Health care use and hospital surgical care for cataract in Austria

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0. SUMMARY
Cataract is highly prevalent in elderly persons and cataract surgery one of the most common interventions. This study aims to describe and explain its regional distribution and the influence of hospitals on cataract diagnosis and surgery.
All hospital stays of the years 2001- 2003 with this diagnosis or procedure are used for investigations. Data are standardized for age and gender and a Bayes' model is applied on the standardized rates.
All together 63,5% of the persons with cataract diagnosis and 63,82% of the persons with cataract surgery were female in 2002. After standardization for age there was no significant difference between genders, but there was a significant difference between public and private hospitals concerning length of stay. The health care supply in cataract and cataract surgery varies highly between districts.
The rates are comparable to those from studies in USA and Australia. On the one hand the use of routine hospital data causes some limits to the investigations; on the other hand the completeness of these data allows geographical comparisons and reflects weaknesses and strengths of the Austrian health care system. The model can be applied to every possible diagnosis and procedure.

1. INTRODUCTION
Cataract is the leading cause of blindness and cataract surgery one of the most common interventions worldwide [1]. The 5 year incidence rate varies between 5% and 7% for people aged 50 years and older [2]. For this reason the health care supply in this field should be as exhaustive as possible.
The MBDS (Minimum Basic Data Set) [3] provides a coded and exhaustive description of all hospital stays and as a consequence a description of the health care use and surgical care for cataract.
This study aims to describe the regional distribution of health care utilisation, need and supply for cataract regarding type of hospital, age and gender of the patients and length of stay.

2. METHODS
According to the ICD-10 all Austrian residents with cataract diagnosis (H25.-, H25.0, H25.1, H25.2, H25.8, H25.9, H26.-, H26.0, H26.1, H26.2, H26.3, H26.8, H26.9, H28.-, H28.0, H28.1, Q12.0) and procedure MEL (medical single procedure) 1554 (cataract surgery with implantation of an intraocular lens) and MEL 1555 (extra capsular cataract surgery with controlled suck- flush treatment) of the years 2001- 2003 in public hospitals were selected for investigations. The same data are available from private hospitals for 2002.
Investigations for regional variability are done on the district level (121 districts).
Hospitals are clustered in central care units, main (focus) care units, extended basic care units, basic care units, low basic care units and other care units.
For regional comparisons indirect standardization for age and gender is done. The Austrian population is used as reference population. Standardized relative risks are calculated and tested according to [4]. Regional investigations are done on persons' level, hospital investigations on patients' level (i.e. one person can be a patient several times).
The use of a Bayes' approach allows modelling the influence of districts' neighbourhood, hospitals' distance and hospitals' capacity. Calculations are done with WinBugs14.

Spatial data are visualized with the assistance of the geographical information system RegioGraph7.

3. RESULTS

3.1. Descriptive statistics

48443 of persons had a cataract diagnosis in public hospitals in 2001, 47797 in 2002 and 48502 in 2003.
The numbers of cataract surgeries for this years and type of hospital were 38963, 39567 and 41067. There were 5100 admissions with cataract diagnosis and 4819 procedures in private hospitals in 2002. All together 63,5% of the persons with cataract diagnosis and 63,82% of the persons with cataract surgery were female in 2002. The average age for procedures was about 73,88 (+-10,56) and didn't vary between genders. After standardization for age there was no significant difference between genders (Table 1). The rates didn't vary over years.

IR for cataract and cataract surgery in 2003 for public hospitals						
	Diagnoses			Surgery		
Age Group	IR men	IR women	total IR	IR men	IR women	IR total
0-50	0,03	0,02	0,03	0,03	0,02	0,02
50-55	0,24	0,17	0,21	0,21	0,15	0,18
55-60	0,47	0,37	0,42	0,4	0,32	0,36
60-65	0,85	0,82	0,84	0,71	0,69	0,7
65-70	1,32	1,51	1,42	1,08	1,27	1,18
70-75	2,41	2,73	2,59	2,04	2,33	2,2
75-80	4,06	4,14	4,11	3,51	3,56	3,54
80-85	6,28	6,99	6,78	5,43	5,92	5,77
85-90	3,75	3,56	3,61	3,1	2,94	2,98
90-95	4,08	3,31	3,49	3,32	2,6	2,76
95+	2,23	2,14	2,16	1,59	1,49	1,51
overall IR	0,46	0,74	0,6	0,39	0,63	0,51
standardized IR/ proportion	1,03		n.s.	1,03		n.s.
IR for cataract and cataract surgery in 2001 for public hospitals						
overall IR	0,46	0,74	0,6	0,36	0,6	0,49
standardized IR/ proportion	1,04		n.s	1,05		n.s.
IR for cataract and cataract surgery in 2002 for public hospitals						
overall IR	0,45	0,73	0,6	0,37	0,61	0,49
standardized IR/ proportion	1,03		n.s.	1,04		n.s.

Table 1: Distribution of cataract and cataract surgery for age and gender

3.2 Regional comparisons of health care use and supply for cataract in Austria

Standardized hospitalisation rates (SHR) were calculated for public and private hospitals together in 2002. The correlation between the standardized rates for diseases and procedure over the districts is between 0,8 and 0,9. Significant regional differences exist for cataract and procedure.

	2001 pub	2002 pub	2002 priv	2002 total	2003 pub
Correlation SHR cataract*SHR catrarct surgery	0,891*	0,916*	0,993*	0,899*	0,932*

highest value SHR catarct	2,35	2,28	4,47	2,08	2,3
	Vöcklabruck	Vöcklabruck	Graz (Stadt)	Vöcklabruck	Vöcklabruck
highest value SHR MEL cataract	1,63	1,82	4,62	1,65	2,21
	St. Pölten (Stadt)	St. Pölten (Stadt)	Graz (Stadt)	St. Pölten (Stadt)	Vöcklabruck
lowest value SHR cataract	0,51	0,53		0,6	0,5
	Feldbach	Fürstenfeld		Oberpullendorf	Feldbach
lowest value SHR MEL cataract	0,53	0,41		0,56	0,55
	Feldbach	Fürstenfeld		Fürstenfeld	Feldbach
* Spearman-Rho, (p<0,01)					

Table 2: Highest and lowest values of the SHR of cataract and procedure in 2002

Figure 1: SHR of cataract and procedure for Austrian districts in 2002

3.3 Comparison of health care use and supply between hospitals

145 public hospitals performed the MBDS in 2001 and 144 in 2002. The documentation of the 38 private hospitals is available for 2002, too. 30 of the public and 5 of the private hospitals have a department of ophthalmology and optometry (Table 3).

The average length of stay was 4,21 in public and 2,97 in private hospitals. The SHR of cataract surgery in private hospitals shows a high health care supply of these units in towns (Figure 2). Central care units and main care units have usually a department of ophthalmology and do most cataract procedures. Many private hospitals without department of ophthalmology do cataract surgery (Table 4).

	2001	2002	2002 private	2003
# hospitals	145	144	38	140
# departments of ophthalmology (% of all diagnoses) (% of all procedures)	29 (91,23%) (95,44%)	29 (90,98%) (94,45%)	4 (30,87%) (31,47%)	29 (85,66%) (94,17%)
average # interventions in departments of ophthalmology	1483,5	1480,1	476,5	1580,5
# hospitals with at least one diagnosis	136	132	24	127
# hospitals with at least one procedure	41	40	18	39

Table 3: hospitals with department of ophthalmology in Austria

Figure 2: SHR of cataract surgery in Austria's private (left) and public (right) hospitals in 2002

		central care units	main (focus) care units	extended basic care unit	basic care unit	low basic care unit	others
department of ophtalmology	yes	20723 (10)	20378 (13)	3700 (7)	0	0	1196 (3)
	no	0	1 (4)	753 (4)	1432 (5)	1865 (4)	2718 (11)

Table 4: hospital types and cataract surgery in 2002

3.4 A model approach for the interaction between districts' and hospitals' health care supply

Small populations in some districts can cause a bias to the results. To get shrinkage of the rates towards the overall mean for districts with small sample sizes a Bayes' model is applied to the data [5]. Further the influence of the nearest hospital is included in the model using capacity (number of beds) and distance (hospital in the same district or not) as factors. The investigations are in progress.

4. DISCUSSION

The results have been compared to results from studies [2] in USA and Australia. There is a higher hospital surgical care supply in Austria. But the variability between districts shows that there is still low supply in some regions. Since socioeconomic factors, like income situation and educational standard [6], have an impact on cataract disease, the use of the MBDS causes some limits to the investigations. Further there is no unique key available on the persons' level. Investigations are done once on the patients' level, for getting information about the health care use and twice on the persons' level, using age, gender, postal code and citizenship as reference key. This may cause some bias to the results for health care need and supply.

On the other hand, the completeness of routine hospital data allows geographical comparisons and reflects weaknesses and strengths of the Austrian health care system. Significant differences in health care supply between private and public hospitals have been found.

Cataract is examined because it is one of the most common diagnoses in Austria, but the model can be applied to every possible diagnosis or procedure.

[1] West SK. Epidemiologic aspects of age-related cataract. In: Tasman W, ed. Philadelphia: Lipincott Williams & Wilkins, 2004

[2] Panchapakesan J, Mitchell P, Tumuluri K, Rochtchina E, Foran S, Cumming RG. Five year incidence of cataract surgery: the Blue Mountains Eye Study. Br J Ophthalmol. 2003 Feb;87(2):168-72.

[3] http://www.bmgf.gv.at ; 02.09.2004.

[4] Breslow NE, Day NE. Statistical Methods in Cancer Research, Vol 2. 1987.

[5] Thomas A, Charlin B. Late Detection of brest cancer and colorectal cancer in Minnesota counties: an application of spatial smoothing and clustering. Statistics in Medicine 2003; 22:113-127

[6] Anonymous. Risk factors associated with age-related nuclear and cortical cataract: a case-control study in the Age-Related Eye Disease Study, AREDS Report No. 5. *Ophthalmology* 2001; 108 (8):1400-1408.