

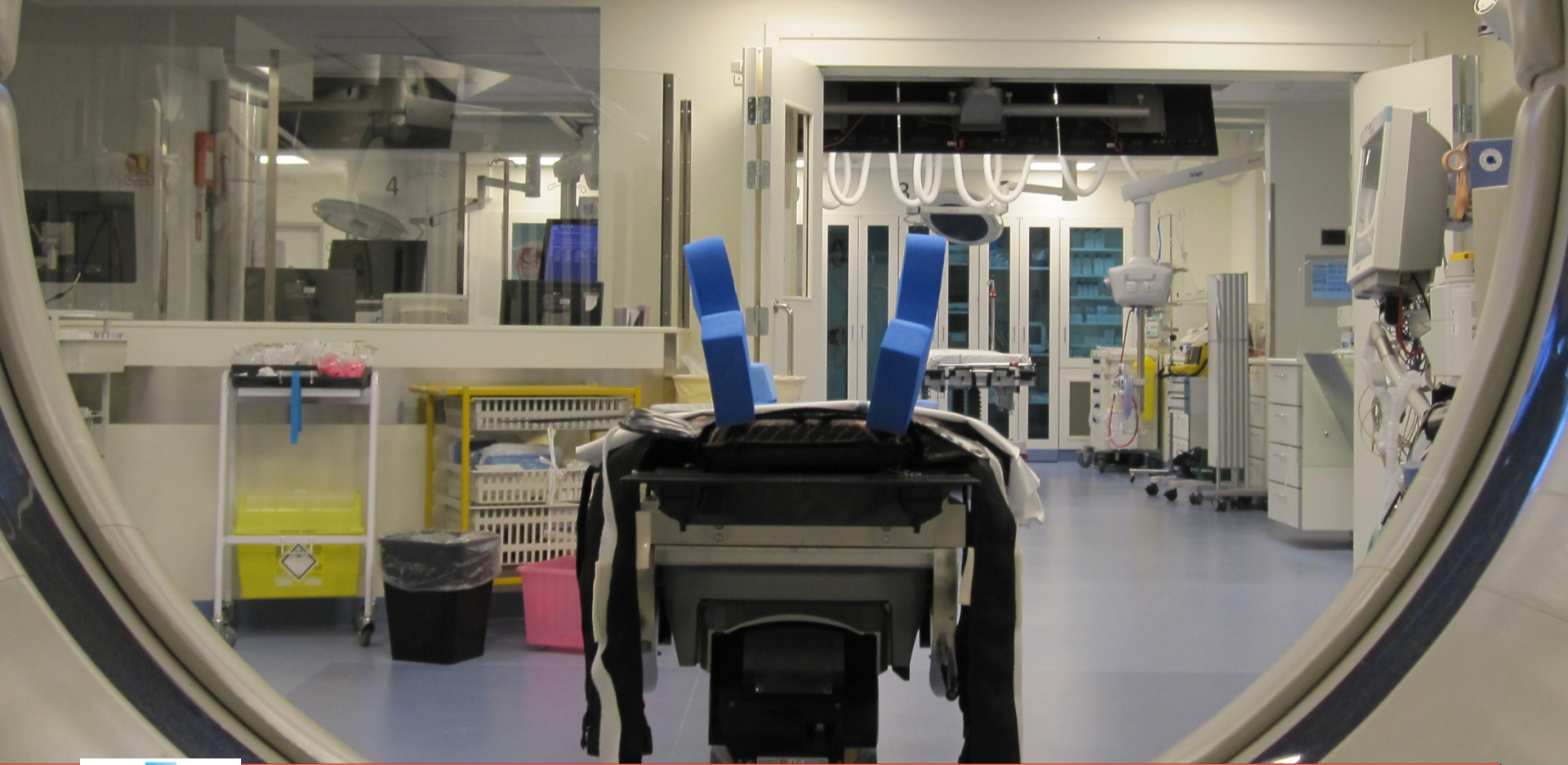
Trauma Center Rigshospitalet Copenhagen University Hospital

Anne Marie Sørensen, Senior Consultant, MD, Ph.D (anaesthesiology)



TRAUMA INTERVENTIONS

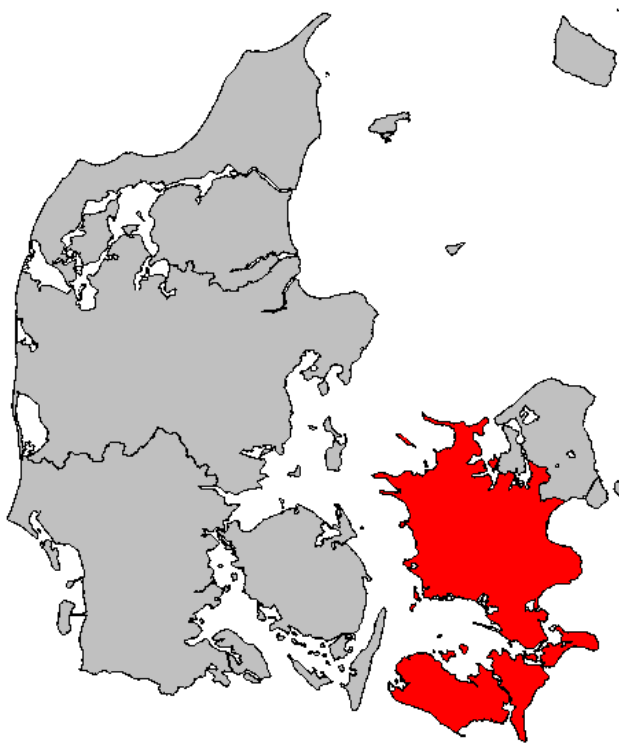
Strategy at arrival in the trauma center



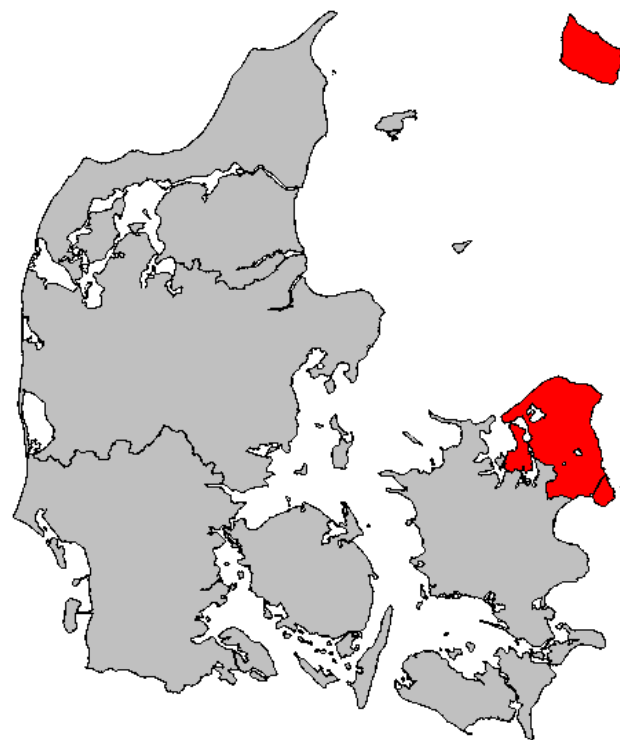
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Rigshospitalet

Uptake area 2.4 mio. citizens



800.000 citizens



1.6 mio. citizens



Rigshospitalet – Trauma Center

- Highly specialized hospital
- Specialists 24/7 (almost....)
- Specially trained nurses and other health care personnel
- Special focus on severely injured
- Education, quality improvement and research
- Traumadatabase (TARN)



Rigshospitalet Trauma Center

Cooperation between a variety of departments



- Anesthesiology
- Blood bank
- Burn unit
- Pediatric surgery
- **Diagnostic radiology and IR**
- Gynecologi & obstetrics
- Intensive care therapy in total 68 beds:
 - Multidisciplinary, neuro- og thoracic/cardiac
- Vascular surgery
- Thoracic/cardiac surgery
- Abdominal/liver surgery



Rigshospitalet Trauma Center

Cooperation between a variety of departments



- Neurosurgery
- Ortopedic surgery incl pelvis-, spine- & hand
- Oto-rhino-laryngology
- Plastic
- Psychiatry
- Pediatric
- Dental, oral, maxillo-facial surgeon
- Hyperbaric oxygen pressure chamber (decompression)
- Urology



Trauma Centre activities

- Trauma team activation (1.100/year)
 - Trauma patients requiring haemostatic resuscitation in 2013:
127 – 13 Damage Control Surgery in the Traume Bay
- Medical severe emergencies (450/year)
- Burn patients (250/year)
- Highly specialised emergency department (12.000/year)
- Only selected patients (physician triaged)
- Medullary cancer patients
- CT scan & operating room 24/7
- Cardiac arrest team – Rigshospitalet
- Disaster management





Trauma Triage

- Physiology
 - Children, consciousness, circulation, breathing
- Anatomical
 - Traumatic brain injury, penetrating, severe fracture/amputation, burns
- Mechanism of injury
 - Traffic, fall from heights, violence, drowning/hypothermia

Physician on the Mobile Emergency Care Unit, HEMS or ambulances activates trauma team



Systematic lifesaving procedures

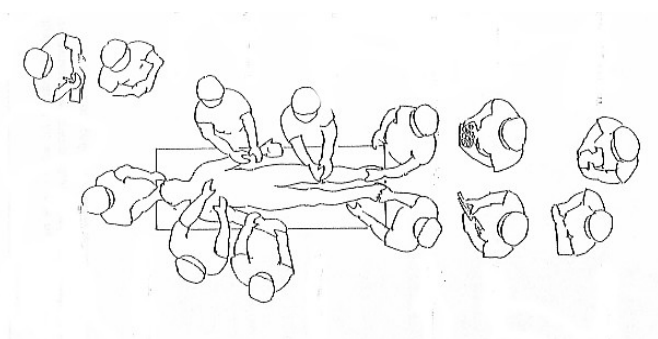
- ABCDE (ATLS)
- Initial assessment
- Treat most severe injuries first
- Ad hoc consultation from all specialties
- Closed loop communication



The Trauma Team 24/7



- Teamleader
Anesthesiologist
- Consultant
- Ortopedic surgeon
Consultant
- Anesthesiologist
Intern/fellow/registrar
- Ortopedic surgeon
Intern/fellow/registrar
- Abdominal surgeon
Consultant (FAST)
- Anesthetic nurse
- 3 trauma nurses
- Secretary
- 2 orderlies
- 2 technicians in Radiology
- Radiologist
Consultant (on call)
- 2 bioanalysts



Systematic lifesaving procedures

- Airway
- Breathing
- Circulation (i.v. lines, a-kanulla, resuscitation – haemostatic resuscitation)
- Priority
 - FAST
 - X-ray thorax
 - X-ray Pelvis
- CT-scan

To optimize initial resuscitation and treatment of the severely injured patient

New trauma Bay – October 2013



Trauma Bay



Trauma Center, Copenhagen University Hospital, Rigshospitalet

The new trauma and resuscitation area

- >260 m² (> 2691ft²)
- 5 bays
- 2 with CT scanner and operating table
in the Trauma Bay
- **Angio Suite**
coming soon - seperately





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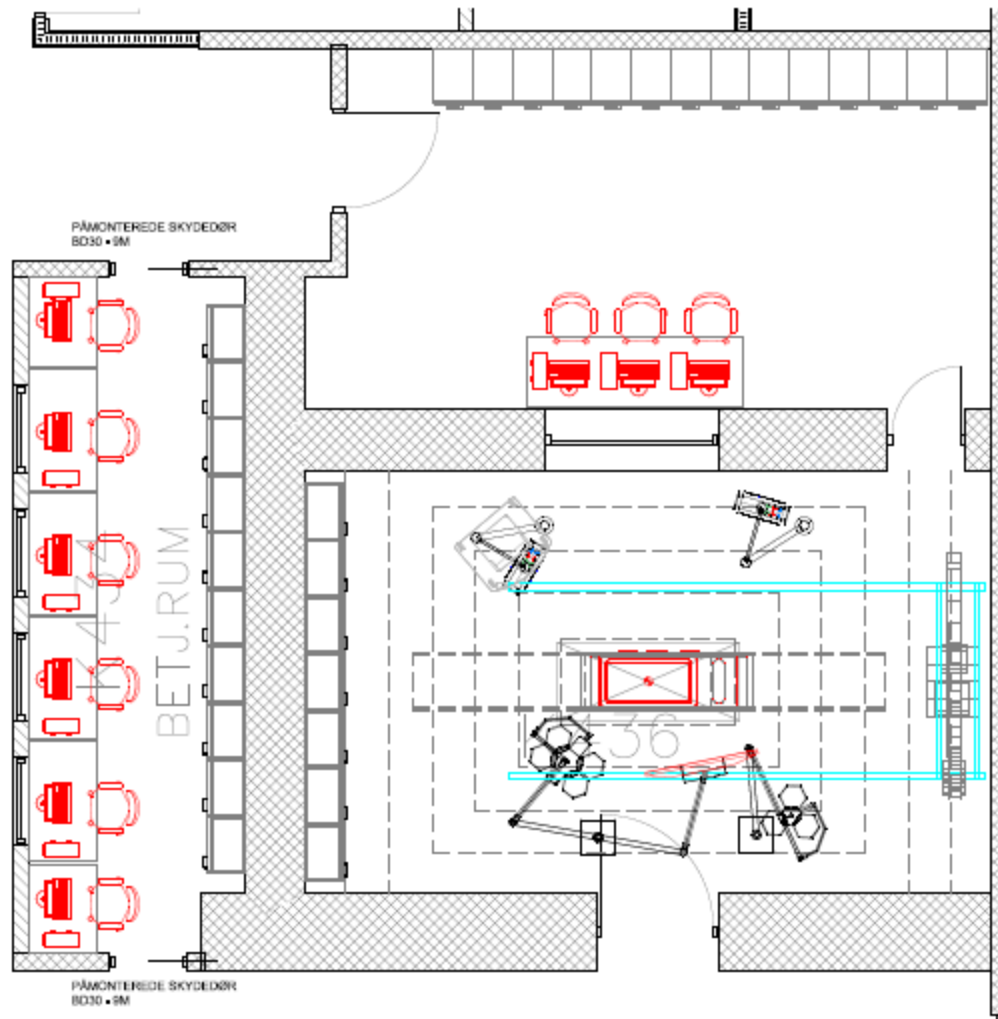


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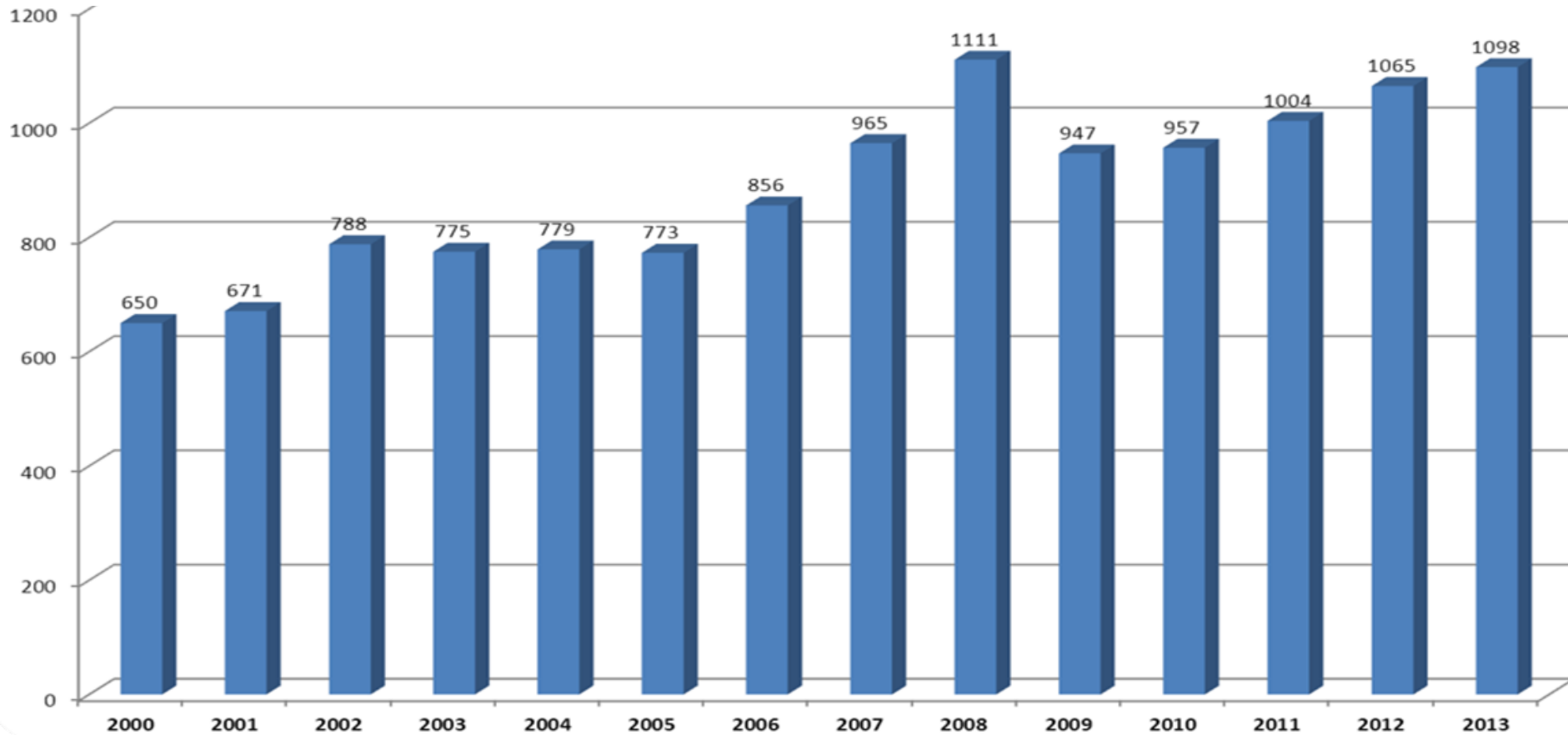


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Angio Suite (coming soon)



Trauma Team Activations 2000-2013



Trauma Center, Copenhagen University Hospital, Rigshospitalet

2013

Trauma Team Activation

In total 1098

Patients with ISS >15

250 patients

Non Survivors 18

Question: Would they be alive if IR was present?



2013 TraumaTeam Activation N= 1098	Non survivors In total 18
Burn injuries	4
Hypothermia	1
Brain injuries	4
Stabbing (PEA at arrival)	3
Multible injuries (PEA at place of accident)	2



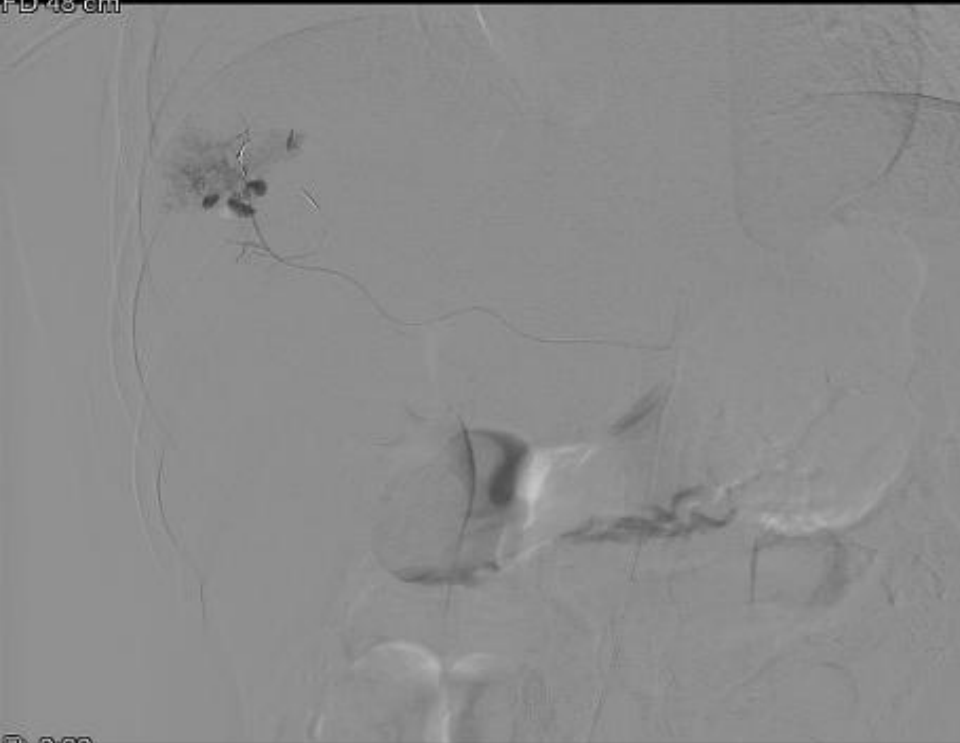
Intervention Radiology – a possibility?

Motorbike	L4 fracture Laesion of v. cava -> retroperitoneal haematoma
2013 Damage Control Surgery 13 patientes	
Fall from height	T thorax, extremities. Pelvisfracture – pelvis sling. Explorative laparotomia (DCS): retroperitoneal haematoma
Car vs. Pedestrian	Awake (GCS 11). Massive transfusion. Pelvic fracture type C. C-clamp. Explorative laparotomia (DCS) : retroperitoneal haematoma





Rot 0°
Ang +0°
FD 48 cm



0.00
3.00
21:03:19

25
1-7

Rot 0°
Ang +0°
FD 48 cm



0.00

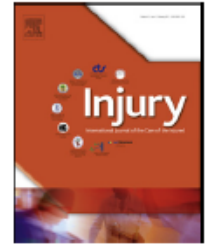




Contents lists available at ScienceDirect

Injury

journal homepage: www.elsevier.com/locate/injury



The evolution of a purpose designed hybrid trauma operating room from the trauma service perspective: The RAPTOR (resuscitation with angiography percutaneous treatments and operative resuscitations)

Andrew W. Kirkpatrick^{a,d,e,f,*}, Christine Vis^b, Mirette Dubé^f, Susan Biesbroek^f,
Chad G. Ball^{a,d,e}, Jason Laberge^f, Jonas Shultz^f, Ken Rea^g, David Sadler^{b,f},
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Furture

Intervention Radiologists in the TraumaTeam?
24/7? On Call?


How can we teach ALL surgeons and
anaesthesiologists to incorporate IR in treatment
of Traumapatient?

Radiologists (IR) as an integrated part of the
TraumaTeam ?




Research & Quality Improvement

Are we the best?



The TRAUMA
Audit & Research
NETWORK



THE UNIVERSITY
of MANCHESTER

DEVELOPING EFFECTIVE CARE
FOR INJURED PATIENTS THROUGH
ANALYSIS AND DISSEMINATION
PROCESS AND OUTCOME



Trauma Center, Copenhagen University Hospital, Rigshospitalet

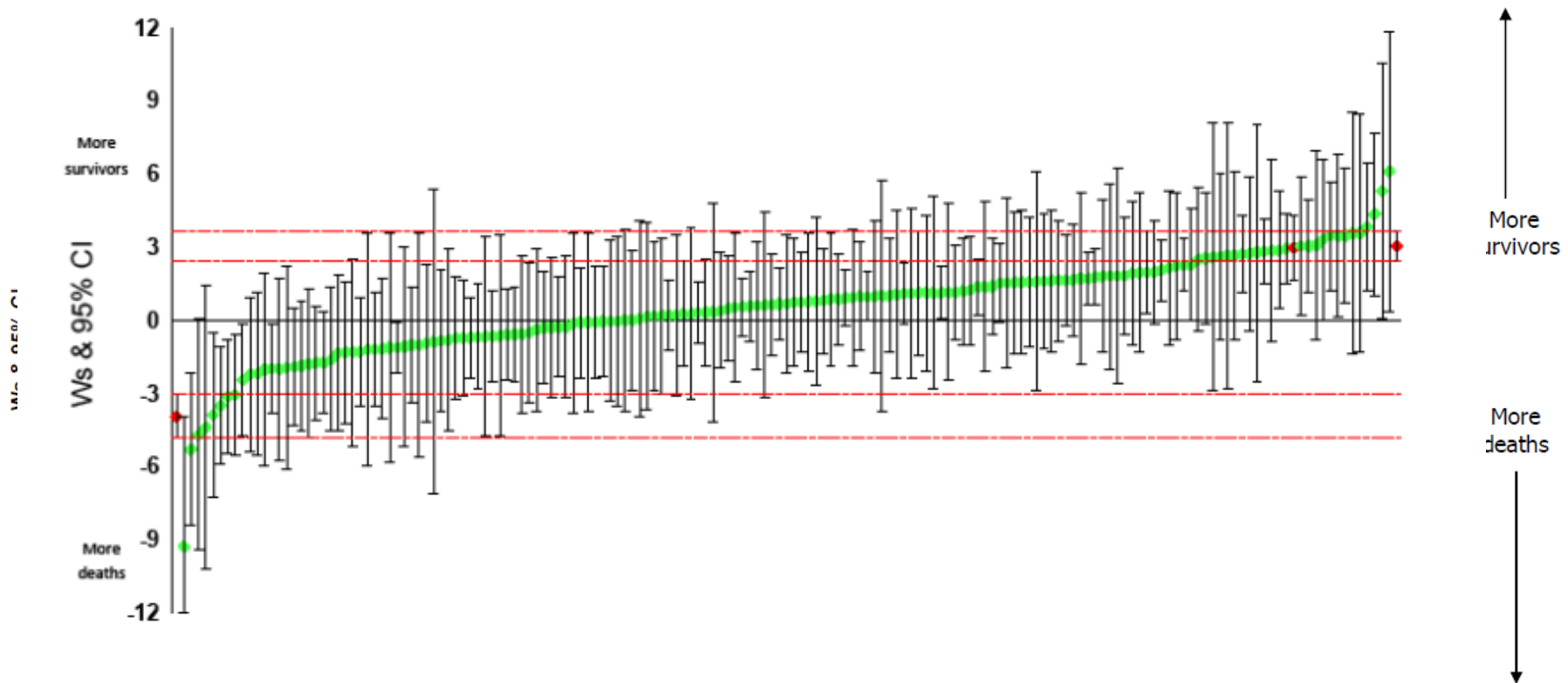
University Hospital of Copenhagen

Comparative Outcome Analysis for all TARN registered hospitals - 01 April 2011 to 31 December 2012

All patients (admitted directly from the scene and referrals in)

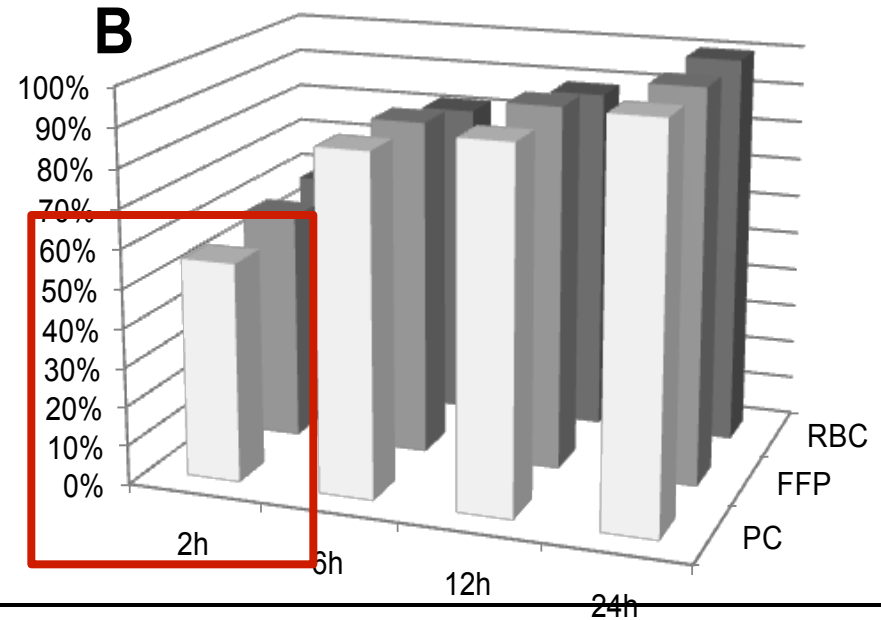
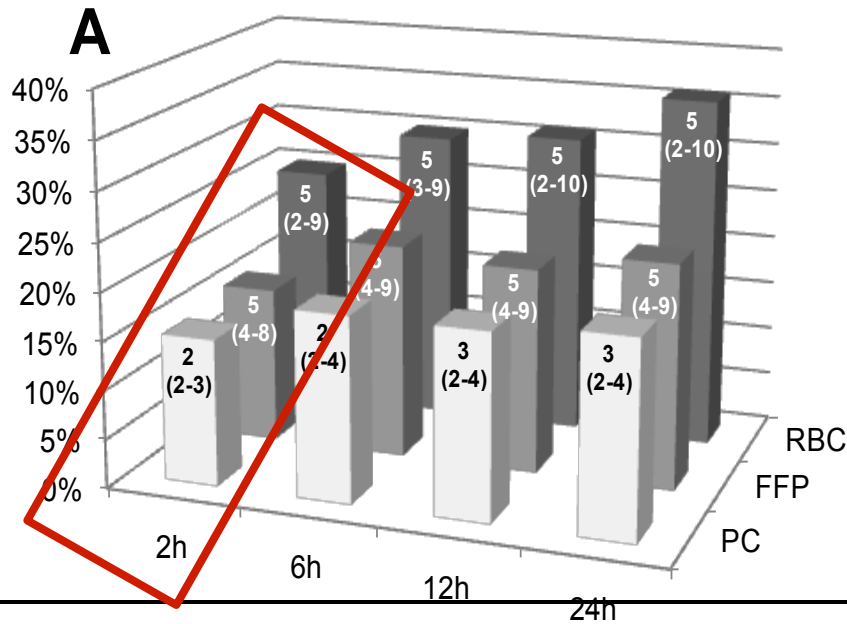
University Hospital of Copenhagen is highlighted

The Ws must be reviewed in conjunction with the Data Completeness and Accreditation figures on page 4.



The highlighted points at either end of the chart and dashed horizontal lines indicate the combined Ws for the top and bottom 10 hospitals of the dataset.





Haemorrhagic mortality < 15% in severely injured trauma patients

Johansson PI, Sørensen A et al. Transfusion 2013

Trauma Center, Copenhagen University Hospital, Rigshospitalet



The "package solution" - Transfusion packages Haemostatic Resuscitation

Stored thawed AB RhD negative plasma immediately available for transfusion.

Acute Transfusion Package (ATP)

5 RBC, 5 FFP; 2 Platelet Concentrates
(ratio ~ 1 : 1 : 1)

Results in

- Haematocrit ~ 30%
- Coagulation factor concentration >30%
- Platelet count of $80 \times 10^9/L$
- Normal TEG[®]

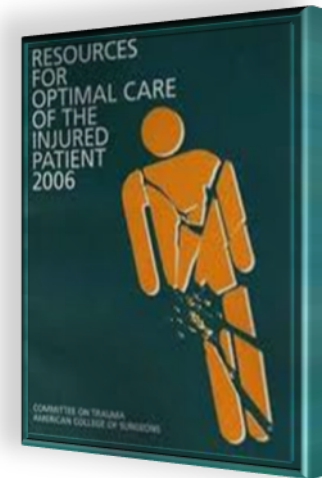
The packages are to be used until haemostasis
Focus on Temperature, Acidose, Avoid dilution





Consultation/Verification

- Consultation/Verification Programs for Hospitals
- Site visit on 9-11 July 2012
- Verification visit
- Trauma System Assessment
- 4 experts from ACS



VRC VERIFICATION
REVIEW
CONSULTATION

for excellence in trauma centers

AMERICAN COLLEGE OF SURGEONS COMMITTEE ON TRAUMA
VERIFICATION, REVIEW, & CONSULTATION PROGRAM FOR HOSPITALS

Level I Trauma Center Consultation Site Visit Report

Rigshospitalet Trauma Center
Copenhagen, Denmark
July 9-12, 2012



AMERICAN COLLEGE OF SURGEONS

*Inspiring Quality:
Highest Standards. Better Outcomes*



Trauma Center, Copenhagen University Hospital, Rigshospitalet

From the Executive Summary

- The review team and the Verification Review Committee evaluated the degree to which the Rigshospitalet trauma program met the general principles and functional intent of these criteria within the context of the Danish system
- **Using this approach, Rigshospitalet was found to be functioning at a level consistent with that of a Level I center**

RECOMMENDATION
INTERVENTION RADIOLOGI 24/7!





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Trauma Center, Copenhagen University Hospital, Rigshospitalet