

# 25<sup>th</sup> GiViTI Meeting

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Baia Flaminia Resort, Pesaro

## ICU performance Situation in other European countries - Slovenia

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# Disclosure

Rafael Kaps is the Country Coordinator for  
Prosafes and CREATIVES.

Primoz Gradisek is the beneficiary partner within  
CREATIVES project.



# UMC Ljubljana



Beds	2,166
Hospital admissions	115,599
Ambulatory visits	1,159,193
Hospital stay	5,6
Budget	500 million euro
Employees	7,884



Recognised for excellence

4 star - 2015

# ICUs in Slovenia

## ESICM STANDARD

- Percentage of the acute hospital beds  
5% (regional) - 10% (university)
- Slovenia: 372 ICU beds



## SLOVENIA

- 316 ICU beds
- Unequal physician and nurse / bed ratio
- Insufficient total & patient area (m<sup>2</sup>)
- Insufficient and unequal technology and equipment
- Variable medical staffing
- Level of care (approximately):
  - LOC I. = 10% of ICU beds
  - LOC II. = 30% of ICU beds
  - LOC III. = 60% of ICU beds

# Personal opinion

The positioning of ICU within a hospital and *understanding intensive care per se* is unfortunately depending on individuals, being tool for demonstrating the political power resulting the differences between ICUs within the hospital and between ICUs in the country.

ICU developing strategy is currently under development.

# Continuous Quality Management in every ICU

2011



2013-2018

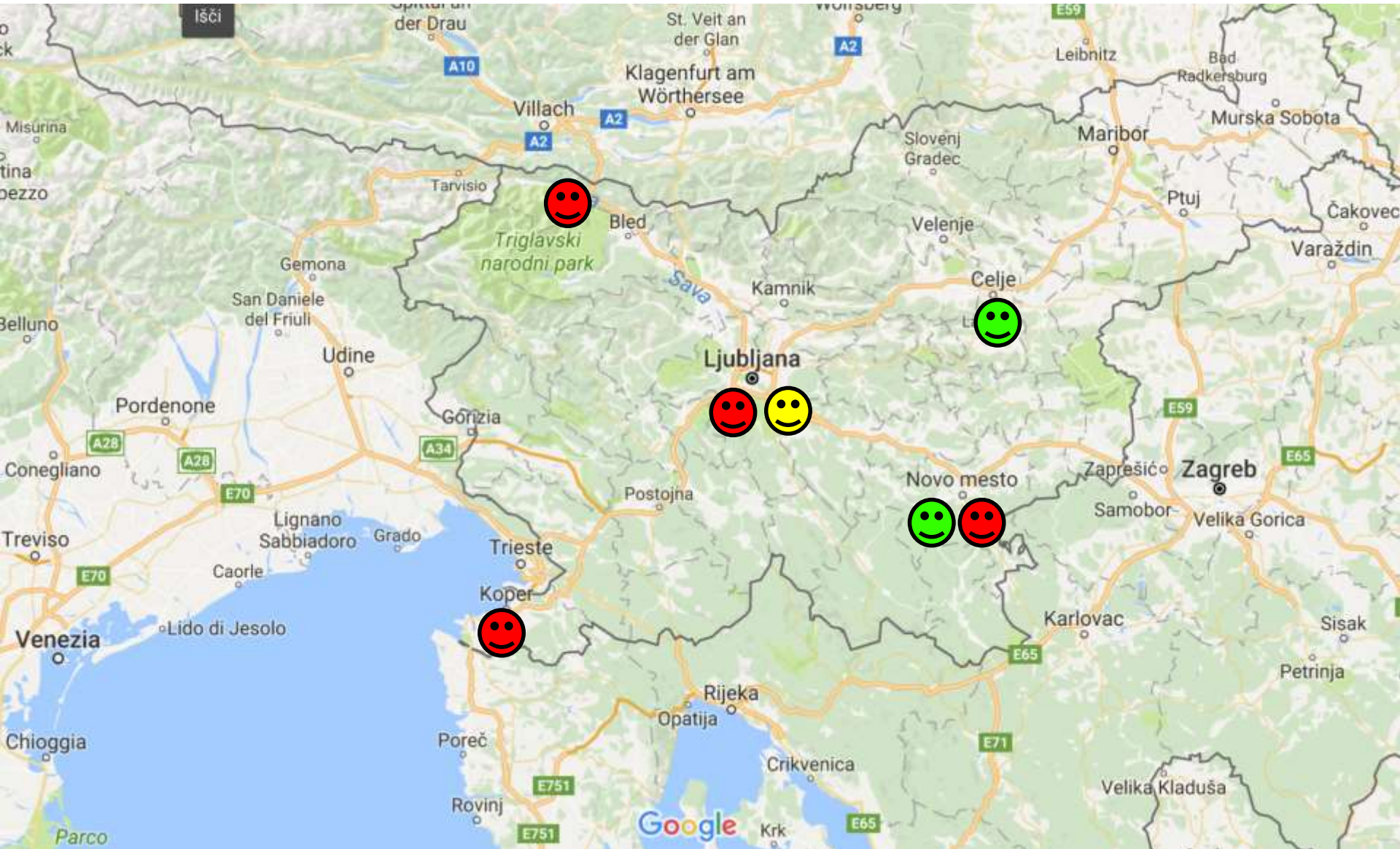
## CREACTIVE study on TBI

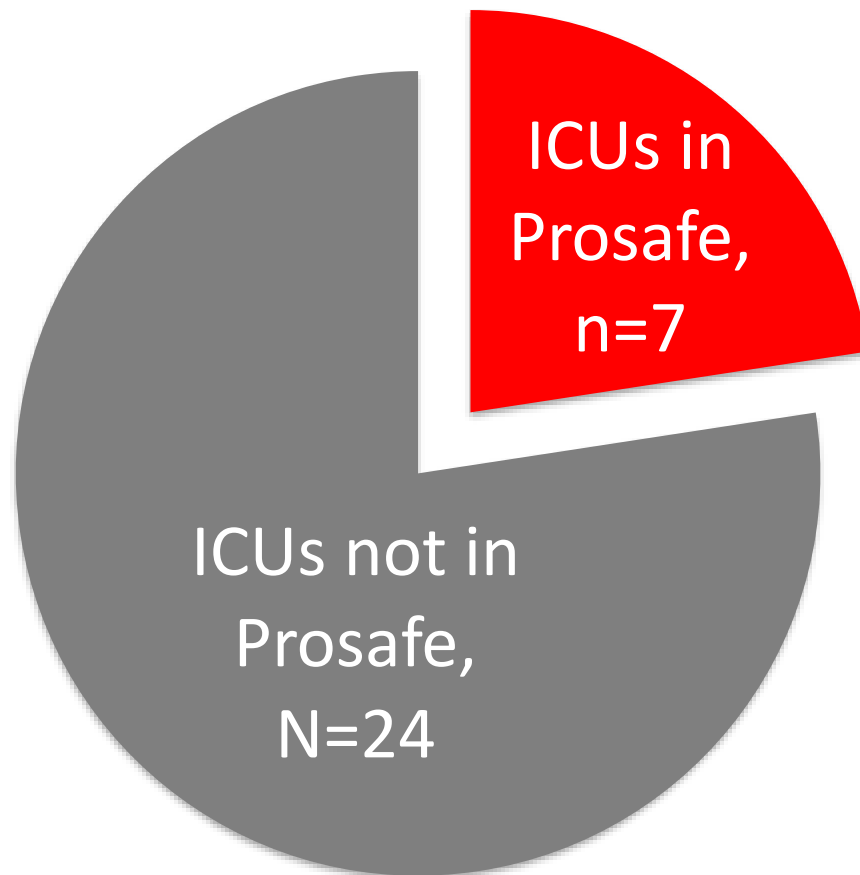
Collaborative **RE**search on **AC**ute Traumatic brain injury (TBI) on  
intens**IV**e care medicine in **EU**rope



# National report 2015

## 7 ICU, n = 2448 patients





ICUs in  
Prosafe,  
n=7

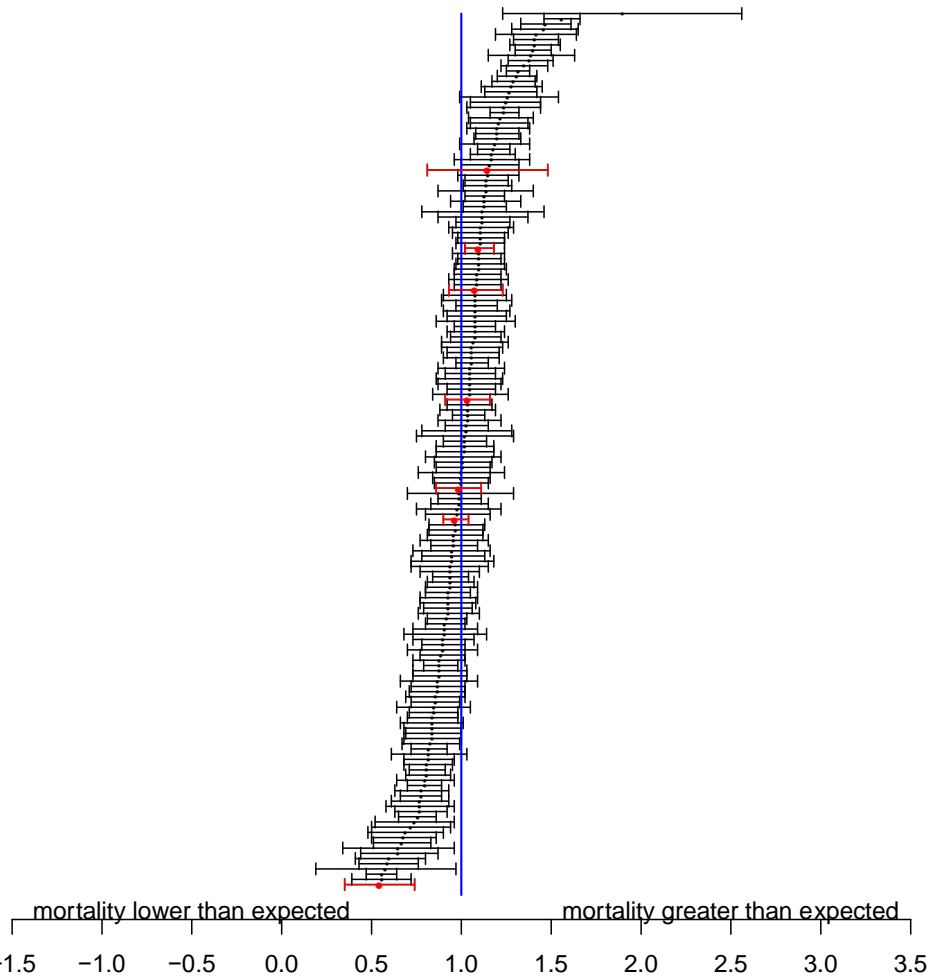
n = 2.448 patients

ICUs not in  
Prosafe,  
N=24

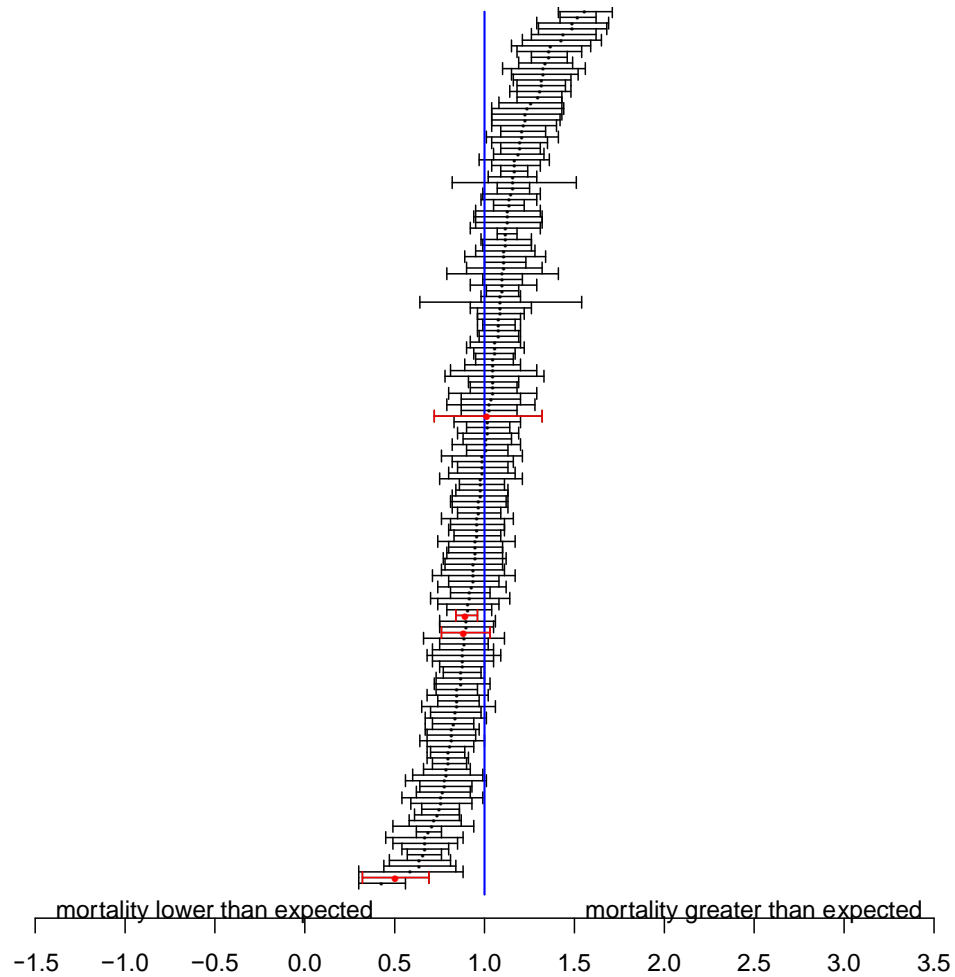
n = 12.804 patients

# Slovenia – GiViTi model

Slovenia – forest plot

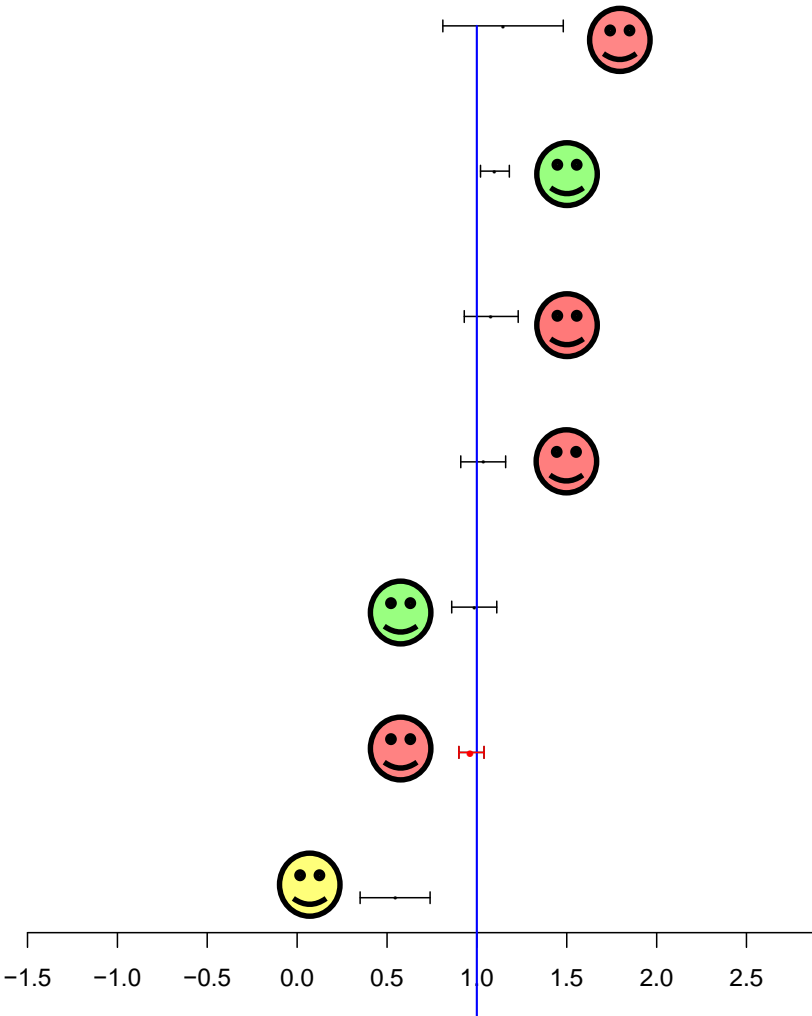


Slovenia – forest plot - multilevel

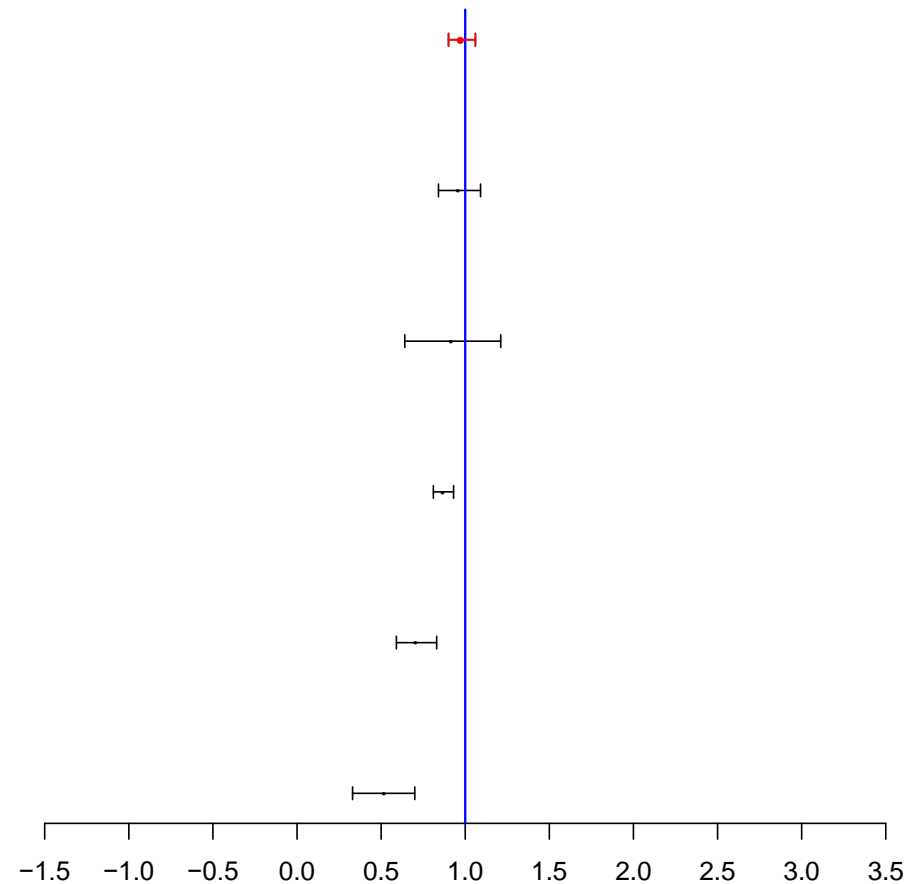


# Slovenia – GiViTi model

Slovenia – forest plot – Italian model



Slovenia – forest plot – Italian multilevel model

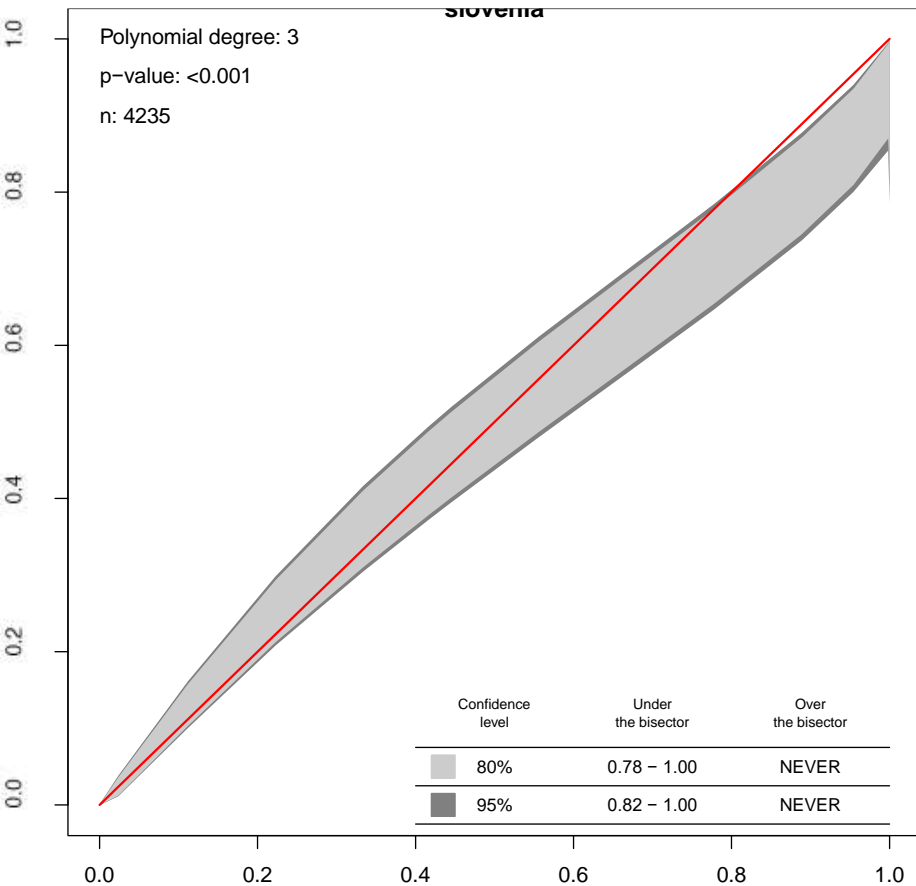


mortality lower than expected

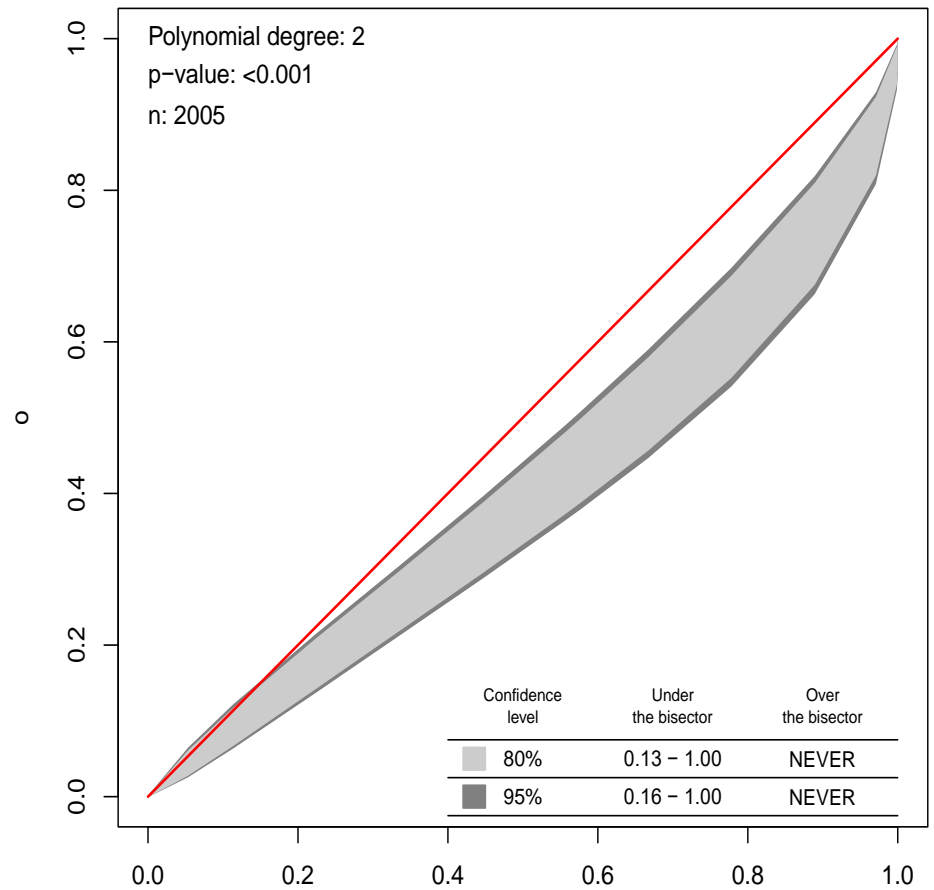
mortality greater than expected

# Slovenia – GiViTi model

## Slovenia

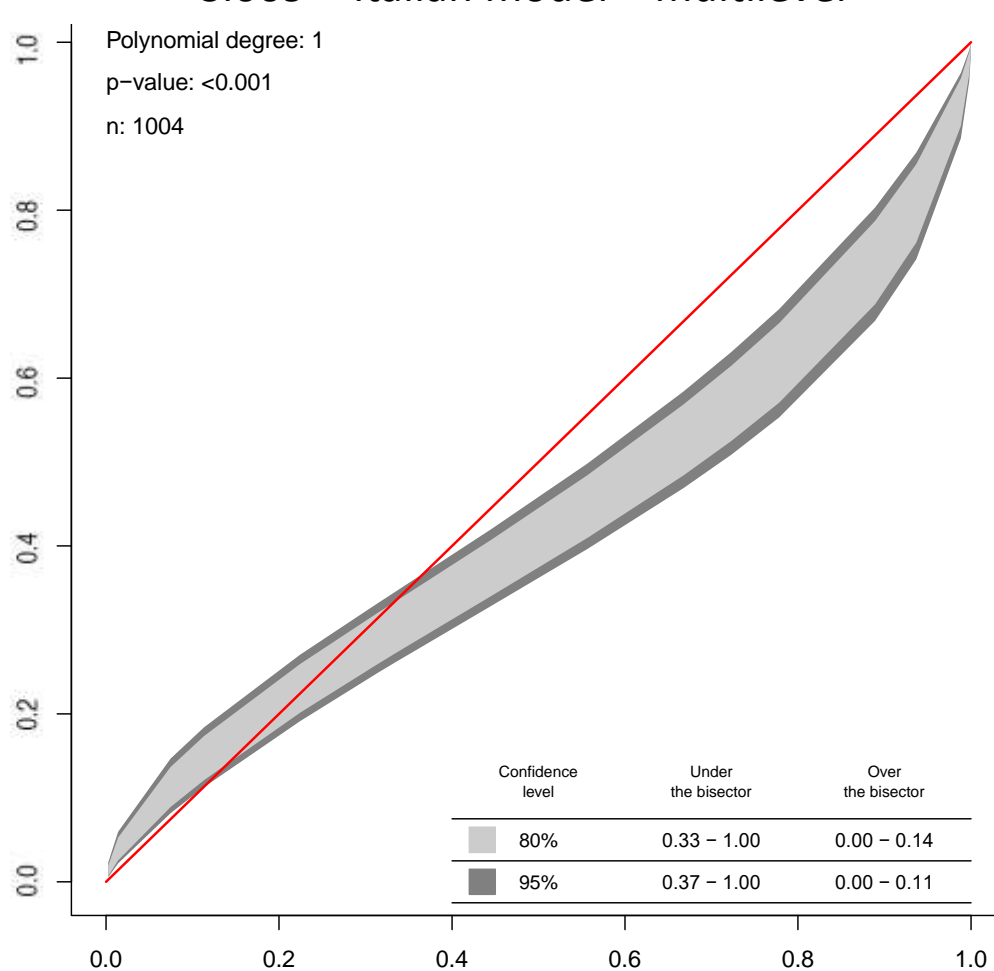


## Slovenia - multilevel



# SI009 (y. 2014-2015)

## SI009 – Italian model – multilevel



# Slovenia, n=2448

# Italy, n=52583

## GENDER

Sex	N	%	%
Male	1527	62.4	59.2
Female	921	37.6	40.8
Missing	0		

## AGE

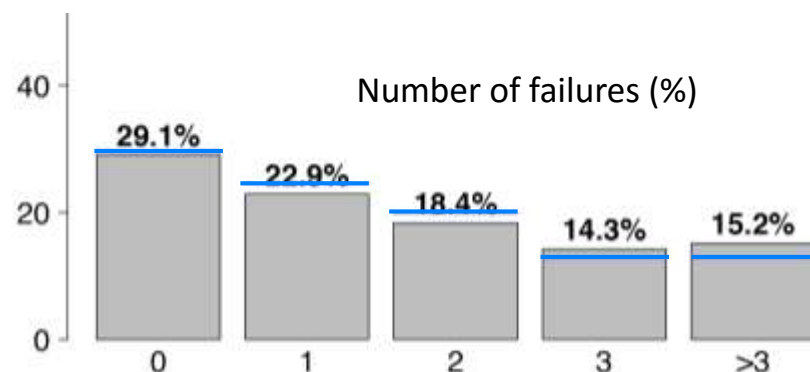
## COMORBIDITIES

Comorbidities	N	%	%
No	378	15.5	16.1
Yes	2066	84.5	83.9
Missing	4		

## REASONS for ADMISSION

Reason for admission	N	%	%
Monitoring/Weaning	960	39.3	39.8
Intensive Treatment	1477	60.4	59.8
Only ventilatory support	465	19.0	32.6
Only cardiovascular support	254	10.4	3.9
Ventilatory and cardiovascular support	758	31.0	23.3

## FAILURES on ADMISSION



# Slovenia, n=2448

# Italy, n=52583

SAPS II	SAPSII			SOFA	SOFA		
	Mean	31.6	37.7		Mean	4.0	5.4
	SD	18.3	20.4		SD	4.0	4.1
	Median	28	34		Median	3	4
	Q1–Q3	18–40	23–49		Q1–Q3	0–6	2–8
	Not evaluable	574	7890		Not evaluable	574	7890
	Missing	13	437		Missing	13	443

Max. SEVERITY of INFECTION	Maximum severity of infection			
		N	%	%
	None	1223	50.7	69.9
	Infection with or without SIRS	553	22.9	9.6
	Severe sepsis	189	7.8	9.8
	Septic shock	447	18.5	10.7
	Missing	36		

FAILURES during STAY	Failures during the stay			
		N	%	%
	No	2075	84.8	87.7
	Yes	373	15.2	12.3

Slovenia, n=2448

Italy, n=52583

ICU stay	ICU stay (days)		
	Mean	6.8	6.2
	SD	10.3	10.1
	Median	3	2
	Q1–Q3	1–7	1–7
	Missing	10	417

ICU mortality	ICU mortality			
		N	%	%
	Alive	2078	85.9	81.8
	Dead	341	14.1	18.2
	Missing	29		

HOSPITAL MORTALITY	Hospital mortality *			
		N	%	%
	Alive	1867	77.9	74.9
	Dead	529	22.1	25.1
	Missing	18		

# Predictors of outcome

Variable	Slovenia OR (95% CI)	Italy OR (95% CI)
ADMISSION CHARACTERISTICS		
Admission source (Medical ward vs Surgical ward – Other ICU – ER)	1.59 (1.24-2.05)	/
Scheduled admission (Yes vs No)	0.49 (0.31-0.76)	/
Age	/	
Gender (Female vs Male)	/	
CLINICAL CONDITION ON ADMISSION		
Pneumonia (Yes vs No)	1.88 (1.45-2.44)	/
Cardiac arrest (Yes vs No)	2.6 (1.6-4.22)	/
Septic shock (Yes vs No)	2.06 (1.55-2.73)	/
ORGAN FAILURES		
Neurologic failure (Cerebral coma vs Postanoxic coma)	1.7 (1.03-2.81)	/
Neurogenic shock (Yes vs No)	3.67 (1.77-7.36)	/



Resources

Resources



# Slovenia

# Italy

Type of ICUs present in hospital	N	%	
General	1	14.3	97.6
Medical	4	57.1	1.2
Surgical	4	57.1	3.0
Neurological/neurosurgical	1	14.3	8.4
Cardiosurgical	1	14.3	18.0
Burns	1	14.3	4.2
Post-transplantations	0	0.0	4.8
Other	1	14.3	21.0

## Number of available beds

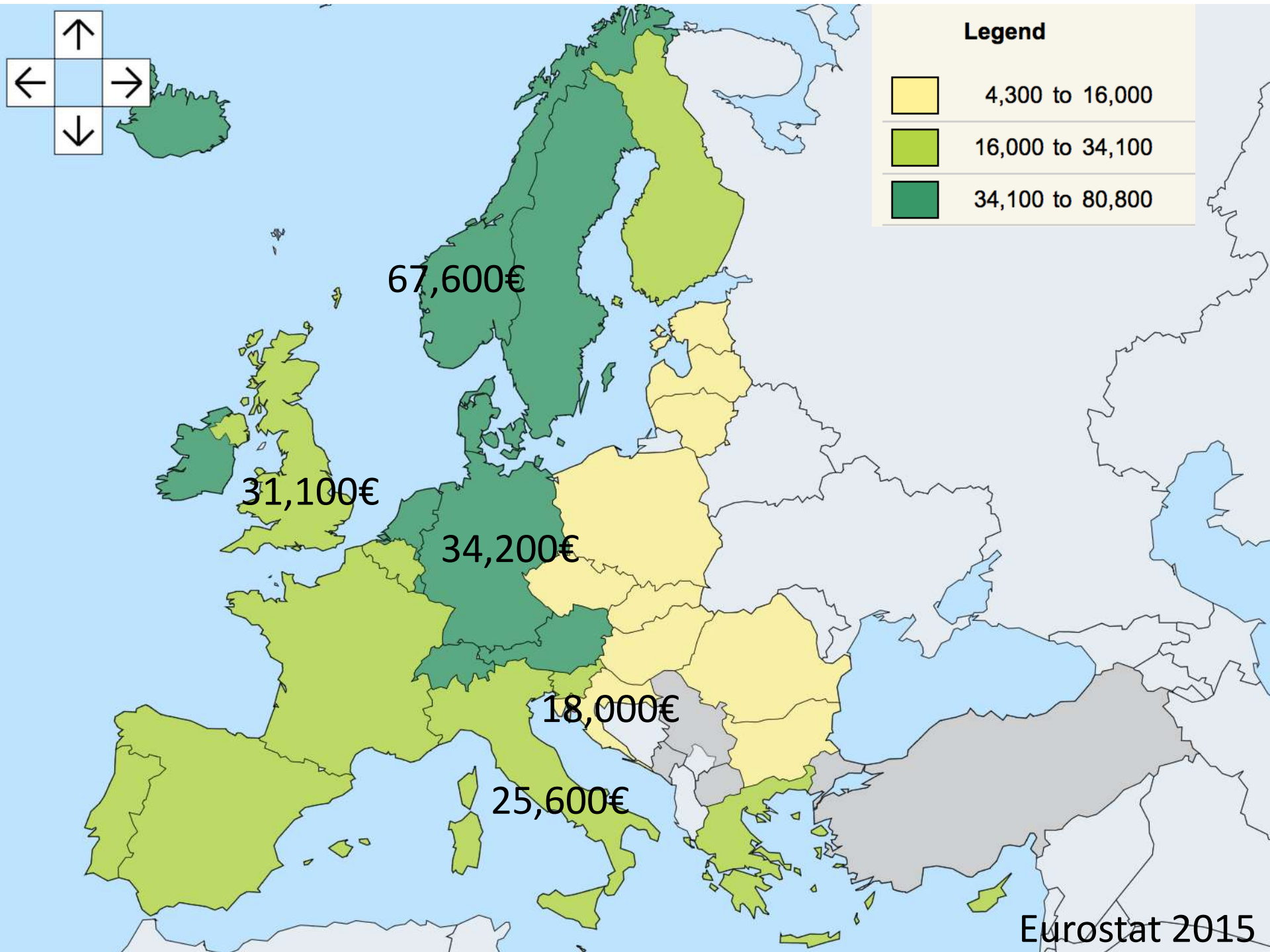
Mean (SD)	10.2 (6.8)	7.5 (3.3)
Median (Q1–Q3)	8 (5.8–12.5)	
Missing	3	

## Square meter per bed

Mean (SD)	9.5 (5.3)	15.6 (19.8)
Median (Q1–Q3)	11 (8–12.5)	
Missing	3	

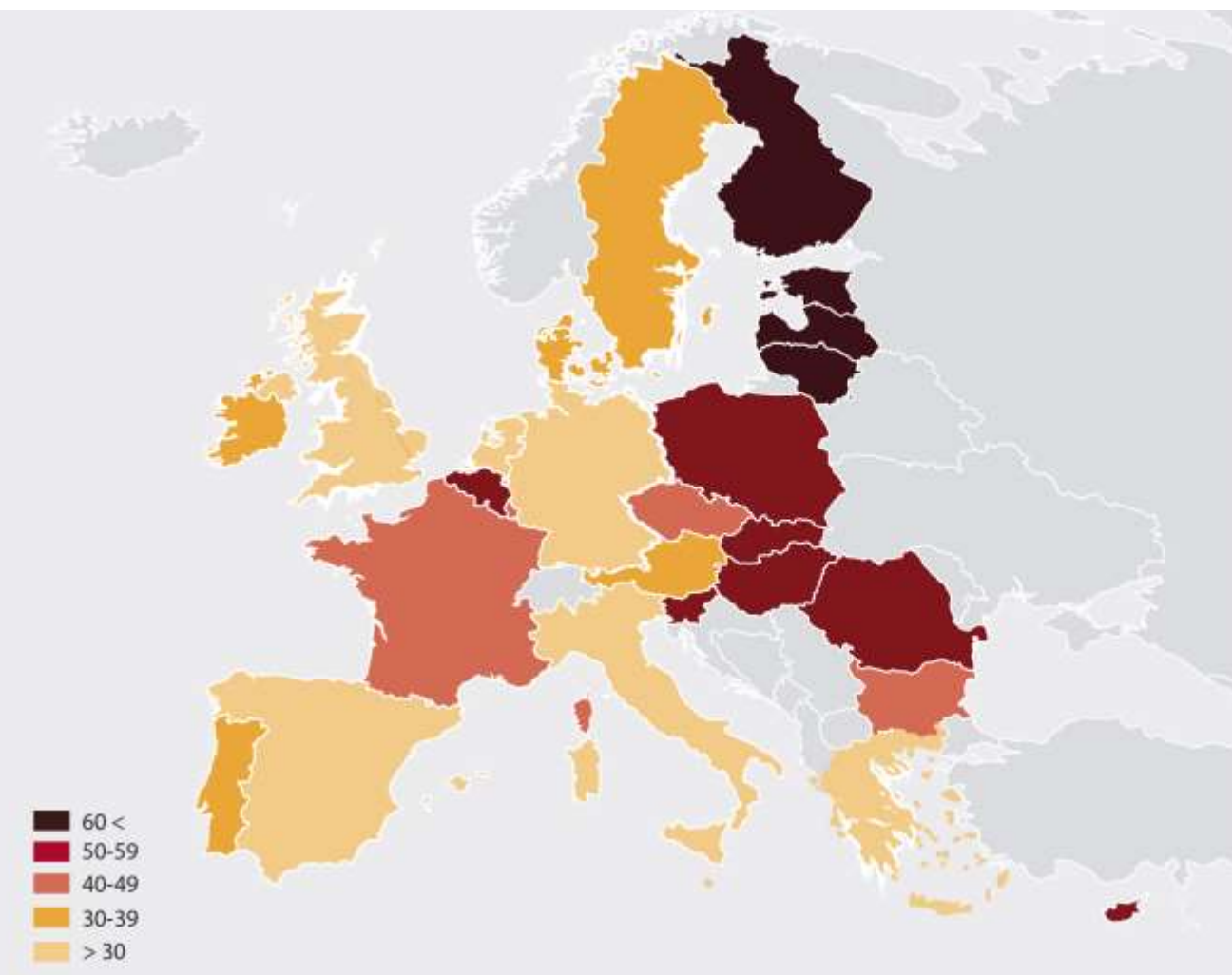


<b>Occupancy rate (%)</b>	<b>71</b>	<b>85</b>
<b>Rotation index (patients/beds)</b>	<b>30</b>	<b>44</b>
<b>Occupied beds per physician</b>	<b>3</b>	<b>3.7</b>
<b>Occupied beds per nurse</b>	<b>1.6</b>	<b>1.8</b>



# Fatal injuries in EU countries 2008-2010

Standardized death rate per 100 000 inhabitants and percentage of injury deaths



Country	Standardised injury death rate	Injury deaths in % of all cases of death
Lithuania	132	13%
Estonia	97	11%
Latvia	90	9%
Finland	64	11%
Slovenia	59	10%
Hungary	59	6%
Poland	58	7%
Romania	53	6%
Slovakia	52	6%
Cyprus	51	6%
Belgium	50	8%
Czech Republic	49	7%
France	44	9%
Luxembourg	40	8%
Bulgaria	40	4%
Austria	39	7%
Sweden	38	7%
Ireland	37	6%
Denmark	35	5%
Portugal	33	5%
Greece	29	5%
Germany	28	5%
Italy	28	5%
United Kingdom	27	5%
Malta	27	5%
Netherlands	26	5%
Spain	25	5%
EU-27	37	6%

2013-2018

# CREACTIVE study on TBI

Collaborative **RE**search on **AC**ute Traumatic brain injury (TBI) on  
intens**IV**e care medicine in **E**urope



# International Mission for Prognosis and Analysis of Clinical Trials in TBI – **IMPACT - 2003**

**IMPACT = International Mission for Prognosis and Clinical Trial design in TBI**

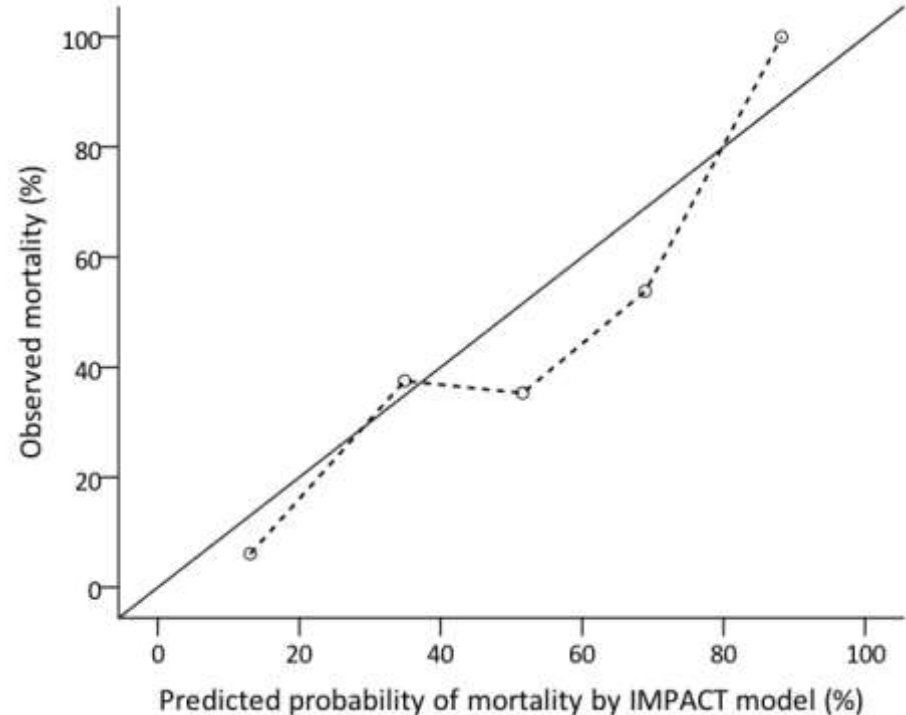
Impact Prognostic Calculator	
Age Age (14-99 years)	64
Motor Score Motor Score Scale	Abnormal Flexion
Pupils Pupils Reacting Scale	One Reacting
Hypoxia	Absent
Hypotension	Present
CT Classification Marshall CT Classification	Evacuated Mass Lesion
tSAH on CT	Absent
EDH mass on CT	Present
Glucose (mmol/L) Glucose (3-20 mmol/L)	14
Hb (g/dl)	--

Probability	
Hypotension	Present
CT Classification	Evacuated Mass Lesion
tSAH on CT	Absent
EDH on CT	Present
Glucose	14
Hemoglobin	12

Model(s) Considered in Calculation		
Core	Core+CT	Core+CT+Lab
Core Model		
<b>Mortality</b>	<b>Unfav.Outcome</b>	
60%	83%	
54% - 65%	80% - 86%	
Core + CT		
<b>Mortality</b>	<b>Unfav.Outcome</b>	
57%	78%	
49% - 65%	71% - 83%	
Core + CT + Lab		
<b>Mortality</b>	<b>Unfav.Outcome</b>	
50%	76%	
38% - 61%	67% - 84%	



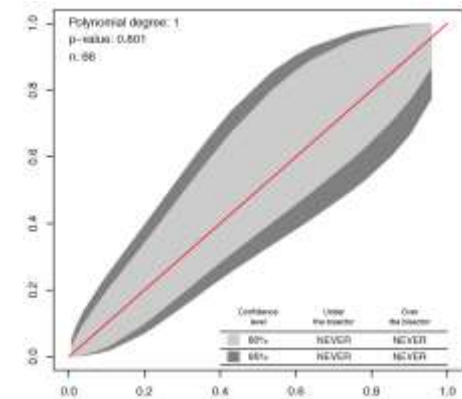
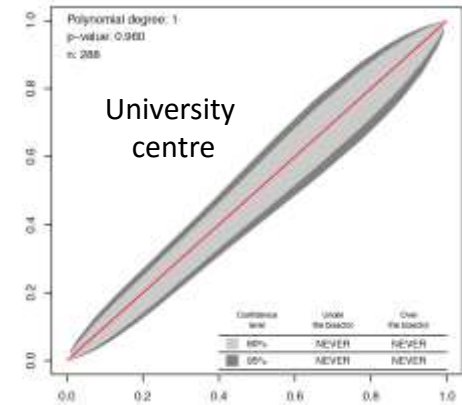
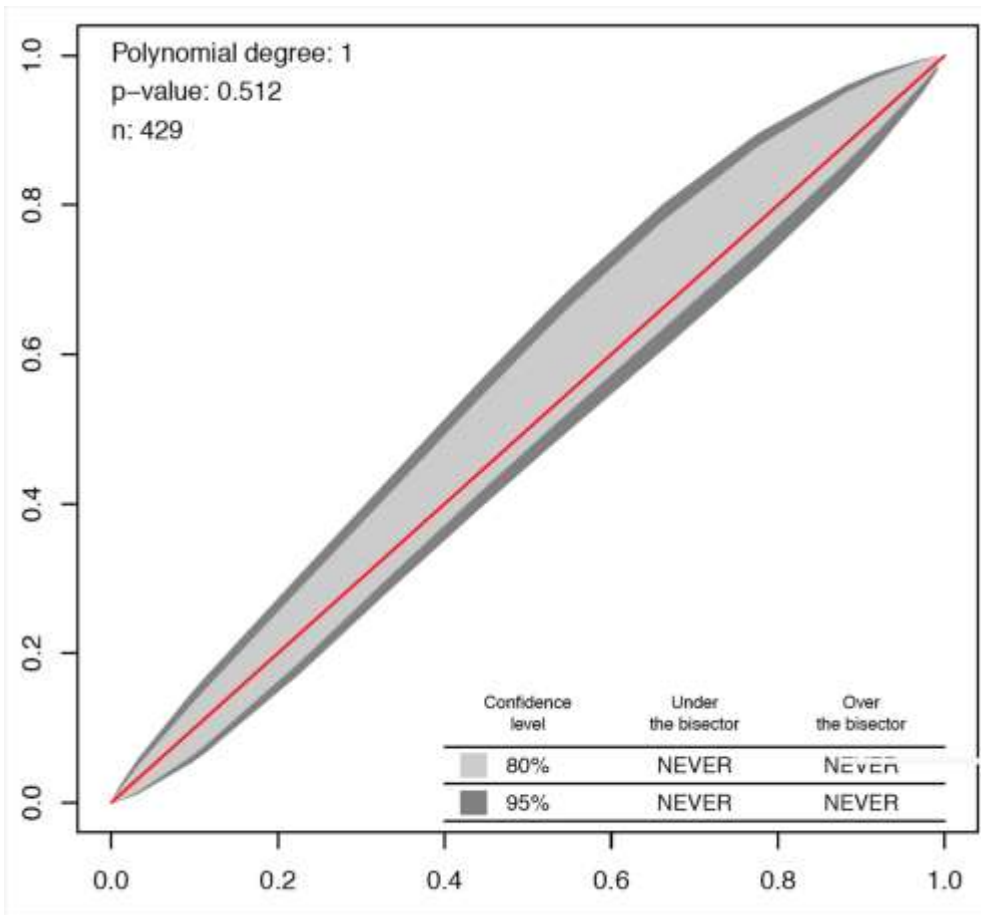
Gradisek P et al. Brain Injury 2012;26:1472-81.

# Traumatic brain injury, UMC Ljubljana, y. 2014-2015

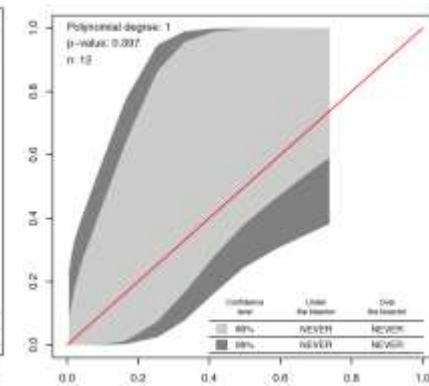
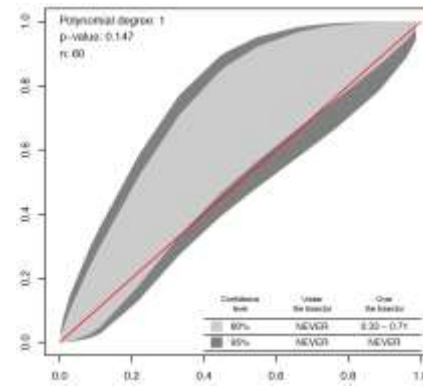
	y. 2014	y. 2015	CREACTIVE project, 51 ICUs, y. 2015
No. of patients	128	148	1457
ICU mortality	19.7%	15.1%	23.3%
Hospital mortality	26.4%	31.6 %	29.9%

# Tertiary vs Non-neurosurgical centers (y. 2014-2015)

TBI – Slovenian model



Non-neurosurgical centers



# Conclusions

1. The structural variation of ICUs within the hospital and between the hospitals is high in Slovenia.
2. ICU and hospital mortality tends to be low in Slovenia, however the number of included ICU is small and differences are huge. It would be very difficult to draw any firm conclusions on present data. However, is a great opportunity for further planning and improvements.
3. The number of ICU patients included in Prosafe is small (30%). Inclusion of other ICU would improve picture about real situation of ICM in Slovenia.



Pirano



Grotte di Postumia

# ICU performance in Slovenia



Lago di Bled



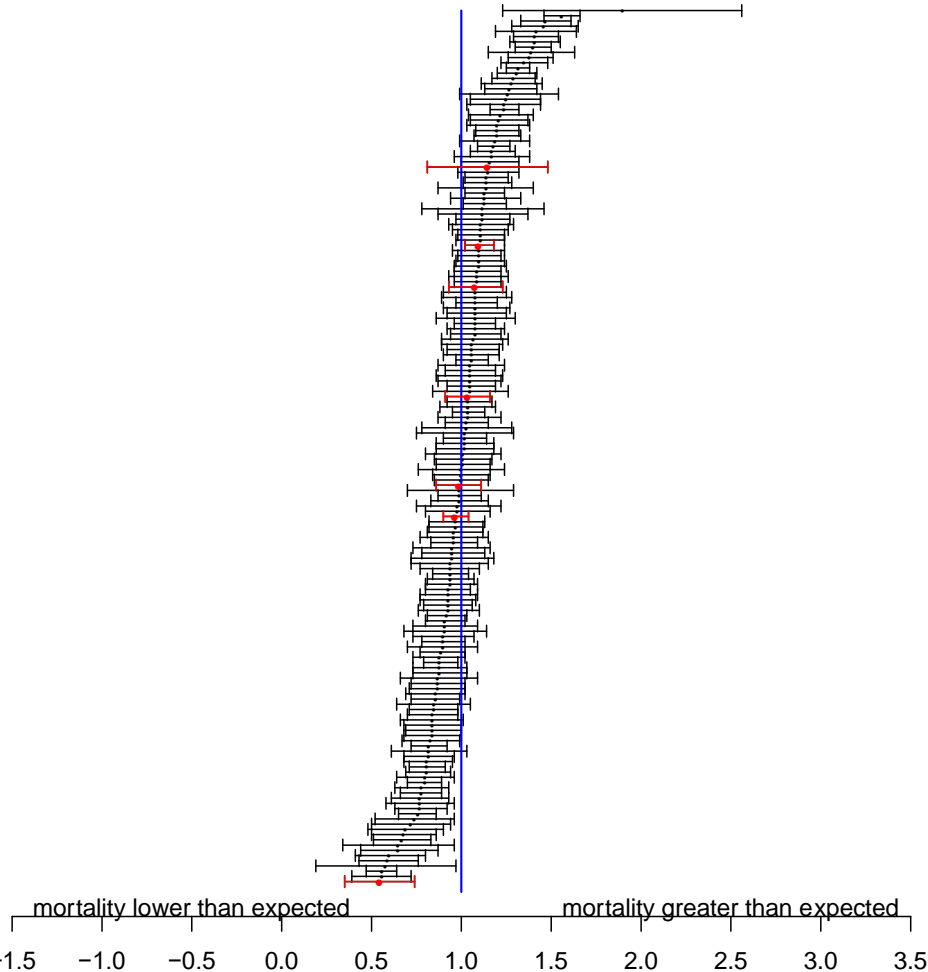
Lubiana



- Število vključenih bolnikov je majhno
- Razlike v strukturnih razlikah velike znotraj slovenskih ICU in med SLO vs IT
- Mortaliteta may be lower however we can see that number of included ICU is small, differences are huge so it would be very difficult to draw any conclusions on present data. However, it is a great opportunity for ???thinking and improvements.
- Inclusion of other Slovenian ICU would

# Slovenia – GiViTi model

Slovenia – forest plot



Slovenia – forest plot – Italian model

