

# Does One Out of Seven Nine-Year Old Boys Suffer from Attention-Deficit/Hyperactivity Disorder (ADHD)? The Increasing Administrative Prevalence of ADHD in Germany, 2003 to 2009

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In our earlier health care utilization studies (for year 2003), we observed an administrative prevalence rate of ADHD in Nordbaden (a region in the South-West of Germany with a population of >2.7 million; cf. Figure 1) of 0.53%, with a peak among nine-year old boys at 8.43%.

## Objectives

The aim of the present study is to establish a longitudinal ADHD patient database and to assess changes of ADHD diagnosis rates by age and gender during years 2003 to 2009.

The database will provide the basis for further in-depth analyses of evolving ADHD-related treatment (including prescribing) and health care utilization patterns in Germany, and of the direct costs attributable to ADHD.

## Methods

Patient-level data were extracted for analysis from the physician-centered claims database of the Kassenärztliche Vereinigung Baden-Wuerttemberg (KV-BaWue: organization of physicians registered with statutory health insurance [SHI]) for the region of Nordbaden, Germany (Figure 1).

The complete claims database was available for analysis, covering the total regional population enrolled in SHI (>2.2 million). Age and gender specific 12-months prevalence rates of ADHD were determined for years 2003 through 2009.

## Results

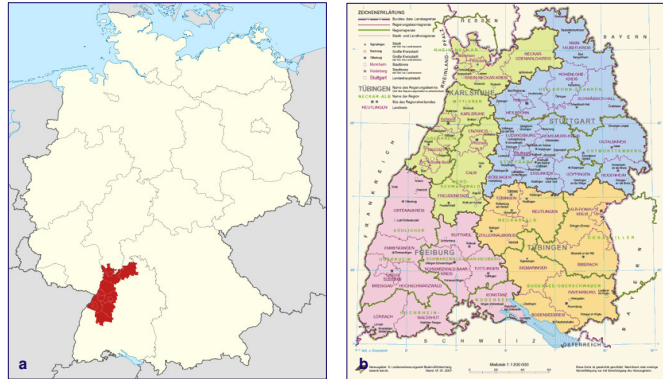
During the seven-year period under study, the overall one-year ADHD prevalence rate increased from 0.53% to 0.95% (Table 1, Figure 2).

ADHD (hyperkinetic disorder: ICD-10, F90.0, F90.1) prevalence rates were highest in the age group 6-12 years (reaching their peak [2009] among nine-year old children, 10.01%; boys, 13.68%), increasing continuously during the observation period (Table 1, Figure 3a).

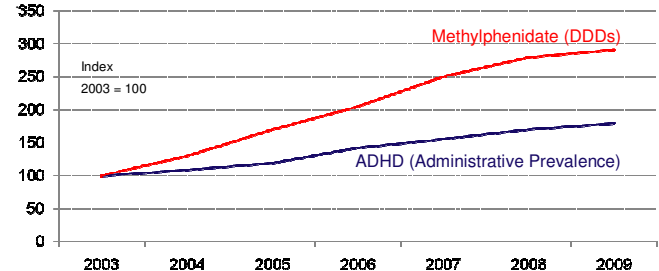
Reported prevalence of ADHD in adults (cf. Figure 3b) remains low given the high rates encountered in children and adolescents, and in light of epidemiological data suggesting persistence of ADHD into adulthood in a large number of patients.

**Table 1:** 12-months prevalence rates for ADHD in Nordbaden / Germany from 2003 to 2009, by age group and gender, separately reported by absence of or coexistence with conduct disorder ("HKD" or "HKCD," respectively).

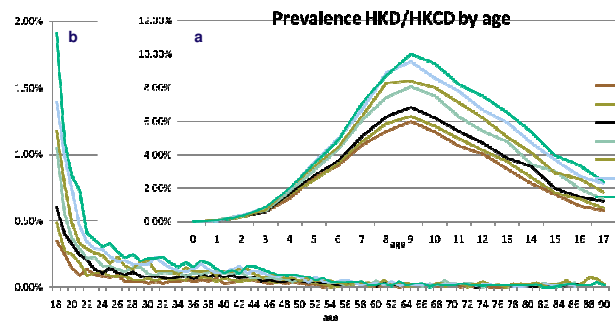
year	gender	0 - 5 years		6 - 12 years		13 - 17 years		18+		total		Total	
		HKD	HKCD	HKD	HKCD	HKD	HKCD	HKD	HKCD	HKD	HKCD	n	%
2003	male	0.87%	0.31%	4.79%	2.11%	1.57%	1.09%	0.04%	0.01%	0.57%	0.27%	8,779	0.84%
	female	0.45%	0.12%	1.87%	0.59%	0.50%	0.25%	0.03%	0.01%	0.20%	0.06%	3,108	0.26%
	total	0.66%	0.22%	3.37%	1.37%	1.05%	0.68%	0.03%	0.01%	0.37%	0.16%	11,887	0.53%
2004	male	0.86%	0.34%	5.01%	2.21%	1.90%	1.21%	0.05%	0.02%	0.61%	0.29%	9,446	0.90%
	female	0.42%	0.15%	2.09%	0.63%	0.57%	0.27%	0.03%	0.01%	0.22%	0.07%	3,426	0.29%
	total	0.65%	0.25%	3.59%	1.44%	1.26%	0.75%	0.04%	0.01%	0.40%	0.17%	12,872	0.57%
2005	male	0.95%	0.30%	5.28%	2.45%	2.31%	1.28%	0.07%	0.02%	0.67%	0.31%	10,293	0.98%
	female	0.48%	0.12%	2.36%	0.64%	0.67%	0.29%	0.05%	0.01%	0.25%	0.07%	3,828	0.32%
	total	0.72%	0.21%	3.86%	1.57%	1.51%	0.80%	0.06%	0.01%	0.45%	0.18%	14,121	0.63%
2006	male	1.05%	0.43%	6.32%	2.83%	2.87%	1.53%	0.10%	0.03%	0.81%	0.36%	12,232	1.17%
	female	0.45%	0.12%	2.82%	0.74%	0.86%	0.36%	0.06%	0.01%	0.30%	0.08%	4,499	0.38%
	total	0.76%	0.28%	4.63%	1.82%	1.89%	0.96%	0.08%	0.02%	0.54%	0.21%	16,731	0.75%
2007	male	1.07%	0.46%	6.67%	2.96%	3.17%	1.70%	0.12%	0.03%	0.86%	0.38%	13,003	1.24%
	female	0.45%	0.15%	3.25%	0.92%	1.06%	0.40%	0.08%	0.01%	0.35%	0.09%	5,256	0.44%
	total	0.77%	0.31%	5.01%	1.97%	2.14%	1.07%	0.10%	0.02%	0.59%	0.23%	18,259	0.82%
2008	male	1.16%	0.49%	7.06%	3.38%	3.66%	2.04%	0.14%	0.03%	0.93%	0.43%	14,223	1.36%
	female	0.47%	0.17%	3.61%	1.05%	1.23%	0.51%	0.09%	0.01%	0.38%	0.11%	5,871	0.49%
	total	0.82%	0.34%	5.38%	2.25%	2.48%	1.30%	0.12%	0.02%	0.64%	0.26%	20,094	0.90%
2009	male	1.16%	0.42%	7.57%	3.47%	4.17%	2.11%	0.18%	0.05%	1.01%	0.44%	15,108	1.44%
	female	0.48%	0.18%	3.72%	1.10%	1.47%	0.55%	0.10%	0.01%	0.41%	0.11%	6,179	0.52%
	total	0.83%	0.31%	5.70%	2.32%	2.86%	1.35%	0.14%	0.03%	0.69%	0.27%	21,287	0.95%



**Figure 1:** Nordbaden (a [left], red; b [right], green), the administrative district of "Karlsruhe" (Regierungsbezirk Karlsruhe) in the German state of Baden-Wuerttemberg, comprises of major parts of the Metropolitan Area Rhine-Neckar (Metropolregion Rhein-Neckar) including the cities of Mannheim and Heidelberg, as well as the urban areas (Stadtkreise) of Karlsruhe and Pforzheim.



**Figure 2:** Number of cases with a diagnosis of ADHD in Nordbaden, 2003 to 2009 (blue; index [2003] = 100) and consumption of methylphenidate (red, DDDs; index [2003] = 100). Source of German methylphenidate consumption data: Schwabe and Paffrath, 2010; specific prescribing analyses for Nordbaden are currently underway.



**Figure 3:** Both in children and adolescents (a) and in the adult population (b) of Nordbaden / Germany, the administrative prevalence of ADHD ("hyperkinetic disorder," with or without concomitant conduct disorder) increased continuously from 2003 to 2009. Age and gender (cf. Table 1) related patterns remained stable during the observation period.

## Conclusions

The administrative prevalence rate of ADHD in Nordbaden / Germany almost doubled during the six-year study period. ADHD was most often diagnosed in children age 6 to 12 years, whereas administrative prevalence remained relatively low in the adult population. From 2003 to 2009, methylphenidate prescriptions in Germany grew even 2.75-fold, thus outpacing the increase in ADHD diagnoses from 2003 to 2009. Further research seems warranted with regard to the underlying dynamics of physician group involvement, quality of health care provision and utilization patterns, and economic implications.

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