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# Architecture of emergency medical services in Germany

## Part I: Integration into the public protection system

### Introduction and problem statement

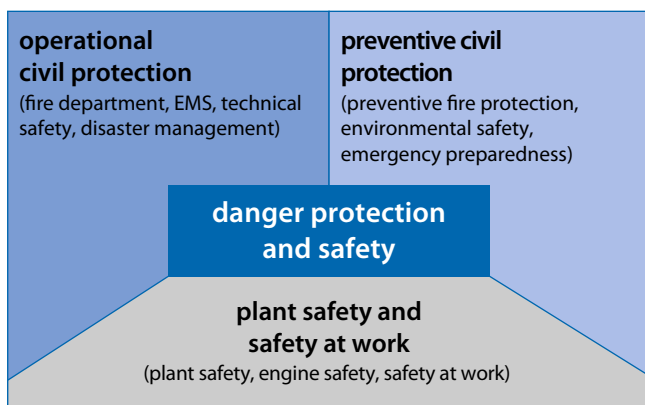
Emergency medical services (EMS) in Germany are regulated according to the EMS state law and are seen as part of civil protection system as well as of services for the public [3].

The development of EMS from simply an ambulance service to a, according to experts, complete third pillar of emergency medical services in Germany (beside the other two pillars: outpatient and inpatient care) began in post-war Germany in the 1950s–1970s. Ambulance services were basically simply small vehicles, some with two stretchers. The drivers working as the emergency personnel only had, if at all, a few hours of limited training in first aid, which qualified them as “suitable personnel.” Nevertheless, even then, the ambulance service personnel’s task was twofold. On the one hand, they transported sick people in the course of transport orders (so-called arranged ambulance service), and on the other hand, there were trips to accidents or emergencies (so-called non-arranged ambulance service, today’s emergency ambulance service). Thus, with respect to EMS, the ambulance service was only responsible for transporting patients and those who were injured, it

did not play a bigger role at that time. The rapidly growing amount of traffic led not only to an increase in traffic deaths in West Germany (the maximum was reached at the beginning of the 1970s with ca. 20,000 traffic deaths per year) but also to a dramatic increase in traffic injuries. These injured people also had to be transported to the hospital, which was done with the available ambulances, but also with private vehicles. The growing number of injured persons triggered innovations in this field, such as additional equipment, larger emergency vehicles, and the founding of organizations that were dedicated to first aid, which brought about the first organized emergency physician services in Cologne and Heidelberg in 1957. In addition to the term “accident vehicle,” the term “ambulance” was also used and became the preferred term. Along with the increase in magnitude came an increase in the amount of equipment and thus more possibilities to help. Whereas speed was the most important aspect for taking the injured to the hospital back then, with the onset of EMS (ambulance car, ambulance car with emergency physician), the ability to practice an enhanced and more comprehensive first response became more and more important. Citizens perceived EMS as part of the protection system, and its functionality was seen as essential for one’s own needs. On the initiative of the traffic ministry, i.e., the German Federal Agency of Traffic (in Germany: BAST), EMS committee of ministries of the states were created in 1970, in which the representative of the ministries from

the “old” states (former West Germany) who are responsible for EMS are represented [7]. Thereby, regular meetings of the EMS representatives from all federal states took place. Consequently, the corresponding discussion and voting platforms were created from which the EMS state law developed in the mid-1970s. Thus, EMS became part of the public rescue service as a part of the “services of general interest” and the civil protection system. The rescue services themselves were essentially carried out by aid organizations. This task was only carried out by the communes that had communal fire departments, some of which dated back to the 19th century, which participated in rescue service. However, it is still being discussed today as to how EMS can be systematically embedded in the architecture of the civil protection system, which tasks are to be carried out by EMS, which competencies are needed for these tasks, and how the participating stakeholders can best interact. This question has increasingly come to the foreground since EMS actions have been growing across Germany for years, in part in double-digit percentages. However, there has not been an actual increase in the *inner dangers*, life-threatening diseases, or injuries [11]. Another special feature is the provision of EMS, as with the operation of EMS, which in contrast to the other civil protection organizations that are publicly funded, is refinanced by health insurance funds. Increasing operative mission numbers, especially those that do not serve to ward off inner dangers (life-threatening danger or severe

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**Fig. 1** ◀ Areas of civil protection, subdivided into a rough and incomplete classification. Moreover, the classification of the individual elements is disputed

harm to health due to illness or injury), are therefore being questioned regarding whether they are not actually part of the responsibility of other stakeholders in the public health sector and should be carried out by them. In particular, this raises the question as to how far the responsibility of EMS reaches, where it ends, and ultimately which responsibilities start thereafter. In addition to the question of responsibility, increasing numbers of EMS personnel are questioning the purpose of their missions, because it is not the missions with life-threatening issues that are increasing, but rather requests for assistance with other causes. The public EMS authorities have to ensure that the constantly increasing work overload in combination with nonurgent cases does not drive the employees to burnout. This could result in a crisis among the personnel, which could lead to demotivation and sickness, even to leaving the branch.

By contrast, the connection to civil protection is not only a question that arises because of the increase in missions, it is also to be found in a draft from 12.06.2017 from the Higher Regional Court of Düsseldorf (Az. VII Verg 34/16) that was submitted to the European Court of Justice in connection with the applicability of § 107 Sect. 1 No. 4 antitrust law (in Germany: GWB). The State Supreme Court of Düsseldorf questions whether EMS missions are civil protection services, which would allow nonprofit organizations to receive EMS orders from outside of the application of the rules of public contracts. The Federal Council of Health-Care Experts also broached the issue of EMS in its

current expertise that was presented as a draft on 07.09.2017 in Berlin<sup>1</sup>, in which EMS and especially the dispatch center were assigned new tasks. Suggestions for funding these new tasks were also made.

The question regarding what EMS have to do with civil protection and how it is to be classified has developed into an issue of widespread interest and is illustrated in this article, in Part 1. Part 2 deals with considerations of EMS within the (emergency) medical care system in Germany.

### Civil protection—what is it?

Abstractly understood, danger is the connection between a threat to persons and their lives or health and/or to (extensive) property damage. Measures that serve to reduce, avoid, or remove such dangers are generalized as civil protection. The structure of civil protection is subdivided into at least three large areas (see **Fig. 1**).

#### Area 1: Preventative civil protection.

This includes all measures and activities that aim to stop or minimize dangers and consequences thereof. Examples of these are preventative fire protection, company contingency planning, strengthening resilience, etc. These measures occur before the danger event has occurred.

**Area 2: Operative civil protection.** Operative civil protection comes into action when the danger event has occurred and must be combated or averted. Organizations involved in effective civil protection are police, fire departments, EMS, civil protection, Federal Agency for Technical Relief (THW), etc.

**Area 3: Plant safety and occupational health.** These areas deal with all measures that provide plants, companies, or organizations with safety, including occupational safety.

### The role of EMS in public safety systems in Germany

The origin of the civil protection system in Germany derives from police law [19]. Maintaining public security and order forms the essential basis of civil protection and is one of the core tasks of an orderly political state (constitutionally protected fundamental democratic order) that provides internal (police) as well as external protection (defense). Therefore, police work can be called practiced police civil protection. By contrast, the rather unwieldy term “non-police aversion of danger” has established itself in the past few years in Germany. This refers to all civil protection areas that are not necessarily police work, i.e., tasks carried out by regulatory agencies, fire departments, disaster protection agencies, and also EMS.

There are overlapping areas in tasks carried out by public regulatory authorities governed in the respective federal state laws with tasks carried out by the federal state police. This can also be partially found in the federal states between tasks carried out by the federal state police and public regulatory authorities. By contrast, fire protection tasks in today's Germany are no longer part of police work, but rather are part of an independent civil protection area. These tasks are carried out by specially trained and equipped emergency personnel and are legally regulated as public tasks. This area comprises fire prevention as well as firefighting and additionally technical rescue (usually designated as technical assistance). The firefighters who carry

<sup>1</sup> Sachverständigenrat im Gesundheitswesen. Die Notfallversorgung in Germany—Status quo. Werkstattgespräch zur Zukunft der Notfallversorgung. 07.09.2017 in Berlin ([http://www.svr-gesundheit.de/fileadmin/user\\_upload/2017-09-08\\_Notfall\\_Webseite.pdf](http://www.svr-gesundheit.de/fileadmin/user_upload/2017-09-08_Notfall_Webseite.pdf)).

out these firefighting and technical rescue missions are thus essentially averting external technical dangers that threaten people's lives and health (external dangers). Police and regulatory authorities also avert external dangers, which include dangers due to disorderly conduct (e.g., misdemeanors) and dangers committed by persons, e.g., criminal acts, which adversely affect public order and public safety. Maintaining order and security through the police and regulatory measures as well as through technical measures (firefighting, technical rescue) protects citizens in their integrity and in those areas of life that are threatened. If people's lives or health are threatened on a large scale, i.e., contiguous parts of the infrastructure, appropriate measures are required that go beyond common measures. These necessary measures are collectively termed "civil protection" and entail that various different services (e.g., first aid teams, special firefighter units, care services, etc.) have to be organizationally integrated and coordinated. In general, the federal states established independent laws on civil protection that predate—historically seen—laws on rescue services by ca. 20 years. These equipment, gear, and deployment concepts have further developed, especially since the end of the 1990s. It began with the establishment of the "Leadership 100 Concept" (DV 100; [6]) and after the 09.11.2001 attack in New York, extremely large attack scenarios [10] were planned, as well as nationwide missions such as the "large-scale mass casualties management concept" (ÜMANV; [10]) and standardized mission units [21].

Increasingly, EMS now comprise, in addition to averting external dangers that endanger human health and life, tasks for averting internal dangers. Internal dangers include all injuries and diseases that endanger human life or cause severe health problems [11]. However, there is a difference between EMS and hospitals, doctor offices, and other health facilities that also save lives and avert or minimize severe health problems: EMS are generally outside of a hospital infrastructure or a health facility. This means that EMS operate in a wide area where external and internal dangers threaten people who

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## Architecture of emergency medical services in Germany. Part I: Integration into the public protection system

### Abstract

In part I, the emergency medical services (EMS) which is part of the public protection system in Germany that works together with police and fire departments is described. Both the development of the EMS and the public protection system are examined. The public protection system of fire departments and EMS is structured into a system for everyday use and an additional system for major accidents and disasters (civil protection system). Fire departments protect people

from "external (technical) threats", while EMS mainly treat and protect from "illness and injuries (internal threats)." The associations and interactions between these actors are described. This article is freely accessible via the "Editors Pick" Choice.

### Keywords

Fire department · Police · Civil protection · Public safety system · Emergency medicine · Organization

## Architektur des Rettungsdienstes in Deutschland. Teil I: Einordnung in das System der operativen Gefahrenabwehr. Englische Version

### Zusammenfassung

In diesem Teil I wird der Einbau des Rettungsdienstes in das System der Gefahrenabwehr in Deutschland im Rahmen der Beschreibung der „Architektur des Rettungsdienstes“ erläutert. Dabei wird sowohl die Entwicklung des Rettungsdienstes als auch die Weiterentwicklung der Gefahrenabwehr beleuchtet. Das Gefahrenabwehrsystem in Deutschland gliedert sich grob in ein System für den Alltag und in ein Erweiterungssystem für besondere (Katastrophen-)Lagen. Die Aufgaben der Abwehr von äußeren Gefahren im Alltag werden dabei im Rahmen ihrer Zuständigkeiten im Wesentlichen von der Polizei und den Ordnungsbehörden

(polizeiliche und ordnungsbehördliche Gefahrenabwehr) sowie der Feuerwehr (technische Gefahrenabwehr) wahrgenommen. Die Aufgabe der Abwehr „innerer Gefahren“ (Lebensgefahr durch Erkrankung oder Verletzung) obliegt zwischenzeitlich umfänglich dem Rettungsdienst. Die Stellung untereinander sowie das Zusammenwirken werden beschrieben.

### Schlüsselwörter

Feuerwehr · Polizei · Katastrophenschutz · Öffentliche Gefahrenabwehr · Notfallmedizin · Organisation

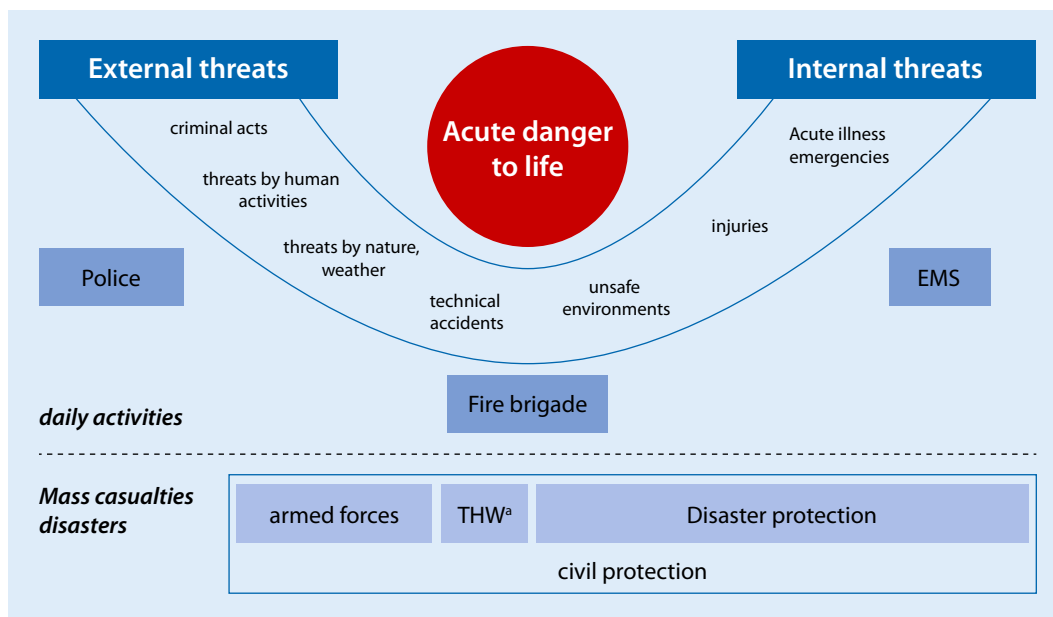
cannot save themselves from disease- or injury-related harm and so require EMS equipment and personnel to avert dangers to life and health. Thus, the term "medical civil protection" has been established [12, 13, 17]. The connection with the other areas of civil protection occurs owing to the common nature of civil protection. Moreover, since internal dangers do not always occur as isolated incidents, but rather especially as the result of external dangers that impact life (e.g., accidents) or persist (e.g., weather, attacks, etc.), averting such dangers can only succeed in connection with civil protection services (e.g., technical and medical measures).

This connection is depicted in **Fig. 2**.

## EMS tasks

### The scope of EMS tasks in the EMS state laws

The scope of EMS tasks is regulated in the EMS state laws, which generally define them as tasks (**Table 1**). It is often stated right at the beginning of the law that EMS are a part of civil protection and health care. When debating how far the jurisdiction of EMS reaches to define the scope of tasks, it has to be determined where the jurisdiction of EMS ends and where other services start. However, especially under closer examination, particularities can be determined that complicate a clear differentiation. Rescue services are almost always classified in



**Fig. 2** ◀ Operational civil protection architecture in Germany. Examples of external and internal dangers are not complete. Police, fire departments, and EMS are parts of the common civil protection system. Civil protection services, THW, and German Armed Forces (in Germany) are part of the second line of defense in civil protection when great dangers threaten humans or areas, and especially the infrastructure. EMS emergency medical services, <sup>a</sup>THW Federal Agency for Technical Relief

the EMS state laws as emergency rescue and combined with (qualified) ambulance services. Some EMS state laws even go so far as to specify both areas as medical-organizational units (NRW, Rhineland-Palatinate, Hesse until 1998). In the laws, emergency rescue is responsible for emergency patients who are in critical condition or face serious harm to health when not treated—or at least that such severe harm to health cannot be ruled out. Non-emergency patients are regularly classified as patients who are not in a critical condition or as other vulnerable patients, as patients with an impaired body function (Schleswig-Holstein), or as patients who are in need of care. These non-emergency patients are generally assigned to the task segment of ambulance services.

Apart from Bavaria, none of the states' regulations specifically restrict the rescue jurisdiction to only life-saving emergency missions. Thus, the definition of EMS as "emergency rescue and ambulance service" includes the responsibility for all people in need of aid, for whom a required medical treatment cannot definitely be excluded. It is likely that the judiciary wished to secure the transport and continued care of injured or impaired, but non-critical, patients, especially in the case of external danger. Therefore, the allocation of non-critical patients to "ambulatory services" means that once

patient contact has occurred, the subsequent transport is also ensured as long as the judiciary of the state wishes to maintain this regulation, which seems likely in the lack of easily available alternatives and services. It remains crucial to communicate that EMS is thus also responsible for "helpless" people.

### Helplessness—an element of civil protection?

Since helplessness is named in the legally defined task area for EMS, the concept of helplessness needs to be addressed in the context of EMS and civil protection. Helplessness can be understood as being characterized as having a lack of autonomy and self-organizational skills. Thus, anyone who is helpless is not capable of recognizing external or internal dangers nor adequately reacting to them. Such people often aimlessly wander around in public and endanger themselves (external threats), or are incapable of shopping for themselves or adequately obtaining enough to eat and drink and so endanger themselves of starving or dehydrating (internal threats). Therefore, helplessness is an "interface" to civil protection. However, this only happens when such helplessness, in connection with external and/or internal threats, leads to or can lead to damage. In general, this occurs owing to a tendency of aggravation. Hereby, the issues that cause the helplessness

cannot be ignored. These range from impaired judgment, for example, due to alcohol, to acute or chronic illnesses or disabilities, and to old age with its natural decrease in autonomy and self-organizational skills. Common wisdom holds that becoming helpless occurs gradually, i.e., there are people who are helpless, but who are still able to cope very well or well enough. However, when the level of helplessness increases, it leads to—rather quickly—a point where the impaired persons can no longer cope and requires external support or help. There are differentiations as to how much help someone needs, which is regulated in the law for mentally handicapped people. For example, caregivers for carrying out various types of assistance can be obtained, such as health care, the right to determine one's place of residence, etc. If the level of autonomy decreases so far that self-care is no longer possible, then a high level of individual care becomes necessary (no legally codified). This is a special form of care, which will not be handled in more depth here. However, if this high level of care is not available and the impaired person is faced with external dangers (e.g., helpless and alone in public), this can lead to an emergency situation that calls for help from neighbors or experts. This can be the police, EMS, or another type of institution that answers emergency calls. Thus, it is understandable that the feature

**Table 1** Overview of the EMS tasks defined in the 16 state laws

	Federal State	Emergency rescue	Ambulance services	Not emergency patients, but (other) needy patients or in need of medical help	Not emergency patients, but care is very necessary or harm to be expected	Special feature
1	Bavaria	+	+	–	–	n/a
2	Baden-Württemberg	+	+	+	n/a	First aid
3	Berlin	+	+	n/a	+	n/a
4	Brandenburg	+	+	+	+	n/a
5	Bremen	+	+	+	+	n/a
6	Hamburg	+	+	+	+	n/a
7	Hesse	+	+	+	+	n/a
8	Mecklenburg-West Pomerania	+	+	+	n/a	n/a
9	Lower Saxony	+	+	+	+	n/a
10	NRW	+	+	+	+	n/a
11	Rhineland-Palatinate	+	+	+	n/a	n/a
12	Saarland	+	+	+	n/a	Task of public health
13	Saxony	+	+	+	n/a	n/a
14	Saxony-Anhalt	+	+	+	n/a	n/a
15	Schleswig-Holstein	+	+	n/a	+	n/a
					At least one vital function impaired	
16	Thuringia	+	+	+	n/a	n/a

Germany has 16 states, which are responsible for fire, police, and EMS  
*n/a* not applicable, *EMS* emergency medical services

helplessness is included in the EMS task portfolio. However, helplessness creates a frame that seems to be infinite and leads to vagueness and can also lead to problems regarding the respective purpose (■ Fig. 3). Including EMS when dealing with helpless persons is advisable when additional external or internal dangers occur.

### Classification of EMS tasks in civil protection (external and internal threats)

The primary task of EMS is averting life-threatening danger and other severe harms to health. Hereby, the focus in EMS is averting external dangers that threaten lives or cause severe bodily harm. This includes persons who are in emergencies that do not require other civil protection services such as police or firefighters. These emergencies are primarily caused by external dangers (e.g., weather, traffic, etc.). The EMS personnel, initially without additional aid, save people at risk. To do this, a call to

112 (EMS number in Germany), as well as suitable vehicles and personnel who are capable of recognizing emergencies and taking appropriate measures (e.g., protection and transport), is necessary. Furthermore, the personnel must be able to recognize if the emergency beside being caused by external threats is also caused by internal threats (e.g., poison, illness, injury), which can require that the patient also obtain medical care, or even become an emergency patient. This task has been carried out in the past by the ambulance services, since emergency medical rescue was not (yet) available. Accident patients were transported to the nearest hospital by the ambulance services without very much health care, except bandages and splints. Colloquial references such as “quick, call an ambulance” can even be heard in television programs to this day.

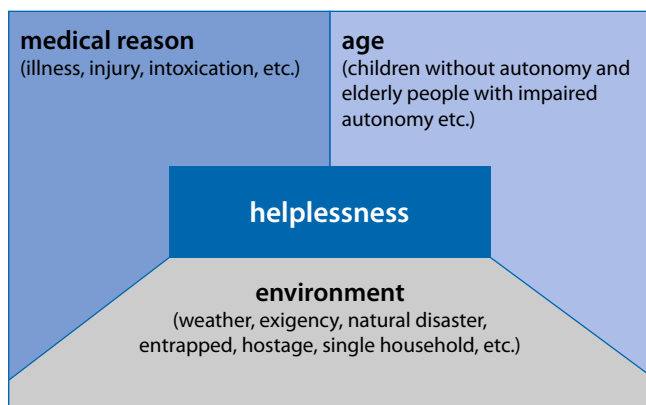
Today, measurement and diagnostic equipment that formerly could only be found in ICC units belong to EMS. Moreover, more and more emergency medi-

cal (including invasive) measures, medications, distribution concepts, as well as electronic documentation and data transmission systems are standard EMS equipment.

Thus, EMS operative tasks can be classified in at least two civil protection areas: averting *external dangers* in emergencies (dangers due to weather, the general public, e.g., gawkers, etc.) and averting *internal dangers* (mortal danger due to internal diseases or injuries) or helplessness [11].

There are also combinations of external/internal dangers and helplessness. In Germany EMS have only limited technical capabilities for averting external dangers. When dangers that require special equipment, more expertise, or authority occur, other civil protection organizations such as firefighters or police are called. Therefore, several civil protection systems work together in combating combined dangers; either together or in a staggered process. However, it is in principle generally a process chain in





**Fig. 3** ◀ Factors that can lead to helplessness, either individually or together

which in the first step the external dangers and then the internal dangers are averted or minimized.

All of these dangers have an *acute component* in common that requires reacting within a specific time frame to avert or minimize harm to people or damage to property. However, a defined reaction time requires the provision of personnel and equipment that are capable of keeping this time frame. In general, one vehicle (ambulance cars) is appropriate for one patient in EMS; an emergency doctor (emergency physician car, HEMS helicopter) is only required in cases of severe diseases or injuries (internal danger). In daily practice, a new management organization is not necessary for EMS. This is in contrast to the management and organization systems typical in civil protection associations.

**Assessment, tactical concepts, and leadership of EMS forces in mass casualties.** Essentially, rescue operations follow this general cycle: alarm, travel to the site, investigate the locality, determine and evaluate external and internal dangers, commence elimination of danger, transport to a suitable hospital, reestablish operational readiness.

At first glance, the civil protection process seems very similar to police and firefighting processes for simple or smaller scenes, i.e., for missions with only a few forces. Since rescue missions generally only deal with one patient (>98% of missions), investigating, determining, and evaluating the localities is done on a simple level. Substantiating the external dangers is generally limited to environmental dangers, technical dan-

gers (e.g., accidents, fires), dangers due to people or groups of people, traffic, etc. As soon as the external dangers increase, the police and firefighting departments are also called, who have additional further-reaching technical possibilities, competences, and authority. Jointly combating external dangers in a mission is everyday routine.

Assessing and evaluating internal dangers is more complex and differentiated. Technical infrastructure and personnel in EMS have substantially risen in the past few decades and define the present state of the art here; regulations to ensure competency of personnel and equipment have been standardized at high levels. Averting internal threats dangers in EMS has now become comparable to treatment in hospital emergency rooms and intensive care units. The depth and breadth of treatment possibilities in cases of internal danger (danger to life and serious health problems) can be clearly seen since EMS has emergency doctors and the competency of the EMS personnel has steadily risen (1977 paramedic with 520 h of training, 1989 paramedic with 2 years of training, 2014 paramedic with 3 years of training) in Germany. The scope and coverage of this will not be handled here; there is specialized literature on this topic.

Larger rescue missions with many patients or other afflicted persons require the same scale of forces and instruments that are needed in larger firefighting or police missions. These instruments are mission plans and standards, specialized personnel for leadership, resource management and organization, communication, training and exercise concepts, etc.

The Leadership 100 Concept [6] is the basis for leadership and management in (large) rescue missions. There are also such regulations for policework [15, 16], firefighting [6], THW [20] as well as for civil protection [9, 18] and the German Red Cross [5], whereby the essential elements are similar. However, each Leadership 100 Concept pertains to the individual service, although the different services work together during large missions. Thus, the question arises as to how these very different organizations/services can work together in one mission yet be completely separately structured, organized, and managed. The answer is that the services have to coordinate among themselves or the missions are under collective leadership.

Everyday firefighting differs from everyday EMS. Firefighting larger fires involves several fire engines with leadership personnel and mission staff who have experience in working together. Thus, firefighter leadership personnel are also experienced in leading, managing, and organizing larger missions. By contrast, everyday EMS often only consists of an ambulance car (in German RTW) or an ambulance car and a physician car in addition. An overarching leadership and management system is not intended. In its historical development, EMS leadership personnel were introduced only gradually, e.g., the “emergency physician in charge” (in German “Leitender Notarzt”, “LNA”) in the 1980s and the “manager EMS” (in German, “Organisatorische Leiter,” ORGL) in the 1990s. However, these positions do not have the same structure as such positions in fire departments. Only the civil protection system, which is organized in units, has similar positions.

The Leadership 100 Concept can be taken as a main regulation concept in public civil protection for carrying out larger missions. This allows the different organizations and functions to be guided under one mission leader, especially since larger missions have several services that have similar tasks (e.g., EMS), which cannot be easily coordinated as independent organizations.

The Leadership 100 Concept [6] has a central strategy that has the goal of

saving lives, whereby the current version seems to stress the aversion of external threats. To quote “3.2.2.1 Tasks of the mission leader”:

*Rescuing, securing and protecting people is the main goal influencing all decisions to be made. However, in many cases, rescue is only possible once prevailing hazards have been removed or at least confined. The protection and recovery of property and environmental protection are always secondary to the rescue of human life.*

This is in principle completely correct; external dangers (when present) must be removed first in order to evaluate and treat internal threats (injuries and illnesses). In special situations only, the sequence of steps must be changed, if e.g., an entrapped person cannot be extracted quickly and medical treatment is possible.

Thus, the fundamental strategy behind the Leadership 100 Concept can be summarized as a concept “to save lives and avert as many deaths as possible and minimize serious harm to health.” According to state of the art in science and technology, this (now) also includes professionally and situationally appropriately averting internal dangers. This means that rescuing (seriously) injured people from external dangers only fulfils part of the strategic goals. Internal dangers must also be averted, which can be summarized as *medical rescue* [4]. This results in realizing that, based on the overall strategy, the necessary tactical concepts have to be developed and applied. Thus, the EMS core competence of medical rescue needs to be at least in the communal civil protection management system (e.g., Leadership 100 Concept). However, medical rescue is not (yet) structurally anchored there. The Leadership 100 Concept lists EMS in section 2.5. only: “pumping water, fire-fighting, EMS” or in Annex 3 “Expert support for the mission leader” together with almost 40 other professional services. EMS leadership positions such as *LNA* and *ORGL*, which are legally required in many places, are not regarded. Viewed historically, it was not clearly defined where these positions were to be embedded in communal civil protec-

tion when the functions were introduced. With the transfer of the responsibility for “triage” and “medical organization” (refer to, e.g., § 7 Abs. 2 EMS state law NRW), it became clear that these were functions at the tactical level ([21], Fig. 4), which were thus a level above immediate patient care (technical level). Both the *LNA* and *ORGL* cooperate to ensure medical care, whereby the *LNAs* concentrate on immediate patient care and *ORGL* ensure that the necessary logistical, technical, and tactical requirements for medical rescue are met. Since this activity is only at the tactical level, i.e., generally occurs at the scene, such expertise is not available at the overlying levels (the level model is described in technical, tactical, operative, and strategic levels in [21]). However, it must be mentioned that when these concepts were developed (mid to end of the 1990s and at the start of the new century), the standard mission scenario entailed major civilian accidents (e.g., bus accidents, multiple collisions, large fires with many injured, etc.). These missions have (to date) strong local dynamics. They are often—especially in conurbations with many resources—quickly processed, even before larger mission leadership can be established and start working. Even then, however, train wrecks were a particularity, which led to a new concept in averting larger accidents (ÜMANV, [10]). However, this concept was and is suitable for smaller accidents, even if there are many injured (i.e., mass casualties), and only a single mission plan (e.g., mass casualty plan) is in use for practically all situations with a large number of injured people. These missions are only processed at the tactical and technical level. Thus, effective communication with hospitals is left as the last challenging organizational task. However, provisions in advanced dispatch plans call for an experienced emergency doctor (*LNA* group) to step in and provide support to the control center or local communication center.

**New challenge—revised EMS mission concepts.** However, unique concept and mission planning have boundaries if there is more than one single scene. If there are several large scenes with many

seriously injured people, or if there are several different EMS mission concepts and decisions have to be made with respect to the distribution of the resources (how the rescue resources are to be distributed, which hospitals are to be assigned, what type of prioritization) or which EMS mission concept (e.g., polytrauma management and care versus tactical medicine) should be applied, then this cannot be recognized, decided upon, or managed locally at the tactical level. There are mission plans for such cases; however, they are still generally based on the Leadership 100 Concept management system.

The decisions that need to be made in such cases require emergency medical expertise that, in the present structure with *LNAs*, only reaches the tactical level of a scene. However, such decisions as described here are not made at this level. To some extent, these decisions must be made in advance (planning level) and prepared and made during the mission (operative level). This is due to adhering to the overarching strategy “to save lives and avert as many deaths as possible and minimize serious harm to health.” However, serious injuries potentially even with hemorrhaging cannot undergo long, drawn-out decision processes. The decision for a specific rescue plan with its corresponding resources and adapted approach needs to be made and justified using only the available, if often limited, information. Furthermore, more information must be acquired, i.e., the right questions have to be asked and the successful scene management constantly updated. Thus, the necessary emergency medical expertise is required during planning as well as during the operative mission level. Communication in treating the seriously injured is not limited to EMS or structures in communal civil protection; rather, the hospitals must be not only “alarmed,” but also comprehensively informed. They have to be able to prepare for the injured, since various high-tech medical procedures might not be immediately available but require specific preparations. Thus, according to the understanding presented here, hospitals need to be part of “medical rescue” and need to be included in the planning

and successful scene management. The same is true for scene situations that are (must be) predominantly carried out by the police, as, for example, in terrorist attack scenarios. Modern concepts of “tactical medicine” are based on military experience and assign specific life-saving tasks with specialized equipment (e.g., tourniquets, hemostyptics, etc.) to medical rescue [8]. The EMS principally provide emergency care in those areas in which the police originally averted danger to life and limb. However, such areas are to be secured by the police before the firefighters or EMS or civil protection services can act. If police medical services are determined to be required by the police in such areas of danger, the fire departments and EMS must be informed and hand over formalities and parking for the on-call vehicles determined.

Principles for cooperation between police, EMS, and care services can be found in framework concepts in various German states (Bavaria [2], Baden-Württemberg [15], NRW [14]) and in organizations (e.g., AGBF, [1]). These principles need to be incorporated into local mission planning. In best-case scenarios, (mission) planning deficiencies can be recognized during exercises, in worst-care scenarios during an actual mission.

Emergency medical expertise can be included in planning through the use of the function EMS Medical Director, which is now available almost completely nationwide. In use, this expertise is provided at the operative level either by the EMS Medical Director or by a member of the LNA group. Thus, an essential element of the mission leadership is embedded at the operative level, i.e., expert handling of “predictability of processes,” which enable predictive decisions. The outstanding advantage of such inclusion is that this enables a joint understanding for the mission.

The tasks and decisions needed at the operative level cannot be underestimated in their importance and time-criticalness. It is common sense that such decisions in medical rescue are the *most relevant* of those that are made during missions.

## Practical conclusion

**Emergency medical services (EMS) in (West-)Germany have been regulated according to the EMS state law since 1974. In most national rescue service laws, the services cover both emergency rescue and (qualified) patient transport. This means that the authority of EMS, contrary to widespread conceptions, over emergency patients, whose lives are in danger and/or who are threatened by serious injury, reaches much further and includes people who are ill and in need of assistance. In the public emergency response system, the EMS is essentially responsible for internal dangers (injuries, illnesses).**

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## Compliance with ethical guidelines

**Conflict of interest** A. Lechleuthner declares that he/she has no competing interests.

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