MERS response reinforced inputs of scientific experts in disease control. The existing task force within CDC played only advisory roles in the MERS response planning and are mainly composed of experts from the field of prevention medicine (the National Assembly Special Committee, 2015). The South Korean President, Park Guen Hye ordered to establish a task force that composed of private sector experts and governmental officials within CDC so that the national government has a better understanding of how the virus outbreak started and the spread of the virus across patients and hospitals (Yonhap News 2015). The national government invited experts from respiratory medicine, infectious disease, and microbiology to the task force and supplemented the lack of experts in the health ministry and the CDC. The South Korean government provided the task force authority to control hospitals that had a MERS patient 18 days after the first patient identified (the National Assembly Special Committee, 2015).

The national government proposed to provide strong authority and resources for the CDC so that the agency can exert its expert power in developing and implementing the response plan (Ministry of Health & Welfare, 2015). The proposed plan includes a direct appointment of the chief of CDC, authority to control a hospital during a virus outbreak, and an increase in the number of professional epidemic investigators.

Public Learning

The virus outbreak highlights the importance of public learning about the nature of the hazard and the response measures at the initial response. Before the MERS outbreak, medical doctors did not have knowledge about the virus originated from the Middle East. The lack of knowledge contributed to the tardy identification of the disease from the first patient and led to the transmission of the disease to other people (Kim, 2015a). One of the medical doctors that the first patient saw diagnosed the patient's symptom as pneumonia because the doctor did not have knowledge about MERS. Later, the first patient visited three other hospitals, and his disease was finally identified at the fourth hospital. At one of the hospital he visited forty percent of the total confirmed patients occurred. If the first medical doctor had knowledge about MERS, the outbreak would be prevented earlier. Medical doctors and other staff of the hospitals that had a MERS patient did not know that their hospitals have a favorable condition for the virus infection, and the ignorance contributed to the spread disease within and across hospitals.

In addition to the lack of knowledge of the doctors, the national government disease control agency did not have sufficient knowledge about how to prevent the spread of the disease. After the patients had been tested positive, the disease prevention and control agency applied a WHO standard (i.e., 2m-1hour) to the MERS case to set a range for quarantine. The public health authority expected people who did not stay with the patient less than 1 hour and 2 m far from the patients will not be infected with the virus (the National Assembly Special Committees; Kim 2015b). Medical doctors were infected with MERS even though they stayed with less than 10 minutes with the first patients. The government authority did not consider the possibilities that patient family can get infected.

The response based on the assumption led to the application of quarantine of narrow range of people and contributed to the spreads of the virus which could be avoided.

In the initial response stage, subnational governments lacked information about how to respond to the virus outbreak complaining the health ministry for insufficient information sharing. During the MERS response, local health agencies, the CDC, Seoul metropolitan agencies had difficulties in cooperating for MERS response (the National Assembly Special Committee, 2015; Ministry of Health and Safety, 2015c). According to Ryu Kyung Gi, the vice mayor of Seoul Metropolitan City, the public health ministry did not provide clear guidance and share information about the infected patients actively with the metropolitan government for over ten days after the first patient had been identified. The metropolitan government employed fifty epidemic investigators to understand the spreads of the virus infection instead of waiting for the professional investigators from the national disease control agency.

After the national government has better understandings of the nature of the virus and the response measures, the national government facilitated information sharing with subnational governments, hospitals, and the public (the National Assembly Special Committee, 2015). The national government did not disclose the names of the hospitals that had MERS-infected patients for over 15 days. After lay people who visited the hospitals without any knowledge had become infected, the government began to disclose the names of the hospitals the patients visited. The national government also provided a list of MERS-free hospitals so that people would not avoid visiting a hospital for important treatment.

Representativeness and Deliberation Process

Emergency response planning and implementation require cooperation from multiple ministries, subnational governments, and private sectors. During the initial response period, the range of the involvement was narrower than the later response period. The public health ministry and the CDC were solely responsible for the initial response, and other participants were involved as the outbreak developed. As the virus outbreak developed, the national government began to form a deliberative mechanism to cover a variety of participants, such as private experts, ministries, agencies, and subnational governments. After two weeks after the first patient identified (June 3, 2015) (the National Assembly Special Committee, 2015). The ministry invited medical experts into the response task force so that they can contribute to the response planning process (Jeong, 2015). Ministry of National Public Safety and Security (NPSS), which is the national emergency management authority organized the supporting headquarter involve ten other ministries, agencies, and subnational governments. On June 9, the national government organized a government-wide meeting led by the prime minister and the ministers from various government functions: public health, foreign affairs, agriculture, interior, police, and defense.

During the post-response period, the national government proposed a deliberative mechanism that cover a broader range of participants. After the control over the virus outbreak by intensive public health measures, the national government proposed to develop a substantial disease control plan

for a potential virus outbreak in cooperation with the relevant ministries, subnational governments, professional medical associations, and citizen groups.

Conclusion

This paper examines how South Korean governments responded to the MERS outbreak through the adaptive government framework. **Table 1** summarizes the above discussion. The study shows that the national and subnational governments had little understanding of the new virus and suffered during the initial response. Before the outbreak, the country did not acknowledge the importance of the control of the disease caused by the new virus originated from a foreign country. When the governments adapted to the response needs of the outbreak by addressing the challenges: responsiveness, scientific learning, public learning, and representativeness in a deliberative mechanism, the governments should have been better able to control the spread of the disease. The responsible ministry and agency were able to improve the coordinate collective efforts among the governments and private hospitals after understanding of the nature of the virus and response measures and changing the existing response structure and practice. The analysis confirms disaster sociologists' argument the highlights adaptiveness of response actions in a disaster situation.

Table 1. Summary of the Challenges and Adjustment during the MERS Outbreak Response

| Period | Responsiveness | Scientific learning | Public learning | Representativeness |
|--------------------------------------|--|--|--|--|
| Initial response (May 20~June 3) | a. low capacity of the health ministry and CDC | Low scientific input in the response planning | a. CDC: low number of epidemic investigators | The public health ministry and CDC only |
| Adjustment period 1 (June 4~June 14) | b. involvement of other ministries and subnational governments | Special Task Force: Addition of scientific experts in infectious disease | b. national and subnational governments: little knowledge Subnational governments: recruited epidemic investigators | Included other ministries and agencies, subnational governments, private experts |
| | c. No effective cooperative mechanism | | | |

| | | | |
|--|-----------------------|---------------------------------------|--|
| Adjustment period (June 415~July 26) | 2 Better coordination | Strong roles of special task force | Better understanding among governments and hospitals |
|--|-----------------------|---------------------------------------|--|

The outbreak experience may provide opportunities and lessons for the South Korean government and other national governments in preparing and preventing a future virus outbreak. The MERS outbreak experience encouraged the national government to strengthen the scientific expertise and authority of the disease control and prevention agency. The national government proposed to restructure the emergency response system to respond immediately to the needs of the virus outbreak. The public health ministry and the disease control agency would be provided government-wide support readily as soon as an import of a new virus is identified. Although the public authority cannot anticipate all possible virus outbreak, the changed response structure and practice will enable the governments to respond better to a similar virus outbreak. Also, the MERS outbreak highlights the monitoring of a virus transmitted across countries and regions. A virus can be easily transmitted via people who travel across countries and regions. A national disease control agency need to improve capacity to monitor the transmission of a biohazard like MERS and to prevent the broad impacts of the hazard.

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