TraumaRegister DGU®
DEUTSCHE GESELLSCHAFT FÜR UNFALLCHIRURGIE

German Trauma Society (DGU)

Committee on Emergency Medicine, Intensive Care and Trauma Management (Sektion NIS)

and AUC - Academy for Trauma Surgery

TraumaRegister DGU®

Annual Report 2016

with patients admitted until end of 2015

TraumaRegister DGU®

TR-DGU

This report does not contain real hospital results (where indicated as 'Your hospital') but provides summary data from the whole registry or artificial values in order to generate an impression of how a real hospital report looks like

Preface

Dear participant of TraumaRegister DGU®,

we are happy to present the **Annual Report 2016** of the TraumaRegister DGU® for your hospital. This report contains all trauma patients admitted until end of 2015, and completely documented until end of March 2016.

The number of patients documented per year has stabilized on a high level. Last year, 39,346 trauma patients have been documented in the registry, this were about 500 more than in 2014. We welcome new participants from Finland, Belgium, Luxembourg, and Switzerland. The number of hospitals from Germany was again about 600.

Unfortunately, the number of patients with less severe injuries is still high. Therefore, the total number patients documented in the registry should not be titled as 'severe trauma' or 'polytrauma'. Last year, a **basic patient group** was defined. This group excludes patients with minor injuries and thus improved the comparability of the results. This decision received a lot of positive feedback so that we continued to limit the annual report to this patient group. In 2015, about 7000 cases (18%) not belonging to the basic patient group were excluded.

A **new dataset definition** of the registry has been approved last year, and the online documentation as been adapted accordingly. The revised online platform has been relaunched early this year. However, a large portion of patients from 2015 (77%) have still been documented with the previous platform. Thus results from the new dataset version will be available in the report only from next year on.

What is new in this report

Compared to the changes introduced last year (new page 1: patient groups; pages 2 & 8 extended with a second page) there were only minor changes in the present report.

The graph presenting the number of **documented patients** (basic group) on page 6.1 has been replaced by a box-plot-like figure. It was also split up for the three different levels of care so that you could compare like with like.

The focus on **data quality** was further increased by adding a new page (9.2). We developed a combined measure for data completeness based on 10 different variables. This combined measure of data quality, the average compoleteness rate, is then compared among all hospitals. Again, a figure similar to a box plot has been added where each hospital could identify the individual value amongst all other hospitals.

Kindest regards

Rolf Lefering Christian Waydhas Stefan Huber-Wagner Ulrike Nienaber

Sektion NIS of DGU – Arbeitskreis TraumaRegister and AUC - Akademie der Unfallchirurgie GmbH

Content

Page

1. Sample

Admission via the shock room and need for intensive care is the official **inclusion criterion** for documenting a patient in the TraumaRegister DGU® (TR-DGU). Patients who died before ICU admission should also be included. This pragmatic criterion was chosen to avoid complicated score calculations in the emergency room, and to limit the documentation to patients with relevant injuries.

However, in recent years, the number of patients with only minor injuries continuously increased. On the one hand, this means a higher workload, but more important it limits also the comparability of findings both between hospitals and over time. Therefore, a '**basic patient group**' was defined last year, and nearly all analyses presented in this report refer to this patient group only (and not to all documented patients).

The severity of an injury is determined by the *Abbreviated Injury Scale* (**AIS**) which assigns a severity grade from 1 (minor) to 6 (maximal) points to each injury. Using these severity grades, more sophisticated measures like the *maximum AIS severity* (**MAIS**), the *Injury Severity Score* (**ISS**) or the *New ISS* (**NISS**) could be derived.

The following table gives an overview about the different patient groups in 2015.

	Your hospital 2015	primary admitted	transfer in	early transfer out	**TR-DGU 2015**
Total number of documented patients	**39346**	33645	3095	2606	39346
MAIS 1 The most severe injury of these patients were of AIS grade 1 (MAIS = 1). Thus they were not severely injured. Furthermore, the RISC II prognostic score has not been validated for these cases. These cases were excluded from further analysis (except page5, chapter 3)	**4211** (11%)	4036	38	137	4211 (11%)
MAIS 2 The worst injury was of AIS grade 2	**8997** (23%)	8148	327	522	8997 (23%)
MAIS 3+ The worst injury was of AIS grade 3 or more (MAIS 3+) which recently was defined as a „serious injury" by the EU when looking for an internationally agreed definition for road traffic research.	**26138** (66%)	21461	2730	1947	26138 (66%)
Intensive care Patients who required intensive care due to their injuries (admission to ICU)	**30557** (78%)	26484	2771	1302	30557 (78%)
Deceased These patients died in the acute care hospital	**3444** (9%)	3095	349		3444 (9%)
Basic patient group This definition includes all MAIS 3+ patients. MAIS 2 patients were included only if they died or were treated on the intensive care unit. Patients also had to have valid age data.	**32338** (82%)	**27142**	**2996**	**2200**	**32338** (82%)
ISS 16+ The definition ISS ≥ 16 (or > 15) is used in many scientific papers on trauma patients.	**17630** (45%)	14120	2115	1395	17630 (45%)
Severely injured Injury severity (ISS ≥ 16) is combined with physiological consequences as done with the new 'polytrauma' definition (see p. 11, and Paffrath et al. 2014).	**10043** (26%)	8309	1020	714	10043 (26%)
Polytrauma According to the new der „Berlin Definition" two body regions need to be severely affected (MAIS 3+ in each), and one or more physiological problems are present (see p. 11, and Pape et al. 2014)	**4800** (12%)	4165	356	279	4800 (12%)

2. Observed Mortality and Prognosis

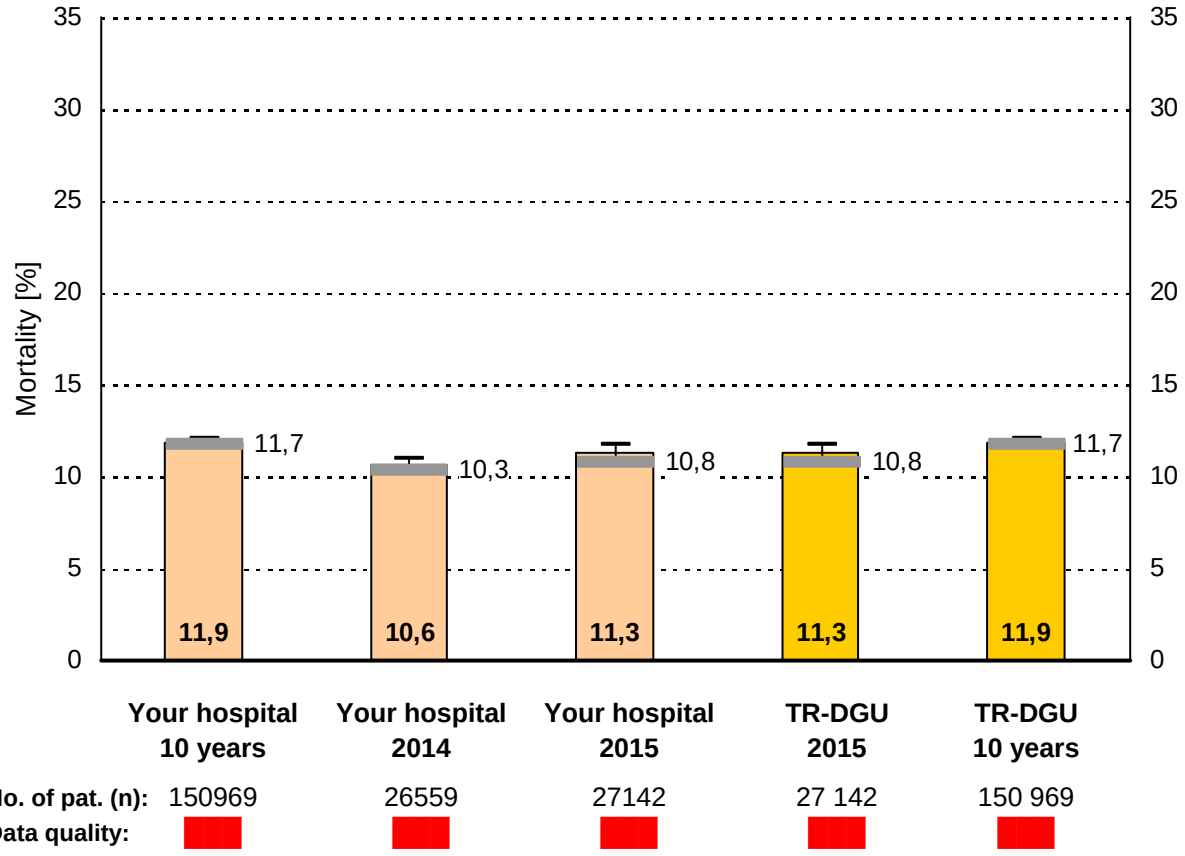
Comparing the **observed mortality** of severely injured trauma patients with their **prognosis** is a central element of quality assessment in the TraumaRegister DGU®. Here the prognosis is derived from the newly developed **RISC II** prognostic score (Revised Injury Severity Classification, see Lefering et al. 2014). This score could be calculated for all primary admitted patients. The analysis on this page is limited to the **basic patient group** as defined on page 1.

Number of patients (basic patient group) documented in the last **10 years** (2006-15): n = **180870**
- among them, documented last year (**2015**): n = **32338**
- among them, **primary admitted** cases (no tranfer in; no early transfer out): n = **27142**

Comparisons of outcome and prognosis will be performed in **primary admitted patients** only. For patients **transferred in** from another hospital (n=2996 in 2015) initial status from primary admission was missing; patients **transferred out** early (within 48 hours after admission; n=2200 in 2015) have no final outcome documented.

The mean age of the 27142 patients was 51.0 years, and 69% ware males. The mean ISS was 18.1 points. Of these patients 3074 died in hospital, which was **11.3%** (95% confidence interval: 10.9 - 11.7). The risk of death prognosis based on RISC II **10.8%**. You find these values in the figure below, where also your hospital results from previous years are presented together with the overall result in the registry.

Details and definition of **data quality** are given on the following page 2.2 (see also page 8).



Legend to the figure:

The bars represent the observed mortality rate; percentages are given at the bottom of each bar. The predicted mortality rate based on RISC II is given as a **grey** vertical bar. This bar turns to **green** or **red** in case that the observed mortality is significantly lower (= better) or higher (= worse) than expected, respectively.

The interpretation of the results has to consider that these findings depend on statistical uncertainty. Therefore, the 95% confidence interval for the observed mortality rate is given as well (***vertical line***). The confidence interval describes a range of values which cover the true value with a high probability (95%). The more patients a value is based on, the narrower is the confidence interval. In case that the expected prognosis lies outside the confidence interval, it could be interpreted as a significant deviation ($p<0.05$).

If the observed mortality rate is based on ***less than 5 cases***, the large confidence interval will not be presented.

Data Quality of Prognosis

The validity of a prognosis depends on the quality and the completeness of variables required for its calculation. The **RISC II** score requires 13 different pieces of information; these data are wighted and combined into a final estimator of outcome. The only compulsory components were age and injury severity, however, every additional information about the patient makes the outcome prediction more precise.

Therefore, we added supplementary information about the data quality of the prediction. If all data required for calculating the RISC II score were present, or if only a single value was missing, then this patient was considered as a '**well documented**' case. The percentage of well documented patients (per hospital) is then used to quantify the data quality of outcome prediction. We defined three colour-coded categories:

means: **95-100%** of cases were 'well documented',
means: **80-94%** of cases were 'well documented',
means: **less than 80%** of cases were 'well documented'.

	Your hospital 10 years	Your hospital 2014	Your hospital 2015	TR-DGU 2015	TR-DGU 10 years
All cases in the basic group (n)	150969	26559	27142	27 142	150 969
'well documented' cases (n)	111435	21229	21287	21 287	109 726
(%)	73.8	79.9	78.4	78.4	72.7
Data quality, colour code					
Average number of missing components per patient	1.1	0.9	0.9	0.9	1.1

Mortality *versus* prognosis

Your hospital 2015: Patients in the basic group: **27142** primary admitted cases
Deviation from prognosis: **+0.5%** (TR-DGU: +0.5%)

The following figure compares each hospital's **observed mortality rate** with the respective **RISC II prognosis in 2015,** like on page 2.1. The deviation of observed mortality rate from the expected prognosis is plotted against the number of patients on the horizontal axis. Negative values correspond to mortality rates which are lower than expected. The dotted lines represent the 95% confidence interval. Hospitals with **less than five patients** were **not included** in this figure, due to the large statistical uncertainty.

3. Basic data from the last 3 years

The results in this table refer to the **basic patient group** only excluding patients with minor injuries (see page 1).
Attention: Results have to be interpreted with caution when the number of patients is low!

		Your hospital				TraumaRegister DGU®	
		10 years	2013	2014	**2015**	2015	10 years
Total no. of patients	[n]	180,870	29,018	31,538	**32,338**	32,338	180,870
Primary adm. & treated	[n]	151,290	24,450	26,604	**27,142**	27,142	151,290
Early transferred out	[n]	10,930	1,810	2,060	**2,200**	2,200	10,930
All primary admissions	[n]	162,220	26,260	28,664	**2,9342**	29,342	162,220
From other hospital	[n]	18,650	2,758	2,874	**2,996**	2,996	18,650
Patients							
Mean age	[years]	49.2	50.4	50.9	**51.2**	51.2	49.2
70 years or older	[%]	23%	25%	26%	**26%**	26%	23%
Male patients	[%]	71%	70%	70%	**69%**	69%	71%
Trauma							
Blunt trauma	[%]	96%	96%	96%	**96%**	96%	96%
Mean ISS	[points]	19.7	18.4	18.4	**18.4**	18.4	19.7
ISS ≥ 16	[%]	59%	54%	54%	**55%**	55%	59%
Head injury (AIS head ≥ 3)	[%]	39%	37%	37%	**37%**	37%	39%
Pre-hospital Care (only primary admissions)							
Intubation	[%]	29%	24%	23%	**22%**	22%	29%
Unconscious (GCS ≤ 8)	[%]	20%	18%	17%	**17%**	17%	20%
Shock (BP ≤ 90 mmHg)	[%]	12%	10%	9%	**9%**	9%	12%
Avg. amount of volume	[ml]	779	672	655	**653**	653	779
Shock Room / ER (only primary admissions)							
Whole body CT	[%]	74%	75%	76%	**78%**	78%	74%
X-ray of thorax	[%]	44%	41%	38%	**36%**	36%	44%
Blood transfusion	[%]	11%	9%	8%	**8%**	8%	11%
Treatment in the Hospital							
Operated patients [1) 4)]	[%]	70%	67%	66%	**65%**	65%	70%
No. of op. if operated [1) 4)]	[n]	3.6	3.4	3.4	**3.3**	3.3	3.6
Treatment on ICU	[%]	88%	86%	87%	**88%**	88%	88%
LOS on ICU [2)]	[days]	7.4	6.7	6.6	**6.4**	6.4	7.4
Intubated/ventilated [2)]	[%]	48%	42%	41%	**39%**	39%	48%
Days intubated [2)]	[days]	3.7	3.1	3.1	**2.9**	2.9	3.7
Outcome							
LOS in hospital [3)]	[days]	18.3	17.1	16.8	**15.9**	15.9	18.3
Hospital mortality [3)]	[%]	11.8%	11.1%	10.8%	**11.4%**	11.4%	11.8%
Multiple organ failure [1)3)]	[%]	23%	20%	20%	**20%**	20%	23%
Discharge to other hosp.	[%]	17%	17%	16%	**18%**	18%	17%

[1)] not available in the reduced QM dataset [2)] only ICU patients [3)] without patients transferred out early [4)] years with incomplete documentation excluded

4. Quality Indicators

Measurements of process of care are compared with the TR-DGU average and with previous years. The results on this page refer to primary admitted cases from the **basic patient group** (see page 1), or subgroups thereof. This includes also patients transferred out early. For calculating the time from hospital admission until various diagnostic procedures, only patients with valid time data were considered (see also remarks below). A standard deviation (SD) is presented only if more than one value was available.

	Your hospital				**TR-DGU**	
Indicator	10 years	2012	2013	**2014**	2014	10 years
Primary admitted cases (basic patient group only)	n=162,220	n=26,260	n=28,664	n=29,342	n=29,342	n=162,220
1. Pre-hospital time from the accident until hospital admission; in patients with ISS ≥ 16 [∅ min ± SD, n]	**72** ± 54 n=77232	**71** ± 56 n=11281	**71** ± 56 n=12295	**73** ± 58 n=12632	**73** ± 58 n=12,632	**72** ± 54 n=77,232
2. Intubation rate in unconscious patients (GCS 3-8) [%, n / total]	**85%** 25322 / 29634	**83%** 3606 / 4333	**83%** 3622 / 4361	**81%** 3822 / 4698	**81%** 3,822 / 4,698	**85%** 25,322 / 29,634
3. Time from hospital admission until **first x-ray of the thorax** [∅ min ± SD, n]	**16** ± 20 n=62101	**17** ± 21 n=9671	**17** ± 21 n=10061	**16** ± 21 n=9973	**16** ± 21 n=9,973	**16** ± 20 n=62,101
4. Time from hospital admission until first **x-ray of the pelvis** [∅ min ± SD, n]	**16** ± 18 n=43026	**17** ± 20 n=6663	**17** ± 19 n=6791	**16** ± 18 n=7002	**16** ± 18 n=7,002	**16** ± 18 n=43,026
5. Time from hospital admission until **abdominal sonography** (FAST) [∅ min ± SD, n]	**6** ± 10 n=117935	**7** ± 10 n=19063	**6** ± 10 n=21468	**6** ± 10 n=23174	**6** ± 10 n=23,174	**6** ± 10 n=117,935
6. Time from hospital admission until **cranial CT** (cCT), in patients with pre-hospital GCS < 15 [∅ min ± SD, n]	**23** ± 17 n=63950	**22** ± 17 n=9992	**22** ± 16 n=10687	**22** ± 17 n=11286	**22** ± 17 n=11,286	**23** ± 17 n=63,950
7. Time from hospital admission until **whole-body CT** (WBCT) [∅ min ± SD, n]	**24** ± 18 n=109513	**23** ± 18 n=18170	**23** ± 17 n=20299	**23** ± 17 n=22035	**23** ± 17 n=22,035	**24** ± 18 n=109,513
8. Time from hospital admission until first **emergency surgery**; (for list of interventions: see remark below) [∅ min ± SD, n]	**86** ± 39 n=23934	**89** ± 38 n=4123	**91** ± 38 n=4522	**90** ± 37 n=4764	**90** ± 37 n=4,764	**86** ± 39 n=23,934

Remarks: ∅ = average
Indicator 1: Times exceeding 8 hours were disregarded.
Indicator 3-8: Times exceeding 3 hours were disregarded.
Indicator 6: If a whole-body CT was performed, it was counted as cCT well.

Indicator 8 is based on the following seven interventions: craniotomy, thoracotomy, laparotomy, revascularization, embolization, and external stabilization of the pelvis or of extremities.

5. Individual Cases

5.1 Non-survivor with a low risk of death (< 15% acc. to RISC II)

Patients from the **basic patient subgroup** who died in hospital although their initial prognosis (based on the RISC II score) seemed to be rather low are listed here. In total, 560 such cases were observed in the whole registry in 2015.

A low risk of death does not mean that none of these patients would die, however, this does not happen very often. Therefore, a detailed analysis of such cases may lead to **relevant problems** during the acute care of these patients. But this could only be judged in a more detailed individual analysis of these cases.

Your hospital: Among the 27142 primary admitted cases, **22253 patients** had a risk of death < 15%. From these cases **560 patients died.** They are listed in the following table (LOS = length of stay).

ID in the registry*	RISC II	ISS	Age	Sex	Date of admission	LOS
D-xxxxx-A@2015-00123.n	9.8	17	89	F	01-Mai-2015	5

5.2 Survivor with a high risk of death (> 75% acc. to RISC II)

Patients who survived although their risk of death was rather high (>75%) could be indicative for a very well functioning **interdisciplinary approach** in acute care. Overall, 210 such cases were observed in the registry last year. Again, details could only be found after individual analysis of each case. Patients transferred into another hospital within the first two days were disregarded here, of course. Nevertheless, patients could have been transferred later and survival might not have been secured.

Your hospital: Among the 27142 primary admitted cases, **1399 patients** had a risk of death > 75%. The survivors among these patients (**n = 210**) are listed below.

ID in the registry*	RISC II	ISS	Age	Sex	Date of admission	LOS
D-xxxxx-A@2015-003.n	81.2	45	25	M	24-Jul-2015	45

5.3 Non-survivor with minor injuries

The RISC II score is calculated for patients with ISS ≥ 4 points only. However, in 2015 there were 4211 cases with an ISS less than 4, i.e. the most severe injury had an AIS severity grade of one (max. AIS = 1). Although such patients usually survive, we observed 28 deaths is this subgroup (0.5%). These cases should be subject of a detailed internal revision, including the correctness and completeness of injury coding.

Your hospital: **4211 patients** had a max. AIS = 1; **20 of them died**:

ID in the registry*	ISS	Age	Sex	Date of admission	LOS

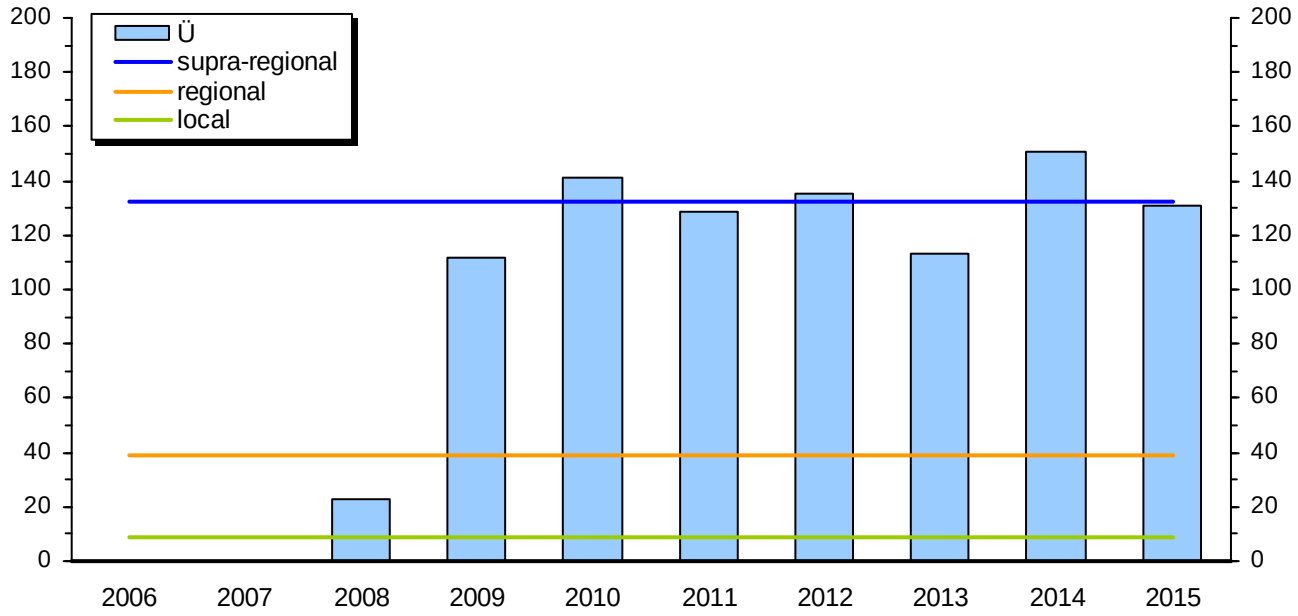
* The ID in the registry is composed of the hospital code, the year of trauma, and an individual patient code

6. Graphical Comparisons

6.1 Patients documented in the last 10 years

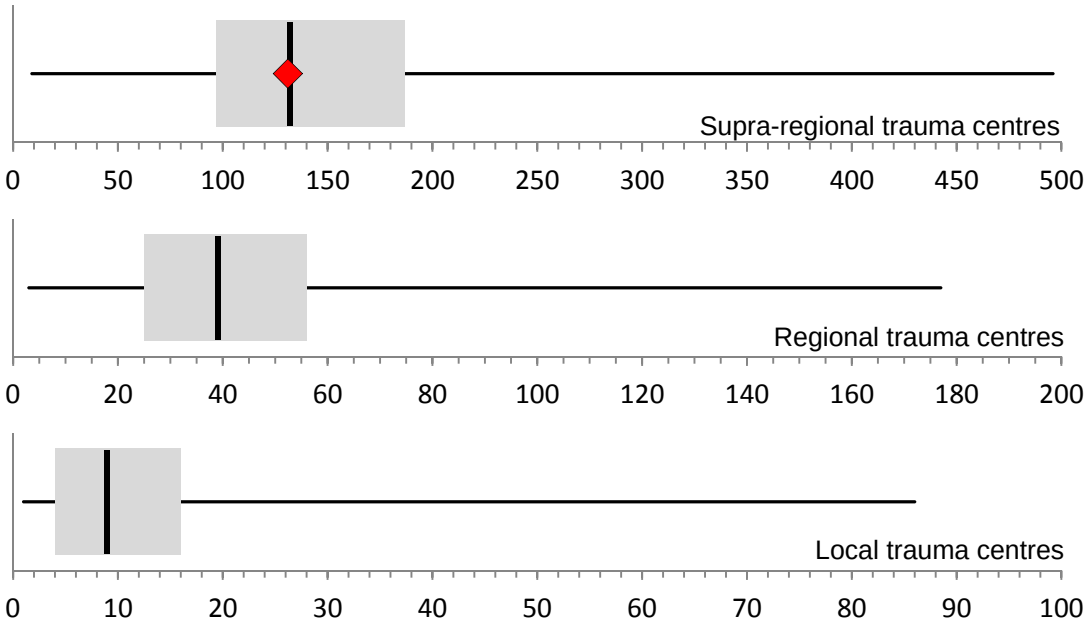
The following figure presents the number of documented trauma patients in the last ten years. Only cases from the basic patient subgroup were considered here. (see page 1 for definition). From your hospital **180870 patients** were documented in the last 10 years, among them **32338 patients from 2015**.

In order to better interpret your annual sample size the **median number of cases** per year and hospital is also given in the figure, for three levels of care: blue line for supra-regional trauma centers (n=132), and orange and green lines for regional (n=39) and local (n=9) trauma centers. Your hospital has been classified as **supra-regional trauma center**. Hospitals without a certified level of care were classified at the best knowledge.



6.2 Level of care and sample size

In 2015, your hospital documented **32338 patients** in the basic patient group. This value is marked with a **red diamond** (♦) below. The values in the graph represent the median (vertilal line), the inter-quartile range (grey box) and minimum / maximum of all hospitals in 2015.

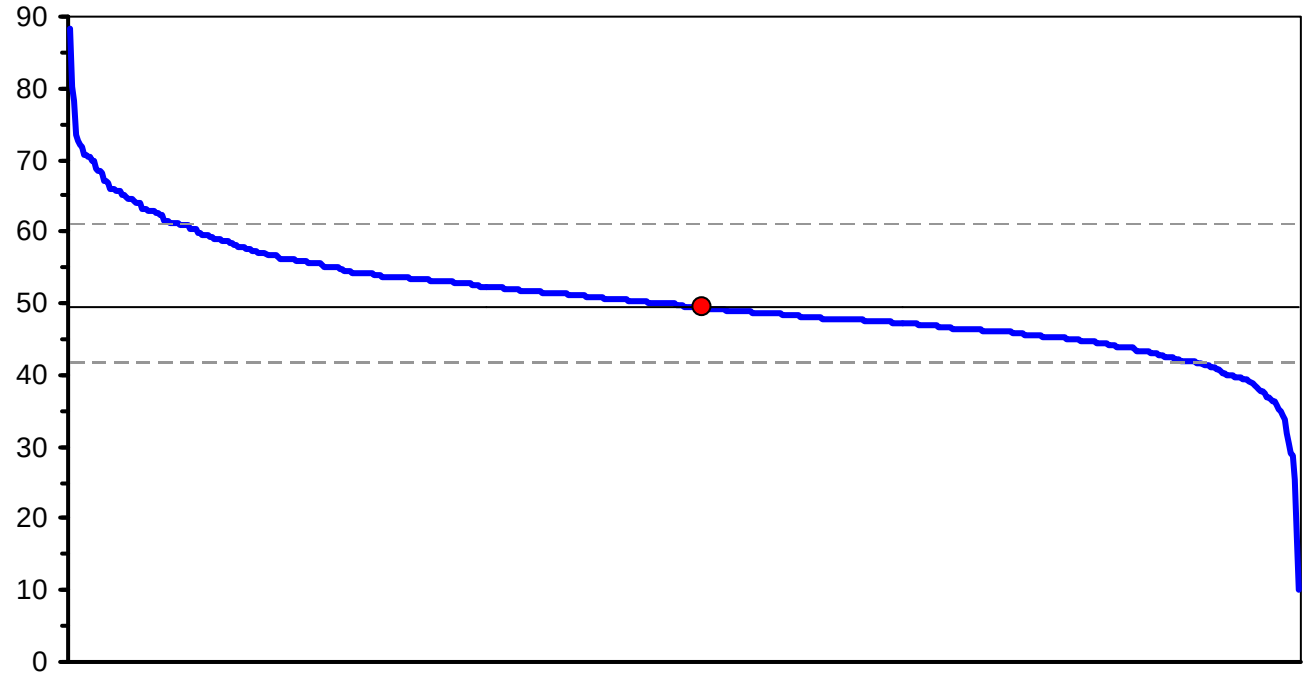


6.3 Graphical Comparisons with other Hospitals 2015

The following figures compare data of your hospital (from **2015**) with respective data from all other hospitals in the TraumaRegister DGU®. Only cases from the **basic patient subgroup** will be considered (see page 1). Your hospital's value is indicated as a **red dot** (●) if data from **at least 3 patients** were available. The horizontal line is the median value of all hospitals, and the broken lines are the 10% and 90% percentiles.

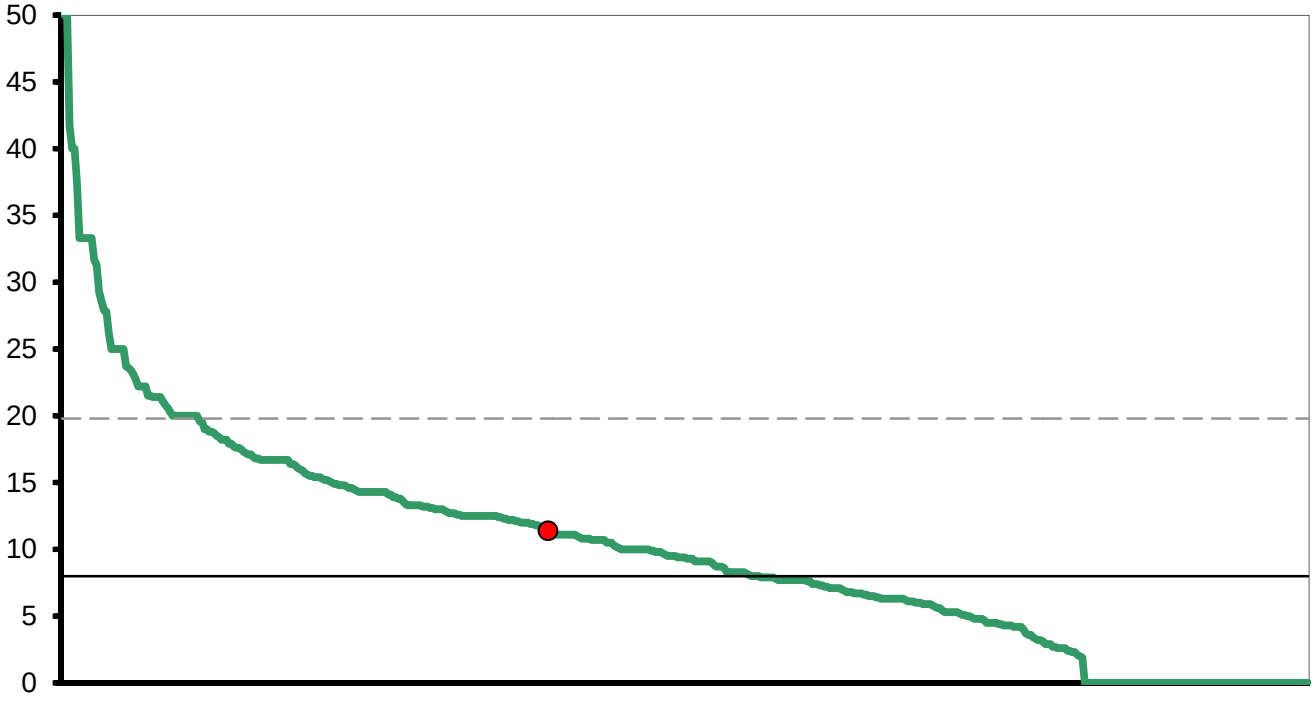
Age (mean) Your hospital: **49.4 years** (3,2338 patients)

The median value of all 591 hospitals in 2015 (with at least 3 cases) was 49.6 years.



Hospital Mortality (%) Your hospital: **11.4%** (3,422 of 30,138 patients)

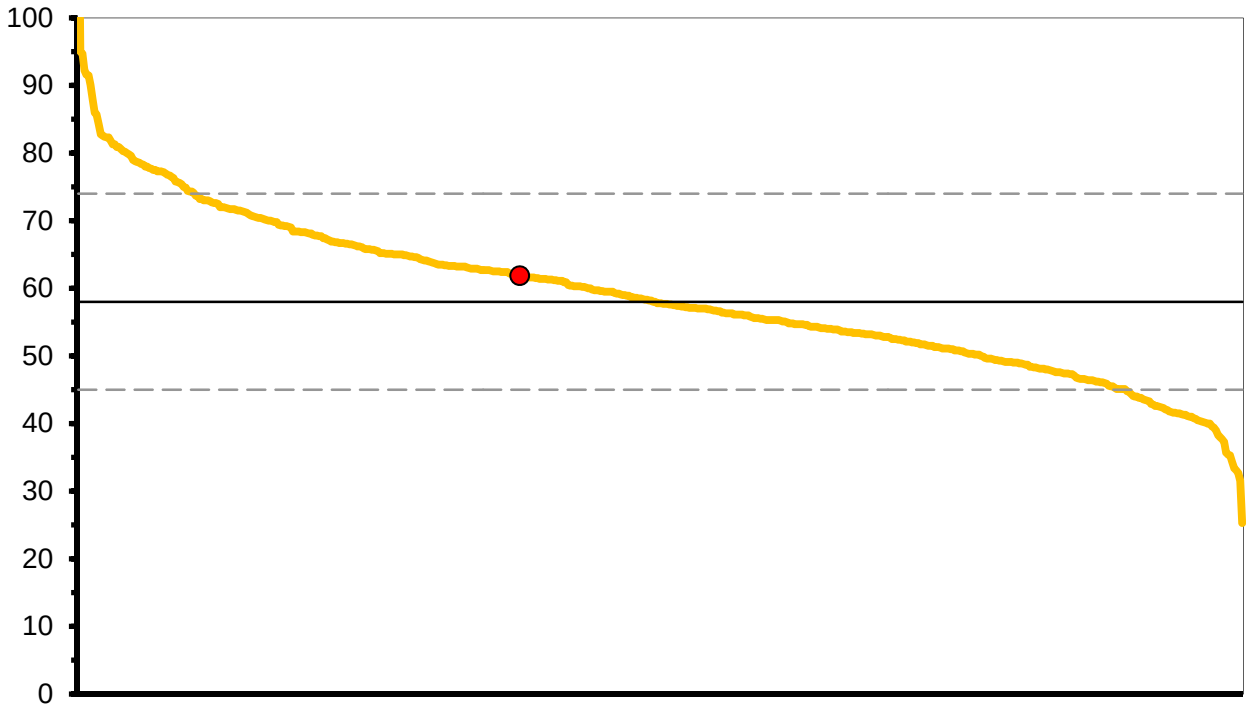
Only primary admitted patients and those transferred in were considered here. Early transfers out (within 48 h) were excluded. The median mortality rate of all 563 hospitals in 2015 (with at least 3 cases) was 8.0%.



Prehospital Time (mean time in min.)

Your hospital: **61.9 min.** (23,104 cases)

Your hospital value is based on 23104 of 29342 **primary admitted patients** from the basic group with valid time points for both accident and hospital admission. The median value of all 576 hospitals (with at least 3 valid cases) in 2015 was 58 minutes. If there were less than 3 cases with valid values your hospital was not included in this figure.



5.4 Length of Stay and Injury Severity

This figure describes the association of length of stay (LOS) in hospital and injury severity (ISS). The mean value was calculated for survivors from the basic patient group. Patients transferred to another hospital (n=172) were excluded here.

Hospitals with less than three valid cases were not included in this figure.

■ Your hospital 2015:

Your hospital value is based on **120 patients.**

LOS: **14.2** days

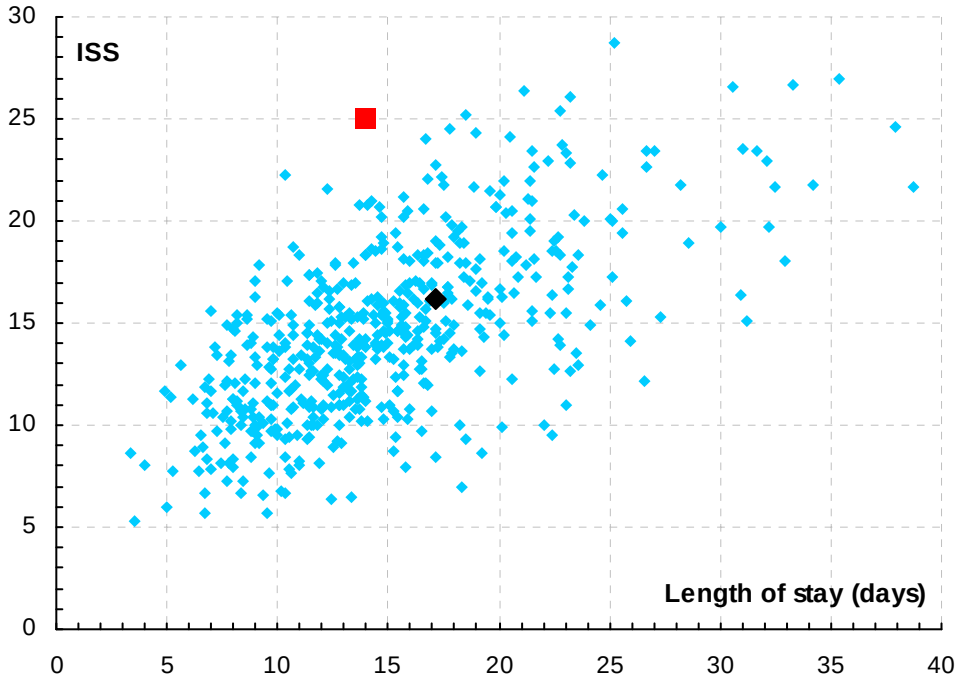
ISS: **25.0** points

◆ TR-DGU 2015:

Patients: 23,820

LOS: 17.1 days

ISS: 16.2 points



7. Basic Data

The following three pages present basic data from five different areas: Demographics / Accident (S); Pre-hospital Phase (A); Emergency Room (B); Intensive Care (C), and Final Assessment / Discharge (D). Your hospital data refer to patients from the basic patient group (see page 1) documented in 2015. Comparative registry data are provided from the same year (**TR-DGU 2015**) and from the last 10 years 2006-2015 (**TR-DGU 10 years**).

	Your hospital 2015		TR-DGU 2015		TR-DGU 10 years	
Total no. of patients (basic patient group)	**32338**		**32,338**		**180,870**	

(S) Demographics / Accident

Primary Admissions / Transfers	%	n	%	n	%	n
primary admitted	**90.7**	29,342	**90.7**	29,342	**89.3**	162,220
among these transferred out within 48h	***6.8***	*2,200*	***6.8***	*2,200*	***6.0***	*10,930*
transferred in within 24h after trauma	**8.4**	2,702	**8.4**	2,702	**9.2**	16,644
transferred in later	**0.9**	294	**0.9**	294	**1.1**	2,006
Patient Characteristics						
Age in years (M ± SD, n)	**51.2** ± 22.6	32,338	**51.2** ± 22.6	32,338	**49.2** ± 22.2	180,870
Children / adolescents (<16y.) (%, n)	**4.0**	1,301	**4.0**	1,301	**4.1**	7,400
Elderly patients (age 70+) (%, n)	**26.2**	8,461	**26.7**	8,461	**22.9**	41,448
Males (%, n)	**69.3**	22,408	**69.3**	22,408	**70.4**	127,264
ASA 3-4 prior to trauma (since 2009) (%, n)	**17.0**	4,827	**17.0**	4,872	**15.5**	21,538
Mechanism of Injury	%	n	%	n	%	n
blunt	**96.1**	29,740	**96.1**	29,740	**95.7**	164,474
penetrating	**3.9**	1,202	**3.9**	1,202	**4.3**	7,399
Type and Cause of Accident	%	n	%	n	%	n
Traffic – car	**21.5**	6,555	**21.5**	6,555	**23.4**	39,280
Traffic – motor bike	**12.8**	3,899	**12.8**	3,899	**13.3**	22,343
Traffic – bicycle	**9.4**	2,857	**9.4**	2,857	**9.1**	15,232
Traffic – pedestrian	**6.9**	2,106	**6.9**	2,106	**7.1**	11,983
High fall (>3m)	**16.3**	4,952	**16.3**	4,952	**17.0**	28,540
Low fall	**26.0**	7,929	**26.0**	7,929	**22.5**	37,766
Suicide (suspected)	**4.4**	1,372	**4.4**	1,372	**4.6**	8,080
Assault (suspected)	**2.6**	805	**2.6**	805	**2.4**	4,182

(A) Pre-hospital Phase

Results only for **primary admitted** cases	**29,342**		**29,342**		**162,220**	
Vital Signs	**M** ± SD	n	**M** ± SD	n	**M** ± SD	n
Systolic Blood Pressure sBP [mm Hg]	**133** ± 33	25,727	**133** ± 33	25,727	**129** ± 34	141,919
Respiratory rate RR [/min]	**15.7** ± 5.6	17,765	**15.7** ± 5.6	17,765	**15.6** ± 6.0	97,552
Glasgow Coma Scale (GCS)	**12.5** ± 4.0	27,412	**12.5** ± 4.0	27,412	**12.2** ± 4.2	151,046
Findings	%	n	%	n	%	n
Shock (sBP ≤ 90 mmHg)	**9.0**	2,314	**9.0**	2,314	**11.7**	16,561
Unconsciousness (GCS ≤ 8)	**17.2**	4,723	**17.2**	4,723	**19.7**	29,805
Therapy	%	n	%	n	%	n
Cardio-pulmonary resuscitation (CPR)	**2.9**	830	**2.9**	830	**3.0**	4,777
Intubation	**22.3**	6,368	**22.3**	6,368	**28.5**	45,204
Volume administration	**82.1**	22,775	**82.1**	22,775	**84.9**	129,879
Analgo-sedation *	**58.2**	8,143	**58.2**	8,143	**65.5**	56,820
Chest drain *	**2.4**	331	**2.4**	331	**3.4**	2,978
Catecholamines *	**7.6**	1,064	**7.6**	1,064	**7.9**	6,850
Volume Administration	**M** ± SD	n	**M** ± SD	n	**M** ± SD	n
Average amount in all patients (ml)	**653** ± 552	27,744	**653** ± 552	27,545	**779** ± 669	152,913
Crystalloids given (%)	**82%**	22,600	**82%**	22,600	**84%**	127,790
average amount, if given (ml)	**769** ± 467		**769** ± 467		**797** ± 482	
Colloids given (%)	**4%**	1,145	**4%**	1,145	**16%**	24,064
average amount if given (ml)	**605** ± 308		**605** ± 308		**642** ± 347	

* not available in the reduced QM dataset

	Your hospital 2015	TR-DGU 2015	TR-DGU 10 years
No. of patients	**32338**	32,338	180,870

(B) Emergency Room

Results for **primary admitted** cases only	**n = 29,342**		**n = 29,324**		**n = 162,220**	
Transportation to hospital	**%**	n	**%**	n	**%**	n
with helicopter	**19.2%**	5,625	**19.2%**	5,625	**21.9%**	35,579
Glasgow Coma Scale (GCS)	**M** ± SD	n	**M** ± SD	n	**M** ± SD	n
if intubated on admission	**3.2** ± 1.2	2,567	**3.2** ± 1.2	2,567	**3.2** ± 1.3	26,503
if not intubated	**12.7** ± 4.0	10,537	**12.7** ± 4.0	10,537	**13.5** ± 2.9	53,729
Initial diagnostics	**%**	n	**%**	n	**%**	n
Sonography (FAST)	**81.7%**	23,985	**81.7%**	23,985	**79.8%**	129,463
X-ray of the thorax	**35.9%**	10,538	**35.9%**	10,538	**42.9%**	69,532
cranial CT (isolated or WBCT)	**89.8%**	26,354	**89.8%**	26,354	**88.0%**	142,820
whole-body CT	**76.9%**	22,564	**76.9%**	22,564	**72.4%**	117,498
ER diagnostic not completed *	**2.3%**	328	**2.3%**	328	**3.0%**	2,673
Time in the ER *	**M** ± SD	n	**M** ± SD	n	**M** ± SD	n
if diagnostics not completed [min] *	**56** ± 47	283	**56** ± 47	283	**46** ± 40	2,612
if send to the operation room [min] *	**68** ± 45	2,513	**68** ± 45	2,513	**69** ± 45	22,462
if transferred to the ICU [min] *	**73** ± 53	5,232	**73** ± 53	5,232	**70** ± 48	35,554
Bleeding and Transfusion	**%**	n	**%**	n	**%**	n
systol. blood pressure ≤ 90 mmHg	**7.9%**	2,149	**7.9%**	2,149	**9.3%**	13,736
hemostasis treatment *	**15.9%**	2,084	**15.9%**	2,084	**13.8%**	9,421
blood transfusion	**7.6%**	2,222	**7.6%**	2,222	**10.7%**	17,342
pRBC, if transfused (mean units)	**5.1**		**5.1**		**6.2**	
FFP, if transfused (mean units)	**3.1**		**3.1**		**4.0**	
Treatment in the ER	**%**	n	**%**	n	**%**	n
cardio-pulmonary resuscitation (CPR) *	**2.5%**	363	**2.5%**	363	**3.0%**	2,703
chest drain *	**9.3%**	1,345	**9.3%**	1,345	**12.8%**	10,815
external fracture stabilisation *	**7.0%**	1,019	**7.0%**	1,019	**7.8%**	6,879
Initial Laboratory Values	**M** ± SD	n	**M** ± SD	n	**M** ± SD	n
base excess [mmol/l]	**- 1.7** ± 4.6	22,532	**- 1.7** ± 4.6	22,532	**- 2.1** ± 4.7	106,398
hemoglobine [g/dl]	**13.2** ± 2.2	28,056	**13.2** ± 2.2	28,056	**12.9** ± 2.4	152,259
Quick's value [%]	**87** ± 22	26,478	**87** ± 22	26,478	**85** ± 22	142,709
Int. Normalized Ratio, INR **	**1.19** ± 0.58	27,026	**1.19** ± 0.58	27,026	**1.21** ± 0.60	145,078
temperature [°C] *	**36.2** ± 1.1	7,396	**36.2** ± 1.1	7,396	**36.1** ± 1.2	40,593

(C) Intensive Care Unit

Patients with **intensive care therapy**	**n = 28,418 (87.9%)**		**n = 28,418 (87.9%)**		**158,427 (87.6%)**	
Severity	**M** ± SD	n	**M** ± SD	n	**M** ± SD	n
SAPS II score on ICU admission *	**25.4** ± 17.3	6,236	**25.4** ± 17.3	6.236	**26.4** ± 16.7	51.948
Treatment*	**%**	n	**%**	n	**%**	n
hemostatic drugs *	**15.6%**	2,141	**15.6%**	2,141	**17.1%**	12,233
dialysis / hemofiltration *	**2.2%**	294	**2.2%**	294	**2.5%**	2,053
blood transfusion * within the first 48 h after admission	**19.1%**	2,895	**19.1%**	2,895	**20.1%**	18,558
mechan. ventilation / intubated	**39.4%**	11,190	**39.4%**	11,190	**47.6%**	75,345
Complications on ICU*	**%**	n	**%**	n	**%**	n
organ failure (OF) *	**34.1%**	4783/14045	**34.1%**	4,783	**37.9%**	32,428
multiple organ failure (MOF) *	**20.4%**	2867/14045	**20.4%**	2,867	**22.8%**	19,510
sepsis *	**5.0%**	681/13632	**5.0%**	681	**6.3%**	5,235
Length of stay and ventilation	**M** ± SD	n	**M** ± SD	n	**M** ± SD	n
length of intubation [days]	**2.9** ± 7.3	28,297	**2.9** ± 7.3	28,297	**3.7** ± 8.5	157,226
LOS on ICU [days]	**6.4** ± 9.9	28,418	**6.4** ± 9.9	28,418	**7.4** ± 11.0	158,407

* not available in the reduced QM dataset ** approximated from Quick's value (PT) if not documented
ICU = Intensiv Care Unit ER = Emergency Room LOS = Length of Stay CT = Computed Tomography
M ± SD = mean and standard deviation

	Your hospital 2015	TR-DGU 2015	TR-DGU 10 years
No. of patiets (basic group)	**32,338**	32,338	180,870

(D) Discharge / Outcome

Diagnoses	**M**	n	**M**	n	**M**	n
number of injuries per patient	**4.5**	32,338	**4.5**	32,338	**4.6**	180.870
patients with only one injury (%, n)	**9.5%**	3,064	**9.5**	3,064	**9.5%**	17.170
Operations*	**%**	n	**%**	n	**%**	n
patients with surgery *	**65.5%**	10,944	**65.5%**	10,944	**70.2%**	68.494
no. of procedures if operated * [Mean]	**3.3**		**3.3**		**3.6**	
Thrombo-embolic Events (MI; pulmonary embolism; DVT; stroke; etc.)	**%**	n	**%**	n	**%**	n
patients with at least one event *	**3.4%**	523	**3.4**	523	**2.9**	2.571
Outcome (without early transfers out)	**%**	n	**%**	n	**%**	n
survivor	**88.6%**	26,716	**88.6%**	26,716	**88.2%**	149.817
hospital mortality	**11.4%**	3,422	**11.4%**	3,422	**11.8%**	20.123
died within 30 days	**11.0%**	3,322	**11.0%**	3,322	**11.4%**	19.360
died within 24 hours	**5.2%**	1,553	**5.2%**	1,553	**5.7%**	9.704
died in the ER/OP (no ICU)	**1.6%**	493	**1.6%**	493	**2.0%**	3.398
Transfer / Discharge (all patients)	**%**	n	**%**	n	**%**	n
Survivor who were discharged and …	**100%**	28,916	**100%**	28,916	**100%**	160.648
transferred into another hospital	**17.6%**	5,096	**17.6%**	5,096	**17.2%**	27.693
among them early discharges (<48h)	**7.6%**	2,200	**7.6%**	2,200	**6.8%**	10.930
transferred into a rehabilitation center	**17.7%**	5,122	**17.7%**	5,122	**22.8%**	36.579
other discharges	**3.4%**	989	**3.4%**	989	**3.3%**	5.381
sent home	**61.2%**	17,709	**61.2%**	17,709	**56.6%**	90.995
Condition at the time of discharge (Glasgow Outcome Scale; GOS) (without early transfers out)	**%**	n	**%**	n	**%**	n
Patients with valid GOS		28,995		28,995		162.010
Surviving patients	**100%**	25,573	**100%**	25,573	**100%**	141.887
– good recovery	**67.3%**	17,214	**67.3%**	17,214	**64.8%**	91.963
– moderate disability	**23.1%**	5,903	**23.1%**	5,903	**24.8%**	35.146
– severe disability	**8.2%**	2,090	**8.2%**	2,090	**8.7%**	12.409
– persistant vegetative state	**1.4%**	366	**1.4%**	366	**1.7%**	2.369
Length of stay in hospital (all patients)	**M** ± SD	n	**M** ± SD	n	**M** ± SD	n
All patients, mean	**14.9** ± 16.3	32,337	**14.9** ± 16.3	32,337	**17.3** ± 19.4	180.833
median	**11**		**11**		**12**	
Only non-survivors	**15.9** ± 16.6	28,915	**15.9** ± 16.6	28,915	**18.5** ± 19.8	160.713
Only survivors, …	**7.0** ± 10.8	3,422	**7.0** ± 10.8	3,422	**7.1** ± 12.4	20.120
median survivors / non-survivors	**11 / 3**		**11 / 3**		**13 / 3**	
Survivors transferred into a rehab. center	**28.8** ± 21.0	5,122	**28.8** ± 21.0	5,122	**30.8** ± 22.8	36.574
Survivors transferred into another hospital	**10.0** ± 14.2	5,096	**10.0** ± 14.2	5,096	**11.3** ± 15.9	27.689
Survivors sent home	**13.6** ± 13.6	17,708	**13.6** ± 13.6	17,708	**15.6** ± 16.9	90.977
Costs of treatment (without early transfers out; see footnote)	**M €**	n	**M €**	n	**M €**	n
Average costs per patient						
… all patients	**14,503**	30,049	**14.503**	30,049	**16.905**	168.977
… only non-survivor	**10,495**	3,399	**10.495**	3,399	**11.349**	19.920
… only survivor	**15,014**	26,650	**15.014**	26,650	**17.647**	149.057
… only patients with ISS ≥ 16	**19,167**	16,154	**19.167**	16,154	**23.156**	98.160
Sum of all costs	435,804,114 €		435,504,114 €		2,856,501,103 €	
Sum of all days in hospital	479,469 days		479,469 days		3.107.629 days	
Average costs per day	**908.93 €**		**908.93 €**		**919.19 €**	

* not available in the reduced QM dataset M = mean

Treatment costs: The estimated treatment costs are based on data of 1002 German TR-DGU patients treated in 2007 and 2008. For these patients a detailed cost analysis was available. Assuming a cost increase of 2% per year would result in 17% higher costs today.

8. Subgroup Analyses

Summary results might not be helpful when looking for potential causes. Therfore, subgroup results of your hospital are presented on this page. Besides descriptive data about the patients and the process of care also hospital outcome and prognosis are presented here for each subgroup.

In order to reduce the statistical uncertainty involved in subgroup analyses, patients from the **last three years** (2013-2015) were pooled together. Again, only patients from the **basic patient group** (see page 1) were considered here.

8.1 Subgroups within your hospital

All results in the following table refer to primary admitted cases from the basic patient group. Patients transferred in as well as those transferred out early (within 48h) are not considered here.

There were a total of **78196 patients** from your hospital in the last three years.

		All patients 3 years	Subgrupps					
			No TBI	Combined trauma	Isolated TBI	Shock	Severe injury	Elderly
Defionition of subgroup		Basic group	AIS head ≤ 1	head and body AIS ≥ 2	AIS head ≥ 3 and AIS elsew. ≤ 1	syst. BP ≤ 90 on admission	ISS ≥ 16 & at least one problem*	age 70 years or more
No. of patients (basic group)	n	78,196	39,055	29,222	9,919	5,855	23,508	19,338
	%	100%	50%	37%	13%	7%	30%	25%
Patients								
Age	[years]	50.5	48.2	50.7	58.7	50.4	58.4	79.7
Males	%	69%	71%	69%	64%	69%	80%	54%
ASA 3-4	%	14%	11%	14%	24%	16%	28%	38%
Injuries								
ISS	[points]	18.0	14.5	22.7	18.2	30.2	28.8	18.7
Head injury (AIS≥3)	%	34%	---	56%	100%	47%	64%	45%
Thoracic injury (AIS≥3)	%	38%	43%	43%	---	56%	52%	34%
Abdominal injury (AIS≥3)	%	9%	13%	8%	---	22%	22%	5%
Pre-hospital care								
Pre-hospital time	min.	62	61	63	63	67	66	63
Intubation	%	23%	13%	33%	32%	65%	50%	21%
Volume given	[ml]	665	664	718	509	1042	818	540
Emergency room								
Blood transfusion	%	8%	8%	10%	3%	36%	19%	7%
Whole-body CT	%	76%	77%	81%	54%	77%	78%	65%
CPR	%	1%	1%	2%	1%	9%	4%	1%
Physiological problems*								
Age ≥ 70	%	25%	19%	26%	42%	25%	46%	100%
Shock (sBP ≤ 90)	%	7%	6%	10%	6%	100%	20%	8%
Acidosis (BE<-6)	%	9%	7%	12%	9%	36%	24%	9%
Coagulopathie	%	11%	8%	14%	14%	32%	27%	20%
Unconsciousness (GCS 3-8)	%	16%	4%	26%	35%	45%	45%	18%
Length of stay								
Treated on ICU	n	69,538	33,487	27,187	8,864	5,019	21,371	16,722
- Intubation (ICU)	[days]	3.0	1.6	4.3	3.9	7.3	6.7	3.3
- Days on ICU	[days]	6.6	5.0	8.3	7.3	12.2	11.5	7.1
Days in hospital	[days]	16.2	16.5	16.8	13.5	20.3	20.1	16.0
Outcome and prognosis								
Non-survivor	n	8,587	1,830	4,188	2,569	2,168	7,188	4,649
Hospital mortality	%	11.0%	4.7%	14.3%	25.9%	37.0%	30.6%	24.0%
RISC II prognosis	%	10.6%	4.6%	14.2%	23.5%	38.0%	29.2%	22.5%

* according to the definition of severely injured patients from Paffrath et al. (*Injury* 2014) and Pape et al. (*J Trauma* 2014)

8.2 Hospital level of care

The following table allows a comparison of your hospital with hospitals of the same level of care. There are three levels of care (local, regional, and supra-regional trauma centers); non-certified hospitals were grouped according to patient volume and ressources. The results of the whole registry (TR-DGU) are presented as well.

Again only cases from the **basic patient group** were considered here. In order to reduce the statistical uncertainty, all patients from the **last three years** were pooled together (available from your hospital: 3 years).

		Your Hospital	Trauma Center			
			local	regional	supra-regional	TR-DGU
Level of care / trauma center		**local**	▼			
Number of hospitals			279	233	124	636
Percentage of patients in TR-DGU			10.2%	32.0%	57.9%	100%
Patients per year	n	**51** /year	**13** /year	**43** /year	**147** /year	**51** /year
All patients (3 years)		n=92 571	n=9 412	n=29 588	n=53 571	n=92 571
primary admitted and treated	n,%	77947 84%	75%	84%	86%	84%
primary admitted; early transferred out	n,%	6070 7%	23%	11%	1%	7%
transferred in from other hospital	n,%	8554 9%	2%	5%	13%	9%
Patients						
average age	[years]	50.9	54,0	51,9	49,7	50,9
elderly patients aged 70+ years	%	26%	30%	27%	24%	26%
males	%	70%	67%	69%	70%	70%
ASA 3-4	%	14%	17%	16%	12%	14%
Injuries						
Injury Severity Score, ISS	[points]	18.4	14,7	17,3	19,7	18,4
ISS ≥ 16	%	54%	39%	50%	59%	54%
polytrauma*	%	15%	8%	12%	17%	15%
pat. with head injury (AIS≥3)	%	37%	23%	31%	43%	37%
pat. with thoracic injury (AIS≥3)	%	37%	34%	37%	37%	37%
pat. with abdominal injury (AIS≥3)	%	9%	8%	9%	10%	9%
Pre-hospital Care (only primary admissions)		n=84 017	n=9 232	n=28 211	n=46 574	n=84 017
time (from accident to hospital)	[min]	61	55	59	64	61
volume administration	[ml]	660	530	633	703	660
intubation	%	23%	7%	15%	31%	23%
unconsciousness (GCS 3-8)	%	16%	7%	11%	21%	16%
Emergency Room (all patients)						
blood transfusionen	%	8%	5%	6%	10%	8%
whole-body CT scan	%	71%	54%	73%	73%	71%
CPR	%	1%	0%	0%	2%	1%
shock / hypotension	%	7%	5%	6%	8%	7%
coagulopathy	%	11%	9%	10%	13%	11%
Length of stay (withot early transfers out)						
length of intubation on ICU	[days]	3.1	0,9	2,2	3,9	3,1
LOS on ICU	[days]	6.8	3,8	5,5	7,9	6,8
LOS in hospital	[days]	16.6	12.5	14.8	18.0	16.6
Outcome and Prognosis (without transfers in and early transfers out)						
Patients	n	77 947	7 105	24 993	45 849	77 947
Non-survivor	n	8 587	493	2 324	5 770	8 587
Hospital mortality	%	11.0%	6.9%	9.3%	12.6%	11.0%
RISC II prognosis	%	10.6%	6.8%	8.9%	12.1%	10.6%

ICU = Intensive Care Unit GCS = Glasgow Coma Scale AIS = Abbreviated Injury Scale ISS = Injury Severity Score, LOS = Length of Stay CPR = cardio-pulmonary resuscitation CT = computed tomography

* Polytrauma: see Berlin definition of Pape et al. (2014)

9. Data Quality and Completeness

9.1 Completeness of selected variables

Registries and audit reports could only be as good as the data they are based on. If a lot of patients have missing data in important variables then these patients have to be excluded from analysis, and results might be biased or even wrong. The following table describes the **completeness rates (%)** of several important variables, together with the **number of patients with missing data (∅)**. The list of variables specifically contains the prognostic variables needed for the RISC II. As on the previous pages only cases from the **basic patient group** were considered here.

Good completeness rates are indicated in green color (96% or better), variables with moderate completeness are marked in yellow (90-95%), and insufficient completeness (below 90%) is indicated in red. The categories for completeness are thresholds defined by experts; they were not derived from the data.

The completeness rates of your hospital **in 2015** are compared with your hospital's data from the previous years (**since 2006**) and with actual overall data from the whole registry (**TR-DGU 2015**). Besides the rates also the number of patients with missing data is given, marked with the ∅ sign, including also cases with implausible data.

Variable	Importance	Category (%)			Your hospital 2015	Your hospital 2006-2014	TR-DGU 2015
Pre-hospital data (A)							
				only primary admitted cases	n=29,342	n=132,878	n=29,342
GCS	RISC II requires the motor component; two quality indicators use GCS for the definition of cases	96+	90-95	<90	**93%** ∅ 1,930	**93%** ∅ 9244	**93%** ∅ 1,930
Blood pressure	initial blood pressure is important for validating the volume therapy and for the definition of shock	96+	90-95	<90	**88%** ∅ 3,615	**87%** ∅ 16,686	**88%** ∅ 3,615
Pupils*	Pupil size and reactivity are relevant for prognosis (RISC II); will be required for all patients in future	96+	90-95	<90	**85%** ∅ 2,621	**92%** ∅ 5,699	**85%** ∅ 2,621
CPR	Cardio-pulmonary resuscitation is seldom (3-4%) but highly predictive for outcome; required for RISC II	96+	90-95	<90	**92%** ∅ 2,288	**93%** ∅ 9,330	**92%** ∅ 2,288
Emergency room (B)							
				only primary admitted cases	n=29,342	n=132,878	n=29,342
Time of admission	Required to calculate the time until diagnostics were performed	96+	90-95	<90	**99%** ∅ 222	**98%** ∅ 2238	**99%** ∅ 222
Blood pressure	BP on admission is used by RISC II as a prognostic variable; also needed for definition of shock	96+	90-95	<90	**88%** ∅ 3,615	**87%** ∅ 16686	**88%** ∅ 3,615
Base excess	Base excess is part of the RISC II and an independent prognostic factor	96+	90-95	<90	**77%** ∅ 6,832	**63%** ∅ 49094	**73%** ∅ 7,658
Coagulation	The INR (or Quick's value) is needed for the RISC II as coagulation marker	96+	90-95	<90	**92%** ∅ 2,316	**89%** ∅ 14826	**91%** ∅ 2,622
Hemoglobin	Is part of the RISC II score as an indirect sign of relevant bleeding	96+	90-95	<90	**96%** ∅ 1,286	**94%** ∅ 8675	**96%** ∅ 1,286
Patients and Outcome							
				all patients	n=32,338	n=148,532	n=32,338
ASA	Prior diseases are relevant for outcome prediction (RISC II); doc. since 2009	96+	90-95	<90	**88%** ∅ 3,996	**80%** ∅ 37,783	**88%** ∅ 3,996
Surgical treatment	A low rate of surgical patients could be based on incomplete documentation (only standard dataset; not QM)	70+	50-69	<50	**66%** 10944/16718	**66%** 57550/87065	**66%** 10944/16718
GOS	The Glasgow Outcome Scale (GOS) describes the patient's condition at discharge or transfer	96+	90-95	<90	**95%** ∅ 1,631	**93%** ∅ 9,794	**95%** ∅ 1,631
Documentation							
				all patients	n=32,338	n=148,532	n=32,338
Time point	A timely documentation of cases is able to improve data quality			months from accident to start of documentation	**3.5** mon.	**6.1** mon.	**3.5** mon.
	Months from discharge until completion of documentation	<3	3-4	5+	**4.6**	**5.6**	**4.6**

* the actual dataset revision includes pupil size and reactivity for all cases

9.2 Comparison of data quality among hospitals

Detailed completeness rates for different variables were presented on the previous page 9.1. In order to compare data quality among hospitals, a combined **quality score** has to be considered.

This score was calculated from the following 10 variables: from the pre-hospital phase GCS, blood pressure, and CPR; from the emergency room phase the time of admission, blood pressure, base excess, hemoglobine, and coagulation (Quick's value or INR); finally the patient's prior health status (pre-injury ASA) and the GOS (Glasgow Outcome Scale) as outcome measure.

All these variables were part of both the standard and the reduced QM dataset.

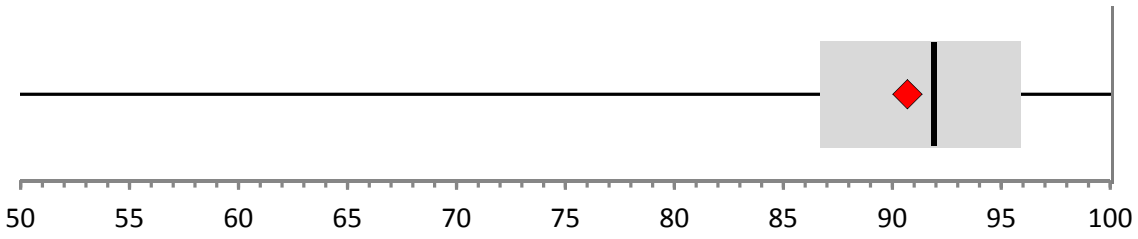
The number of missing data points from all **primary admitted trauma patients in the basic patient group** were then added and compared to the theoretical maximum. This leads to an average completeness rate based on 10 different variables.

Data Completeness	**Your hospital 2015**	**Your hospital 2006-2014**	**TR-DGU 2015**
Primary admitted patienten in the basic patient group	n=29 342	132 878	29 342
Theoretical sum of all values	293 420	1 328 780	293 420
Sum of missing values	∅ 27 197	∅ 162 690	∅ 27 197
Average data completeness rate (%) based on 10 different measurements	**90.7%**	**87.8%**	**90.7%**

Graphical comparison with other hospitals

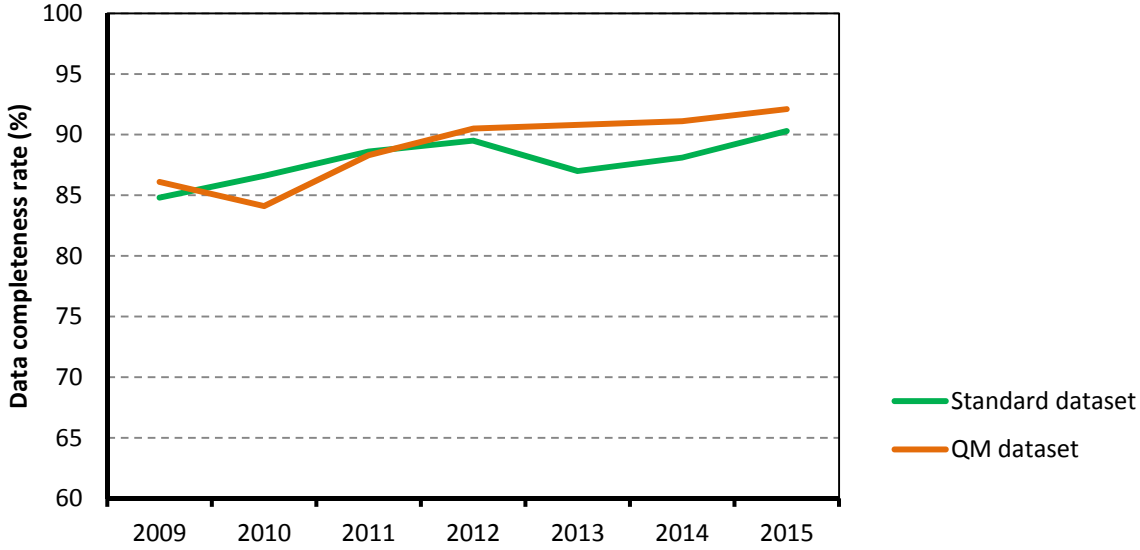
The following figure summarizes the completeness data from all 634 hospitals who submitted cases in 2015. The value of your hospital is presented as a **red diamond**.

The figure follows the idea of a box plot where the grey box ranging from 86.7 to 95.9 covers half of all hospital values. The vertical line within the box is the median hospital value (91.9%).



Development over time

The following figure shows the development of data completeness in the last 7 years since 2009. The completeness rates were pooled separately for hospitals using the standard dataset and the reduced QM dataset.

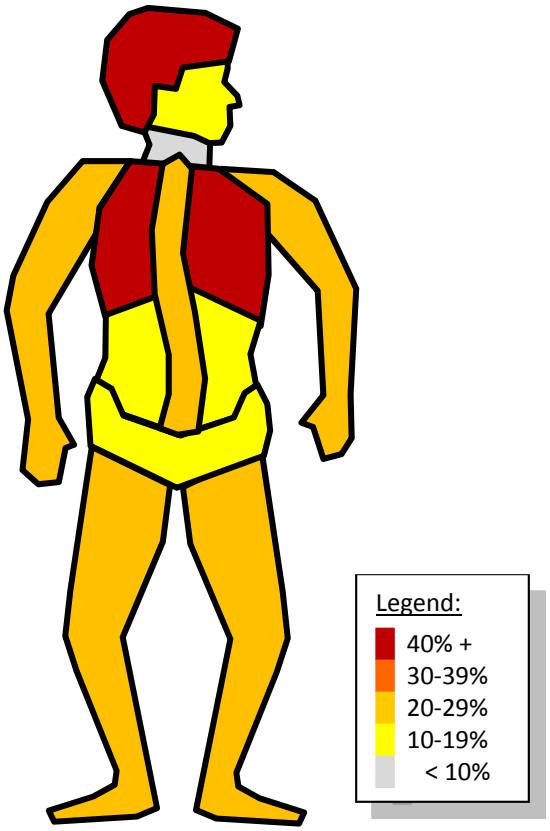


10. Pattern of Injury

The figure below shows the average injury pattern of your patients compared with the TraumaRegister DGU®. For these data all cases from the **basic patient group** were considered. In order to reduce the statistical uncertainty, all patients from the last three years **(2012-2014)** were pooled. In these three years, a total of **92894 patients** from your hospital have been documented in the registry (TR-DGU: 92 894).

Data are presented for each of the nine body regions according to the **Abbreviated Injury Scale (AIS).** The rates refer to injuries with an injury severity of **at least two points** (including, for example, radius fractures, spine fractures, lung contusions, etc.). The colour-coded figure refers to injury distribution from the whole registry.

Head	Your hospital	**48.0%**	(n = 44 597)
	TR-DGU	48.0%	(n = 44 597)
Face	Your hospital	**11.2%**	(n = 10 379)
	TR-DGU	11.2%	(n = 10 379)
Neck	Your hospital	**1.2%**	(n = 1 157)
	TR-DGU	1.2%	(n = 1 157)
Thorax	Your hospital	**44.7%**	(n = 41 517)
	TR-DGU	44.7%	(n = 41 517)
Abdomen	Your hospital	**14.4%**	(n = 13 346)
	TR-DGU	14.4%	(n = 13 346)
Spine	Your hospital	**28.2%**	(n = 26 241)
	TR-DGU	28.2%	(n = 26 241)
Arms	Your hospital	**28.2%**	(n = 26 221)
	TR-DGU	28.2%	(n = 26 221)
Pelvis	Your hospital	**13.3%**	(n = 12 400)
	TR-DGU	13.3%	(n = 12 400)
Legs	Your hospital	**27.1%**	(n = 25 200)
	TR-DGU	27.1%	(n = 25 200)



Serious Injuries (AIS 3+)

Injuries with a severity of 3 points or more (AIS) are considered as ‘serious‘. The prevalence of serious injuries in four different body regions (head; thorax; abdomen; extremities) is given below. The body regions considered here refer to the respective regions of the *Injury Severity Score.*

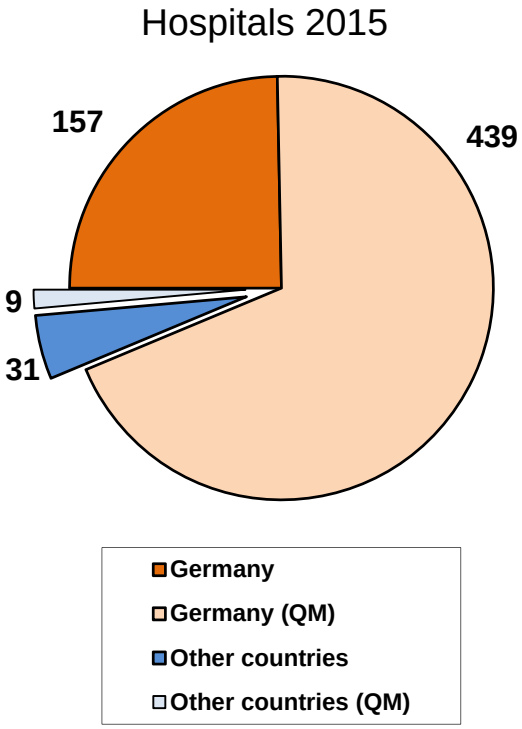
In contrast to the figure above only patients with **at least one relevant injury** (MAIS 3+; see page 1) are considered here. In the last three years there were **75570** such **patients** from your hospital. They constitute **81%** within the **basic patient group** (TR-DGU: 81.4%).

Serious injury (AIS ≥ 3)	**Your hospital** n = 75 570	**TR-DGU** n = 75 570
… of the **head**	**45.5%** (n=34 420)	45.5% (n=34 420)
… of the **thorax**	**45.1%** (n=34 081)	45.1% (n=34 081)
… of the **abdomen**	**11.6%** (n=8 743)	11.6% (n= 8 743)
… of the **extremities**	**29.5%** (n=22 294)	29.5% (n=22 294)
Patients with **more than one** seriously injured body region	**30.0%** (n=22 696)	30.0% (n=22 696)

11. General Results

Some results from the actual analysis of 2015 data from the TraumaRegister DGU® are of general interest. They will be presented here without reference to individual hospitals' results.

11.1 Hospitals and Patients



Hospitals

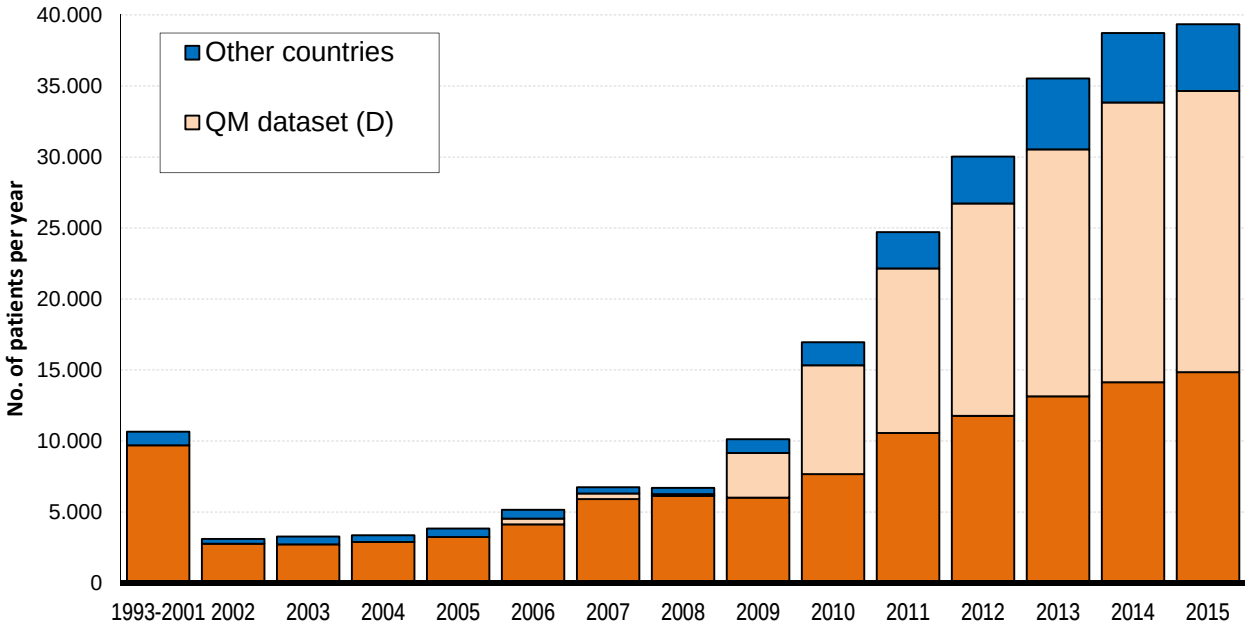
In 2015 data of **39.355 patients** from **636 actively participating hospitals** were documented in the TraumaRegister DGU®. The total number of cases documented since 1993 thus increased to **238,247** patients. However, not all of these cases were severely injured. Details are given on the next page 11.2.

Among the total number of 636 hospitals there were 40 hospitals from outside Germany (6,3%): Austria 18, Switzerland 5, The Netherlands 4, Belgium 4, Luxembourg 4, Finland 3 Slovenia 1 and United Arab Emirates 1. The number of German hospitals was 596 last year.

The figure on the right shows the distribution of hospitals regarding their location (German vs. non-German) and the use of the standard dataset or the reduced QM dataset, respectively. The reduced version of the dataset is mainly used in Germany by local (87%) and regional (76%) trauma centers. The majority of level one trauma centers are using the standard documentation sheet (68%).

Patients

The figure below demonstrates the continuous increase of registered patients over time. The percentage of non-German patients actually is 11.9%. Only 4.6% of patients have been documented before 2002 when the online documentation was introduced. Last year, about half of all patients (48%) were documented with the standard dataset



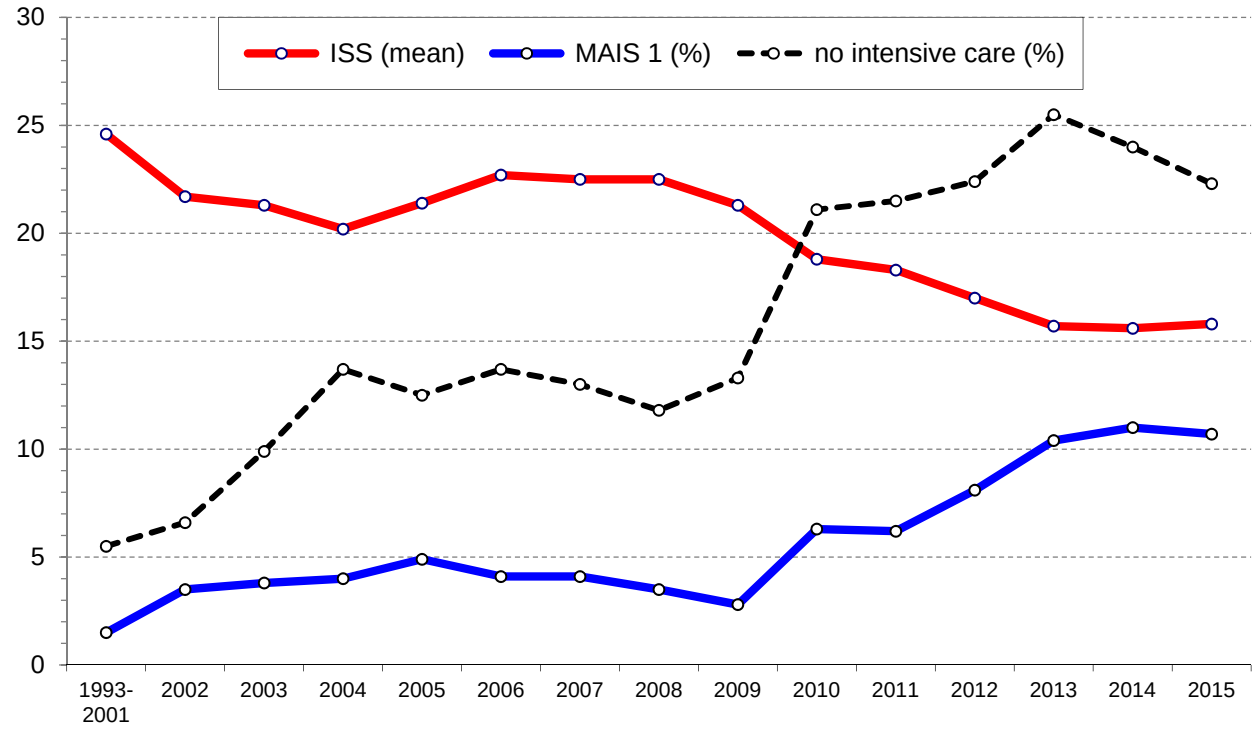
11.2 Severity of Injuries

The TraumaRegister DGU® is designed to document and analyse **severely injured patients**. These patients are specifically suitable for the evaluation of interdisciplinary cooperation in trauma care within a hospital. It also reduces the workload for documentation considerably if not all but only severely injured patients are registered.

However, there are different approaches to define a 'severely injured' patient. The TR-DGU uses the need for intensive care as a pragmatic and easy to determine inclusion criterion. But in 2015, only 77.7% of all documented patients were treated on ICU. And this is not due to early deaths in the emergency room (only 499 patients; 1.3%) who did not reach the ICU.

In the scientific literature the **Injury Severity Score (ISS)** is frequently used to define severe trauma, for example, ISS ≥ 16 (in 2015 this refers to 45% of all documented patients). The concept of '**polytrauma**' has recently been reconsidered, and a new definition known as Berlin Definition has been published: at least two body regions have to be seriously injured (AIS≥3) and, in addition, there have to be one or more physiological problems (see Pape et al., *J. Trauma* 2014). In the TR-DGU this refers to 12% of patients last year).

Over the last years, there is an obvious trend to document more and more **patients with minor injuries** only. The figure below shows that the ISS has decreased to 15,8 points in 2015. In the 1990s the mean ISS was about 25 points. One reason for this is that the number of documented patients with marginal injuries (MAIS 1 = the worst injury is of AIS grade 1). In 2015 there were 4211 such patients, or 11% of the total number. Especially small hospitals (local trauma centers) tend to document patients with only minor injuries (23% of all patients in 2015 had MAIS 1).



The **basic patient group** defined last year excludes all patients with MAIS 1. Patients with a worst injury of grade 2 (MAIS 2) were included only if they died or were treated on the intensive care unit. If the worst injury grading was 3 or more (MAIS 3+) all cases were included. Furthermore, a valid entry for age is required in order to calculate the RISC II prognostic score. This basic patient group actually (2015) consists of 82% of all documented patients. Nearly all results presented in this report refer to this patient group in order to increase the comparability of the results.

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Statistical analyses and preparation of the annual audit reports:

Rolf Lefering (IFOM) in cooperation with **Ulrike Nienaber** (AUC)

Address for correspondence:

Ulrike Nienaber
Register and Research Coordination
Academy of Trauma Surgery (AUC GmbH)
Cologne Merheim Medical Center
Ostmerheimer Str. 200,
51109 Cologne, Germany
Phone: +49 221 88 82 39 - 0
E-Mail: traumaregister@auc-online.de

Prof. Dr. Rolf Lefering
Institute for Research in Operative Medicine (IFOM)
Faculty of Health, University Witten/Herdecke
Ostmerheimer Str. 200
51109 Cologne, Germany

Phone: +49 221 98957-16
E-Mail: rolf.lefering@uni-wh.de

Financial Disclosure:

The **TraumaRegister DGU®** receives fees from the participating hospitals collected by the **AUC GmbH**. The AUC GmbH, a 100% affiliate of the DGU (Deutsche Gesellschaft für Unfallchirurgie), also hosts the registry and is owner of the database. Hospitals certified as members of a German trauma network (TraumaNetzwerk DGU®) are obliged to participate in the TraumaRegister DGU®, all other hospitals participate voluntary.

In the past 10 years the registry received financial or other support from the following organizations and companies:

- Private University Witten/Herdecke gGmbH and Cologne-Merheim Medical Centre (2005-2016)
- Novo Nordisk A/S, Bagsværd, Denmark (2003-2009)
- Sanofi Aventis Deutschland GmbH (2008)

Publications from the TraumaRegister DGU®

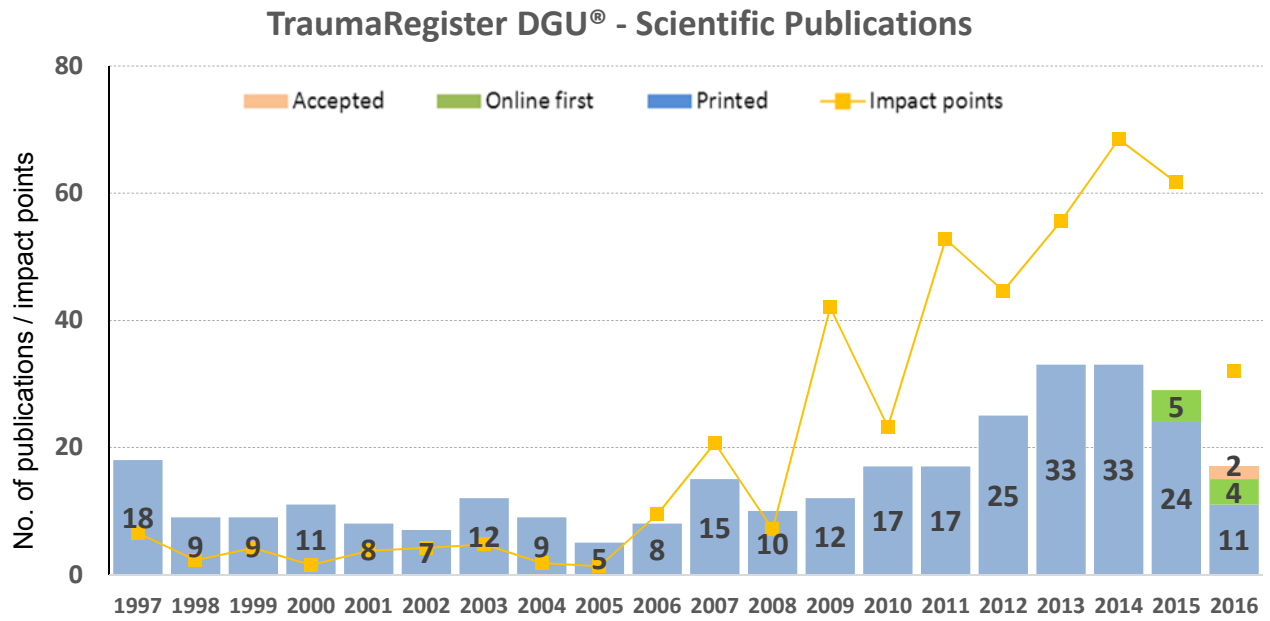
Publications from the last three years (2014-2016), no abstracts; last update: August 2016

An extended list of publications from the TraumaRegister DGU® including also papers published previously is available on **www.traumaregister-dgu.de**.

[PDF] / [PDFprov] = this paper is available in PDF format / provisional PDF format.

The articles indicated with **[PDF]** could be provided to interested users on request if there is no direct access to the respective journal. In this case, please send an email to: traumaregister@auc-online.de .

The following figure presents the **number** of publications from the TraumaRegister DGU® since 1997 as well as the sum of **impact points** reached with these papers.



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List of abbreviations used in the report

Abbreviations

AIS	Abbreviated Injury Scale
ASA	American Society of Anaesthesiologists
AUC	AUC – Academy of Trauma Surgery (Akademie der Unfallchirurgie GmbH)
BE	Base Excess
CT	Computed tomography
CCT	Cranial computed tomography
DGU	German Trauma Society (Deutsche Gesellschaft für Unfallchirurgie)
pRBC	Packed red blood cells
FFP	Fresh Frozen Plasma
GCS	Glasgow Coma Scale
GOS	Glasgow Outcome Scale
h	Hour
Hb	Hemoglobine (or Haemoglobine)
INR	International Normalized Ratio
ISS	Injury Severity Score
M	Mean value
MAIS	Maximum AIS severity score
min	Minute
ml	Milliliter
MOF	Multiple Organ Failure
NACA	National Advisory Committee for Aeronautics
NIS	Committee on Emergency Medicine, Intensive Care and Trauma Management of the German Trauma Society (Sektion NIS of DGU)
NISS	New Injury Severity Score
OP	Operation
OF	Organ Failure
PDF	Portable Document Format
PTT	Partial thromboplastin time (in sec)
QM	Quality management
RISC	Revised Injury Severity Score (prognostic score)
RISC II	Revised Injury Severity Score, version II
RTS	Revised Trauma Score
SAPS	Simplified Acute Physiology Score
sBP	Systolic blood pressure
sec	Seconds
SD	Standard deviation
SMR	Standardized Mortality Ratio
SOFA	Sequential Organ Failure Assessment
TBI	Traumatic brain injury
TPZ	Thromboplastin timet; Quick's value
TR-DGU	TraumaRegister DGU®
TRISS	Trauma and Injury Severity Score (prognostic score)