The Nordbaden Project for Health Care Utilization Research in Germany: Database Characteristics and First Application

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Abstract

With a population of 82.5m, Germany represents the largest health care market in Europe. Yet, research into epidemiology, resource utilization, and actual cost associated with specific disorders has been hampered by the fragmentation of the national health care system.

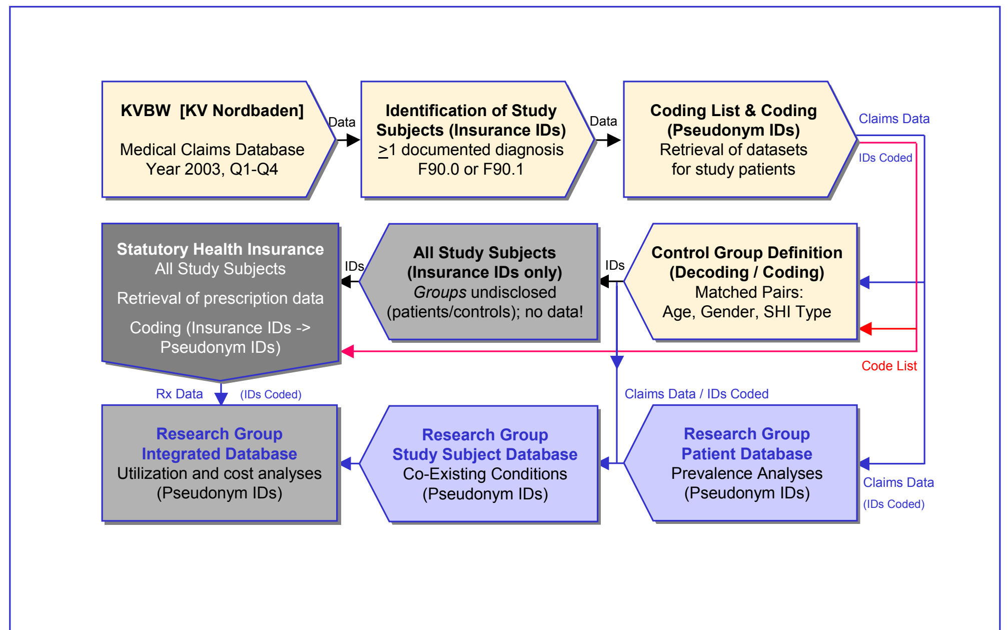
Objectives: 1. To establish an integrated claims database in the German region of Nordbaden, allowing retrospective patient-based analyses; 2. to evaluate how representative the selected sample may be considered for Germany as a whole; and 3. to assess its potential by determining administrative prevalence rates of ADHD.

Methods: The complete claims database of the official physicians' organization of Nordbaden (KVNB) in South-Western Germany for the four quarters of 2003 was first coded to protect the privacy of patients and physicians, and subsequently integrated and restructured according to patient pseudonyms, as to allow patient and disease specific cross-sectional analyses. Sociodemographic and health care related characteristics of the sample population were compared with data for West Germany, East Germany, and Germany as a whole. One-year prevalence rates were determined for attention-deficit/hyperactivity disorder (ADHD).

Results: Claims data for 2.238m persons insured by the SHI (82.2% of the regional population; cf. Germany: 70.4m or 85.3% SHI insured) were available, representing – as judged by key sociodemographic and medical indicators (some of which are presented) – the German SHI insured population. ADHD (hyperkinetic disorder: ICD-10, F90.0, F90.1) prevalence rates were: age 0-6: 1,26% (boys: 1.72%, girls: 0.77%), age 7-12: 4.97% (boys: 7.15%, girls: 2.66%), age 13-19: 1.31% (males: 1.91%, females: 0.60%), and adults: 0.04% (males: 0.04%, females: 0.03%).

Conclusions: Especially when combined with data from regional hospitals and sick funds, databases like the "Nordbaden Project" will provide a valuable tool for studies of real-world health care utilization and direct medical costs associated with defined medical conditions. Specific findings on ADHD are discussed in light of international epidemiological data.

Design



Database Characteristics

- **Retrospective Database Analysis**
  - Claims database from KV Nordbaden / Germany
  - N=2.238m individuals covered by Statutory Health Insurance (SHI)
- **Case Control Technique**
  - For examination of co-morbidity, health care utilization, and attributable medical costs (ongoing analyses)
  - Matched pairs (by age, gender, health insurance)
- **Cross-Sectional Study**
  - Integrating patient-related data (from all four quarters of 2003)
- **Study & Data Transfer Protocols**
  - Including prospectively defined Data Analysis Plans
  - Approved by KVNB Data Protection Officer

Population ↓

[2003]	Nordbaden	Germany
Population		
Total number	2.723m	82.537m
Insured by SHI ("GKV")	2.238m (82.2%)	70.422m (85.3%)
Of those:		
Male/female ratio	0.88 / 1	0.88 / 1
Age 0-6 years	150,476 (6.7%)	4.470m (6.4%)
Age 7-12 years	141,857 (6.3%)	4.166m (5.9%)
Age 13-19 years	175,663 (7.9%)	5.722m (8.1%)
Age ≥20 years	1.770m (79.1%)	56.064m (79.6%)

Physicians →

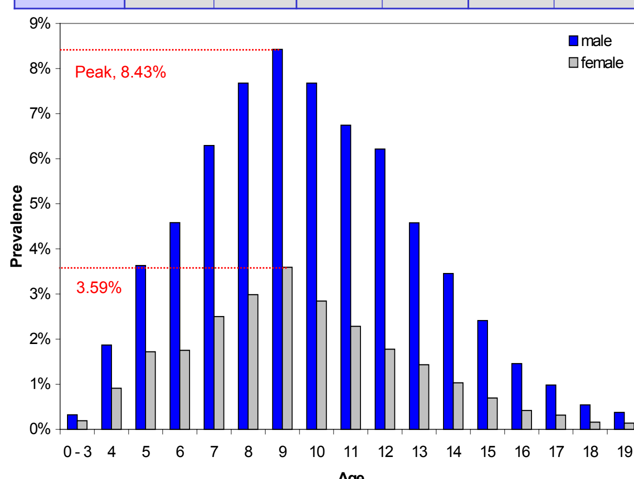
[2003]	Nordbaden	Germany
Physicians (g.p.'s & all specialties)		
Total number	4,905	127,711
No. / 100,000 insured persons	219.1	181.4
Practitioners ("APIs")		
Total number	2,102	70,747
No. / 100,000 insured persons	93.9	86.3
Pediatricians		
Total number	211	6,093
No. / 100,000 insured persons	9.3	8.7
Child & Adolescent Psychiatrists		
Total number	30	519
No. / 100,000 insured persons	1.3	0.7

First Application: Attention-Deficit/Hyperactivity Disorder (ADHD)

- **ADHD Group**
  - All SHI insured patients in the region of Nordbaden with at least one diagnosis "Hyperkinetic Disorder" (ICD-10, F90.0) and/or "Hyperkinetic Conduct Disorder" (ICD-10 F90.1) during 2003
- **Control Group (Matched Pairs Technique)**
  - For each F90.0/F90.1 patient, a control patient with similar demographic characteristics (age, gender, type of statutory health insurance) was randomly identified
- **For both patient groups,**
  - the complete claims dataset was available from the KV database (including demographic data, diagnoses, all medical services rendered by physicians and psychologists and covered by SHI)

Prevalence

	Overall Prevalence		Male		Female	
Age group	%	n	%	n	%	N
0-6 Years	1.26%	1,893	1.72%	1,329	0.77%	564
7-12 Years	4.97%	7,046	7.15%	5,215	2.66%	1,831
13-19 Years	1.31%	2,306	1.99%	1,789	0.60%	517
≥20 Years	0.04%	630	0.04%	345	0.03%	285
Total	0.53%	11,875	0.83%	8,678	0.27%	3,197



Physicians Involved

Child & Adolescent Psychiatrists (CAPs) and Pediatricians

Age group		Subjects with ADHD	Subjects with ADHD seen in 2003 by a Child & Adolescent Psychiatrist			Subjects with ADHD seen in 2003 by Pediatrician		
[years / gender]		n	n	%	95% CI	n	%	95% CI
0 - 6		1,893	290	15.3%	13.7% - 17.0%	1,308	69.1%	67.0% - 71.2%
hereof:	male	1,331	219	16.5%	14.5% - 18.6%	920	69.1%	66.6% - 71.6%
	female	562	71	12.6%	10.0% - 15.7%	388	69.0%	65.0% - 72.8%
7 - 12		7,046	2,283	32.4%	31.3% - 33.5%	3,487	49.5%	48.3% - 50.7%
hereof:	male	5,220	1,745	33.4%	32.1% - 34.7%	2,546	48.8%	47.4% - 50.1%
	female	1,826	538	29.5%	27.4% - 31.6%	941	51.5%	49.2% - 53.8%
13 - 19		2,306	783	34.0%	32.0% - 35.9%	793	34.4%	32.4% - 36.4%
hereof:	male	1,791	600	33.5%	31.3% - 35.7%	617	34.5%	32.2% - 36.7%
	female	515	183	35.5%	31.4% - 39.8%	176	34.2%	30.1% - 38.5%
20 +		630	13	2.1%	1.1% - 3.5%	17	2.7%	1.6% - 4.3%
hereof:	male	356	3	0.8%	0.2% - 2.4%	11	3.1%	1.6% - 5.5%
	female	274	10	3.6%	1.8% - 6.7%	6	2.2%	0.8% - 4.7%
total		11,875	3,369	28.4%	27.6% - 29.2%	5,605	47.2%	46.3% - 48.1%
hereof:	male	8,698	2,567	29.5%	28.6% - 30.5%	4,094	47.1%	46.0% - 48.1%
	female	3,177	802	25.2%	23.7% - 26.8%	1,511	47.6%	45.8% - 49.3%

Specialists (CAPs, Psychiatrists, Neurologists)

Age group		Subjects with ADHD	Subjects with ADHD seen at least once in 2003 by a physician specialist			Subjects with ADHD seen at least four times in 2003 by a physician specialist		
[years / gender]		n	n	%	95% CI	n	%	95% CI
0 - 6		1,893	338	17.9%	16.2% - 19.7%	97	5.1%	4.2% - 6.2%
hereof:	male	1,331	251	18.9%	16.8% - 21.1%	70	5.3%	4.1% - 6.6%
	female	562	87	15.5%	12.6% - 18.4%	27	4.8%	3.2% - 6.9%
7 - 12		7,046	2,773	39.4%	38.2% - 40.5%	1,049	14.9%	14.0% - 15.7%
hereof:	male	5,220	2123	40.7%	39.3% - 42.0%	814	15.6%	14.6% - 16.6%
	female	1,826	650	35.6%	33.4% - 37.8%	235	12.9%	11.4% - 14.5%
13 - 19		2,306	939	40.7%	38.7% - 42.8%	314	13.6%	12.2% - 15.1%
hereof:	male	1,791	723	40.4%	38.1% - 42.7%	241	13.5%	11.9% - 15.1%
	female	515	216	41.9%	36.6% - 46.3%	73	14.2%	11.3% - 17.5%
20 +		630	211	33.5%	29.8% - 37.3%	79	12.5%	10.1% - 15.4%
hereof:	male	356	130	36.5%	31.5% - 41.8%	52	14.6%	11.1% - 18.7%
	female	274	81	29.6%	24.2% - 35.3%	27	9.9%	6.6% - 14-0%
total		11,875	4,261	35.9%	35.0% - 36.8%	1,539	13.0%	12.4% - 13.6%
hereof:	male	8,698	3,227	37.1%	36.1% - 38.1%	1,177	13.5%	12.8% - 14.3%
	female	3,177	1,034	32.5%	30.9% - 34.2%	362	11.4%	10.3% - 12.6%

Discussion

- **General Observations (database-related)**
  - The Nordbaden claims database provides a useful tool for epidemiological and health care utilization research.
- **Specific Observations (ADHD-related)**
  - There is a high administrative prevalence of ADHD in children and adolescents compared to "true prevalence" estimates based on ICD-10, which converge at 1.5 - 2.4%.
  - Most patients (>64%) were not seen by a specialist during 2003.
  - Using a minimum of four annual visits as a proxy, we estimate that a small number of patients (only ~13%) were treated by – or under continuous supervision of – a specialized physician (despite an above-average number of specialists in the Nordbaden region).
  - Among adults, ADHD was rarely diagnosed (/recognized).
- **Hypothesis**
  - *"German physicians use DSM-IV criteria to diagnose ADHD in children and adolescents but are required by administrative system to code according to ICD-10."*
  - This hypothesis receives some preliminary support from a convenience sample of six surveyed German pediatricians.
- **Some Implications**
  - High importance of non-specialists (pediatricians and general practitioners) for care of patients with ADHD.
  - Unexplained mismatch between reported ADHD prevalence rates in children and adolescents and low recognition in the adult population.
- **Some Project Limitations**
  - "Reporting bias"? Underreporting unlikely, given the fee-for-service system; "compliant" reporting (incentives by system).
  - "Formulary bias"? SHI insured patients represent 85% of population.
  - Database limited to the range of services covered by SHI.
  - Claims databases do not provide information on clinical outcomes.