



# Identification of Hearing Loss Among Privately Insured Children in the United States

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## **Disclaimer:**

The opinions expressed in this presentation are solely those of the presenter and do not necessarily represent the official position of the Centers for Disease Control and Prevention.

# Overview

- ❑ Objective
- ❑ Methods
- ❑ Results
- ❑ Strengths & Limitations
- ❑ Future Direction

# Background & Methods

# Early Hearing Loss

- ❑ Hearing loss, when undetected, can delay speech and language development.
  - Early identification → Early enrollment in services
- ❑ Objectives:
  - Determine the number of privately insured children diagnosed with hearing loss in the United States
  - Describe their demographic characteristics
  - Describe their common (if any) co-occurring conditions

# Methods

- Truven Health MarketScan<sup>®</sup> Commercial Claims and Encounters Databases 2010-2014
  - De-identified US patient data
  - Includes inpatient and outpatient services
  - More than 260 contributing employers and 40 contributing health plans

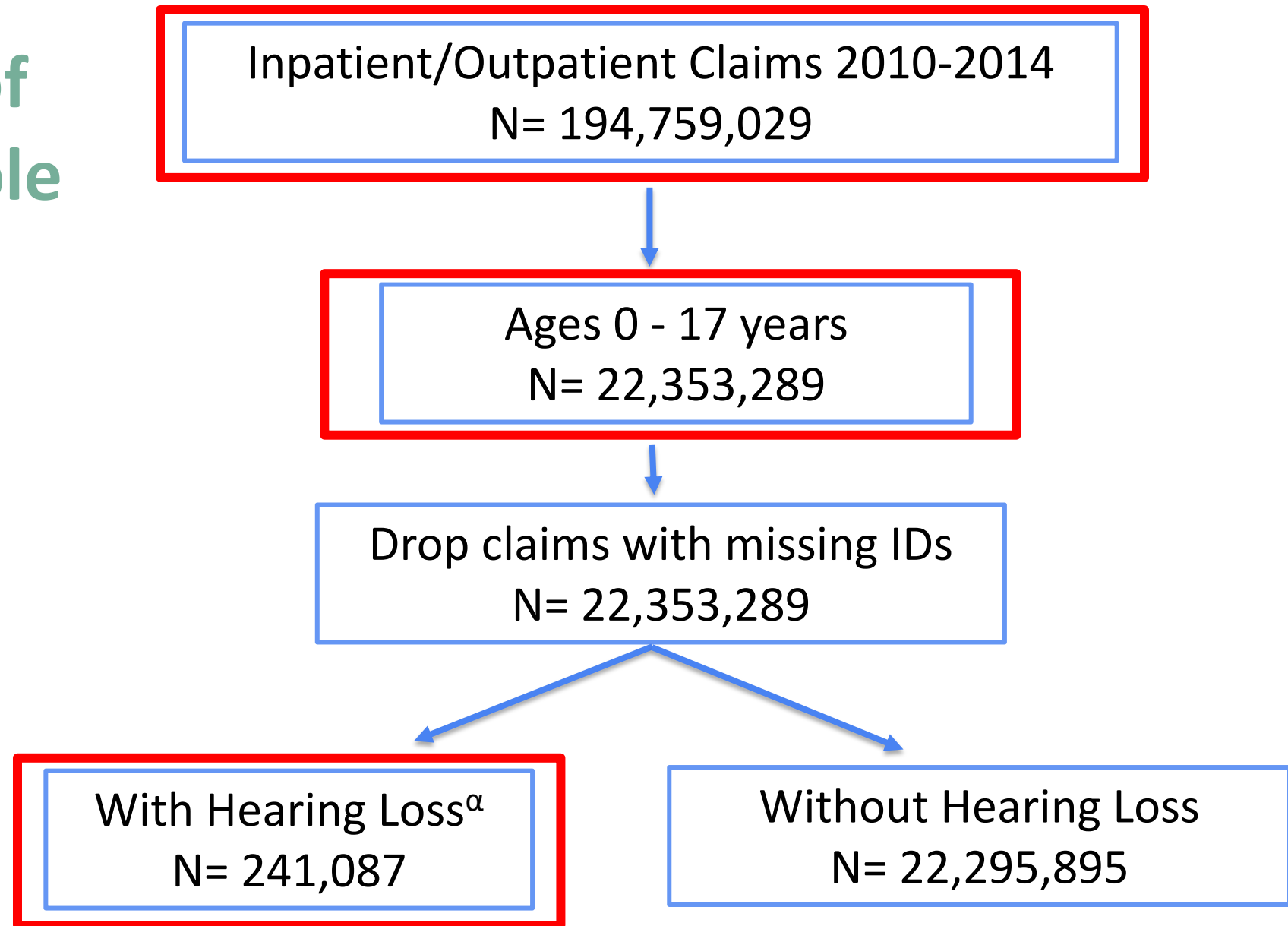
# Methods (*continued*)

- ❑ Children: 0 - 17 years of age
- ❑ Scanned for diagnoses of hearing loss
  - Case definition of hearing loss
    - 2 claims with a hearing loss diagnosis ICD-9-CM<sup>α</sup> code
    - 1 claim with a hearing aid or cochlear implant CPT<sup>β</sup> or HCPCS<sup>β</sup> code

<sup>α</sup>ICD-9-CM, International Classification of Diseases, 9th Revision, Clinical Modification

<sup>β</sup>CPT Current Procedural Terminology; HCPCS, Healthcare Common Procedure Coding System, American Medical Association (AMA)

# Flowchart of Study Sample



<sup>α</sup>ICD-9-CM, CPT and HCPCS codes for hearing loss (389.xx, 794.15, 794.16), hearing aid services (92590-92596, 92620-92621, 92630, 92700, 99002, 99499, V5010-V5011, V5014, V5090, V5110, V5160, V5241, V5050, V5060, V5130, V5140, V5247, V5253, V5257, V5261, V5264-V5267, V5275, V5299) and cochlear implant services (69949, 69930, 92510, 92601-92604, L8614-L8624, L8627-L8629)

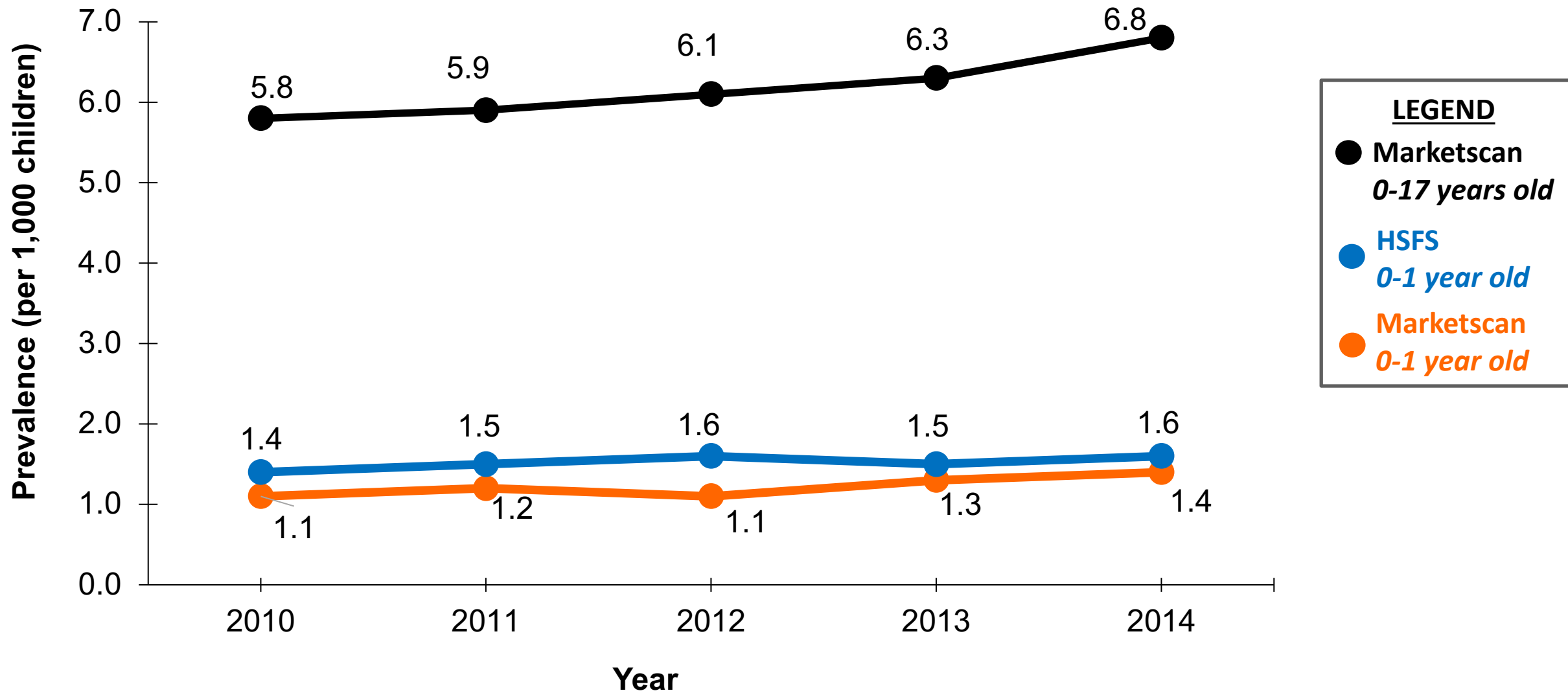


**Results**

**Table 1. Demographic characteristics of privately insured children with and without hearing loss (Truven Health MarketScan® Commercial Databases, 2010-2014)**

Characteristic	Hearing Loss (N = 241,087)		No Hearing Loss (N = 22,295,895)	
	n	%	n	%
<b>Gender</b>				
Male	136,870	56.8%	11,331,744	50.8%
Female	104,217	43.2%	10,964,151	49.2%
<b>Age in years (Mean ± SD)</b>	6.2 ± 4.9		8.0 ± 5.6	
<b>Age group (years)</b>				
0-3	87,697	36.4%	6,232,665	28.0%
4-7	66,997	27.8%	4,397,281	19.7%
8-11	42,265	17.5%	4,490,851	20.1%
12-15	32,046	13.3%	4,728,992	21.2%
>15	12,082	5.0%	2,446,106	11.0%
<b>Census Region</b>				
Northeast	55,867	23.2%	3,934,492	17.6%
Midwest	55,162	22.9%	5,345,109	24.0%
South	84,161	34.9%	8,226,500	36.9%
West	40,122	16.6%	4,357,086	19.5%
Unknown	5,775	2.4%	432,708	1.9%

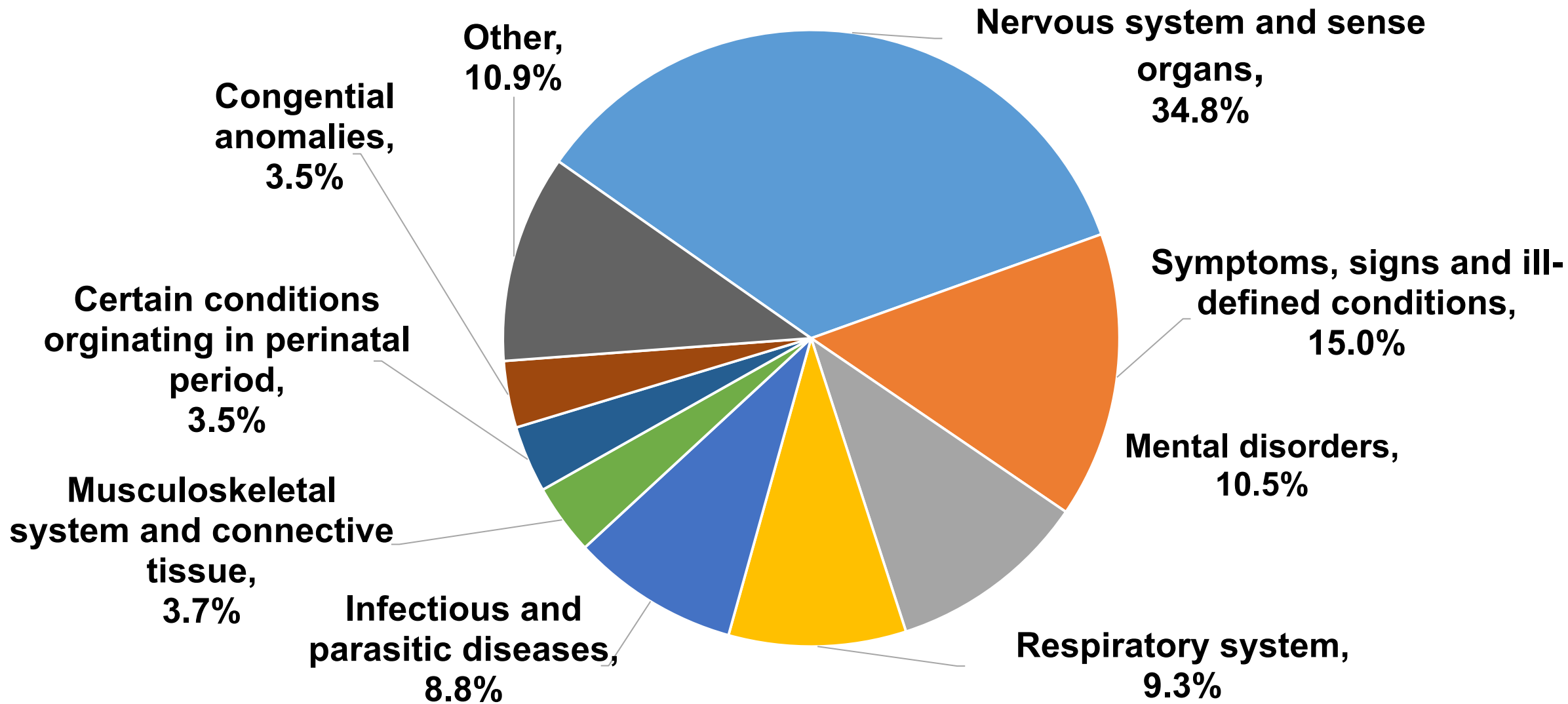
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**Figure 1. Annual prevalence of hearing loss per 1,000 privately insured children (Truven Health MarketScan® Commerical Claims and Encounters Databases, 2010-2014)**

**Table 2. Types of hearing loss related claims among privately insured children with hearing loss (N = 241,087) (Truven Health MarketScan® Commercial Databases, 2010-2014)**

Hearing Loss Variable	n	%
<b>Cochlear implant</b>	5,901	2.4%
<b>Hearing aid related claims</b>	7,568	3.1%
<b>Type of hearing loss</b>		
	<b>n</b>	
Conductive hearing loss	116,044	
Sensorineural hearing loss	65,048	
Mixed conductive and sensorineural hearing loss	12,231	
Deaf, nonspeaking, not elsewhere classifiable	365	
Other specified forms of hearing loss	5,177	
Unspecified hearing loss	80,829	
Abnormal function study	10,286	
Other abnormal auditory perceptions	34,033	



**Figure 2. Co-occurring conditions among privately insured children with hearing loss (N=99,718), by ICD-9 coding group (Truven Health MarketScan® Commercial Claims and Encounters Databases, 2010-2014)**

**Conclusions**

# Main Conclusions

- Identification of hearing loss among privately insured children 2010-2014:
  - Annual prevalence of hearing loss appears to be increasing
  - More males are diagnosed with hearing loss compared to females
  - More children in younger age groups are diagnosed with hearing loss compared to children in older age groups
  - Only a small percentage have a cochlear implant or hearing aid device

# Strengths

- ❑ One of few studies looking at:
  - Prevalence of hearing loss in children
  - Co-occurring conditions with hearing loss
- ❑ Large sample size – representative of Americans with employer-provided health insurance



# Limitations

- ❑ Large convenience sample
- ❑ Includes individuals with large self-insured employer health plans
- ❑ Case definition is based on billing codes – cannot be validated using medical records

**Future Direction**

## Future Direction

- ❑ Compare Truven Health MarketScan<sup>®</sup> Medicaid Claims Databases
- ❑ Compare Truven Health MarketScan<sup>®</sup> Commercial Claims and Medicaid Claims Databases 2015-2016
- ❑ Further investigate co-occurring conditions
  - Investigate common conditions within ICD-9 categories
  - Compare to children without hearing loss

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