

Children and adolescents in the United States with Congenital Adrenal Hyperplasia are not at increased risk for Attention-Deficit/Hyperactivity Disorder

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Introduction

- Congenital adrenal hyperplasia (CAH) due to 21-hydroxylase deficiency is characterized by impaired cortisol synthesis and disruption in the hypothalamic pituitary adrenal (HPA) axis regulation leading to excessive adrenal androgen production (Figure 1) [1].
- HPA axis function has been shown to be closely tied to mental health symptoms. In particular, hypocortisolemia and hyperandrogenism have been linked to Attention-Deficit Hyperactivity Disorder (ADHD) [2-3].
- The only previous study to directly assess the risk for ADHD among pediatric patients with CAH was based on a small sample of children and adolescents (n=54), and reported an increased rate of ADHD in males as compared to the reported prevalence in the general population [3-4].

Figure 1. HPA Axis function in CAH

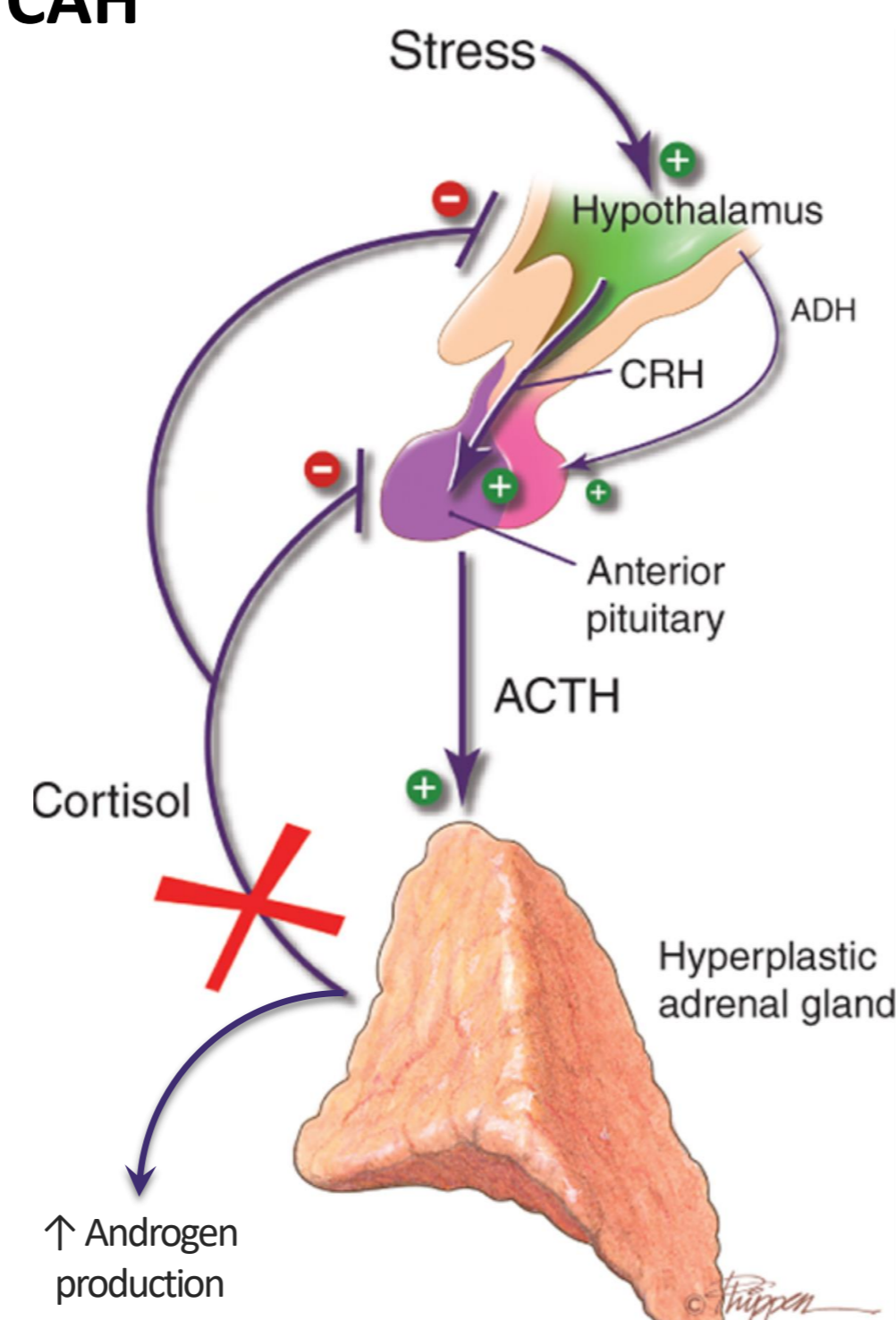


Image adapted from Sarafoglou K, Hoffmann GF, Roth KS. *Pediatric Endocrinology and Inborn Errors of Metabolism*, 2e; 2017

The objective of the current study was to investigate the prevalence of ADHD in large administrative samples of insured children and adolescents with CAH compared to the general pediatric population in the United States.

Methods

- We used the Treatment Pathways® interface to analyze health insurance claims data in the IBM® MarketScan® Commercial and Medicaid Claims Databases.
- Data from all individuals who met the inclusion criteria during the study period were included (Figure 2).
- CAH prevalence was measured as the percentage of children and adolescents with ≥2 claims with E25.0 ICD-10 codes for CAH and ≥2 glucocorticoid prescriptions filled during the study period.
- A comparison group for the general population was created by including all individuals who meet the study inclusion criteria but did not meet the criteria for CAH.
- ADHD prevalence was measured using a published claims-based algorithm [5].
- During analysis, subjects were stratified by enrollment in either an employer-sponsored private (Commercial) or public (Medicaid) insurance plan, and by age (5-11 years vs 12-18 years).
- Odds Ratios (OR) and confidence intervals (CI) were calculated to compare the risk for ADHD in the CAH population with the general population.

Figure 2. Study Inclusion Criteria



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- MarketScan® data are licensed by IBM® to the Centers for Disease Control and Prevention (CDC) for public health use by CDC researchers. The views and findings in this report do not necessarily reflect the official position of the CDC.

Results

- The study period prevalence of CAH in the Commercial and Medicaid samples was 1/9,500 (Table 1) and 1/14,000 (Table 2), respectively.

Table 1. Commercial sample

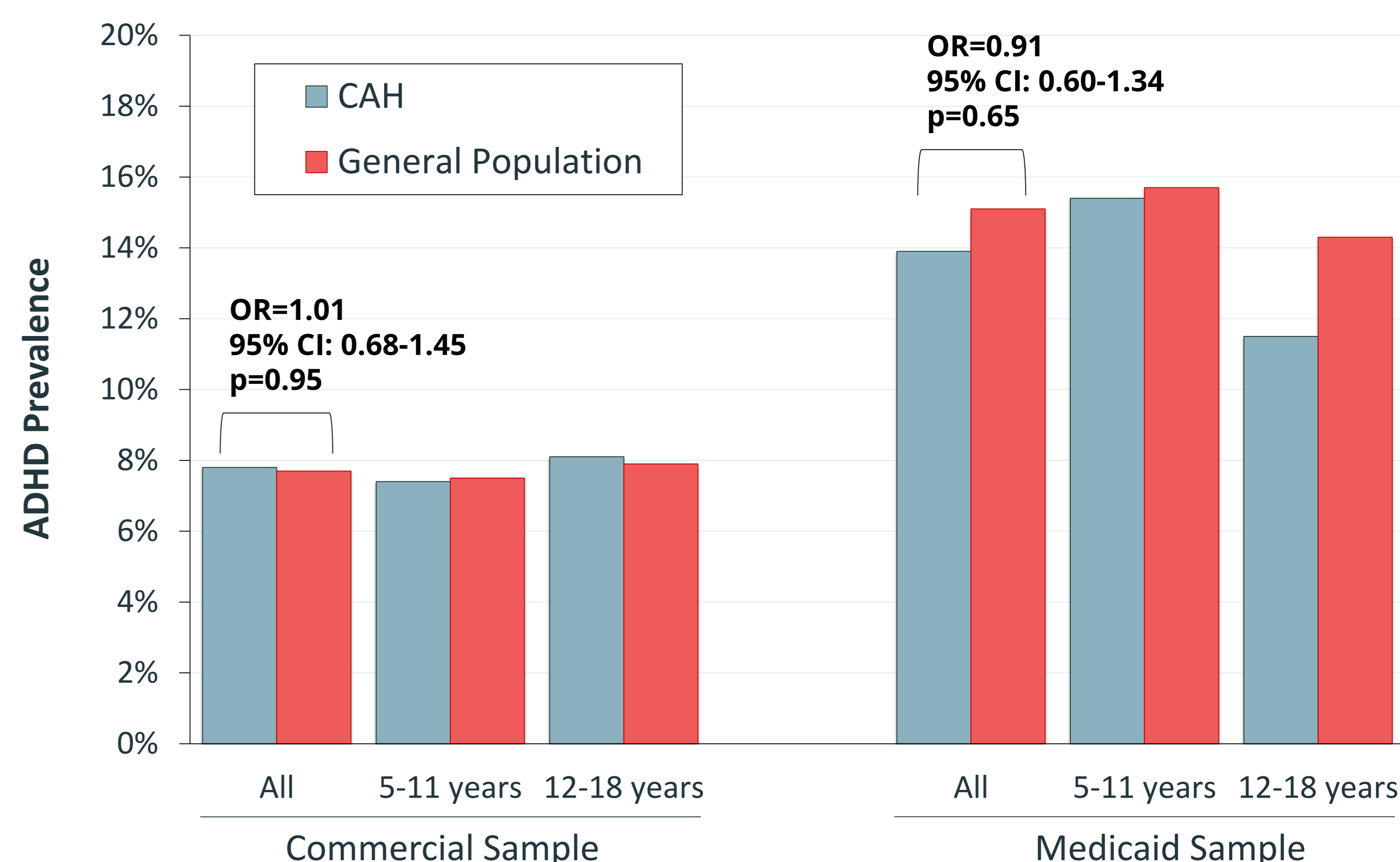
	Total Subjects	Met Criteria for ADHD
General Population		
All	3,532,914	272,685
5-11 years	1,655,679	123,987
12-18 years	1,876,871	148,669
CAH		
All	373	29
5-11 years	176	13
12-18 years	197	16

Table 2. Medicaid sample

	Total Subjects	Met Criteria for ADHD
General Population		
All	2,766,096	418,260
5-11 years	1,602,812	252,351
12-18 years	1,163,284	165,909
CAH		
All	201	28
5-11 years	123	19
12-18 years	78	9

- Overall, ADHD prevalence was higher in the Medicaid sample as compared to the Commercial sample.
- There was no increased risk for ADHD among those with CAH as compared to the general population in either sample (Figure 3).
- ADHD prevalence also did not differ significantly by age (Figure 3).

Figure 3. ADHD prevalence across study subsamples



Conclusion

- Using two large national samples of privately and publicly insured children and adolescents with CAH in the United States, we found that the prevalence of ADHD was comparable to that of the general pediatric population.
- These findings suggest that enhanced screening for ADHD among the pediatric CAH population may not be warranted.
- Our findings are limited by the smaller sample size of subjects who met criteria for CAH.
- Future studies will investigate the relationship between CAH and other common mental health comorbidities among children and adolescents, including depression and anxiety.

References

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