



THE HELSINKI TRAUMA OUTCOME STUDY

HTOS 2005

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Terveystieteiden tutkimuskeskus
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Referred to Traumarekisteri, a database for trauma-related information in Finland. It is a national trauma register. Treatment for each patient is done in accordance with the Finnish register.

Design: L. and M. Hänninen, Kari Hänninen, Saku Teittinen
Published and sold under the name: Health and Trauma Register (TRAUMAREKISTERI), 2006

Finland

- 5.3 million inhabitants in Finland
- Hierarchical health care system based on large number of community hospital
- 21 central hospitals (5 university hospitals)
- 4.200 annual **trauma related** deaths
- **1.200 – 1.400 annual severe trauma (ISS > 22) (estimate!)**



Handolin et al., Injury
2006; 37: 622-625



Finland

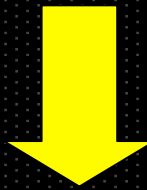
- No common national intrahospital guidelines in trauma care
- No common guidelines in national trauma management regionalization (in process)
- No national trauma registry
- The first (the only) local trauma registry since 2004 (**Helsinki University hospital**)
- No audits on trauma care (national / international)
- No outcome performance comparisons between hospitals

We don't know how good or bad we are!!



The solution

We don't know how good or bad we are!!



The Helsinki Trauma Outcome Study

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2005



Helsinki University hospital

- There is 600.000 people in Helsinki
- “Greater-Helsinki” (Helsinki with its surroundings) \approx 1 million people
- Helsinki University hospital admits **all severe trauma taking place in the Southern part of Finland**
- Catchments area for HUH \approx 1.5 million people

= 25 % of the total Finnish population



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Helsinki University hospital

- Three (3) individual units admitting severe trauma in HUH
- Two of them (**Töölö + Meilahti**) admitting pts > 16 years
- **Töölö hospital** = blunt polytrauma, max-facial trauma, neurotrauma, burn injuries (also pts < 16 with neurotrauma)
- **Meilahti hospital** = penetrating torso trauma, isolated abdominal / thoracic blunt trauma (referred from another hospitals)
- **Töölö / Meilahti are not Level 1** (according to the RCS/ACS); some on-site surgical disciplines lacking (2 km; Töölö lacking cardiothoracic, vascular, urologic / Meilahti lacking neurotrauma, orthotrauma)



Terveystieteiden tutkimuskeskus
Traumarekisteri: Trauma-
rekisterin 2. osasto on ollut
käytössä 12.2004. Rekisterin
osasto on ollut käytössä
12.2004 alkaen.

Rekisterin Traumarekisteri, a database
for trauma-related information in
Finland. It is a national project.
Treatment for each patient is done
according to the national system.

Design: L. and M. Hänninen, S. and R. Hänninen, S. and T. Hänninen
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Helsinki and Trauma Register Finland, 2004

HUH PreHospital

- EMS with prehospital emergency doctor system (anesthetists specialized in emergency care) staffed by HUH
- EMS doctor system both in ambulance and helicopter
- EMS doctor meeting practically all the severe trauma pts prehospitally



Traumarekisteri



Terveystieteiden tutkimuskeskus
Traumarekisteri: Trauma-
rekisterin 2. versio on ollut
käytössä 2.2.2005. Rekisteri on
edellyttänyt laadunvarmistusta
11.2005 alkaen.

Rekisteri on Traumarekisteri, a database
for keeping a record information on Trauma
Injuries. It is a national project
financed by the Finnish state.
Rekisteri on Traumarekisteri, a database
for keeping a record information on Trauma
Injuries. It is a national project
financed by the Finnish state.

Design: L. and M. Hänninen, Kari Hänninen, Sisko Teittinen
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Helsinki and University Hospital Helsinki, 2005

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The Helsinki Trauma Outcome Study

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2005



HTOS 2005

- Inclusion criteria = All trauma patients **aged > 16 years** meeting the TARN inclusion criteria
- Probability of survival = (no TRISS 2004 ->) **The TARN prediction model-method**
- The **TARN prediction model-method** = based on a transformation of the **ISS, the GCS, age, gender and age by gender interaction**



HTOS 2005 inclusion criteria

All trauma patients irrespective of age who met any of the following criteria:

- All trauma admissions whose length of stay was 72 hours or more
- All trauma patients admitted to an Intensive Care or High Dependency Area
- All deaths of injured patients occurring in the hospital (even if the cause was medical)
- All trauma patients transferred to another hospital for further emergency care or admitted to a high dependency area or died from injuries

Irrespective to above, following patients were not included:

- Isolated fractures of the femoral neck or single pubic rami fractures aged 65 years or more
- Isolated closed, undisplaced or not comminuted limb injuries
- Soft tissue spinal strains
- Closed or undisplaced facial injuries
- Simple penetrating injuries not involving deeper structures or less than 20% blood loss
- Uncomplicated skin injuries
- Less than 10% superficial or partial thickness burns



Terveystieteiden tutkimuskeskus
Traumarekisteri: Tilasto-
raporttien 2. osasto on ollut
käytössä vuodesta 2005 alkaen.
Terveystieteiden tutkimuskeskus
Traumarekisteri: a database
for trauma-related information in
Finland. It is a national project
financed by the Finnish Academy
of Sciences.

Design: L. and M. Hämäläinen, H. and R. Hämäläinen, L. and M. Hämäläinen
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Study population characteristics

	Age (mean)	Age (range)	Male patients	Referred patients	ISS (mean)	Patients with ISS > 15	Patients with ISS > 22
Helsinki	54.0 *	16 – 97	1,017 (62.2 %)*	440 (26.9 %)*	14	546 (33.4 %)*	303 (18.5 %)*
England	49.0	16 – 110	8,943 (58.6 %)	1,198 (7.8 %)	11	2,535 (16.6 %)	1,331 (8.7 %)
Total	49.4	16 – 110	9,960 (58.9 %)	1,638 (9.7 %)	11	3,081 (18.2 %)	1,634 (9.7 %)

Age: T-test $p < 0.0001$

Male patients: $\chi^2 = 8.05$ $p < 0.0046$

Referred patients: $\chi^2 = 613.43$ $p < 0.0001$

ISS > 15: $\chi^2 = 279.41$ $p < 0.0001$

ISS > 22: $\chi^2 = 163.51$ $p < 0.0001$



Type of injury

	Helsinki	England
Blunt	95.7 %	97.1 %
Penetrating	4.3 % *	2.9 %
* $\chi^2 = 7.06$ $p < 0.05$		



Cause of injury

	Helsinki		England	
	n (%)	95 % CI	n (%)	95 % CI
1 Fall < 2 m	857 (52.4 %)	50 – 54.8	6,607 (43.3 %)	42.5 – 44.1
2 Traffic accident	295 (18.1 %)	16.2 – 20	4,186 (27.4 %)	26.7 – 28.1
3 Other blunt injury	296 (18.1 %)	16.2 – 20	2,256 (14.8 %)	14.2 – 15.4
Fall > 2 m	123 (7.5 %)	6.2 – 8.8	1,787 (11.7 %)	11.2 – 12.2
Stab injury	48 (2.9 %)	2.1 – 3.7	371 (2.4 %)	2.2 – 2.6
Gun shot injury	16 (1.0 %)	0.5 – 1.5	64 (0.4 %)	0.3- 0.5



Results Ws

Ws “referrals-in” excluded:

Helsinki + 3.0 (95 % CI + 2.3 to + 3.8)

England + 0.2 (95 % CI 0.0 to + 0.6)

Ws “missing- data” excluded:

Helsinki + 3.0 (95 % CI + 2.3 to + 3.7)

England + 0.3 (95 % CI + 0.0 to + 0.6)

= almost three more survived trauma patients out of 100 patients in a study population in Helsinki compared to England



Conclusions

- The present study is **the first major outcome study (audit) on the performance of trauma care in Finland**
- There is no nation-wide Finnish (Scandinavian/European) trauma registry -> the **TARN was the option for the reference database** for the present study (audit)
- The present study only covers the southern part of Finland with urban and sub-urban areas, thus **not reflecting fully the overall situation in Finland**
- However, the **results are still very promising** 😊
- There is **an obvious need to establish a continuous trauma audit protocol** for Helsinki and also for all large Finnish trauma admitting hospitals
- The **effect of the size of hospital** is one possible factor -> the present **results may indicate the benefits of regionalization** (heavier patient load and larger hospitals)??



Authors

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Thank you for your attention