

**Alexandra BRAZINOVA**  
*International Neurotrauma Research Organisation (INRO)*

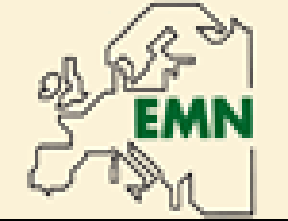


# **Epidemiology, treatment and outcome after severe traumatic brain injury in European regions with different economic status**

Walter Mauritz, Alexandra Brazinova, Martin Rusnak,  
Ingrid Wilbacher, Marek Majdan, Ivan Janciak

**INTERNATIONAL NEUROTRAUMA  
RESEARCH ORGANISATION (INRO)**

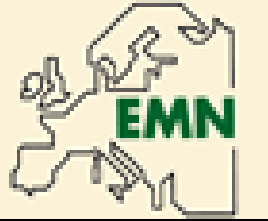
**Vienna, AUSTRIA**



# Hypothesis

**the economic status of a region  
influences quality of the health care  
system**

**quality of care influences the outcome of  
patients with severe brain trauma**



# Goals

**to check mortality rates of patients with severe TBI from centres of varying economic status**

**to identify factors that may contribute to differences in mortality**

**to quantify quality of TBI care**



# INRO Projects

- ✓ ***“Reducing mortality and long-term disability of TBI victims through research into treatment procedures used in Bosnia-Herzegovina, Macedonia and Croatia”***
- ✓ ***“Effects of the use of guidelines for the treatment of patients with severe TBI” - in Austria***
- ✓ ***An International Health Care Initiative: Improving Patient Outcome from Head Injury in Central and Eastern Europe***
- ✓ **Sources of support: grants from European Union, Austrian National Bank (Jubilee Fund), Austrian Worker’s Compensation Board, Ala and Ralph Isham and other private donors**

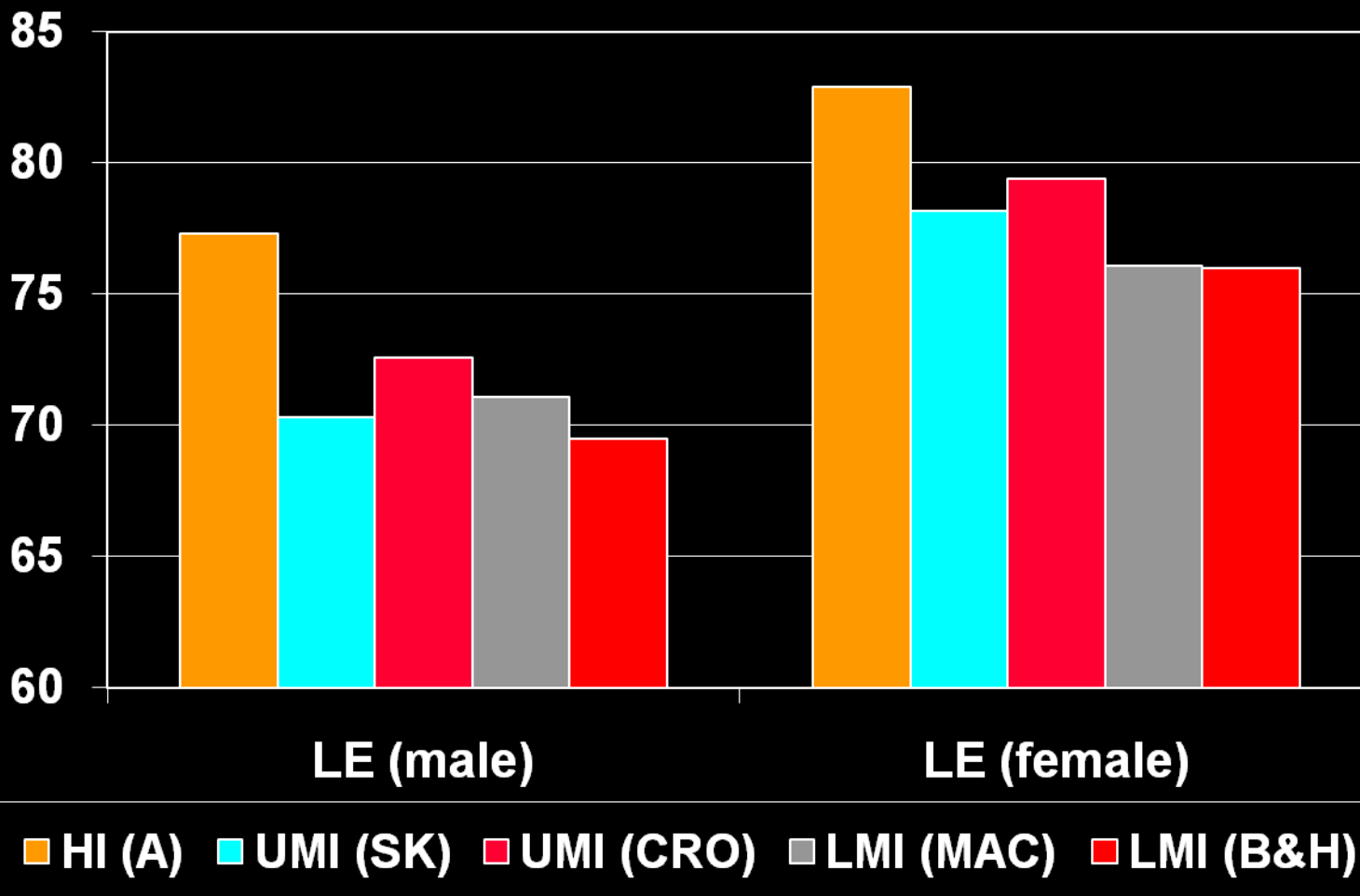


# Methods

- ✓ **Between 01/2001 and 12/2005, 13 centres enrolled patients with severe brain trauma – 1172 patients.**
- ✓ **Three regions (according to GDP)**
  - **“high income” (Austria, 5 centres)**
  - **“upper middle income” (Croatia, Slovakia, 6 centres)**
  - **“lower middle income” (Bosnia, Macedonia, 2 centres).**



# Life expectancy



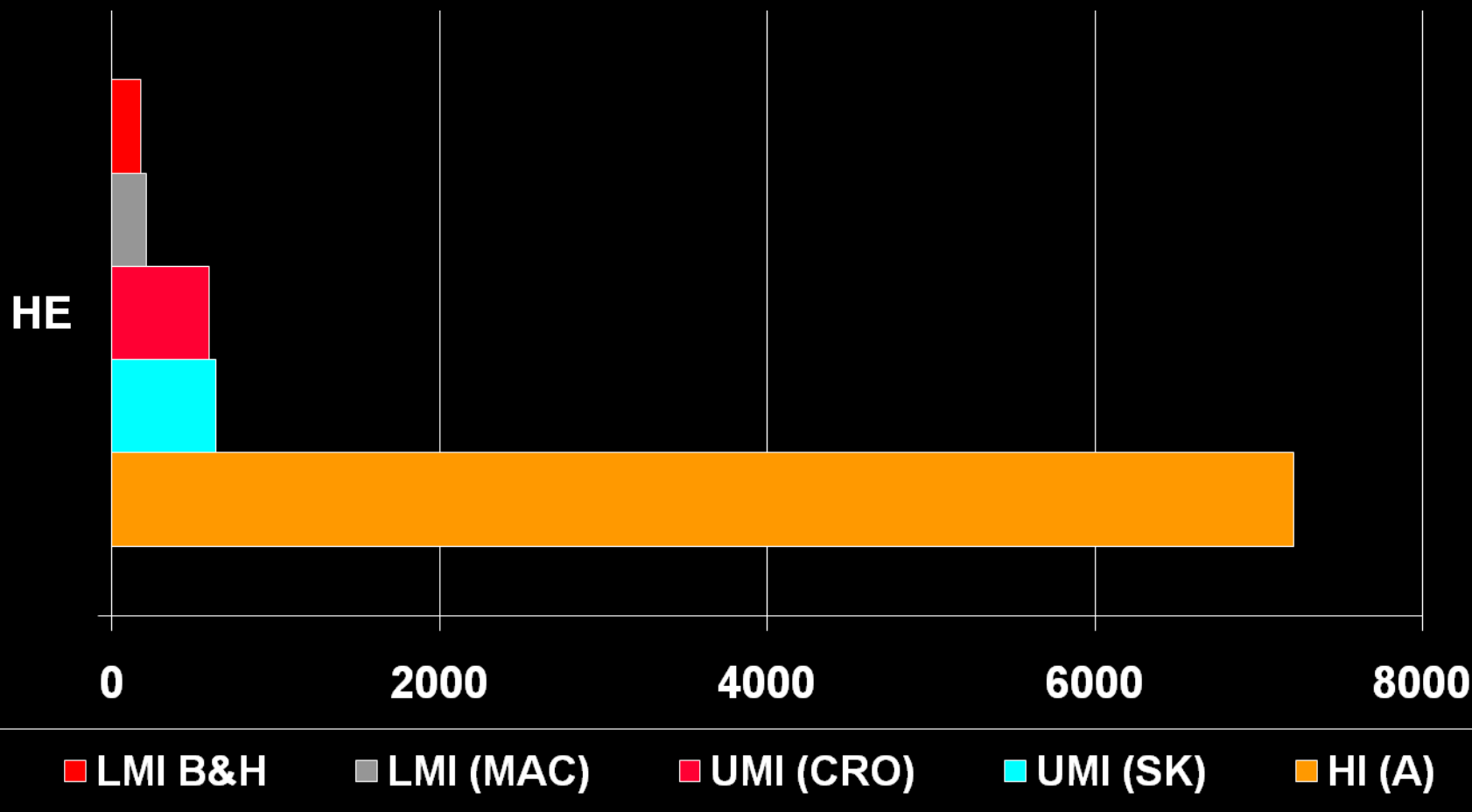


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# Total Health Expenditure (USD per capita per year)





# Methods: Data collection

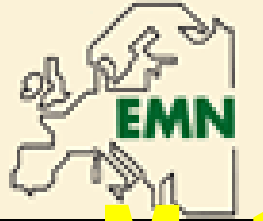
- ✓ **Inclusion criteria:**
  - **“severe TBI” - GCS score of 8 or less following resuscitation, or a GCS score deteriorating to 8 or less within 48 hours of injury**
  - **only patients who survived at least until admission to ICU**





# Methods: ITCP database

- ✓ **International Traumatic Coma Project database**
- ✓ **Data submission over the internet**
- ✓ **demographic data, cause, location, mechanism and severity of trauma, prehospital status and treatment, results of CT scans, results of lab testing, data on surgical procedures, duration of various treatments, complications, outcome at discharge from ICU, and information on status and location at 3, 6 and 12 months after injury**
- ✓ **Personal data protection was observed and the identifiers were kept separately from the data**



# Methods: Quality of Care Scoring

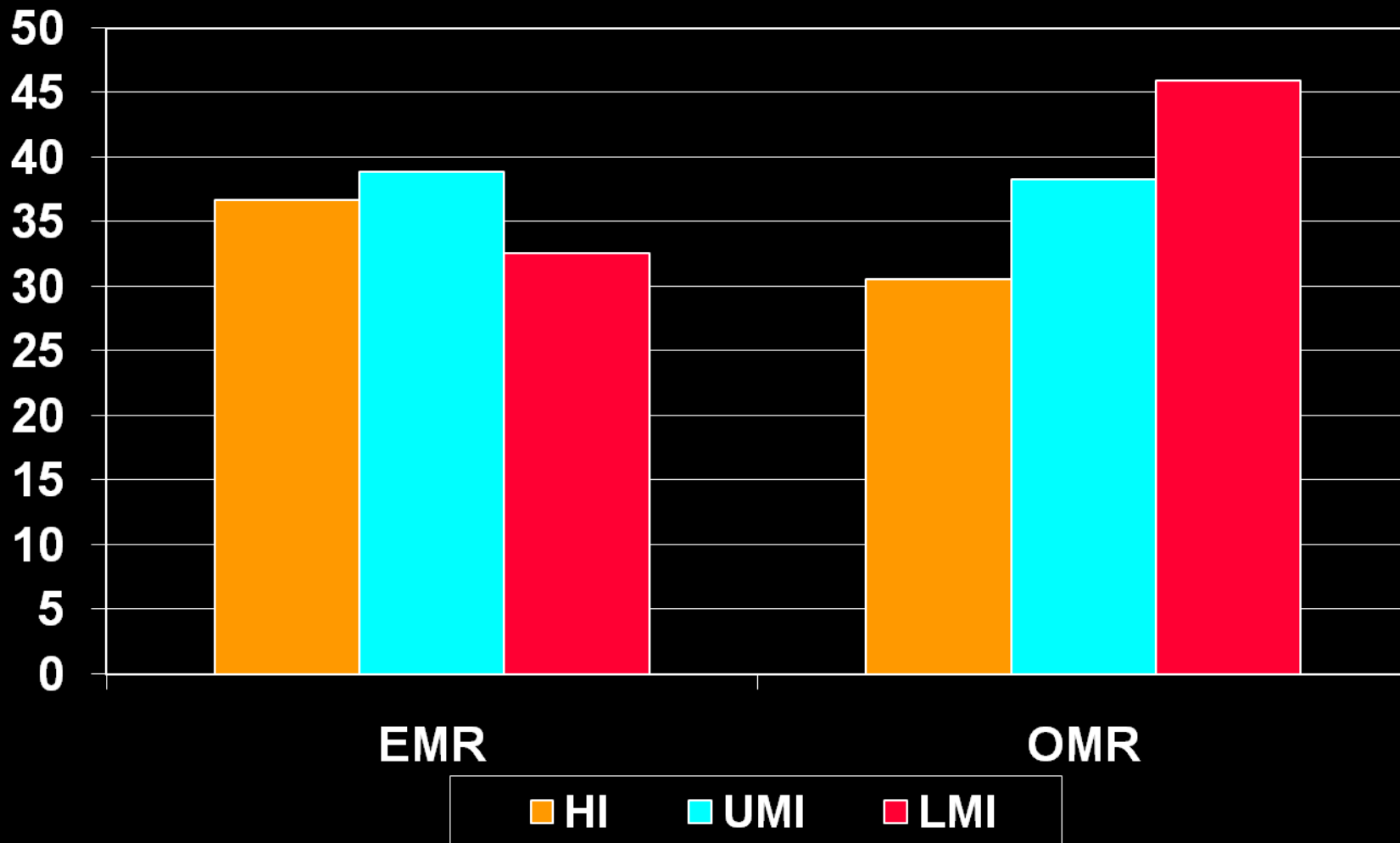
Location	Status	Indicator of quality	done	not done
prehospital	GCS<9	ET / other airway	+5 / +3	-5
prehospital	SBP<130	<1000 / 1000 – 2000 mL	+5 / +3	-3
prehospital		Direct transport	+3	-3
prehospital		Helicopter transport	+2	0
hospital		Time adm-CT <60 min	+3	-3
hospital		<b>ICP monitoring placed</b>	<b>+3</b>	<b>-3</b>
hospital		<b>Steroids used</b>	<b>-5</b>	<b>+5</b>
ICU		BT <sub>max</sub> <38.5 °C	+3	-3
ICU		40 < pCO <sub>2</sub> mean < 32 mmHg	+3	-3

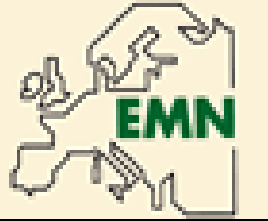
Total score (sum of all points) was divided by number of entries for each patient



# Results: Outcomes

## Observed versus expected (TRISS) mortality rates



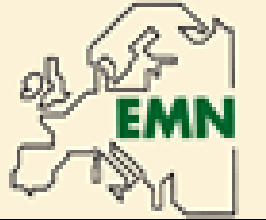


# “Centre Effect”

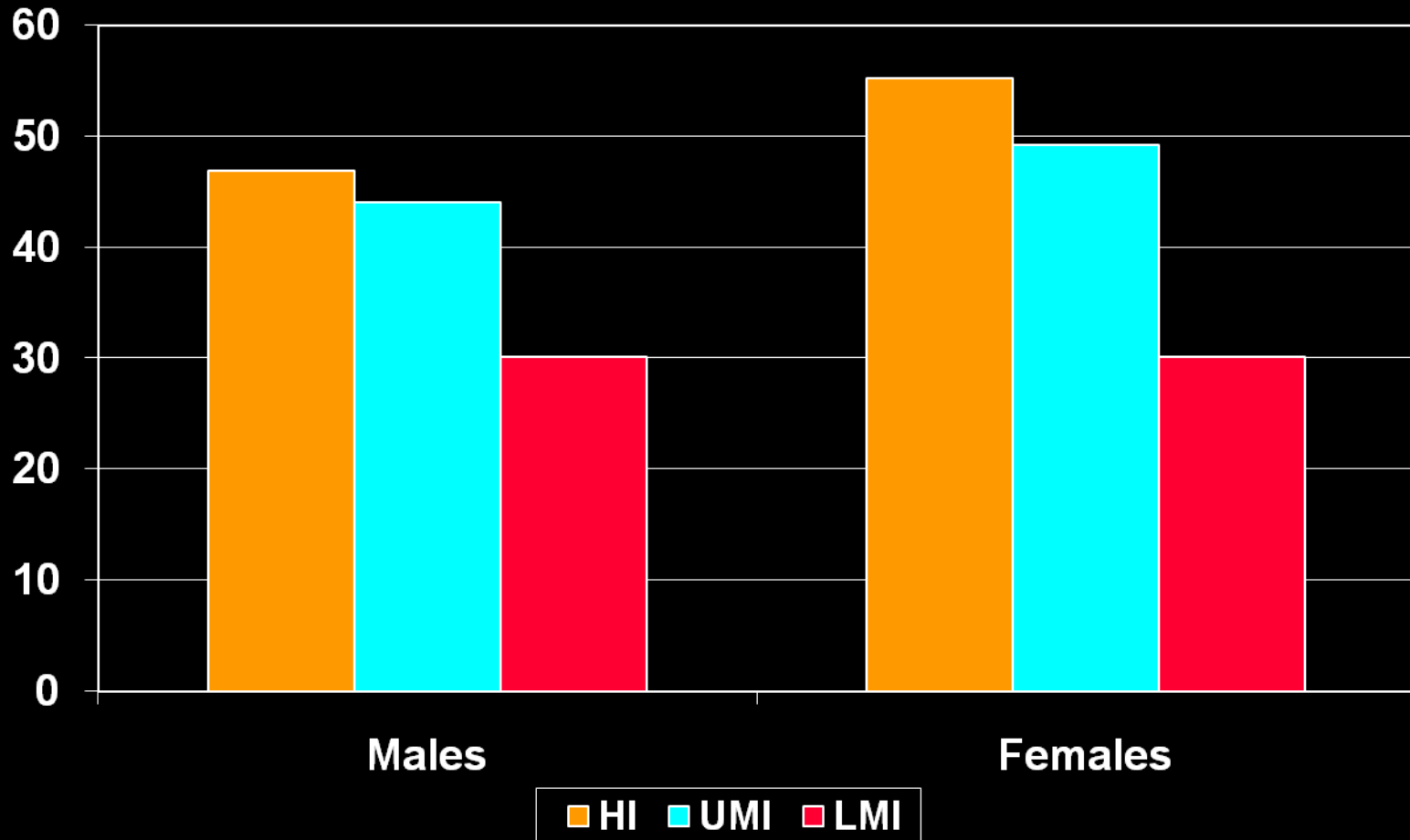
- ✓ compared to the “HI” centres, admission to a “middle income” centre was associated with lower odds ratios for survival (logistic regression):

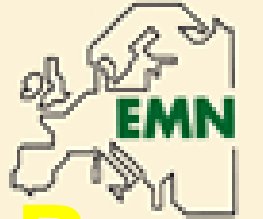
**LMI: OR 0.13 (0.08-0.20)  $p < 0.000001$**

**UMI: OR 0.74 (0.50-1.10)  $p = 0.1399$**

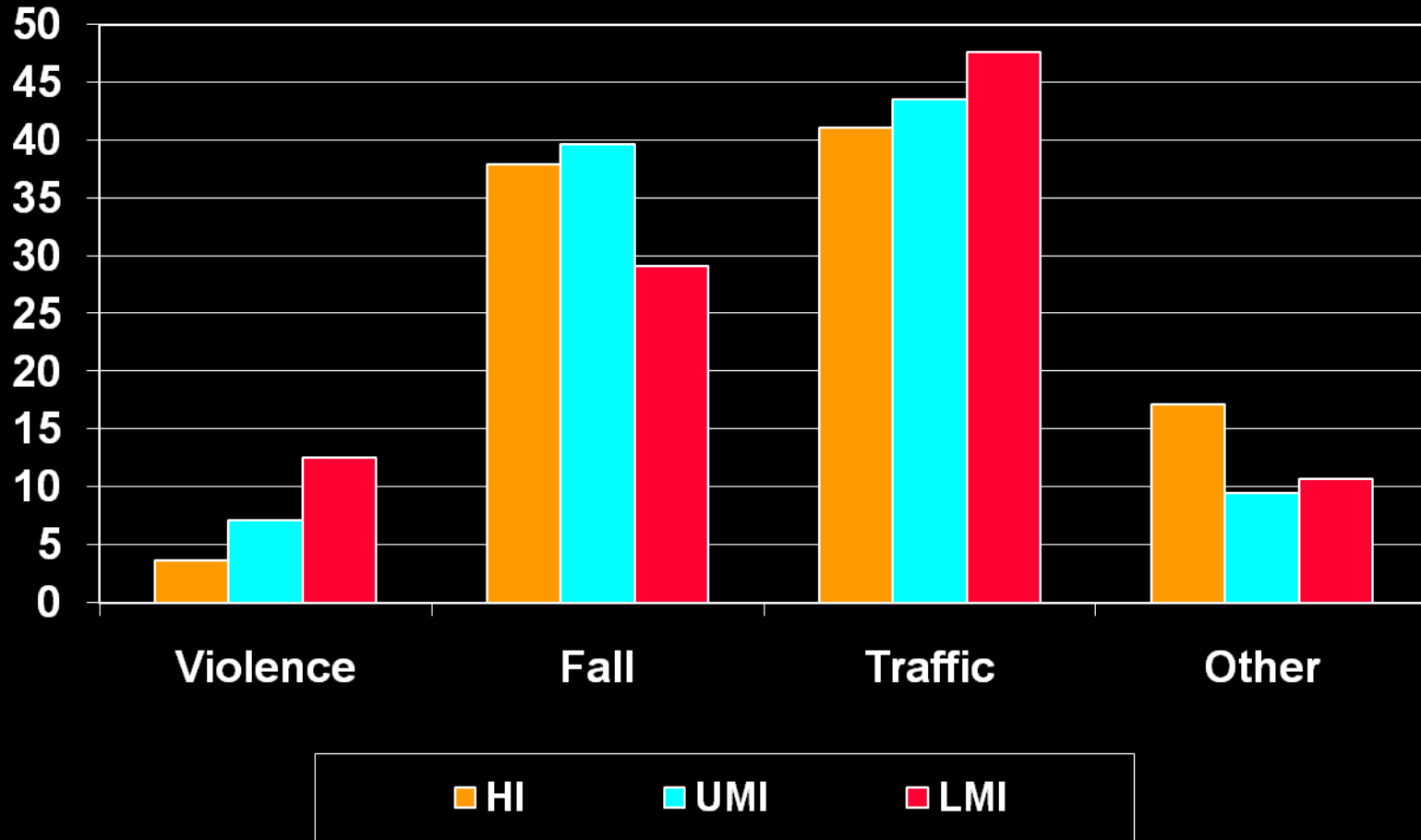


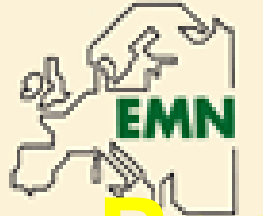
# Possible Factor: Mean age



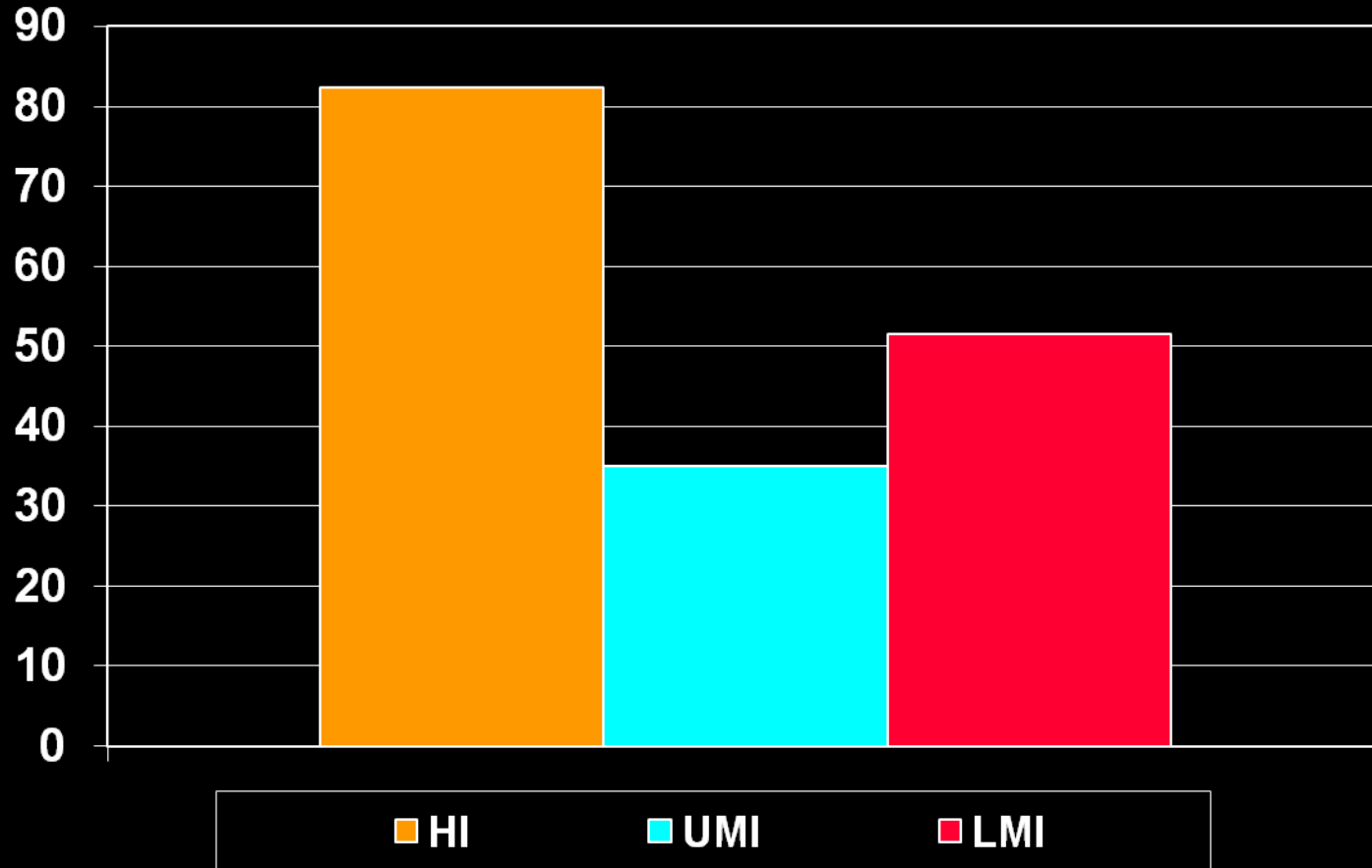


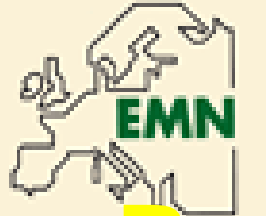
# Possible Factor: Trauma Mechanism



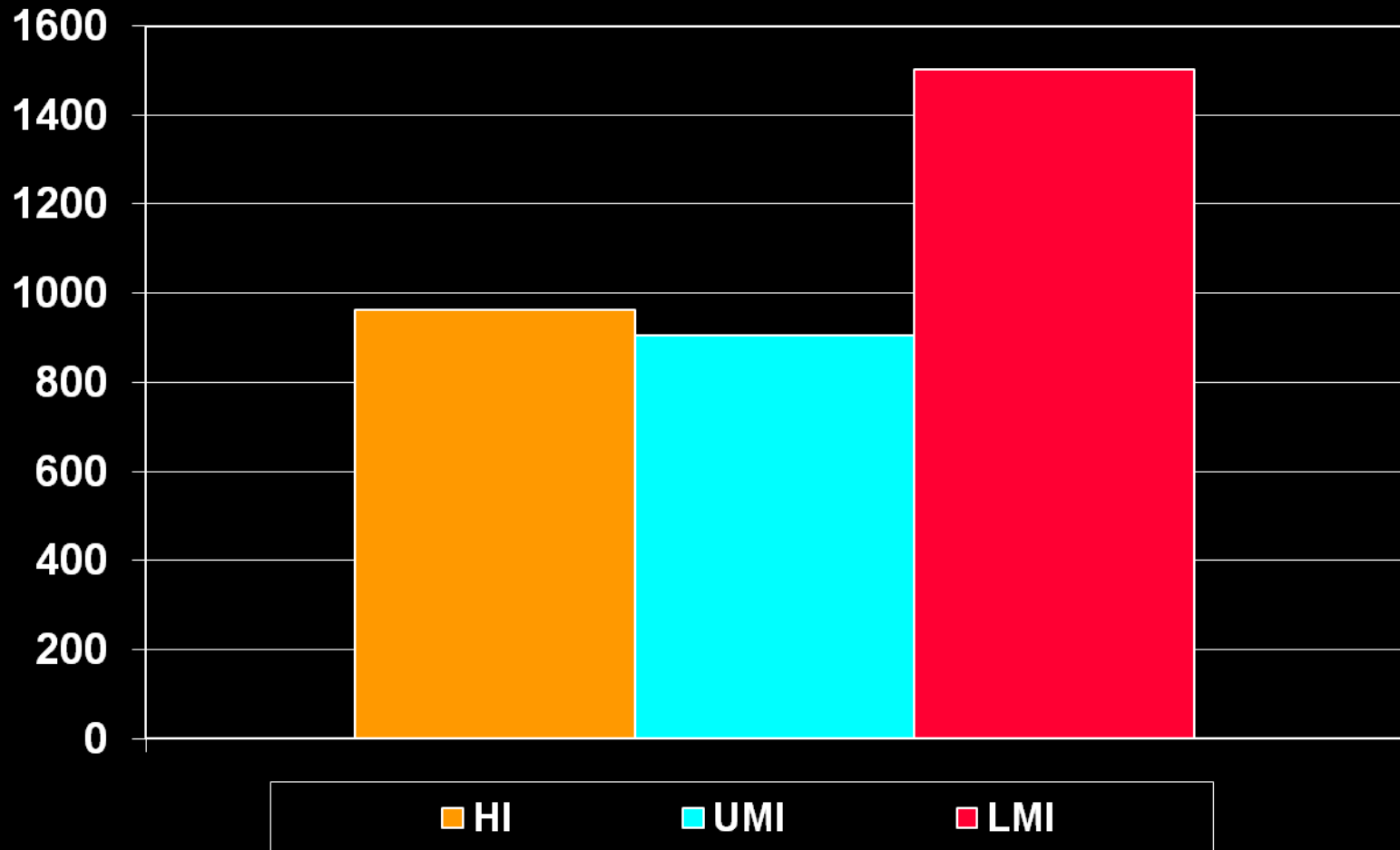


# Possible Factor: preh. Intubation





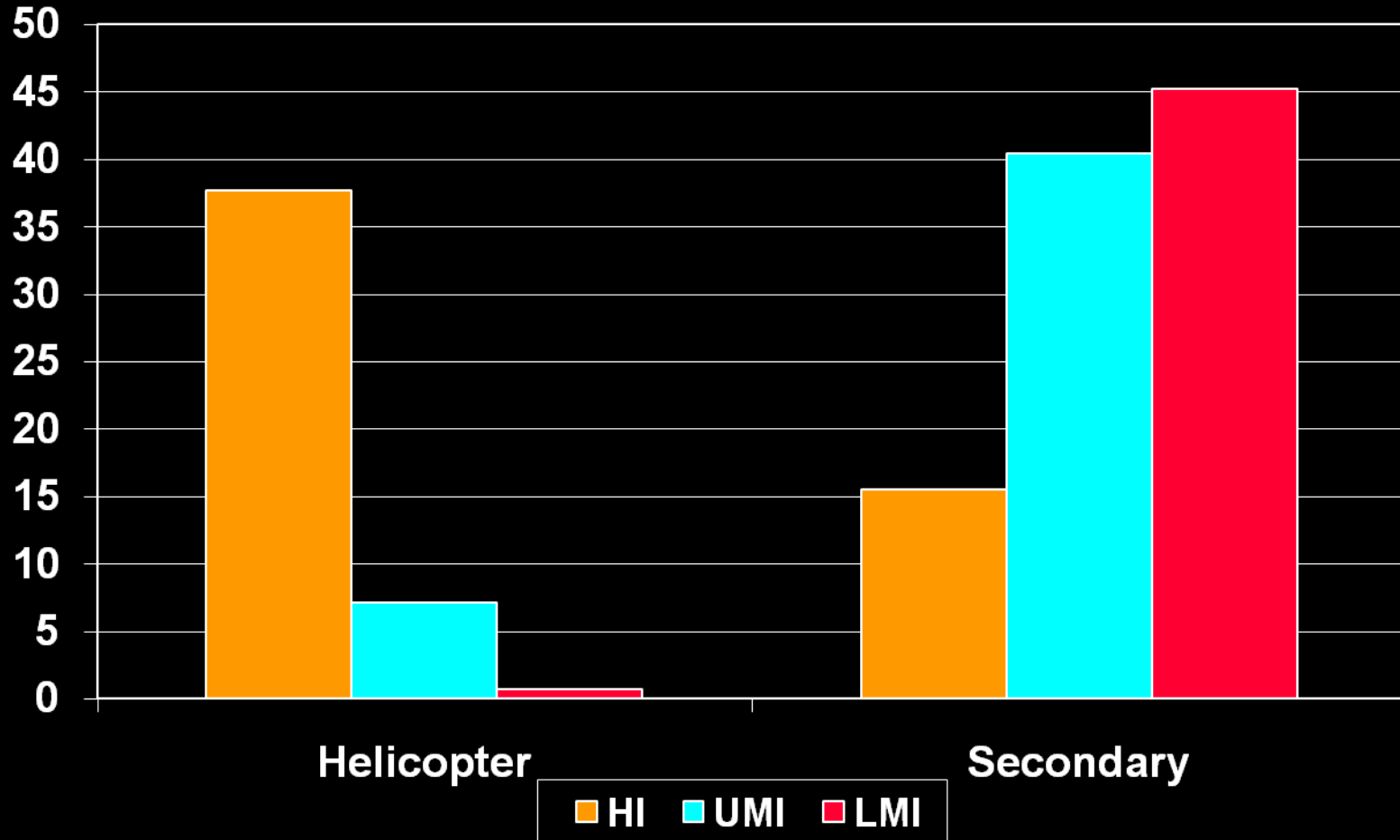
# Possible Factor: preh. IV volume

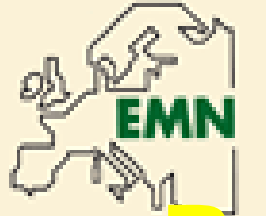




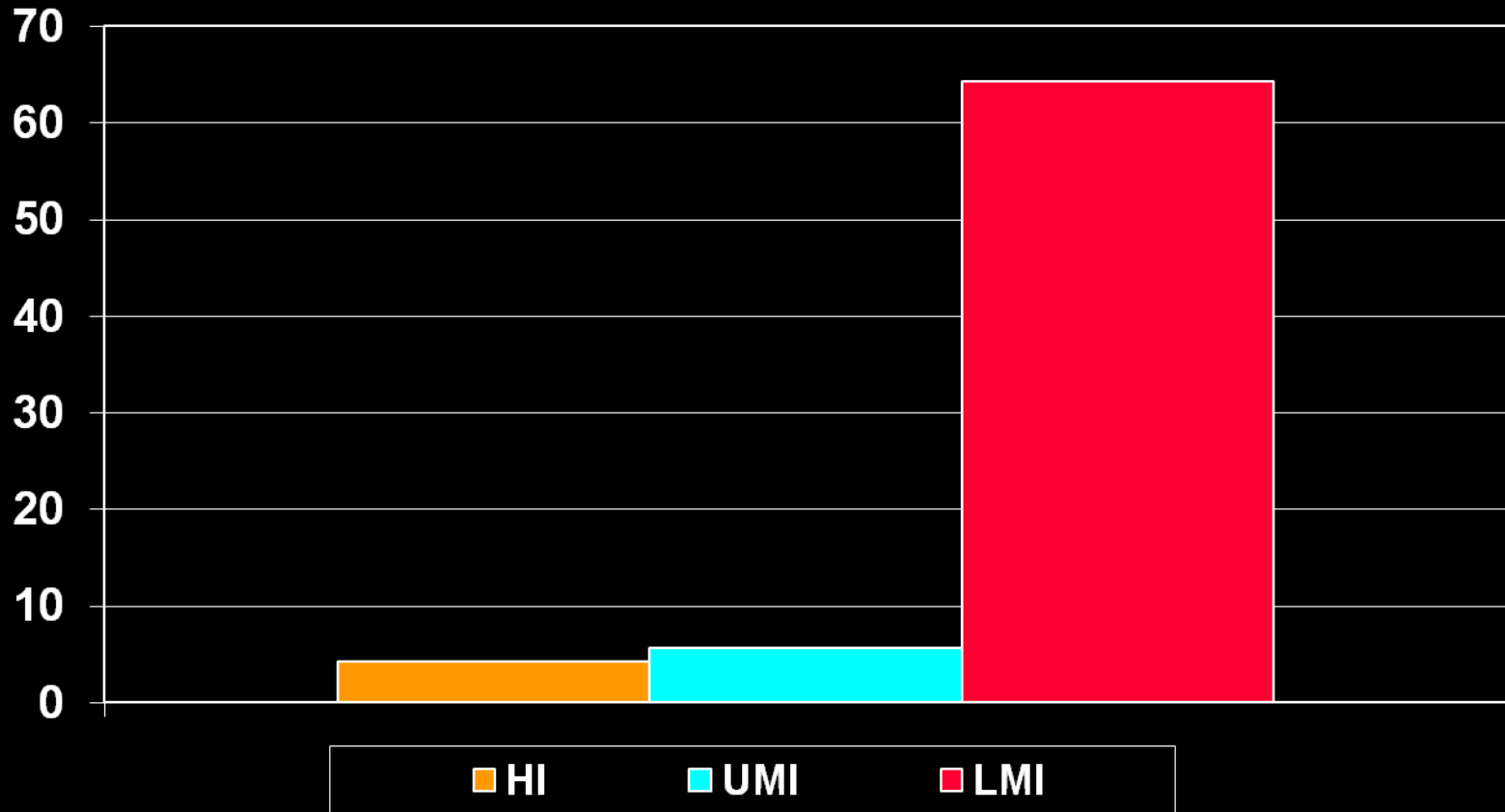


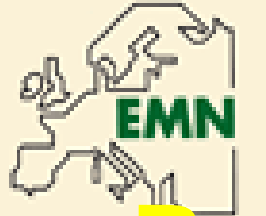
# Possible Factor: Transport



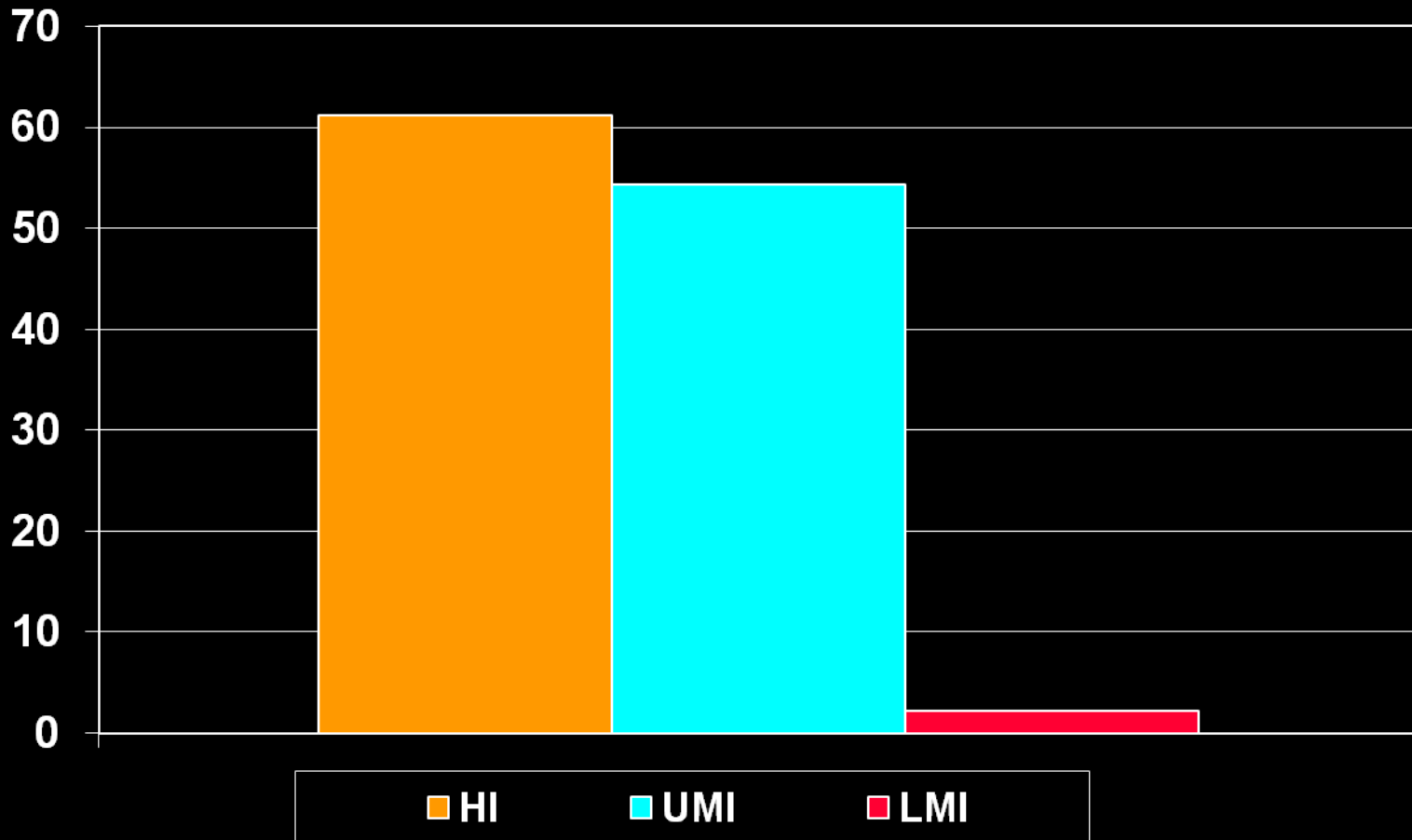


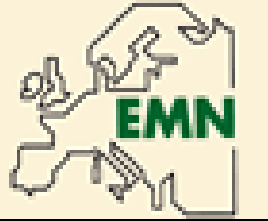
# Possible Factor: Steroids used





# Possible Factor: ICP monitoring



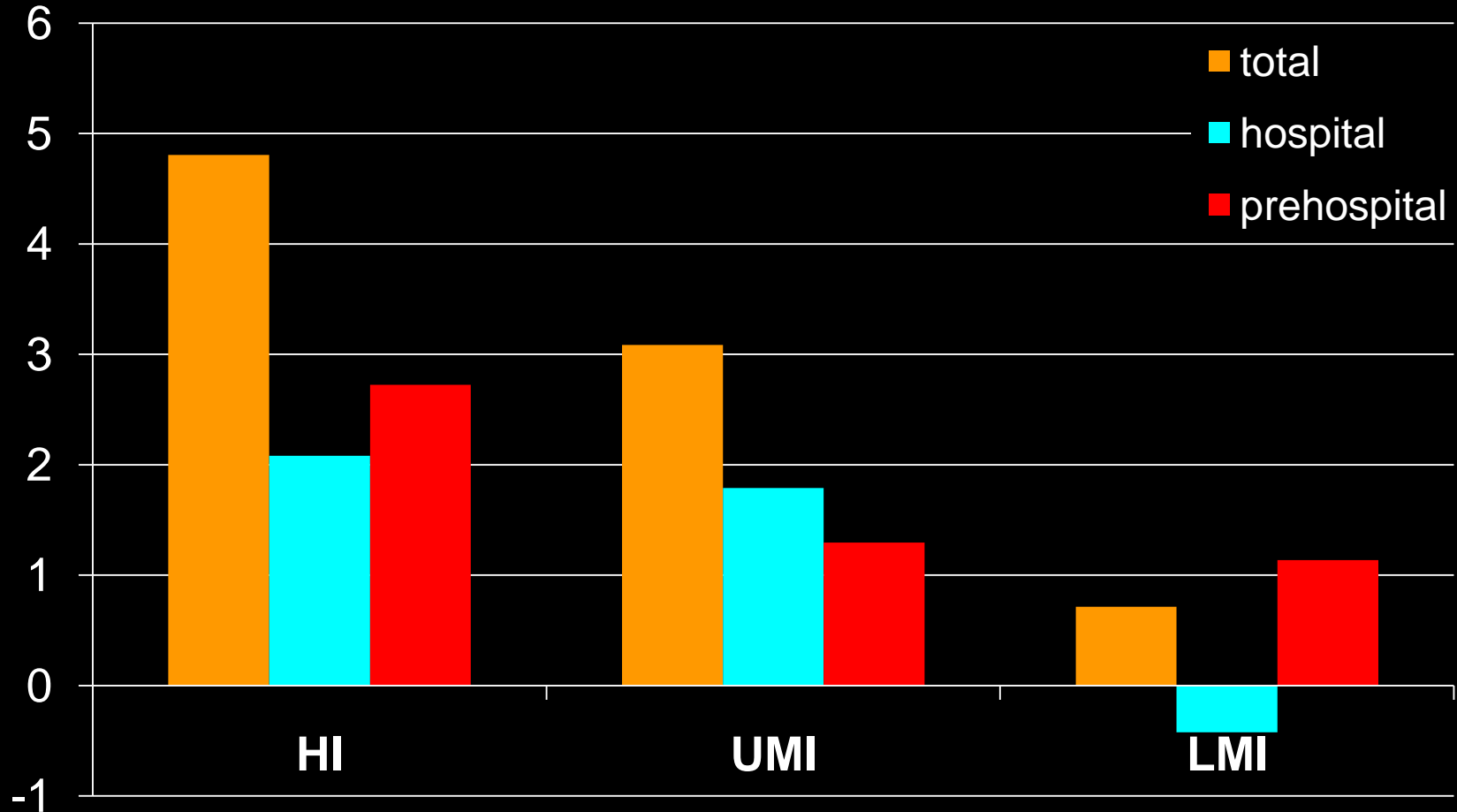


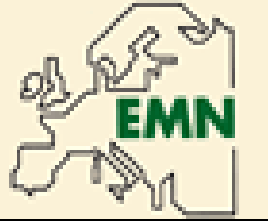
# Possible associations

- ✓ **We were** not able to identify associations between survival and single factors
  - **Gender, age, trauma mechanism**
  - **Number of available ICU nurses**
  - **Rates of MRSA infections**
  - **Rates of prehospital intubations**
  - **Direct transfer**
  - **ICP monitoring**



# Quality Score





# Summary

**BUT:**

**there is a clear association between**

- economic status**
- quality of care, and**
- outcomes of patients with severe TBI**

**THANK YOU FOR YOUR ATTENTION!**