



# Immediate leadership in emergency medical service during the COVID-19 pandemic

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COVID-19 pandemic**

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This case study explores how the COVID-19 pandemic from March 2020 to May 2023 affected the immediate leadership in the Helsinki City Rescue Department (HCRD). There are studies about its effects on the employees and how the pandemic was handled on a city level, but this study focused on the immediate leaders' experiences in response to the prolonged crisis through the perspective of rescue sub-officers and the paramedic supervisors.

Insights for improving crisis management and resilience in an emergency medical service (EMS) are produced with the case study research method. Identification and description of key leadership challenges and best practices during the pandemic can help improve crisis management and resilience in an EMS.

The theoretical framework combined crisis leadership theories, infection prevention and control (IPC) practices, the Clean Cab system, and resilience concepts. 11 thematic interviews with immediate leaders, document analysis, and direct observations used in data triangulation improved the validity and reliability of this study.

Key findings showed that while EMS operations remained stable and are the organization's core services for society despite the surrounding situation, immediate leaders experienced significant changes in workload as administrative work grew, leading to decision-making and communicational needs. Effective leadership relied on honesty, adaptability, clear communication, and team cohesion. The basis for the IPC practices was found in the leaders' previous work history, usually as a firefighter-EMT (Emergency Medical Technician). Adoption of IPC practices was accelerated, fostering a shift in workplace culture, but further focus on the implementation of practices is advised. Challenges included information fatigue, uneven compliance with safety protocols, and role ambiguities.

Recommendations for the future include implementation of after-action reviews after significant crises and incidents, enhanced training in immediate leadership, and maintenance of the existing systems supporting leadership. Fostering interdisciplinary collaboration, organizational learning, and cultural change in IPC practices forms a base for future pandemic resilience.

Keywords: COVID-19, emergency medical services, immediate leadership, resilience

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## 1 Introduction

The novel coronavirus started spreading globally in 2020 as an epidemic and was declared a pandemic by the World Health Organization (WHO) on 11<sup>th</sup> March 2020. This became a health crisis which eventually turned out to be a crisis for societies. The WHO declared on 5<sup>th</sup> May 2023, more than three years into the pandemic, that the disease did no longer fit the definition of a PHEIC (Public Health Emergency of International Concern), although the global epidemic is still ongoing. Globally, it is to be expected that either the still circulating coronavirus or some other similar potentially harmful to humans and pandemic developing pathogens will cause a new crisis in the future as the human population increases, biodiversity is lost and climate change advances, and aggressive land use for human activities make room for expanding interfaces between humans, animals and the environment (Chatterjee 2021).

In the City of Helsinki, where more than a third of nearly 40,000 employees have worked on the front lines in the social and health care sector during this period, the epidemic waves and various viral variants have caused different stages in the pandemic and the management of thereof (Järvelä 2022). The Helsinki City Rescue Department (HCRD) provides services for the city on several fields: risk assessment and accident prevention, preparedness for emergency and exceptional situations, and minimizing the effects of accidents via rescue operations and emergency medical services (EMS) (Pelastustoimi n.d.a; Rescue Act 2011).

The unprecedented pandemic situation challenged and changed the actions of the rescue services and emergency medical services especially in a workplace safety point-of-view and new personal protective equipment (PPE) and procedures mitigating the risk of infection were put in use (Järvelä 2022). This situation has been studied to some extent on city level and by HUS Group (Helsinki University Hospital), but there is little research about how the pandemic was perceived by the employees and acted upon by the HCRD as an organization. Why were the emergency medical services successfully provided despite the global challenges? How leadership, which is an irreplaceable function during a crisis, as it forms the basis for other actions according to the city's annual report (Järvelä 2022), can be sustained and modified accordingly during a long crisis? The changes in daily routines and new tasks burdened everyone working in the HCRD and the organization's position in the larger field changed too, as the Wellbeing Service Counties came into effect during this crisis.

This research aims to explore the everyday level perception of the pandemic and how immediate leadership was affected during those times. It gives a point of view, which helps to

clarify to an extent why the Helsinki City Rescue Department succeeded in its operations during the COVID-19-pandemic. In future, more tasks previously done by fire officers are transferred to lower-level supervisors, as the officers are moved into development work positions and eventually into the central government (Kaukonen 2015). This puts more demands on the future immediate leaders operating in crisis situations and daily operations.

The Finnish society build its crisis resilience on the whole-of-society approach, which builds on relationships and interactions among stakeholders from every level of the society. The guidance and risk assessment comes from the governmental level, while the legislation mandates certain levels of preparedness from different actors. On household level, the preparedness focuses on 72h reserves and individual's skills and education (SPEK n.d.).

This study focuses on immediate leadership and leaders in context of emergency medical services because there is little previous knowledge about the subject based on preliminary literature. Higher level studies have been done and the effects on the employees are also studied. Now it is time to research what happened between those levels among the rescue sub-officers and paramedic supervisors. The case is defined temporally between March 2020 and May 2023, the time when the WHO considered COVID-19 as a pandemic, and locally to the EMS provided by the HCRD.

An employee position in the organization as a firefighter-paramedic who also deputizes as a rescue sub-officer provided access and understanding to perform this research. The following research questions guided this research:

RQ: How did the COVID-19 pandemic affect the immediate leadership in the Helsinki City Rescue Department in 2020 to 2023?

HRQ1: How did the points of view vary between a rescue sub officer and a paramedic supervisor?

HRQ2: How were the IPC practices seen by the supervisors during the COVID-19 pandemic?

The results help to identify factors that are important related to immediate leadership, organizational resilience and successful operations in a crisis with suggestions on future research and development. This research is beneficial as it can help gain understanding about supporting leaders' capabilities to lead and manage (Järvelä 2022).

The report is published in Theseus as deemed appropriate by the Helsinki City Rescue Department, as openly as possible considering the possible security related issues in the current global situation. A media release is also written as a maturity test.

This thesis used AI for translations, text editing, and context brainstorming. Data was partly analyzed with the help of ChatGPT4o as described later.

### 1.1.1 Hygiene and infection prevention on duty

According to ECDC (European Centre for Disease Prevention and Control) (2023) infection prevention and control (IPC) practices are different measures which aim at mitigating the spread of pathogens in healthcare settings and so decrease a risk of an outbreak and thus reduce the burden towards personnel and organizations providing the service. These measures can be administrative, hygiene precautions and source control measures, environmental measures, or transmission-based precautions and personal protective equipment (PPE). (ECDC 2023.)

The chain of infection, seen in figure 1, consists of six links according to the WHO (2023 27): the infectious agent, reservoir, portal of exit, mode of transmission, portal of entry and susceptible host and if it is broken, the process gets interrupted, and the infection is prevented. Cleaning contaminated can for example break the chain from the reservoir.

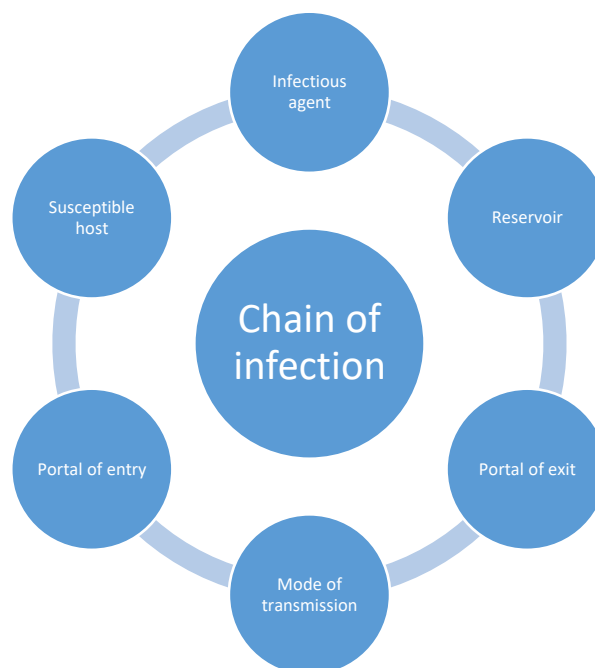


Figure 1: Chain of infection (WHO 2023a)

Occupational safety and health control framework has five levels of action for removing hazards: elimination, substitution, engineering controls, administrative controls, and personal protective equipment (PPE). This can be seen in figure 2. The elimination, physical removal

of the hazard being the most effective, followed by substitution, replacement of the hazard. Engineering controls, like isolation of people from hazards, are in the middle. Administrative controls, changing the way people work being second least effective and PPE being the least effective. (WHO 2023a 28.)

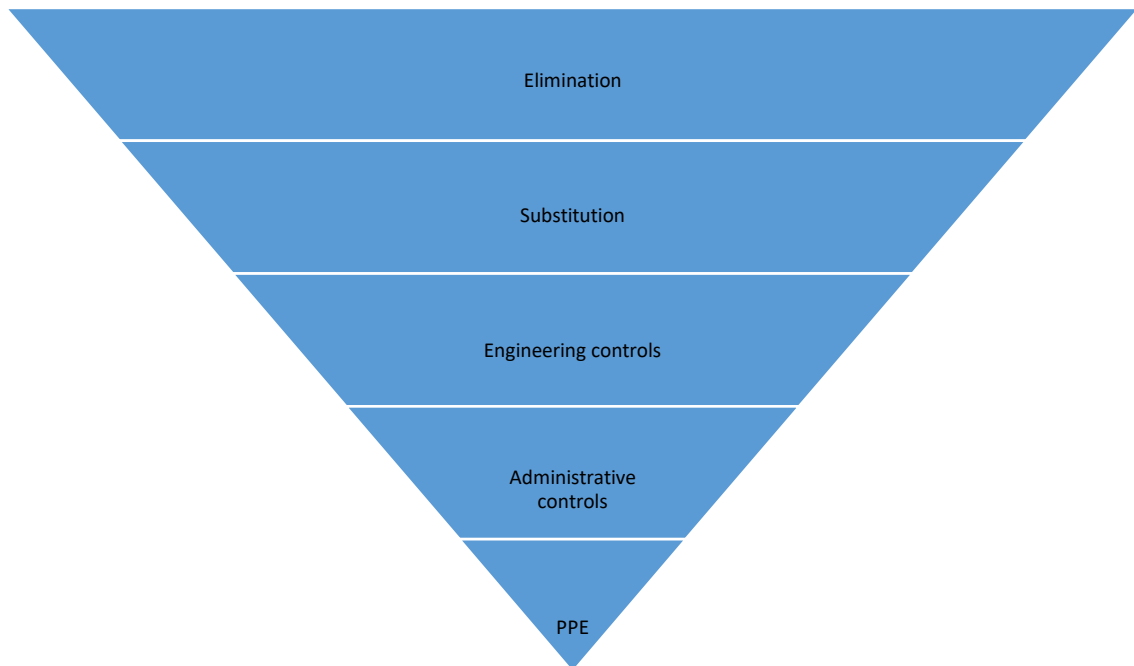


Figure 2: Hierarchy of occupational safety and health controls (WHO 2023a)

The Clean Cab system, the Skellefteå Model or 'Puhdas paloasema', originates from Sweden and aims to decrease firefighters' exposure to harmful substances in both operations and fire station service by managing routines and work in a way that minimizes contact to dirty material (Karvonen 2021). As there is no possibility to check which substances the firefighters encounter, it is wise to use precautionary principle and consider unknown particles as harmful and act accordingly (Swedish Civil Contingencies Agency 2015). In Figure 3, the introduction process for this model into practice can be seen and it should start with the education of personnel after which the routines and flows from clean to dirty and back to clean should be applied into everyday work using proper tools like PPE.

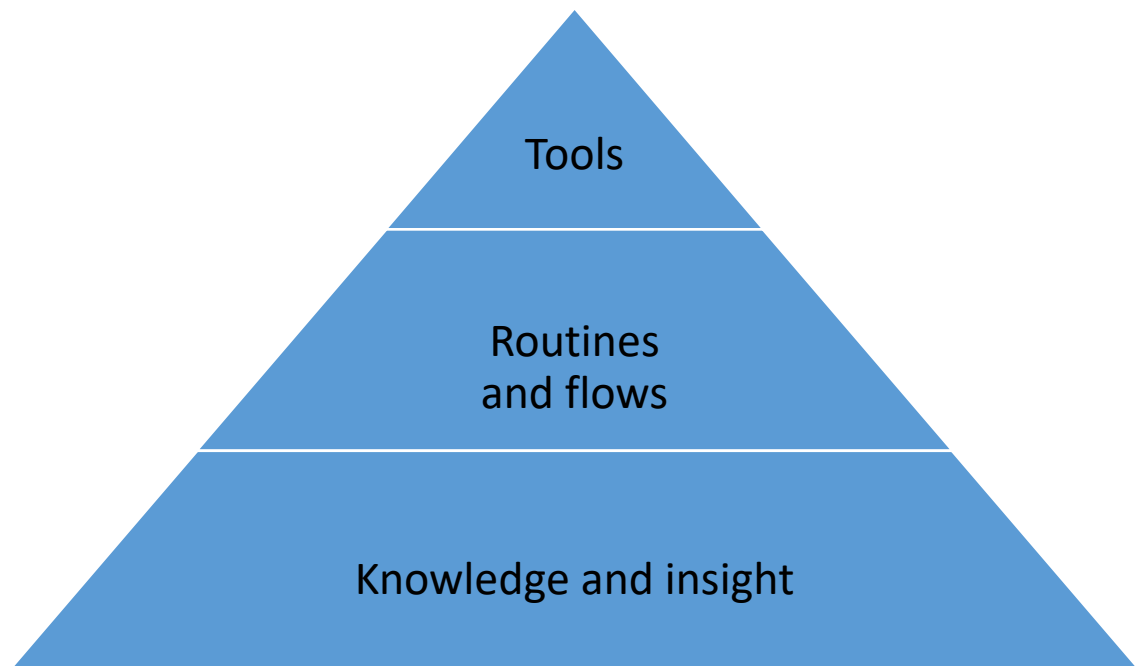


Figure 3: Clean Cab system introduction process (Swedish Civil Contingencies Agency 2015)

These models have similarities when compared, although the time for an illness to manifest varies significantly, as most firefighters do not suffer from a serious occupational illness and the ones affected by harmful substances develop illnesses with very long timeframes, up to 40 years according to Mustacchi (Swedish Civil Contingencies Agency 2015). Infections from pathogens tend to show symptoms quicker, but can have long term effects on an individual, for example in the form of long COVID. The major factor in both models is knowledge, which enables elimination and avoidance, while routines or administrative controls provide the models for everyday workflow and the actual equipment only helps with the provision of safety, if needed.

## 2 Theoretical background

The following chapter covers the relevant background for this thesis and forms the theoretical basis to which the results are compared. This creates a science-based framework for this study and makes it possible to apply theories into reality.

The preliminary literature search was done using the PCC-model (Population, Concept, Context), see Table 1, which helped to frame this study and to expose relevant literature and previous research and is recommended by the JBI (Joann Briggs Institute) for identifying the main concepts of primary research question (Aromataris, Lockwood, Porritt, Pilla, Jordan

2024). In this study these meant the paramedic supervisors and the rescue sub-officers working as immediate leaders during the COVID-19 pandemic.

Population	EMS-supervisors = paramedic supervisors, rescue sub-officers = lower fire officers, immediate superiors	EMS-supervisors, paramedic supervisors, rescue sub-officers, emergency medical services personnel, firefighter leadership, emergency response team leaders
Concept	Leadership and management during pandemics, infection prevention and control practices, immediate leadership	Leadership strategies during pandemics, crisis management in pandemics, emergency response leadership, pandemic management approaches, leadership in public health emergencies, infection prevention and control practices, hygiene protocols, personal protective equipment (PPE) usage, decontamination procedures
Context	COVID-19 pandemic	Pandemic response, Covid-19 management, public health emergencies, infectious disease outbreaks, global pandemics, CBRNE

Table 1: PCC-framework

Appropriate databases were selected in collaboration with information specialists at Laurea UAS while also using manual search, Google scholar and ChatGTP4o, as a source of information or a guide towards it. Governmental publications formed a major theoretical background in preparedness and crisis mitigation theory. Publications about research methodology helped with the implementation of this study.

The relevant literature helped to build the framework, to establish a timeline of the pandemic, and to plan and analyze the interviews and other gathered data. The material included answered the research questions and provided related knowledge base for this research. Publications were of different sorts, varying from scientific articles to otherwise relevant publications, mainly open access internal HCRD documentation excluded. Peer reviewing or other methods of credibility proofing of articles and documents was seen as a strength when considering their validity and reliability.

Leadership in nursing has been studied and described extensively and, according to Groves and Hewitt, nurse manager competencies have been identified as important contributors to an organization's success (Kantanen 2017). The leadership in rescue services and emergency medical services has not been studied extensively and its teaching in the relevant lines of studies is limited mostly to operational and managerial aspects. This study explores and explains how the recent pandemic situation was mitigated through the viewpoint of immediate leaders.

The focus with the theoretical background was on leadership strategies and styles, crisis preparedness and mitigation, crisis communication and resilience. The aim was to find similarities between different theories and fields of work and to explore them in the EMS context.

## 2.1 Preparedness and security, and health security

The societal resilience in Finland is based on comprehensive security, in which the vital functions of the society are jointly taken care of with collaboration between authorities, businesses, organizations, and citizens in every circumstance and at all levels of the society with base in normal conditions' arrangements and legislation (Finnish Government 2025).

Finland's national risks are assessed in regular intervals, and the purpose of this assessment is to anticipate relatively sudden incidents that require the authorities to adopt exceptional measures or even request foreign help to mitigate risks involving wide national impact on the vital functions of society (Ministry of the Interior n.d.a). The European Union Civil Protection Mechanism obliges every member state to assess these man-made and natural disaster risks at national level and to summarize the findings to the European Commission every three years and the first national risk assessment was drafted in 2015.

The National risk assessment (2023) and the more local regional risk assessment of Uusimaa (2023) state that a pandemic is a relevant threat also in the future and for example influenza pandemics have had outbreaks every 10-40 years. As a densely built and people rich city, which also has many ports and means of mass transport within or near it, the capital (Helsinki City) carries significant risk of new epidemics and pandemics. From the beginning these risk assessments have identified global infections as a potential hazard, although the pathogen has been a type of influenza-virus.

The risk assessment of Uusimaa region identifies a pandemic as a significant risk, that organizations need to take into consideration for to be able to perform their tasks on national level as smooth as possible, and to be ready for possible unconventional actions in

exceptional circumstances (Uudenmaan riskiarvio 2023). The dense population raises the possibility for pandemic and epidemic situations which threaten public health and the capacity of health services and can be caused by a virus, bacteria, parasite, or fungoid (Uudenmaan riskiarvio 2023).

The Ministry of Social Affairs and Health (2023) states that the healthcare and social welfare services strive to ensure that the population has the essential services to their health, functional capacity, and healthy environment in all conditions and prevention of infectious diseases is a part of these services. In Finland the municipalities are responsible for organizing health care, and as such also responsible for the prevention of infectious diseases in their geographical areas. The health centers advise and guide on these diseases and should be the primary contact point in matters concerning infections. The hospital districts are regional experts. (The Ministry of Social Affairs and Health 2023.)

The Regional State Administrative Agencies coordinate and monitor the prevention of these diseases in their areas and control that the hospital districts have sufficient healthcare preparedness for incidents in their regions. On the national level, the Ministry of Social Affairs and Health is responsible for general planning, guidance, and monitoring of the prevention of infectious diseases. The Advisory Board on Communicable Diseases, appointed by the Government, works under the Ministry monitoring overall development in disease outbreaks and supports the Ministry's work in prevention. (The Ministry of Social Affairs and Health 2023.)

The Ministry of Social Affairs and Health (2023) directs, monitors, and coordinates healthcare and social welfare services' preparedness for incidents and emergencies jointly with other operators. The Preparedness Unit is responsible for preparedness matters at the Ministry. The Finnish Institute for Health and Welfare (THL) is a national expert agency that guides and supports municipalities, hospital districts, and regional state administrative agencies in their work preventing infectious diseases. It also studies these diseases, and their agents monitor disease threats in Finland and abroad. Diagnostics, monitoring, and prevention are developed, and the public is informed about them. It also guides the public about infection avoidance and prevention of the spread of diseases. It is an independent research institute operating under the Ministry. (The Ministry of Social Affairs and Health 2023.)

The Finnish Institute of Occupational Health (TTL) is the expert agency in matters of risk assessment of work-related infections and the planning and implementation of preventative measures especially in occupational healthcare. Collaboration and cooperation across administrative branches, border authorities, and media, and between countries on an international level is necessary. THL works closely with the WHO and the European Centre for

Disease Prevention and Control (ECDC). The Ministry for Foreign Affairs publishes travel advice bulletins on the general security situations of different countries. The Communicable Diseases Act forms the basis for the division of responsibilities and is supplemented by the Government Decree on Communicable Diseases. (The Ministry of Social Affairs and Health 2023.)

These risk assessments are made in cross-sectoral cooperation and lay the foundation for preparedness in line with the Security Strategy for Society, the whole-of-society engagement in preparedness being a multi-stakeholder approach including everyone from individuals, civil society, businesses and the public sector with the 72-h concept in mind (Ministry n.d.; Ruggiero, Piotrowicz & John 2024). The expected level of preparedness varies with each stakeholder from several months of reserves by significant actors to the three days' worth of the individual household's supplies.

Health security means the actions taken to protect the general population from different harms related to health, like previously known communicable diseases or new biological or chemical threats (Katz, Kiviranta & Helve 2023). Readiness is based on existing structures and continuous practice, and education is needed for keeping competence while early warning, tracking and reporting provide support for this activity (Katz et al. 2023).

#### 2.1.1 CBRNE incidents/threats

The acronym CBRNE stands for chemical substances, biological agents, radioactive material and nuclear weapons, and high-yield explosives. These threats or incidents can be intentional or unintentional - caused by accidents, intentional acts or natural causes like communicable diseases. In Finland cross-administrative cooperation between authorities and other actors has been a strength in preparedness for these CBRNE threats and is part of the comprehensive security and defense (Ministry of Defence 2024).

The rescue services should prevent accidents and take care of rescue operations tasks in all security and safety situations with the purpose of saving and protecting people, property and the environment while limiting damage and mitigating consequences (Ministry of Defence 2024). Preparations include reserving the required equipment, training of personnel and oversight. CBRNE risks have been noted in the planning of operations of rescue services (Ministry of Defence 2024).

#### 2.1.2 COVID-19 pandemic

The pathogen, severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), belongs to the betacoronaviruses and the disease it causes is called the coronavirus disease 2019 (COVID-19),

which is a respiratory infection leading to respiratory failure and multiorgan manifestations in humans when severe a disease (Truong Nguyen et al. 2022).

The coronavirus spread to Finland in early 2020 and made its way to the metropolitan area, where Helsinki is situated. The effects of the pandemic hit cities hardest, Helsinki especially, as most infections were concentrated into these areas (Järvelä 2022). The city was hit by the first wave of the Covid-19 pandemic in March 2020 and the highest infection rates were detected in March 2021 and from January 2022 to March 2022, during which the health care capacity was seriously challenged (Järvelä 2022).

During the pandemic there were restrictions affecting everyday life between 2020 and 2021 and in early 2022 (Järvelä 2022). Globally the WHO (the World Health Organization) declared the pandemic over in May 2023, but the virus is still infecting and even killing people, not forgetting the constant evolution of the pathogen (United Nations 2023).

The pandemic changed the normal processes and operations in the Helsinki City Rescue Department significantly. Especially the safety at work was a critical issue and for example the emergency medical service provided by the HCRD saw a flood of new protocols and personal protective equipment (PPE) aiming to reduce the risk of contracting the disease (Järvelä 2022). The first wave of the pandemic was seeded by 42 viral introductions and one of those caused a third of all COVID-19 infections in early 2020 fueled by international travel, mainly from Spain, Italy, and Austria (Truong Nguyen et al. 2022).

Viruses mutate over time and these SARS-CoV-2 viruses with different mutations are called variants, later described by the Greek alphabet. The betacoronaviruses have a relatively high evolutionary rate, which lead to multiple viral lineages circulating the globe and small fraction of these are considered as variants of concern (VOCs), which are considered having enhanced transmissibility, pathogenicity, evasion of immune responses, and possibly having resistance to vaccines (Truong Nguyen et al. 2022).

According to the Ministry of Social Affairs and Health (2024) it is estimated that the COVID-19 killed at least 15 million people globally and from the infected, a case fatality rate of 1% was concluded. Likely over 50% of the Finnish population of 5,56 million were infected and this estimation does not include the infected without symptoms. The COVID-19 pandemic can be seen as a midlevel pandemic scenario involving a pathogen with risen virulence, contagiousness, and case mortality rate while the infected persons can transmit the disease before any symptoms arise. The following was also true and a characteristic of a midlevel pandemic: the need for hospitalization has grown especially among vulnerable groups and the

population does not have previous immunity, no antiviral medication is at hand, and immunizations begin later. (Ministry of Social Affairs and Health 2024.)

The city organized itself by its crisis management model in March 2020 and a coronavirus coordinating group chaired by the mayor was set up to coordinate views and steer the necessary operational decisions on issues with a city-wide impact while the city's divisions and agencies set up their own crisis groups too (Järvelä 2022). Finally, a coordinating group for the Helsinki metropolitan area was established on the initiative of the mayor in the autumn of 2020 and this group had a major role in coordinating the decisions in the metropolitan area and whole Finland (Järvelä 2022).

The vaccinations started in December 2020 and by 2021 most Finns, as also most of the global population, have either been vaccinated or contracted the disease, which resulted in decrease of severe cases of coronavirus disease and during the 2022 management of the pandemic became a part of the city's normal operations, with the decisions handled at lower organizational levels (Järvelä 2022).

The HCRD was part of the urban environment division before the beginning of well-being service counties in 2023, after which it is a part of the Social Services, Health Care and Rescue Services Division. In addition to national level organizational change, the rescue commander of HCRD was appointed in May 2020, although the position was deputized from 2019 onwards.

The Communicable Diseases Act did not fully meet the requirements posed by the COVID-19 pandemic and during the pandemic the law was changed 18 times by mostly temporary statutes. Other laws were also changed during this period and because of the pandemic EU legislation and international agreements were also renewed or needs for renewal identified. During the pandemic, several assessments were conducted in Finland, and they lay ground for policy work and decision making, although a more holistic and longer-term analysis is still needed. (Ministry of Social Affairs and Health 2024b.)

COVID-19 pandemic was controlled with measures based on Communicable Diseases Act and decrees by the law. The WHO called the disease as a PHEIC based on International Health Regulations and the Finnish Government gave a decree stating the coronavirus disease as a highly contagious disease posing a public health risk on 14<sup>th</sup> February 2020. This pandemic was the first time for the legislation that a state of emergency had to be mitigated by the Emergency Powers Act. (Ministry of Social Affairs and Health 2024b.)

During the pandemic the Finnish Government made on 6<sup>th</sup> May 2020 a decision about controlling of the pandemic via a hybrid strategy, which aimed to effective mitigation of the disease in a way that minimized harm towards population, society, business, and fundamental rights. The strategy aimed to limit the spread of the virus and ensured the functionality and capacity of health care while providing special protection to people belonging to high-risk groups. The restrictions were divided into a three-tier system based on the severity of the pandemic situation. The leading thought being: “test, trace, isolate, and treat”. Later, the strategy was complemented with countrywide tracing and inoculation strategies. These strategies were updated several times as the epidemic situation fluctuated. (Ministry of Social Affairs and Health 2024a.)

## 2.2 Leadership

Historically, leadership has been one of the most researched subjects in organizational research according to Juuti (Helsilä & Salojärvi 2013 97-114). Despite this, relatively little is known about leadership. No scientific model has been able to fully grasp the deepest core of leadership, and the models have evolved through history starting from the leadership characteristics, which put emphasis on individual qualities of a leader and natural born leaders. The behavioral theories of the 1930's onward focused on leaders' actions and in the 1970's the scope was on situational explanations. From the 1980's the focus shifted to understanding processes through which meanings are born within a community by for example a charismatic leader who can answer acute problems within a group or a community. Finally, from the 1990's onwards a rise of poststructuralism reduces leadership into a form of talk which aims to provide better points of view about the situations at hand. (Helsilä & Salojärvi 2013 97-114.)

In the Finnish language word ‘johtaminen’ is ambiguous and it can be divided into management, the process of dealing with or controlling things or people; and leadership ,the action of leading a group of people or an organization, but in general according to Kuisma, Holmström, Nurmi, Porthan and Puolakka (2022, 110), leadership is target focused social interaction with which the human action is focused in a way that a common goal can be reached in a required way. Leadership aims to increase the effectiveness of action and its results by managing methods of work (Kuisma et al 2022, 110). Seeck (2021, 20) defines leadership and management as an action by which human labor and physical reserves can be acquired, focused, and utilized efficiently so that a certain goal can be reached.

Leadership is context related, and methods of leadership are closely connected to the culture and operational environment of the action according to Nivala, and Huhtala adds that it connects tightly to organizational daily life in which meanings are formed and developed

(Seeck 2021, 21). Leading people can be seen as a service, which should produce favorable conditions for work and help individuals find their best features says Juuti (Seeck 2021, 21).

A paradigm is, according to Guillén, a system which consists of intertwined ideas and techniques which offer both the diagnosis and the solution for problems at hand - so a leadership paradigm is a system of ideas and techniques by which an organization is lead (Seek 2021, 24).

A significant leadership educator in Finland is the Finnish Defense Forces and its leadership education has spread throughout the society via individual's lessons in leadership as part of the mandatory conscript service, and this can be seen as hierarchical leadership in certain organizations like the rescue services (Ruotsalainen 2015). Deep leadership, which is based on the transformative leadership paradigm, has been the paradigm of choice since the early 2000's and before that more hierarchical and authoritarian leadership was the way to lead people, as was common in military organizations at time (Puolustusvoimat 2022). This transformative paradigm underlines encouraging, inspiring, and coaching leadership with the four corners of deep leadership: excitement, trust, learning, and respect (Puolustusvoimat 2022).

The military leaders operational environment and its effects on how the leadership is performed can be seen as sliding scale from open to limited and finally minimal room of operating with time for decision making and execution growing smaller as the room decreases - this means movement from predictable and stable environment into a dynamic, complex, and rapidly changing and is to be mitigated by moving the leadership style from people centered and capacity building model towards management centered capacity utilizing model (Puolustusvoimat 2022). This progression can be seen also in rescue and emergency medical services' leadership and management as the changes in the environment require different approaches.

Daniel Goleman (2000) states that flexibility in leadership styles provides the most effective leadership and that it can be learned. As the leader aims to get results, emotional intelligence, the ability to manage oneself and one's relationships forms the basis for success and consists of four capabilities: self-awareness, self-management, social awareness, and social skill, into which the six different styles of leadership: coercive (demand of immediate compliance - "Do what I tell you."), authoritative (mobilization towards a vision - "Come with me."), affiliative (creating emotional bonds and harmony - "People come first."), democratic (building consensus through participation - "What do you think?"), pacesetter (expecting excellence and self-direction - "Do as I do, now."), and coaching (developing persons for the future - "Try this."), can be based on. (Goleman 2000.)

According to Litwin, Stringer and McClelland, (Goleman 2000) these six leadership styles have a measurable effect on the working environment in an organization, also known as the climate. It is estimated that this climate accounts for about a third of the results of an organization when measured via impact on financial results like sales, revenue, and growth. Six key factors influencing an organization's environment of work are: flexibility, as the feeling of freedom to innovate without excess bureaucracy; responsibility, as an individual feeling towards the organization; standards, as the level set by people; rewards, as the sense of accurate feedback and the suitability of rewards; clarity, as a characteristic of values and mission; commitment, as a level towards a common goal. (Goleman 2000.)

The six styles have different effects on the general climate and four of them can be seen as positive, the authoritative having the most strongly positive an effect while the coercive and pacesetting styles had a negative effect on the overall climate (Goleman 2000). Kuisma states that (Kuisma et al., 111-112) according to Lewin, there are three differing ways to lead which have a use in operative leadership: authoritative, democratic, and laissez faire, which means "to let go" and is useful in situations where the team is professional and knows what to do thus giving room for the leader to focus on other tasks while not forgetting the final responsibility of leadership and supervision.

Coleman (2023, 115-124) says strong and effective leadership is needed from every level of the organization during a successful crisis management and in combination with trust between the employees and the managers, effective systems and disseminated plans, management of the situation is possible. The CEO or equivalent in the responding organization should work alongside the communication team and lead the overall response. There are 10 crisis leadership qualities a leader can demonstrate in a crisis, and which can put the organization in a more advantageous position. A leader should be motivating, consistent, decisive, compassionate, visible, ethical, resilient, responsible, effective at communicating, and skillful at managing expectations when acting. (Coleman 2023, 115-124.)

Motivating employees with positive and supporting actions and statements make them feel prepared to tackle the situations ahead and this can be achieved by demonstrating leadership from the front and understanding what the employees are facing in the situations. A positive, consistent and unflustered appearance may also create an environment of confidence and safety on an organizational level. (Coleman 2023, 118.)

Decisiveness is shown by swift actions, by making quick decisions when needed. A firm appearance of confidence and comfort in taking decisions without seeming to be in a hurry is suggested. A leader should be involved in the preplanning of crisis mitigation actions for this to happen with ease and to be prepared to listen to expert guidance and advice within the

organization while showing how this information is used in informed actions. A balance between involvement of staff and being directive should be found as a failure in listening to affected people, employees, and the public will extend the crisis. (Coleman 2023, 119.)

Compassion, when authentic, enhances the perception of a crisis response which is not cold and impersonal. This means that a leader should also be approachable. It adds humanity to the communication and activities of a leader and adds to the other expected actions of an effective crisis leader who should be resilient, calm and seem as acting efficiently. (Coleman 2023, 119.)

By staying visible a leader shows that he or she is not hiding from the problem but actively works to mitigate it. Communication should be prioritized face-to-face concerning all stakeholders internal and external, and a clear delegation of responsibilities shows situational awareness and helps to ease the workload of a leader. (Coleman 2023, 120.)

Ethical response means doing the right things in response development instead of trying to just protect the reputation of an organization. Decisions making should be in line with legislation and ethical frameworks, ultimately the responsibility towards public opinion. This can be achieved by media and social media monitoring, with the help of the communications team, and taking the views of employees into consideration when planning actions. (Coleman 2023, 120-121.)

Resilience is built before a crisis by leader's own development. Crisis mitigation is exhausting and puts pressure on a leader and the team but gives an opportunity to build credibility by effectively dealing with the challenges. Being the face of the organization, directing the activities and working out a long-term plan for recovery is taxing. Individual well-being should not be overlooked and if needed, appropriate help for traumatic experiences should be used. (Coleman 2023, 122.)

Responsible organizations have teams responding to a crisis, as a single leader cannot meet the demands on operations, communications, and stakeholder management. Effective teamwork, while clearly staying responsible for response, focusing on the most important tasks that need to be done. A team of tactical advisors in different departments is recommended. (Coleman 2023, 122-123.)

CEO and senior leaders should understand the importance of effective communication supporting the organization. The communication team must demonstrate how they are effectively contributing to business priorities daily. A leader should be able to speak to people at all levels and across all sectors of society and be prepared to undertake the most

challenging of media interviews. It is important to know how to conduct themselves on social media too as their behavior during the crisis will be subject to intense scrutiny. (Coleman 2023, 123.)

Expectations come from the public and the employees and can be skillfully managed. Early engagement and shared narrative throughout the early stages of crisis will build trust and confidence in the leader. An honest and open style that provides information based on evidence is essential. This will lead to trust and confidence in the response. (Coleman 2023, 123-124.)

The previous qualities are most needed by the high-level leaders but apply to each person in a leadership role to some extent. Individuals form functional units that can operate purposefully and safely on missions and keep up the readiness while at the station. Further on, the units ultimately form an organization that can be either resilient and adaptable or succumb to the weight of past performance (Välikangas 2010).

Kantanen (2017, 49) states that nursing leader's competence to lead can be divided into two main categories, general and special competence, and these big categories can be further divided into following parts (Table 2):

General competence:	Special competence:
Promotion of evidence-based decision-making	Substance knowledge
Building and maintaining relationships	HR management
Communication and influencing skills	Operational management
Service initiation and innovation	Research and development competence (Kantanen 2017)
Resilience and composure	
Integrity and ethical stance	
Sustained personal commitment	
Professional competence and credibility	

Table 2: Nursing leader's competences (Kantanen 2017)

While the research shows the vastness of leadership as a phenomenon, good practices for leadership work can be formed by combining the research and literature with the commonly shared perception of bad leadership and the ways people would like to be lead (Helsilä &

Salojärvi 2013, 105). It can be said that leadership is a goal-oriented action which aims to achieve certain results with a certain group of individuals and the purpose of leadership is to facilitate adaptation into an ever-changing organizational environment and tasks. Commitment to shared goals and how much a leader acts according to them forms a base for action. A leader should “be a seller of enthusiasm” according to Juuti. (Helsilä & Salojärvi 2013, 105-114.)

Leader is also central in forming the culture and atmosphere of work group. Own example and building of mutual trust ensure a warm and building relationship, which benefits both parties. This trust must be earned by respect and trust in employees. Different situations require different roles from a leader, and it can be said that leadership is managing things with people and while things can be managed with preplanned standards, people need to be led by emotions into new ventures and more beneficial ways to work. Good leadership can be described as shared and discussive, which builds reserves of employees. (Helsilä & Salojärvi 2013, 105-114.)

An immediate leader is in a service job and can help employees flourish in their work by helping with adapting of work and the personal growth of an individual by supporting and encouraging as a coach or a mentor. Leadership is a skill that can be learned, and one develops into a great leader gradually with critical review and development of one's own ways of work. Traditional view sees immediate leadership as planning and overseeing, but according to studies there is a lack of time for this. The work is clustered and information abundant short sprint like act which can burden mentally. That is why it is necessary to realize your own resources and to be able to lead oneself effectively with less risk of overburdening and stress. (Helsilä & Salojärvi 2013, 105-114.)

These varying descriptions of leadership, and especially crisis leadership, help us build a framework to which the findings from this research can be compared to for building an understanding of the actions taken in this exceptional period. Because the employees in the target organization are of different ages, it can be assumed that differing views about leadership and management are present. The knowledge about different styles of leadership and firm grasp of organizational context by personal work history helps in this task.

### 2.3 The Helsinki City Rescue Department

The Helsinki City Rescue Department (2025) was founded in 1861, and it operates as a department of the City of Helsinki under the guidance of both the Ministry of the Interior and the city. It employs about 800 people, of which around 500 works in the rescue services. 12 rescue stations and four marine stations are spread around the city area. The department has

also other supportive and educative establishments like technical abase, practice field, Helsinki Rescue School and museums. The 12 rescue stations operate continuously around the city and each station has both rescue units and ambulances, with various specialties of rescue capabilities and levels of emergency medical abilities. 14 contract fire brigades provide support in certain situations. (Helsinki City Rescue Department 2025; Pelastustoimi n.d.b.)

Accident prevention aims to ensure that people and organizations have the capacity to act safely in their immediate environment by safety education and communication involving stakeholder events, social media channels and for example safety education in nurseries and schools. Safety training is provided by open and customized training supporting the community's self-preparedness. Advice and guidance to residents, companies and communities is provided by fire safety inspectors who also monitor the implementation of the Rescue Act by fire inspections. (Helsinki City Rescue Department 2025.)

Rescue services aim to save people, property, and the environment while limiting the damage and consequences caused by accidents and disasters. There are approximately 520 rescue professionals, of which about 55 are full-time paramedics, ready to address both rescue and emergency medical care duties. Contract fire brigades have around 300 employees ready for operation and if necessary, the rescue units can work as part of the emergency medical service providing the first response duties in high-risk incidents. Other capabilities of the services include maritime capabilities, water rescue and diving, damage control and oil spill mitigation, Urban Search and Rescue (USAR), Maritime Incident Response Group (MIRG), Rescue Task Force (RTF), and CBRNE. (Helsinki City Rescue Department 2025.)

The emergency medical services in Helsinki are provided by the Helsinki City Rescue Department for the HUS Group, which has the responsibility based on the Health Care Act (2010) to organize prehospital emergency care in its territory. Emergency medical care consists of status evaluation and care of a patient who has suddenly fallen ill or received injuries and if needed, transportation of the patient to a health care unit. The duties also include maintenance and preparation for disasters and other emergency conditions. (Pelastustoimi n.d.a.)

Finland went through a major change in organization as in the end of 2022 the new wellbeing service counties took this role of organizers at the guidance of the Ministry of Social Affairs and Health. The City of Helsinki continued to be responsible for organizing health, social, and rescue services and the HUS Group is still responsible for demanding specialized healthcare duties required by the law (Ministry of Social Affairs and Health 2024a). The rescue services belong to the Ministry of Interior's administrative sector, but organizationally they belong into the City of Helsinki's Social Services, Health Care and Rescue Services Division and the

department has two set of tasks - the statutory tasks defined in the Rescue Act, funded by the state, and services provided for the city, not covered by state funding (Pelastustoimi n.d.b). The department is prepared for major crises, disasters, and exceptional circumstances including CBRNE (Chemical substances, biological pathogens, radioactive substances, nuclear weapons, explosives) situations and military attacks (Pelastuslaitos 2022).

The service's yearly activities can be seen on the following figure (Figure 4) and shows that there was a significant decrease in missions in the beginning of the pandemic as the EMS missions fell from 63550 in 2019 to 56608 in 2020, only to rise again in 2021 to 63888, and again decreasing to 64000 in 2022 and further to 60914 in 2023. The rescue missions have fluctuated between 9268 in 2019 to 9597 in 2023, in 2020 8807, in 2021 9438, and in 2022 8706 missions. In 2024 the EMS missions have fallen significantly to 50961 due to joint measures of stakeholders mitigating the number of calls. Rescue missions in 2024 were 7943 and accident prevention service events fluctuated slightly from 5222 in 2019 to 7995 in 2024 with a decrease in numbers during the pandemic as face-to-face contacts were limited in society.

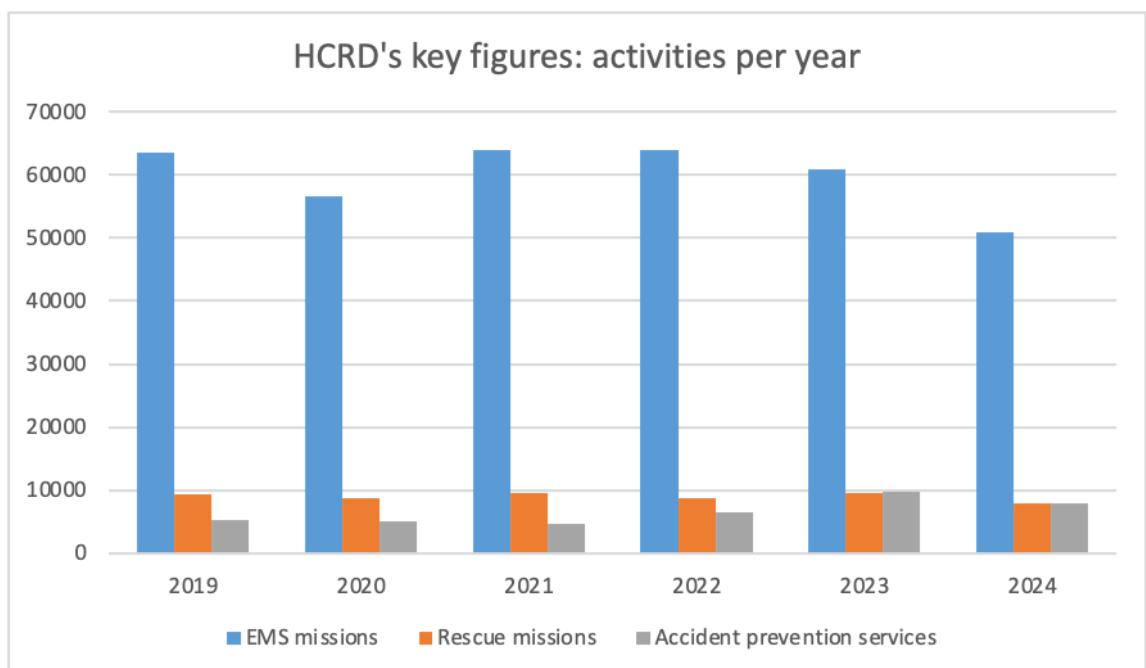


Figure 4: Key figures of yearly activities (Jaakkola 2023; HCRD 2025)

The Finnish rescue services operate with shared values of humanely, professionally, reliably together for a safe and crisis resistant Finland. The HCRD's values are community spirit, reliability, equality and relevance. On societal level it can be thought that organization's core function evolves constantly but slowly, with paradigms lasting for 20-30 years, which affect

trends and fashions, by which ultimately slogans and modes of operations are developed by on a timescale of a year or less (Seeck 2021, 29). Currently there is an ongoing paradigm change, which will affect the organization in the future.

### 2.3.1 Immediate leadership

Immediate superiors act in managerial positions on daily operational work directly and are next in rank to the employees owning a degree of administrative authority. They also represent the employer when directing work and are responsible for workplace safety. The fire officers and paramedic supervisors act as experts in their respected fields in addition to operational leadership and management.

This study focuses on paramedic supervisors, who are responsible for the city-wide management of units, and the rescue sub-officers, who manage the rescue stations in which the units and the crew are. Both supervisors attend to missions too daily. The work for every party involves leadership and management, is likely time-critical and full of interruptions, although for certain positions a certain amount of worktime is restricted for other administrative or expertise tasks.

At the HCRD the operational duties can be divided as seen in Figure 5 and the positions involve various capabilities and roles. The fire officers act as the highest level of rescue authority daily and operationally command rescue operations involving several units. Capabilities in supervisory management and expert tasks in a rescue and safety sector organization. (Emergency Services Academy Finland 2025a.)

Rescue sub-officers, lower fire officers or fire station deputy managers, who work as fire station deputy managers and unit leaders supervise their shifts, commandeer smaller rescue operations, plan and instruct training, act as fire inspectors, safety instructors and educators. Planning and organization of station service, including HR-activities, are part of the job. (Emergency Services Academy Finland 2025b.)

Paramedic supervisors, or EMS-supervisors, are mandated by decree on emergency care to provide in certain high-risk incidents, manage and lead the daily resources on their area of responsibility, and support the Emergency Response Centre Agency when needed. They also have immediate leadership and development tasks to fulfill as mandated by the employee. (Kuisma et al. 2022.)

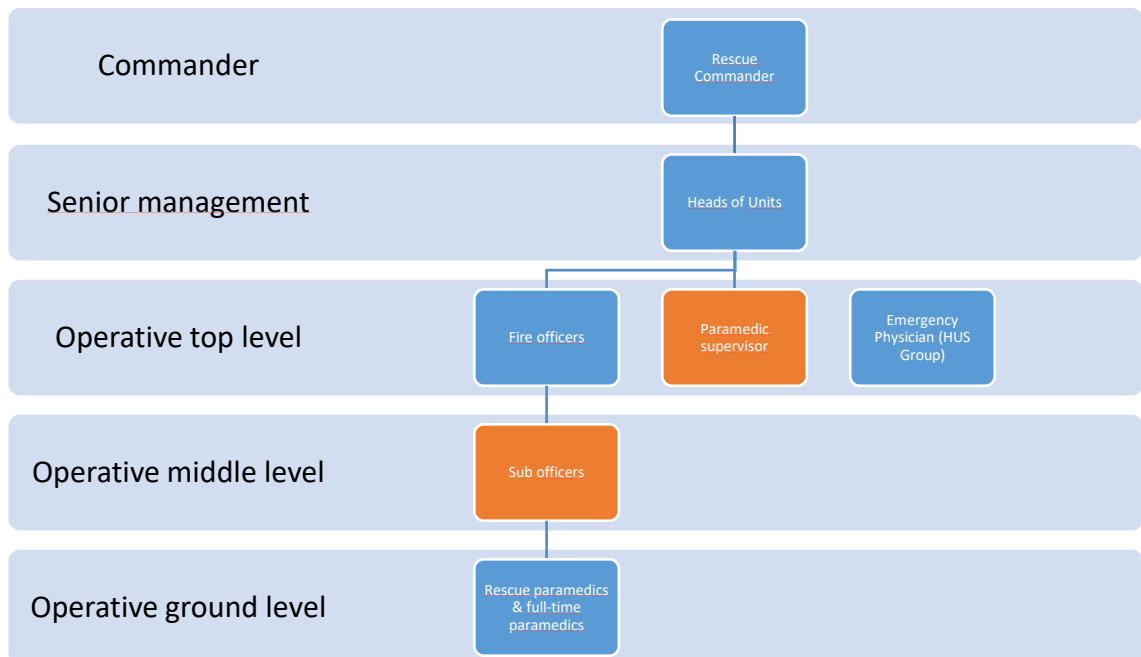


Figure 5: Structure of organization and supervisory positions in HCRD

The educational background of the supervisors varies within the organization as the sub-officers have first acquired a degree in firefighting (90 ECTS) and then added the sub-officer degree (60 ECTS). While the EMS-supervisors can have similar studies in their personal history, usually the Emergency Care bachelor's degree programme (240 ECTS) is the required educational background for the position in EMS. Higher degrees can also be attained, but they are not compulsory for applying into these supervisory positions although beneficial. Fire officers can have background in firefighting, or the mandated bachelor of Rescue Services (240 ECTS).

Education of leadership comes from different viewpoints when the paramedic supervisors and rescue sub-officers are compared as rescue services tend to focus more on the service provided to the people (Ruotsalainen 2015, 70). Mankinen has studied the job of firefighter as a way of life and found discrepancies between the ways that the legislation and the individual saw their professional understanding, as the legislation and senior management saw the task mostly as accident preventions while firefighters were more action oriented and thought the profession through putting out fires (Ruotsalainen 2015, 59).

The paramedic supervisors have a more patient centered approach according to Kuisma (Kuisma et al. 2022, 110) due to the education. Development as a leader starts with recognition of own values and personal traits, being aware and purposeful action. Values, self-knowledge, upbringing, leadership education and experiences as a leader form the

capability to lead while acknowledging that one is not born as a good leader but grows and develops through self-awareness, constant learning, and feedback. (Puolustusvoimat 2022.)

As the employer is obliged by law to carry the principal responsibility for workplace safety and health by safety management (hazard identification and risk assessment), orientation and work guidance, work planning and working environment design (Occupational Safety and Health Act 2002) and the immediate leader is the first representative of employer in this, these positions can be assumed to produce extra pressure on immediate leaders on everyday leadership during a pandemic.

### 2.3.2 Prehospital Emergency Care

The HUS Group (2025) arranges prehospital emergency care in cooperation with four rescue departments and two private companies, and as HUS activities. Two emergency medical physicians are on call in the Helsinki metropolitan area, another of locations being the Central Rescue Station in Helsinki. The wellbeing service counties are mandated to organize services for dealing with urgent cases at any time of day and patients can receive urgent care at the centers irrespective of their place of residence. These cases include injuries, a sudden onset of an illness, a flare-up of long-term illness, or a deterioration of functional ability with a need for immediate intervention - the treatment cannot be postponed due to the risk of condition or injury to worsen. (HUS 2025.)

Emergency medical services provide this care on site of the incident and include transport to a health care unit, if needed. The Health Care Act and the Government Decree on the Grounds for Urgent Care and the Requirements for 24-hour Services by Specialty lay down the provisions for urgent care. These services must include primary healthcare services, specialized healthcare services, related diagnostic services, and emergency social services under the Social Welfare Act. National guidance and advisory services, Medical Helpline 116 117 and Emergency Hub at Healthvillage.fi, provide people with guidance and advice about assessment of the urgency of care and examinations. (HUS 2025; Ministry of the Interior n.d.b.)

## 2.4 Crisis and issue management

A risk is a condition, object, situation, or other threat involving a probability of harm/danger to people and/or property according to Griffith (2023) and one needs to be aware of personal and organizational values affecting the risk intelligence, the ability to perceive the likelihood and severity of an event, and risk tolerance, the level of willingly accepted risk.

Coleman (2023, 72-77) defines the crisis communication and operational strategy by EMS approach to a crisis as follow, see Figure 6: it has a strict structure in place with a gold commander in the overall control setting the strategy and acting as the top decision maker and communicator during the crisis; silver commanders have some responsibilities in decision making and coordination of plans supporting the strategy on tactical level; bronze commanders, the operational level does the actual implementation while decisions can be made in every level with careful control. Responsibility to act in a specified key area flows down from those above the ranking in command-and-control way. Hierarchies and structures within the organization help with implementation but regular briefings and meetings are needed as the situation evolves, and an alternate course of action might be relevant (Coleman 2023, 72-77).



Figure 6: Gold, silver, bronze structure in decision making by Coleman (2023)

Coleman (2023) continues that the emergency services have routine in planning and exercising with legal roles within a society creating responsibility to act. The responses must include a long-term view of management, as the service is a part of the community throughout the crisis and after. Key communities and stakeholders should be identified and clear communication used as a consequences management tool in different formats aiming to reduce confusion and concern with the possibility of early warning of an issue impacting the work in the future (Coleman 2023, 72-77).

The human aspect of a crisis should be central in communication and action, according to Coleman (2023). Some emergencies require a liaison officer assigned to those affected, the victims and their next of kin or the aid provider themselves. The attempt is to keep everyone involved and affected updated during a fast-evolving crisis so further damage from second- and third-hand knowledge can be averted. As the areas of responsibilities of an emergency service are vast, the use of tactical advisers is suggested. These can be people within the organization having expert knowledge about the subject at hand. This means the gold and silver level people must be open to suggestions from the bronze level occasionally. (Coleman 2023, 72-77.)

Finally, Coleman (2023) states that a debriefing should look at all areas of the response and consider the good and bad about the response with focus on future improvements. A hot debrief can be done immediately after the main event involving other agencies involved in the response, but a longer term debrief is also necessary so that the recovery phase can be assessed. The idea is not to look for people to blame, but to improve the response by identification of urgent actions and building for a stronger recovery. (Coleman 2023, 72-77.)

#### 2.4.1 The Jaques' Relational Model of Crisis Management

The Relational Model of Crisis Management can be seen as a continuous and non-linear model which builds from clusters and offers a holistic approach to management of issues and crises (Jaques 2007). This model enables issue management, which is said to be the best way to manage crises and helps to address the underlying issues and triggering events (Jaques 2007). The model can be seen in the following Figure 7, and it consists of four elements built around clusters of processes and activities which can be addressed non-linearly as related and integrated disciplines (Jaques 2007).



Figure 7: Issue and crisis management relational model (Jaques 2007)

Crisis preparedness and prevention clusters belong to the pre-crisis management elements while crisis incident management and post-crisis management clusters belong to the crisis management elements according to Jacques (2007) but often should happen simultaneously when handling a crisis. Crisis management is about understanding and managing issues before problems turn into crises, to which the model is suitable.

Jacques (2007) states that the crisis preparedness cluster includes planning processes such as pre-planning and assigning roles and responsibilities beforehand, providing adequate systems and manuals for crisis management infrastructure in the form of documentation and resources. Pre-crisis training and simulations include programs for familiarization of new employees and testing of premeditated responses (Jacques 2007).

The crisis prevention cluster includes, according to Jacques (2007), scanning and implementation of early warning systems like process audits, preventative maintenance, issue and environmental scanning, social forecasting, and anticipatory management. Issues and risks should be managed via identification and prioritization, and strategies should be developed and implemented. Emergency response includes the planned and readied infrastructure, training, and documentation (Jacques 2007).

The crisis incident management cluster includes crisis recognition and as an emergency evolves into a crisis the emphasis is on objective evaluation and early recognition of the

imminent situation (Jacques 2007). Systems activation and response means the activation processes, call out mechanisms, the availability of backups or system redundancies, and the crisis management with the selected strategy aiming in damage mitigation, management of stakeholders, and media response (Jacques 2007).

Post-crisis management is about recovery and business resumption according to Jacques (2007), meaning operational recovery, financial costs, market retention, business momentum and share price protection. Post-crisis impacts such as judicial inquiries, litigation, damage to reputation and media scrutiny should also be addressed. Finally, evaluation and modification - the learning from experience by tools like root cause analysis, assessment of management, and revision of processes completes the cycle (Jacques 2007).

The aim of this model is to promote improved theoretical understanding of the different disciplines and minimize the human and financial costs by reducing the risk and the impact of adverse events (Jacques 2007).

#### 2.4.2 The Sequence of Reliability

Griffith (2023) proposes that an organization can become highly reliable using socio-technical science in a certain order called The Sequence of Reliability. This starts with the identification and understanding of the risks and how they are perceived by individuals, teams and the whole organization. After this, reliability can be managed in order of systems, aiming for effectiveness and resilience, humans, by influencing performance and behavior, and organizations, by achieving sustainment and becoming predictive (Griffith 2023).

The sequence is essential, as it can make one consistently reliable over time and enables adaptation to any risk while working with a diverse group of people and resources (Griffith 2023). The iceberg-model works as a metaphor and states that usually the known adverse events, reported near misses, and audits and inspections reveal only a part of the whole while the biggest components, human and system reliability remain unseen (Griffith 2023).

By combining the cyclical Jaques' model of crisis management with the Sequence of Reliability, the gathered data can be understood and evaluated better while a structure for assessing the overall performance of the organization and its components is possible to be formed.

An organization can be seen as a combination of people working within systems, so optimal performance requires competence in managing the complex ways in which people and systems interact and in practice means that before blaming individuals making sense of the

risk, the system, and the environment for understanding why rules are found hard to follow (Griffith 2023).

The socio-technical performance of an organization is mainly limited by the supportive systemic structures and humane interaction limiting systemic controls according to Griffith (2023) and summarizes that: “Often, the more reliable our system, the less reliable the human” - it is humane to make errors. Systems degrade and this creates the need to manage the consequences of past performance (Välikangas 2010). How people act is based on culture, which rises from societal groups and is constantly evolving while influencing the way the world is seen through experiences and how others are interpreted (Griffith 2023).

### 2.4.3 Resilience

Resilience is defined by Välikangas (2010, 3) as an organizations capacity to undergo deep change without or prior to a crisis, while in ecology the definition rises from the system’s ability to withstand a disturbance without undergoing a major transformation (Välikangas 2010, 7). It can be a significant strength in an individual’s life and career helping to cope with the difficulties and adversities of life and at the same time it can pose a major threat to an individual, if resilience becomes an overrated phenomenon (King & McSpedon 2024).

Resilience is a word that has multiple meanings depending on the context. On the individual level it can be divided into internal and external resilience, which means psychological wellbeing despite hardships and ability to survive and act within one’s surrounding reality (Lipponen 2022, 26). It is accompanied by adaptability to changes, social proficiency and feeling of meaningfulness on everyday level and instead of only reacting to challenges, resilience involves a thought of evolvment (Lipponen 2022, 27-28). Resilience can appear as an ability to withstand pressure, up to a point, and should not be confused with toughness as sometimes rigidity is needed while other times flexibility is needed (Lipponen 2022, 30-31). Secondly, it can be found in recovering from adversity with a forward-looking mentality with focus on the future and development, while having a realistic view about the loss (Lipponen 2022, 31-32). Thirdly, resilience appears in coping with a long-term, even never-ending, adversity while maintaining a similar future prone mentality as in the second type (Lipponen 2022, 32). Finally, occasionally resilience is also physical endurance and strength, which helps to survive situations and to find new skills and physical characteristics mitigating losses (Lipponen 2022, 33).

On an organizational level resilience can be seen as capability to bounce back after strategy failure, recover or persist during and after a crisis - how nimbly an organization is able to renew and to adapt for to survive viable in changed circumstances (Välikangas 2010, 19;

Lipponen 2022, 270). Välikangas (2010, 19-20) suggests that organizational resilience can be divided into resilience I, the neutralization of a crisis by taking timely actions before the strike, and resilience II, the capability to survive a crisis, and defines strategic resilience as “the capability to turn threats into opportunities prior to their becoming either”.

In nature, the key to resilience is to make the parts more resilient compared to the whole by building redundancies, recombination, variation, mobility, and being subject to natural selection or benefitting from luck (Välikangas 2010, 28). Operational resilience helps to endure sudden shocks, and it manifests by robustness, mindfulness, and accident avoidance and recovery while strategic resilience is about being able to benefit from an opportunity, either imminent or long term, by having the capacity to sustain and accomplish strategy change, capacity to create positive surprises, having sustainability, and avoiding escalations (Välikangas 2010, 30).

Teperi says that prehospital medical care can be seen as a line of work involving critical incidents which are partly an attractive or motivating factor for the employees but also a source of social, psychological, and physiological stress which needs to be mitigated. Events that have happened during the individual’s work history can undermine performance and have adverse effects on well-being if not appropriately dealt with. The emphatic distancing, which helps to operate daily at work, can turn into numbing feelings leading to problems in personal life. Especially constantly working on the limits or outside of own competence may lead to frustration and depression. (Kuisma et al. 2022, 898-911.) Same characteristics can be found in the rescue operations and the leadership work included in both fields of operations.

The Finnish Institute of Occupational Health (FIOH) (Sallinen, Punakallio, Halonen, Pehkonen & Sihvola 2024) recommends the following ways to control the workload in an external crisis concerning rescue services and emergency medical services either by modifying the work or by enhancing of individual’s reserves and resilience. The work can be modified by methods seen on Table 3. Especially leadership and communication can affect the workload as it can ease psychosocial overburdening when done properly and clearly. Clear roles and standardized operational procedures help mitigate the psychosocial strain. On the individual level regular practice of crisis situations can prevent strain comprehensively and professional competence built beforehand makes it easier to withstand adversities. Team spirit and support from the work community and team members help to mitigate psychological burden.

Modification of work:	Individuals' reserve and resilience support:
Appropriate leadership and communication, which helps especially psychosocial overburdening. Leadership should be encouraging and interactive while management focuses on clear lines of leadership, processes of flow of information and the familiarity of everyday leadership. In communications, it is important to keep up regularity, openness, and the usefulness of the information shared.	Regular and recurring practice of crisis situations, which prevents strain comprehensively.
Duty re-scheduling, so overexertion can be avoided with long enough breaks between shifts.	Taking care of an individual's professional competence and performance, by building up reserves beforehand on knowledge, physical capabilities and psychosocial abilities.
Breaks at work, so that the break can be taken before heavy fatigue.	Support from the employer and the work community, which prevents the excessive psychosocial load.
Clarifying roles and responsibilities, which prevent most of all psychosocial strain, by pre-crisis orientation into the individual's roles and responsibilities in a crisis.	Methods of mental care and support, which prevent and mitigate the psychosocial strain of work.
Checklists and standard operating procedures, so the cognitive load can be minimized.	
Planning the usage of human resources, which holistically prevents overexertion via preplanning of roles and responsibilities, duty rotation, deputizing and obtaining of extra personnel.	
Preventing excessive physical strain, by focusing on ergonomics, the length of work shift, and offering more breaks.	

Table 3: Ways to control the workload in an external crisis (Sallinen et al. 2024)

The resilience of a work community is necessary for the actual capability to work, and resilient employees are a basis for organizational survival of crisis, development and thriving in uncertain conditions (Lipponen 2022, 270-271).

### 3 Case study research

Yin (2018) argues that case study research should not be categorized as a mere type of qualitative study as Denzin, Lincoln, Creswell and Poth have stated, but it may be separated from qualitative research as an independent method of inquiry as it might be needed to follow a customized research procedures starting with the identification of the case. Case study research can utilize both qualitative and quantitative methods in its execution and is appropriate in certain situations (Yin 2018).

A twofold definition of case study, an empirical method, as a research method can be seen beginning with the scope of a study: a contemporary phenomenon (the case) investigated in depth and within a real-world context, especially when the boundaries between phenomenon and context are not evident (Yin 2018, 15). Secondly, as the phenomenon is hard to distinguish from the context, methodological characteristics rise as relevant features: a case study copes with the technically distinctive situation involving more variables of interest than data points, benefits from prior theoretical propositions guiding the steps of the study (design, data collection, and analysis), and relies on multiple sources of evidence enabling triangulation of converging data (Yin 2018, 15).

The general path and necessary steps of this research can be seen in the following Figure 8.

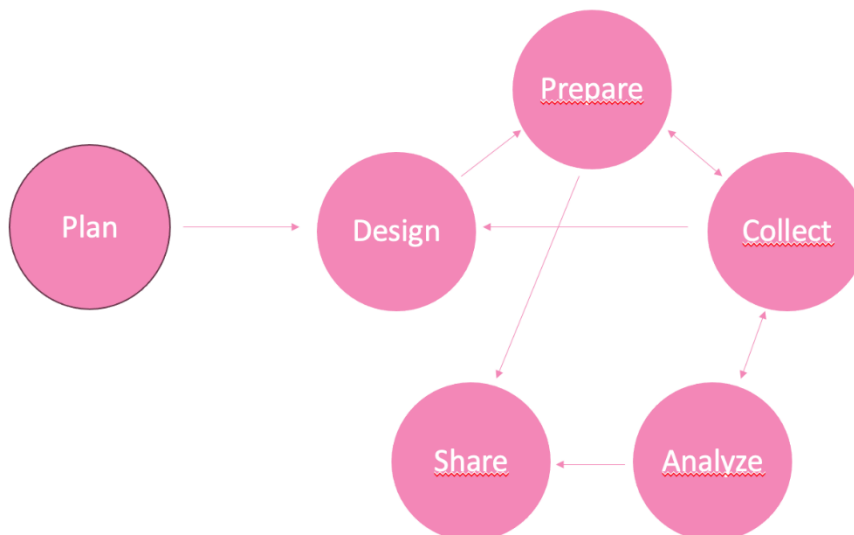


Figure 8: Case study research process according to Yin (2018)

The six sources of evidence in case study research are documentation, archival records, interviews, direct observations, participant observation, and physical artifacts (Yin 2018, 114). This study can use publicly available information, archives, registers, and

documentation for triangulating converging evidence with the gathered data from the interviews for reliable results. The epistemological orientation is realist, which assumes that there is a single reality independent of any observer (Yin 2018, 16) so the answers from the subjects are taken as is and the results are to be derived from them as a truth.

This study used the case study research method, because it is commonly found in social sciences and practicing professions and it allows in-depth, holistic, real-world perspectives exploration of organizational and managerial processes and small group behavior (Yin 2018, 5). As there is not much prior research in the context of this thesis, leadership and management inside a firehouse during an exceptional disturbance like a pandemic, this study is performed as an exploratory case study. As the research questions are formed as ‘how, why?’, no control over behavioral events is needed, and the focus is on contemporary events, the case study method is appropriate (Yin 2018, 9-13).

This method is appropriate, as there is access as an employee of the rescue department to sufficient data relating to the case as interviewing possibilities, reviewable documents and records, and the possibility to make field observations. Previous understanding about the work of a rescue paramedic and their immediate superiors has been gathered through personal work history. The case study researcher aims to identify the unique features of organizations and individuals and how interactive processes work and influence the way things work (Bell & Waters 2018, 29).

Proper documentation and use of a research diary, piloting of the method of inquiry, and constant self-reflection for possible bias throughout the project makes the research more valid and reliable. A research diary was kept during the study, with which the observations and findings were analyzed and compared on a regular interval so that the basic question: “What does the material want to say?” could be answered (Kananen 2015, 92).

Triangulation of collected material is typical for case study research and helps to understand complex problems from different viewpoints and adds to the reliability of this study, meaning that the research question and the phenomenon being studied is studied with the help of interviews, documents and other case study research compliant pieces of evidence (Kananen 2015, 33-34).

Qualitative analysis sees and examines the data as a whole and aims to produce a single logical entity by data collection through certain theoretical method, and with the reduction of collected data into a generalized level thus solving a mystery (Alasuutari 2011, 38-39). Finding the common features of material being analyzed or forming a rule that can be applied

without contradictions is how this is done while keeping the differing findings in perspective (Alasuutari 2011, 40-41).

This study can also be seen as a qualitative study made with case study research strategy, but it does not change anything in its actual implementation as a qualitative study depicts real life according to Hirsjärvi, Remes and Sajavaara (2010, 161) as comprehensively as possible by exposing facts through the value base of the researcher and usually carries the following characteristics:

- The research is holistic in data collection and the data is collected in real circumstances
- Humans are favored as instruments of information collection
- Data is analyzed inductively
- Qualitative methods are implemented in data collection
- Informants are purposefully selected
- The research plan develops as the study advances
- Cases are thought unique and interpreted accordingly (Hirsjärvi et al. 2010 164).

### 3.1 Documents and data

Other sources of data supplementing the interviews are discussions with key stakeholders within the organization, COVID-19 related documents found in the databases of the HCRD, personal observations, and physical artifacts found within the rescue stations. Table 4 summarizes these sources of data.

Name	Quantity (N=177)	Type	Description
COVID-19 briefing	99	.pdf	2020 x 50, 2021 x 43, 2022 x 6, general up-to-date information about the pandemic, measures taken, and current situation
EMS guidelines	11	.pdf	SOPs about IPC-practices, hygiene, registering cases, and up-to-date protocols (updated 22 x 2020, 5 x 2021, 2 x 2022)
Usage of HCRD premises	20	.pdf	General rules about service in the rescue stations and the

			usage (limitations) of the use of premises
Guidelines for management	25	.docx, .pdf	SOPs to the management and registering of vaccinations, protocols about returning to work after infection, quarantine protocols, limitations to the use of workforce when pregnant
General COVID-19 information	12	.pptx, .pdf	FIHOs general information about COVID-19 and hand washing, briefings about the pandemic situation, terminology
Other	9	.pdf	Use of remote communication (Teams, OVI-portal), lending of equipment for remote work, information about the services of occupational health

Table 4: Source documents

177 documents were found and manually analyzed. Most of the documents were COVID-19 briefings which gave personnel updated information about the pandemic on a regular basis. The guidelines for management, aimed to help rescue sub-officers work and employees to act accordingly in a quarantine situation, were the second largest group of documents. Guidelines about the use of HCRD premises during the pandemic were the third biggest group. Daily work in ambulances and rescue units was guided by EMS guidelines, which were updated 29 times during the pandemic. Other documents studied include general information about COVID-19 and, for example, remote work-related guidelines. Personal observations are made from different stations when visiting during the pandemic and afterwards.

### 3.2 Interviewing as a data collection method

Subjects were selected by purposeful sampling and in the case of lacking subjects snowballing method could have been an option in informant gathering. The interviews were thematically guided as this allowed the subjects to speak about individually relevant matters in the context of the study (Bell & Waters 2018, 214). The transcribed interviews were analyzed via inductive content analysis so that the meaningful matters can arise from the data, rather than from the decision of a researcher. Codification of the data was done as many times as needed for relevant categories to rise (Bell & Waters 2018, 216).

The informants were recruited via email and general info about the study was sent beforehand to enable informed consent for the actual interview. 11 interviews were conducted via Teams and the informants were either rescue sub-officers or paramedic supervisors in different stations, shifts and assigned duties. Nearly everyone contacted was able and willing to participate in the interview. Job histories varied, as well as the educational background.

The thematic interview structure was tested with a sub-officer and the interview is included in the data, as the questions and themes seemed relevant - only the question “what is resilience?” was left out and otherwise approached during the following interviews. The themes were based on previous literature and proved to be informative for the scope of this study.

A total of 11 thematic interviews were conducted via individual Teams online meetings in Finnish. The interviewees (see Table 5) included paramedic supervisors (6) and rescue sub-officers (5) from different shifts, stations and individual areas of responsibility. Every informant had a degree in firefighting and their work history was long, exceeding 10 years in the field of rescue services and EMS. Supervisory experience varied between 4 and over 15 years. Some of the sub officers worked as station managers. One interview was expected to last about 45 minutes and the sessions varied between 34 minutes 2 seconds and 69 minutes 3 seconds. The average length of an interview was 47 minutes 2 seconds.

Informant (N=11)	Role (6 + 5)
A	Rescue sub-officer
B	Paramedic supervisor
C	Paramedic supervisor
D	Rescue sub-officer

E	Paramedic supervisor
F	Rescue sub-officer
G	Rescue sub-officer
H	Paramedic supervisor
I	Paramedic supervisor
J	Paramedic supervisor
K	Rescue sub-officer

Table 5: The informants interviewed

The individual interviews were manually transcribed to a general level in Finnish and personal information was anonymized in the process. The aim was to anonymize to a level where informant's characteristics appear same for most of the people involved in the research and it can be assumed that a person is unidentifiable when searched for with reasonable measures (Hyvärinen, Nikander & Ruusuvaori 2017, 418-419).

The total length of the transcript was 37 pages and 24180 words in font Aptos, size 10 and row spacing 1, when the questions and the answers were separated into own passages. Later, it was translated into English using ChatGTP4o as an assistant. The translation was proof-read and the generated text edited before further use in analysis.

The aim was to get enough participants, so saturation point could be reached from the interviews. The researcher's responsibility was that the validity and reliability of the study could be maintained. The questions were not pre-written, but the interviews were conducted as a semi-structured thematic interview (see Appendix 2). Because of lacking time resources and scheduling difficulties not all willing to be interviewed could be interviewed during the research.

The transcript data was segmented into sentences and turned into a table form. Then it was categorized and coded into themes for final analysis via inductive content analysis. The following themes were identified, see Table 6, infection control and prevention, leadership and team dynamics, pandemic preparedness and response, impact of the pandemic, cultural and structural differences.

Infection control and prevention	training, knowledge, and practices before and during the pandemic.
Leadership and team dynamics	leadership styles, challenges, and group cohesion
Pandemic preparedness and response	organizational readiness, information flow, and operational adjustments
Impact of the pandemic	changes to workloads, morale, and personal coping strategies
Cultural and structural differences	between firefighters and paramedics, and variations across stations

Table 6: Themes induced from the interviews

### 3.3 Ethics

This research followed the Finnish National Board on Research Integrity (TENK) guidelines for the responsible conduct of research (RCR) and implementation checklist was used as a guide in the process (TENK 2023). The study followed a predisposed plan and only the timeline changed slightly during the implementation of the research.

Written agreements were made with the HCRD about the project, in accordance with the research permit approval process of the Helsinki's Social Services, Health Care, and Rescue Services Division's appraisal process, and interviewees were informed in advance, and the interviews were conducted under informed consent. A short descriptive plan of research was presented in Finnish including the intended use of AI during the process when applying for the permit. Research permit was obtained from the HCRD in August 2024 and the actual data collection lasted until the end of 2024 after which reporting and presenting of findings were timely.

This project received no external funding but was done in collaboration with the Helsinki City Rescue Department. Minor expenses came from ChatGPT license. This study is not subject to the Medical Research Act and according to the National Board on Research Integrity (TENK)'s instructions no ethics assessment from a human sciences ethics committee is necessary. Because of the current global situation, no critical information about the resources of the rescue department is published.

### 3.4 Data management and security

Data security was ensured by not collecting any personal or sensitive data. Report and other data were processed on a personal computer protected with proper encryption and password. AI was used, the prompts did not include classified information, and the use was stated according to the Laurea UAS use of AI guidelines. Interviews were recorded for later transcription, but the data collected and processed during the thesis process will be deleted appropriately after the work is finished as the data should be kept the shortest time possible (European Commission 2023).

During the research project the Chatham House Rule was followed when reporting, attending meetings, engaging in conversations or otherwise gathering relevant data, the guiding spirit being 'share the information received while not revealing the identity or the affiliation of the speaker(s) or any other participant (Chatham House 2024). The aim was to create a safe environment to discuss even sensitive issues and generate ideas while breaking down barriers. The participants received enough information about the case study research before the interviews, and an agreement of consent was taken from each one (see Appendix 1). The data management plan can be seen in Appendix 3. It states how the data was protected and processed during the project. The following chapter provides a description of the philosophy that guided the use of AI.

### 3.5 Use of AI

Data safety was ensured by not giving anything confidential or internal documentation of the HCRD to the LLM (Large Language Model) as input and its access to use the input for model learning was restricted. A private account with multifactor authentication prevented any unauthorized use of the tool. In general, ChatGPT4o was utilized as a research assistant to which one could talk to like a person and for example ask for an opinion about the structure of the report or suggested translations and ideas about editing the text. Only open-source documents and anonymized and generalized interview transcripts were used as inputs.

I assigned a role that I wanted for the LLM and started having conversations with it. Uploaded documents helped to anchor the model more towards the clouds of words that I was interested in. Feedback was given to the ChatGPT as needed regarding the answers and outputs it gave regularly throughout the process, and this helped to modify the model according to the needs of this research.

Prompting guided the language model towards wanted style and information, by simple statements like: "Respond in English. You are an expert in qualitative research and

understand the field of emergency medical services and rescue operations in Finland and abroad. Epidemiologically, you comprehend the basics of the coronavirus pandemic and its impacts on the aforementioned organizations. The goal is to produce a scientific report.”. During the whole thesis process, the LLMs evolved and new features were taken into use as they appeared and were in concordance with the Laurea AI guidelines.

The prompting was guided by Rinehart’s eight tips of prompt-writing: breaking complex tasks into smaller steps; using step-by-step prompting and chain-of-thoughts; providing training examples helping with complex tasks; adding relevant contextual information when possible; repeating the main instructions at the end; including words and phrases guiding the response; use of clear punctuation, headings and markers of sections; specifying the wanted output structure (Reilley 2024, 219).

This case study research utilized ChatGPT4o in different phases of the study as a tool for editing texts, translating interviews from Finnish into English, in general editing of the report, and in context ideation. Previous knowledge acquisition was also a task in which AI helped as the terminology in the PCC-model was introduced partly by the ChatGPT4o. Everything the model offered was double checked or otherwise verified, as it is possible for a LLM (Large Language Model) to hallucinate. Personal knowledge about the context helped to eliminate the risk of hallucination.

LLM gave a helping second opinion when finding similarities between the informants’ answers and helped to tie the data into openly available general knowledge within the scope of this research. This helped to validate the personally made segmented and inductively analyzed findings from the interviews. The report was written by me and any suggestions made by LLM about the editing of this report were scrutinized before implementation. The purpose for the use of AI was to enhance my own expertise within the context of this study and to further improve my work life skills as suggested by Arene (2024).

#### 4 Results

This section presents the findings of the research, categorized based on Jaques’ Relational Model of Crisis Management and Griffith’s Sequence of Reliability. The results are divided into three levels: systemic, human and organizational. Each level is examined through pandemic preparedness and prevention, crisis incident management, and post-crisis management. The theoretical background provides a base for exploratory research concerning the COVID-19 pandemic and how it was perceived by the immediate leaders.

In general, the responses from the rescue sub-officers were more concise compared to the paramedic supervisors. Is this because of learned ways to communicate, or a personal quality shared by the informants, is unclear. Paramedic supervisors' answers were more elaborate and longer in general. As this was a health-related crisis, the subject may have been more familiar and that may have affected the answers. Every informant had a long work history at the HCRD and common grounds between the informants were reportedly found through the degree in firefighting, the basic level EMS operations, and the basic level of CBRNE operational capabilities.

The leadership styles varied, but honesty, fairness, inclusiveness, mutual trust, and open communication with other people were common characteristics with every informant. This has likely maintained morale and cohesion of the teams. The paramedic supervisors seemed to describe their individual styles to lead more than the rescue sub-officers. Some informants used more precise and scientific language describing their ways to lead and had educated themselves further either on their own time or through courses and degrees.

The styles of leadership reportedly ranged from laissez faire to collaborative and supportive to direct and authoritative, depending on the situation. Many had thought about the individual leadership style, and some had been studying the subject further in their own spare time. The shared view among the informants was that basic education gives basic knowledge, and further learning happens during work life in leadership and basically every aspect of these professions.

The pandemic timeline can be seen in Figure 9, in which the blue shows the 7-day median of hospitalizations and black means deaths in a 21-day average. The green line shows the percentage of first vaccination rising from 0% to 81%. The first wave in April 2020 rose to 264 hospitalizations and 167 deaths. Peak in April 2022 is 1230 hospitalizations and 597 deaths mostly due to the Omicron variant, which was capable of infecting vaccinated individuals. The WHO's declaration of pandemic lasted from March 2020 to May 2023, and a lot of countries returned to some type of pre-pandemic normalcy in 2022 (WHO 2023b; WHO n.d.).

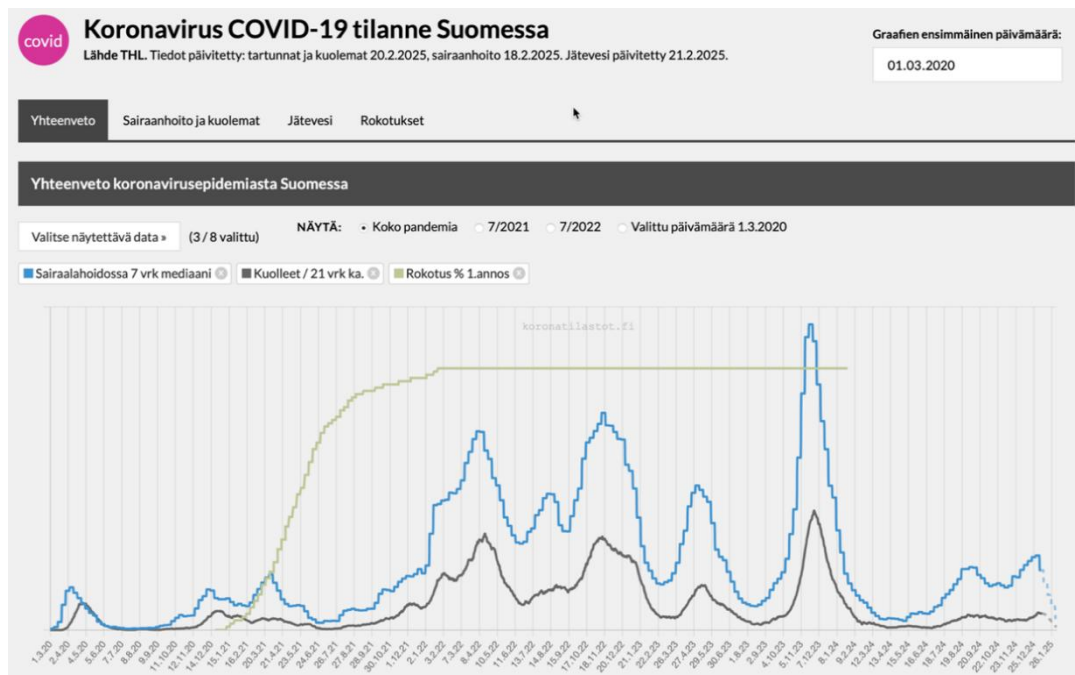


Figure 9: COVID-19 situation in Finland (Koronatilastot.fi)

The HCRD could not have prevented the pandemic in any way, as it was a health-related global issue which turned into a crisis. We can identify several factors helping the HCRD to mitigate and adapt to the pandemic through the collected data.

#### 4.1 Crisis preparedness and prevention

When the crisis preparedness is considered, the department had pre-existing infection prevention and control guidelines, which were based on previous epidemics like the avian flu H1N1 in the late 1990's and early 2000's. There are guidelines concerning the everyday IPC-practices when operating in the emergency medical services, and specially tailored SOPs for calls involving possible dangerous or highly infectious diseases like measles, hemorrhaging fevers, and tuberculosis.

Overall hygiene and cleanliness are also included in the daily tasks during shifts at the stations' weekly tasks. Protection against an invisible threat is also planned in the SOPs concerning CBRNE-situations. These plans were more a single instance type according to the informants and needed to be adjusted to suit the COVID-19 pandemic which was extremely long-lasting when compared to previous situations.

The stockpile of PPE was available and ready for use even before the pandemic. The expected usage did not meet the demand, which caused some extra work and needs for stockpiling

during the pandemic. The global supply chains proved volatile, as certain goods were rerouted to other countries or otherwise unavailable when the situation developed further. More equipment was acquired successfully throughout the pandemic, although the risk of unsuccessful buys was real.

A pandemic scenario was included in the crisis communications plan. A clear chain of communication was also pre-established involving the Rescue Commander and the Chief of Communications. It was thought that there would be time to prepare and learn from other countries' response as Finland is remote a country. Now there was under a month before the pathogen arrived.

Initially there was an underdeveloped infrastructure for remote work and meetings, but the lockdowns and other measures of IPC significantly catalyzed its adaptation. This created much work for the personnel building the systems and the need for rapid education about the ways of remote working was apparent.

The informants described that nothing as severe as the recent pandemic had happened in the recent history, so there was reported skepticism about the seriousness of the coronavirus as a pathogen. In the beginning there was a belief that this disease would not cause major concerns. This was seemingly assumed because of previous experiences with the avian flu and other diseases, which did not create major crises. Although the general atmosphere among the employees varied vastly from a business-as-usual mentality to real fear about the health and safety of everyone.

IPC-practices were said to be familiar to every informant at least on a basic level. Most described having a good level of practice, although the EMS was described as a differing environment for these practices when compared to hospitals and other healthcare facilities. Some progress was described even pre-pandemic, but the quickest development needed a pandemic as a catalyst. In general, the paramedic supervisors seemed more accustomed to the IPC-practices while the Clean Cab system was more familiar to the rescue sub-officers. Both classes of informants identified similarities between the methods of exposure mitigation.

The Clean Cab system was mostly learned during the work, as it is relatively new and still making its way into practice in Finland. Culture and individual attitudes along with station infrastructure affected the level of compliance according to informants. Before this model, it was normal to smell smoke, and a little soot was regarded as a part of the job. Especially before the generalization of this method, personal interest has been the motivator in learning

of it. Station infrastructure hinders the adaptation of this model, especially at the older rescue stations.

The overall task of the HCRD stays the same no matter the circumstances according to the informants. Only the environment and methods of operations vary accordingly. The department has a long history of rescue and emergency medical service provision for the City of Helsinki, and this has created possibilities for truly long-term relationships to develop.

The national risk assessment recognized a possibility of pandemic, although the 2018 version identified the threat as pandemic influenza or similar widespread epidemic. Both COVID-19 and influenza are contagious respiratory illnesses, while causing viruses are different. This has guided the preparedness of the HCRD mandated by the Ministry of Interior and the comprehensive security strategy of Finland.

The global situation was observed continuously and when the spread seemed imminent, an executive crisis management team was established on 16<sup>th</sup> March 2020, and regular meetings started which laid ground to mitigation strategies. The informants described that the situation got severe quickly. Organizations had pre-existing contacts with HUS via emergency physicians and long-term history of collaboration. HCRD is also a longtime collaborator in the capital region.

The hierarchy of the rescue department is clear and the units within are siloed to a degree divided into a few levels of organizational leadership. This enabled a clear line of decision making and communications during the pandemic. The EMS unit has the highest level of substance related knowledge in a health-related crisis within the organization.

Pre-pandemic collaboration with the HUS Group provided significant advantage during the pandemic as guidelines and practices could be quickly adapted into EMS setting and distributed to the employees. This created significant administrative work for the paramedic supervisors and the executive crisis board, senior management, and the rescue sub-officers who were responsible for the management of a certain rescue station.

#### 4.2 Crisis incident management and post-crisis management

The first wave of COVID-19 arrived at Helsinki in March 2020 and quickly became the main story in every media outlet. There was reportedly significant variation in emotional response from fear to business-as-usual kind of attitude among the employees. Many informants addressed a grave concern about safety at work as there was not enough knowledge about the disease at first. The situation was described as a trip to the unknown.

On 12 March 2020 The fire stations closed from visitors limiting the human contacts and the spread of the virus. Handshaking was banned and information about the COVID-19 symptoms was distributed to the employees. COVID-19 hotline was established early on, and it added to the workload of paramedic supervisors.

The first COVID-19 case was described as an exciting task, to which the personnel attended to with CBRNE like precise SOPs. Initially the PPE was heavy but quickly adapted to a more suitable version as the cases grew more common.

In the beginning of pandemic, grave concern about the sufficient storage levels of PPE rose. Some of this was due to the media, which reported about shortages. A reminder about the proper use of equipment was given and its use only for work was stated. This was executed from every level of the organization and via multiple channels of communication - ultimately enforced by the rescue sub-officers.

The need for information was significant. There was real fear among the employees and supervisors concerning COVID-19 and its effects on employees. Trust in the processes and SOPs were present among the personnel. General feeling changed as time went on. COVID-19 started to seem like a "normal flu". Uncertainty and constant updates caused mental strain. Leaders felt responsible for the work safety of the employees. The prolonged nature of the pandemic strained mentally the leaders who had to manage their own fatigue while supporting their teams. The information given was considered necessary.

Workloads changed, as operational load grew less but administrative work grew significantly. Prioritization was needed as some tasks had to be done and, for example, development work put on hold in the beginning of the pandemic. The command structure remained intact and allowed operational continuity, though the daily workflows shifted significantly.

Especially in the beginning of the pandemic, ad hoc modification to IPC-guidelines was necessary, which created challenges in maintaining protocol consistency. The rescue sub-officers reported this as an issue, because it took time to familiarize them with the changes and to make sure every employee was also notified about the models.

When considering information availability and consistency, mass emails and collecting the relevant information on a shared page on the department's intranet were beneficial. Everyone needed to quickly adapt to online meetings and education. Frequent updates caused information fatigue, as news, briefings, and changing guidelines came from within the organization and from other governmental or media actors through the pandemic

Communication was described abundant but informative, sometimes repetitive. Teams proved to be an appropriate channel for reaching out to personnel. Communication specialists were overworked, as much manual labor was needed writing COVID19-briefings. This affected normal work. There was a campaign of stickers and posters guiding personnel into proper PPE use, social distancing, and hand hygiene on the station level. This likely helped to keep up the compliance with guidelines to some level.

The senior management seemed to combine the Clean Cab system with the everyday IPC-practices in planning and tried to distribute this to the daily operations at the stations. Much of this responsibility was ultimately on the individual's and the compliance was monitored by the rescue sub-officers. The culture within a shift at a station forms partly through the actions and personality of the immediate leaders. Informants said that there is variance within the department considering how this work is done.

Strong team spirit was reported by most participants within their shifts, supported by mutual respect and clear communication. Despite the reported differences, most respondents reported positive work relationships and teamwork. Collegial support was also available when needed and actively used based on an individual's strengths and weaknesses.

The rescue sub-officers managed the daily shifts at rescue stations while the paramedic supervisors managed the fleets and worked as experts leading more equal teams when compared to the hierarchy of a rescue station. The balance of operational and administrative duties swayed during the pandemic as the call volumes dropped and the number of administrative tasks such as informing the staff, contact tracing, and compliance monitoring rose.

Most of the informants reported no significant differences in leading full-time paramedics or EMTs (Emergency Medical Technicians) compared to firefighters, although due to the different work schedules the firefighters seemed to possess a stronger team identity. Some tailored leadership approaches were needed. Some informants described firefighters being more team oriented in their thinking and full-time paramedics as more care driven individual thinkers. The biggest effect on how a person works and thinks was thought to come through work experience. Cultural differences affected dynamics but could be managed with little effort.

A significant obstacle in acting as a HR-leader for the full-time paramedics arose from the differing work schedules - every paramedic is under a station manager's duty although not necessarily working on the same shift. The station managers have office days which make meetings possible in person, although the COVID-19 restrictions in movement hindered this.

Moreover, the sub-officers do not work in EMS, so giving proper feedback for performance at work is difficult, even impossible.

Unofficial channels like WhatsApp were also used successfully in contacting personnel or sharing important information, as there was no quick way to get in contact with the employees officially. The informants noted that fire officers were not as involved in the process of briefing as they could have been. E-mail was read frequently, and the newest information was easily found on the intranet. It was challenging to ensure that all team members received, understood, and implemented new guidelines as communication relied heavily on digital tools like e-mail and Teams-meetings.

There were some daily operations impeding siloing apparent between the paramedic supervisors and the fire officers. The COVID-19 briefings were supposed to be led by a fire officer covering the organizational situation while the paramedic supervisors provided expertise on the situation from a more medical point of view. This collaboration did not work as well as it could have.

Vaccinations started at the end of 2020 and were accepted by almost all personnel. Individual cases of non-compliance had to be resolved. Fatigue was a recurring theme, with compliance to protective measures decreasing over time and needing a reminder from superiors. The virus variants posed also a challenge, as the Omicron variant was more capable to infect vaccinated persons. The restrictions needed to be adapted several times during the long period of pandemic.

Some skepticism about certain measures needed to be addressed. This was more a discussion with the employees about why we did things this way and, for example, other EMS-providers the other way. Morale fluctuated during this long period of time and leaders were required to emphasize the importance of guidelines while addressing team concerns about safety and workload. It was said that this management of compliance is something that needs attention in every long-term decision and could be thought of as a human trait. The immediate leaders have a key role in the maintenance of standards within the service.

The HCRD seemed to react quickly when the situation became more severe. The information flow throughout the pandemic seemed to follow the fast pace of current media. There was evidence of pre-planning as there are legal obligations to prepare as an organization for certain scenarios. Hierarchical structures within the department played a dual role by facilitating decision-making while also reinforcing silos. It was reported that it felt like the fire officers disappeared into their own silo although the responsibility for carrying out the

COVID-19 briefings remained on them during the pandemic. Some issues might have arisen from the new remote meeting technology.

Strong collaboration with external organizations such as HUS and THL, and the Ministries was a critical factor in improving responses during the pandemic. There was a clear order of preference, if competing guidelines came to be, and the information was fitted for the employees within the department by the leaders. Clear SOPs about cleaning and handling COVID-19 patients were published quickly and updated regularly. Significant work was done in customizing the IPC-protocols for the needs of HCRD. Emphasis was on understandability and the paramedic supervisors acted as interpreters. Safety at work was of grave concern and the possibility of misinterpretations was minimized.

Post-crisis reflection shows that the pandemic made some informants question the previous methods of infection prevention and control as lax when compared to guidelines during the COVID-19 crisis. It was suggested that some of this laxness was due to cultural habits. The practices evolved quickly when the pandemic struck, and employees were compliant. IPC practices were understood as a workplace safety question.

Personal routines and external support networks were critical for maintaining personal resilience during the pandemic. Many informants highlighted the importance of maintaining normalcy outside of work, although the pandemic could not be avoided as it was affecting the whole society. Personal recovery was disrupted by the increased demands of leadership, as for example concerns about workplace safety came into dreams. Hobbies and, for example, control of media use when off duty was reported to help coping.

Redundancies were minimal in certain key positions, which meant that delegation was not possible and raised the workload on an individual level. Despite the significant change in workload, excess strain was not reported although compared to normal one felt the change. Contact tracing was time consuming and labor intense when needed. The on-call COVID-19 duty officer was needed mostly as support for decisions of sub officers and was described as an asset.

Only a few individual flare ups of COVID-19 happened during the whole pandemic in a few shifts and stations. These were mitigated successfully by local lockdowns. Should the situation worsen, there were plans concerning redistribution of the workforce. All leaves were canceled a few times as the pandemic situation surged. It can be said that the siloing and limitation of contacts combined with the proper use of PPE supported by informative stickers spread around the department worked well.

The pandemic elevated the importance of infection control and prevention practices. People seem to dare call in sick more often too and exposing other team members to possible communicable diseases is not ok anymore, thus the culture within shifts might have changed. Infection control and prevention has transformed from peripheral concern into a central priority, which can be seen in initiatives coming from the employees. It seems like people are more aware about hand hygiene and public health risks.

No reviews of organizational performance have been conducted in the department. Communications and crisis communications are not part of any big rescue exercise. Seems like there was a quick return to new normal. When the future preparedness was discussed, it seemed foreign to the informants. Some systems in material management proved also outdated and it was hoped that a substitute could be found.

Organizations learned valuable lessons in preparedness, but maintaining this can be challenging due to resources and planning constraints. There is more collaboration between organizations and even different countries. Now there are more plans ready and tried for the next pandemic. Innovations were made during the pandemic: supervisor shift changes are graduated, Teams-meetings have become routine, and new equipment taken into use.

## 5 Discussion

Despite the challenges the HCRD successfully maintained EMS services throughout the pandemic. This demonstrates organizational resilience and adaptability, which ultimately mean the resilience and adaptability of the humans within the organization as it can be understood as socio-technical combinations of people working within systems (Griffith 2023, 142-143). The systems present at the HCRD supported the immediate leaders and the employees in their daily operations well. Much work was needed to adapt and fit the measures accordingly for the department, but organizational collaboration supported this effort enough.

The results align with Jaques' Relational Model of Crisis Management, showing that the pre-crisis preparedness influences response effectiveness but requires real-time adaptation done repeatedly. Griffith's Sequence of Reliability highlighted how systemic support enhances human performance, though some gaps in organizational cohesion persisted.

The basic work changes relatively little in rescue services and emergency medical services regardless of the environment and circumstances. This means that the professionals have

plenty of practice for the organization's core function even during the normalcy. The standard protocols might just need to be adjusted according to different situations.

The mandatory level of fitness in rescue operations forms a basis for individual's resilience and should be maintained. There are also schemes concerning full-time paramedics and EMTs (FIOH n.d.) and it might be beneficial to consider setting a certain required level of physical capability for front line work in the EMS.

The findings show that adaptive leadership is essential in a crisis and for example the leadership styles described by Goleman (2000) and Coleman (2023) are tools to be used depending on the situation. Immediate leaders would likely benefit from continuous training in crisis leadership and everyday leadership. The capabilities to act in a crisis should be strongly based on everyday actions and competences as it ensures practice and familiarity with the substance, which reduces mental strain. Mental resilience should be a priority and burnout risk could be mitigated by applying the existing methods of defusing and debriefing in combination with the workload management strategies described by FIOH (2024).

Crisis communication strategies were present in this crisis but might be improved by focusing on clear and digestible information flow, which prevents information fatigue and maintains compliance with evolving guidelines. The workload of certain people within communications grew significantly as there was a great amount of manual labor involved in the production of COVID-19 briefings.

Minimizing the excess manual work involved in communications and contact tracing would free resources in a crisis. It was suggested that special task units should be considered for these positions, as the gathered routine and experience might make the work more fluent. In decision making, this kind of Team B could also share additional thinking and guidance through brainstorming (Leonard, Howitt & Giles 2020). The department has a lot of internal competence among the employees, which could be identified and used in different situations.

The organization implemented the previously mentioned "ideas have ranks, not people" - approach and it enabled innovations from the bottom up or any which way (Leonard, Howitt & Giles 2020). Some stations implemented staggered shift changes to review the latest updates and ensure smooth transitions. This became an organizational practice later. This type of innovation from scarcity should be emphasized (Välikangas 2010).

Targeted nudging communication strategies might help getting the message through to the employees as meant by the supervisors as nudging according to Thaler and Sunstein is defined as "any aspect of the choice architecture that alters people's behavior in a predictable way

without forbidding any options or significantly changing their economic incentives” (Giroux et al. 2021). Now the distributed guideline stickers were left in place for a long time, which means that people lose interest, and it is possible that their effectiveness is diminished over time.

Common grounds for infection prevention and control can be found from CBRNE-practices and the Clean Cab system for the immediate leaders. This could be utilized in future more as new stations are being designed. Emphasis should be on the infrastructure, which would help with the implementation of control measures. For example, a clear one-way flow of processes from dirty to clean when cleaning units. The CBRNE training was focused on single instances, and the possibility of long-term incident was excluded from practice. This may indicate that the higher-level planning has not fully reached the grassroot level of organizations.

Cultural change is also justified and worth promoting, as it can affect cleaning practices (WHO 2023a, 168). It can be assumed that people working within the EMS have differing views about IPC-practices such as, for example, wrist watches which hinder effective disinfection when using alcohol based handrubs, can still be seen used by employees when working in ambulances.

The leadership during the pandemic required adaptability, clear communication and resilience as the pressures of team management and responding to unprecedented challenges underscored the importance of leadership skills and institutional support. This support was found from the City of Helsinki. It had a significant role in the successful response to pandemic.

Some key leaders seemed to be unable to delegate their work, and this poses a threat to resilience in future crises. The organization has clear role assignments concerning normal daily activities, but the assignments in a severe crisis or state of emergency can remain vague and need to be clarified and practiced. Team resilience can be built by using the FIOH’s guidelines about workload control or for example by Ferrazzi and Morken’s (2022) three practices of collaboration, care and support within the team, and collective responsibility for the team’s energy.

The organization had to mitigate the effects of the pandemic by forming bubbles between departments and station lockdowns. This seemed to cut cooperation between the paramedic supervisors and fire officers. The established COVID-19 hotline acted as a substitute channel of cooperation between the employees. The regular COVID-19 meetings among other workforce managerial tasks were assigned for the fire officers, but the technical implementation of briefings was not a clear success. Effective organizational performance

requires fostering inclusivity and collaboration across these siloed groups while maintaining operational effectiveness.

Inclusiveness and response about work performance of full-time paramedics, proved problematic by Lankinen (2021), might be enhanced by using the in-house educated deputy rescue sub-officers who work in EMS as a contact person between the immediate leader and the full-time paramedic.

In general, an in-depth study focusing on the cultures within the department would also enlighten how different people see and interpret different things. This could help even out some discrepancies within everyday work life as there are several views about the work and purpose of a rescue and emergency medical service between individuals and organizational positions.

Overall, the effectiveness and operations in general were not assessed after the crisis and this hinders learning from this exceptional period. Usage of After-Action Review, see Figure 10, or other scalable structured methods of review would likely help the HCRD to become more adaptable and benefit from iterative learning to adjust strategies and tactics as challenges evolve. It would be important to address the five common questions in an AAR: “What happened during the response and what was supposed to happen?”, “Why did it happen?”, “What can be learned?”, “What should change?”, “Have changes taken place?” (ECDC 2023).

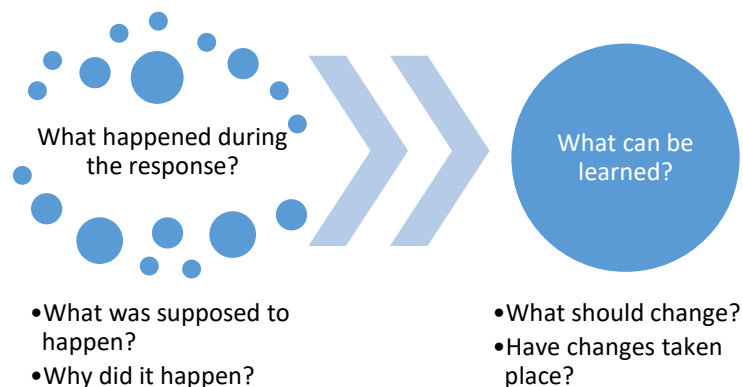


Figure 10: After-Action Review's common questions (ECDC 2023)

Further research is needed on how the prolonged crisis can be adapted to and mitigated, for example by assessing whether the key-personnel worked in a suitable way with appropriate responsibilities, as effective leadership and management are irreplaceable actions in crises (Järvelä 2022). Besides technical and operative knowledge, it is necessary to learn to

understand the human factors from different levels of society, starting from the individual and the characters of work, forming a description of interactions on organizational system level (Kuisma et al. 2022, 911). Interesting questions to address would also be: Is there an optimal size of a rescue department and where is the sweet spot for personal connection to mission, and nimbleness in decision making as an organization? (Axelsson 2025).

As the United States of America has once again started the resignation process from the WHO, and being a substantial financial contributor with 18% stake, this will surely have effect on future global disease tracing and pandemic mitigation capabilities meaning, that other members must do more (WHO 2025). Global challenges like pandemic or climate change cannot be resolved by individuals, but by equally implemented global efforts. Hopefully this study creates some base for future development of knowledge-based crisis preparedness and mitigation for the Helsinki City Rescue Department with a glocal, global and local perspective.

The methods used provided a clear picture of the effects of COVID-19 on immediate leaders. The interviews proved informative, although exhaustive considering research resources. As a researcher, who also works in the department, I certainly have some presumptions and biases, which might affect the objectivity of this study. The results are validated with triangulation from multiple sources of evidence and for the protection of informant anonymity, no excerpts were written as the risk of exposure is significant when informants are few in numbers and know each other well.

The method and strategy proved arduous but educative for me and personally I learned a lot during this thesis process. This study helps to understand the internal cultures and ways of interaction within the rescue services and EMS and establishes a baseline for future research. Validity, the level of actual reflection of this study to the reality (Bell & Waters 2018, 316), and reliability, the stable and consistent result produced by the method (Bell & Waters 2018, 313), were adequate as the data was triangulated and the informants started to produce similar answers during the interview process while the research diary and critical readers guided me forward in this process. Nevertheless, the final responsibility lies within me as the sole author of this report.

Unfortunately, the interviews could not be saved for later research use as the contract made concerning this research demands that no other material besides the report is to be archived. The transcripts might have benefitted future research, especially if they would have been made in detail and thus enabling other scopes of research (Hyvärinen, Nikander & Ruusuvoori 2017, 413-414).

Results are generalizable within the context of this research but can hopefully show some reference when compared to similar organizations operating in or preparing for a crisis. It would be beneficial to further study how leadership is performed in these hierarchical organizations in which the authority is commonly gained through years of service by climbing the ranks (Ruotsalainen 2015, 59). The spread of a rescue department as an organization across the area it operates on creates possibilities for internal cultures to evolve within the organizational culture and these individual cultures can have major effect on the overall performance of an organization.

The final responsibility about conclusions made and the proper use of this research method is on me. There is no way this research could ever cover every detail about the immediate leadership in a crisis, but I am certain that to a degree this has explored this aspect of crisis management so that a baseline for future research and development can be established.

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ChatGPT4o has been used to edit this report.

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## Appendix 1: Information about the study and informed consent form



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University of Applied Sciences

**Tietoa tutkimuksesta,  
sekä suostumuslomake**

65 (68)

Anssi Lindqvist

Syyskuu 2024

### Tietoa tutkimuksesta

#### *Lähijohtaminen Helsingin kaupungin pelastuslaitoksella COVID-19-pandemian aikana (Immediate leadership in Helsinki City Rescue Department during the Covid-19 pandemic)*

Olen palomies-ensihoitaja, YAMK-opiskelija Anssi Lindqvist ja osana opintojani (*Laurea UAS, Master's Degree Programme in Global Health and Crisis Management*) toteutan opinnäytetyöni case-tutkimuksena Helsingin kaupungin pelastuslaitoksen operatiivisten palveluiden lähijohtamisesta koronapandemian ajalta.

Tarkoituksena on kartoittaa kokemuksia lähijohtamisesta poikkeuksellisen kriisin aikana tilastoihin ja jo olemassa oleviin materiaaleihin pohjautuen sekä haastatteluilla, jotka toteutetaan etäyhteydellä suomeksi työaikojen puitteissa. Haastattelun kohderyhmänä ovat paloiesimiehet ja ensihoitomestarit, jotka ovat työskennelleet johtotehtävissä lähiesihenkilönä pandemia-aikana.

Erityistä valmistautumista haastatteluun ei tarvita, joskin rauhallinen paikka ja noin 45 minuuttia aikaa tulisi varata haastattelutilannetta varten. Haastattelukutsut lähetetään toimenkuvien perusteella - etenkin henkilöt, jotka saivat erityisiä vastuutehtäviä pandemia-aikana ovat keskiössä. Tutkimuksessa hyödynnetään lumipallo-otantaa, jolloin tiedonhaku etenee avainhenkilöstä toiseen.

Haastattelut litteroidaan ja data abstrahoidaan ennen raportointia, joten yksittäisiä henkilöitä ei ole tunnistettavissa. Raportoinnissa noudatetaan Chatham House Rule -sääntöä, jonka mukaan on sopivaa käyttää esimerkiksi tapaamisissa saatua tietoa, mutta pidättäytyä paljastamasta puhujan identiteettiä tai kytköksiä - ”Jaa saamasi informaatio, mutta älä paljasta sen kertojaa”. Tietoja säilytetään vain opinnäytetyön tekemisen ajan suojatussa tietojärjestelmässä ja ne tuhoetaan, kun raportti on julkaistu. Yksilöllä on oikeus omiin tietoihinsa GDPR-asetuksen mukaisesti.

Tutkimus tuottaa tietoa lähijohtamisen nykytilasta poikkeuksellisissa olosuhteissa, sekä hyvistä käytänteistä organisaatioissa tulevien pandemioiden varalta sekä jatkotutkimusten tai kehitystöiden pohjiksi. Raportti kirjoitetaan englanniksi tutkintokielen mukaisesti ja julkaistaan Theseus-palvelussa. Lisätietoja tutkimuksesta on saatavilla pyydettäessä.

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## Suostumus tutkimushaastatteluun osallistumisesta

*Lähijohtaminen Helsingin kaupungin pelastuslaitoksella COVID-19-pandemian aikana (Immediate leadership in Helsinki City Rescue Department during the Covid-19 pandemic)*

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Minua on pyydetty osallistumaan yllä mainittuun YAMK-opinnäytetyöhön, jonka tarkoituksena on tutkia pelastuslaitoksen lähiesihenkilöiden kokemuksia koronapandemian ajalta aikaväliltä maaliskuu 2020 - toukokuu 2023. Osana case-tutkimusta haastatellaan kyseisenä ajankohtana lähiesihenkilönä työskennelleitä esihenkilöitä operatiivisista palveluista sekä ensihoidon että pelastustoiminnan puolelta.

Olen lukenut ja ymmärtänyt saamani tutkimustiedotteen ja suostun sen mukaiseen tutkimukseen. Olen saanut tutkijalta riittävästi tietoa tutkimuksesta ja sen yhteydessä suoritettavasta tiedonkeruusta, käsittelystä ja luovuttamisesta sekä tutkimuksen tarkoituksesta.

Minulla on ollut riittävästi aikaa harkita tutkimukseen osallistumistani, eikä minua ole painostettu tai houkuteltu osallistumaan. Tiedän, että tietojani käsitellään luottamuksellisesti ja ettei niitä luovuteta sivullisille. Kerätty materiaali säilytetään suojatuissa järjestelmissä tutkimuksen toteutuksen ajan ja se tuhotaan, kun työ on julkistettu Thesesus-palvelussa.

Ymmärrän, että osallistumiseni on vapaaehtoista ja tiedän oikeuteni keskeyttää osallistumiseni missä tahansa vaiheessa prosessia. Peruuttamiseen mennessä kerättyä tietoa voidaan käyttää osana tutkimusaineistoa. Tiedän, ettei tutkimukseen osallistumisesta makseta korvausta mahdollisista kuluista tai haitoista. Haastattelut pyritään toteuttamaan työaikana Teams-sovelluksen avulla ja yhden haastattelun kesto on noin 45 minuuttia.

Allekirjoituksellani vahvistan osallistumiseni tähän tutkimukseen

Tutkittavan allekirjoitus ja nimen selvennys Päiväys

Suostumuksen vastaanottaja Päiväys

Alkuperäinen asiakirja arkistoidaan ja kopio suostumuksesta annetaan tutkittavalle.

## Appendix 2: Structure of the thematic interview

1. Taustatiedot (Background)
  - a. Kuinka olet saavuttanut nykyisen työtehtäväsi (lähi)esihenkilönä?
  - b. Millainen on koulutustaustasi?
  - c. Mitä päivittäinen työnkuvasi pitää sisällään?
  - d. Miten kuvailisit johtamistapojasi?
  - e. Kuinka kuvailisit ryhmähenkeä vuorossasi/ryhmässäsi?
  - f. Millaiseksi koet henkilöstön (pelastajat ja ensihoitajat) johtamisen?
  - g. Millaiseksi koet osaamisesi CBRNE-tilanteiden osalta?
  - h. Mitä ymmärrät infektion torjunnalla ja aseptiikalla?
  - i. Miten koet puhtas paloasema -ajattelun ja toimintamallit?
2. Koronapandemia (COVID-19 pandemic, March 2020 - May 2023)
  - a. Millaiselta koronapandemia tuntui ja kuinka se vaikutti työyhteisöön?
    - i. Onko se herättänyt keskustelua esimerkiksi työvuorossa?
  - b. Tuliko normaaliin työnkuvaasi muutoksia sen aikana?
    - i. Oliko muutoksilla vaikutusta normaaliin työhön?
  - c. Mistä sait tietoa koronaviruksesta pandemia-aikana?
    - i. Miten kuvailisit viestintää?
    - ii. Syntyikö näkemuseroja?
    - iii. Miten koit määrättyt suojaustoimenpiteet?
    - iv. Kuinka tieto jaettiin eteenpäin henkilöstölle?
  - d. Saitko tukea työhösi pandemia-aikana?
  - e. Nousiko henkilöstöstä erityisiä tarpeita tai huolia kyseisenä aikana?
  - f. Kuinka työskentely sujui poikkeuksellisissa oloissa?
    - i. Infektioiden torjunta ja aseptiikka käytännössä?
    - ii. Miten näet suorituksen organisaatiotasolla?
      1. Työnjaon selkeys?
      2. Viestintä ja koulutus?
  - g. Millaiseen normaaliin olemme palanneet?
    - i. Syntyikö hyviä käytänteitä, joita edelleen käytetään?
3. Resilienssistä ja työkuormituksen hallinnasta (Resilience and workload management)
  - a. Miten koit työkuorman pandemiassa?
  - b. Syntyikö tarvetta erityisjärjestelyille?
  - c. Pystyitkö palautumaan työvuorojen välissä?
  - d. Koitko osaamisesi riittäväksi tilanteessa johtamiseen?
  - e. *Mitä ymmärrät resilienssillä?*
    - i. *Organisaatiotaso?*
    - ii. *Yksilötaso?*
  - f. Mikä auttoi sinua jaksamaan läpi poikkeuksellisten olojen?
4. Tulevaisuuden tarpeista (Future needs)
  - a. Millaiseksi näet tulevaisuuden riskit pandemioihin liittyen?
    - i. Tunnetko varautumisen perusteita?
5. Muuta aiheeseen liittyvää (Other relevant comments)

### Appendix 3: Data Management Plan

This research used the following data sources: documentation (administrative documents, formal studies and evaluations, news clippings and articles), archival records (Teams meeting records, minutes), interviews, direct observations, physical artifacts (guideline stickers). The documentation was retrieved from the archives and the internal storage of the Helsinki City Rescue Department. Original copies were kept separate, and it is possible that some pre-existing material had been deleted from these places before this study began. Some data was from public sources. The data was systematically documented in tables, and a research diary was kept during the process.

The informants received a general description of the study beforehand and with the information letter an informed consent form was provided. The interviewing was done via Teams-meeting, and the interviews were transcribed by me to a general level in Finnish, attendees anonymized during the process, and written analysis has a traceable version history. The analyzed material contained no personal data and was provided to the author by the stakeholders of this research, if not publicly available.

Security and integrity of the data were ensured via usage of organizational cloud services with two-step authentication. This kept the data in a controlled environment and prevented unauthorized access. Publicly available documents were downloaded to a secure personal computer for further use. This ensured the consistency of the data. No ethical issues related to the data, or the thesis project, were identified as the anonymity of the informants, and the data security was maintained throughout the process. The research was conducted according to the ethical guidelines. Intellectual property and copyright laws were respected and if needed permission for data use was obtained. All sources were properly cited.

All possible temporary copies and data related to this thesis except the published report are deleted upon completion of this study. The use of the data analyzed is possible through this report, but direct document access is not possible due to a contract made with the stakeholder.