



Co-Occurrence of Hearing Loss and Mental Disorders 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.

Learning Objectives

By the end of the session, participants should:

- Summarize the co-occurrence of hearing loss and mental disorders among privately insured children using individual-level claims data.
- Compare demographic characteristics of deaf and hard of hearing children, children with mental disorders, and deaf and hard of hearing children with mental disorders.
- Describe the strengths and limitations of using administrative data and how it can support national and statewide EHDI efforts.

Background

Hearing Loss

- Prevalence
 - 1 to 3 out of 1,000 infants are deaf or hard of hearing (D/HH)
 - 5 out of 1,000 children aged 3-17 years (NHIS 1997-2005)
- Undetected hearing loss delays speech, language, social & academic development



Mental Health and Hearing Loss

- Deaf and hard of hearing (D/HH) children at risk for problems with cognitive, emotional, behavioral, and motor development
- Prevalence of mental health problems
 - 2-4 times higher than children without hearing loss
- Early identification may help improve care management for D/HH children



Mental Health Among Children

- 13-20% of children experience mental disorders each year
- Diagnosed prevalence by parent report among 3-17 year olds (NSCH 2007)
 - ADHD: 8.9% (ever); 6.8 (current)
 - Anxiety: 4.7% (ever); 3.0% (current)
 - Behavioral or conduct problems: 4.6% (ever); 3.5% (current)
 - Depression: 3.9% (ever); 2.1% (current)
 - Tourette syndrome (6-17 year olds): 0.3% (ever); 0.2% (current)

Objective

- To assess demographic characteristics and the co-occurrence of mental disorders among privately insured children diagnosed with hearing loss in the United States



Methods

Methods

- Truven Health MarketScan® Commercial Databases 2012-2014
- Inclusion criteria: aged 3-17 diagnosed with hearing loss with or without mental disorder
- Variables
 - Demographics: age, gender, region
 - Hearing loss
 - Mental disorder

Case Definitions Based on ICD-9-CM*

■ Hearing Loss

- 2 claims with a hearing loss code or 1 claim with a hearing aid or cochlear implant procedure/service code

■ Mental Disorder

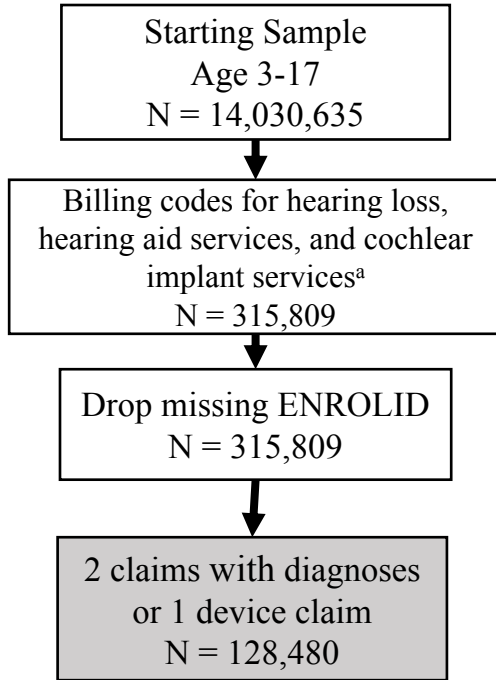
- Included attention-deficit/hyperactivity disorder (ADHD); oppositional defiant disorder or conduct disorder (ODD/CD); depression; anxiety, obsessive compulsive disorder (OCD); post-traumatic stress disorder (PTSD); tic disorder
- 2+ outpatient claims or 1 inpatient claim with a diagnosis code for any of these mental disorders

*ICD-9-CM, International Classification of Diseases, 9th Revision, Clinical Modification

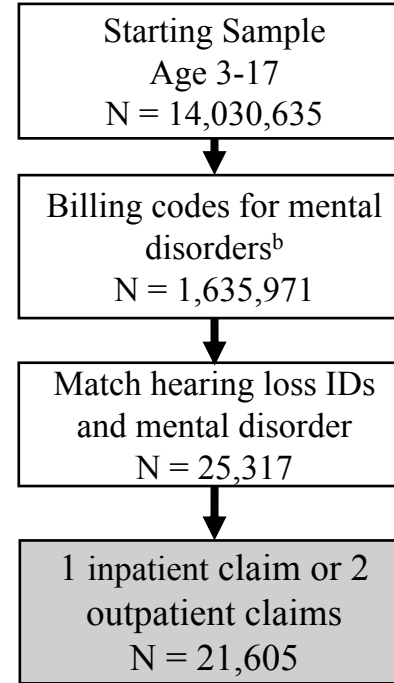
Results

MarketScan Flowchart

All Hearing Loss



Hearing Loss and Mental Disorder



^aICD-9-CM, CPT and HCPCS codes for hearing loss (389.xx), 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 (92510, 92601-92604, L8614, L8616-L8622)

^bICD-9-CM codes for Attention-Deficit/Hyperactivity Disorder (314.xx); Oppositional Defiant Disorder or Conduct Disorder (312.8x, 312.9, 313.81); Depression (296.2x, 296.3x, 300.4, 311); Anxiety, Obsessive Compulsive Disorder, or Post-Traumatic Stress Disorder (300.0x, 300.3, 301.4, 309.21, 309.81); and Tic Disorder (307.2x)

Hearing Loss Among Privately Insured Children

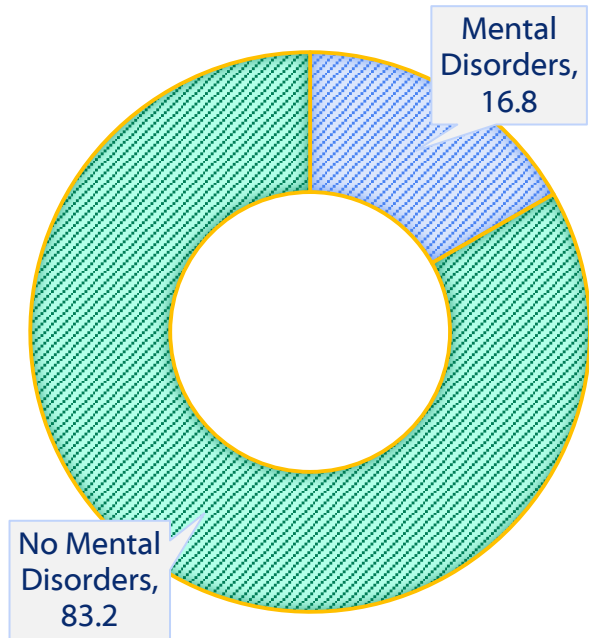
Table 1. Demographic characteristics of privately insured babies with hearing loss and co-occurring mental disorders, Truven Health MarketScan® Commercial Databases, 2012-2014.

Characteristic	Hearing Loss Only		Hearing Loss & Mental Disorder		All Hearing Loss	
	n	%	n	%	n	%
Sample size	106875	83.2%	21605	16.8%	128480	100.0%
Mean Age ± SD	8.1 ± 4.2		9.9 ± 3.7		8.4 ± 4.2	
Median Age (IQR)	7.0 (5.0-11.0)		9.0 (7.0-13.0)		8.0 (5.0-12.0)	
Age Groups (years)						
3-6	48665	45.5%	4371	20.2%	53108	41.3%
7-10	27797	26.0%	8362	38.7%	35733	27.8%
11-14	19072	17.8%	5702	26.4%	24857	19.3%
≥15	11450	10.7%	3170	14.7%	14782	11.5%
Gender						
Male	57726	54.0%	13199	61.1%	70925	55.2%
Female	49149	46.0%	8406	38.9%	57555	44.8%
Region						
Northeast	27410	25.6%	5903	27.3%	33323	25.9%
North Central	23197	21.7%	4892	22.6%	28080	21.9%
South	34062	31.9%	6970	32.3%	41033	31.9%
West	19387	18.1%	3183	14.7%	22571	17.6%
Unknown	2819	2.6%	657	3.0%	3473	2.7%

Types of Hearing Loss

Type of Hearing Loss	n	%
Conductive hearing loss	46381	36.1%
Sensorineural hearing loss	26683	20.8%
Mixed conductive sensorineural hearing loss	3291	2.6%
Deaf	72	0.1%
Other specified forms of hearing loss	1179	0.9%
Unspecified hearing loss	24875	19.4%
Abnormal function study	2683	2.1%
Other abnormal auditory perceptios	12426	9.7%

Co-Occurring Mental Disorders among D/HH Children



Mental Disorder Category	n	%
All Mental Disorders	21605	16.8
Attention-Deficit/Hyperactivity Disorder (ADHD)	14897	11.6
Depression	4140	3.2
Anxiety, Obsessive Compulsive Disorder (OCD), or Post-Traumatic Stress Disorder (PTSD)	8288	6.5
Oppositional Defiant Disorder/Conduct Disorder (ODD/CD)	3762	2.9
Tic Disorder	996	0.8

Conclusions

Summary

- Increase awareness of co-occurrence of mental disorders
 - D/HH have greater risk
 - 1 in 6 privately insured D/HH children have co-occurring mental disorders
- Prior 1990's, assessment instruments were not validated for D/HH children and children were rarely interviewed

Summary (continued)

- Important to understand communication needs and health characteristics
 - Appropriate treatment and support
- Improve access to specialized child and adolescent mental health services
- Improve knowledge and understanding among clinicians without experience of treating D/HH children

Strengths

- One of the few studies to look at co-occurrence of hearing loss and mental disorders among privately insured and Medicaid insured children
- Medicaid data inclusive of all children served
- Study approach was more inclusive of claims associated with hearing loss and mental disorder
 - Mental disorder and hearing loss not always on same claim

Limitations

- Cross-sectional design
- Selective of those included in MarketScan data
 - Large convenience sample with mostly large employer data
 - Biases or fail to generalize to other populations
- Diagnoses based on billing codes
 - No medical records for validation
 - Severity of mental disorder not captured
- Despite limitations, complements other data or used as benchmarks

Future Directions

- Expand to Truven Health MarketScan® Commercial Databases 2015-2016
- Compare to Medicaid MAX data
- Investigate other comorbidities or co-occurring conditions
- Prevalence Trends

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Questions



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The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.



Type of Hearing Loss By Condition

Type of Hearing Loss	Hearing Loss Only		Hearing Loss and Mental Health		All	
	n	%	n	%	n	%
Conductive hearing loss	40585	38.0%	117	0.5%	46381	36.1%
Sensorineural hearing loss	22198	20.8%	127	0.6%	26683	20.8%
Mixed conductive sensorineural hearing loss	2698	2.5%	13	0.1%	3291	2.6%
Deaf	59	0.1%	4	0.0%	72	0.1%
Other specified forms of hearing loss	990	0.9%	17	0.1%	1179	0.9%
Unspecified hearing loss	20883	19.5%	376	1.7%	24875	19.4%
Abnormal function study	2231	2.1%	34	0.2%	2683	2.1%
Other abnormal auditory perceptios	8322	7.8%	379	1.8%	12426	9.7%