The search for

The perfect performance indicator in trauma

Validation of 40 indicators in 110.000 German trauma patients

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Conflict of Interest: none

Quality management of severely injured patients in Germany

„The reason to start a German Trauma Registry more than 25 years ago was a controversial discussion…"

„…Most hospitals treating trauma patients wanted to show that they performed best."

„The first meeting took place in 1992 at the Trauma Department of the University Hospital in Essen…. There was a controversial discussion… Finally three main goals of the trauma registry were defined:

- Documentation of epidemiology and monitor changes over time
- Support of a quality improvement programs
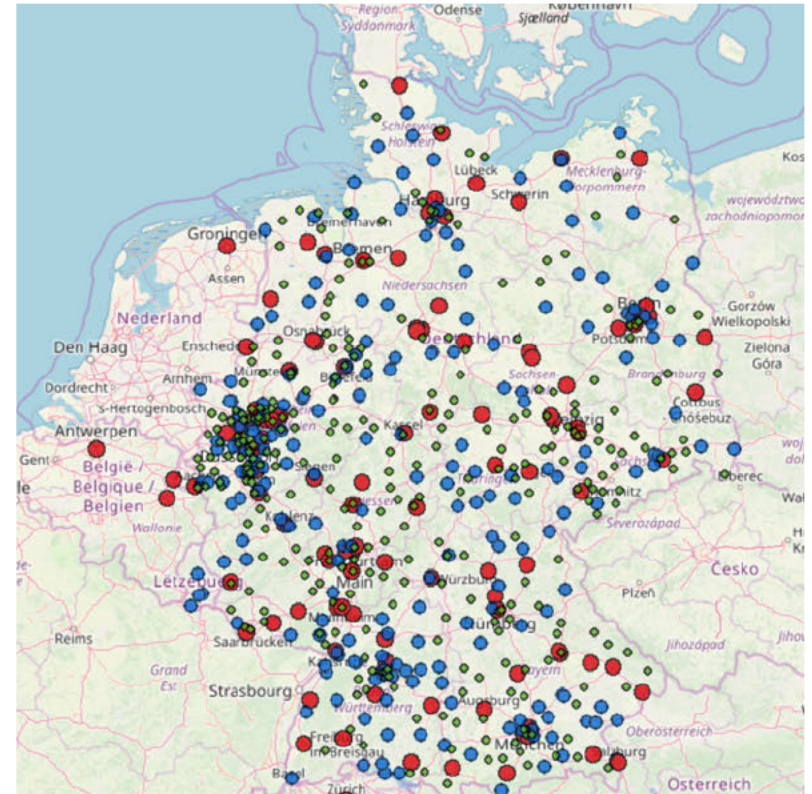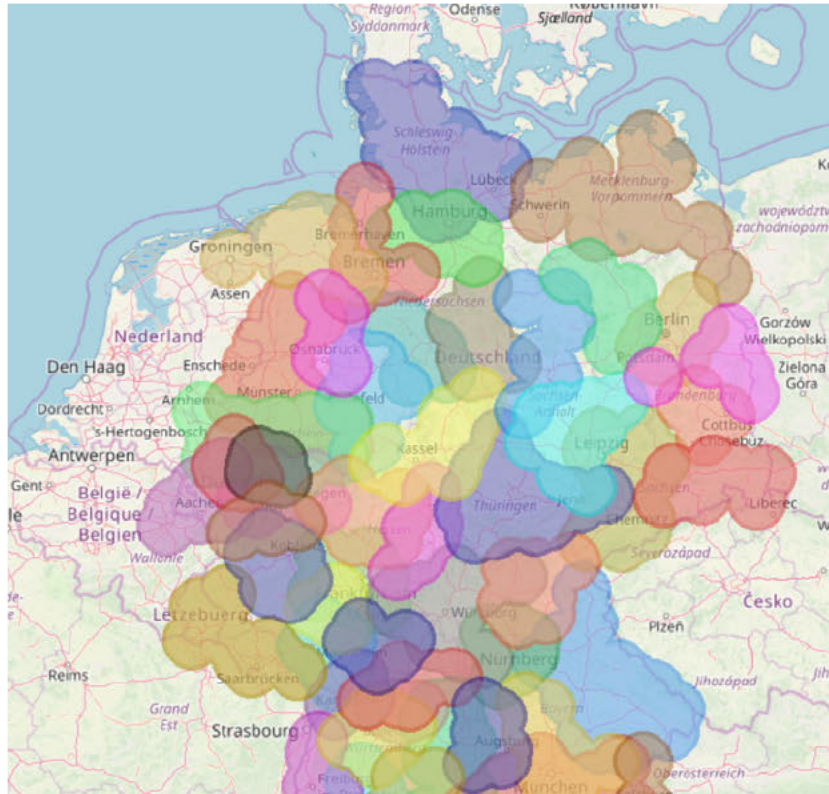- Establishing a data bank for scientific evaluation"

TRAUMA®REGISTER
DEUTSCHE GESELLSCHAFT FÜR UNFALLCHIRURGIE

- Bouillon B, Hoffmann R, Siebert H, Sturm J: Preface. German Trauma Registry. Injury 45 Suppl 3: S4-5 (2014)
- TraumaRegister DGU: 20 years TraumaRegister DGU((R)): development, aims and structure. Injury 45 Suppl 3: S6-S13 (2014)

ATLS® / ETC / PHTLS / TCCC / TDSC

TraumaNetzwerk DGU®

Buchholtz S, Lewan U, Debus F et al.: TraumaNetzwerk DGU((R)): Optimizing patient flow and management. Injury 45 Suppl 3: S89-92 (2014)

total prehospital treatment time (Germany)

72 ± 54 min

- Sektion Notfall- Intensivmedizin und Schwerverletztenversorgung der DGU: Jahresbericht des TR-DGU. Köln (2016)

in hospital treatment time in ER (Germany)

69 ± 48 min

- Fischer M: [The 2016 consensus document on emergency care for the general public during the pre–hospital phase and at the hospital]. Notfall Rettungsmed 19: 387-395 (2016)
- Sektion Notfall- Intensivmedizin und Schwerverletztenversorgung der DGU: Jahresbericht des Traumaregisters der Deutschen Gesellschaft für Unfallchirurgie 2016. Köln (2016)
- Wutzler S: [Time intervals during and after emergency room treatment]. Unfallchirurg 113: 36-43 (2010)

Performance / Quality indicator

…Quality indicators are figures which are presumed to be associated with the quality of care and outcome…

äzq
Ärztliche Zentralstelle Qualitätssicherung

**Beurteilung
klinischer Messgrößen des
Qualitätsmanagements**

**- Qualitätskriterien
und -Indikatoren in der
Gesundheitsversorgung -**

Konsenspapier
der Bundesärztekammer,
der Kassenärztlichen Bundesvereinigung und
der AWMF

- http://www.aezq.de/qualitaetsindikatoren

Examples

① Structure

- POC diagnostik
- MS-CT
- qualification of Staff
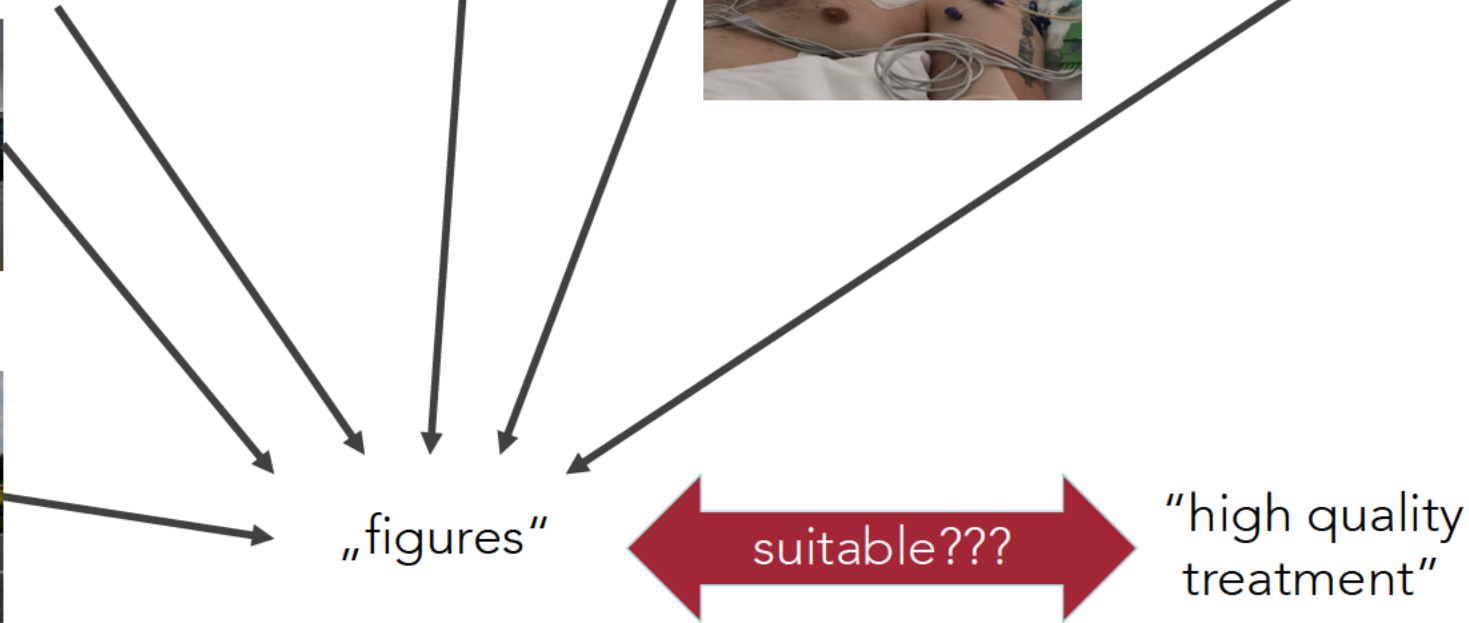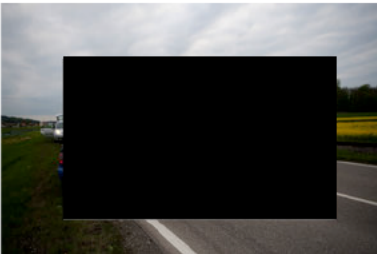- blood bank
- SOP

② Process

- treatment time
- events
- actions

③ Results

- mortality
- complications
- satisfaction
- costs

„figures"

suitable???

"high quality treatment"

Quality indicators TR-DGU in 2012

- For many years hardly nothing changed
- „unimportant" (e.g. time until FAST) ?

Indicator	Your Hospital				TR-DGU	
	10 years	2010	2011	2012	2012	10 years
Primary admitted patients	n=681	n=66	n=141	n=156	n=26,377	n=97,101
1. Pre-hospital time from the accident until hospital admission; in patients with ISS ≥ 16 [∅ min ± SD]	97 ± 80 n=163	75 ± 35 n=23	78 ± 26 n=44	81 ± 27 n=57	70 ± 52 n=10,414	71 ± 50 n=45,466
2. Intubation rate of unconscious patients (GCS ≤ 8) [%, n / total]	93% 136 / 147	85% 11 / 13	87% 33 / 38	97% 30 / 31	84% 3394 / 4045	88% 16.431 / 18.618
3. Time from hospital admission until **first x-ray of the thorax**; in patients with ISS ≥ 16 [∅ min ± SD]	37 ± 21 n=18	7 ± n=1	± n=0	38 ± 30 n=3	16 ± 22 n=4,750	13 ± 19 n=22,218
4. Time from hospital admission until first **x-ray of the pelvis**; in patients with ISS ≥ 16 [∅ min ± SD]	36 ± 21 n=11	± n=0	23 ± 15 n=3	40 ± n=1	17 ± 21 n=3,184	15 ± 18 n=16,113
5. Time from hospital admission until **abdominal sonography** (FAST); in patients with ISS ≥ 16 [∅ min ± SD]	4 ± 4 n=451	9 ± 7 n=21	5 ± 3 n=111	5 ± 4 n=125	7 ± 11 n=8,877	7 ± 11 n=36,311
6. Time from hospital admission until **CT of the head** (cCT); in patients with GCS < 15 [∅ min ± SD]	15 ± 11 n=268	14 ± 7 n=26	16 ± 13 n=66	17 ± 14 n=73	23 ± 17 n=9,604	24 ± 18 n=36,758
7. Time from hospital admission until **whole-body CT** (WBCT); in all patients [∅ min ± SD]	16 ± 11 n=368	16 ± 8 n=48	15 ± 11 n=108	15 ± 12 n=126	24 ± 18 n=17,673	24 ± 18 n=55,892
8. Time from hospital admission until first **emergency surgery**; for selected interventions (see remarks below) [∅ min ± SD]	92 ± 41 n=73	92 ± 39 n=14	81 ± 38 n=18	101 ± 42 n=31	87 ± 39 n=3,998	81 ± 41 n=10,910

Evaluation of quality indicators – The RUMBA method

R	Relevant	The indicator is relevant concerning the result
U	Understandable	The staff and / or the community understand the indicator
M	Measurable	All needed figures are available (without efforts)
B	Behavioural	The team / the authority can influence the indicator
A	Achievable	Good results must be achievable

Evaluation of quality indicators – The QUALIFY method

".... QUALIFY is an instrument for the structured assessment of quality indicators in the health sector. It checks whether these (indicators) are capable of reliably representing differences in the quality of care. The instrument (QUALIFY) has been designed to be used in all sectors of medical care (outpatient and inpatient acute care, outpatient and inpatient rehabilitation) ..."

Available online at www.sciencedirect.com
ScienceDirect
ZaeFQ
www.elsevier.de/zaefq

ELSEVIER
URBAN & FISCHER

Zärztl. Fortbild. Qual.Gesundh.wes. (ZaeFQ) 101 (2008) 683–688

Im Blickpunkt

QUALIFY: Ein Instrument zur Bewertung von Qualitätsindikatoren

Anne Reiter[1,*], Burkhard Fischer[1], Joachim Kötting[1], Max Geraedts[2], Wilfried H. Jäckel[3], Klaus Döbler[1]

[1]Bundesgeschäftsstelle Qualitätssicherung gGmbH (BQS), Düsseldorf
[2]Public Health Studiengang, Universität Düsseldorf
[3]Abteilung Qualitätsmanagement und Sozialmedizin, Universitätsklinikum Freiburg

Review of current literature

Review of potential quality indicators for the TraumaRegister DGU®

137
Identification of potential quality indicators
• TR-DGU 9, TARN 14, ATLS 17, S3 guideline polytrauma 57, review of literature 39, experts whish 2

68
Exclusion of 69 QI due to
• Multiple nomination, overlaps

43
Exclusion of 25 QI
• can not be recorded with the Trauma Register DGU dataset
• does not fit with the the inclusion criteria of the TR-DGU

• QUALIFY assessment

- Stabilization of coagulation parameters

- Missed injury

- Prehospital placement of thoracic drains AND replacement/placement at resuscitation room

- Explorative laparotomy

- Shock on admission (severe TBI)

- Prehospital respiratory rate measurement available

- Prehospital intubation and ventilation in patients with RR < 6

- Number of thromboembolic events

- Non-fixation of femur fracture

- Time spent in resuscitation room

- Prehospital analgosedation

- CT in critically injured patients

- Complications (e.g. sepsis)

- Craniotomy for intracranial hemorrhage (AIS 5)

- Length of stay in the intensive care unit

- Length of stay at the hospital

- Pulse oximetry after chest trauma

- Administration of fibrinogen for fibrinogen deficit

- Documentation of GCS and pupil reaction and width

- Shock on admission (severe TBI)

- Time between accident and hospital admission

- Time until radiography of the chest

- Time until radiography of the pelvis

- Blood oxygen level < 90 percent without artificial respiration (Prehospital)

- Time until start of transfusion

- Time until laparotomy for abdominal trauma

- Arterial blood gas analysis (ABG) done / Base excess (BE) documented

- FAST done for patients without CT

- Time until CT / radiography of the pelvis in patients with pelvis fracture

- Time between hospital admission and FAST

- Prehospital airway management in unconscious patients (GCS < 9)

- Time until surgery for hemorrhagic shock

- Time until craniotomy for severe TBI

- Complete basic diagnostics available.

- Time until CCT with GCS < 15

- Prehospital capnometry (etCO2) in intubated patients

- Time until first emergency surgical intervention (7-item list)

- Use of CCT with GCS > 14

- Application of pelvic sling belt (Prehospital)

- Time until surgical intervention for penetrating trauma

- Administration of tranexamic acid

- Mortality

- Time between hospital admission and WBCT

The QUALIFY Method

13 Experts

43 potential indicators

20 Questions:

- 3* Relevance

- 8* Scientific approach

- 9* Practicability

Table 1 Summary of the key statements of quality indicators to be assessed with the QUALIFY approach i.a.w. Reiter et al. [14, 15]

Category		Criterion/key statement	Assessment made	Scale
Relevance	R1	Significance: "The indicator covers aspects of quality of life, morbidity, or mortality."	Yes	4-level
	R2	Benefit: "Use of the indicator can have a positive effect on the quality of care."	Yes	4-level
	R3	Potential risks/side effects: "No risks are known/assumed which may result from the use of the indicator."	Yes	4-level
Scientific approach	W1	Indicator evidence: For structure indicators: "The existence of the measured structure leads to a better result." For indicators regarding indication: "Meeting the measured indication criteria leads to a positive risk–benefit balance." For process indicators: "The existence of the measured process leads to a better result." For outcome indicators: "The measured outcome can be influenced by the service provider."	No	4-level
	W2	Unambiguity of definitions: "The indicator is defined clearly and unambiguously."	Yes	4-level
	W3	Reliability: "It is a reliable measurement."	No	4-level
	W4	Statistical ability to differentiate	No	4-level
	W5	Risk adjustment: "The indicator is sufficiently adjusted to risk" (Are all factors that are not caused by the user taken into due account?)	No	4-level
	W6	Sensitivity: "The indicator provides sufficient sensitivity."	No	4-level
	W7	Specificity: "The indicator provides sufficient specificity."	No	4-level
	W8	Validity: "The indicator provides sufficient validity."	No	4-level
Practicability	P1	Understandability and interpretability for patients and interested public	Yes	4-level
	P2	Understandability and interpretability for medical and nursing personnel	Yes	4-level
	P3	Possibility to influence the indicator manifestation: "The quality indicator refers to an aspect of care which can be influenced by the actors to be assessed."	Yes	4-level
	P4	Availability of data: "The data are documented by the service provider as a routine or can be collected with acceptable effort."	yes	4-level
	P5	Data collection effort: "There is no data collection method available that provides at least equivalent results with less effort."	Yes	2-level
	P6	Implementation barriers: "Implementation barriers are unknown or covered by adequate measures."	Yes	4-level
	P7	Accuracy: "The correctness of the data can be verified."	Yes	2-level
	P8	Data integrity: "Is the individual data set intact?"	Yes	2-level
	P9	Completeness of the data: "Is it possible to verify that all occurring cases were recorded?"	Yes	2-level

The QUALIFY Method

13 Experts

43 potential Indicators

20 Questions:

- 3* Relevance
- 8* Scientific appoache
- 9* Practibatility

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	P7	Accuracy: "The correctness of the data can be verified."	Yes	2-level
	P8	Data integrity: "Is the individual data set intact?"	Yes	2-level
	P9	Completeness of the data: "Is it possible to verify that all occurring cases were recorded?"	Yes	2-level

Consents in experts` QUALIFY rating

ID	Description	Consensus Value
TR82	Stabilization of coagulation parameters	
TR88	Missed injury	
TR59	Prehospital placement of thoracic drains AND replacement/placement at resuscitation room	
TR97	Explorative laparotomy	
TR83	Shock on admission (severe TBI)	
TR23	Prehospital respiratory rate measurement available	
TR86	Prehospital intubation and ventilation in patients with RR < 6	
TR89	Number of thromboembolic events	
TR15	Non-fixation of femur fracture	
TR10	Time spent in resuscitation room	
TR92	Prehospital analgosedation	
TR80	CT in critically injured patients	
TR17	Complications (e.g. sepsis)	
TR96	Craniotomy for intracranial hemorrhage (AIS 5)	
TR78	Length of stay in the intensive care unit	
TR62	Length of stay at the hospital	
TR12	Pulse oximetry after chest trauma	
TR85	Administration of fibrinogen for fibrinogen deficit	
TR94	Documentation of GCS and pupil reaction and width	
TR91	Shock on admission (severe TBI)	
TR71	Time between accident and hospital admission	
TR93	Time until radiography of the chest	
TR44	Time until radiography of the pelvis	
TR99	Blood oxygen level < 90 percent without artificial respiration (Prehospital)	
TR100	Time until start of transfusion	
TR43	Time until laparotomy for abdominal trauma	
TR87	Arterial blood gas analysis (ABG) done / Base excess (BE) documented	
TR81	FAST done for patients without CT	
TR42	Time until CT / radiography of the pelvis in patients with pelvis fracture	
TR74	Time between hospital admission and FAST	
TR14	Prehospital airway management in unconscious patients (GCS < 9)	
TR48	Time until surgery for hemorrhagic shock	
TR18	Time until craniotomy for severe TBI	
TR02	Complete basic diagnostics available.	
TR75	Time until CCT with GCS < 15	
TR04	Prehospital capnometry (etCO2) in intubated patients	
TR50	Time until first emergency surgical intervention (7-item list)	
TR77	Use of CCT with GCS > 14	
TR16	Application of pelvic sling belt (Prehospital)	
TR49	Time until surgical intervention for penetrating trauma	
TR98	Administration of tranexamic acid	
TR13	Mortality	
TR76	Time between hospital admission and WBCT	

Consensus Value columns: 1 2 3 4 5 6 7 8 9 10 11

Description of the indicator

Code No. of the indicator

Mean value of the 3 relevance criteria used as a rough measure to determine the sequence

Quality indicator: TR91   3.1

Shock on admission (severe TBI)

R1 Relevance	3.4	
R2 Benefit	3.2	
R3 Potential risks/side effects	2.8	
W2 Unambiguity of definition	3.6	
P1 Understandability for the patient	2.5	
P2 Understandability for medical/nursing personnel	3.8	
P3 Possibility to take influence	1.8	
P4 Availability of data/effort involved	4.0	
P6 Implementation barriers	3.4	

Coding	Mean
	> 3.5
	> 3.0
	>= 2.5
	< 2.5

QUALIFY criteria

Mean rating value

Color coding

ORIGINAL ARTICLE

CrossMark

Evaluation of new quality indicators for the TraumaRegister DGU® using the systematic QUALIFY methodology

Dan Bieler[1] · Anna Hörster[2] · Rolf Lefering[2] · Axel Franke[1] · Christian Waydhas[3,4] · Stefan Huber-Wagner[5] · Markus Baacke[6] · Thomas Paffrath[7] · Jan Wnent[8] · Ruth Volland[9] · Barbara Jakisch[10] · Felix Walcher[11] · Martin Kulla[12]

- Bieler D, Hörster A, Lefering R, Franke A, Waydhas C, Huber-Wagner S, Baack B, Paffrath T, Wnet J, Volland R, Jackisch B, Walcher F, Kulla M: Evaluation of new quality indicators for the TraumaRegister DGU® using the systematic QUALIFY methodology. Eur J Trauma Emerg Surg 2018; (online first http://DOI.org/10.1007/s00068-018-1055-z)
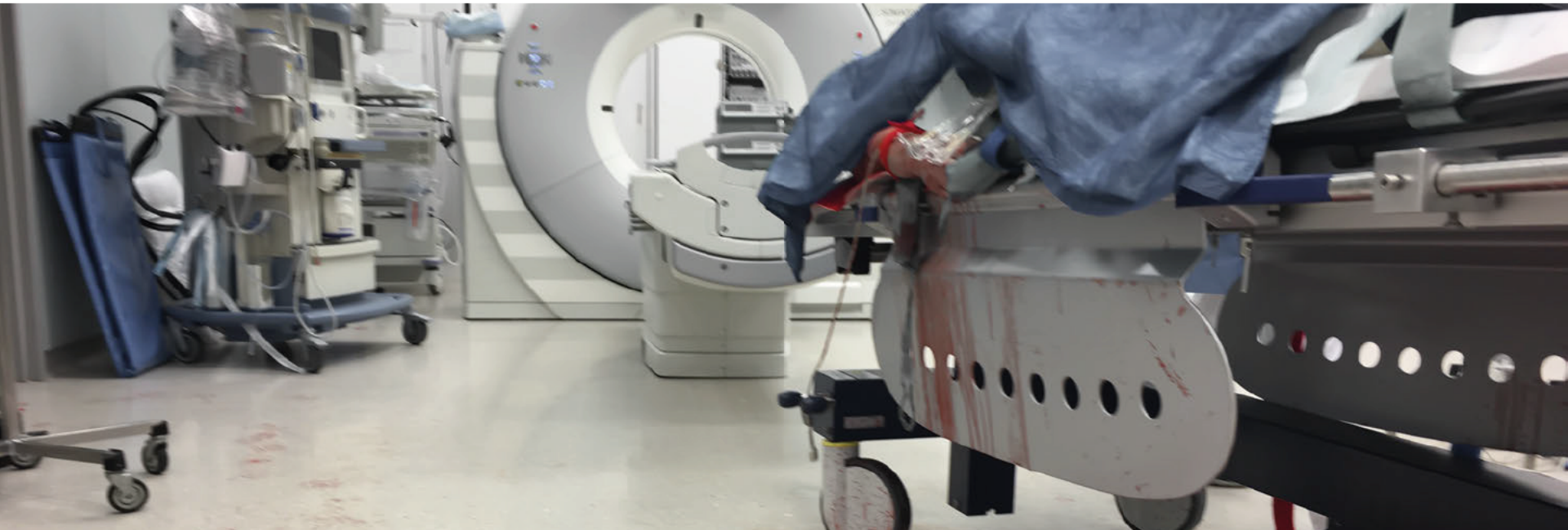
Validation of potential performance indicators in 110.000 German trauma patients

Material and Method

- TR-DGU project ID 2017-037

- Dataset:

    - national (German) trauma centers

    - 5 years: 2012-2016

    - primary admitted patients (no secondary transferred patients)

    - n=111.656

- Evaluation of all potential performance indicators

"Indicator view"

patients with a negative indicator characteristic
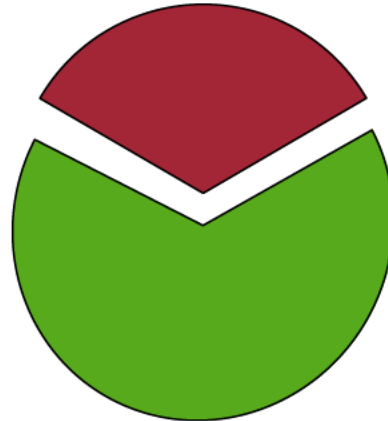
$$\frac{\text{observed mortality rate}}{\text{RISC II mortality rate}} > 1 \longrightarrow \text{bad outcome}$$

$$\frac{\text{observed mortality rate}}{\text{RISC II mortality rate}} < 1 \longrightarrow \text{good outcome}$$

patients with a positive indicator characteristic

- Lefering R, Huber-Wagner S, Nienaber U, Maegele M, Bouillon B: Update of the trauma risk adjustment model of the TraumaRegister DGU: the Revised Injury Severity Classification, version II. Crit Care 18: 476 (2014)
- Horster A, Kulla M, Bieler D, Lefering R: Empirical evaluation of quality indicators for severely injured patients in the TraumaRegister DGU®. Der Unfallchirurg (online first https://dx.doi.org/10.1007/s00113-019-0699-4) (2019)

"Trauma center view"

Trauma centers with "low performance" SMR > 1
n=97 trauma center
42% of all patients $\longrightarrow$ low degree of indicator fulfillment

Trauma centers with <200 cases/5 years
n=506 trauma centers
26% all patients
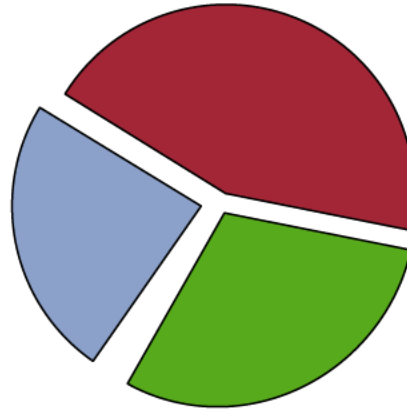
Trauma centers with "good performance" SMR <1
n=71 trauma center
32% of all patients $\longrightarrow$ high degree of indicator fulfillment

080 Computed tomography in severley injured patient

Observed collective (denominator)	Severe trauma ▪ GCS ≤ 12 ▪ HR > 120/min ▪ BP < 100 mmHg ▪ RR > 30/min ▪ >= 2 body regions with AIS >=3 ▪ High energy trauma	Cases: n = 83,042 (74,4 % of the whole collective)
indicator (counter)	positively rated result: CT performed	n = 76424 (92,0 %)

Trauma center view	n	Ratio QI „positiv"	rating
"good performing TCs"	27,178	93.6 %	
"low performing TCs"	36,451	94.2 %	unclear
Small trauma centers	19,413	85.7 %	

Indicator view	n	ISS (MW)	mortality	RISC II	Δ	rating
QI fulfilled	76,424	19.7	11.9 %	11.4 %	+ 0.6 %	good performance indicator
QI not fulfilled	6618	18.9	24.3 %	20.9 %	+ 3.4 %	

018 Time until decompressive craniotomy in severe TBI

Observed collective (denominator)	• AIS-Head > 3 • craniotomy • time until surgery < 300 minutes	Cases: n=4,021 3,6 % of the whole collective			
indicator (counter)	time until start of surgical procedure	mean (n=4,021): 84.8 minutes			

Hospital view	n	mean	SD	Median	rating
"Good performing TCs"	1,423	84.2	42.9	75.0	unclear
"Bad performing TCs"	2,261	84.3	43.1	75.0	
Small trauma centers	337	90.5	48.3	80.0	

Indicator view		n	ISS (mean)	observed death rate	expected death rate (RISC II)	Δ	rating
Q1	0 – 57 minutes	1,011	29.7	41,5 %	34,7 %	+ 6,9 %	not suitable as performance indicator
Q2	58 – 75 minutes	1,016	29.7	38,8 %	32,3 %	+ 6,5 %	
Q3	76 – 101 minutes	1,007	29.1	33,0 %	30,1 %	+ 2,9 %	
Q4	> 101 minutes	987	28.1	25,2 %	24,8 %	+ 0,4 %	

20 of 40 Quality indicators had a positive correlation to mortality

QI-ID	potent a performance nd cator	trauma center v ew	nd cator v ew
004	etCO2 / Kapnometrie bei intubierten Patienten*	🟩	🟩
081	Sonografie durchgeführt falls kein GK-CT	🟩	🟩
012	Pulse Oxymetrie beim Thoraxtrauma	🟧	🟩
042	Zeit bis zum CT / Rö-Becken bei Patienten mit Beckenfraktur	🟧	🟩
077	cCT bei GCS <14	🟧	🟩
080	CT beim kritisch Verletzten	🟧	🟩
094	Dokumentation von GCS und Pupillenreaktion und Pupillenweite	🟩	🟧
002	Vollständige Basisdiagnostik vorhanden	🟧	🟩
096	Kraniotomie bei intrakraniellen Blutungen (A S 5)*	🟧	🟩
099	SPO2 < 90 ohne ntubation	🟥	🟩
016	Anlage Beckengurt*	🟩	🟥
014	Prähospitale ntubation bewusstloser Patienten (GSC ≤ 8)	🟥	🟩
043	Zeit bis zur Laparotomie bei Abdominaltrauma	🟩	🟥
010	Zeit im Schockraum	🟩	🟥
098	Gabe von Tranexamsäure*	🟥	🟩
017	Komplikationen (z B Sepsis)	🟥	🟩
083	Hypothermie bei CU Aufnahme**	🟥	🟩
089	Anzahl thromboembolischer Ereignisse	🟥	🟩
015	Nicht-Fixierung Femurfraktur	🟥	🟩
097	Explorative Laparotomie*	🟥	🟩

* ab TR-DGU Datensatz Version 2015
** Hypothermie = ≤ 35°Celsius

- Clinical relevant differences are hard to find

- Different results depending on the used method!

- „small trauma centers" achieved more often negative results

- CAVE: outcome parameter is survival of the patient

15 of 40 Indicators show a positive QUALIFY and a positive scientific evaluation

QI-ID	potential performance indicator	trauma center view	indicator view	QUALIFY	TR-DGU (2017)
Prähospital (n=5)					
004	etCO$_2$ / Kapnometrie bei intubierten Patienten	🟩	🟩	3,8	X
012	Pulsoxymetrie beim Thoraxtrauma	🟧	🟩	3,6	
099	S$_p$O$_2$ < 90% ohne Intubation	🟥	🟩	3,7	
016	Anlage Beckengurt	🟩	🟥	3,6	X
014	Intubation bewusstloser Patienten (GSC ≤ 8)[a]	🟧	🟩	3,6	X
Zeiten im Schockraum (n=1)					
043	Zeit bis zur Laparotomie bei Abdominaltrauma	🟩	🟥	3,4	
Interventionen/Ereignisse im Schockraum (n=9)					
081	FAST durchgeführt, falls kein GK-CT	🟩	🟩	3,3	X
077	cCT bei GCS < 14	🟧	🟩	3,6	X
080	CT beim kritisch Verletzten	🟧	🟩	3,6	
094	Dokumentation von GCS, Pupillenreaktion und Pupillenweite	🟩	🟧	3,4	
002	Vollständige Basisdiagnostik vorhanden	🟧	🟩	3,4	X
096	Kraniotomie bei intrakraniellen Blutungen (AIS 5)	🟧	🟩	3,3	X
098	Gabe von Tranexamsäure	🟥	🟩	3,5	X
017	Komplikationen (z.B. Sepsis)	🟥	🟩	3,3	
083	Hypothermie (≤ 35°C) bei ICU-Aufnahme	🟥	🟩	3,2	

Negative QUALIFY AND a negative scientific evaluation

QI-ID	potential performance indicator	trauma center view	indicator view	QUALIFY	TR-DGU (2017)
023	Messung der AF vorhanden			2,8	
093	Ze t b s zum Röntgen-Thorax			2,1	
074	Ze t b s Abdomen-Sonograph e			2,8	
059	Thoraxdra nage prähosp ta UND Neuan age m Schockraum			2,4	
092	Ana gosed erung			2,3	
044	Ze t zw schen K n kaufnahme und Röntgen Becken			2,1	
071	Prähosp ta e Ze t zw schen Unfa und K n kaufnahme			3,0	X
086	Intubat on be AF < 6 oder a ternat ve Atemwegss cherung			2,7	

Prehospital treatment time (PTT) and in-hospital mortality in Germany
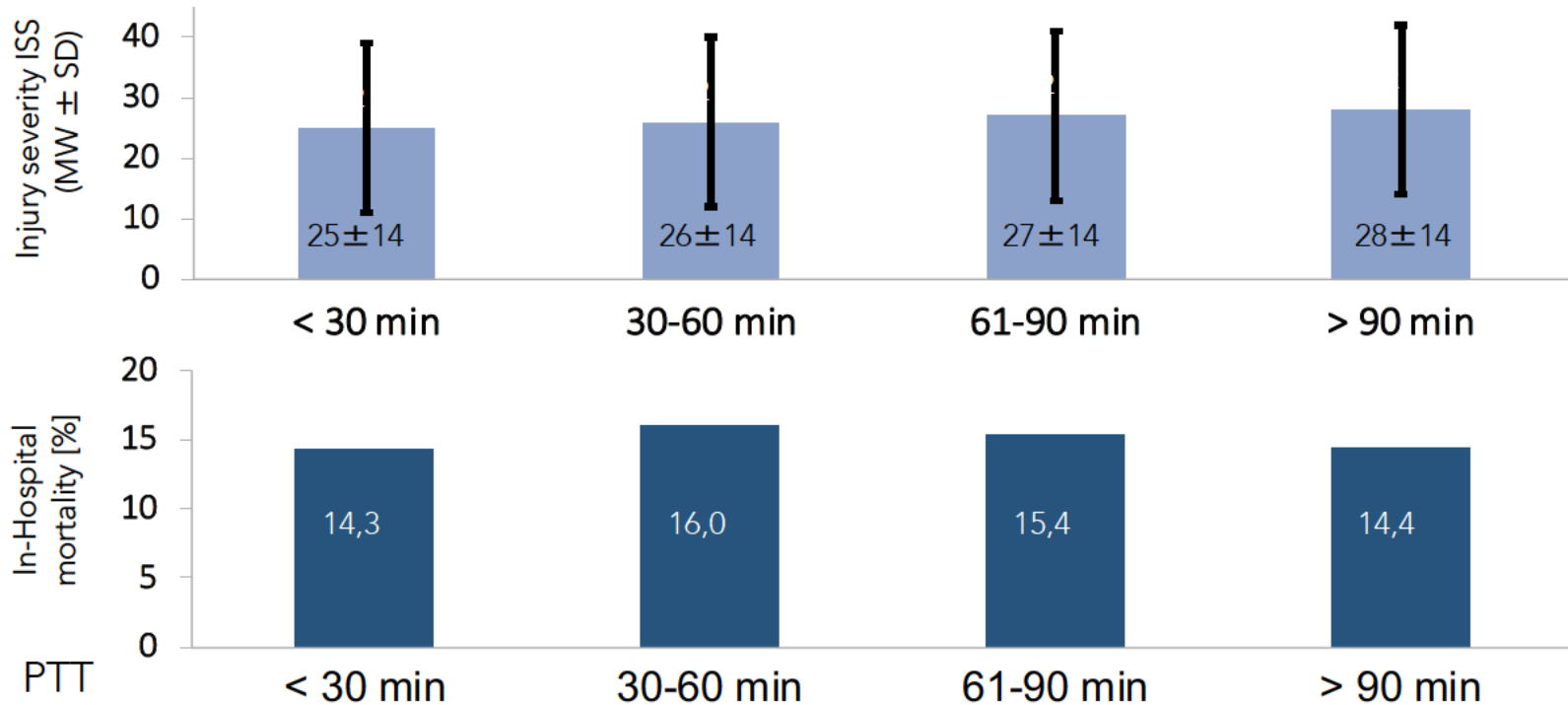
- Kleber C: [Rescue time and survival of severely injured patients in Germany]. Unfallchirurg 116: 345-350 (2013)
- Kulla M.: Prehospital endotracheal intubation and chest tubing does not prolong the overall resuscitation time of severely injured patients: a retrospective, multicentre study of the Trauma Registry... Emerg Med J 29: 497-501 (2012

Unequal QUALIFY and scientific evaluation

QI-ID	I	Potential performance indicator	trauma center view	indicator view	QUALIFY	TR-DGU (2017)
Prähospital						
091		Schock be Aufnahme (schweres SHT)	🟥	🟥	3,1	
Prozesszeiten im Schockraum						
042		Ze t b s zum CT / Rö-Becken be Pat enten m t Beckenfraktur	🟧	🟩	3,0	
010		Ze t m Schockraum	🟩	🟥	2,7	
076		Ze t zw schen K n kaufnahme und Ganzkörper-CT	🟧	🟧	3,6	X
018		Ze t b s zur Kran otom e be schwerem SHT	🟧	🟥	3,5	
100		Ze t b s zur Transfus on***	🟧	🟥	3,5	X
050		Ze t b s zum ersten Notfa e ngr ff (7er L ste)	🟥	🟥	3,6	X
048		Ze t b s zur OP m hämorrhag schen Schock	🟥	🟥	3,6	X
049		Ze t b s OP be penetr erendem Trauma	🟥	🟥	3,5	X
075		Ze t b s cCT be GCS <15	🟥	🟥	3,1	
Interventionen/Ereignisse im Schockraum						
089		Anzah thromboembo scher Ere gn sse	🟥	🟩	2,9	
015		N cht-F x erung Femurfraktur	🟥	🟩	2,8	
097		Exp orat ve Laparotom e*	🟥	🟩	2,1	
085		Gabe F br nogen be F br nogendef z t	🟥	🟧	3,6	
088		Übersehene Ver etzungen	🟧	🟥	3,1	
082		Stab s erung der Ger nnungsparameter	🟥	🟥	3,5	
087		B utgasana yse durchgeführt / BE vorhanden	🟥	🟥	3,3	

Results

- Observed outcome parameter was the survival of the patient / hospital mortality.

- 50% of the potential performance indicators have a correlation to hospital mortality

- Clinically relevant (important) differences are hard to find

- Performance indicators observing interventions or events show better results than those measuring time intervals

- „small trauma centers" achieve more often negative results

"Top Performance Indicator"

- Use of capnography in intubated patients (ID 004)
- A FAST was performed if no WB-CT was done (ID 081)

Der Unfallchirurg

Originalien

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[2] Klinik für Anästhesie, Intensivmedizin, Notfallmedizin und Schmerztherapie, Bundeswehrkrankenhaus Ulm, Ulm, Deutschland
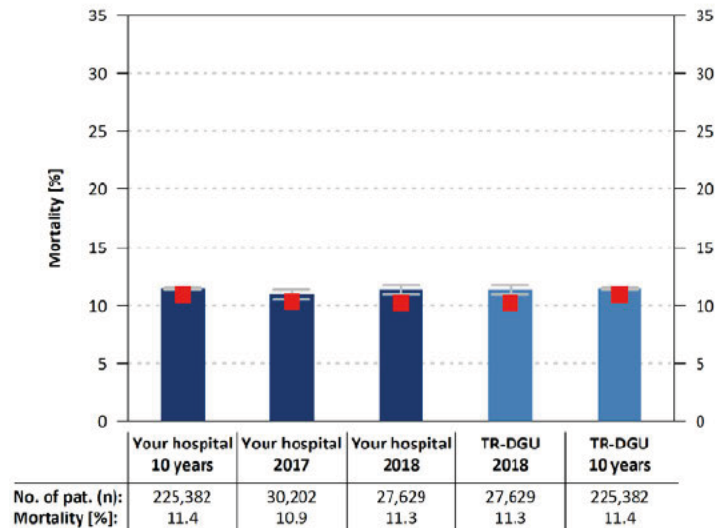
[3] Klinik für Unfallchirurgie und Orthopädie, Wiederherstellungs- und Handchirurgie, Verbrennungsmedizin, Bundeswehrzentralkrankenhaus Koblenz, Koblenz, Deutschland

Empirische Überprüfung der Qualitätsindikatoren für Schwerverletzte im TraumaRegister DGU®

- Horster A, Kulla M, Bieler D, Lefering R: Empirical evaluation of quality indicators for severely injured patients in the TraumaRegister DGU®. Der Unfallchirurg 2019 (online first https://dx.doi.org/10.1007/s00113-019-0699-4)

Committee on Emergency Medicine, Intensive Care and Trauma Management of the German Trauma Society (DGU)

AUC – Academy for Trauma Surgery

Annual Report 2019

TraumaRegister DGU®

Observed mortality rate versus risc prognosis

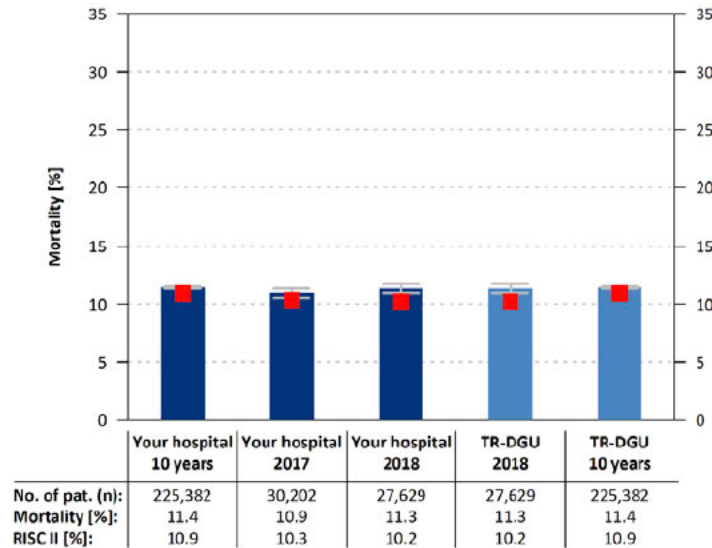| No. of pat. (n):	Your hospital 10 years	Your hospital 2017	Your hospital 2018	TR-DGU 2018	TR-DGU 10 years
No. of pat. (n):	225,382	30,202	27,629	27,629	225,382
Mortality [%]:	11.4	10.9	11.3	11.3	11.4
RISC II [%]:	10.9	10.3	10.2	10.2	10.9

Figure 2: Observed mortality and risk of death prognosis (RISC II)
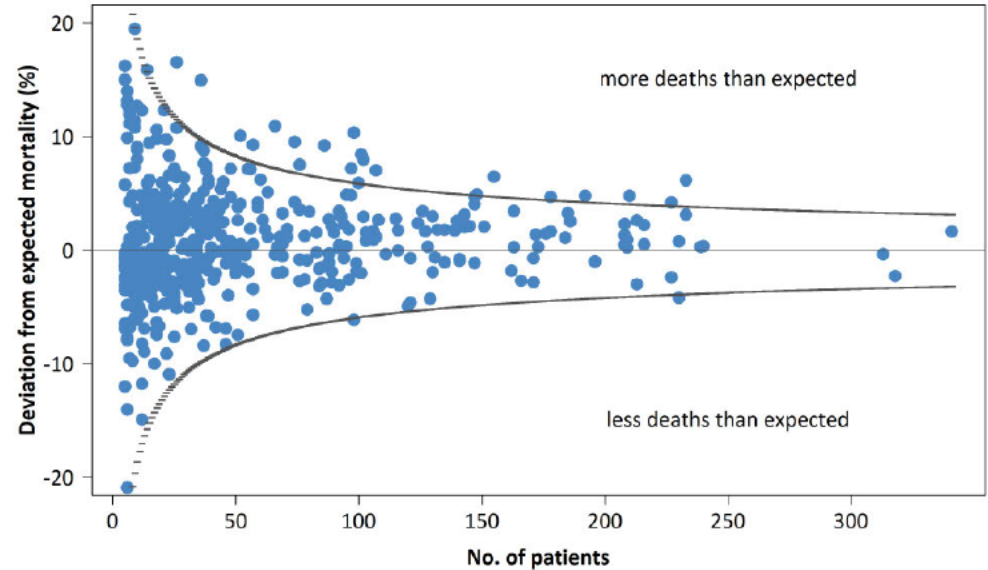

Figure 3: Deviation between the observed mortality and the risk of death prognosis (RISC II) of every in the TR-DGU participating hospital with more than 5 cases in the year 2018, ♦ : Your hospital

4.1.2 Capnometry in intubated patients

A capnometry in intubated patients allows to detect a malpositioning of the tubus. Only patients with a prehospital endotracheal intubation with valid data for capnometry are considered here (since dataset revision 2015). Intubated patients without data to the capnometry cannot be analysed (n = 1,803).
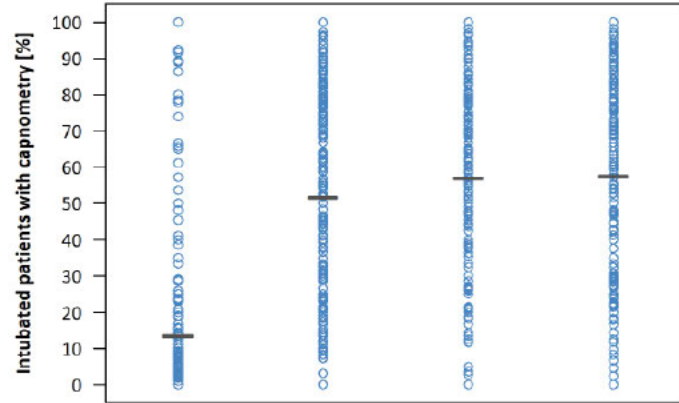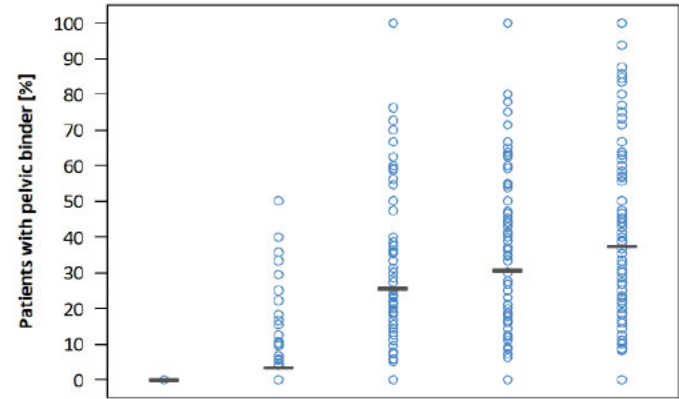

Year:	2015	2016	2017	2018
Your hospital:	14 %	52 %	57 %	57 %
Capnometry (n):	876	3,390	3,666	3,355
Intubated (N):	6,478	6,545	6,429	5,835
TR-DGU:	14 %	52 %	57 %	57 %
Capnometry (n):	876	3,390	3,666	3,355
Intubated (N):	6,478	6,545	6,429	5,835

Figure 5: Distribution of the capnometry rate in prehospital intubated patients over all hospitals, 2015-2018, ♦ Your hospital, — TR-DGU, o single hospital value

4.1.4 Pelvic binder in pelvic fracture

The stabilisation of an instable pelvic fracture can help to improve the hemodynamic status of the patient. Only cases with a pelvic fracture (AIS severity 3 to 5) are considered here. The pelvic binder is documented in the standard dataset only (since the dataset revision 2020).
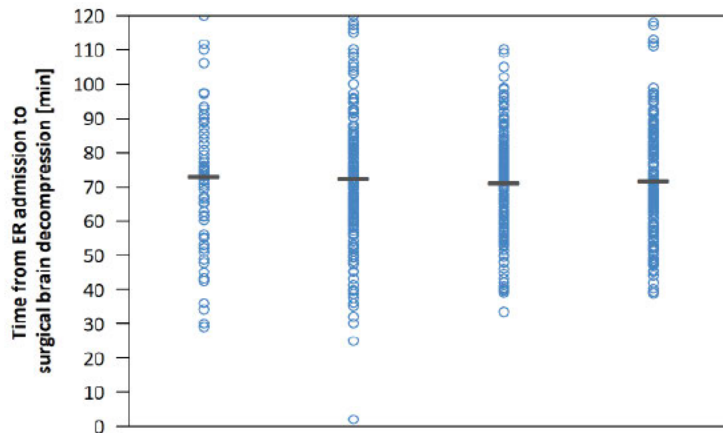

Year:	2014	2015	2016	2017	2018
Your hospital:	0 %	3 %	26 %	31 %	37 %
Pelvic binder (n):	0	46	364	465	512
Pelvic fracture (N):	1,275	1,329	1,422	1,512	1,366
TR-DGU:	0 %	3 %	26 %	31 %	37 %
Pelvic binder (n):	0	46	364	465	512
Pelvic fracture (N):	1,275	1,329	1,422	1,512	1,366

Figure 7: Distribution of the pelvic binder rate in patients with an instable pelvic fracture over all hospitals, 2014-2018, ♦ Your hospital, — TR-DGU, o single hospital value

4.2.6 Surgical brain decompression

In patients with intracranial bleeding after severe traumatic brain injury (TBI, AIS severity = 5) a surgical brain decompression is indicated. Only surgery patients with a valid time to surgery (max. 120 minutes) and AIS severity degree of 5 are considered in this analysis.
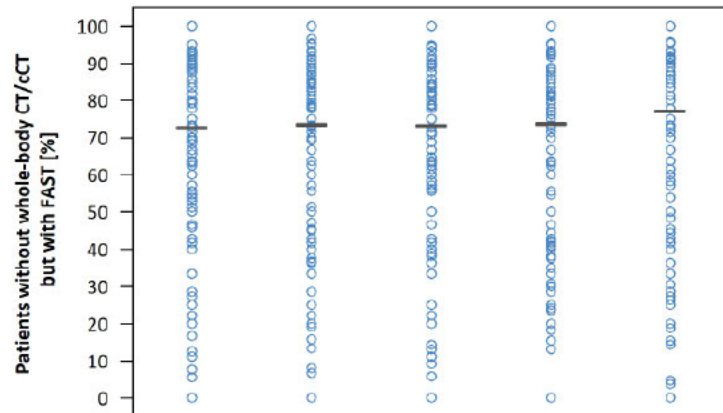

Year:	2015	2016	2017	2018
Your hospital:	73 [min]	72 [min]	71 [min]	72 [min]
n:	192	796	789	702
Min-Max:	20-120 [min]	2-120 [min]	1-120 [min]	15-120 [min]
TR-DGU:	73 [min]	72 [min]	71 [min]	72 [min]
n:	192	796	789	702
Min-Max:	20-120 [min]	2-120 [min]	1-120 [min]	15-120 [min]

Figure 13: Distribution of the mean duration from admission to the ER until surgical brain decompression over all hospitals, 2015-2018, ♦ Your hospital, — TR-DGU, o single hospital value

4.3.2 Sonography in patients without CT

If no whole-body CT / cCT has been performed, abdominal sonography (FAST = Focused Assessment with Sonography for Trauma) should be part of the diagnostic work-up. All patients with no documented whole-body CT / cCT are included in this analysis. A missing value regarding the FAST is considered as „not performed".

Year:	2014	2015	2016	2017	2018
Your hospital:	73 %	74 %	73 %	74 %	77 %
FAST (n):	2,038	2,119	2,045	2,080	1,947
No WBCT/cCT (N):	2,800	2,875	2,791	2,814	2,522
TR-DGU:	73 %	74 %	73 %	74 %	77 %
FAST (n):	2,038	2,119	2,045	2,080	1,947
No WBCT/cCT (N):	2,800	2,875	2,791	2,814	2,522

Figure 15: Distribution of the sonography rate in patients without whole-body CT / ccT over all hospitals, 2014-2018, ♦ Your hospital, — TR-DGU, o single hospital value

The search for ~~The perfect~~ better performance indicators in severe trauma

- The evaluation of potential performance indicators using registry data can effectively support an increase in quality of care

- Indicators that focus on interventions or events are more often associated with mortality than indicators that measure time intervals

- The expert recommendations of the performance indicators currently listed in the TR-DGU annual report were largely confirmed by the empirical evaluation

- Indicators that are not associated with an improved outcome should be reviewed through in-depth analysis to see if an improvement in the indicator can be achieved