

PUBLIC  
**ANNUAL REPORT**  
**2019**

**OUT-OF-HOSPITAL CARDIAC ARREST 2019**

by Deutsches Reanimationsregister – German Resuscitation Registry (GRR)

Deutsches  
Reanimationsregister



**Note:**

The German Resuscitation Registry (GRR) is an online database with a constantly growing number of data sets. Due to different analysis dates, the figures given may differ from those in previously published reports.

The fourth public annual report on out-of-hospital cardiac arrest (OHCA) by the German Resuscitation Registry (GRR) contains the current data, facts and figures on resuscitation provided by the participants in the German Resuscitation Registry. Data records from 88 emergency medical services (EMS), representing a population of approx. 26.6 million inhabitants, are used as a foundation. Thus, reliable information on the resuscitation incidence in Germany, but also on the care of these patients and the success of treatment can be obtained.

As a limitation, it is to be noted that due to the voluntary participation in the German Resuscitation Registry (GRR) the data analysed represent a sample and may not be representative. This brief report is only a partial summary of the recorded data. The presentation is based on the Utstein Report, the international standardized reporting format for out-of-hospital. If simplified of „CPR“ is spoken, it is out-of-hospital (EMS) resuscitation procedures for OHCA of various suspected or confirmed causes.

In the following, the overall data from the German Resuscitation Registry (GRR) for the period 01.01.2019 up to and including 31.12.2019 were analyzed. In addition, the data of a reference group of 30 German emergency medical services from the same period were analyzed, which met the following inclusion criteria:

- Incidence of resuscitation >30/100,000 inhabitants and year
- ROSC (Return Of Spontaneous Circulation) <80%
- RACA (ROSC after Cardiac Arrest) score calculable >60%
- Percentage of documented follow-ups of at least 30%

## CONTENTS

Number of patients and emergency medical services	6
Incidence of out-of-hospital cardiac arrest	6
Age of patients	7
Gender distribution	7
CPR before the EMS arrive	9
Sites where cardiac arrest occurs	10
Witnessed cardiac arrests	10
Telephone instructions on CPR	11
Time between alarm and arrival of the 1st vehicle	11
Suspected cause of cardiac arrest	12
First recorded ECG rhythm	13
Resuscitation procedures	14
Use of mechanical chest compression devices	14
Outcome of EMS treatment	15
In-hospital treatment	16
Summary	17
Authors	18

„We in Mönchengladbach have been successfully participating in the German Resuscitation Register since 2014 and have been involved in the data collection, especially during the introduction of our new resuscitation protocol. It is used as an important quality management instrument and also helps to motivate our employees.“

Dr. Marc Deußen, Medical Director of the Emergency Medical Services,  
Mönchengladbach Fire Department

## NUMBER OF PATIENTS AND EMERGENCY MEDICAL SERVICES

15,274

from 88 emergency medical services

In 2019, the total number of out-of-hospital cardiac arrests documented in the German Resuscitation Registry was 15,274 from 88 emergency medical services.

6,115

from 30 emergency medical services

The chosen reference group for this report meets the above mentioned inclusion criteria and comprises 6,115 patients from 30 EMS.

The reference group is highlighted in the report. This group is supplemented by the overall data. The overall data is indicated as such in this report.



## INCIDENCE OF OUT-OF-HOSPITAL CARDIAC ARREST

In 2019, the incidence of CPR was 62.6 CPRs per 100,000 inhabitants per year in the overall data. Extrapolated to Germany's current population of 83.02 million, in 2019 approximately 51,970 patients were resuscitated by the emergency medical services after a sudden cardiac arrest.

At the reference sites, the incidence rose from 69 (2018) to 72.6 resuscitations per 100,000 inhabitants per year.

### Death declaration and resuscitation

138 | 118.5  
overall data

### CPR by EMS

72.6 | 62.6  
overall data

## AGE OF PATIENTS

The average age of patients was about 69 years. Very young patients - younger than 18 years - were rarely resuscitated. An increasing number of patients aged over 80 years can be observed over time; their proportion is now more than 30% (2014: 27.7%).



## GENDER DISTRIBUTION

male

66.0%

65.9%  
overall data

female

34.0%

34.1%  
overall data

## CPR BEFORE THE EMS ARRIVE

For years, public campaigns have aimed to draw attention to sudden cardiac death and possible CPR by laypersons. Furthermore, the guidelines on CPR recommend telephone guided CPR by dispatch centers. Telephone guided CPR is more and more implemented within Germany.

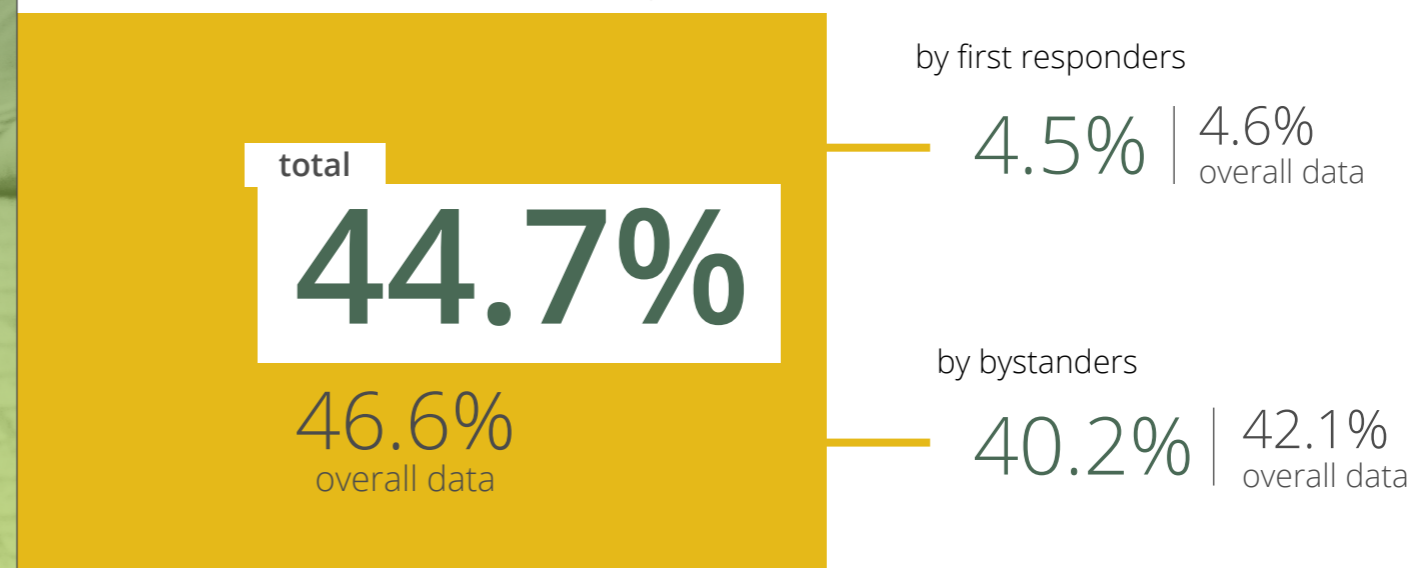
The 2019 annual report shows a bystander CPR rate of 42.1% in the overall group and a significant increase from 31.1% (2014) to 40.2% in the reference group. Telephone instructions on resuscitation also rose from 12.4% (2014) to 23.4% in the reference sites. This is where the campaigns show their effect!

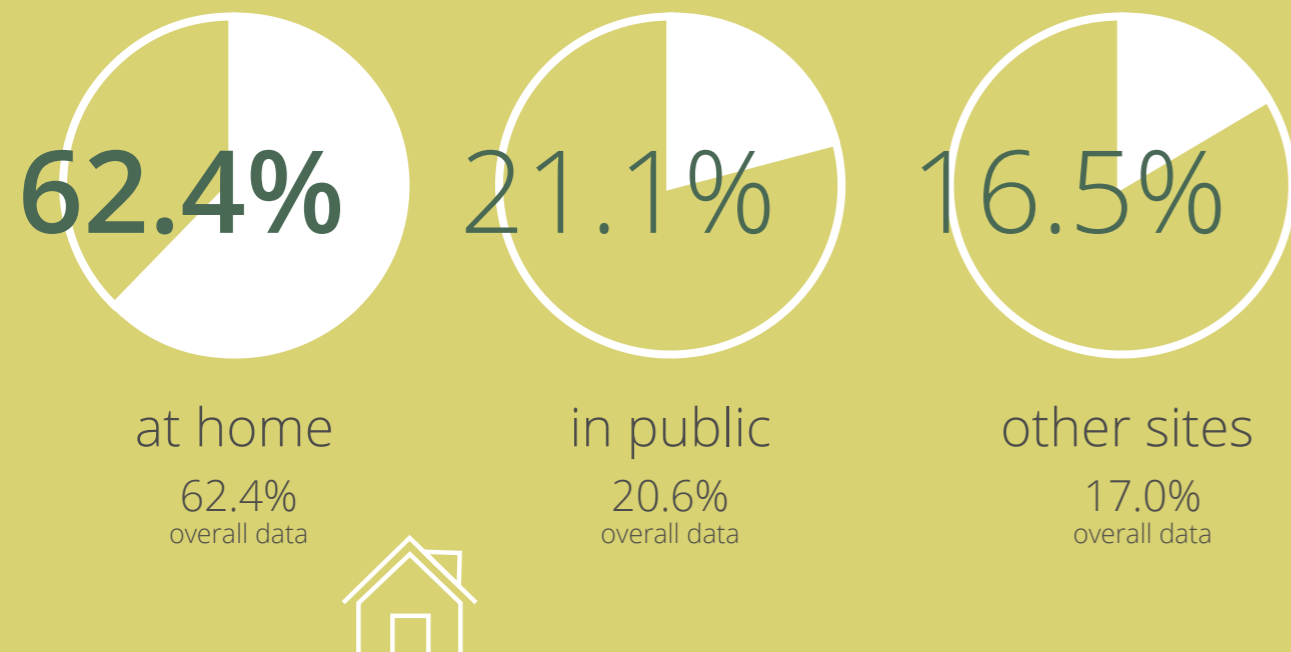
In 4.5% of the cases, first responders carried out CPR before the EMS arrived. In Germany, first responders are voluntary units that are not part of the regular EMS but are used by the dispatch centres to bridge the interval until the EMS arrives.



„The benchmark function is very helpful for emergency medical services and emergency physicians as well as hospitals (in-hospital care) when comparing them with others. This is also true for our dispatch centre, which has been able to see its very good progress in telephone guided resuscitation in a longitudinal comparison for years.“

Bernd Strickmann, Medical Director of the Emergency Medical Services Gütersloh



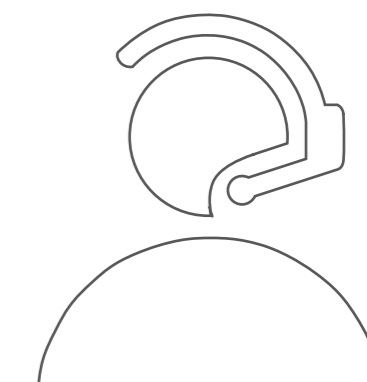


The vast majority of resuscitations in 2019 also took place in private homes. This circumstance also leads to the fact that, on the one hand, relatives or acquaintances are usually present as witnesses, who can start bystander resuscitation. On the other hand, this is one reason why early defibrillation does not occur in the vast majority of cardiac arrests - publicly accessible defibrillators are rarely available at home.

### TELEPHONE INSTRUCTIONS ON CPR

**23.4%**

22.9% overall data



### WITNESSED CARDIAC ARRESTS

overall observed cardiac arrest

**52.2%**

52.8% overall data

by bystanders

**43.5%**

44.3% overall data

by first responders

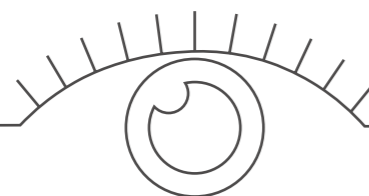
**1.7%**

1.5% overall data

by EMS

**6.9%**

7.1% overall data



### TIME BETWEEN ALARM AND ARRIVAL OF THE 1ST VEHICLE

The average time between receiving the alarm and arriving at the scene with the first unit (RTW or NEF) was **6 minutes and 25 seconds**.

**06:25 ± 03:26**

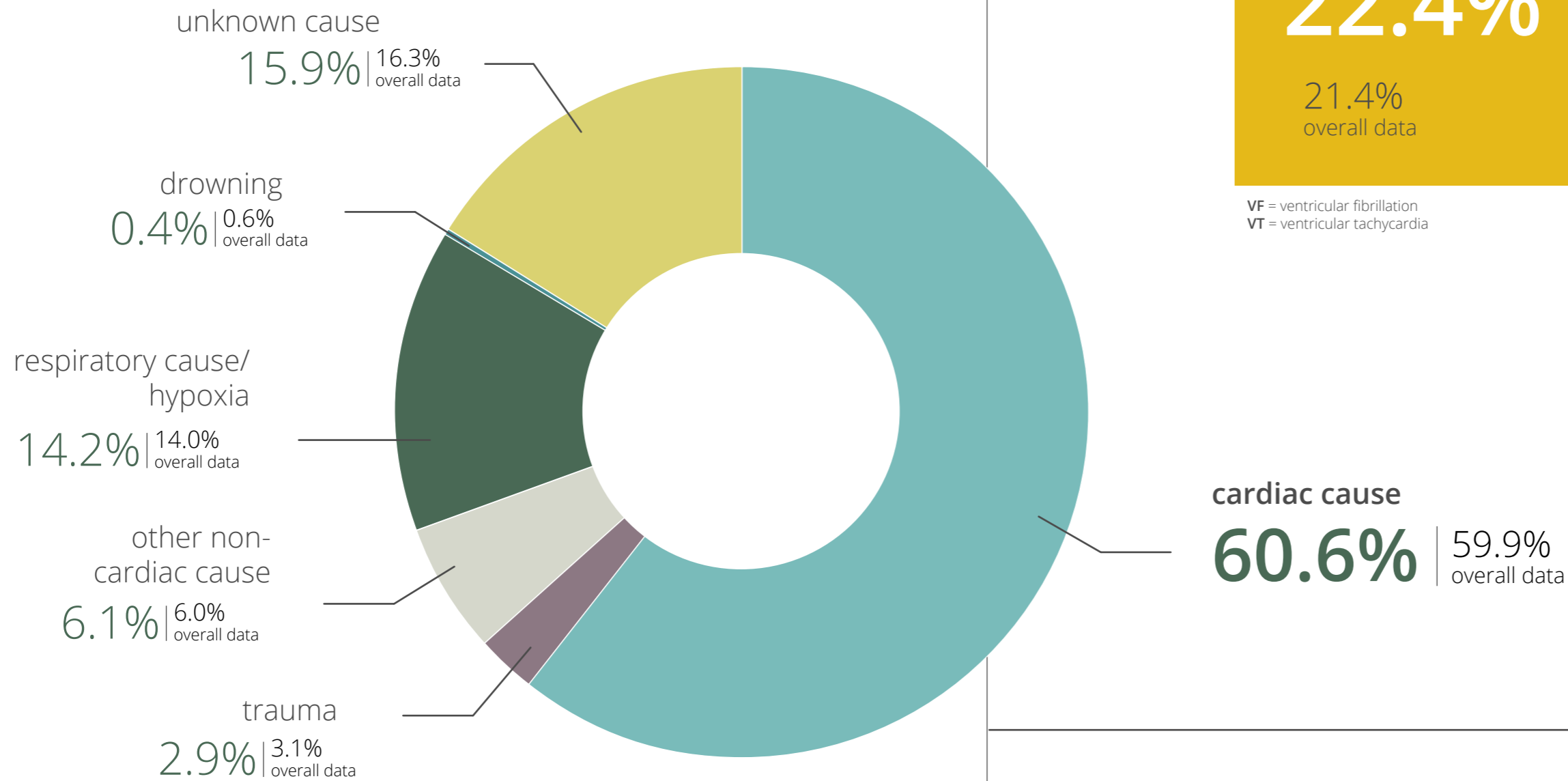
06:48 ± 03:52 overall data



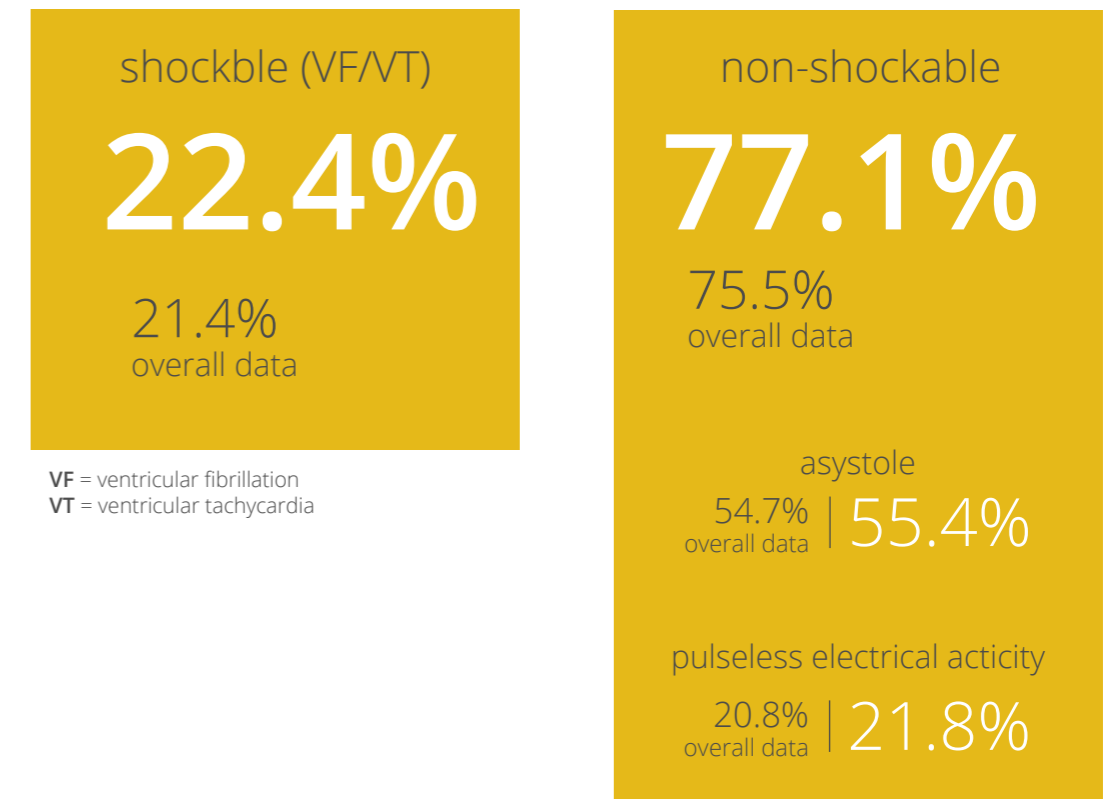
RTW = Rettungswagen, ALS-ambulance  
NEF = Notarzteinsetzfahrzeug, Emergency physician's car

## SUSPECTED CAUSE OF CARDIAC ARREST

Information on causes of cardiac arrest is based on the suspected diagnoses of the emergency physicians. Of course, this information may differ from the exact diagnoses.



## FIRST RECORDED ECG RHYTHM

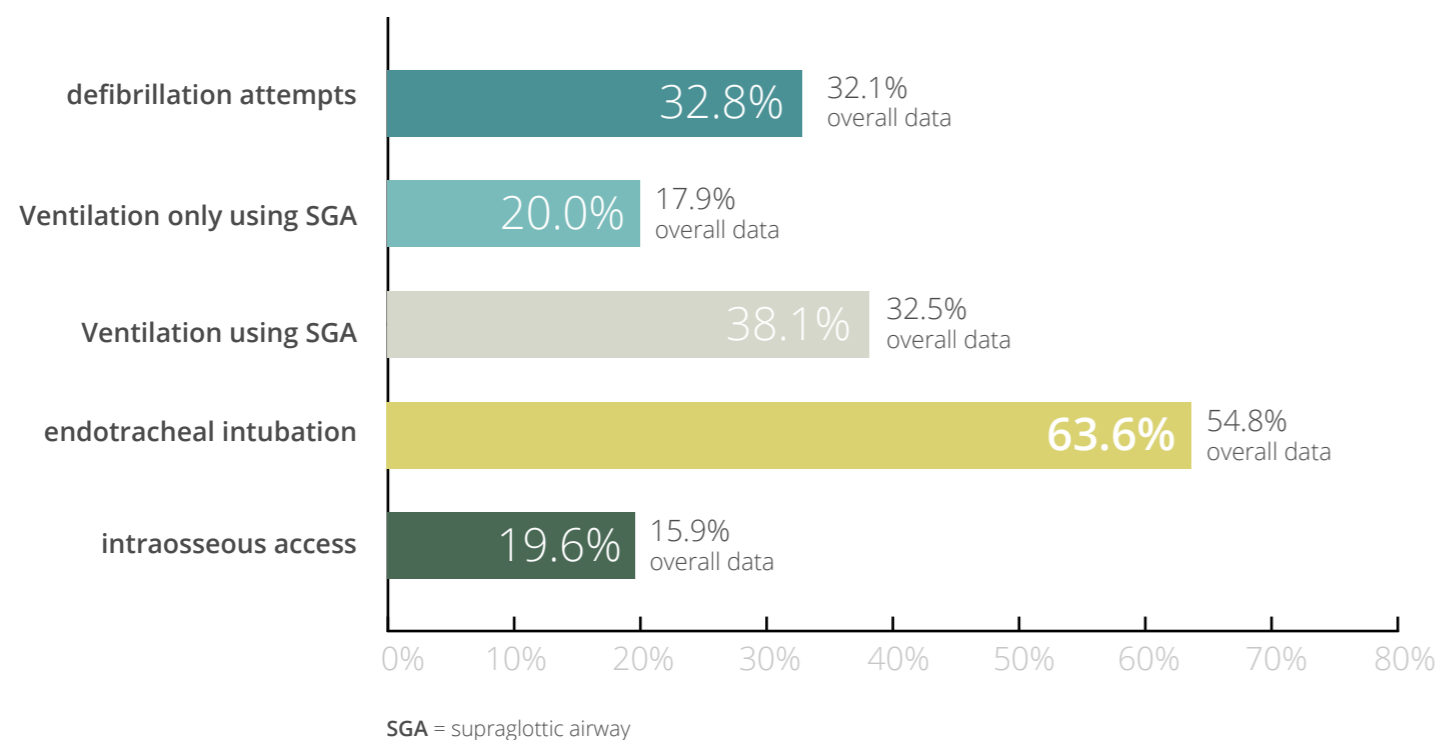


VF = ventricular fibrillation  
VT = ventricular tachycardia



## RESUSCITATION PROCEDURES

Resuscitation procedures have undergone the greatest changes over the years. In comparison to the German reference group, in 2019 we recorded fewer defibrillation attempts and endotracheal intubations, while ventilation via laryngeal tube/mask is more frequent and intraosseous access is used more often.



## USE OF MECHANICAL CHEST COMPRESSION DEVICES

**12.8%** | 10.9% overall data

## OUTCOME OF EMS TREATMENT

In 2019, 43.5% (overall data) to 45.9% (reference group) of patients were resuscitated successfully (ROSC), and 34.5% (overall data) to 37.5% (reference group) of patients reached the hospital with their spontaneous circulation. However, no change in the admission rate could be achieved.

Extrapolated to Germany, approximately 6,740 patients could be discharged after an OHCA in 2019.

ROSC	<b>45.9%</b>	43.5% overall data
ROSC on admission to hospital	<b>37.5%</b>	34.5%
24-hour survival	<b>21.8%</b>	
discharged alive from hospital	<b>11.2%</b>	

## IN-HOSPITAL TREATMENT

The rate of patients admitted to hospital with target temperature management is 23.0%. In addition, coronary angiography was performed in 31.6% of cases.



Target temperature management

23.0%

overall data



Coronary angiography

31.6%

overall data

## SUMMARY

The present annual report „Out-of-hospital cardiac arrest 2019“ by the German Resuscitation Registry (GRR) describes the data of 15,274 patients from 88 sites and of 6,115 patients from 30 reference sites for the year 2019.

Compared to previous years, there has been an increase in bystander and telephone guided CPR, which - in all probability - has led to a higher CPR incidence and admission rate.

However, it can also be noted that in 2019 there were more frequent departures from the gold standards for resuscitation. Instead, the alternative recommendations of the CPR guidelines were applied. For example, emergency physicians more often used an intraosseous access or supraglottic airway device instead of providing the patients with an intravenous access and endotracheal tube.

In addition, mechanical chest compression devices have been used more frequently. These deviations may be responsible for the fact that survival to hospital discharge did not improve despite an increased rate of admission to hospital.

This first primarily descriptive presentation of the findings from the German Resuscitation Registry (GRR) for the year 2019 in comparison with previous years is methodologically inadequate to reliably demonstrate a causal relationship between the therapeutic measures and outcome. Further analyses are necessary to better represent and statistically describe the causal relationship.

The data on which this report is based and further information can be found in *Anästhesiologie und Intensivmedizin* (Anästh Intensivmed 2020; 61: V89-V93).

## AUTHORS



**Matthias Fischer**

» Klinik am Eichert, ALB FILS Kliniken GmbH, Department of Anaesthesiology, Intensive Care, Emergency Medicine and Pain Therapy, Göppingen



**Jan Wnent**

» University Medical Center Schleswig-Holstein, Institute for Emergency Medicine, Kiel  
» University Medical Center Schleswig-Holstein, Department of Anaesthesiology and Intensive Care Medicine, Campus Kiel  
» University of Namibia, School of Medicine, Windhoek, Namibia



**Jan-Thorsten Gräsner**

» University Medical Center Schleswig-Holstein, Institute for Emergency Medicine, Kiel  
» University Medical Center Schleswig-Holstein, Department of Anaesthesiology and Intensive Care Medicine, Campus Kiel



**Stephan Seewald**

» University Medical Center Schleswig-Holstein, Department of Anaesthesiology and Intensive Care Medicine, Campus Kiel  
» University Medical Center Schleswig-Holstein, Institute for Emergency Medicine, Kiel



**Sigrid Brenner**

» University Hospital Dresden, Department of Anesthesiology



**Tanja Jantzen**

» Intensive Care Transport Mecklenburg-Vorpommern, Kreisverband Parchim e.V., Parchim



**Berthold Bein**

» Asklepios Klinik St. Georg, Department of Anaesthesiology and Intensive Care Medicine, Hamburg



**Andreas Bohn**

» City of Münster, Fire Department, Medical Director of the Emergency Medical Services



**Patrick Ristau**

» University Medical Center Schleswig-Holstein, Institute for Emergency Medicine, Kiel

... and the participating Emergency Medical Services in the German Resuscitation Registry (GRR)

[www.reanimationsregister.de](http://www.reanimationsregister.de)

Deutsche Gesellschaft für Anästhesiologie  
und Intensivmedizin e.V. (DGAI)

Roritzerstraße 7  
D-90419 Nürnberg

Phone +49 911 9337-80  
Fax +49 911 9338-195

Deutsches Reanimationsregister –  
German Resuscitation Registry (GRR)

Copyright © by Deutsches Reanimationsregister 2020

Suggested citation::

Fischer, M., Wnent, J., Gräsner, J.-T., Seewald, S., Brenner, S., Jantzen, T., Bein, B., Bohn, A., Ristau, P., & the participating Emergency Medical Services in the German Resuscitation Registry (GRR). (2020). *Public Annual Report 2019 on Out-of-Hospital Cardiac Arrest 2019 by Deutsches Reanimationsregister - German Resuscitation Registry (GRR)*. [www.reanimationsregister.de/berichte.html](http://www.reanimationsregister.de/berichte.html)