The evaluation of the data content selection process for Finnish electronic Patient Care Record in the Emergency Medical Services

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The Finnish Ministry of Social Affairs and Health has advanced the national development of the Finnish electronic Patient Care Record in the Emergency Medical Services. The development has been going on for some years, the data content and the requirements for the electronic Patient Care Record have been formed as a result. On this evaluation the history behind the need for the national electronic Patient Care Record in Emergency Medical Service is described. One part of the advancement of the electronic Patient Care Record was the data content selection. This evaluation examined the process of the data content selection for the Finnish electronic Patient Care Record in Emergency Medical Service.

The digitalisation has offered new possibilities for the healthcare and as a part of that for the Emergency Medical Services. It has helped to develop information systems, communication methods and patient care pathways. The advancement of the information-based management has reached national and regional level reporting and decision making. Understanding of the information system solutions and the data has increased and they are seen as a possibility to assist decision making with accurate and real time information. This knowledge of the state of the services can be used to improve the quality of them. For these reasons, the need for a national solution to utilise and collect data from the Emergency Medical Services has been recognized. This has led to the development of the national electronic Patient Care Record in Emergency Medical Services. The electronic Patient Care Record will advance the utilisation of the data collection and trough that it offers significant opportunities to improve the availability and quality of the care, management and operational aspect of the services. The data content of the electronic Patient Care Record aims to answer for these needs set on a national and operational level.

The evaluation method used on this evaluation was Program Theory-driven Evaluation Science. The evaluator formed the evaluation questions with the help of the stakeholders and answered to them based on the data sources available of the data content selection process. As a result, the evaluator described the timeline of the data content selection process on written and visual form. The actual data content selection process was described by writing and by using visualization in a form of a logic model. Lastly the ready data content was presented and the suggestion for the future processes were made based on the results.

The evaluation process and the assessment indicated that it would be beneficiary to use more profound documenting methods of the processes similar. The assesment suggests that there is a need for more deeper evaluation to be made, to recognize the subcategories of the activities during the process. This kind of evaluation would offer more information about national level project models and enable better and more efficient work methods in the future.

Keywords: Emergency Medical Services, electronic Patient Care Record, Finland, evaluation, Data Content

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1 Introduction

The Finnish Emergency Medical Service (EMS) on its current form is relatively young, even though the roots of the transportation of the patient to the hospital from the scene of the emergency has longer history. The development of the EMS has been rapid, especially on the 21st century. The development has been affected by the legislation, advancement of the medical care possibilities, advancement of the infrastructure and the digitalisation. Modern day EMS is a crucial safety and health care operator. (Ilkka 2016; Kurola et al. 2016.)

The digitalisation has offered new possibilities for the healthcare in general and for EMS. It has been enabling the improvements and examination of care pathways, communication methods and the information systems. The advancement of the information-based management has reached national and regional level reporting and decision making. Understanding of the data and information system solutions has increased and it is seen as a possibility to assist decision making with accurate and real time information. This doesn´t only offer solutions for the decision making but improves the quality of the services and gives important knowledge of the state of the services. (Ilkka 2016; Kurola et al. 2016.)

For this reason, the need for a national solution to utilise and collect data from the EMS has been recognized. The result of this need is the national electronic Patient Care Record in EMS. This will advance the utilisation of the data collected from the services and offer significant opportunities to built utilised nationwide EMS model which will serve the patients by improving the care, management, operations and availability of the care. It also opens possibilities to national and international benchmarking. (Ilkka 2016; Kurola et al. 2016.)

This development has been affected also advancement of other safety and emergency officials` information systems. They integrate with the electronic Patient Care Record (ePCR) in EMS and support the information flow from official to another. This enables the assessment of the patient care path from the point of contact to the definitive care. Part of the development of ePCR in EMS has also been the national Kanta services which are enabling the integration of ePCR as a part of the national Patient Data Repository. With this integration, it is possible to support the information flow between different health care units. (Ilkka 2016; Kurola et al. 2016.)

The process of building the national ePCR in EMS and implementation of it, has been supported by the Finnish Ministry of Social Affairs and Health. Since the ePCR in EMS hasn´t existed before, has the development process been unique. The data content for the ePCR was developed in collaboration with operational level experts to ensure that it serves the needs of the operational EMS. For the basis of the data content was chosen to be internationally used American EMS data content, NEMSIS. This data content was chosen to support the goal for

unified data content, enable the data collection and make the content user-friendly. International standard also offered opportunities for international benchmarking.

Since the process of the data content selection for the Finnish ePCR in EMS was done first time in Finnish history, it was also a new as a process. The process itself offers information about the work methods, definition of the data content and the activities done to achieve the data content that can be implemented on the operational level in a form of ePCR.

This evaluation opens the history behind the need for the ePCR in EMS as a national solution. It also examines the process of the data content selection for the Finnish ePCR in EMS. The evaluation process was done by using program driven evaluation science (PTdES) by forming the evaluation questions with the help of the stakeholders and answering to them based on the data sources available of the process. As a result of this evaluation the timeline of the data content selection process was described visually and in written, the data content selection process was described by writing and using visualization of a logic model. Lastly the ready data content is presented and evaluated and the suggestion for the future processes made.

2 The development of the Finnish Emergency Medical Services

The Emergency Medical Services have roots in battlefield medicine. During the first world war there was a need to transport wounded soldiers from the field to the medical care point and if that was not possible, the wounded were treated on the battlefield. This system led to the development of battlefield medicine which slowly transformed to civilian emergency medical care. After the war, the time of industrialization created new demands for the growing cities to organise internal security and medical care. In the early 19th century United States were the first to develop the emergency medical service for the civilians. This was based on the model from the battlefield medicine. The model slowly found its way to Europe, first to Paris and London. (Nyström 2006; Ryynänen, Iirola, Reitala, Pälve & Malmivaara 2008.)

The Emergency Medical Services (EMS) arrived at Scandinavia and to northern Europe in 20th century. Helsinki was the first city in Finland with the EMS services in the early 20th century. Helsinki was rather small city when compared to other capitals in Europe but it´s growth was rapid and the new ways to maintain security and offer medical care were necessary. Before developing the transportation systems to the hospital, the most common way to transport people in need for medical care was by horse carriage or by the foot, mostly depending heavily of how wealthy the person was. In 1903 a board of doctors started preparing the humanistic way of transporting people from home or place of the emergencies to hospitals. After a quest for suitable model for emergency transportation, similar model of the emergency medical care services as used in Stockholm, was chosen. In 1905 Finland had its first emergency medical services and it was executed in the co-operation between the board of healthcare and fire-department. Healthcare having the responsibility of the process and the regulation and the fire-department taking care of the execution. (Nyström 2006; Ryynänen, Iirola et al. 2008.)

Until 1969, the EMS were mostly focused on the transportation of the patient from the emergency setting to hospital and the only treatment offered at the time was first aid. In the 1960´s the actual Emergency Medical Services started to take its current form. The rapid development of the medicine and technology made it possible to treat patients on the emergency scenery and it was noticed to have benefits on treatment of the patients on definitive care. Despite of the advancing practices, the development was not linear. Different treatment methods and medical devices such as defibrillator, breath support, ways of staunching bleeding, fluid therapies and medication slowly became part of the EMS. The evolution of EMS lead to the development of different EMS units. The units offered different levels of treatment; for example, the advanced life support unit was called to the emergency setting if the patient case was assessed as demanding. These units were prepared to give the medical care and treatment to the patient on the scenery of the emergency. However, there was no unified policies for different EMS units or the preparedness of the units, which means,

that the standards of these advanced level life support units varied a lot. (Nyström 2016; Ryynänen, Iirola et al. 2008.)

The most important turn in the development of the Finnish EMS was the Primary Health Care Act 1972. This law decreed that the municipalities were responsible of arranging ambulance service in their area. In the 1970`s was the first time when it was clearly defined trough legislation what the EMS are for and how the emergency care services should be organized in Finland. Many important developments were made at that time. The governing of the ambulance services was defined, the education for the rescue-emergency medical technicians (EMT) was founded and the medical knowledge of the medical doctors was integrated as part of the EMS. Different treatment methods were developed to suit for the EMS. At that time period the emergency response centres were also founded and established. (Nyström 2016; Ryynänen, Iirola et al. 2008.)

Until the year 1989 the EMS were changing, and the development was rapid. Part of the development was creating the risk assessment system for emergency response centres; this unified the policies of dispatching the right authority to the right place at right time. The rescue-EMT`s educational program was advancing as well, for example the students were trained to perform some operations on the field circumstances, which only the doctors were performing before. This was because it was noticed that some medical operations can have lifesaving effects for the patients on the scene of the emergency. During the years 1990-2005 the EMS had more clear organizational foundation and systematic base for the EMS had been established. The organizational foundation created opportunity for the EMS to develop to its current form but also the development of the infrastructure, roads and security were factors contributing on that. (Nyström 2016; Ryynänen, Iirola et al. 2008.)

Technological development has been one of the most important factors when considering the evolution of the emergency medical care. During the 20th century the technology advanced especially in the fields of information and communication technology. The communication technology has made it possible for the emergency service units to communicate more clearly with other authorities, reach the patient faster than before and to communicate and pass information with the physicians, while on the field, in real time. The advancement of the information technology has made it possible to use electronic Patient Care Records on the field circumstances, however, this development has happened mostly on 21st century. (Nyström 2006; Ryynänen, Iirola et al. 2008.)

2.1 The Finnish Emergency Medical Services on the operational level

The Emergency Medical Services (EMS) are part of the healthcare, and it is defined as a medical service offering medical care and treating sudden injuries and illnesses outside of the hospital environment, also by providing transportation to the definitive care. In Finland the healthcare districts are responsible organizing the prehospital care. Healthcare districts can choose how they organize the EMS, meaning that they can carry it out by themselves, in co-operation with rescue department or in co-operation with private service provider. (The Finnish Ministry of Social Affairs and Health 2018.)

According to the Finnish Health Care Act (Terveydenhuoltolaki 29.12.2016/1516) The EMS are responsible of keeping up the preparedness of their own and are required to participate on the preparedness planning of the major accident or other special situation with other authorities and officials. Besides offering medical care and treatment outside of the hospital environment the EMS transfers patients from the hospital unit to another, when the patient needs care and monitoring during the transfer. The EMS are required by the law to direct the patients or other participants involved on the emergency settings to the psychosocial support, if it is needed. The co-operation with other officials is defined the law, meaning that the EMS has to offer help in a mission between authorities, like police, customs or fire and rescue department. (The Finnish Ministry of Social Affairs and Health 2017.)

Ministry of the Social Affairs and Health oversees regulating, observing and development of the EMS on national level. The services are defined by laws, which can be seen on Table 1, and they have to be organized based on the instructions gathered, which are called the service level recommendations. The service level recommendations instruct the healthcare districts to organize their EMS in co-operation with other healthcare emergency services. They define, what kind of services should be offered in healthcare districts, based on the population on the area. The service level should be based on considering the needs of a healthcare district and the care must be organized efficient, adequate and rightfully dimensioned way. All the healthcare districts must make service level decree of their own and they are obligated to report about it. (The Finnish Ministry of Social Affairs and Health 2018.)

Laws affecting of the regulation of Finnish EMS
Asiakastietolaki (165/2012)
Henkilötietolaki/ Personal Data Act (523/1999)
Kiireellisen hoidon perusteista ja päivystyksen erikoisalakohtaisista edellytyksistä (652/2013)
Laki hätäkeskustoiminnasta (692/2010)
Laki julkisen hallinnon turvallisuusverkkotoiminnasta/Act on the Operation of the Governement Security Network (HE 10/2015)
Laki potilaan asemasta ja oikeuksista/ Act on the Status and Rights of the Patients (785/1992)
Laki sosiaali- ja terveydenhuollon asiakastietojen sähköisestä käsittelystä/ Act on the Electronic Processing of Client Data in Healthcare and Social Welfare (255/2015)
Laki Terveyden ja hyvinvoinnin laitoksesta/ Act on the National Institute for Health and Welfare (668/2008)
Lääkelaki/ Medicines Act and Decree (395/1987)
Mielenterveyslaki/Mental Health Act (1116/1990)
Potilasvahinkolaki (585/1986)
Sosiaali- ja terveysministeriön asetus ensihoitopalvelusta (340/2011)
Sosiaali- ja terveysministeriön asetus terveydenhuollon valtakunnallisista tietojärjestelmäpalveluista (165/2012)
Sosiaalihuoltolaki / Social Welfare Act (1301/2014)
Terveydenhuoltolaki / Health Care Act (1326/2010)

Table 1: Laws affecting of the regulation of Finnish EMS (Ilkka 2015). The English translation of the law added, if available (Finlex 2020)

In Finland the guidance and the basis of the EMS is securing equal services in similar sized healthcare districts, this is done by considering the population density in the area. As an example, it is important to take into consideration the time lag of reaching the patient, this should be similar in the areas with the same population density. This is to guarantee that the patients will get equal services compared to the areas similar. The services should be produced in the most efficient way with the personnel available. All this is because the goal of the EMS is to produce the most efficient and equal care possible. (The Finnish Ministry of Social Affairs and Health 2017.)

The healthcare districts are obligated to report publicly after making the service level decree. Report of the implementation must be delivered every quarter. When the service level decree is made, in the process there are requirements to follow and they are included in the reporting; the environment of the EMS, population, age structure, distribution of the population, the risk category, the goals, prediction of the tasks of the EMS, resources available and the description of the management system. The reports are made by collecting the data of the state of the EMS, to ensure the quality, to notice possibly needed

improvements and to support the efficiency of the supervision and the strategic management. (The Finnish Ministry of Social Affairs and Health 2017.)

The EMS structure is levelled and hierarchical. In charge on the operational and administrational level are the head physicians of the emergency medical care on the healthcare district, the head of the emergency medical operations and the field operation managers. Responding system is based on criteria-based dispatching where the emergency response centre makes the risk assessment and sends the units to the emergency scenery based on the assessment. The advanced units are supposed to reach the emergency scenery within 30 minutes. If that is not possible or in the area there is no available units, the first responder unit will be dispatched. The first responder unit is capable of performing emergency first aid until more advanced units will arrive, then the first responders hand over and stay to assist other units if necessary. First responders are capable for providing immediate life-saving care in the event of a medical emergency such as advanced first aid, cardio-pulmonary resuscitation and using automated external defibrillator. Healthcare districts oversee the training and organizing the first responder services. It is common that the first responders are from other emergency services like fire department or police but there are also voluntary fire brigades working as on call responders. (Eastern-Uusimaa Emergency Service Department 2011; Kurola 2001; Ryynänen, Iirola et al. 2008.)

Basic life support units and advanced life support units, both have ability to provide more wider treatments and they can transport the patient to the definitive care. Basic life support units can´t provide invasive medical treatment but they can start treatments with oxygen, in some cases cannulation, cardio-pulmonary resuscitation and use automated external defibrillation. They might have some allowances to provide basic medicine treatments but generally the advanced medical treatment is provided by advanced life support units. The advanced life support units can provide invasive treatments depending of their allowances which are defined by the healthcare districts and the physician in charge of the EMS. Invasive treatments include different medical procedures and providing medicines. Besides this, there are paramedics working as critical care paramedics having advanced education and allowances provided by the healthcare district. Critical care paramedics can provide and perform more advanced procedures in medical emergencies, but their allowances and education vary trough healthcare districts. Besides these units there are physician led emergency medical service units, very often these are air ambulances (FinnHEMS). These units working in the healthcare district areas and there are also phycisian led ground units. These units have unlimited provision of care and are usually accompanied by other units mentioned above. Figure 1 visualizes the risk assessment-based dispatching hierarchy described. (Eastern-Uusimaa Emergency Service Department 2011; Kurola 2001; Ryynänen, Iirola et al. 2008.)

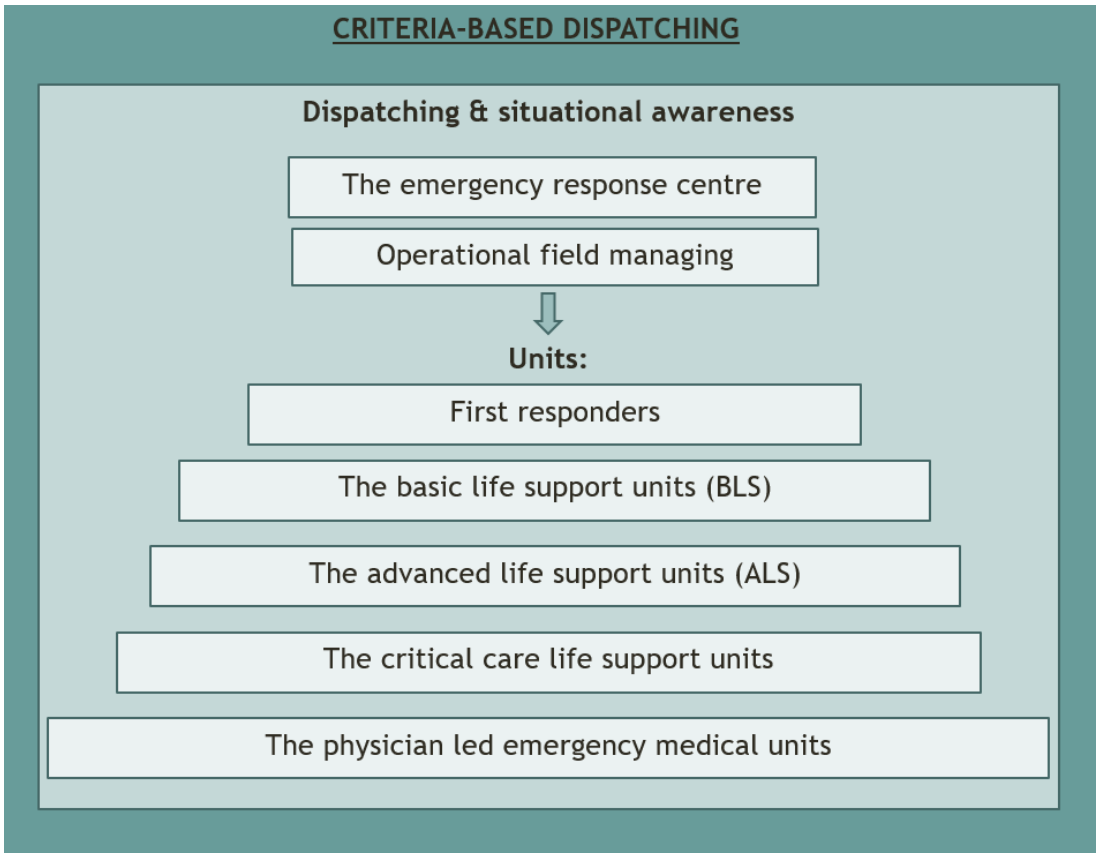


Figure 1: The Finnish emergency medical system on operational level. The picture is modfied from article Ensihoitojärjestelmä- Mikä se on (Kurola 2001)

2.2 The Finnish Emergency Medical Services (EMS) today

The advancement of education, technology and organisational development the emergency medical care as its own unit inside the health care has shaped the EMS to be one of the crucial safety and health care operator in the modern-day society. From only transporting patients from the emergency scene to the hospital, the modern model of the EMS focuses on risk assessment, assessment of the patient's condition and offers emergency medical care. Since 2010 the development of the healthcare and especially the development of different emergency care units has affected on the EMS. Primary health care units are limiting their opening hours and directing the patients to the bigger emergency units on the municipality hospitals. This has affected on the development of the EMS, which is these days more than before focused on advancing the care of the patients who don´t necessarily need emergency care. This means that besides emergency medical care the modern-day EMS units are doing care assessment, non-emergency medical care on the scenery and planning the follow up care. (Ilkka 2016; Kurola et al. 2016.)

The education of the EMS professionals has changed and even though the rescue-EMTs are still educated, there are polytechnic and vocational studies for EMT´s and paramedics. The

advancement shows also in pedagogical methods, the simulation training is part of the studies and more options for further trainings after degree are available. The advancement towards non-emergency medical care shows especially on the education, the polytechnic degree for paramedics used to be solely focused on the emergency patient care but now students are first licensed as nurses and after that as paramedics. (Kurola et al. 2016.)

Big role has on the EMS development has played the advancement of the digitalisation and communication technology. For long the EMS didn´t have national or even regional unified digital systems or protocols and it has influenced the development of the digital solutions in the EMS. In 2010 the Finnish Health Care act (Terveydenhuoltolaki 1326/2010) ordered the healthcare districts to organize the EMS under their governing, uniting the emergency medical care to the strategic goals of the regional social- and healthcare. The healthcare districts are divided in 5 different special responsibility districts, which organize specialised health care services by taking over some of the healthcare districts responsibilities. These special responsibility districts are also responsible of organizing round-the-clock emergency medical services physician. (Ilkka 2016; Kurola et al. 2016; The Finnish Ministry of Social Affairs and Health 2017.)

The Finnish Health Care act and it´s clear decrees about organizing the healthcare led to the development of the field operations managing model on the EMS. Because of the act the emergency medical care field managing operations were unified among the special responsibility districts. The new model was taken in use to make the operational field managing more efficient and unified nationally. Before that the emergency response centre (ERC) was responsible for the operational field management and situational awareness, however, they were not a mandated authority to execute the operations. The Finnish EMS field managing model is regionally organized, the field operations managers are responsible of situational awareness and controlling the available resources accordingly on the area. Efficient use of the resources as well as the decision making, based on real time information, has created a need for development of efficient communication tools. (Ilkka 2016; Kurola et al. 2016.)

Finnish government and authorities have worked together to develop the field managing information system KEJO, which supports the efficient use of the resources available and helps, among other safety and emergency authorities, the EMS field managers to have real time situational awareness. When KEJO was developed the organisational structures had changed in the EMS. The emergency medical care processes were merged within healthcare districts and special responsibility areas, also the the emergency response centre went through a nationwide renewal. The renewal of the emergency response centre took place during the years 2011-2014. The purpose of the renewal was to unify the operational models of the emergency response centres throughout Finland to offer equal and quality services for

the citizens and to authorities. The renewal included reforming the managing models, developing the knowledge of the emergency response centre employees and creating an entity of services which would provide sustainable and accurate response in crisis situations. (Ilkka 2016; Kurola et al. 2016.)

This reform was studied, and the results were published on 2011. In the study was examined the performance of one emergency response centre and the study concluded that the percentage of the high priority calls increased and there was trend when observing the dispatchers´ ability to recognize life-threatening conditions with the standardization of the protocols of new emergency response centre. However, the study also concludes that this cannot be concluded as a definitive answer for the question how the renewal affected on the dispatchers´professional abilities, although the results are encouraging. The emergency response centres also got a new information system for emergency response. The system was integrated to be used in all the centres and it can be used together with the field managing system KEJO. This new information system, ERICA was first taken in use in 2018. (Lindström, Pappinen, Falck, & Castrèn 2011; Kurola et al. 2016.)

These renewals have required the nature of the EMS to evolve. The most important changes like integration of the information systems and managing models have required more collaboration between different authorities than before. These things have changed the nature of information flow, it being easier, equal and higher quality even in the times of crisis. (Ilkka 2016; Kurola et al. 2016.)

2.3 Development of the information-based management and the information systems in the Finnish Emergency Medical Services

From a review made in the data quality assessment on EMS on 2018 it indicates that the data quality and the in the EMS needs more assessment, attention and incestement. The data quality should be something to pay attention to as it offers an understanding of the current state of the services and offers suggestions for the improvements. The data quality assessment can be done in a simple and clear manner and therefore support to assure better quality for the data in the healthcare settings, such as the EMS. The findings of the review indicate the most common way to asses the data in EMS are the accuracy, consistency and the completeness. The data completeness is highly important for the EMS with the accuracy in order to improve the quality of the care and for decision making. Besides the data within the EMS system it is important to recognize the need for the data linkage between different states of the care such as primary and secondary care, which offer more room for the data consistency. This supports the linkage between data sources and helps to advance the quality of the information flow and enhancement of the communication across the organizational levels. However, it should be recognized that the quality of the data is affected by different variables starting from organizational, technical and individual variables. These variables may

affect on the data accessibility and they should be taken into account when designing information systems. (Mazhoufi, Ayatollahi, Khorazani-Zavareh 2018.)

The Ministry of Social Affairs and Health published the National survey of the Finnish Emergency Medical systems. It introduced and evaluated the current models of the Finnish Emergency medical systems. The survey clearly indicated that the current models, data management and collection don't support the need for the information to advance the information-based management. It was stated that there is a need for more uniform data collection methods, developing information-based management methods and the need for solutions to support the development of the EMS in a sustainable and efficient way. (Kurola et al. 2016.)

The figures collected on the survey, clearly show that the expenses of the emergency medical care have raised after the service level decree, when the responsibility of organising the EMS was given to the healthcare districts. The reasons for this are not only the changes on the organizational responsibilities but increased personnel costs as well as the changed role of the EMS. Focus has changed from the transportation of the patients to the treatment of the patients and it also indicates the fact that the EMS now treat patients with less urgent medical issues. On the other hand, the report concluded that there is not enough efficient and uniform data to reliably evaluate the efficiency of the care, clinical pathway of the patient from the EMS to the medical care. This means that the assessment of the current development needs and issues would need more accurate and reliable data. (Kurola et al. 2016.)

The information-based management or knowledge management are defined in a variety of ways in different sources. In general, it is described as a way to manage the systems and processes creating, organizing, distributing, using and storing the information. Information-based management is control over the information lifecycle. Lifecycle consists of the usage of the information being created and stored. There are various of models of information processes as well as the perspectives of the information management, as an the personal and organizational. The organizational model views the information-based management as process which contains all the processes of the information available. The organization uses this information to achieve and better themselves towards the strategic objectives. This means also using information to better the existing products and services, creating new services based on the available information as well as reduce uncertainty and risks on manage the costs. When reflecting the information-based management on organisational level on the Finnish EMS systems it can be observed that there is lack of uniform sources of data documenting and collecting of the information to evaluate the efficiency, costs and organizational information. This has partially been affected by the fact that there has not been a nationwide uniform information system for observing, for example the information

about the dispatching the units or collecting the information of the patient care from the dispatching to the definitive place of care. The need for accurate, on time information is high when the goal is to create cost effective, efficient processes which serve the patients and population the most secure and efficient way. This also enables of the building of patient-centred care processes and development of more uniform nationwide procedures and care pathways. (Detlor 2010; Kurola et al. 2016.)

To support this for some years the Finnish Social Affairs and Health ministry has been advancing the national electronical patient care system (ePCR) for emergency care services since in Finland hasn´t yet existed national electronical patient care system for emergency care services. The development of the ePCR has been part of development of field systems KEJO and ERICA. The goal of these two systems has been to support the need to create information and field systems offering tools for better communication and for standardization of the data enabling, collection and analysis of the EMS operations and EMS variables of the EMS operations. The collection and comparison of the data enables the earlier mentioned better service and information-based management of the future operations and the EMS care protocols. (Ilkka 2016; Ilkka 2015.)

2.4 The current situation of the information-based management in Finnish Emergency Medical systems

The information-based management is only reliable if the decisions are made based on the accurate, reliable and effective information. One key factor in the whole process is to identify the requirements for the information and match them to the delivery of the information. To make that possible the information systems must support efficient use and distribution of information, so it benefits the organizational decision making. Effectiveness is current term in health care organizations. Effective evaluation of the processes can help to make decisions when there is reliable information about the processes, effectiveness of the treatment and care, costs and goal-orientation. However, one of the things enabling the efficiency evaluation and usage of the information is because the information networks are often shattered, not user friendly, don´t offer enough information and there is no nationwide solutions or guidelines to support the efficient way of using the information. This reflects of the information-based management and decision making also in the EMS, the data management and therefore information or data usage has been described to be unreliable, insufficient and it is lacking the possibility for the uniform data collections. One of the key reasons for this is the lack of the national data management trough national data repository. (Detlor 2010; Ilkka 2016; Simonen 2012.)

Not only the whole process of information-based decision making but the secondary use of effective knowledge in decision making can be improved by supporting the quality,

accessibility and availability of the information. This means that by enabling the accessibility and improvement of the quality of the information at hand supports information-based decision-making process in the health care. Rational information-based decision making should be supported by the knowledge available from different sources. There are important factors to be considered such as identifying the needs of the information, addressing those needs, storing the information, designing the ways of using the information, distributing it and the most importantly use the information. The valid information and the methods to use it don´t always offer the easy solution when it comes to the decision making but it offers a very good foundation to make rational decisions based on real time information. (Detlor 2010; Simonen 2012.)

The recognizable need for more uniform method gathering of the information was recognized trough the National survey of the Finnish Emergency Medical systems. The information collected on the survey was not reliable enough to give full picture of the state and the efficiency of the EMS in Finland because the information available was not consistent, and the data sources were fractured and incoherent. This proves that for national guidance, administrative level decision making and the advancement of the EMS services it is crucial to gain more unified and reliable information of the operations. Different needs for development were identified, such as gaining clear, unified information from emergency response centre about dispatching in order to develop and analyse the operations as well as replacing the current patient record form used in the EMS with more structural and electronic formal directed to the patient care. The patient record in the EMS used now is not intended as a patient record but used as a Social Insurance Institution form (SV210) for the patient to gain coverage of the care. This current form doesn't advance the information flow between different health care professionals and it is not serving the needs to patient treatment documenting in EMS. The SV210 form doesn´t make the communication between the EMS and emergency units possible and in its current form it doesn´t offer clear and unified information of the condition of the patient and it is not integrated as a part of the electronic Patient Care Records in hospitals. (Kurola et al. 2016.)

The Finnish Health Care act and especially its decree about the EMS indicates that the healthcare districts are responsible of gathering, distributing and processing the available information about the EMS in the area. Healthcare districts are responsible for offering the current statistics and reports not only for the management of the EMS and the healthcare districts but also to the governmental organs such as regional state administrative agencies and the Finnish Institute for Health and Welfare. Beside the legislation The Finnish Ministry of Social Affairs and Health has set strategic program "Sote-tieto hyötykäyttöön 2020" to establish more efficient and processed way to benefit from the information available on social- and healthcare. This includes the health and wellbeing information produced by the

patients, as it also discusses of effective way to use of healthcare and patient data available and especially usage of it as a foundation of the information-base management. The goal of this strategic program is to create national solutions for the information gathered from different variables of the healthcare being usable on the national level. The information flow and data would be available not only for certain districts or municipalities but for the healthcare management, national level decision makers as well as for the professionals working on the field. This would support another strategic goal to improve and offer more equal care for patients` despite of their residence. To achieve that it is required to develop national solutions which will gather, process and storage the information available for the use of social- and health care so that it enables the usage of the data as a part of the decision-making process. The current situation doesn´t support these goals because there isn´t uniform data sources on the national level to gather the data and all the healthcare districts have different practises to collect and process information. From these needs the national organs with the support of the Ministry of Social Affairs and Health have developed the national solutions such as uniform information systems as well as national patient data repository as part of Kanta services. (Ilkka 2016; The Finnish Ministry of Social Affairs and Health 2014.)

2.4.1 ERICA and KEJO – Information systems for emergency and safety officials

The Emergency Response Centre Information System (ERICA) is Finnish national emergency response centre system and it is developed to enable the communication between the safety and emergency officials. In Finland there is 6 emergency response centres and the goal is to implement ERICA in all of them. The first place where ERICA was implemented was in Oulu in 29.11.2018. KEJO is Finnish field information system used by all the officials including stakeholders like police, customs, the EMS services and fire and safety department. KEJO is owned by the police forces. It includes as map services, location services, information and reporting services. (Ilkka 2016.)

From the EMS point of view the main objective of KEJO and ERICA has been to utilise the data gathering and cover the entire chain of information of the patient care path from the dispatch to the definitive treatment of the patient. The data coverage doesn´t only enable the better care of the patient but it offers also utilised information about the effectiveness of the care, the protocols and effectiveness of care pathway of the patient from point of the contact to the definitive care. Before mentioned assessments haven´t been possible because there hasn´t been enough reliable and standardized data and ways to collect them in uniform way. There hasn´t been real time, reliable knowledge about the effectiveness of the EMS or the whole service chain or care pathways, especially on the national level. Enabling the better care for the patient trough information flow between different instances is also supported by the operational level study made in 2015. The study concluded that the

operational level professionals as the EMT´s and the paramedics should have also availability to view patients` information to be able to make affective and accurate decisions of the care of the patient. Evidence of this study indicated that the patients got most appropriate care when the operational professionals had the access to the up to date health records of the patient. KEJO will bring together two ways of to utilise the data; The national ePCR and the Patient Data Repository of Kanta services enables the EMS to get Patient Data regardless of the location of the patient´s primary hospital district or residence. Development of the national data repository has required collaboration and active measures from several stakeholders such as the Ministry of Social Affairs and Health, the Finnish Institute for Health and Welfare and the Social Insurance Institution of Finland, the National Police Board and the Emergency Response Centre Administration. (Ilkka 2016; Zorab, Robinson, & Endacott 2015.)

2.4.2. The National Patient Data Repository and electronic Patient Care Record (ePCR) in the Finnish EMS

In Finland the need for national information solutions for healthcare has culminated in development on national health and social care treasure, Kanta. Kanta offers digital services for health care and social welfare, these services benefit the social and health care professionals, service providers and citizens. Kanta has multiple digital services such as My Kanta Pages where citizens can view their own medical records, pharmaceutical service where all the prescriptions are issued digitally and to support that the pharmaceutical database where all the necessary information of the medicine can be found. Kanta services have also the Patient Data Repository with archives of old patient data. These services can be accessed all around Finland and it unifies the national usage and access to the data for professionals and citizens. (Kanta 2020.)

The Patient Data Repository is part of Kanta services, it is a service for health care professionals to access patient data and it serves as a long-term storage for the patient information. The Patient Data Repository has central role on passing information between different healthcare services providers as it enables the usage of patient information across Finland. Citizens can see their own data created in health care units by using My Kanta service. All the data is archived in uniform format, so the data is transferable between different information systems of different operational units. (Kanta 2020.)

The national electronic Patient Care Record (ePCR) for the EMS is a patient record document recorded on its own view on the National Patient Data Repository. The recorded patient record document view (ENSIH) is structured and its operating principles comply with general structure of medical records. This is significant because to produce uniform and utilise the produced information, it is necessary to have structured data. To create structural form which serves both professionals and the service providers has the ePCR data structure been

based on the American NEMSIS data content. NEMSIS is a shorten from The National Emergency Medical Services Information system, it is nationally used database in United states that and it used for storing the EMS data all around USA and its territories. Its goal is to improve the understanding and support EMS data collection and analysis with stakeholders in the EMS community. NEMSIS provides tools for the EMS data utilization and trough that effective and improved patient care. NEMSIS can be used from the emergency response centre to the patient´s arrival to the definitive care and it standardizes, aggregates and utilizes the information collected. It is original product of National Highway Traffic Safety Administration (NHTSA) of United States and developed in collaboration with the University of Utah. It uses a common computer language XML which is shorten from Extensible Markup language. The usage of NEMSIS data content has been chosen in a purpose to harmonise the content of the national ePCR in Finnish EMS. The data contents and definitions of the Finnish template have been modified and limited from the original NEMSIS data content to serve the Finnish EMS needs. The NEMSIS is licence free and the permit to adapt the content for Finnish needs has been given. The national development of the Finnish ePCR in EMS is part of the larger project of which goal is to harmonise all the data contents of the EMS in the Nordic countries. (Ilkka & Räty 2017; NEMSIS 2020.)

The ePCR in EMS will be introduced as a part of KEJO and the ePCR data content is the responsibility of the Finnish Institute of Health and Welfare. The requirements, functionalities and the data content are published, the data content can be found from the national code service of The Finnish Institute of Health and Welfare (THL). The dispatching information appearing in the ePCR in EMS will be brought straight from the information system of the emergency response centre, ERICA and the professional view and the recording of the patient information will be done by using KEJO. KEJO and the ePCR in EMS implementation will be done by Patria Aviation, Portalify, Codea which together are called as the PPC group. The ePCR in EMS will have data interfaces with ERICA and The Patient Data Repository. (Ilkka & Räty 2017; Ilkka 2015.) Figure 2 clarifies the integrations and information flow between different inormation systems.

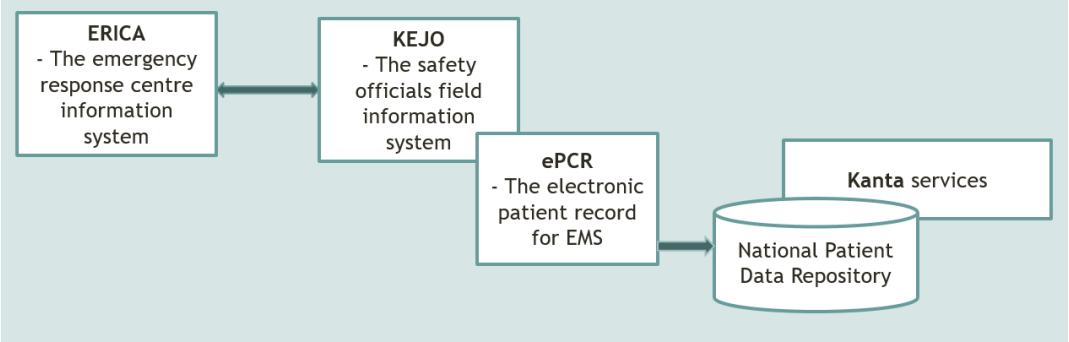


Figure 2: Components and information systems interfacing with ePCR in EMS

2.5 The judgement for the evaluation of data content selection process of the electronic Patient Care Record (ePCR) in EMS

As it can be seen from the chapters above, the major integrations and advancements of KEJO and ERICA have been developed and implemented trough different national organs. The ePCR in EMS will be integrated within KEJO and the patient information will be included in National Patient Data Repository in Kanta services. The structural development and qualification process for the data content of ePCR in EMS has been done for the first time in Finland. The process of analysing and utilising the data content and modelling the structural qualifications for the use of EMS has been done by using NEMSIS data content and applying it to the Finnish EMS needs. The process of choosing the data content has been made under the understanding that the information-based management requires uniform data for the support of the decision making and operational level improvements. This has been recognized in the national survey made by The Ministry of Social and Health Affairs on the National survey of the Finnish Emergency Medical systems. (Kurola et al. 2016.)

On national level the data serving the recognized needs for the information-based management, on the best possible way, is structured, utilised and collected in a uniform way. The selected data content should serve the substantial decision making, not only on operational level but on a national and local level. The knowledge about the selection process of the data content can support the future processes of data content selection and clarify the process of creating data content, which serves the recognized needs. When implementing different processes, the importance for the outcome is to evaluate the process itself.

On evaluation the different components and activities should be evaluated, even if the outcome or results of the process wouldn´t be clear. It tends to give answers of how well the process is working, has the program been implemented and designed the most beneficial way or is the process serving the stakeholders. This helps, not only to evaluate the process itself but to evaluate the possible outcome and to tell more about the process as well as if the outcomes have met the objectives intended. Evaluation gives also important information to the stakeholders such as; What was done? Why it was done? How it was done? Why it matters? (CDC 2011) This evaluation will examine how the data content selection process activities were implemented and what kind of outputs did they result.

On reflection to the development of the ePCR in EMS data content, these questions are important. The theoretical framework itself answers to the question why development and implementation of the ePCR in EMS is crucial for the advancement of the EMS in Finland. However, it is important to understand how and why the data content was built, which methods were used during the process to understand the outcome and make the process transparent and acknowledged. This is done to serve the future processes and development of

the information flow and the further development of the electronic Patient Care Records in EMS.

The recognizable need for the nationally unified ePCR in EMS is clear and this leads to the aim to create a national data repository for EMS which will also integrate to the National Patient Data repository in Kanta services. This development would guarantee the availability of the information flow, not only for the professionals of EMS, but for national and regional level decision makers, patients, other health care professionals and stakeholders. It would not only help to create more reliable ways to gain information of about EMS operations but to ensure the information flow from the point of care to another. (Kurola et al. 2016.)

3 The objectives of the evaluation

The main objectives of this evaluation are to recognize, describe and analyse the process of selection of structure and the data content of the Finnish electronic Patient Care Record (ePCR) in the Emergency Medical Services (EMS). As a final product, the evaluation will describe and analyse the process of the selection of the data content for the Finnish ePCR in EMS. The results are compared with recognized needs described in the published material and during the selection process. The evaluation will also offer recommendations for the future selection process of the new components.

4 The evaluation methods

Program Theory-driven Evaluation Science (PTdES) is defined as a science of using systematically knowledge about some phenomena and using the scientific methods to improve, produce knowledge and feedback about some social, educational, health, community or organizational programs. It can also determine, merit or bring more significance to the program. The main objective of using PTdES is to develop and improve programs, aid decision making, facilitate new ways of organizational learning. It can advance the development by generating new knowledge and supporting the transparency and accountability needs of the organizations or programs. (Donaldson 2007, 8-12.)

The Program Theory-driven Evaluation Science (PTdES) bases the evaluation in three systematic steps. First step is to develop program impact theory, second to formulate and prioritize the evaluation questions and third is to answer to the evaluation questions. Formed evaluation questions are answered by using the scientific methods. The method is theory-driven but uses empirical evaluation on the side of the theory. It is necessary to engage stakeholders as a part of the evaluation process to maintain an understanding how the program is going to solve the presumable problem or problems. When the stakeholders are engaged and the theory developed with them, it helps the evaluators to form and prioritize the evaluation questions. After the questions are formed the evaluator will answer to the

prioritized questions by using the method of choice. This method can be attached to the context of the evaluated program and can be unstructured or structured interviews, observational method, case study, randomized or controlled trial. The method used is chosen by the evaluator and its reliability depends on the discussion with the stakeholders on what would be credible evidence on the program theory context. (Donaldson 2007, 8-12.)

PTdES is a neutral method and focuses on the development of program theory and evaluation questions, which will also free the evaluator from method constraints. PTdES leaves room for methodological approaches as the evaluator can choose the method after understanding the program itself. This will produce practical credible knowledge to enlighten the stakeholders and offering cumulative knowledge for organizations. The method is criticised of some being unreliable in some cases and soft, second class investigation and its accuracy has been questioned as Donaldson presents in his book Program Theory-Driven Evaluation Science: Strategies and Applications. (Donaldson 2007, 8-12.)

Stewart I. Donaldson presents the additional guide for applying PTdES and program impact method in his book Program Theory-driven Evaluation Science: Strategies and Applications (2007) by referencing the CDC, Centers for Disease Control and Prevention of United States, evaluation steps and guidelines as presented in Figure 3.

Figure 3: Visualising the steps of the PTdES with Centers of Disease Control evaluation framework as used in: A Framework for program evaluation, 2017 (CDC 2017)

The stakeholders are primary users of the program. The needs of the users have to be considered and it can be done by using logic models, mapping out expected effects, resources and the context. The evaluation design has to include purpose questions, users, methods and agreements. The gathering of the evidence must take into notice different indicators, sources, quantity and quality and made conclusions must be justified with the analysis,

interpretation, judgement and recommendations. All this will lead to giving feedback, representing the results, designing and disseminating the outcome. The logic model supports the planning, managing, evaluating the program. It presents the shared relationships among the outputs and outcomes of the program, including activities and resources. It clarifies "what" the program is doing and what are the results of the strong implementation of what. (CDC 2018; Donaldson 2007, 8-12.)

One of the methods used in the PTdES is the logic model. The logic model describes the relationship between the program´s activities and possible assumptions, underlying expectations and intentions that program will work under. There are variety of ways to use the logic models and its components. It can be visually represented as a flow chart, map or a table but it should be presented on one page. Despite of the free visual presentation form, there are basic components to consider when developing the logic model. The logic model should be visually engaging, include appropriate amount of details, be relatable and designed to be audience specific as well as it should reflect the context of the program described. (CDC 2006.)

The evaluation of the process of defining the data content selection of the Finnish ePCR for EMS can be viewed as a program process. It can also be seen as the program and its outcome is the data content for the ePCR in EMS and the process. The data content of the ePCR rose from needs to unify, renew and redirect the information, data and data collection on national level. However, the development of the ePCR in EMS is firmly attached to the development of other safety and emergency services information systems and could be examined as a partial process of that development. Despite of this, this evaluation will examine the data content defining of the Finnish ePCR in EMS as its own process and will evaluate the process as a single program process since the long-term outcomes and even or intermediate outcomes can´t yet be evaluated since the data content hasn´t yet been implemented on the field conditions. Initial outcome of the program can be defined as established data content of the ePCR in EMS.

5 The ethical approach of the evaluation

In this evaluation process, the evaluation was assessed with utility, feasibility and propriety principles. The utility means that the information needs of the intended users will be served. The principle of feasibility requires the evaluator to be prudent and diplomatic. The propriety principle expects evaluator to work in ethical and legal manner. The guiding principles when applying the method chosen should include systematic inquiry, where evaluators conduct systematic data-based inquires with competence, integrity and honesty. This should be displayed by the evaluator trough entire process as well as the respect towards the people and responsibilities and general and public welfare. (CDC 2017; Donaldson 2007, 8-12.)

These standards and steps should be cross-referenced during the evaluation process and its different phases to guarantee that the process will be effective, and the information produced is ethically qualified. Especially the step of the propriety should be taken account on the ethically sustainable evaluation process. The propriety step includes considering the evaluation to be conducted legally and ethically and regarding the welfare of those involved or affected by the results. (CDC 2017.)

The evaluation process is also guided by the professional ethical conduct published by American Evaluation Association. There are five guiding principles which are interdependent and interconnected and they are recommended to be used in every phase of the evaluation, from initial discussion to the implementation. Systematic inquiry asks evaluators to conduct databased inquiries. These inquiries should be methodical, contextually relevant and thorough. The evaluator should be able to discuss the process in a contextual way; how the values, assumptions, possible theories, methods, the results and analyses will affect the evaluators' interpretation of the outcomes. Competence conduct is showing the evaluators professional skills on the process and therefore offering the skills required to deliver the completion of the evaluation process to the stakeholders. Integrity is an important principle to ensure the stakeholders about the transparency and honesty of the evaluation. The evaluator should also be aware, honour the well-being, and acknowledge the individuals, cultures and across groups involved of the evaluation and its results. Evaluators should aim to contribute to the common good and equitable and just society. (American Evaluation Association 2018.)

The ethical approach of this evaluation will be examined among the results, as it is relevant for the subject. The evaluation process will be approached by ethical principles of the evaluator stated by the National Center for Disease Control and Prevention (CDC) of United States, Stewart I. Donaldson’s Program Theory-driven Evaluation Science book, published 2007 and American Association of Evaluation.

6 The implementation of the evaluation in data content selection process of the electronic Patient Care Record (ePCR) in EMS

The implementation of the evaluation process started in the early 2019 when the evaluator was brought together to discuss about the EMS with the senior specialist of the Finnish Ministry of Social Affairs and Health. The development of the Finnish EMS ePCR was discussed, as the senior specialist Lasse Ilkka has been one of the main experts working with the advancement of the ePCR in EMS as well as with the information systems ERICA and KEJO. From the discussions rose the need for the evaluation of model the selection process of the data content of the Finnish ePCR in EMS. On the spring 2019, the topic of the evaluation was clarified to be about the selection process of the data content of ePCR in EMS.

The original focus of the topic had a wide range of variables from evaluating the whole process of the data content advancement and the selection to open comparison with the Finnish data content of ePCR in EMS with the data content of the NEMSIS. Due the nature of evaluation, which is the Master´s degree thesis, evaluator had to limit the topic and for that reason it was narrowed to evaluation of the selection process of the data content built for ePCR in EMS.

The implementation of the evaluation was decided to base on data sources of free structured interviews, project team memos and published information available. The free structured interviews were done in May 2019 and June 2019. The interviews involved senior specialist Lasse Ilkka and managing consultant and partner of Salivirta & Partners, Timo Kaskinen. Timo Kaskinen has been part of the development of the ePCR in EMS from early stages as an IT-consultant and is working in co-operation with Lasse Ilkka.

Besides the interviews, final process of the evaluation was done by based on the official project memos made on regular meetings during the data content selection process and on the other relevant material regarding the project. The evaluation process was completed during the spring 2020, the evaluator finishing the report and modelling the selection process.

Time	Implementation
January- April 2019	Engagement of the stakeholders, describing the needs
May-June 2019	The evaluation design, gathering of the evidence
July- December 2019	Analysis and description of the selections process of the data content
June 2020	The results of the evaluation and future recommendations

Table 2: The evaluation implementation timetable

6.1 Describing the content and defining the evaluation questions

On the evaluation process when describing the program, it is important to form the evaluation questions. This process includes gathering knowledge about the mission and vision, goals, objectives and other current information of the program, such as fact sheets, web pages or strategic, communication and marketing plans. It is also necessary to review possible

existing program reviews or logical models. The activities and outcomes should be recognized and listed and then clarified to the stakeholders. This can be reviewed with the stakeholders as a logic model to clarify all the components of the program. (CDC 2018.)

The evaluator had three different discussion during the January-April 2019 with the senior specialist Lasse Ilkka to clarify the content of the evaluation. The Finnish ePCR in EMS development was still ongoing but the data content and operational requirements of the ePCR in EMS was already formed and published. This data content and the selection process of it was completely new in Finland regarding to EMS and from that fact rose the need to review and describe the process. Evaluator clarified the topic and studied the background material available of the process and development of EMS and ePCR in EMS. This material was referred to the evaluator by Mr. Ilkka. The studied material can be seen from the references and it is referred to on the theoretical framework, these publications can also be seen on the material index on Appendix 1.

The evaluator read the memos of the project team, which were from the meetings regarding the selection process and these included some of the data content qualification process documentation as well. The list of the materials read can be seen from the material index on Appendix 1. As the evaluated process differed from the traditional program evaluation process, decided the evaluator use logic model as part of the results of the evaluation, usually the logic model is used before the evaluation to describe the program evaluated. The evaluator decided to do this with the intention to clarify the steps of the data content selection process and to give an understanding of the process as a whole. The evaluator formed the evaluation questions based on the information gathered from the discussions and the data sources available.

Usually the whole program described is not the main focus of the evaluation. The focus can be chosen trough evaluation standards of utility, feasibility, accuracy and propriety. These standards ask; Who will use the information from the evaluation? How much resources is possible to dedicate to the evaluation process? What design will serve the need for the information the best way possible? Who should be part of the process it to be ethical? The utility standard asks to consider the purpose of the evaluation. The purpose can be generating new knowledge and assessing the implementation or improvement. The users are considered by examining who will use the information and who will benefit from it. The purpose is clarified, renewed and re-evaluated with the stakeholders. The program components are recognized and identified as possible focus of the evaluation, such as specific activities, outcomes and pathways to the outcomes. When refining the focus, it is also important to re-evaluate the perspective of how much it focuses on the key issues that are important to the stakeholders and what is the efficiency of the evaluation. After this the evaluation questions

are posed based on the feasibility standard which examines the evaluation process from perspective of how long the program has existed as a reflection of the state of the development. All these standards and the questions can be posed as evaluation questions as well, these can be questions like; Was some specific activity implemented as planned? Did the outcomes occur in an acceptable level? Were there specific changes on the outcome and were they because of the implementation of the activities? (CDC 2018.)

The background and the judgement of the need for this evaluation process is described on reflecting the development of the EMS services in Finland and presented on the theoretical framework on this evaluation. To understand the data content selection process, it is required to understand the need for the development of the information systems on national level for EMS. After the discussions with the senior specialist Lasse Ilkka, it was clear for the evaluator, that the focus of the evaluation will be the selection process of the data content of the ePCR in EMS. However, the wide range of the material and long development process of the ePCR were offering the information for wider evaluation than it was possible to do. This limitation occurred because of the position of the evaluator and the resources available. The evaluation process is documented as the final thesis for the Master´s degree in Laurea University of Applied Sciences and due the nature of the work, it was not possible to include to the evaluation some of the topics discussed during the evaluation process modelling. One of these excluded topics being further comparison between Finnish ePCR in EMS with American data content of NEMSIS. After studying the material available as well as discussing about the focus with Mr. Ilkka and Mr. Kaskinen, it was clear that the focus of the evaluation would be on the process of the selection of the data content of ePCR in EMS.

Based on the material and the information available the content was examined and the evaluation process was reviewed and examined with the stakeholders. The evaluation questions were formed from the clarification of the focus and with the understanding of the maturity of the process as well as the development level of the ePCR in EMS at the current moment. This meant also understanding the outline that the advancement of the information systems in EMS and other safety and emergency officials were not completed and the ePCR development on technical level was still ongoing. Considering this, it was clear that the questions were directed more to the data content selection and recognizing the methods used in that process. The focus was on producing more knowledge to support the similar processes in the future. The examination of the focus can be seen from Table 3.

Focus of the evaluation	
What is the purpose of this evaluation?	The purpose is to evaluate the selection process of the data content of the Finnish ePCR for EMS. The data content chosen is based on data content used in United States, called NEMSIS. The comparison between the two data contents is also relevant and necessary for understanding the full development process of ePCR in EMS in Finland. This will require comparison also with the EMS models between United States and Finland.
Spesific activities	Activities : - Defining the needs for the ePCR in EMS in Finnish system - Selection of the data content model - Selection and qualification process of the data content for Finnish ePCR for EMS - The timeline of the data content selection process
Spesific outcomes from the activities	The structured data content for ePCR in EMS.
Who are the users?	The users of this information are the officials on different levels, especially the ones participating on the selection process of the data content and possibly international groups working on the similar development projects. The main user of the information is the key stakeholder senior specialist Lasse Ilkka from Ministry of Social Affairs and Health. The information can be also used by the professionals on operational level as well as the patients.
Who will benefit from the information gained from the evaluation?	The users of this information are the officials on different levels, especially the ones participating on the selection process of the data content and possibly international groups working on the similar development projects. The main user of the information is the key stakeholder senior specialist Lasse Ilkka from the Ministry of Social Affairs and Health. The information can be also benefit the professionals on operational level as well as the patients.
The efficiency and the resources of the evaluation	The evaluation will be made as a part of the Master´s degree studies on Laurea University of Applied Sciences. The evaluation will be final thesis of the Master´s program and it is done by the evaluator. The time efficiency is divided on several months and the process itself will take almost a year. The resources are limited. The nature of the evaluation limits the possibilities to widen the evaluation for the whole of introducing and modelling the process of development of ePCR and the data content, including the comparison of the two different data contents and EMS systems (Finland and USA). For these reasons the purpose has to be limited for modelling the process of the selection of the data content for ePCR in EMS.

Table 3: Examination of the focus of the evaluation, documented 2019. Done according to CDC´s Program evaluation framework checklist for step 2 (CDC 2018)

Evaluation questions formed based on the examination of the focus of the evaluation:

1. What was the timeline of the development of ePCR for EMS?
2. Describe the process of the data content selection?
3. What kind of data content was formed as a result?
4. Does the data content serve the national needs of the ePCR in EMS?

6.2 Defining the evaluation design and material

After the evaluation questions are formed it is relevant to consider the best possible evaluation design. The most common designs are experimental, quasi-experimental or non-experimental. Where experimental and quasi-experimental include to the design participators, control groups and interventions between different groups, the non-experimental design doesn´t use control or comparison groups but focuses the evaluation by using other methods such as correlation study, case study or survey. The method is chosen by

the evaluator and the facts to consider are how important it is to translate program to other settings, how much resources there are to invest on the implementation of the evaluation and are there naturally occurring control or comparison groups. From these reflections and from evaluation questions, can be formed a measurement table that gives more support to the design and clears the settings of the evaluation. It clarifies the available information to answer the evaluation questions and supports the basis of the design. (CDC 2018.) The measurement table for clearing the evaluation design can be seen on Table 4.

Evaluation questions	Data sources	Data collection methods
What was the timeline of the development of ePCR in EMS?	Unstructured interviews of the experts. Memos of the meetings of the project team working on development on ePCR in EMS and the data content qualifications. The memos are from Finnish institute of Health and Welfare from years 2013-2018. The published material of the data content selection and requirements. The published material about the EMS.	The timeline is built based on the information, publications and memos available. After this the workshop is formed with the experts. The workshop has a theme and focus but it is carried out as unstructured interview. The evaluators notes about the timeline will be discussed and corrections made based on the information from the interviews. The timeline will be clarified and built in its form by the evaluator.
Describe the process of the data content selection?	Unstructured interviews of the experts. Memos of the meetings of the project team working on development on ePCR in EMS and the data content qualifications. The memos are from Finnish institute of Health and Welfare from years 2013-2018. The published material of the data content selection and requirements. The published material about the EMS.	The process is described based on the knowledge gained of the timeline modelling and by examining the memos and the data content sheets. The process will be described with logic model and built as in a form of a visual model from the information and documents available. This will be specified with the unstructured interviews with experts. The phases of the process will be examined on the workshop and after that the evaluator describes the process visually and in writing.
What kind of data content was formed as a result?	The material regarding the data content selection and review is available for the evaluator. The data content chosen is available for the evaluator trough publications and the material offered by Mr. Ilkka.	The data content will be reviewed and verbally introduced by most existing parts based on the information available for the evaluator
Does the data content serve the national needs of the ePCR in EMS?	The material of the data content selection and review is available for the evaluator. The data content is available for the evaluator in published form. The data content and the reflection will be made based on the chosen data content and the document published: Kurola, Ilkka et al. 2016. National survey on the operation of the Finnish Emergency Medical Service (EMS) system. The Ministry of Social Affairs and Health, Finland. In this document the needs for the information systems and for ePCR for EMS are defined. The reflection will also take advantage of the needs noted from the data content process modelling.	The data content will be reflected on the needs that are described in the publication mentioned and the needs noted from the data content process modelling. This will include reflection of the process of data selection and the timeline. Possible further notes and suggestions will be given based on the notions made from the evaluation questions.

Table 4: Measurement table, documented 2019. Done after the National Center for Disease Control and Prevention Program evaluation framework checklist for step 3 (CDC 2018)

After examining the evaluation questions, the data sources and the data collection methods were defined. The evaluator was able to examine the project memos from the Finnish Institute for Health and Welfare, regarding the development of the data content of the Finnish ePCR in EMS. These memos gave an understanding and ability to form the timeline as well as shape the perception about the process. The memos available for the evaluator are not published and can´t be shared because of the national safety and privacy regulations, as there is some sensitive information included. The information collected and examined was supported by two different workshops with senior specialist Ilkka and Mr. Kaskinen from Salivirta & Partners. The workshops were based on unstructured interviews and the themes were focused on examining the timeline and different phases of the development process of the Finnish ePCR in EMS. The interview material was collected on the written notes and used as a part of the material for the evaluation. The interviews were not recorded, and the written notes made by the evaluator are not published for safety reasons, as they include some sensitive information. The sensitive information in the memos and the interviews are mostly information regarding the information systems of the safety and emergency officials which is classified information. For the reason of integrity, the evaluator decided to keep all the memos and the interview materials unpublished to support fully the principle of privacy, safety and to not accidentally include classified information in published publication.

The material included the data content of NEMSIS and the data content chosen for the Finnish ePCR for EMS. The data content material was reviewed by the evaluator to get clearer picture of the methods used in the data content selection process and to understand the structured content of the Finnish ePCR in EMS. This content was reviewed in a workshop and notes were taken to support the understanding of the content and the process. The evaluator also used published material in the theoretical framework of this evaluation, to present and gain full understanding of the background and the needs for information system development and for the development of ePCR in EMS in Finland. The list of all the materials used in this evaluation can be seen in Appendix 1.

The material was reviewed on April and May 2019 and two workshops were held in 28.5.2019 and 26.6.2019. The workshops lasted 2 hours each and the evaluator determined the topic based on the material and the evaluation needs. The first workshop focused on the timeline built by the evaluator, based on the written material available. The second workshop clarified the results of the first one and was mostly unstructured freeform conversation about the development process of information systems, the content of NEMSIS and Finnish ePCR in EMS.
After the workshops the evaluator examined the memos available and reflected them on the notes from interviews and built the basis of the timeline and modelled the data content selection process for ePCR in EMS.

7 Evaluation results

7.1 The timeline of the development of ePCR in EMS

The first recognition for the need of the EMS information system and for the ePCR was 2002-2004 in Satakunta´s SAKU-project which surveyed the current state of the EMS and designed regional EMS operational model for the region of Satakunta. The plan was to implement the developed operational model. Despite of the aim, the project never reached implementation level. In the following years from 2003 to 2009 there was a couple of regional projects recognizing the need for the ePCR in EMS and these projects even produced some requirement analysis for the ePCR in EMS. From 2003-2006 Southeast Finland had a regional project with provincial government to develop the regional model and strategy of the EMS. Part of this regional project was a spin off project called KAAPO which unified the electronic Patient Care Record systems on the hospital district area, and it had its own part for patient record in EMS. Even though this patient record could be filled out electronically, it had to be printed out as a paper version to deliver the information of the patient between the health care entities. This was not a national but regional solution and only included the region of Southeast Finland. (The Finnish Ministry of Social Affairs and Health 2009.)

The first actual requirement analysis for the ePCR in EMS was made in 2009 at the region of Päijät-Häme. This project proposed the NEMSIS data content as a basis of the structured content of the Finnish ePCR in EMS. The project was regional, but the Finnish Ministry of Social Affairs and Health was partially involved on the project. On this requirement analysis was also suggested that the possible ePCR in EMS would be integrated with the HL7 standard. HL7 being internationally recognized standard which provides framework for integration, sharing, retrieval and exchange of the information. HL7 standards define the packaging and communication between parties by setting the structure, data type requirements, and language for integrations. The standard supports delivery and evaluation of health systems and supports clinical operations. (HL7 2007-2020.)

Despite of the requirement analysis, the project at the region of Päijät-Häme was not progressed and the development didn´t move further. On the same time the development projects for ERICA and KEJO were founded. ERICA was result of the project called TOTI, which was a designated national project to develop the operational models and information systems of emergency response centres in Finland, this advancement was part of the full reform of the emergency response centres organizational model. And as seen on the study done in 2011, the results of this reform are indicating slight change on the emergency response centre dispatchers´ ability to detect life threatening situation, however, this doesn´t profoundly indicate any affects of the ERICA system on dispatching. (Lindström et al. 2011.) At the same time, in 2009 the project of requirement analysis for KEJO started, it

being national project like TOTI. The partial requirement analysis for KEJO was made also in TOTI-project but the KEJO development ownership was transferred for police forces, emergency response centre being responsible of ERICA. It is to be noted, that both information systems have been developed in co-operation with several different safety and emergency officials and supported by the national organs and ministries.

The advancement of the national level ePCR in EMS project was slowed down on years 2009-2013, mostly because of the change of the healthcare legislation. The renewal of the legislation defined that instead of the municipalities the healthcare districts are responsible organizing the EMS in their area. This renewal was made in 2011 and implemented in 2013. This change took time and adaptation for the EMS as the services were partially re-organized. The requirement analysis for KEJO was made at the same time with the legislation change and the ePCR in EMS was decided to include as one part of KEJO system. This was national recognition for the need of the ePCR in EMS and the actual development started from that point forward in 2013. This advancement was supported by the ICPC2 classification, which was included to EMS and it created one of the structural, unified data content requirements for the ePCR in EMS.

The ICPC2 is international classification of Primary Care and it is accepted in WHO FIC as a reason for encounter code. In Finland the code can be used by all the health care professionals on the side of the ICD-10. For the nurses and other health care professionals taken on side the physicians, it is recommended to use mainly ICPC2 code first and then ICD-10 codes. The ICPC2 code is used in the EMS and it supports the information flow from the beginning of the point of care. Nationally responsible organ owning the codes and the rights is the Finnish institute for health and welfare. (WHO 2020; Association of Finnish municipalities 2019.)

The year 2013 was a significant year for the advancement of the ePCR in EMS. The Ministry of Social Affairs and Health founded a working committee for development of emergency medical healthcare, and it had its own division for the EMS. The division was closely involved with the development process of KEJO and the ePCR. The division had several participants, most importantly operational level representatives, the head EMS physicians from all the five special responsibility health districts. In the spring 2013 the ePCR in EMS advancement and requirement analysis started with the team of five head EMS physicians, representatives of the Finnish Ministry of Social Affairs and Health, Social Insurance Institution of Finland and IT-consultant from CGI. The role of the IT-consultant was on the following year taken by Timo Kaskinen from Salivirta & Partners.

In the autumn 2013, the division had made its first investigations and analysis for the possible existing ePCR data contents and standards for the EMS in Europe and globally. The analysis compared possible options which could be used as a reference for Finnish ePCR in EMS. The NEMSIS data content was considered and qualified as an option. The decision of the use of the NEMSIS as a standard for Finnish ePCR in EMS data content was made in the autumn 2013. The decision was based on the analysis made by the EMS division. In the winter 2013 the division had prepared first draft of the data content of the Finnish ePCR in EMS. The draft was released for the statement and review round for the stakeholders. Among the national development, in 2013 started the international co-operation for development of the ePCR in EMS. The co-operation with Norway and Denmark started, as the countries were in the process of developing their own ePCR in EMS. This co-operation has foundation in a wider design to aim to unify the data content of the ePCR in EMS in Nordic countries.

In the first quarter of 2014, the data content of ePCR in EMS was under further development and this continued throughout 2014. In the end of the year 2013 and during the year 2014 the development was unified with the code server division of the Finnish Institute of Health and Welfare (THL).THL is a significant national actor for the data content, code server development and requirement analysis of Finnish healthcare. In the winter 2014, the THL made a report regarding the eArcive in EMS and its better national utilization (Ilkka 2015). This was groundwork for the national ePCR in EMS and reflected the need and possibilities for national solution for ePCR in EMS. The report was published at 2015.

In the end of 2014, the Finnish ePCR in EMS project was reviewed and the decision to continue the work of the EMS division for development of ePCR was made. The estimated timeframe for the division was till the year 2016. The aim was to implement the ePCR in EMS in 2016 nationally. On 2015 the project group was divided in different teams to make operational requirement analysis, specifications for the requirements, correlations and technical requirements. The work continued throughout 2015 and in 2016 the first operational requirement analysis was published and the first data content for the ePCR in EMS was ready. During the year 2016 the timetable for the implementation was re-evaluated and it was noticed that the original timetable wouldn´t hold as planned. The implementation of the national ePCR in EMS was postponed till the year 2017 or 2018 by the estimation. On 2017 the requirement analysis of the data content was moved under THL, and it continued the work in a form of supporting the implementation, this process was still ongoing when this evaluation was done. In 2017, the data content for the ePCR in EMS was updated and the Social Insurance Institution of Finland was building the data architecture and the integration with Kanta services. On 2018 there was some contract renewals made with the suppliers of the information systems and new clarified implementation plan was made. The implementation seemed to be postponed at least till 2019.

In 2018, the operational requirement analysis and the requirement analysis were completed and the review and commenting of the requirements were open for the special responsibility districts of healthcare. The reviews were taken in notion on further development. The implementation of the information system ERICA was implemented at the same time, in the end of the year 2018. In 2019, the development of the ePCR in EMS was still ongoing as a part of the production of the EMS information management, this being part of the bigger project of the information production in social- and healthcare. The information production project in social- and healthcare is owned by THL. The specific implementation date for the ePCR in EMS was not known when this evaluation was made but the plan for implementation during the year 2020 excisted. The data content and the requirements on technical and operational level were finished and published in 2018. The timelines´visual model can be viewed from Appendix 2.

7.2 Describing the process of the data content selection

When the program is described with the logic model, the model itself can vary from its form and visual output. The logic model is used to describe the program activities, outputs and outcomes. Basic logic model has two sides, the process and the outcome. The process itself describes the inputs, such as resources, activities and direct products. The outcome part usually describes short-, intermediate- or long-term effects of the program. (CDC 2006.)

The process is recognizable through reflection of the data sources. The timeline gathered from the memos, published sources and supported by interviews with the stakeholders creates an understanding of the phases of the data content selection. The selection process itself can be described as one activity of the bigger process of the project to implement the ePCR in EMS. The first activity of the process was the recognized need for national information system for ePCR in EMS. This involved regional development and engagement of the stakeholders on operational as well as on the national level. The development of the information systems for safety and emergency officials and the development of the national information systems for healthcare supported the need for ePCR in EMS. From recognized needs, coming from different stakeholders, the design phase included gathering the division and a team of experts to design the ePCR in EMS. The analysis of the needs for ePCR includes analyzing the data contents, recognizing the needs of the operational level agents and the goals of the national level information management and uniform data collection.

The design led to the requirement analysis, where the team built the requirements on technical, data content and on operational level. This phase was supported the national level stakeholders with different publications made during the process. From requirement analysis the process continued to the working phase and the initial outcome is the implementation of

ePCR in EMS. On the working phase the technical architecture, data content reviews and execution plan for implementation were created. Implementation of the ready-made data content in the EMS is the initial short-term outcome. However, this visualization assumes that the ready product is already being implemented. The implementation phase was not on production when this evaluation was made. These phases can be visualized in a linear model to give a basic understanding of the selection process and its activities. With the closer examination it was noticed that the process was not linear, and the actual selection included different phases overlapping each other and the initial outcome was postponed. The notion made by the evaluator was, that the ready data content for the Finnish ePCR in EMS can be seen as a result of the work phase or requirement analysis. However, when examining the full process, it was considered important by the evaluator to include the initial outcome on the first level modelling. This model can be seen on Figure 4.

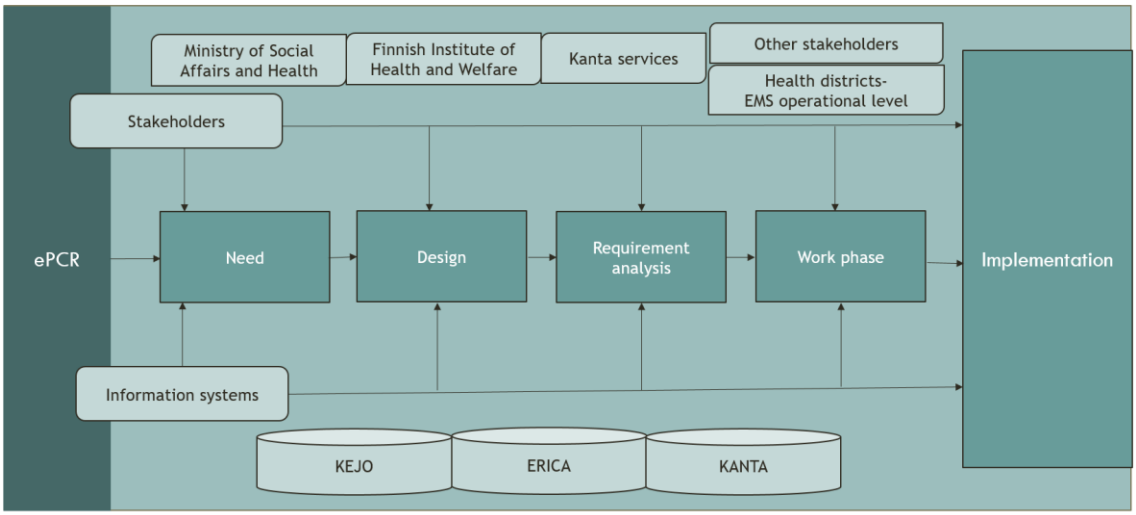


Figure 4: The linear model of the main activities of the process and the initial outcome as implementation

The evaluation focused on the data content selection and the actual activities in this process were recognized through the data sources available. This led to dividing the process was in the different phases to clarify the actions and activities taken. The data content selection process of the ePCR in EMS was then written on a table form (Appendix 3). The table shows each of the phases and its activities. Based on the table the process was defined and visually modelled (Appendix 4).

The selection process was divided into seven phases that included different activities. The first phase, which can be seen from Figure 5, included the decision to implement ePCR in EMS as a part of KEJO. After this the Ministry of the Social Affairs and Health founded the working committee for development of the emergency medical care, and it included the separate

division for development of the EMS. As a part of the EMS development it was important to include the operational experts on the division to ensure that the data content will serve particularly and firstly the operational level of the EMS.

Phase 1.
The decision to implement ePCR as part of KEJO
Founding a working committee for development of emergency medical care with division of EMS
Gathering the division of experts. - 5 operational level experts from each special responsibility health care districts, the head physicians of EMS - Representatives of the Finnish Ministry of Social Affairs and Health - Representatives of the Social Insurance Institution of Finland - IT-consultant (in the beginning CGI, later on Salivirta & Partners)

Figure 5: The first phase of the selection process and its activities

On the second phase, seen on the Figure 6, the division gathered the information and defined the needs for the data content. This was done with consideration of different aspects of the needs for information and what would be relevant information when considering the whole concept of information management. The content needs were gathered by dividing the needs in different categories. Firstly, it was important to recognize what are requirements for the identification of the patient and where this information is needed and how the information will flow from the EMS units to the patient data repositories in other substances in health care. Another considered point was, how the administrative information will be passed through to the Social Insurance Institution of Finland and for other administrative operators. Last, the questions formed; What kind of information is required from the actual medical care? Which part of the structured content should be feeded in freeform? And what is selectively structured, compulsory information in use of the ePCR? After forming the categories, the required information was divided into categories based on the information needs. There were six categories recognized based on what information was needed to the ePCR from different substances. The categories were: 1. The emergency response centre 2. The dispatch 3. The health care service provider 4. The EMS unit 5 The patient information 5. The EMS medical care.

Phase 2.
Defining the needs for the data content
Comparison of the national and global standards
Selection of the NEMSIS data content as basis of the Finnish ePCR in EMS

Figure 6: The phase two activities when defining the data content

The needed dispatch code information for the ePCR in EMS from the emergency dispatch centre was considered to be linked with ICPC2-codes. It was clear during the process that the ICPC2-codes would serve a purpose in the ePCR data content, especially on dispatching information. The information of the dispatch, the health care provider and the unit were necessary to collect and include to the data content, since it offers general information of

about the whole emergency dispatch and the health care service provider. It should be automatically linked to the ePCR. The most important factor for the ePCR data content was considered to be the information of the patient as well as the care provided. The following needs were recognized: The patient should be identified in nationally uniform way and trough that the basic information of the patient would automatically be available through Kanta services. The condition of the patient should be assessed trough performance scale. The main issue and the degree of the level of the medical issue should be assessed and recorded on the ePCR. The physiological information such as measurements should be produced with automatic time stamp and the most common laboratory results should be included in the ePCR. The usual operations should be included in the ePCR as well as the pharmaceutical treatment and the consultation and regimens of the physicians.

The data content definition overlapped with the selection of the data standard. The goal of the selection process was to choose internationally usable data content and standard. After the period of comparison and reviews, it was stated that there is no general ePCR data content for EMS in Europe available that could be applied for the purposes of data content of the Finnish ePCR in EMS. The NEMSIS was internationally applicable data standard and compatible with HL7-standard. NEMSIS was also opening further possibilities for international benchmarking if used as a data content for the Finnish ePCR in EMS. The selection of NEMSIS was clear after the analysis. As the evaluator can´t present the NEMSIS data content as whole in this evaluation for its size, is the content available on NEMSIS webpage, https://nemsis.org/technical-resources/version-3/version-3-data-dictionaries/. The Version 3 was used for this data content. The NEMSIS is licencing free and the modifications of the content has been permitted for Finnish use.

Figure 7: The phase three activities when defining the data content

On the third phase, which can be seen on the Figure 7, the needs were clarified and the data standard of NEMSIS chosen. The selection of the data content started for the Finnish ePCR in EMS. This phase overlapped with some parts of the second phase, one of these being definition of the needs. The third phase overlapped with the fourth phase as well. On the fourth phase the definition continued through workshops and the network peer-evaluation. The data content selection was mainly focused on the medical information content. At this phase it was clear that the ICPC2 will be used with the dispatching code as a part of the ePCR in EMS. It was also decided that the ECOG performance scale status would be implement as a part of the evaluation done for the overall condition of the patient. ECOG is a scale and criteria used to assess how patient's status is on scale 0-5 on the physical, activity and

abilities to care for themselves. ECOG is used in different contexts in health care. (ECOG-ACRIN Cancer research group 2020.)

The data content was divided and affiliated from NEMSIS, based on how compulsory the information would be when recording the patient information in the ePCR on the dispatch. This similar method of compulsory information affiliation is used on the original content of NEMSIS. The information that should be documented on the ePCR was divided into categories of 1. volunteer information 2. noted information 3. conditionally compulsory 4. compulsory with notes and 5. compulsory. The information classified as compulsory will be required to record on the ePCR every time the patient is met by the EMS unit. The EMS care information categories were chosen to be: Injuries, status of the patient, physiological measurement with ECG, laboratory tests, resuscitation, EMS procedures, pharmaceutical care, transportation, follow-up care and information considering the patients death.

The project team working on the data content of the ePCR was divided in different speciality areas when during the selection process of the data content. The chosen content was reviewed and commented on the regular meetings of the project team. The data content for the ePCR was defined, analysed and chosen from NEMSIS data content. The project team used the color code selection. The team reviewed the data content several times and made the selection for the ePCR data content by using color-codes; red meaning that the data content was discarded, yellow was for consideration and blue was included in the ePCR and for the draft for the statements. This selection process led to the phase four, which can be seen from Figure 8.

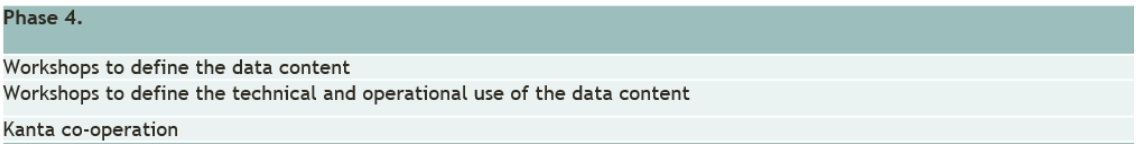


Figure 8: Phase four activities when defining the data content

The data content selection was defined in over 40 workshops and meetings between different stakeholders. These stakeholders were representatives and experts from operational and national level institutions, such as healthcare districts EMS operational level professionals, representatives from THL and Social Insurance Institution of Finland. These meetings clarified the chosen information and modelled also the content for the technical and operational requirements. The content was advanced together with Kanta services, as the purpose of the ePCR in EMS would be to integrate it with the National Patient Data Repository. This phase overlapped with the phase five. The data content was defined and advanced at the same time as the process of the operational requirement analysis and technical requirement analysis for

the ePCR in EMS was advanced. Both of these requirement analyses were made in co-operation between the EMS development division and THL. This can be seen from Figure 9.

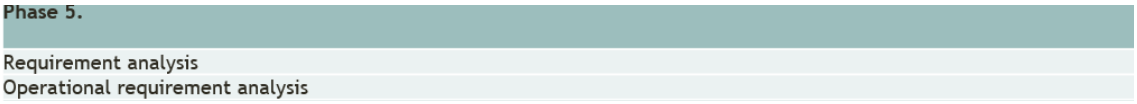


Figure 9: The phase five activities when defining the data content

On phase six, as seen on the Figure 10, the selection process together with the requirement analysis was prepared for the review and statements. The review and statements were coming from different officials on national and operational level. After the statement rounds the content got its final touches and it was published together with the requirements. The data content of ePCR in EMS was updated after it was first published. The requirement publication is available for reading: Kansallinen sähköinen ensihoitokertomus- Tietosisältö sekä toiminnallinen ja vaatimusmäärittely. (Ilkka & Räty 2017.)

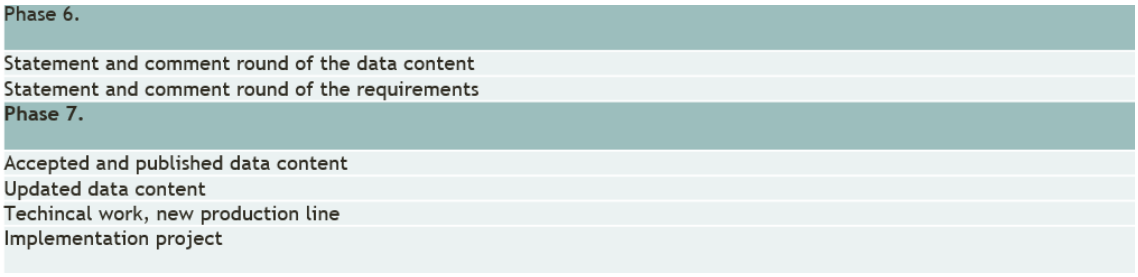


Figure 10: The phase six and seven activities when defining the data content

The seventh phase is still ongoing as the the implementation project for ePCR in EMS is still under development. The responsibility of the implementation is on the Finnish Institute for Health and Welfare (THL). The implementation of the ePCR in EMS is part of the bigger project of social- and healthcare information production. Seventh phase is seen on the Figure 10.

The final visualisation of the process can be seen on the Appendix 4. The methods and activities used were consistently leading to the uniform data content for ePCR. The process was not linear, and the phases overlapped in a timely manner which can be perceived from the model made.

7.3 The data content and its' response to the national needs for the ePCR in EMS

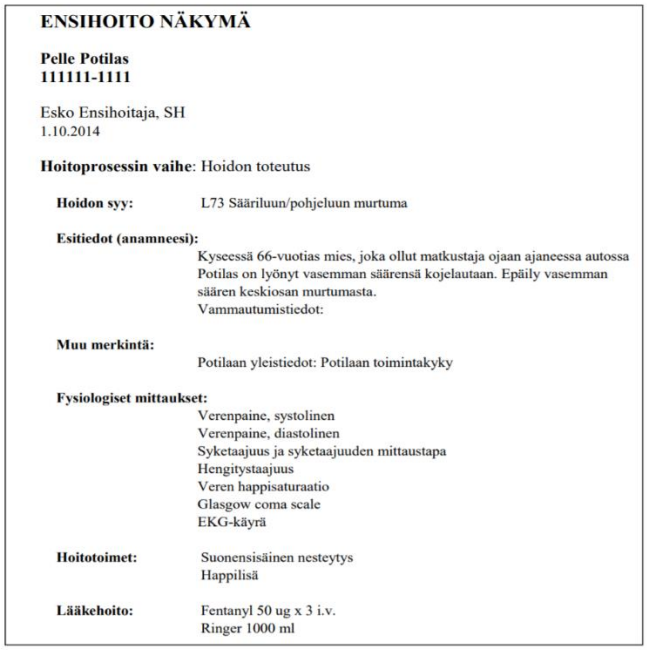
The data content is published on a code server of Kanta services and can be viewed as an excel sheet. The data content without some of the code details can be viewed from Appendix 5. of this evaluation. The data content and the requirements can be formally reviewed through the Kansallinen sähköinen ensihoitokertomus- Tietosisältö sekä toiminnallinen ja

vaatimusmäärittely, as the new version was published 2017. (Ilkka & Räty 2017.) The data content is presented on the Table 5.

The data content of the ePCR in EMS	
· Dispatching information	· Injury
· Anamnesis	· Status of the patient
· EMS unit	· Physiological measurements
· EMS service organizer	· ECG
· EMS service provider	· Laboratory and imaging results
· EMS team members	· Resuscitation
· EMS unit information and timestamps	· EMS operations
· General information of the patient	· Medical treatment
· Contact person of the patient	· Transportation of the patient and follow-up
· Reason for emergency care and urgency	· Information regarding the death of the patient
· Regimens	· Invoicing and administration information

Table 5: The data content of the ePCR in EMS (Ilkka & Räty 2017)

This content has several different subcategories due the technical form of structured format of the ePCR. The whole data content can be viewed from Appendix 5. The view of the ePCR in EMS has been presented in requirement publication Kansallinen sähköinen ensihoitokertomus-Tietosisältö sekä toiminnallinen ja vaatimusmäärittely and can be seen on Figure 11. (Ilkka & Räty 2017.)



ENSIHOITO NÄKYMÄ

Pelle Potilas
111111-1111

Esko Ensihoitaja, SH
1.10.2014

Hoitoprosessin vaihe: Hoidon toteutus

Hoidon syy: L73 Sääriluun/pohjeluun murtuma

Esitiedot (anamneesi):
Kyseessä 66-vuotias mies, joka ollut matkustaja ojaan ajaneessa autossa
Potilas on lyönyt vasemman säärensä kojelautaan. Epäily vasemman
säären keskiosan murtumasta.
Vammautumistiedot:

Muu merkintä:
Potilaan yleistiedot: Potilaan toimintakyky

Fysiologiset mittaukset:
Verenpaine, systolinen
Verenpaine, diastolinen
Syketaajuus ja syketaajuuden mittaustapa
Hengitystaajuus
Veren happisaturaatio
Glasgow coma scale
EKG-käyrä

Hoitotoimet: Suonensisäinen nesteytys
Happilisä

Lääkehoito: Fentanyl 50 ug x 3 i.v.
Ringer 1000 ml

Kuvio 7. Jatkuvan kertomuksen ENSIH-näkymällä tekstimuotoinen tieto ja rakenteinen tieto kirjataan otsikoilla jäsentäen. Rakenteisista tiedoista näkymällä näytetään vain hoidon kannalta erikseen määritelty, keskeinen tieto. Ensihoitokertomuksessa ei käytetä diagnoosikirjauksia, vaan kirjataan hoidon syy käyttäen ICPC-luokitusta. Kertomusnäkymällä näytettävät vähimmäistiedot määritellään tietosisältömäärityksissä.

Figure 11: Structured format based on the data content built for the ePCR in EMS (Ilkka & Räty 2017)

The needs for the ePCR in EMS and the data collection in nationally unified form are described in the national survey published in 2015: Report of the eArcive in Emergency Medical Services – towards better national utilization (Ilkka 2015) The survey indicates that there is a need for the ePCR in EMS, which will serve all the participants on the care pathway of the patient and provide information needed. This has significant impact on patient safety by securing the information flow from operational unit to another. The national information management helps also the EMS personnel to gain clearer view of the patients` status since all the basic information of the patient and the dispatch is integrated as a part of the ePCR in EMS. National ePCR in EMS has also more effective impact on the treatment of the patient, for example when the physician consulted for regimen will have the information of the patient and about emergency dispatch available on real time. This supports the goals of effectiveness of the care and patient safety. For all the stakeholders the comprehensive and user-friendly data content is beneficial. The content is available for the stakeholders in different positions and the information can be categorized for the purpose, for example for national or regional level reporting or research. This is benefits national and regional level decision making and it makes possible the benchmarking of the EMS on national level. The uniformed data collection requires unified data content that is user-friendly and in use of all of the EMS systems nationally. These needs can only be answered on the development of information management in the EMS on national level. (Ilkka 2015.)

The data content can also be reflected trough the needs defined in the beginning of the selection process of the data content, which can be seen on the paragraph 7.2. The needs were recognized in the beginning of the process. These needs were described and defined as requirements for the data content and the aim was to find a way for the identification of the patient and support the information flow, not only for the health care substances but for administrative stakeholders, add the information required from the medical care of the patient and create structured content with freeform writing with options of the selectively structured variables.

The administrative flow of information has been considered in the data content thoroughly by offering necessary information of the patient and the EMS unit and about the service provider with the invoicing and the administrative information. The information flow for the stakeholders has been advanced on the side of the data content selection. The Kanta services and its administrative organs have been working to generate an integration and ICT-architecture around the patient information flow. This is more closely examined in the publication of the data content and requirements, Kansallinen sähköinen ensihoitokertomus-Tietosisältö sekä toiminnallinen ja vaatimusmäärittely (Ilkka & Räty 2017) and from other publication Ensihoitopalvelun kansallinen tietovaranto ja tiedolla johtaminen (Ilkka 2016).

The medical information of the patient is structed, selectively structured and offers a chance for freeform writing as well. The content is created with the thought of what is necessary information that needs to be documented whenever patient is met by the EMS unit. It is divided into categories of 1. volunteer information 2. noted information 3. conditionally compulsory 4. compulsory with notes and 5. compulsory. The information being compulsory is required to record on the ePCR every time the patient is met. The data content of the medical care should include simple patient identification in a nationally uniform way and trough that it should be possible to reach the basic information of the patient from the National Patient Repository. The patient condition should be evaluated trough performance scale and physiological measurements should include automatic time stamp as well as the content should include the most common laboratory results and the usual EMS operations, consultation of the physicians for regimen and the possible pharmaceutical treatment.

When the structured content available is reflected on these needs recognized in the beginning of the process, it seems that all of them has been reached. The patient identification has more of a technical approach, so it differs a bit from selecting the actual data content. However, it was taken into consideration throughout the process in a form of the ICT architecture built in co-operation with Kanta services. The performance scale is used together with ICPC2 and it is included to the data content. The information defined about the condition and care of the patient is included thoroughly to the data content and it includes the EMS operations, consultations or regimens and the possible medical or pharmaceutical treatment. These needs of the patient identification and trough that the access to the information of the patient trough National Patient Data Repository are supported by the study made in 2015. The study results indicated that and understanding of patients' previous health record and existing medical conditions supports the treatment of the patient in the EMS. When the operational instances have access to the knowledge of the patients' medical history, it will support the idea of more accurate decision making and treatment. (Zorab et al. 2015.)

Mazhoufi et al. (2018) present based on the review of data quality assessment in the EMS, that the assessment of the data should be done in a simple and clear manner, as this way it supports the better quality of the data and the most common way to asses this data is trough accuracy, consistency and the completeness. In this case only the data content can be assessed and not the actual implementation and data gathered from the field operations, but the data content can be reviewed as based on the needs set for it. The completeness and accuracy of the data is important for the future advancement and decision making in healthcare. The uniform manner to collect data and information flows between different care levels and units, support the consistency of the data. The data content developed for the Finnish ePCR in EMS seems to support these principles on a theoretical level by being

consistent and taking into account the information flow between different stakeholders. The data completeness is highly important for EMS with the accuracy in order to improve the quality of the care and for decision making which has been considered, as the ePCR in EMS in national project. (Mazhoufi et al. 2018.)

As throughout the evaluation the needs for better and unified national data collection and structured data content for the ePCR in EMS has been highlighted, it can be said that the national data content for the ePCR in EMS aims to answer to the needs from its part. When reflecting the needs on the finished data content of ePCR in EMS, it does show up as clear, structured and user friendly. The implementation of the data content on field circumstances hasn´t been executed yet and that is why the final outcomes can´t be evaluated. However, the goals set to unify and create a structured data content for the ePCR in EMS has been achieved. The initial core process for the advancement of the ePCR data content lasted for four years and was made in collaboration with national organs and most importantly with the operational level of the EMS. The selection process was mainly focused on different physiological variables of the data content, but it didn´t leave out different stakeholders from administrative and technical level. These experts were interviewed and listened in different phases of the data content selection process. The data content seems to be serving the overall need for user friendly and comprehensive data content but as long it is not fully implemented and integrated, the initial outcomes can´t be evaluated. The recognized needs have been collected on the table form and evaluated on a simple manner based on is the content answering for the needs set. These answers can be seen from Table 6.

Recognized need	Is the need met on the data content of ePCR in EMS or on the development process YES/NO	Reasoning
The ePCR in EMS should serve all the participants on the care pathway of the patient and provide information needed, as this has also significant impact on patient safety (Ilkka 2015)	YES, from the most parts. The technical development of the ePCR is still ongoing.	The information flow for the stakeholders has been advanced together with the data content selection process. Kanta services and its administrative organs have been working to generate an integration and ICT-architecture around the patient information flow.
The EMS personnel should gain clearer view of the patient when the basic information of the patient integrated and automatically implemented as a part of the ePCR. (Ilkka, 2015)	YES, from the most parts. The technical development of the ePCR is still ongoing.	The data content has been built on reflecting the operational needs. The development has been done in collaboration with Kanta services in order to generate patient information flow with the National Patient Data Repository.
The treatment of the patient will be more efficient and safer when the physician consulted for regimen will have real time information about the patient and emergency dispatch available. (Ilkka, 2015)	YES. However, the initial outcome can´t yet be evaluated.	The data content has been built on reflecting the operational needs. The data content is structured to be comprehensive, informative and user friendly. Technical development to enable this, has been done in collaboration with Kanta services to generate patient information flow with the National Patient Data Repository.
Comprehensive and user-friendly data content is beneficial. The content will be available for the stakeholders in different positions and the information can be categorized for the purpose, for example national or regional level reporting and research. This will support the principle of information management. (Ilkka, 2015)	YES and NO	The finished data content of ePCR in EMS, does show up as clear and structured. The implementation of the data content and its outcomes or effects on the operational level and reporting level can´t be evaluated. The goals to unify and make structured national data content has been successfully achieved.
The national level decision making, and regional reporting will be more efficient and uniform. The uniform data content would make possible the benchmarking on national level. (Ilkka, 2015)	YES and NO	The implementation of the data content of the ePCR in EMS is still ongoing and can´t be evaluated from the user point of view yet. This also affects on the evaluation regarding to the reporting and uniform data collection or benchmarking. However, the national data content offers a clear basis for the uniform data collection, reporting and for the development of the EMS services on national level.
Data content is user-friendly, comprehensive and in use of all of the EMS systems nationally. (Ilkka, 2015)	YES and NO	The data content is clear and well structured national format, serving the needs of the operational level. However, the national implementation hasn´t been executed.
The structured, nationally recognized form for the identification of the patient	YES	The data content offers form for the identification of the patient and this can be used as an access to the patient information in National Patient Data Repository. The technical advancement possibilities for this are taken into notice on the selection of the data content of the ePCR in EMS. The technical solutions are still ongoing project.
The data content is available and serving the needs of the health care substances outside of the EMS.	YES	The Kanta services and its administrative organs have been working to generate an integration and ICT-architecture around the patient information flow.
The data content will serve the needs and support the information flow to administrative stakeholders.	YES	This has been taken into notion with the selection of the data content since the beginning of the process. The Kanta services and its administrative organs have been working to generate an integration and ICT-architecture around the patient information flow also for administrative stakeholders.
The data content will serve the needs for the information about the emergency medical care of the patient.	YES	The data content meets the needs for the emergency medical care of the patient. This was taken into notion on the selection process of the data content. The data content was weighed and structured with the operational expertise in all of the phases of selection process and can be viewed from the outcome.
The data content will serve the need for structured data content by including freeform options with selectively compulsory structures.	YES	The content is classified with the necessary information that needs to be documented and it is divided into categories for volunteer information, noted information, conditionally compulsory, compulsory with notes and compulsory. On the content there is compulsory information required to fill out every time patient is met.

Table 6: How the data content met the needs recognized

8 Assessment of the evaluation ethic, process and outcomes

8.1 Assessment of the evaluation according to the ethical principles

The ethical principle of utility was maintained during the evaluation process. The information was collected with ethical behavior and the information needs were intended to meet with systematical accuracy and honesty. The data available for the evaluator was reviewed with honesty and transparency the stakeholders being involved in the process. Some of the data sources seen by the evaluator had content that can´t be published in the evaluation for the reasons of confidentiality and safety administration on national level. For this reason, the evaluator decided, after consideration, to leave all the memos and, other data sources regarding the process, unpublished. This decision was done to maintain the ethical requirements considering the classified information.

The cross-referencing of the ethical principles presented in the paragraph 5. was applied during different evaluation phases and throughout the evaluation process. For the evaluator especially integrity and the transparency of the process were important, the stakeholders were informed of the phases and possible changes on the schedule of the evaluation process and all the work phases were transparent for the stakeholders. The final phase of the evaluation was done without the stakeholders and evaluator created the content fully independently.

The systematic inquiries for the data sources were made and the evaluator was discussing about the methods of the evaluation and focus with the stakeholders in several occasions. The evaluator was showing the competence for the evaluation with the professional position as a managing consultant regarding to the health care ICT solutions, trough the studies on Master´s level and trough the interviews with stakeholders. The integrity of the evaluation process was maintained throughout, as the main aim of the evaluation was to generate more information about the process of selection the data content and make the selection process, not only visible but available for the use of future projects.

For the integrity of the evaluation, it is to be mentioned that the evaluator was connected with the senior specialist Ilkka trough the evaluators former workplace, Salivirta & Partners. As for the sake of the integrity it is to be noted that the managing consultant and partner of Salivirta & Partners, Timo Kaskinen was involved on the interviews. However, the evaluation process was not discussed outside of the interviews in a manner that it would have affected on the results of the evaluation. As Timo Kaskinen was part of the data content selection process from the early phases, he was heard as stakeholder and an expert. In the last phase of the evaluation, the evaluator didn´t work in the company anymore and the results of the evaluation can be viewed as impartial also for that reason.

8.2 Assessment of the evaluation process and outcomes

The evaluation process leads to conclusions. The conclusions are justified with evidence gathered; they should be consistent with the values of the stakeholders. To ensure justified conclusions the data analysis, synthesis, clarification, systematic interpretation and appropriate comparison with the relevant standards is required. This means that the evaluator uses the appropriate methods to summarize the analysis and interprets the significance of the results by deciding what it means. The judgments should made against the stated values which will classify the results. One way is to consider the alternative way of comparison with program objectives, national norms, needs or comparison group. This should include possibly an alternative explanation for findings and indication why these explanations are relevant. The recommended actions should be consistent with the conclusions. (CDC 2018.)

When the recommendations are presented the evaluator should ensure that the stakeholders are aware of the findings and that the findings are considered on the decision making regarding the program. The most important thing is to ensure that the evaluation achieves its primary purpose by being useful. It should be taken into consideration that several facts can affect on this, such as the credibility of the evaluator, clarity of the report and its timelines and disseminations. Some other factors are the disclosure of findings, impartial reporting and possible changes in organizational context. This requires that the evaluator to disseminates the procedures used and the lessons learned from the evaluation to the stakeholders. The communication of the results should be designed to meet the needs of the stakeholders. (CDC 2018.)

8.3 The current state discussion

The evaluation process started from the discussion of the current state on the national data collection regarding the EMS and the advancement of the ePCR in EMS. The information solutions in healthcare have been rapidly developing during the 21st century in Finland, for example the national development of the Patient Data Repository. The EMS information system has been prolonged compared to the advancement of other information system development in the healthcare. This can also originate from the fact that the EMS is relatively new section of the healthcare, as it can be seen from the theoretical framework of this evaluation. The need for the information solutions and for the ePCR in EMS has been recognized in the early phases of 2000´s but this didn´t lead into further actions. Even though, on regional level the need for the ePCR in EMS was recognize, it required actions and commitment on a national level to create a solution that will benefit all the stakeholders, other healthcare operators, the EMS and the national and regional directive organs. The essential need to have national uniform data content and collection rose at the same time

with the healthcare reform where the organizational responsibilities changed from the municipalities to healthcare districts. The real time information, data collection, reporting that will support the principles of the information management was discovered to be crucial part of advancement and effective patient care in EMS, not to forget the need for adequate decision making.

The selection of the data content for the ePCR in EMS is a part of the bigger project to create sustainable, efficient and structured content for the patient information in EMS. This process is crucial for the information to be comprehensive and user friendly and to serve the needs of the patient, the users and information management on regional and national level. The transparency of the process can help to develop similar processes in the future, to discover the possible pitfalls and make more linear project execution. It also offers information of the process itself and it can be examined together with the results. The data content selection process was unique, as it was the first one when regarding the EMS in Finland and for that reason the transparency, visibility and understanding of the process can offer significant information for the future.

As the process of data content selection for ePCR in EMS can be seen examined trough this evaluation, it does show the efficient teamwork supported by national level organs. However, it also shows that the actors on this process were many and the plan for the ePCR in EMS implementation was postponed. The development and implementation of the Finnish ePCR in EMS has been rather slow since the beginning and it is still ongoing. The results of the nationally supported project to develop the uniform solution for the Finnish ePCR in EMS that serves all the levels of the stakeholders and most importantly the care of the patient, can´t be evaluated yet, since the implementation is still on its way. The implementation of the ePCR in EMS wasn´t executed as planned but despite of that when examining the data content and requirements created for ePCR in EMS, the preparations has been successfully made and are available for the implementation. The plan for the implementation could have possibly been ran together with the data content selection more efficiently. The whole process of the implementation of the ePCR in EMS didn´t efficiently support the selection process the way it could have. The continuous postponing of the implementation delayed the implementation of the data content of the ePCR in EMS on operational level. With that notion, it can be considered, will the data content serve the needs of the ePCR in EMS when it is finally implemented?

The selection process itself was discovered not to be linear and the phases introduced in this evaluation were overlapping with each other. The phases contained several different subcategories but to give clear picture of the selection process, the evaluator decided to select the most significant phases recognized. The selection process included systematic

analysis of different available data contents used in the EMS, before the selection of NEMSIS data content. The standards which led to selection of the NEMSIS were clearly indicated on the selection process and they were seen as most beneficial when reflecting the national needs for uniform information collection. The selection of the NEMSIS data content was also supported by the possibility for national and especially international benchmarking and co-operation with other Nordic countries.

Within the selection process, there were clear indications of the systematic evaluation and mapping for the needs of the EMS for the data content. The needs were also reflected on the development of national level healthcare information system and data collection development. Throughout the data content selection, the operational EMS expertise was used profoundly, especially regarding the data content of the emergency medical care operations. The selection and reflection of the content was made according to the needs of the Finnish EMS and the models and variables of the Finnish EMS system was taken into consideration in every step of the selection process.

At the same time with the data selection process was done the operational requirement analysis. The requirement analysis supports the data content and implementation of the data content of the ePCR in EMS. The project team was working on the data content, but the drafts were shared with the stakeholders with the opportunity to comment. The stakeholders involved were technical and operational expertise from all the levels. When examining the process, it can be seen that the data content was reviewed and defined in a transparent way. These facts support the understanding of the evaluator that the development process was purposely made transparent and included all the possible actors important for the process. The possibility for stakeholders and experts to review and comment the data content and requirements, is showing the willingness of the project team to co-operate in a most beneficial way for all the levels.

The completed data content seems to be serving the needs of the ePCR in EMS. It is well structured and has compulsory structured information requirements as well as volunteer options. The content is meeting the needs set on on the national level on the publications as well as the needs recognized in the beginning of the data content selection. The implementation of the ePCR in EMS will offer more accurate information of how it serves the users and information management in all the levels and especially the care of the patient.

The evaluation process itself was longer than expected and planned in the beginning of the evaluation process. This can be seen as having some effect on the credibility of the evaluation. The data sources used on the evaluation were collected on the spring 2019 and

the evaluation was executed in the spring 2020. The evaluator had a longer than expected period between the data collection for the evaluation and the execution of the evaluation.

The analysis and the evaluation of the materials and modelling of the process was completed on the spring 2020. At that time, some of the information was not available for the evaluator anymore, this was due technical issues regarding the changes on the work status noted on the ethical part of this evaluation. The evaluator made the evaluation based on the available documents and information during the end of the year 2019, so the limited content in the spring 2020 didn´t have crucial effects on the evaluation process.

The evaluation questions were answered accordingly, and the process of the data content selection for ePCR in EMS was visualized. The content analysis can be said to be superficial, but the evaluator decided to focus on the selection process on the level which makes it understandable for all the stakeholders and offers comprehensive understanding of the national level project. It is recognised that this leaves the possibilities open also for further evaluation and observation.

8.4 Suggestions for the future development of the selection processes similar and evaluations

The results of the evaluation suggest that on similar kind of projects, there would possibly be a need for more structured guidance and planning on the national level. This appears from the overlapping of the project with the actual implementation of the ePCR in EMS. The implementation of the ePCR in EMS would have been beneficial to run more coherently with the selection of the data content and the requirement analysis. The reasons for delays of the implementation vary but possibly more consistent guidance and direction of the projects like this on national level would be beneficiary in the future. The national organs co-operation could be examined and reflected for the future projects, since this kind of projects have several stakeholders and beneficiaries.

The produced model of the process on this evaluation serves the purpose of understanding the actual process itself and gives opportunities to evaluate the efficiency of similar kinds processes in the future. The selection process of the data content for ePCR in EMS was consistent and the work was done in coherent manner. The phases of the progress were recognizable and transparent. For the future implementation of similar kind of processes, it could be considered, should the process be documented separately and possibly more consistently. The memos of the actual project meetings are saved but to understand the full picture of the process itself and the activities done could be beneficiary to document the future projects on process level to support the efficiency of the work practices.

The collection of the data sources available and studying the data content made as well as the visualization of the data content selection process for ePCR in EMS opened more available evaluation and observation possibilities for the future. As said in the discussion, the data sources used for this evaluation were wide and the evaluation itself didn´t include deeper analysis of the phases or variables of the data content selection process. In the future it would be possible to design an evaluation model to represent the process on deeper level and examine the activities and outcomes in more profound manner. Other subject that rose to the surface on the early point of the evaluation was the comparison of the Finnish data content for ePCR in EMS and the data content NEMSIS from United States. This comparison should also include the comparison and examination of the EMS systems in the countries mentioned. The Finnish data content of the ePCR in EMS could also be reflected and evaluated against some of the international procedure standards such as resuscitation or some other standardized procedure in emergency medical care.

The implementation of the ePCR in EMS on operational level is still withheld. However, the plan for implementation is targeted to be executed during the year 2020. When the ePCR in EMS is implemented on operational level, it offers the whole new understanding of the comprehensiveness and the user-friendliness of the data content developed. The results of the operational use may vary in the beginning, but the data content should support the operational level, the information flow and most importantly the efficient and good care of the patient. For the future, the examination and evaluation of the whole process as well as the implementation is suggested to be made. Suggestions for the future can be seen from Table 7.

	Suggestions for the future:
1.	The evaluation suggests that on similar kind of projects, there would be a need for more structured guidance and planning on the national level. The implementation of the ePCR in EMS would have been beneficial to run more coherently with the selection of the data content and the requirement analysis.
2.	For the future implementation of similar kind of processes, it should be considerd; should the process be documented separately and more consistently. This could be beneficiary for the future projects as it supports the efficiency of the work practices.
3.	In the future, it would be possible to design an evaluation model to represent the process on deeper level and examine the activities and outcomes in more profound manner.
4.	The evaluation of the comparison of the Finnish data content for ePCR in EMS and the data content NEMSIS from United States could be done. This comparison should also include the comparison and examination of the EMS systems in the countries mentioned.
5.	The Finnish data content of the ePCR in EMS could be reflected and evaluated against some of the international procedure standards such as resuscitation or some other standard-ized procedure in emergency medical care.
6.	The examination and evaluation of the whole process of the defining process of the ePCR in EMS to the implementation is suggested to be made, to gain an understanding as a process in whole and to examine and evaluate the user friendliness of the ePCR in EMS.

Table 7: Suggestions for the future based on the evaluation

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Figures

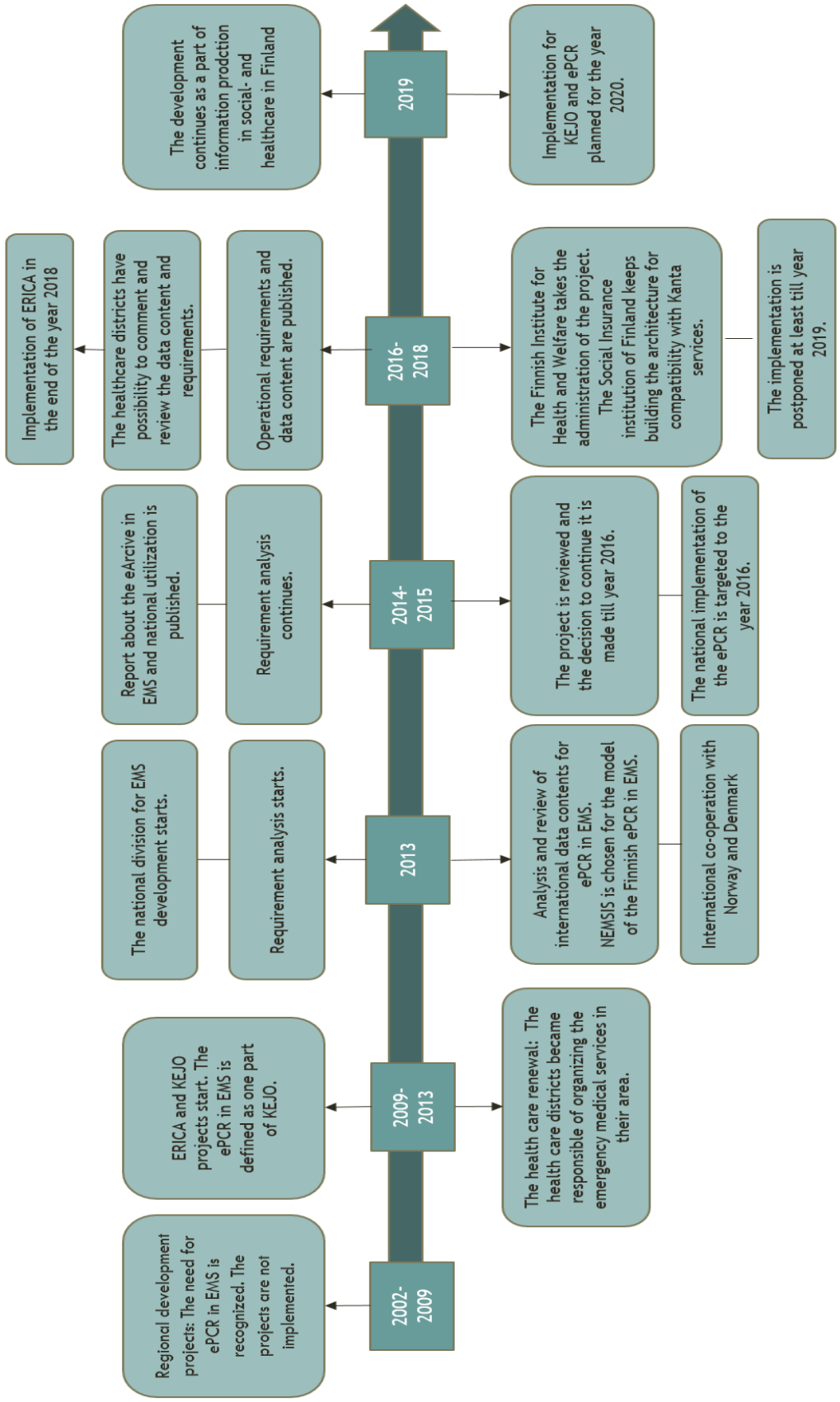
Tables

Appendices

Appendix 1. The material index

	Material used in the evaluation		
	Source	Published/available	Pages
1	Ilkka, L. 2015. Report of the eArcive in Emergency Medical Services - towards better national utilization. National Institute for Health and Welfare	https://www.julkari.fi/bitstream/handle/10024/126313/TY%C3%962015_13_THL%20Esiselvitys%20ensihoitopalvelun%20valtakunnallisesta%20tiedonhallinnasta%20v.%2015.6.2015_sk%20%282%29.pdf?sequence=1	43
2	Ilkka, L (toim.).2016. Ensihoitopalvelun kansallinen tietovaranto ja tiedolla johtaminen. Terveyden- ja hyvinvoinnin laitos, työpaperi 31/2016	https://www.julkari.fi/bitstream/handle/10024/131300/URN_ISBN_978-952-302-744-2.pdf?sequence=1	36
3	Ilkka, L. Räty, T. 2017. Kansallinen sähköinen ensihoitokertomus- Tietosisältö sekä toimin-nallinen ja vaatimusmäärittely.Ohjaus 15/2017.	http://www.julkari.fi/bitstream/handle/10024/135230/URN_ISBN_978-952-302-915-6.pdf?sequence=1&isAllowed=y	54
4	Kurola,J., Ilkka, L., Ekstrand,A., Laukkanen-Nevala, P., Olkinuora, A., Pappinen, J., Riihimäki, J., Silfvast, T & Virkkunen, I. 2016. National survey on the operation of the Finnish Emergency Medical Service (EMS) system. Ministry of Social Affairs and Health, Finland.	http://julkaisut.valtioneuvosto.fi/bitstream/handle/10024/79069/Rap_2016_67.pdf?sequence=1&isAllowed=y	53
5	NEMSIS. 2020.Version 3 data dictionaries & XSD	https://nemsis.org/technical-resources/version-3/version-3-data-dictionaries/	Excel sheets, no page estimation
6	Codeserver, Kanta services. The data content of the Finnish ePCR in EMS.	https://koodistopalvelu.kanta.fi/codeserver/pages/publication-view-page.xhtml	Excel sheets, no page estimation
7	The memos of the project team (The Finnish Institute for Health and Welfare) Years 2013-2018	Not published	Estimated 250 pages
8	The data content qualifications. Excel sheets	Not published	Excel sheets, no page estimation
9	The interview notes from the workshops	Not published	Estimated 10 pages

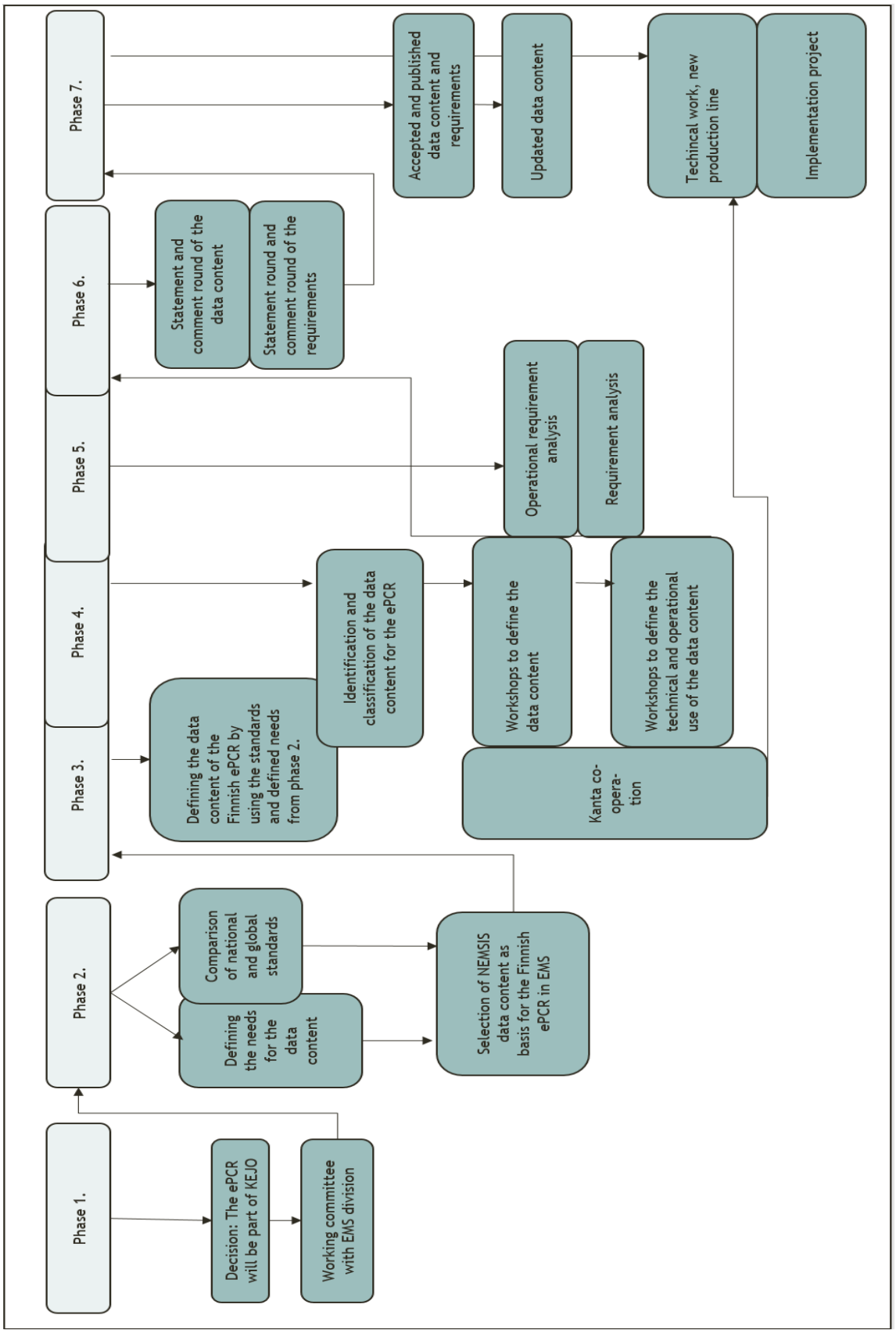
Appendix 2. Visual presentation of the timeline of Finnish ePCR in EMS development



Appendix 3. The phases of the data content selection for Finnish ePCR in EMS

Selection of the data content
Phase 1.
The decision to implement ePCR as part of KEJO
Founding a working committee for development of emergency medical care with division of EMS
Gathering the division of experts. - 5 operational level experts from each special responsibility health care districts, the head physicians of EMS - Representatives of the Finnish Ministry of Social Affairs and Health - Representatives of the Social Insurance Institution of Finland - IT-consultant (in the beginning CGI, later on Salivirta & Partners)
Phase 2.
Defining the needs for the data content
Comparison of the national and global standards
Selection of the NEMSIS data content as basis of the Finnish ePCR in EMS
Phase 3.
Defining the data content of the Finnish ePCR by using the standards and defined needs from the phase 2.
Identification and classification of the data content
Phase 4.
Workshops to define the data content
Workshops to define the technical and operational use of the data content
Kanta co-operation
Phase 5.
Requirement analysis
Operational requirement analysis
Phase 6.
Statement and comment round of the data content
Statement and comment round of the requirements
Phase 7.
Accepted and published data content
Updated data content
Techincal work, new production line
Implementation project

Appendix 4. The visualisation of the data content selection process of Finnish ePCR in EMS



Appendix 5. The data content for ePCR

Codeserver, Kanta services: https://koodistopalvelu.kanta.fi/codeserver/pages/publication-view-page.xhtml

1	Ensihoitokerto-mus	Ensihoitokertomus	Ensihoitokertomus
100	Ensihoitopalve-lun yksikkö	Ensihoitopalvelun yksikkö	Ensihoitopalvelun yksikkö
101	Yksikön kutsu-tunnus	Yksikön kutsutunnus	Yksikön kutsutunnus
110	Ensihoitopalve-lun järjestäjä	Ensihoitopalvelun järjestäjä	Ensihoitopalvelun järjestäjä
111	Järjestäjän tun-niste	Järjestäjän tunniste	Järjestäjän tunniste
112	Järjestäjän nimi	Järjestäjän nimi	Järjestäjän nimi
120	Ensihoidon palvelun-tuottaja	Ensihoidon palveluntuottaja	Ensihoidon palveluntuottaja
121	Palveluntuotta-jan tunnus	Palveluntuottajan tunnus	Palveluntuottajan tunnus
122	Palveluntuotta-jan nimi	Palveluntuottajan nimi	Palveluntuottajan nimi
130	Ensi-hoitoyksikön jä-senet	Ensihoitoyksikön jäsenet	Ensihoitoyksikön jäsenet
131	Nimi	Nimi	Nimi
132	Yksilöivä tun-niste	Yksilöivä tunniste	Yksilöivä tunniste
133	Ensihoidon pät-evyys	Ensihoidon pätevyys	Ensihoidon pätevyys
134	Rooli ensihoi-totehtävän ai-kana	Rooli ensihoitotehtävän ai-kana	Rooli ensihoitotehtävän aikana
140	Ensihoitoyksi-kön tehtävätie-dot, ajat ja vii-veet	Ensihoitoyksikön tehtävätie-dot, ajat ja viiveet	Ensihoitoyksikön tehtävätiedot, ajat ja viiveet
141	Tehtävälaji	Tehtävälaji	Tehtävälaji
142	Tehtävälajin an-toaika	Tehtävälajin antoaika	Tehtävälajin antoaika
143	Tehtäväkiireel-lisyys	Tehtäväkiireellisyys	Tehtäväkiireellisyys
144	Tehtäväkiireel-lisyyden antoa-ika	Tehtäväkiireellisyyden antoa-ika	Tehtäväkiireellisyyden antoaika
145	Yksikkö hälytetty	Yksikkö hälytetty	Yksikkö hälytetty
146	Tehtävä vastaanotettu	Tehtävä vastaanotettu	Tehtävä vastaanotettu

147	Yksikkö matkalla	Yksikkö matkalla	Yksikkö matkalla
148	Yksikkö kohteessa	Yksikkö kohteessa	Yksikkö kohteessa
149	Yksikkö potilaan luona	Yksikkö potilaan luona	Yksikkö potilaan luona
150	Hoitovastuu siirretty toiselle ensihoitoyksikölle	Hoitovastuu siirretty toiselle ensihoitoyksikölle	Hoitovastuu siirretty toiselle ensihoitoyksikölle
151	Yksikkö poistuu kohteesta tai kuljettaa	Yksikkö poistuu kohteesta tai kuljettaa	Yksikkö poistuu kohteesta tai kuljettaa
152	Yksikkö perillä	Yksikkö perillä	Yksikkö perillä
153	Potilas luovutettu	Potilas luovutettu	Potilas luovutettu
154	Ajan puuttumisen perustelu	Ajan puuttumisen perustelu	Ajan puuttumisen perustelu
155	Kohteen tavoittamisviiveen syy	Kohteen tavoittamisviiveen syy	Syy poikkeuksellisen pitkälle kohteen tavoittamisajalle
156	Kohteessaoloviiveen syy	Kohteessaoloviiveen syy	Syy poikkeuksellisen pitkälle kohteessaoloajalle
157	Kuljetusviiveen syy	Kuljetusviiveen syy	Syy poikkeuksellisen pitkälle potilaan kuljetusajalle
158	Viiveen syy potilaan luovuttamisessa	Viiveen syy potilaan luovuttamisessa	Syy poikkeuksellisen pitkälle ajalle potilaan luovuttamisessa tai ensihoitoyksikön valmiuteen palaamisessa
200	Potilaan yleistiedot	Potilaan yleistiedot	Potilaan yleistiedot
201	Potilaan henkilötunnus	Potilaan henkilötunnus	Potilaan henkilötunnus
202	Nimi	Nimi	Potilaan nimi
203	Toimintakyky	Toimintakyky	Potilaan toimintakyky
210	Potilaan yhteyshenkilöt	Potilaan yhteyshenkilöt	Potilaan yhteyshenkilöt
211	Yhteyshenkilön nimi	Yhteyshenkilön nimi	Yhteyshenkilön nimi
212	Yhteyshenkilön puhelinnumero	Yhteyshenkilön puhelinnumero	Yhteyshenkilön puhelinnumero
213	Yhteyshenkilön suhde potilaaseen	Yhteyshenkilön suhde potilaaseen	Yhteyshenkilön suhde potilaaseen
250	Hoidon syy ja kiireellisyys	Hoidon syy ja kiireellisyys	Hoidon syy ja kiireellisyys
250.1	Hoidon syyn pääryhmä	Hoidon syyn pääryhmä	Hoidon syyn pääryhmä

250.2	Pääryhmän tukikysymysten vastaukset	Pääryhmän tukikysymysten vastaukset	Pääryhmän tukikysymysten vastaukset
251	Hoidon syy	Hoidon syy	Hoidon syy
252	Hoidon kiireellisyys (triage)	Hoidon kiireellisyys (triage)	Hoidon kiireellisyys (triage)
253	Hoidon kiireellisyyden määritysaika	Hoidon kiireellisyyden määritysaika	Hoidon kiireellisyyden määritysaika
254	Potilaan ilmoittama oire	Potilaan ilmoittama oire	Potilaan ilmoittama oire
255	Oireiden tai tapahtuman alku	Oireiden tai tapahtuman alku	Oireiden tai tapahtuman alku
256	Oireen ensisijaisuus	Oireen ensisijaisuus	Oireen ensisijaisuus
257	Oireen kesto	Oireen kesto	Oireen kesto
258	Ensisijaisen oireen anatominen sijainti	Ensisijaisen oireen anatominen sijainti	Ensisijaisen oireen anatominen sijainti
259	Ensisijaisen oireen elinjärjestelmä	Ensisijaisen oireen elinjärjestelmä	Ensisijaisen oireen elinjärjestelmä
260	Hoidon toteuttamisen esteet	Hoidon toteuttamisen esteet	Hoidon toteuttamisen esteet
261	Hoidon syyn tai kiireellisyyden puuttuminen	Hoidon syyn tai kiireellisyyden puuttuminen	Hoidon syyn tai kiireellisyyden puuttumisen perustelu
288	Hoito-ohjeen pyytäneen ensihoitoy. jäsenen tunn.	Hoito-ohjeen pyytäneen ensihoitoy. jäsenen tunn.	Hoito-ohjeen pyytäneen ensihoitoyksikön jäsenen tunniste
289	Hoito-ohjeen antajan palveluyksikön nimi	Hoito-ohjeen antajan palveluyksikön nimi	Hoito-ohjeen antajan palveluyksikön nimi
290	Hoito-ohjetiedot	Hoito-ohjetiedot	Hoito-ohjetiedot
291	Hoito-ohjeen muoto	Hoito-ohjeen muoto	Hoito-ohjeen muoto
292	Hoito-ohje	Hoito-ohje	Hoito-ohje
293	Hoito-ohjeen antoaika	Hoito-ohjeen antoaika	Hoito-ohjeen antoaika
294	Hoito-ohjeen antajan tunniste	Hoito-ohjeen antajan tunniste	Hoito-ohjeen antajan tunniste
295	Hoito-ohjeen antajan nimi	Hoito-ohjeen antajan nimi	Hoito-ohjeen antajan nimi
296	Hoito-ohjeen antajan rooli	Hoito-ohjeen antajan rooli ensihoitopalvelussa	Hoito-ohjeen antajan rooli ensihoitopalvelussa

	ensihoitopalvelussa		
297	Hoito-ohjeen antajan roolin tarkenne	Hoito-ohjeen antajan roolin tarkenne	Hoito-ohjeen antajan roolin tarkenne
298	Hoito-ohjeen sisältö	Hoito-ohjeen sisältö	Hoito-ohjeen sisältö
299	Hoito-ohjeen antajan palveluyksikkö	Hoito-ohjeen antajan palveluyksikkö	Hoito-ohjeen antajan palveluyksikkö
300	Vammautumistiedot	Vammautumistiedot	Vammautumistiedot
301	Vammapotilas	Vammapotilas	Vammapotilas
302	Vammamekanismi	Vammamekanismi	Vammamekanismi
303	Vammautumisen riskitekijät	Vammautumisen riskitekijät	Vammautumisen riskitekijät
304	Potilaan paikka ajoneuvossa	Potilaan paikka ajoneuvossa	Potilaan paikka onnettomuusajoneuvossa
305	Potilaan käyttämä turvaväline	Potilaan käyttämä turvaväline	Potilaan käyttämä turvaväline
306	Turvatyynyt	Turvatyynyt	Turvatyynyjen käyttö
307	Putoamiskorkeus	Putoamiskorkeus	Putoamiskorkeus
400	Potilaan status	Potilaan status	Potilaan status
400.1	Ensiarvio	Ensiarvio	Ensiarvio
401	Painoarvio	Painoarvio	Painoarvio
402	Ihon löydös	Ihon löydös	Ihon löydös
403	Pään löydös	Pään löydös	Pään löydös
404	Kasvojen löydös	Kasvojen löydös	Kasvojen löydös
405	Kaulan löydös	Kaulan löydös	Kaulan löydös
406	Rintakehän tai keuhkojen löydös	Rintakehän tai keuhkojen löydös	Rintakehän tai keuhkojen löydös
407	Sydämen kuuntelulöydös	Sydämen kuuntelulöydös	Sydämen kuuntelulöydös
408	Vatsan löydöksen sijainti	Vatsan löydöksen sijainti	Vatsan löydöksen sijainti
409	Vatsan löydös	Vatsan löydös	Vatsan löydös
410	Lantion tai sukuelinten löydös	Lantion tai sukuelinten löydös	Lantion tai sukuelinten löydös
411	Selän tai selkärangan löydöksen sijainti	Selän tai selkärangan löydöksen sijainti	Selän tai selkärangan löydöksen sijainti

412	Selän tai selkärangan löydös	Selän tai selkärangan löydös	Selän tai selkärangan löydös
413	Raajan löydöksen sijainti	Raajan löydöksen sijainti	Raajan löydöksen sijainti
414	Raajan löydös	Raajan löydös	Raajan löydös
415	Silmän löydöksen sijainti	Silmän löydöksen sijainti	Silmän löydöksen sijainti
416	Silmän löydös	Silmän löydös	Silmän löydös
417	Mielentila	Mielentila	Mielentila
418	Neurologinen status	Neurologinen status	Neurologinen status
419	Päihteiden käytön todentaminen	Päihteiden käytön todentaminen	Päihteiden käytön todentaminen
420	Raskaus	Raskaus	Raskaus
421	Lisätiedot	Lisätiedot	Lisätiedot
422	ajankohta, jolloin status kirjattiin	ajankohta, jolloin status kirjattiin	Statuskirjauksen aika
50	Ensihoitotehtävän perustiedot	Ensihoitotehtävän perustiedot	Ensihoitotehtävän perustiedot
500	Fysiologiset mittaukset	Fysiologiset mittaukset	Fysiologiset mittaukset
5000	Ensihoitokertomusmerkinnän väliversio	Ensihoitokertomusmerkinnän väliversio	Kyseessä on ensihoitokertomusmerkinnän väliversio
501	Mittaustapahtuman aika	Mittaustapahtuman aika	Mittaustapahtuman aika
502	Verenpaineen mittaustapa	Verenpaineen mittaustapa	Verenpaineen mittaustapa
503	Systolinen verenpaine	Systolinen verenpaine	Systolinen verenpaine
504	Diastolinen verenpaine	Diastolinen verenpaine	Diastolinen verenpaine
505	Syketaajuuden mittaustapa	Syketaajuuden mittaustapa	Syketaajuuden mittaustapa
506	Syketaajuus	Syketaajuus	Syketaajuus
507	EKG-löydös	EKG-löydös	EKG-löydös
508	EKG-kytkennät	EKG-kytkennät	EKG-kytkennät
509	EKG:n tulkinta	EKG:n tulkinta	EKG-tulkinta
509.1	EKG-tulkinta tekstinä	EKG-tulkinta tekstinä	EKG-tulkinta tekstinä
51	Tehtävänumero	Tehtävänumero	Tehtävänumero
510	Hengitystaajuus	Hengitystaajuus	Hengitystaajuus
511	Hengitystyö	Hengitystyö	Hengitystyö

512	Uloshengitysilman hiilidioksidi	Uloshengitysilman hiilidioksidi	Uloshengitysilman hiilidioksidi
513	Veren häkäpitoisuus, %	Veren häkäpitoisuus, %	Veren häkäpitoisuus, %
514	Veren happisaturaatio, %	Veren happisaturaatio, %	Veren happisaturaatio, %
515	Silmien GCS-pisteytys	Silmien GCS-pisteytys	Silmien GCS-pisteytys
516	Puheen GCS-pisteytys	Puheen GCS-pisteytys	Puheen GCS-pisteytys
517	Liikevasteen GCS-pisteytys	Liikevasteen GCS-pisteytys	Liikevasteen GCS-pisteytys
518	GCS:n arvioon vaikuttavat tekijät	GCS:n arvioon vaikuttavat tekijät	GCS:n arvioon vaikuttavat tekijät
519	Kivun voimakkuus	Kivun voimakkuus	Kivun voimakkuus
52	Tehtävän antaja	Tehtävän antaja	Tehtävän antaja
520	Alkoholin määrä uloshengitysilmassa	Alkoholin määrä uloshengitysilmassa	Alkoholin määrä uloshengitysilmassa
521	Kehon lämpötilan mittauspaikka	Kehon lämpötilan mittauspaikka	Kehon lämpötilan mittauspaikka
522	Kehon lämpötila	Kehon lämpötila	Kehon lämpötila
523	APGAR	APGAR	APGAR
524	Mittauksen kirjaamattomuuden perustelu	Mittauksen kirjaamattomuuden perustelu	Mittauksen kirjaamattomuuden perustelu
525	Keskiverenpaine	Keskiverenpaine	Keskiverenpaine
53	Tehtävän antajan tarkenne	Tehtävän antajan tarkenne	Tehtävän antajan tarkenne
54	Hätäkeskuksen tunniste	Hätäkeskuksen tunniste	Hätäkeskuksen tunniste
55	Hätäkeskuksen nimi	Hätäkeskuksen nimi	Hätäkeskuksen nimi
56	Puhelun kytkeytyminen 112-järjestelmään	Puhelun kytkeytyminen 112-järjestelmään	Puhelun kytkeytyminen 112-järjestelmään
57	112-puhelun alku	112-puhelun alku	112-puhelun alku

570	Labororatorio- ja kuvan-tamistutkimukset	Labororatorio- ja kuvan-tamistutkimukset	Labororatorio- ja kuvan-tamistutkimukset
571	Tutkimuksen aika	Tutkimuksen aika	Tutkimuksen aika
572	Laborato-riotutkimus	Laboratoriotutkimus	Laboratoriotutkimus
573	Laboratoriotu-los tekstinä	Laboratoriotulos tekstinä	Laboratoriotulos tekstinä
574	Kuvan-tamistutkimus	Kuvantamistutkimus	Kuvantamistutkimus
575	Kuvantamistu-los	Kuvantamistulos	Kuvantamistulos
576	Tutkimuksen tekotapa	Tutkimuksen tekotapa	Tutkimuksen tekotapa
577	Laboratoriotu-los ja yksikkö	Laboratoriotulos ja yksikkö	Laboratoriotulos ja yksikkö
58	Kohteen osoite	Kohteen osoite	Kohteen osoite
59	Kohteen kuvaus	Kohteen kuvaus	Kohteen kuvaus
60	Kohteen tark-ennus	Kohteen tarkennus	Kohteen tarkennus
600	Potilaan elvytys	Potilaan elvytys	Potilaan elvytys
601	Potilaan elotto-muus	Potilaan elottomuus	Potilaan elottomuus
602	Potilaan elotto-muuden arvio-itu aika	Potilaan elottomuuden arvio-itu aika	Potilaan elottomuuden arvioitu aika
603	Potilaan elotto-muuden havaitsija	Potilaan elottomuuden havaitsija	Potilaan elottomuuden havaitsija
604	Elvytys ennen ensihoitohen-kilöstöä	Elvytys ennen ensihoitohen-kilöstöä	Elvytys ennen ensihoitohen-kilöstöä
605	Elvytyksen antaja ennen ensihoitohen-kilöstöä	Elvytyksen antaja ennen ensi-hoitohenkilöstöä	Elvytyksen antaja ennen ensi-hoitohenkilöstöä
606	Neuvovan de-fibrillaattorin käyttö pe-ruselvytyksess	Neuvovan defibrillaattorin käyttö peruselvytyksess	Neuvovan defibrillaattorin käyttö peruselvytyksessä
607	Neuvovan de-fibrillaattorin käyttäjä pe-ruselvytykse	Neuvovan defibrillaattorin käyttäjä peruselvytykse	Neuvovan defibrillaattorin käyt-täjä peruselvytyksessä
608	Syd-änpysähdyksen syy	Sydänpysähdyksen syy	Potilaan elottomuuden syy

609	Hoitoelvytyksen toteuttaminen	Hoitoelvytyksen toteuttaminen	Hoitoelvytyksen toteuttaminen
61	Potilasmäärän luokka	Potilasmäärän luokka	Potilasmäärän luokka
610	Hoitoelvytyksen tarkennus	Hoitoelvytyksen tarkennus	Hoitoelvytyksen tarkennus
611	Jäähdytyshoito	Jäähdytyshoito	Jäähdytyshoito
612	Primaarirytmi	Primaarirytmi	Primaarirytmi
613	Potilaan elvytyksen lopputulos	Potilaan elvytyksen lopputulos	Potilaan elvytyksen lopputulos
614	Spontaanin verenkierron palautuminen	Spontaanin verenkierron palautuminen	Spontaanin verenkierron palautuminen
615	EKG-löydös jatkohoitoon luovutettaessa	EKG-löydös jatkohoitoon luovutettaessa	EKG-löydös jatkohoitoon luovutettaessa
616	Elvytyksen lopettamisen aika	Elvytyksen lopettamisen aika	Potilaan elvytyksen lopettamisen aika
617	Elvytyksen lopettamisen syy	Elvytyksen lopettamisen syy	Potilaan elvytyksen lopettamisen syy
618	Elvytystiedon puuttumisen perustelu	Elvytystiedon puuttumisen perustelu	Elvytystiedon puuttumisen perustelu
700	Ensihoitotoimenpiteet	Ensihoitotoimenpiteet	Ensihoitotoimenpiteet
701	Toimenpiteen aika	Toimenpiteen aika	Toimenpiteen aika
702	Ensihoitotoimenpide	Ensihoitotoimenpide	Ensihoitotoimenpide
703	Toimenpiteen suorittaja	Toimenpiteen suorittaja	Toimenpiteen suorittaja
704	Toimenpideyritysten määrä	Toimenpideyritysten määrä	Toimenpideyritysten määrä
705	Hengitystiehallinnan syy	Hengitystiehallinnan syy	Hengitystiehallinnan syy
706	Hengitystiehallinnan komplikaatio	Hengitystiehallinnan komplikaatio	Hengitystiehallinnan komplikaatio
707	Hengitystiehallinnan komplikaation syy	Hengitystiehallinnan komplikaation syy	Hengitystiehallinnan komplikaation syy
708	Käytetty hengitystieväline	Käytetty hengitystieväline	Käytetty hengitystieväline

709	Hengit-ystievälineen syvyys	Hengitystievälineen syvyys	Hengitystievälineen syvyys
710	Hengit-ystievälineen si-jainnin varmis-tamistapa	Hengitystievälineen sijainnin varmistamistapa	Hengitystievälineen sijainnin varmistamistapa
711	Hengit-ystievälineen si-jainnin varmis-taja	Hengitystievälineen sijainnin varmistaja	Hengitystievälineen sijainnin varmistaja
712	Hoitoväline ja koko	Hoitoväline ja koko	Hoitoväline ja koko
713	Nesteensi-irtoreitti	Nesteensiirtoreitti	Nesteensiirtoreitti
714	Defibrilloinnin energia	Defibrilloinnin energia	Defibrilloinnin energia
715	Iskujen ko-konaismäärä	Iskujen kokonaismäärä	Iskujen kokonaismäärä
716	Tahdistuksen energia	Tahdistuksen energia	Tahdistuksen energia
717	Tahdis-tustaajuus	Tahdistustaajuus	Tahdistustaajuus
718	Ensihoi-totoimenpitei-den kom-plikaatiot	Ensihoitotoimenpiteiden komplikaatiot	Ensihoitotoimenpiteiden kom-plikaatiot
719	Ensihoi-totoimenpitei-den lisätieto	Ensihoitotoimenpiteiden lisätieto	Ensihoitotoimenpiteiden lisätieto
720	Hengit-ystievälinetie-don puuttumisen perustelu	Hengitystievälinetiedon puuttumisen perustelu	Hengitystievälinetiedon puuttumisen perustelu
721	Toimenpiteen suorittajan nimi	Toimenpiteen suorittajan nimi	Toimenpiteen suorittajan nimi
780	Lääkehoito	Lääkehoito	Lääkehoito
781	Lääkkeenantoa-ika	Lääkkeenantoaika	Lääkkeenantoaika
782	Lääkkeen nimi	Lääkkeen nimi	Lääkkeen nimi
783	Lääkepakkauk-sen yksilöivä tunniste ja nimi	Lääkepakkauksen yksilöivä tunniste ja nimi	Lääkepakkauksen yksilöivä tun-niste ja tunnisteen mukainen nimi
784	ATC-koodi ja ATC-koodin mukainen nimi	ATC-koodi ja ATC-koodin mu-kainen nimi	ATC-koodi ja ATC-koodin mukai-nen nimi

785	Aineen koodi, koodin mukainen nimi ja koodisto	Aineen koodi, koodin mukainen nimi ja koodisto	Aineen koodi, koodin mukainen nimi ja koodisto
786	Lääkkeen vahvuus tekstinä	Lääkkeen vahvuus tekstinä	Lääkkeen vahvuus tekstinä
787	Lääkkeenantoreitti	Lääkkeenantoreitti	Lääkkeenantoreitti
788	Lääkkeenantotapa	Lääkkeenantotapa	Lääkkeenantotapa
789	Lääkkeenantopaikka	Lääkkeenantopaikka	Lääkkeenantopaikka
790	Annettu lääkemäärä ja määrän yksikkö rakenteisena	Annettu lääkemäärä ja määrän yksikkö rakenteisena	Annettu lääkemäärä ja määrän yksikkö rakenteisena
791	Annettu lääkemäärä tekstinä	Annettu lääkemäärä tekstinä	Annettu lääkemäärä tekstinä
792	Lääkeinfuusion aloitusaika	Lääkeinfuusion aloitusaika	Lääkeinfuusion aloitusaika
793	Lääkeinfuusion päättymisaika	Lääkeinfuusion päättymisaika	Lääkeinfuusion päättymisaika
794	Lääkkeen antajan nimi	Lääkkeen antajan nimi	Lääkkeen antajan nimi
795	Lääkkeen annon peruste	Lääkkeen annon peruste	Lääkkeen annon peruste
799	Lääkehoidon komplikaatiot	Lääkehoidon komplikaatiot	Lääkehoidon komplikaatiot
800	Lääkkeen antajan tunniste	Lääkkeen antajan tunniste	Lääkkeen antajan tunniste
801	Lääkkeen antajan palveluyksikkö	Lääkkeen antajan palveluyksikkö	Lääkkeen antajan palveluyksikkö
900	Jatkotoimet	Jatkotoimet	Jatkotoimet
901	Kuljettamatta jättämisen syy	Kuljettamatta jättämisen syy	Kuljettamatta jättämisen syy
902	Kuljetettujen potilaiden määrä	Kuljetettujen potilaiden määrä	Kuljetettujen potilaiden määrä
903	Kuljetusväline	Kuljetusväline	Potilaan kuljetusväline
904	Kuljetusasento	Kuljetusasento	Potilaan kuljetusasento
905	Kuljetuskohteen tyyppi	Kuljetuskohteen tyyppi	Kuljetuskohteen tyyppi
906	Vastaanottava hoitolaitos	Vastaanottava hoitolaitos	Vastaanottava hoitolaitos
907	Sairaalan yksikkö	Sairaalan yksikkö	Sairaalan yksikkö

908	Vastaanottavan laitoksen nimi	Vastaanottavan laitoksen nimi	Vastaanottavan laitoksen nimi
909	Ennakkotiedon ilmoittamisen aika	Ennakkotiedon ilmoittamisen aika	Ennakkotiedon ilmoittamisen aika
910	Ohjeet potilaalle	Ohjeet potilaalle	Ohjeet potilaalle
911	Ilmoitus muulle viranomaiselle	Ilmoitus muulle virano-maiselle	Ilmoitus muulle viranomaiselle
912	Ensihoitajan su-ositus päivystykselle	Ensihoitajan suositus päivystykselle	Ensihoitajan suositus päivystykselle
990	Kuolema	Kuolema	Kuolema
991	Kuoleman tun-nistamisaika	Kuoleman tunnistamisaika	Kuoleman tunnistamisaika
992	Kuoleman toteamisaika	Kuoleman toteamisaika	Kuoleman toteamisaika
99999	Poistetut tieto-kentät	Poistetut tietokentät	Poistetut tietokentät