

Incidence and Geographical Variation of Cataract and Cataract Surgery in Austria

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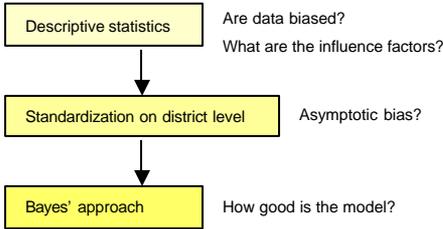
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Purpose

In recent years the use of routine hospital data in epidemiology has become a new strong tool. This study aims to describe its advantages and disadvantages for investigations in spatial statistics and in health care supply. Investigations are done for cataract, one of the most common diagnoses in Austria.

Evaluation of Routine Data in Epidemiology



Routine Hospital Data

Minimum Basic Data Set (MBDS)[1]

- Document the complete amount of hospital admissions and procedures for all Austrian (public and private) hospitals.
- Represent the state of health of the Austrian population.
- Allow big retrospective studies.
- Reflect reality but may be biased.
- No ID for patient identification available.

Cataract and cataract surgery

Cataract is a clouding or opacity of the lens of the eye. This can cause a decrease in vision and may lead to eventual blindness. Prognostic factors can be increasing age, female gender, current smoking, diabetes, sunlight exposure, higher educational status, other eye diseases [2]. Cataract surgery is one of the most common interventions for people aged 50 years and older in Austria and worldwide (5% - 7% 5-year incidence rate) [3].

Public and Private hospitals

All public Austrian hospitals perform the MBDS. Since 2002 the same dataset is available for the private hospitals. Public and private hospital data show the real hospital utilization, demand and supply for cataract. Further there can be shown differences in inpatient treatment between private and public hospitals.

Abstract

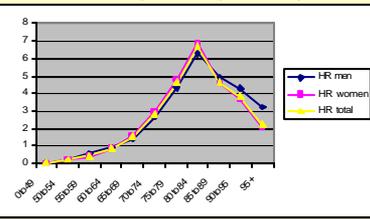
Cataract is highly prevalent in elderly persons and cataract surgery one of the most common interventions [5]. The use of routine data in epidemiology causes some bias to the results, but it shows hospitalisation habits for Austria exhaustively. The question for need and resource allocation is tried to be answered by the identification of spatial patterns in health care use and supply. Comparisons of crude rates show significant differences. This makes an age and gender standardization necessary. There is a significant difference in LOS (length of stay) between public and private hospitals. Crude and standardized hospitalisation rates show significant differences between districts. The Bayes' model approach assumes a Poisson distribution for the data and takes the influence of adjacent districts into account. The influence of unknown prognostic factors is modelled as unstructured heterogeneity (BMY-model). Results show a strong neighbour's correlation for hospitalisation rates for private hospitals. Further investigations are going to be done on hospital's distance and capacity.

Descriptive Statistics

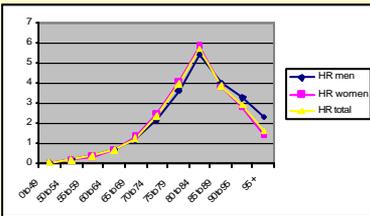
Hospitalisation rates (HR)

Age Group	2001		2002		LOS (days)	
	Observed	Expected	Observed	Expected	Public	Private
0-9	0.00	0.00	0.00	0.00	0.00	0.00
10-14	0.00	0.00	0.00	0.00	0.00	0.00
15-19	0.00	0.00	0.00	0.00	0.00	0.00
20-24	0.00	0.00	0.00	0.00	0.00	0.00
25-29	0.00	0.00	0.00	0.00	0.00	0.00
30-34	0.00	0.00	0.00	0.00	0.00	0.00
35-39	0.00	0.00	0.00	0.00	0.00	0.00
40-44	0.00	0.00	0.00	0.00	0.00	0.00
45-49	0.00	0.00	0.00	0.00	0.00	0.00
50-54	0.00	0.00	0.00	0.00	0.00	0.00
55-59	0.00	0.00	0.00	0.00	0.00	0.00
60-64	0.00	0.00	0.00	0.00	0.00	0.00
65-69	0.00	0.00	0.00	0.00	0.00	0.00
70-74	0.00	0.00	0.00	0.00	0.00	0.00
75-79	0.00	0.00	0.00	0.00	0.00	0.00
80-84	0.00	0.00	0.00	0.00	0.00	0.00
85-89	0.00	0.00	0.00	0.00	0.00	0.00
90-94	0.00	0.00	0.00	0.00	0.00	0.00
95+	0.00	0.00	0.00	0.00	0.00	0.00
Overall	0.00	0.00	0.00	0.00	0.00	0.00

HR cataract 2002/ public and private hospitals



HR cataract surgery 2002/ public and private hospitals



Data and graphics show a strong dependence of the hospitalisation rates of cataract and cataract surgery on age and gender. For this reason data are standardized for these two factors.

Are data biased by coding errors?

The significant rate of wrong coded data in the MBDS is < 5.

Do hospitalisation rates depend on the distance

Standardization on District Level

Standardized rates of cataract (left) and cataract surgery (right)

Public hospitals 2001



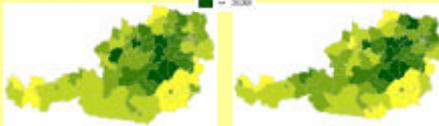
Public hospitals 2002



Private hospitals 2002



Total 2002



The distribution of the hospitals with a department of ophthalmology and the density of general practitioners in the districts are possibly prognostic factors for the hospitalisation



Bayes' Model Approach

Small populations in some districts can cause a bias to the results. To get a shrinkage of the rates towards the overall mean for districts with small sample sizes a Bayes' model is applied to the data [6].

Bayes' approach/model

$$O_i \sim \text{Poisson}(\mu_i)$$

$$\ln(\mu_i) = \ln(E_i) + a_0 + b_1 + b_2$$

O_i ...observed numbers

E_i ...expected numbers

$i = 1, \dots, n$...districts

a_0 ...constant term

b_1 ...spatial autocorrelation coefficient of district

b_2 ...coefficient for the unstructured heterogeneity of district

Bayes' results

The results show a strong influence of neighbouring districts on the district's hospitalisation rates for private hospitals. There is only poor influence for private and public hospitals together.

In a next step the influence of the distance to and the capacity of the next hospital will be included in the model.

References

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