

Variation of treatment of acute myocardial infarction in Swiss hospitals: Do hospital and regional characteristics matter?

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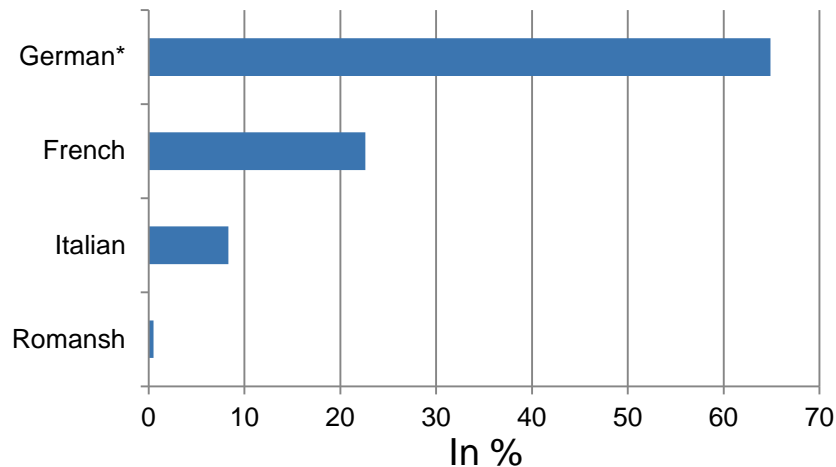
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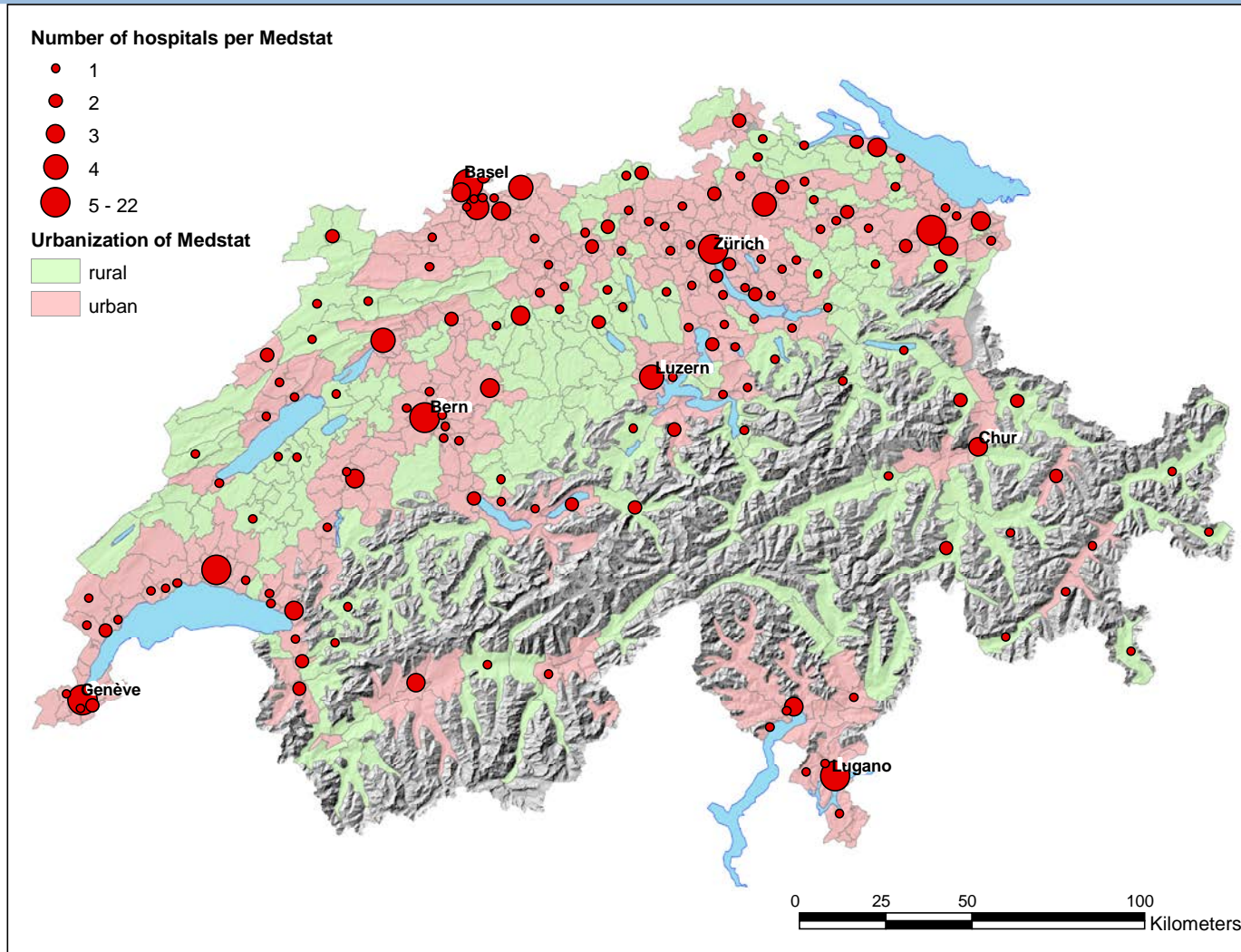
Switzerland – Fact sheet

- > 41,285 qkm
- > Limited settlement area due to mountainous areas
- > Population density: 203.5 inhabitants/qkm
- > 4 official languages



- > 8,139,631 inhabitants (of that: 23.8% foreigners) in 2013
- > Compulsory health insurance, fee and reimbursement vary on your selected level of co-payment

Number of hospital and urbanization level per Medstat (2010)



Cardiovascular disease (CVD)

- > Why focus on CVD?: Still biggest cause of deaths worldwide

Table: Causes of death and main diagnosis of hospital stays in Switzerland 2010

	Deaths		Hospital stays	
	Total	In %	Total	In %
1 st : CVD	21,959	35	144,976	11
2 nd : Cancer	16,277	26	83,578	6.3
3 rd : Respiratory system	3,726	5.9	69,654	5.3
Total	62,649	100	1,322,818	100

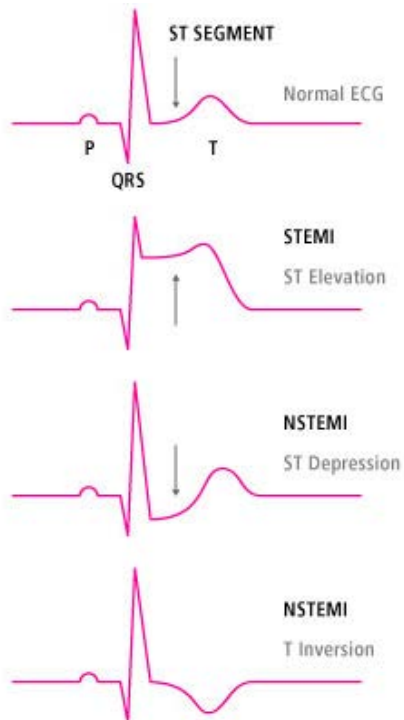
— CVD contributes to a considerable part of the overall economic burden of disease

- > Studies in the US, the UK and Swiss data indicate spatio-temporal variation in the care for CVD

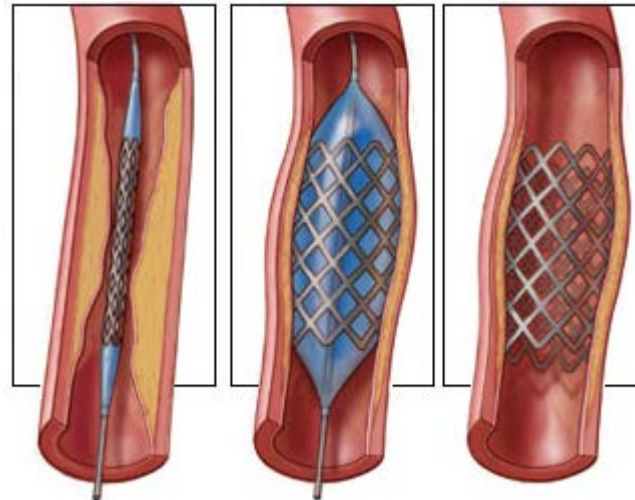
Objective

- > Measuring differences in treatment of acute myocardial infarction (AMI) patients across hospitals in Switzerland

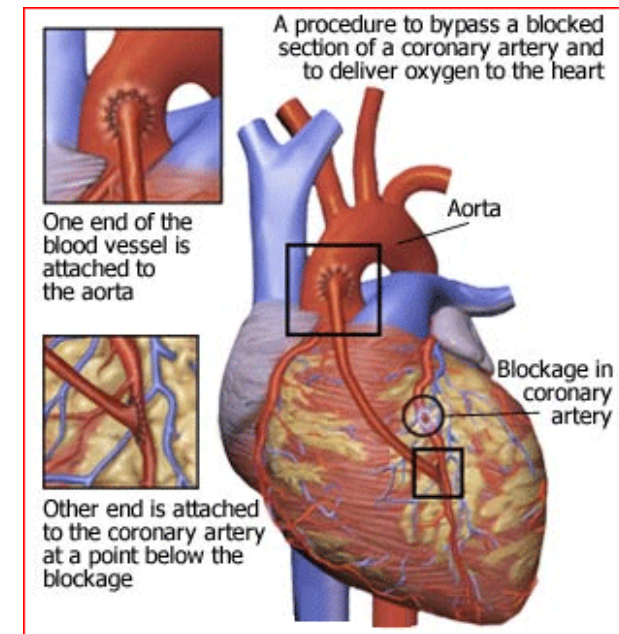
STEMI



PCI



CABG



PCI: percutaneous coronary intervention
CABG: coronary artery bypass grafting

Data

Study period: 2010-2011

- > Data from the Swiss Federal statistical office:
 - **Hospitalisation data set:** patient-id, age, sex, hospital-id, primary and secondary diagnoses (ICD 10) and treatment codes (CHOP), date of entry and exit, etc.

 - **Hospital data set:** type of hospital, number of employees and FTE and beds, number of angiography devices, CT or MRI, emergency room, etc.

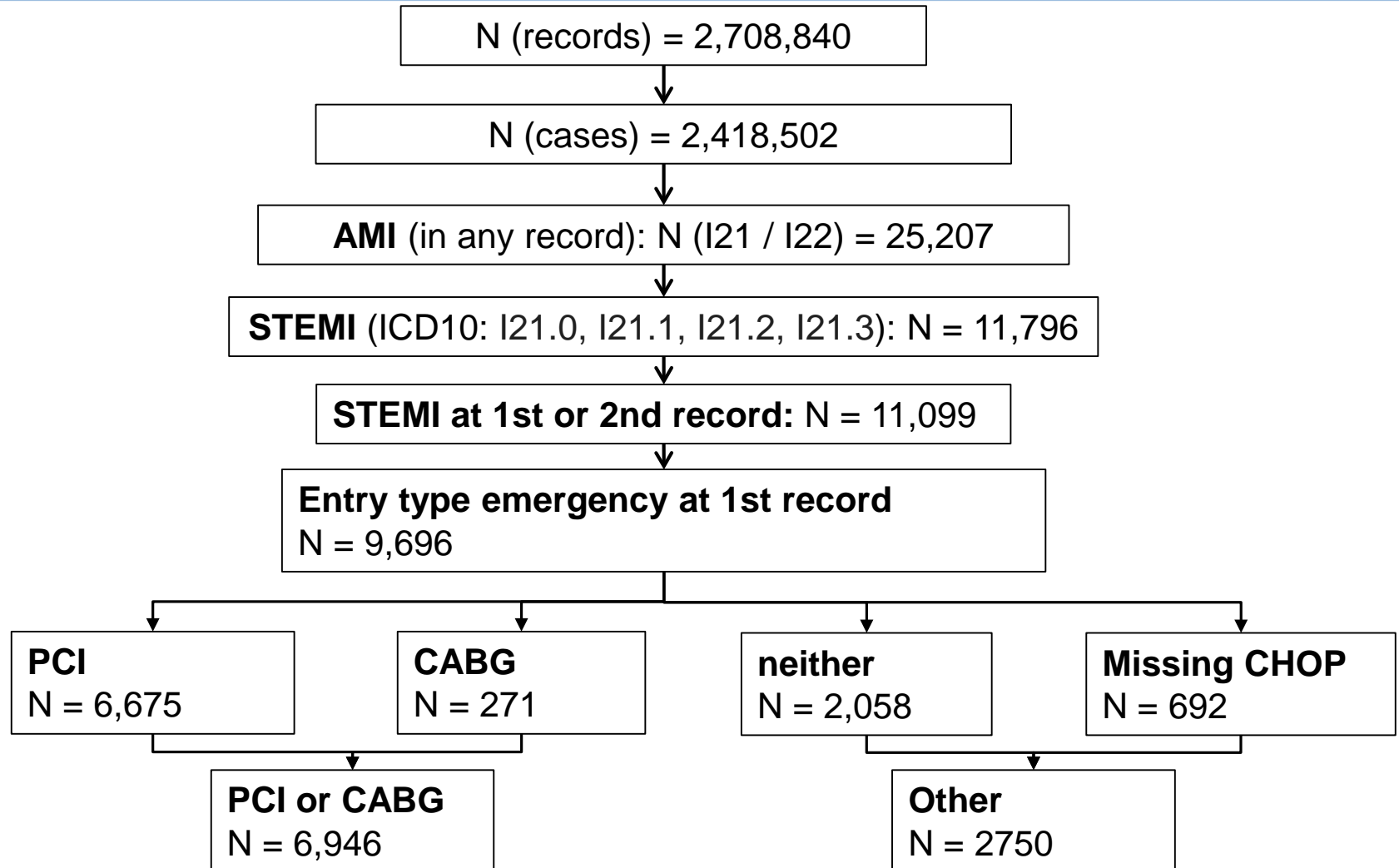
Construction of a STEMI treatment episode (case)

- > More than one record per patient, consideration of referrals
- > Construction of a case: Same pid, aligned or overlapping time periods, max 1 day between discharge and next admission

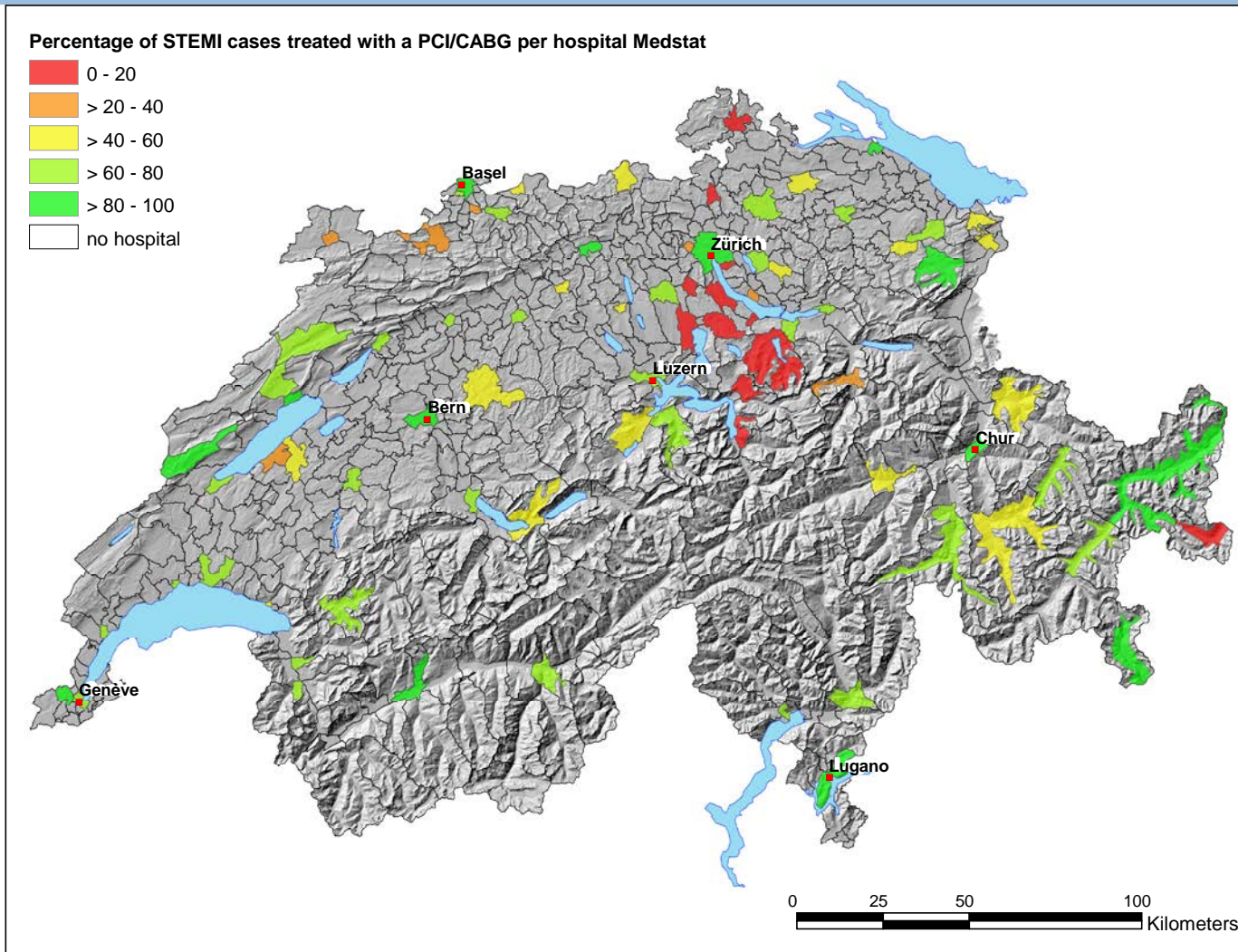
Case-ID	Hospital-ID	Date of entry	Date of exit	Length of stay (record)	Date of entry (case)	Date of exit (case)	Length of stay (case)
4164	86	18.12.2009	30.12.2009	12	18.12.2009	16.01.2010	29
4164	361	18.12.2009	19.12.2009	1	18.12.2009	16.01.2010	29
4164	219	30.12.2009	16.01.2010	17	18.12.2009	16.01.2010	29
4164	219	30.12.2009	31.12.2009	1	18.12.2009	16.01.2010	29
4164	219	31.12.2009	05.01.2010	5	18.12.2009	16.01.2010	29

- > 8.5% of all cases with overlapping time periods:
 - wrong length of stay and difficulties to order the referrals
- Use in the analysis: first hospital

Flow chart: Selection process (2010-2011)



Percentage of all STEMI cases treated with PCI/CABG per first hospital Medstat (2010-11)



Characteristics of the 2 treatment groups (1)

	Treatment groups					
	PCI/CABG		no PCI or CABG		Total	
	No.	Row in %	No.	Row in %	No.	Col in %
No. of STEMI cases	6,946	72	2,750	28	9,696	100
Sex						
<i>Men</i>	5,254	77	1,615	24	6,869	71
<i>Women</i>	1,692	60	1,135	40	2,827	29
	PCI/CABG		no PCI or CABG		Total	
	In years		In years		In years	
Age						
<i>Mean</i>	63.3		72.0		65.8	

Characteristics of the 2 treatment groups (2)

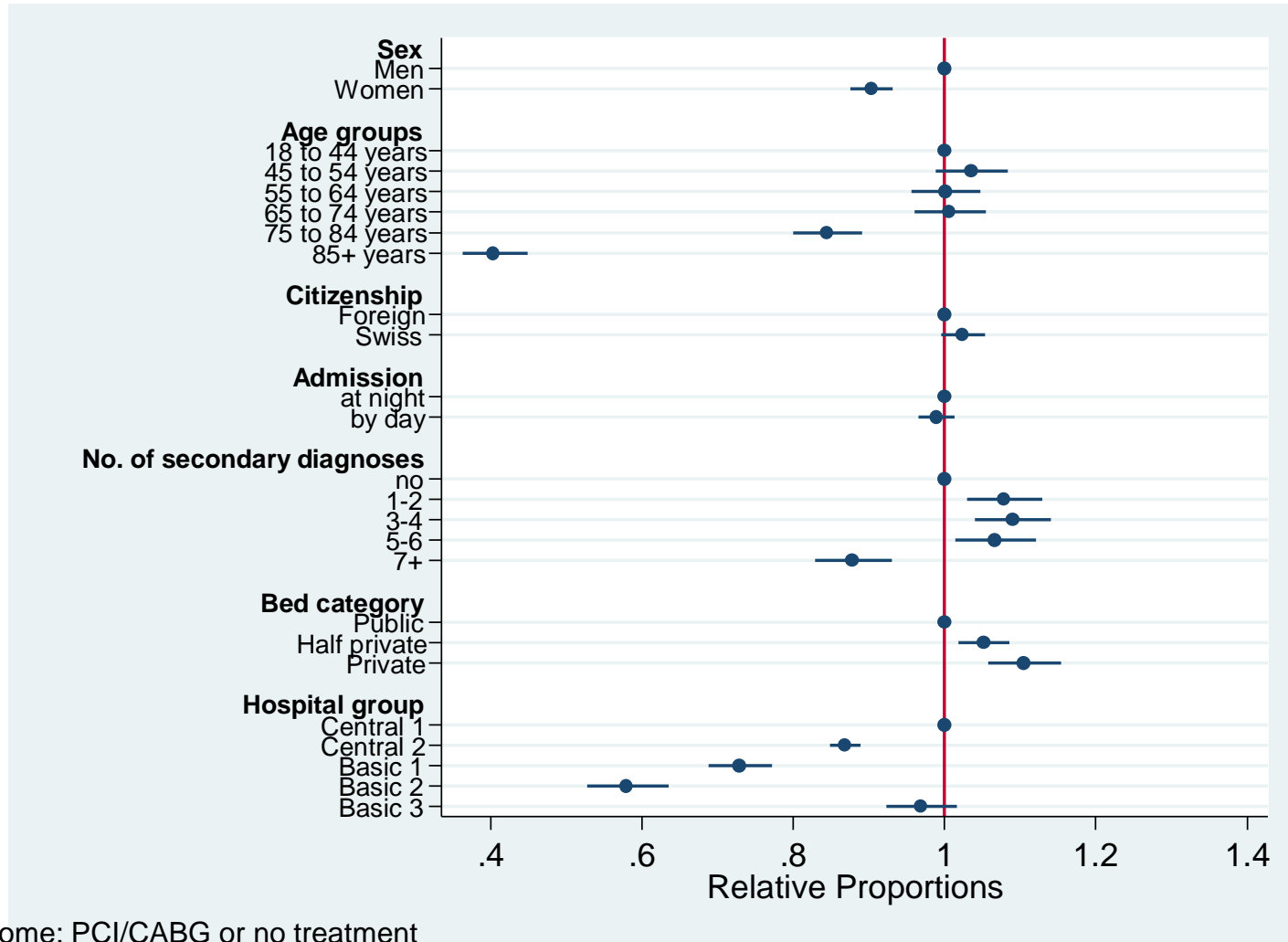
	Treatment groups				Total	
	PCI/CABG		no PCI or CABG		Total	
	No.	Row in %	No.	Row in %	No.	Col in %
No. of STEMI cases	6,946	72	2,750	28	9,696	100
First hospital group						
<i>Central 1 (30000+)</i>	2,571	81	593	19	3,164	33
<i>Central 2 (9000<30000)</i>	3,294	70	1,431	30	4,725	49
<i>Basic 1 (6000<9000)</i>	478	58	349	42	827	9
<i>Basic 2 (3000<6000)</i>	233	45	280	55	513	5
<i>Basic 3 (<3000)</i>	370	79	97	21	467	5
Language (first hospital)						
<i>German</i>	5,085	71	2,055	29	7,140	74
<i>French</i>	1,455	71	597	29	2,052	21
<i>Italian</i>	406	81	98	19	504	5

Statistical analysis

- > Multivariable poisson regression with robust standard errors to model the relative proportion of receiving PCI/CABG by patient, hospital and regional characteristics

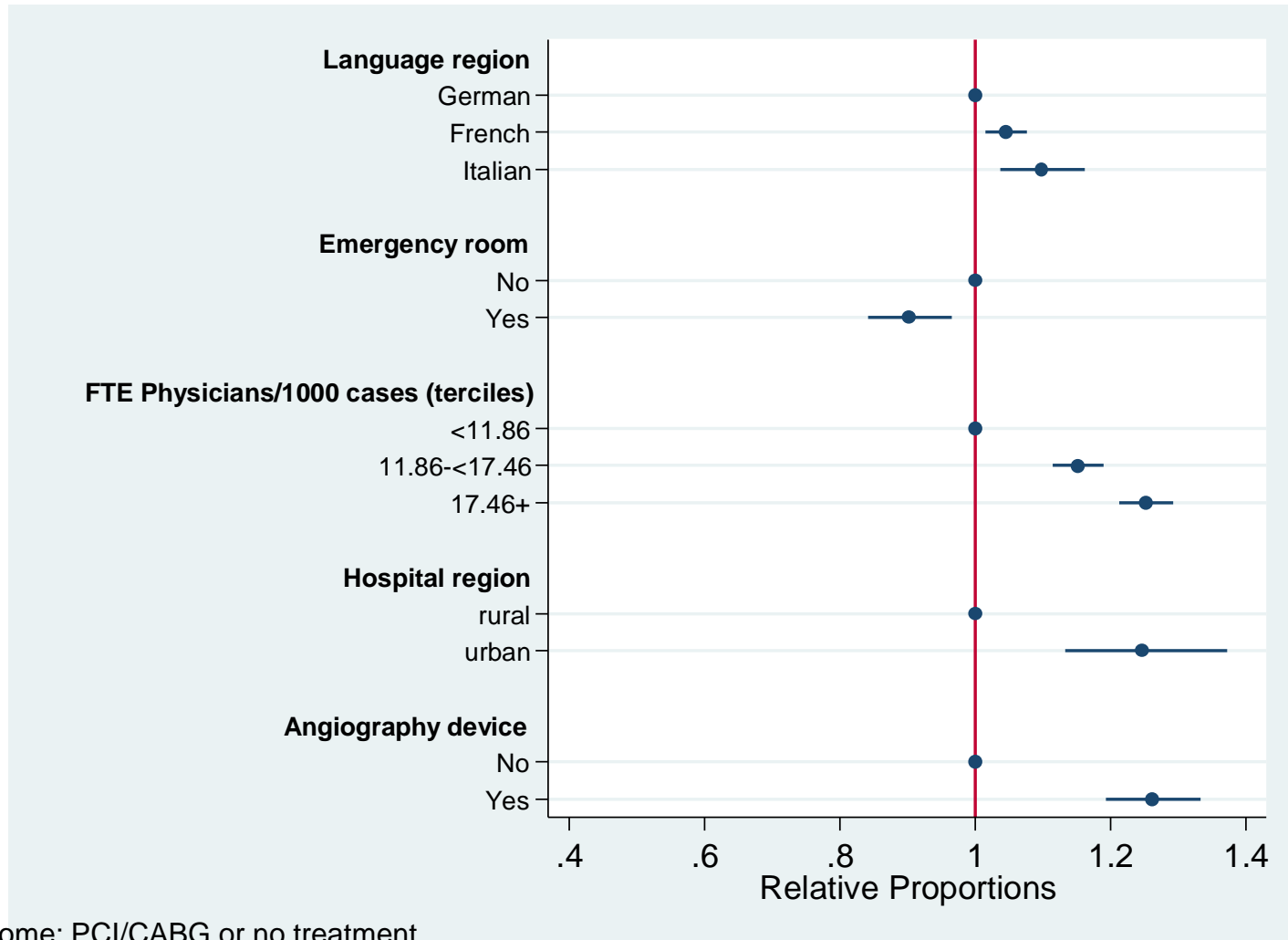
- > Two versions of multivariable models incorporating hospital characteristics:
 - using predefined hospital group (5 levels)
 - using the characteristics of the hospitals and region (availability of emergency room, angiography device, FTE of physicians, language region, urbanization level)

Poisson regression for PCI/CABG (1) – Patient characteristics and hospital group



N = 9696; Outcome: PCI/CABG or no treatment

Poisson regression (2) – Patient and specific hospital characteristics



N = 9696; Outcome: PCI/CABG or no treatment

Summary and conclusion

	Patient	Hospital	Regional
More PCI/CABG	Swiss citizenship, half private and private bed category	Higher FTE physicians, presence of an angiography device	French or Italian language region, urban area
Less PCI/CABG	Female, older than 75 years, many comorbidities (>7)	Presence of an emergency room	-

- Patient, hospital and regional characteristics contribute to the variation in receiving PCI/CABG in STEMI patients
- The association with (not) having an emergency room was not expected and warrants further study

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