

### Evaluation of Training and Quality Management during 8 Years

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Early defibrillation is an internationally recognised first aid concept in case of cardiac arrests caused by ventricular fibrillation. Comprehensive studies show a significant increase in the rate of successful resuscitations. However, due to the organisational structure of the rescue service, the immediate availability of a doctor for defibrillation in case of ventricular fibrillation is not always ensured. Therefore, this activity should be delegated to the medical assistant staff. This evaluation shows the application of this concept over a period of eight years.

The District of Dachau covers an area of 579 km<sup>2</sup> with approximately 129,000 inhabitants. The rescue service is provided exclusively by the Bavarian Red Cross. They operate four rescue stations and two emergency doctor vehicles around the clock. During daytime, the emergency doctors on call are provided by the hospitals of Dachau and Markt Indersdorf. At night and on weekends, the emergency doctors on call are provided by a group of specialist doctors only. In addition, there always is a "leading emergency doctor" on duty.

The training concept was carried out as follows: In June 1993, the first medical assistant staff was trained in a pilot project. At that time, mostly paramedics could participate in this project. The course included a 16-hour basic training in ECG interpretation and knowledge of medical equipment. Furthermore, the participants were taught the application of the preset algorithm by case simulations. The algorithm was preset by the persons in charge according to the general guidelines of the AHA and the ERC. The doctor-in-charge tested the training success by a written and practical examination. To maintain a high quality standard, the training was repeated every six months with a final refreshing examination. Already in 1994, the suggestion was taken up to train also medical staff whose education did not correspond with that of the paramedics. So, it was ensured that also first responders master early defibrillation. Therefore, the number of medical aids participating in the refresher courses has continued to grow. In 1993, 43 persons were trained, while in 2000 the number of participants rose to 125 whose prevailing role was as first responders.

In accordance with these requirements, requisition of equipment had to be increased. In 1993, only two defibrillation training units were available. Today, we are able to meet our requirements with AEDs on every ambulance, emergency vehicle and first responder.

Thanks to these efforts, the rate of primary successful resuscitations could be raised to 42% in the District of Dachau. The rate of long-term survivors amounts to approximately 12%. For example, in 2000, the AED was used eight times without the presence of a doctor with respect to a total of 90 resuscitations.

Thus, it can be shown that quality management leads to

higher quality standards also in the rescue service, significantly improving the medical care to the population.

**Key words:** automatic external defibrillation; first responders; paramedics; physicians; resuscitation; success; training  
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### Trauma Management in the Rescue Service: Circle Training as an Educational Concept and Analysis of a New Training Method

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*Introduction:* Trauma management is a challenge for every doctor on emergency call. An emergency with poly-traumatised patients always represents a special stress situation for the medical staff involved. This situation may be aggravated by the technical rescue teams with unknown equipment and different working methods. If communication and teamwork have not been trained at all levels, a rather simple, but potentially complex situation can quickly turn into a dangerous one for the patient and the rescue team. In order to reduce these uncertainties, a new training concept was tested within the service area of the Rescue Association of Dachau.

The District of Dachau covers an area of 579 km<sup>2</sup> with approx. 129,000 inhabitants. There exist two federal highways as well as a great number of winding country roads as potential dangers for creating trauma. The district is crossed by an ICE railway track. Moreover, the district is situated within the closer lane of approach to the Munich Airport Franz-Josef-Strauß, and is included into its primary plan of alert. The rescue service is provided exclusively by the Bavarian Red Cross that operates four rescue stations and two emergency doctor vehicles around the clock. During the daytime, the emergency doctors on call are provided by the hospitals of Dachau, Markt Indersdorf. At night and on weekends, the doctors on emergency doctors on call are provided only by a group of specialist doctors. In addition, there is always a "leading emergency doctor" on duty.

*Method:* The training concept was carried out as follows: (1) to the effect of a circle training, the participants were assigned into small groups. The training was offered as a lecture and performance simultaneously for assistant staff and emergency doctors; (2) the teams were formed only at the route of practice, but were not separated during the whole training program; (3) the teams consisting of at most 4 emergency doctors and 4 to 6 paramedics passed one after the other through realistic stations of practice, such as road accidents, explosion accidents, construction site accidents; and (4) a forward medical post with approximately 20 injured persons had to be built up—this being the most difficult task to organise from a tactical point of view. The training concept contained the support and guidance of the team by experienced emergency doctors and members of the Fire Brigade of Dachau on the basis of a tutor system. Special attention was paid to the organisation of the place of damage under the restricted conditions of first action.

Another aim of practice, was to improve the cooperation and communication with the technical rescue team, such as the fire brigade. The teams were given sufficient opportunities for discussion with the tutors. No model solution was proposed to the teams in order to allow several different ways of solution to be found.

**Results:** The analysis of the trauma training provided interesting results. Overall, the participants were enthusiastic about the performance. On a range of marks from 1 to 5, the average total mark was 1.2. All participants would recommend it to others. The professional benefit was stated as being very high (mark: 1.1).

To the effect of a quality process, all persons seriously injured now are recorded within the rescue service area. The first results also show an increased application of the subjects taught in the real situation.

**Conclusion:** Thus, it can be shown that quality management leads to higher quality standards also in the rescue service, significantly improving the medical care provided to the population.

**Key words:** alert; analysis; doctors; hazards; management; paramedics; plan; quality; rescue; standards; stress; team; training; trauma; tutors

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### Quality Management in the Rescue Service: Resuscitation Analysis in a Rescue Service Area *Karl Wilhelm; Christian Günzel; Frederic William; Heidi Estner*

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**Introduction:** Based on a prospective study, resuscitations in a rescue service area were analysed within a period of 12 months with respect to place, time, primary cardiac rhythm, measures to be taken, and, in particular, the outcome of the patients. The data all were collected in the District of Dachau, Bavaria, where emergency medical services are provided exclusively by the Bavarian Red Cross. A demanding training of the paramedics who have to undergo an annual test in Advanced Cardiac Life Support (ACLS) and early defibrillation has been running for several years. A first-responder system also has been installed. The ambulance and emergency vehicles, as well as the first-responder systems are equipped with AEDs. The patients are resuscitated according to a preset resuscitation algorithm including early defibrillation by rescue service staff and drug treatment on the basis of the American Heart Association (AHA) guidelines.

**Methods:** The district analysed has approximately 129,000 inhabitants. The medical care of the population is nearly exclusively provided by the district-owned hospitals of Dachau and Markt Indersdorf. The rescue service operates four rescue stations and two emergency doctor vehicles around the clock. Based on a record sheet, all resuscitations within the period of 01 January 2000 through 31 December 2000 were recorded. The outcome of the patients could be followed-up in all cases.

**Results:** In total, there were 90 resuscitations. The average age was 60 years. A few more men than women were resus-

citated. The most outstanding fact was a relatively high rate of resuscitations of children (8%). Approximately 20% of the patients were resuscitated by laymen. The most frequent cause for the resuscitations were internal diseases (81%). Most patients (78%) were treated at home. The outcome was surprising: 42% of the patients were taken to hospital after return of spontaneous circulation. Also, 12% were long term survivors. A most satisfactory outcome is the fact that 6% of the survivors were able to leave the hospital without any neurological deficiencies.

The subgroup analysis of resuscitations indicates that the best outcome occur in cases of observed cardiac arrest and immediate resuscitation by laymen.

**Conclusions:** First-class technical equipment and superior training of the rescue service staff may significantly improve the rate of resuscitations in a rescue service area. It can be shown that quality management leads to higher quality standards also in the rescue service, significantly improving the emergency medical service for the population.

**Key words:** bystanders; cardiopulmonary arrests; defibrillation; outcome; quality management; resuscitation; standards; training

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### Quality Management in the Rescue Service: Development of Standards for Treatment of Stroke Patients

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**Introduction:** In view of the number of stroke patients to be treated each year, and the importance of the emergency "stroke" for each patient, the Förderverein and the Bavarian Red Cross of Dachau decided to promote quality standards in the preclinical care by specific training and the development of a stroke record.

**Methods:** Based on a prospective observation, the treatment of stroke patients was to be surveyed in a rescue service area over a period of 8 months with respect to gender of the patient, age, body temperature, blood sugar, oxygen saturation, and ECG-rhythm. The collective survey comprised the District of Dachau, Bavaria, the rescue service of which being exclusively provided by the Bavarian Red Cross. The District of Dachau covers an area of 579 sqkm with approx. 129,000 inhabitants. The rescue service operates four rescue stations and two emergency doctor vehicles. Several first-responder systems have been installed.

In current training courses, guidelines for stroke treatment were imparted, and a standardised record sheet was introduced; it was to be filled-in by every paramedic in case of the diagnosis of "stroke". Besides age and gender, the risk and prognosis factors for the disease as known today, had to be obtained in accordance with an algorithm.

**Results:** On the basis of this record sheet, all stroke treatments from 01 June 2000 up to 01 February 2001 inclusive were recorded. The evaluation of these records indicated that: in total, 94 patients were treated under the primary