The impact of office-based care on hospitalizations for ambulatory care sensitive conditions

10th World Congress in Health Economics
16th July 2014 in Dublin

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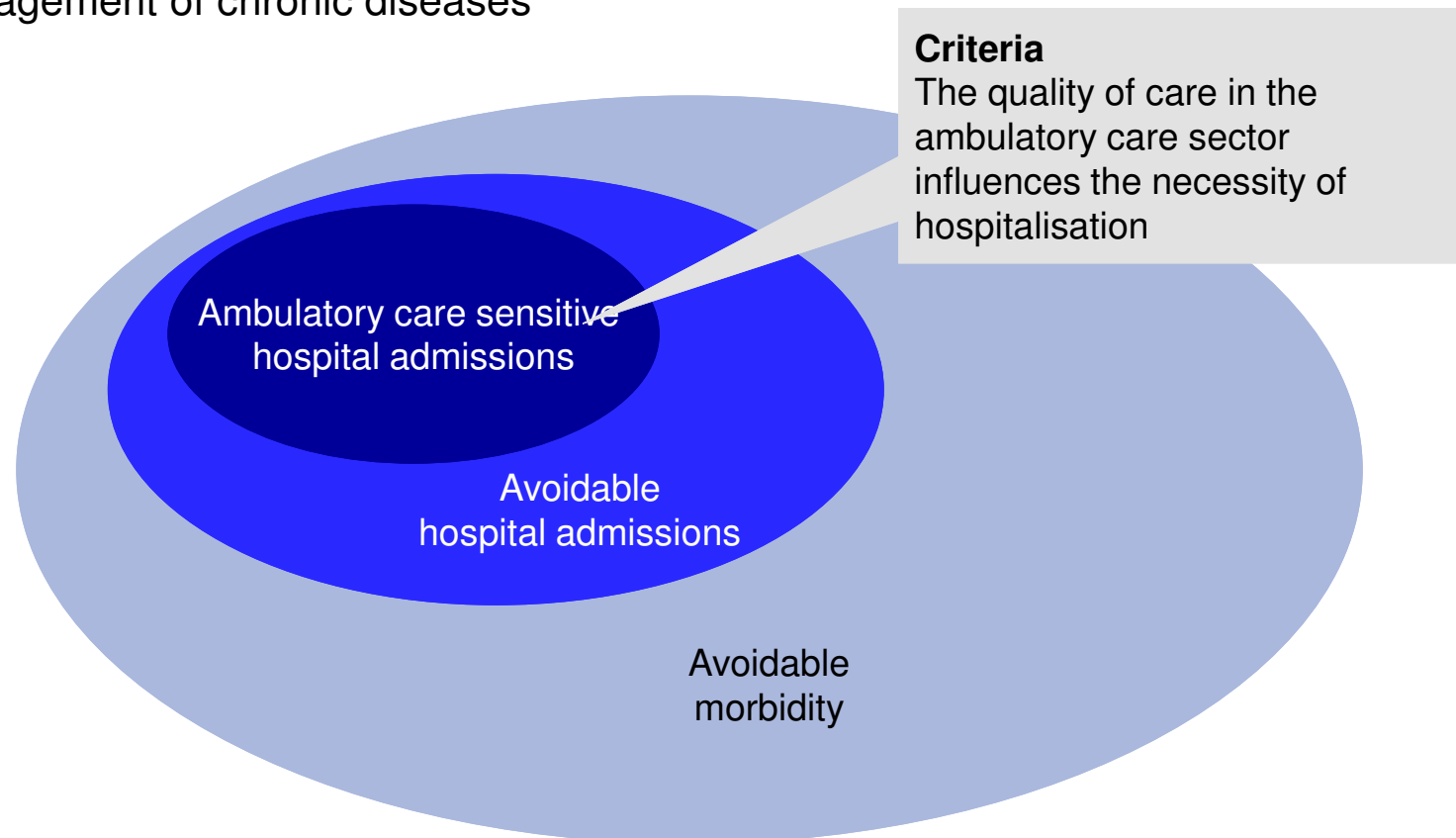*Ludwig Maximilians University Munich*

Introduction

- **German Advisory Council on the Assessment of Developments in the Health Care System** (SVR) stressed importance to initiate a quality competition among providers in the ambulatory care sector

- Difficult to **quantify quality of care** provided in the ambulatory sector because
  - a) most patients suffer from long term chronic conditions with no distinct endpoint
  - b) it is difficult to establish which ambulatory care provider would be accountable for a specific outcome

- SVR recommended **using risk adjusted rates of hospitalizations** that are sensitive to access and quality of care provided by ambulatory care providers within a regional unit

- Aim of present study: **to quantify the impact of specific office-based care on hospitalizations for ambulatory care sensitive conditions (ACSCs)**
  - → under what conditions could specific ambulatory treatments serve to lower the hospitalization rate/ increase quality of care
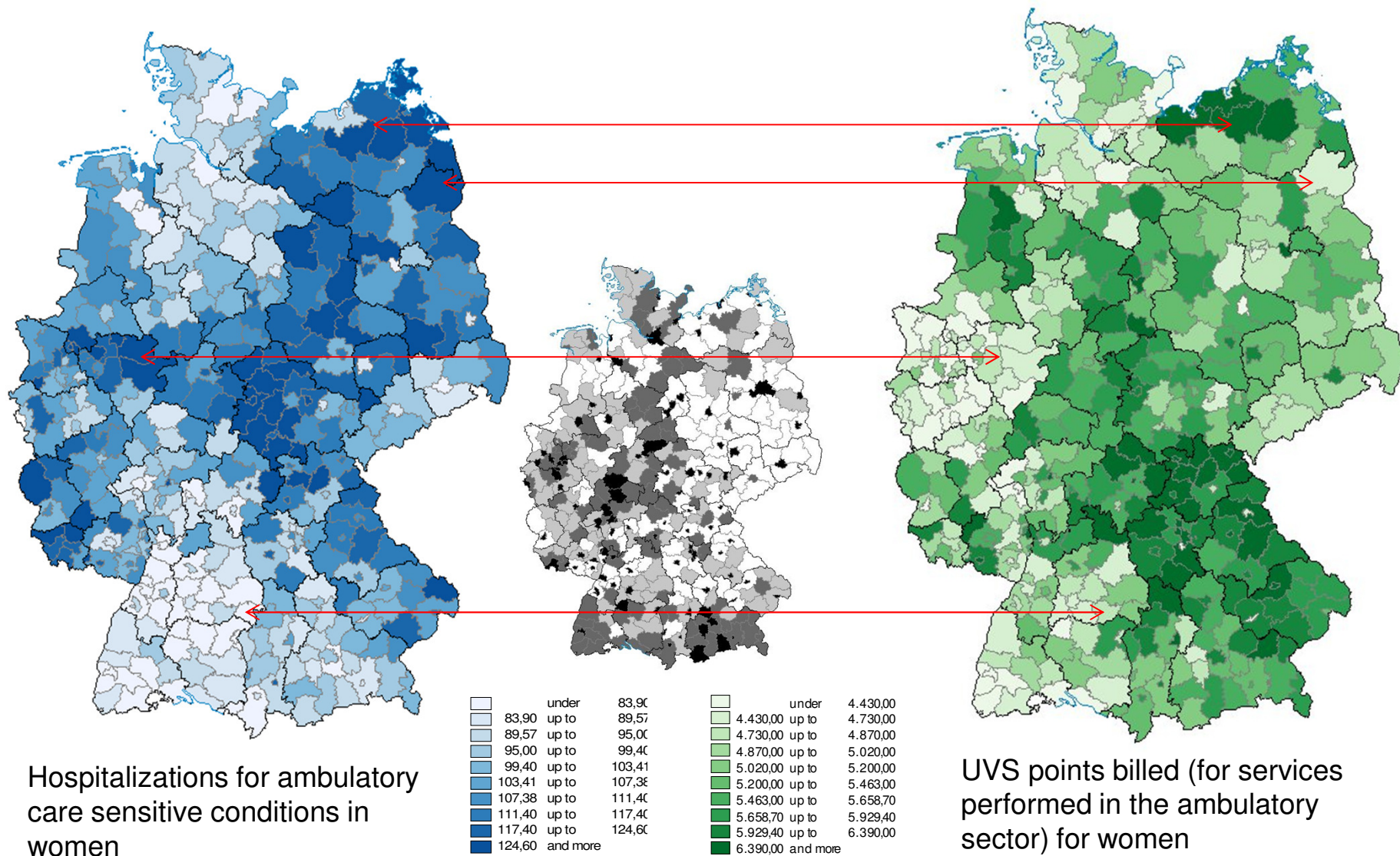
Ambulatory care sensitive conditions

- effective acute treatment
- effective primary preventative measures
- effective management of chronic diseases

Criteria
The quality of care in the ambulatory care sector influences the necessity of hospitalisation

Ambulatory care sensitive hospital admissions

Avoidable hospital admissions

Avoidable morbidity

Manuscript: Sundmacher, L; Kopetsch, T 2014: The impact of office-based care in hospitalizations for ambulatory care sensitive conditions. European Journal of Health Economics, in press

List of ACSCs	ICD 10 codes for ambulatory care sensitive indications	ICD 10 codes for selecting the relevant UVS (Uniform Value Scale For Doctors' Fees) reimbursements
Angina pectoris	I20, I24.0 I24.8 I24.9	I20, I24
(Congestive) heart failure	I11.0 I50 J81	I11 I50 J81
Influenza and pneumonia	J10 J11 J13 J14 J15.3 J15.4 J15.7 J15.9 J16.8 J18.1 J18	J10 J11 J13 J14 J15 J16 J18
Epilepsy and convulsions	G40 G41 R56 O15	G40 G41 R56 O15
Diabetes mellitus with complications	E10.0-E10.8 E11.0 E11.8 E12.0 E12.8 E13.0 E13.8 E14.0 E14.8	E10 E11 E12 E13 E14
Essential hypertension	I10 I11.9	I10, I11
Dehydration and gastroenteritis	E86 K52.2 K52.8 K52.9	E86, K52
Diseases of the lower respiratory tract	J20 J41 J42 J43 J47	J20 J41 J42 J43 J47
ENT infections	H66 H67 J02 J03 J06 J31.2	H66 H67 J02 J03 J06 J31
Phlegmon, acute lymphadenitis, etc.	L03 L04 L08.0 L08.8 L08.9 L88 L98.0	L03 L04 L08 L88 L98
Stomach and duodenal ulcers	K25.0-K25.2 K25.4 K25.6 K26.0 K26.2 K26.4 K26.6 K27.0 K27.2 K27.4 K27.6 K280 282 K284—	K25 K26 K27 K28
Dental disease	A69.0 K02 K03 K04 K05 K06 K08 K09.8 K09.9 K12 K13	A69 K02 K03 K04 K05 K06 K08 K09 K12 K13
Asthma	J45, J46	J45, J46
Iron deficiency anaemia	D50.1 D50.8 D50.9	D50
Pyelitis and nephritis	N10 N11 N12 N13.6	N10 N11 N12 N13
Vaccine-preventable diseases	A35 A36 A37 A80 B05 B06 B16.1 B16.9 B18.0 B18.1 B26 G00.0 M01.4	A35 A36 A37 A80 B05 B06 B16 B18 B26 G00 M01
Gangrene	R02	R02
Illnesses caused by malnutrition	E40 E41 E42 E43 E55.0 E64.3	E40 E41 E42 E43 E55 E64
Acute salpingitis and ophoritis, inflammation of the pelvis in women	N70 N73 N74	N70 N73 N74

Geographic variation

	under	83,90
	83,90 up to	89,57
	89,57 up to	95,00
	95,00 up to	99,40
	99,40 up to	103,41
	103,41 up to	107,38
	107,38 up to	111,40
	111,40 up to	117,40
	117,40 up to	124,60
	124,60 and more	

	under	4.430,00
	4.430,00 up to	4.730,00
	4.730,00 up to	4.870,00
	4.870,00 up to	5.020,00
	5.020,00 up to	5.200,00
	5.200,00 up to	5.463,00
	5.463,00 up to	5.658,70
	5.658,70 up to	5.929,40
	5.929,40 up to	6.390,00
	6.390,00 and more	

Hospitalizations for ambulatory care sensitive conditions in women

UVS points billed (for services performed in the ambulatory sector) for women

5

Regression models

- Estimated **linear spatial models** at the level of the 413 German counties and county boroughs for the years 2007 and 2008

$$ACSCs_i = \lambda W ACSCs_i + \beta_1 SA_i + + \beta_2 PD_i + \beta_3 H_i + \beta_4 R_i + u_i$$

- SA (# doctors in practice/ level of UVS) and physician density (# medical students) were **instrumented**; **non-linear formulations** of SA and PD were tested

- SA and ACSCs were directly **age-standardized and weighted** according to size of districts (empirical bayes approach)

- well-defined set of **covariates**: influence of hospital sector (#beds, distance to next hospital, average los for ACSC), risk factors (emergencies, avoidable mortality, unemployment) and control for shares of privately insured

- **Data sources** (all administrative data is based on a full sample on the level of districts)
  - medical services in the ambulatory sector (National Association of Statutory Health Insurance Physicians)
  - hospitals diagnoses (Federal Statistical Agency)
  - socioeconomic and demographic data (Federal Office of Construction and Regional Planning)
  - shares of privately insured (Federal Insurance Agency)

Regression results for women

Dependent variable: rate of hospitalizations for ACSCs for women	IV estimation			IV estimation with nonlinear modeling of SA			Spatial lag correlation model with IV and nonlinear modeling of SA		
	Coefficients	Robust standard errors		Coefficients	Robust standard errors		Coefficients	Standard errors	
Medical services (IV)	**-0,026407**	**0,0114108**	*	**-0,1288267**	**0,0489415**	**	**-0,1212485**	**0,0458249**	**
Medical services (IV)				**0,00000927**	**0,00000436**	*	**0,0000088**	**0,00000405**	*
Physicians per 100,000 inhabitants (IV)	-0,0974714	0,0483697	*	-0,1039009	0,0506615	*	-0,0818745	0,0408837	*
Hospital beds per 10,000 inhabitants	0,0379127	0,0236095		0,0419384	0,0235029	*	0,0197523	0,0174373	
Distance to the next hospital in driving minutes	0,6914968	0,3035463	*	0,6965177	0,301035	*	0,5656787	0,2457887	*
Average length of hospitalization for an ambulatory sensitive condition	-0,0215479	0,4964002		-0,0152273	0,4920182		-0,1945025	0,4475584	
Emergencies in the hospital per 1,000 inhabitants	0,1670706	0,042251	***	0,16453	0,042524	***	0,1361698	0,0306304	***
Avoidable female mortality per 100,000	0,0421003	0,05443		0,0357675	0,0545084		0,0233205	0,0457298	
Unemployment rate (in %)	1,622016	0,4324285	***	1,601207	0,4373027	***	0,0233205	0,3484941	***
Proportion privately insured (in %)	-0,8164255	0,5786715		-0,9391464	0,5809102		-0,8686995	0,518984	*
Constants	243,4405	68,86791	***	528,6352	147,5497	***	407,0155	138,7954	**
λ							0,9767816		***
Adjusted R ^ 2	0,5562			0,5606			0,584		
Number of observations	413			413			413		
Log likelihood							-1500,2091		
F test for SA-instruments (F values)	49,55	***							
F test for PD-instrument (F value)	31,54	***							
Moran's I				17,910		***			
Robust Lagrange multiplier statistic (spatial lag)				143,160		***			
Robust Lagrange multiplier statistics (spatial error)				7,05		**			

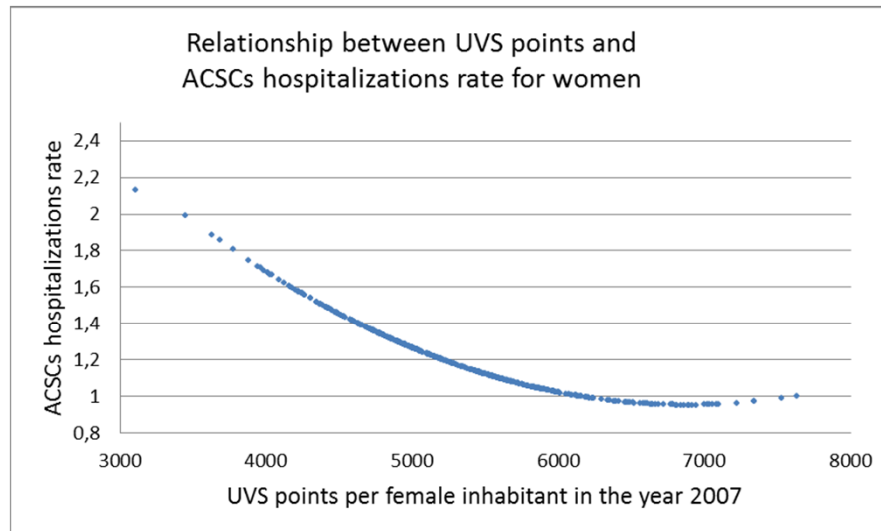*p<=0,05   **p<=0,01   ***p<=0,001

+The 15 dummies for the German states are not shown here

Graphical illustration

Relationship between UVS points and ACSCs hospitalizations rate for women

Relationship between UVS points and ACSCs hospitalization rate for women (evaluated at the mean value of the covariate)

Relationship between UVS points and ACSCs hospitalization rate for men (evaluated at the mean value of the covariate)

Relationship between UVS points and ACSCs hospitalizations rate for men
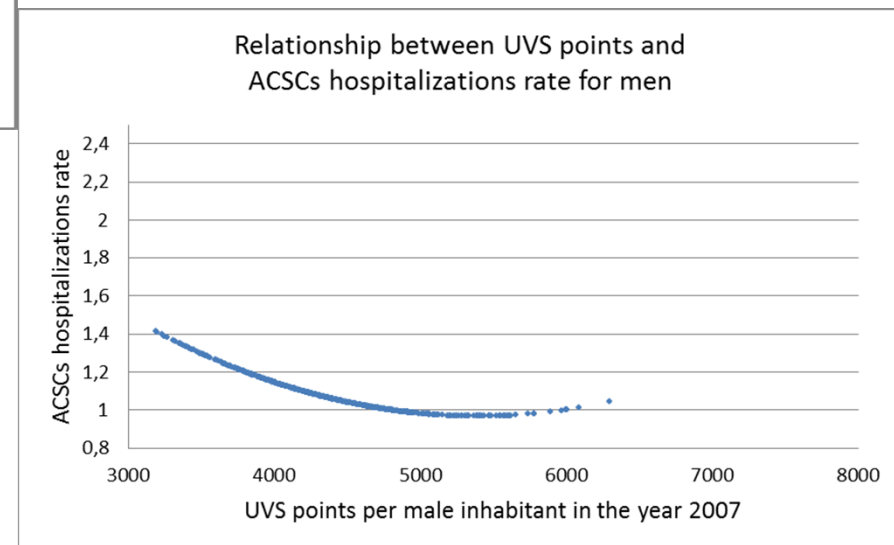
Conclusions/ Implications of the models

- An additional € spent on treatment for ACSCs decreases the rate of hospitalizations for ACSCs for women and men **up to an annual point value of approximately *6891* and *5735* respectively**

- The correlation is not linear but, as suspected, exhibits **diminishing marginal returns**

- Additional medical services may reduce the rate of hospitalizations for ACSCs but – ceteris paribus - this correlation **depends on the absolute level of office-based services in a county**

- A **county with a very low level of specific medical services** would profit most from an increase in those specific services.

- C*eteris paribus* counties with a **high volume of services exhibit flat of the curve medicine**

Thanks a lot
for your attention!

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