

Tracking Babies Along the 1-3-6 Journey

# The Tennessee EHDI Information System

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*The mission of the Tennessee Department of Health is to protect, promote and improve the health and prosperity of people in Tennessee*

# Learning Objectives

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- To assess newborn hearing screening coverage, follow-up tests and intervention services for Tennessee babies
- To identify missed screenings, retests, or intervention and retrieve contact information needed for follow-up
- To provide data related support to the Tennessee Department of Health, Newborn Hearing Screening Program (NHS) and its partners

# Presentation Outline

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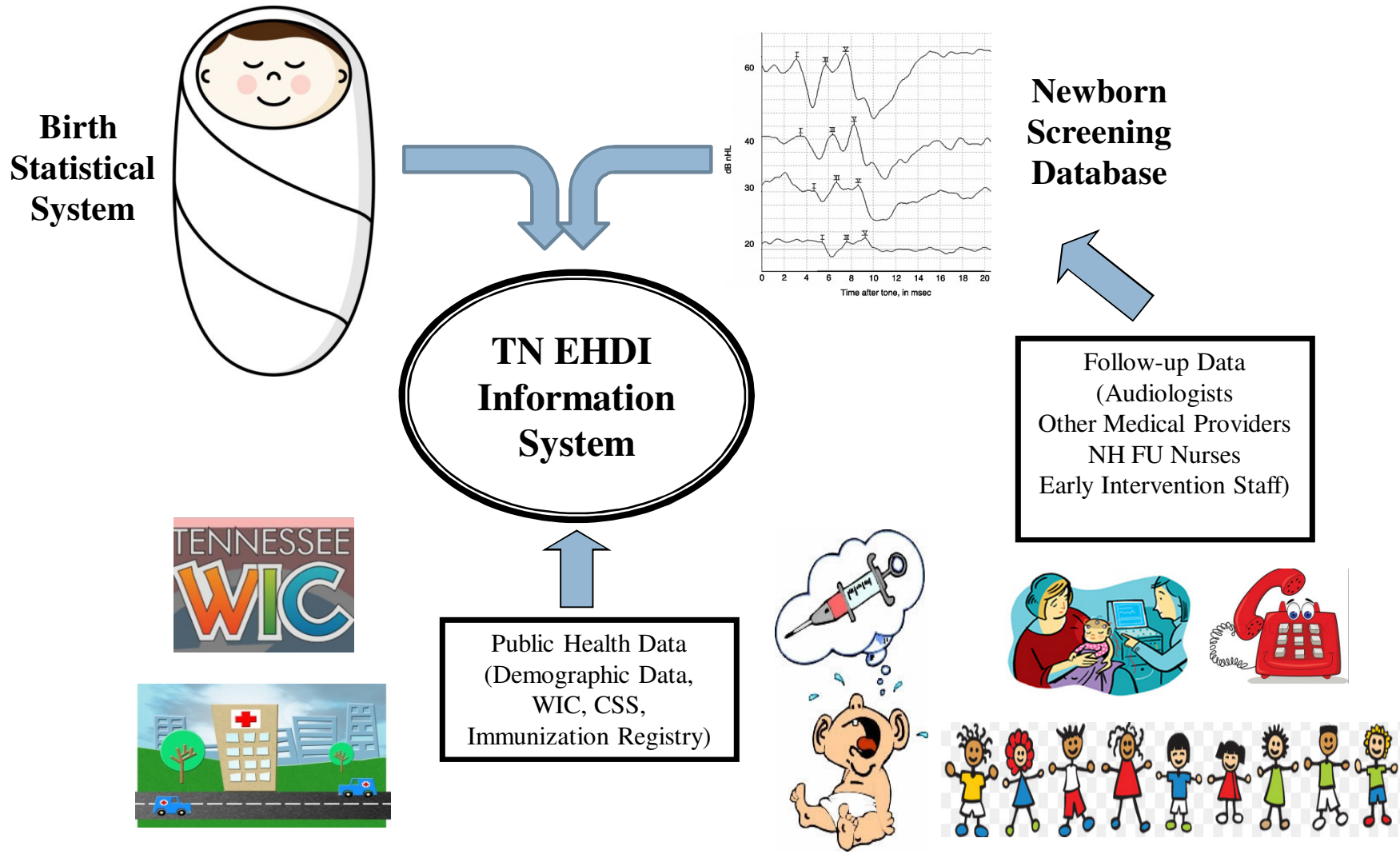
- TN EHDI-IS overview
- Data systems included in the EHDI-IS
- Data linkage process
- Reports generated from the EHDI-IS
- Where TN babies are regarding 1-3-6 goals

# TN EHDI-IS Overview

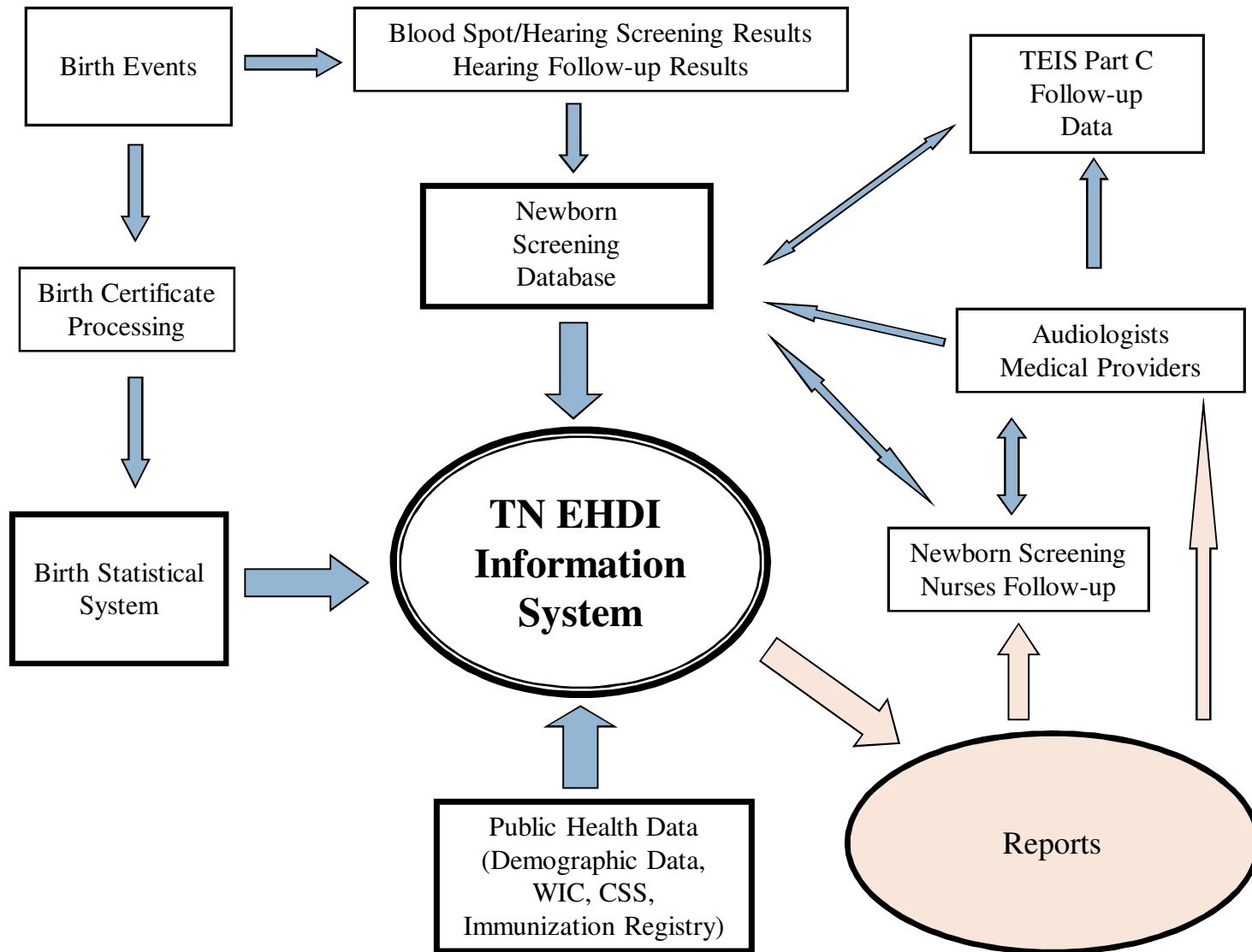
4

- CDC EHDI funded since 2008
- Purposes
  - To assess newborn hearing screening coverage, follow-up tests and intervention services for Tennessee babies
  - To identify missed screenings, retests, or intervention; to retrieve contact information needed for follow-up
  - To provide data related support to the Tennessee Department of Health, Newborn Hearing Screening Program (NHS) and its partners

# TN EHDI-IS at a Glance



# TN EHDI-IS Flow Chart



# Data Systems included in EHDI-IS

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- Birth statistical system (BSS)
  - Office of Health Statistics
  - Direct access
  - Daily updates
  - 1,500-2,000 records/week or ~90,000/year
  - No delay in data access
  - 2-4 weeks after birth events

# Data Systems Cont.

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- Newborn screening records
  - Real time, direct access
  - 1,500-2,000 records/week or ~95,000/year
  - No delay in data access
  - No data entry delay when hearing results submitted on blood spot form
  - Some delay if hearing results submitted separately



# Data Systems Cont.

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- Public health data
  - Patients utilizing any health department services
    - Base file generated from birth records
    - Updated at any PH service encounter
      - Immunization
      - WIC
      - Primary care services etc.
      - Children Special Services (CSS) – including diagnosis codes
  - Updated demographic and provider info
    - Used for follow-up
  - Monthly updates since 2012

# Data Linkage Process

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- ~ 90,000 births each year – base cohort for follow-up
- ~95,000 newborn screening records (one baby may have multiple records)
- Birth and screening records are linked on
  - ▣ Screening form number
  - ▣ Baby's medical record number
  - ▣ Mother's SSN and baby's birth order and DOB range
  - ▣ Baby's DOB
  - ▣ Other variables used for assessing the match
    - Birth order
    - Birth time
    - Child's and mother's last name
    - Mother's resident or mailing address

# Data Linkage Cont.

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- For 2012 births
  - 99.4% birth records linked to NS records
    - Among non-linked records (551)
      - 36% home births
      - 46% died within 7 days of age (including 2 home births)
  - 99.6% NS records linked to birth records
    - Among non-linked records (317 unique children)
      - 12% home births
      - 65% not screened for hearing loss

# Data Linkage Cont.

12

- Public health data
  - Birth certificate number provided for most records
  - Updated health care provider information
  - Updated mailing address and/or phone number
  - Diagnosis information - helps pick up some hearing loss cases missed by the NS tracking system
  - Linked to selected birth records
    - Without a hearing screening
    - With referred hearing results
    - Pending or LFU to diagnosis

# Data Linkage Cont.

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- Outcomes from public health data (2012 births)
  - 4,000 + with updated phone number or address
  - Picked up 6 HL cases for 2012 births (85 total)

# Reports from EHDI-IS Data

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- Summary reports on
  - # in-state births
  - # and % hearing screening
  - # and % with hearing loss risk factors
  - # and % referrals
  - # and % hearing loss
  - # and % receiving early intervention
  - # and % lost to follow-up

# Reports Cont.

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- Summary reports grouped by
  - Birthing facilities
  - Primary care/attending physicians
  - Demographic characteristics (maternal race, ethnicity, education, resident county or zip codes, etc.)
  - Method and location of follow-up tests
  - Age (at initial screening, diagnosis, and intervention)
- Formats: PDF; Excel; Crystal Reports – flexible

2013 Birth Cohort Summary by Birth Place  
 Births, Hearing Screening and Screening Results  
 By Birthing Facilities  
 Outcome = NotPass for HWNL

The FREQ Procedure

Screen_Rate	Frequency	Percent	Cumulative Frequency	Cumulative Percent
100%	4	5.19	4	5.19
95-99.9%	63	81.82	67	87.01
90-94%	5	6.49	72	93.51
70-89%	2	2.60	74	96.10
21-49%	1	1.30	75	97.40
0-20%	2	2.60	77	100.00



2013 Birth Cohort - with Hearing Screening  
Age at Time of Screening

Birth Place	Total Screened	Before 1 Month		After 1M Before 3M		After 3 Month		Age Unknown	
		Number	%	Number	%	Number	%	Number	%
ATHENS REGIONAL MEDICAL CENTER	418	416	99.5%	1	0.2%	0	0.0%	1	0.2%
BAPTIST DEKALB HOSPITAL	7	6	85.7%	1	14.3%	0	0.0%	0	0.0%
BAPTIST MEM HOSP-UNION CITY	228	225	98.7%	1	0.4%	0	0.0%	2	0.9%
BAPTIST MEMORIAL HOSP MEMPHIS	4,353	4,284	98.4%	58	1.3%	9	0.2%	2	0.0%
BAPTIST MEMORIAL HOSPITAL-TIPT	417	416	99.8%	0	0.0%	0	0.0%	1	0.2%
BLANCHFIELD ARMY COMMUNITY HOS	1,748	1,732	99.1%	5	0.3%	0	0.0%	11	0.6%
BLOUNT MEMORIAL HOSPITAL	748	748	100.0%	0	0.0%	0	0.0%	0	0.0%
CENTENNIAL MEDICAL CENTER	3,044	2,929	96.2%	87	2.9%	24	0.8%	4	0.1%
CLAIBORNE COUNTY HOSPITAL	2	2	100.0%	0	0.0%	0	0.0%	0	0.0%
COOKEVILLE REGIONAL MEDICAL	1,526	1,518	99.5%	3	0.2%	0	0.0%	5	0.3%
CROCKETT HOSPITAL	310	306	98.7%	2	0.6%	0	0.0%	2	0.6%
CUMBERLAND MEDICAL CENTER	637	636	99.8%	0	0.0%	0	0.0%	1	0.2%
DEKALB COMMUNITY HOSPITAL	1	1	100.0%	0	0.0%	0	0.0%	0	0.0%
DYERSBURG REGIONAL MEDICAL CEN	441	436	98.9%	0	0.0%	0	0.0%	5	1.1%
FRI ANGER FAST WOMENS SERVICES	2,507	2,501	99.8%	5	0.2%	0	0.0%	1	0.0%
WYTHE MEDICAL CENTER	1	1	100.0%	0	0.0%	0	0.0%	0	0.0%
WELLMONT BRISTOL REGIONAL MED	850	845	99.4%	2	0.2%	1	0.1%	2	0.2%
WELLMONT HOLSTON VALLEY HOSP	1,091	1,063	97.4%	24	2.2%	3	0.3%	1	0.1%
WILLIAMSON MEDICAL CENTER	1,542	1,536	99.6%	4	0.3%	1	0.1%	1	0.1%
WOMENS WELLNESS & MATERNITY	46	45	97.8%	0	0.0%	0	0.0%	1	2.2%
	<b>82,625</b>	<b>81,242</b>	<b>98.3%</b>	<b>1,065</b>	<b>1.3%</b>	<b>151</b>	<b>0.2%</b>	<b>167</b>	<b>0.2%</b>

**2013 Birth Cohort (Failed Initial Screening) - Retest Results by Time at Test  
Tennessee State Overall  
Diagnosis Summary--Treating FL Cond. HL as HWNL**

	Age at Retest																	
	Age Unknown			<1 Month			1-3 Months			3-6 Months			6-12 Months			>12 Months		
	Number	Row Percent	Col Percent	Number	Row Percent	Col Percent	Number	Row Percent	Col Percent	Number	Row Percent	Col Percent	Number	Row Percent	Col Percent	Number	Row Percent	Col Percent
Missing	1,497	90.7	98.9	63	3.8	5.3	65	3.9	8.6	21	1.3	9.6	5	0.3	8.8	-	-	-
HWNL	12	0.6	0.8	1,095	57.2	92.2	613	32.0	80.7	149	7.8	68.3	37	1.9	64.9	7	0.4	100.0
HearLoss	2	4.3	0.1	1	2.2	0.1	22	47.8	2.9	17	37.0	7.8	4	8.7	7.0	-	-	-
PEND	3	3.7	0.2	13	15.9	1.1	36	43.9	4.7	20	24.4	9.2	10	12.2	17.5	-	-	-
PENDOTH	31	37.8	2.0	15	18.3	1.3	24	29.3	3.2	11	13.4	5.0	1	1.2	1.8	-	-	-
Subtotal	1,545	40.9	100.0	1,187	31.5	100.0	760	20.1	100.0	218	5.8	100.0	57	1.5	100.0	7	0.2	100.0

	All Ages		
	Number	Row Percent	Col Percent
Missing	1,651	100.0	43.7
HWNL	1,913	100.0	50.7
HearLoss	48	100.0	1.2
PEND	82	100.0	2.2
PENDOTH	82	100.0	2.2
Subtotal	3,774	100.0	100.0

**2013 Birth Cohort Summary by Birth Place  
Births, Hearing Screening and Screening Results  
By Birthing Facilities  
Outcome = NotPass for HWNL**

Birth Place	Birth Place ID	Live Births Number	Hearing Screening Number	Hearing Screening %	Pass	Refers	Pct Referred	Risk Number	Risk %	HWNL	Confirmed HL	Fluct. Cond. HL	Incidence per 1,000	Lost to Retest	Enrolled	Enrolled Fluct. HL	Enrolled %
METHODIST MED CTR OAK RIDGE	0109520	587	580	98.8%	541	18	2.9%	42	7.4%	8	0	0	0.00	8	0	0	.
BLOUNT MEMORIAL HOSPITAL	0509020	759	748	98.6%	726	22	2.9%	12	1.6%	12	1	0	1.32	9	1	0	100.0%
SKYRIDGE MEDICAL CENTER	0607922	1,119	1,014	90.6%	973	39	3.8%	11	1.0%	18	0	0	0.00	20	1	0	.
JELICO COMMUNITY HOSPITAL	0710625	200	197	98.5%	191	5	2.5%	10	5.0%	2	1	0	5.00	2	1	0	100.0%
MCKENZIE REGIONAL HOSPITAL	0904225	445	439	98.7%	431	8	1.8%	12	2.7%	5	0	0	0.00	2	0	0	.
NEWPORT MEDICAL CENTER	1504922	187	185	98.9%	177	8	4.3%	6	3.2%	2	0	0	0.00	6	0	0	.
HARTON REGIONAL MEDICAL CENTER	1609823	873	867	99.3%	853	11	1.3%	13	1.5%	4	0	0	0.00	7	0	0	.
CUMBERLAND MEDICAL CENTER	1802222	640	637	99.5%	631	6	0.9%	28	4.4%	3	0	0	0.00	2	0	0	.
METRO NASHVILLE GENERAL HOSP	1909424	484	474	97.9%	439	30	6.3%	6	1.2%	4	0	0	0.00	26	0	0	.
ST. THOMAS MIDTOWN	1909425	6,238	6,177	99.0%	6,108	66	1.1%	348	5.6%	35	7	0	1.12	19	5	0	71.4%
VANDERBILT UNIVERSITY HOSP	1909428	4,551	4,357	95.7%	3,810	533	12.2%	515	11.3%	293	10	0	2.20	204	6	0	60.0%
VANDERBILT UNIVERSITY MEDICAL CENTE	1909429	1	1	100.0%	1	0	0.0%	0	0.0%	0	0	0	0.00	0	0	0	.
SUMMIT MEDICAL CENTER	1909434	1,187	1,140	96.0%	1,087	50	4.4%	9	0.8%	24	1	0	0.84	21	1	0	100.0%
CENTENNIAL MEDICAL CENTER	1909435	3,150	3,044	96.6%	3,021	20	0.7%	40	1.3%	9	2	0	0.63	9	2	0	100.0%
BAPTIST DEKALB HOSPITAL	2106623	7	7	100.0%	7	0	0.0%	0	0.0%	0	0	0	0.00	0	0	0	.
HORIZON MEDICAL CENTER	2202420	396	391	98.7%	378	12	3.1%	1	0.3%	4	0	0	0.00	8	0	0	.
DYERSBURG REGIONAL MEDICAL CENTER	2308121	458	441	96.3%	404	35	7.9%	12	2.6%	18	0	0	0.00	13	0	0	.
VOLUNTEER COMMUNITY HOSPITAL	9204522	357	350	98.0%	330	20	5.7%	6	1.7%	12	0	0	0.00	4	0	0	.
WILLIAMSON MEDICAL CENTER	9402823	1,461	1,406	96.2%	1,379	24	1.7%	5	0.3%	15	5	0	3.42	4	5	0	100.0%
UNIVERSITY MEDICAL CENTER	9508922	849	810	95.4%	797	11	1.4%	17	2.0%	8	0	0	0.00	3	0	0	.
UNKNOWN	9999999	0	87	.	79	8	9.2%	26	.	1	1	0	.	0	0	0	0.0%
		<b>85,580</b>	<b>83,794</b>	<b>97.9%</b>	<b>80,157</b>	<b>3,585</b>	<b>4.3%</b>	<b>3,829</b>	<b>4.5%</b>	<b>2,082</b>	<b>85</b>	<b>3</b>	<b>0.99</b>	<b>1,204</b>	<b>74</b>	<b>1</b>	<b>87.1%</b>

# Crystal Reports - [2013 crystal reports\_summary by hospital id.rpt]

File Edit View Insert Format Database Report Window Help

1110

2013 crystal reports\_summary by hospital id.rpt x

Design Preview x

2013 crystal reports

- 0109520
- 0509020
- 0607922
- 0710625
- 0904225
- 1504922
- 1609823
- 1802222
- 1909424
- 1909425
- 1909428
- 1909429
- 1909434
- 1909435
- 2106623
- 2202420
- 2308121
- 2500020
- 2606822
- 2805221
- 3008422
- 3008423
- 3209224
- 3209225
- 3307720
- 3307723
- 3308239
- 3605620
- 4005122
- 4700000
- 4700028
- 4708821
- 4708824
- 4708832
- 4788249
- 5003623
- 5100010
- 5202721
- 5407524
- 5505022
- 5708524
- 5708526



The Early Hearing Detection and Intervention Program

## Newborn Hearing Screening Report by Individual Birthing Hospital



Date Of Birth Range: 1/1/2013 - 12/31/2013

1909425 ST. THOMAS MIDTOWN

### SCREENS:

Total # Births	<b>6,238</b>
Total # Births with a Hearing Screen	6,183
% with Hearing Screen	99.1
Total # with Hearing Referred	67
% with Hearing Referred	1.1
Total # with Hearing Passed	6,113
% with Hearing Passed	98.9
Total # with Risk Factors	352
% with Risk Factors	5.7

### TYPE OF RISK FACTOR:

Neonatal Indicator Syndrome	254
Family History	1
Craniofacial Anomalies	39
In-utero Infection	13
Any Risk Factors	0
	352

### AGE AT TIME OF TEST:

<= 1 Month of Age	6,093 (98.5%)
1-3 Month of Age	78 (1.3%)
> 3 Month of Age	6 (0.1%)
Unknown Age	6 (0.1%)

### REASON FOR NO TEST:

Not screened/Unable to test	46
Declined	1
Discharged/Transferred	2
Still in Hospital	1
Expired	4

### TEST METHOD:

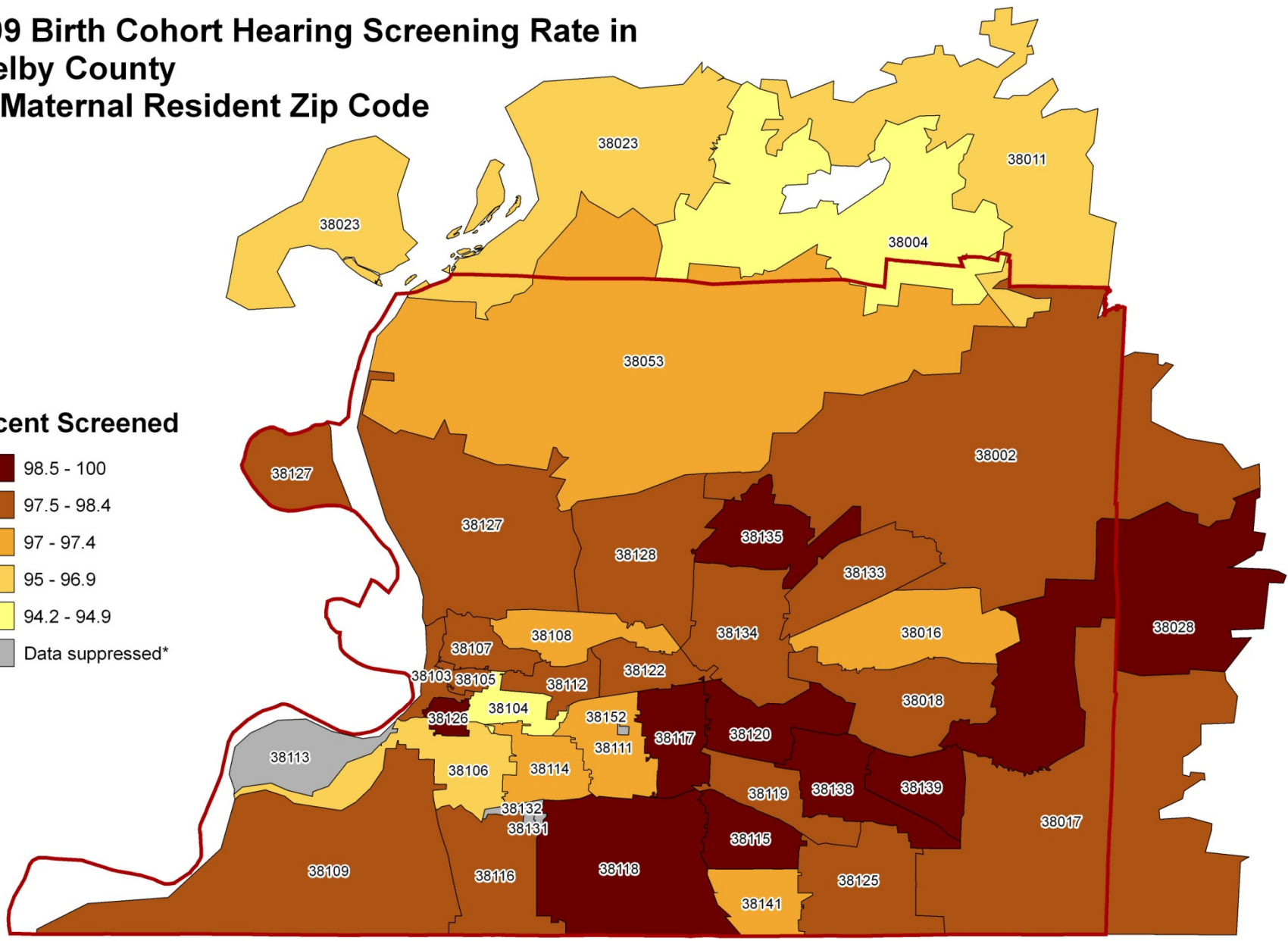
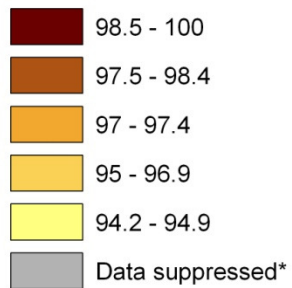
Number of ABR	6,158 (99.6%)
Number of OAE	1 (0.0%)
Number of Both ABR & OAE	23 (0.4%)
Number of Method Unknown	1 (0.0%)

FOLLOW-UP ON RETESTS AND OUTCOMES



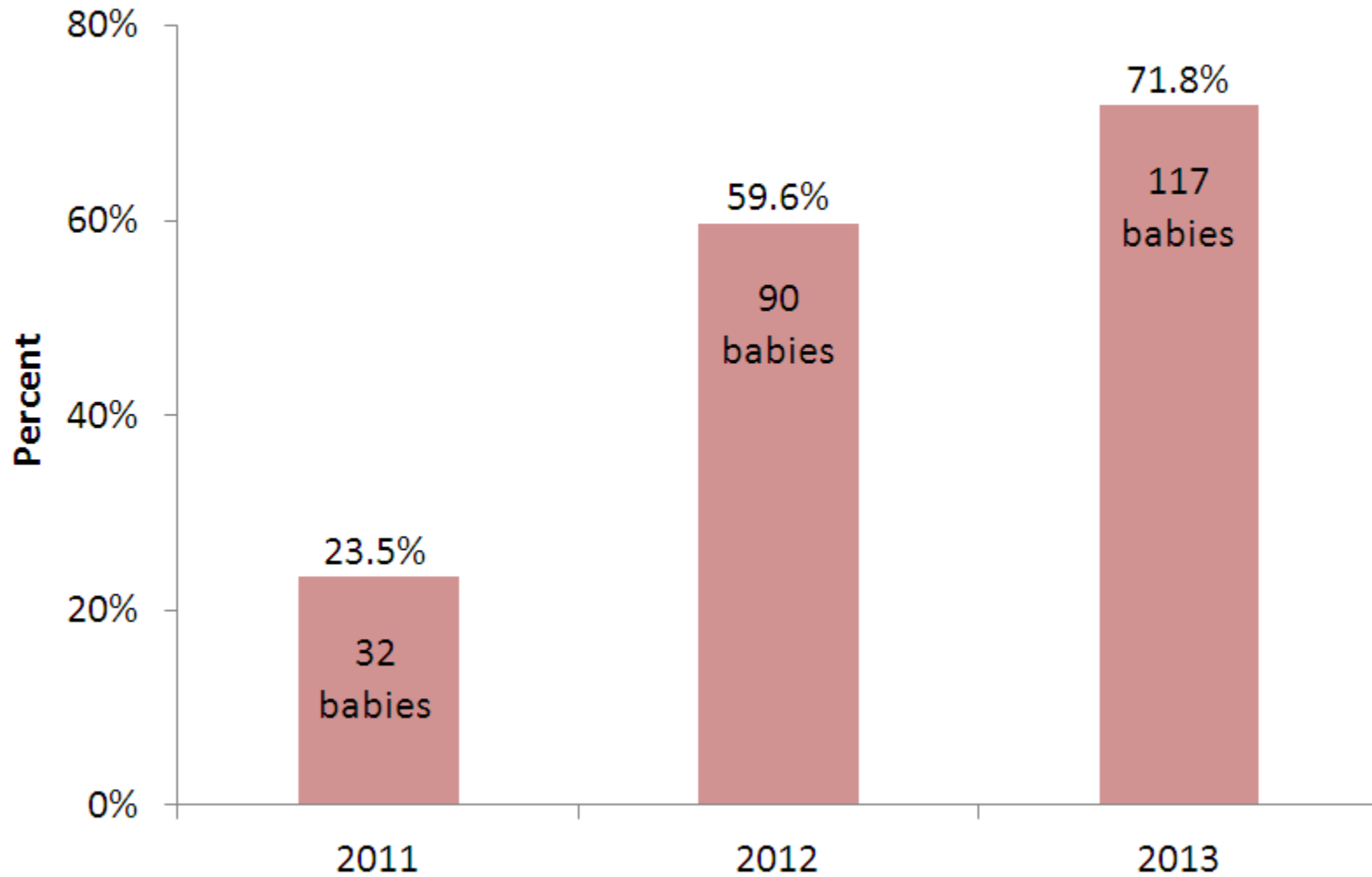
# 2009 Birth Cohort Hearing Screening Rate in Shelby County By Maternal Resident Zip Code

## Percent Screened



\* Data suppressed for zip code areas with 9 or fewer births

## Hearing Screen Among Midwifery Centers w/ OAE Equipment, Tennessee, 2011-2013



# Reports Cont.

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- Individual reports
  - Patient-level information on those who
    - have not received initial hearing screening
    - have risk factors
    - need follow-up tests/diagnosis
    - have confirmed hearing loss



Not screened by hospi

- 0109520
- 0509020
- 0607922
- 0710625
- 0904225
- 1504922
- 1609823
- 1802222
- 1909424
- 1909425
- 1909428
- 1909434
- 1909435
- 2202420
- 2308121
- 2606822
- 2805221
- 3209224
- 3307720
- 3307723
- 3308239
- 3605620
- 4005122
- 4700000
- 4700028
- 4708821
- 4708824
- 4708832
- 4788249
- 5003623
- 5100010
- 5202721
- 5407524
- 5505022
- 5708524
- 5708526
- 6008022
- 6206420
- 6300070
- 6307820
- 6609920
- 6704021
- 7107020
- 7107025
- 7406321
- 7509321
- 7559501

PHa

PHb

Da


Da

Da


Da

Da

PF



**Tennessee Department of Health**  
**Newborn Hearing Screening**  
**Phone 1-855-1357 Fax 615-532-8555**  
**One Ear or Both Ears**  
**Not Screened by Birthing Hospital**  
**Child DOB: 1/1/2013 - 12/31/2013**



Date Report Run: 2/25/2014

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**0109520      METHODIST MED CTR OAK RIDGE      Page 1 of 2**

TDH# Form #	Child's Name Birth Date MRN	Mother's Name City, State	Submit Hearing Test Results			Initial reason for no hearing screen: Transferred, Died or Declined
			Results	Date Method	Risk Factor	
20130311032 E201858	CROSS, KAMDEN 01/24/2013 636990	MARGO CROSS WINFIELD TN	<input type="checkbox"/> Pass (R) <input type="checkbox"/> Refer (R) <input type="checkbox"/> Pass (L) <input type="checkbox"/> Refer (L)	___/___/___ <input type="checkbox"/> ABR <input type="checkbox"/> OAE	<input type="checkbox"/> 1 <input type="checkbox"/> 3 <input type="checkbox"/> 6 <input checked="" type="checkbox"/> 2 <input type="checkbox"/> 4 <input type="checkbox"/> 6 <input type="checkbox"/> A <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> Declined <input type="checkbox"/> Still in Hospital <input type="checkbox"/> Expired <input type="checkbox"/> Transferred <input type="checkbox"/> Other: _____
20132244177 E350481	LADUKE, JACOB 08/05/2013 643002	ASHLEY LADUKE OAK RIDGE TN	<input type="checkbox"/> Pass (R) <input type="checkbox"/> Refer (R) <input type="checkbox"/> Pass (L) <input type="checkbox"/> Refer (L)	___/___/___ <input type="checkbox"/> ABR <input type="checkbox"/> OAE	<input type="checkbox"/> 1 <input type="checkbox"/> 3 <input type="checkbox"/> 6 <input checked="" type="checkbox"/> 2 <input type="checkbox"/> 4 <input type="checkbox"/> 6 <input type="checkbox"/> A <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> Declined <input type="checkbox"/> Still in Hospital <input type="checkbox"/> Expired <input type="checkbox"/> Transferred <input type="checkbox"/> Other: _____
20132254618 E350587	SMITH, COHEN 08/08/2013 643157	BILLIE SMITH OAK RIDGE TN	<input type="checkbox"/> Pass (R) <input type="checkbox"/> Refer (R) <input type="checkbox"/> Pass (L) <input type="checkbox"/> Refer (L)	___/___/___ <input type="checkbox"/> ABR <input type="checkbox"/> OAE	<input type="checkbox"/> 1 <input type="checkbox"/> 3 <input type="checkbox"/> 6 <input checked="" type="checkbox"/> 2 <input type="checkbox"/> 4 <input type="checkbox"/> 6 <input type="checkbox"/> A <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> Declined <input type="checkbox"/> Still in Hospital <input type="checkbox"/> Expired <input type="checkbox"/> Transferred <input type="checkbox"/> Other: _____
20132311026 E350584	DOUGHERTY, LILIANAH 08/13/2013 643295	TIFFANY DOUGHERTY ROCKWOOD TN	<input type="checkbox"/> Pass (R) <input type="checkbox"/> Refer (R) <input type="checkbox"/> Pass (L) <input type="checkbox"/> Refer (L)	___/___/___ <input type="checkbox"/> ABR <input type="checkbox"/> OAE	<input type="checkbox"/> 1 <input type="checkbox"/> 3 <input type="checkbox"/> 6 <input checked="" type="checkbox"/> 2 <input type="checkbox"/> 4 <input type="checkbox"/> 6 <input type="checkbox"/> A <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> Declined <input type="checkbox"/> Still in Hospital <input type="checkbox"/> Expired <input type="checkbox"/> Transferred <input type="checkbox"/> Other: _____
2013231176 E350843	SMITH, JEREMIAH 11/13/2013 646042	WHITNEY SMITH KNOXVILLE TN	<input type="checkbox"/> Pass (R) <input type="checkbox"/> Refer (R) <input type="checkbox"/> Pass (L) <input type="checkbox"/> Refer (L)	___/___/___ <input type="checkbox"/> ABR <input type="checkbox"/> OAE	<input type="checkbox"/> 1 <input type="checkbox"/> 3 <input type="checkbox"/> 6 <input checked="" type="checkbox"/> 2 <input type="checkbox"/> 4 <input type="checkbox"/> 6 <input type="checkbox"/> A <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> Declined <input type="checkbox"/> Still in Hospital <input type="checkbox"/> Expired <input type="checkbox"/> Transferred <input type="checkbox"/> Other: _____

**Risk Factors:**

1. NICU > 5 days 2. Syndrome associated with progressive or late onset HL 3. Family history of permanent childhood hearing loss 4. Craniofacial anomalies including those that involve the pinna, ear canal, ear tags, ear pits or temporal bone anomalies 5. In-utero infections such as CMV, Herpes, Rubella, Syphilis, & Toxoplasmosis	6. ECMO  A. Chemotherapy C. Ototoxic medications or loop diuretics D. Hyperbilirubinemia requiring exchange transfusion	E. Physical findings such as white forelock associated with syndromes known to include SNHL or permanent conductive HL  F. Postnatal culture-positive infections associated with SNHL, including confirmed bacterial and viral (especially Herpes & Varicella) meningitis
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# Reports Cont.

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- Data quality control reports: record-level details where
  - initial screening methods are in conflict with screening results
  - hearing test dates are in conflict with child DOB
  - type/degree of hearing loss is in conflict with final diagnosis
  - disposition codes are in conflict with diagnosis codes
  - other potential issues

1	LINK	C_dob	ABR	L_EAR	R_EAR	Heardt	Screen_HT
2	20130084210	01/03/13	1	0	0	01/03/13	Error_Need Check
3	20130084389	01/06/13	2	0	0	01/07/13	Error_Need Check
4	20130084391	01/06/13	2	0	0	01/07/13	Error_Need Check
5	20130091120	01/05/13	1	0	0	01/06/13	Error_Need Check
6	20130111189	01/08/13	1	0	0		Error_Need Check
7	20130151206	01/10/13	2	0	0	01/10/13	Error_Need Check
8	20130151428	01/07/13	2	0	0	01/09/13	Error_Need Check
9	20130181158	01/14/13	1	0	0	01/15/13	Error_Need Check
10	20130221024	01/19/13	2	0	0	01/20/13	Error_Need Check
11	20130221205	01/17/13	2	0	0	01/19/13	Error_Need Check
12	20130224533	01/20/13	2	0	0	01/21/13	Error_Need Check
13	20130234379	01/21/13	2	0	0	01/22/13	Error_Need Check
14	20130251026	01/20/13	2	0	0	01/21/13	Error_Need Check
15	20130311046	01/24/13	2	0	0	01/25/13	Error_Need Check
16	20130311052	01/24/13	2	0	0	01/26/13	Error_Need Check
17	20130324358	01/29/13	2	0	0	01/31/13	Error_Need Check
18	20130354275	02/01/13	2	0	0	02/02/13	Error_Need Check
19	20130361076	01/30/13	2	0	0	02/01/13	Error_Need Check
20	20130361077	01/30/13	1	0	0	01/31/13	Error_Need Check
21	20130391074	02/04/13	2	0	0	02/06/13	Error_Need Check
22	20130391074	02/04/13	2	0	0	02/05/13	Error_Need Check
23	20130424263	02/06/13	2	0	0	02/08/13	Error_Need Check
24	20130451029	02/05/13	2	0	0	02/07/13	Error_Need Check
25	20130451056	02/09/13	2	0	0	02/10/13	Error_Need Check
26	20130501135	02/13/13	2	0	0	02/15/13	Error_Need Check
27	20130511008	02/14/13	1	0	0	02/16/13	Error_Need Check
28	20130521067	02/17/13	2	0	0	02/18/13	Error_Need Check
29	20130591017	02/21/13	2	0	0	02/23/13	Error_Need Check
30	20130591024	02/22/13	2	0	0	02/24/13	Error_Need Check
31	20130634216	03/01/13	2	0	0	03/02/13	Error_Need Check
32	20130641215	02/26/13	1	0	0	02/27/13	Error_Need Check
33	20130644382	03/03/13	2	0	0	03/04/13	Error_Need Check
34	20130661091	03/01/13	1	0	0		Error_Need Check
35	20130661179	02/28/13	1	0	0	03/01/13	Error_Need Check
36	20130661180	02/28/13	1	0	0	03/01/13	Error_Need Check

1	PATNO	DIAGCODE	DISPOSITION	Type_l	Type_r	Degree_l	Degree_r
2			INITWNL	Within Normal Limits	Within Normal Limits	Within Normal Limits	Within Normal Limits
3			INITWNL	Within Normal Limits	Within Normal Limits	Within Normal Limits	Within Normal Limits
4			INITWNL	Within Normal Limits	Within Normal Limits	Within Normal Limits	Within Normal Limits
5			INITWNL	Within Normal Limits	Within Normal Limits	Within Normal Limits	Within Normal Limits
6			INITWNL	Within Normal Limits	Within Normal Limits	Within Normal Limits	Within Normal Limits
7			INITWNL	Within Normal Limits	Within Normal Limits	Within Normal Limits	Within Normal Limits
8			HEARWNL	Within Normal Limits	Within Normal Limits	Within Normal Limits	Within Normal Limits
9			INITWNL	Within Normal Limits	Within Normal Limits	Within Normal Limits	Within Normal Limits
10			INITWNL	Within Normal Limits	Within Normal Limits	Within Normal Limits	Within Normal Limits
11			INITWNL	Within Normal Limits	Within Normal Limits	Within Normal Limits	Within Normal Limits
12			INITWNL	Within Normal Limits	Within Normal Limits	Within Normal Limits	Within Normal Limits
13			HEARWNL	Within Normal Limits	Within Normal Limits	Within Normal Limits	Within Normal Limits
14				Within Normal Limits	Within Normal Limits	Within Normal Limits	Within Normal Limits
15			EXPIRED	Within Normal Limits	Within Normal Limits	Within Normal Limits	Within Normal Limits
16			AUTOCLOSH	Within Normal Limits	Within Normal Limits	Within Normal Limits	Within Normal Limits
17			INITWNL	Within Normal Limits	Within Normal Limits	Within Normal Limits	Within Normal Limits
18			NOCNTCT	Inconclusive	Inconclusive	Inconclusive	Inconclusive
19			MOVED	Unspecified	Unspecified	Moderate	Moderate
20			NOCNTCT	Pending	Pending	Pending	Pending
21			NOCNTCT	Within Normal Limits	Pending	Within Normal Limits	Unspecified
22			MOVED		Inconclusive		Inconclusive
23			MOVED	Inconclusive	Within Normal Limits	Inconclusive	Within Normal Limits
24			AUTOCLOSH	Inconclusive	Inconclusive	Unspecified	Unspecified
25			AUTOCLOSH	Inconclusive	Inconclusive	Unspecified	Unspecified
26			AUTOCLOSH	Inconclusive	Inconclusive	Unspecified	Unspecified
27			MOVED	Pending	Pending	Inconclusive	Inconclusive
28			AUTOCLOSH	Pending	Pending	Inconclusive	Inconclusive
29			NOCNTCT	Inconclusive	Within Normal Limits	Inconclusive	Within Normal Limits
30			AUTOCLOSH	Within Normal Limits	Fluctuating Conductive	Within Normal Limits	
31			AUTOCLOSH	Unspecified	Within Normal Limits	Unspecified	Within Normal Limits
32			NOCNTCT	Inconclusive	Within Normal Limits	Inconclusive	Within Normal Limits
33			AUTOCLOSH	Inconclusive	Inconclusive	Inconclusive	Inconclusive
34			AUTOCLOSH	Inconclusive	Inconclusive	Inconclusive	Inconclusive
35			AUTOCLOSH		Within Normal Limits	Inconclusive	Within Normal Limits
36							

# Reports Cont.

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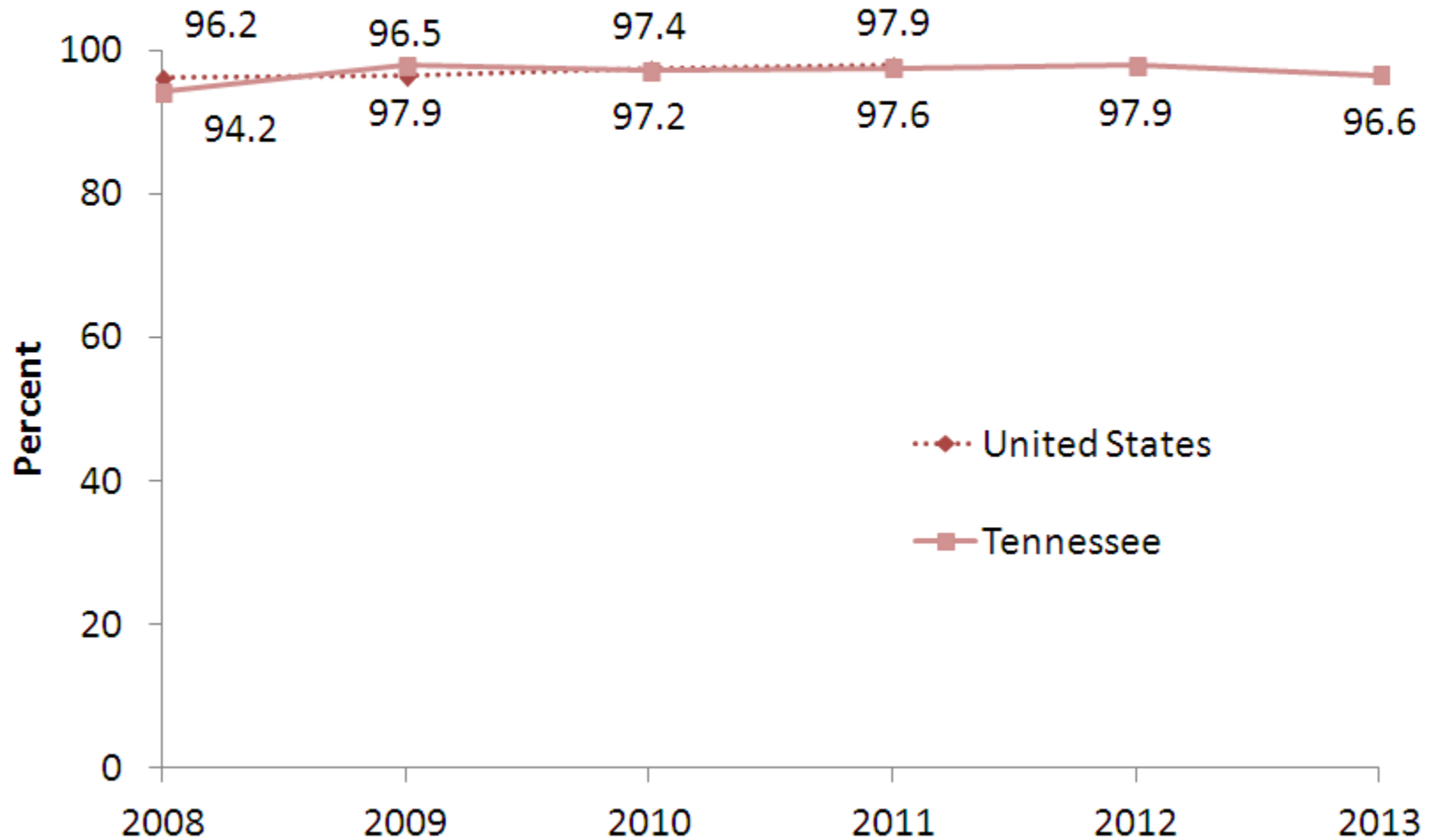
- Report updates
  - Weekly updates
  - Shared on a network drive
  - NHS staff share appropriate reports with partners such as hospitals, audiologists, etc.

# Where We Are on 1-3-6 Goals

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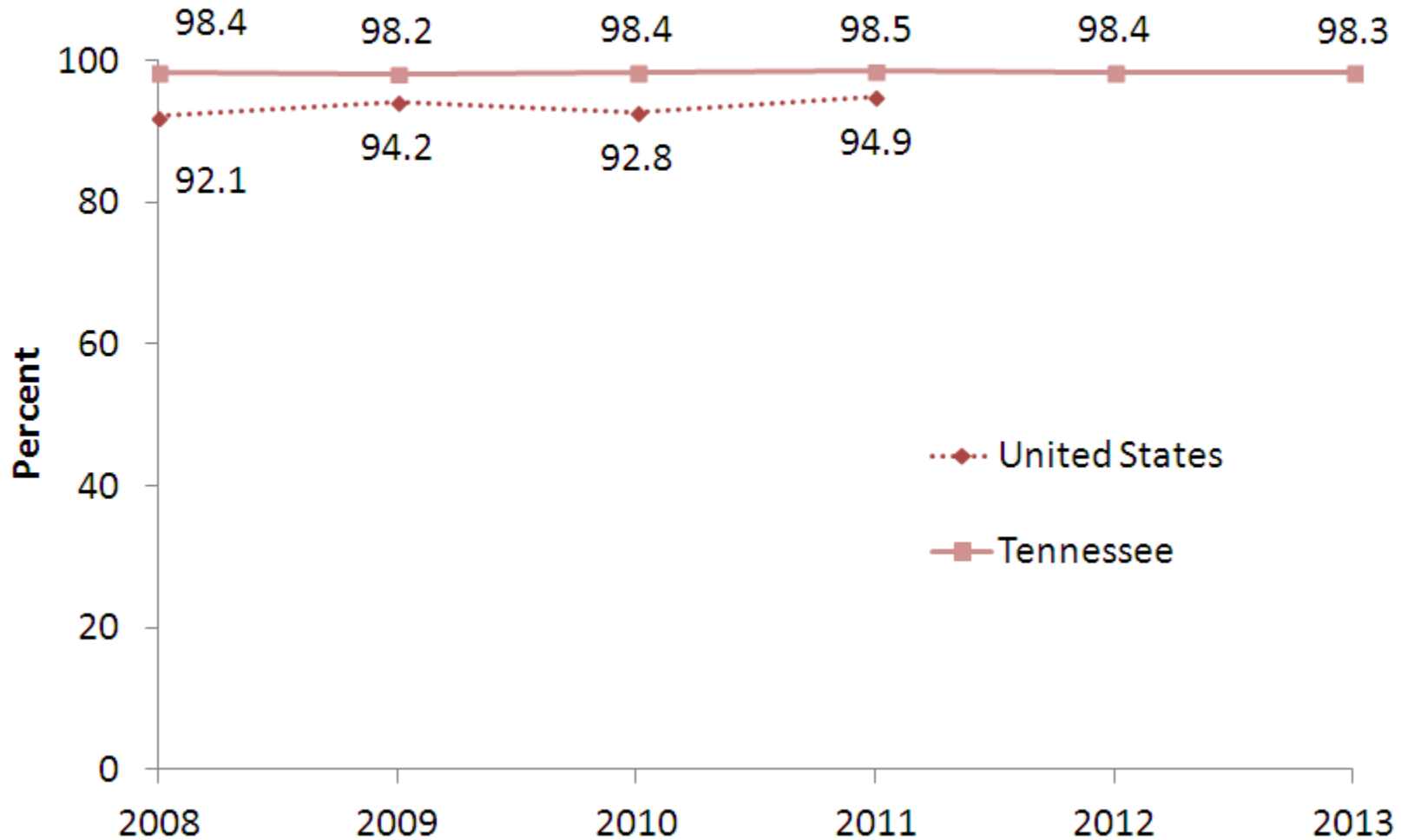
- Screening rate
  - Percent screened within 1 month of age
- Diagnostic follow-up rate
  - Percent diagnosed within 3 months
- Part C enrollment rate
  - Percent enrolled within 6 months

## Rate of Newborn Hearing Screening Tennessee and United States, 2008 to 2013\*



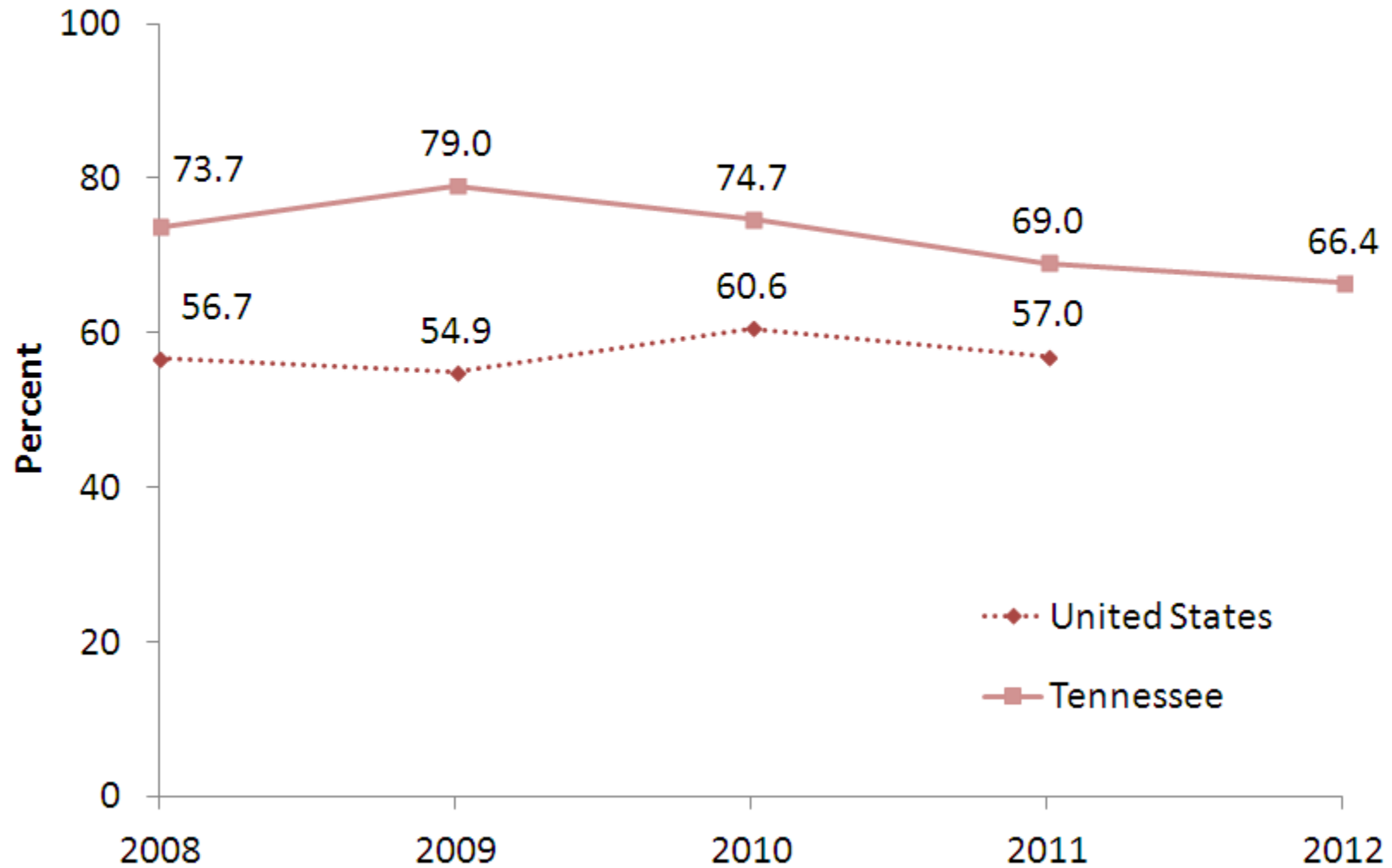
\*2013 data are provisional. Updated Feb 2014

## Newborn Hearing Screening Conducted Before 30 Days of Age Tennessee and United States, 2008 to 2013\*





## Rate of Follow-up to Hearing Diagnosis Among Children Who Failed Initial Screening



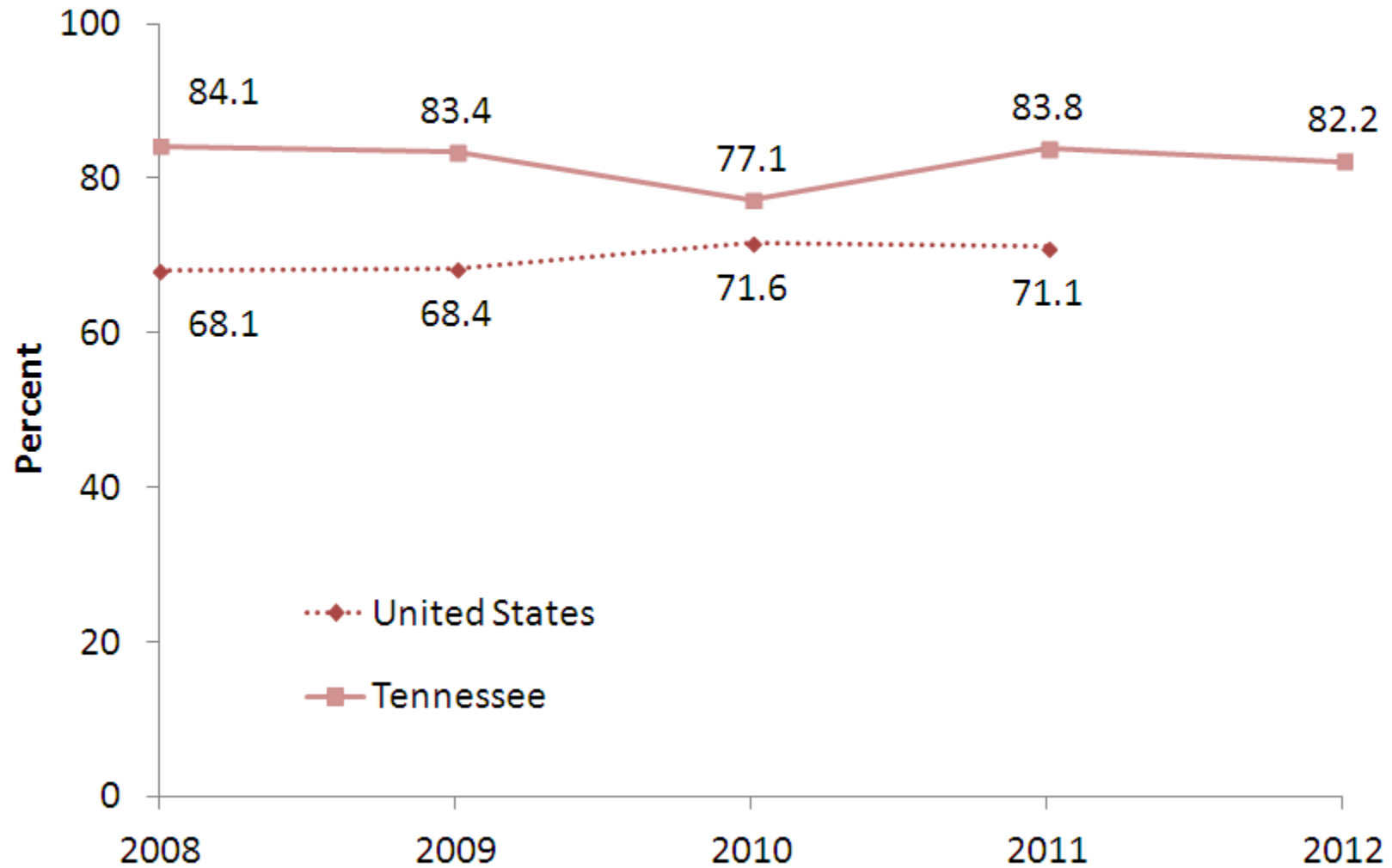
Follow up data as of Feb 2014

Data sources:

US Data: CDC EHCI ([www.cdc.gov/ncbddd/hearingloss/ehdi-data.html](http://www.cdc.gov/ncbddd/hearingloss/ehdi-data.html))

TN Data: TN EHCI-IS

## Diagnosis Received Before 3 Months of Age Among Children with a Diagnosis (HL and HWNL)



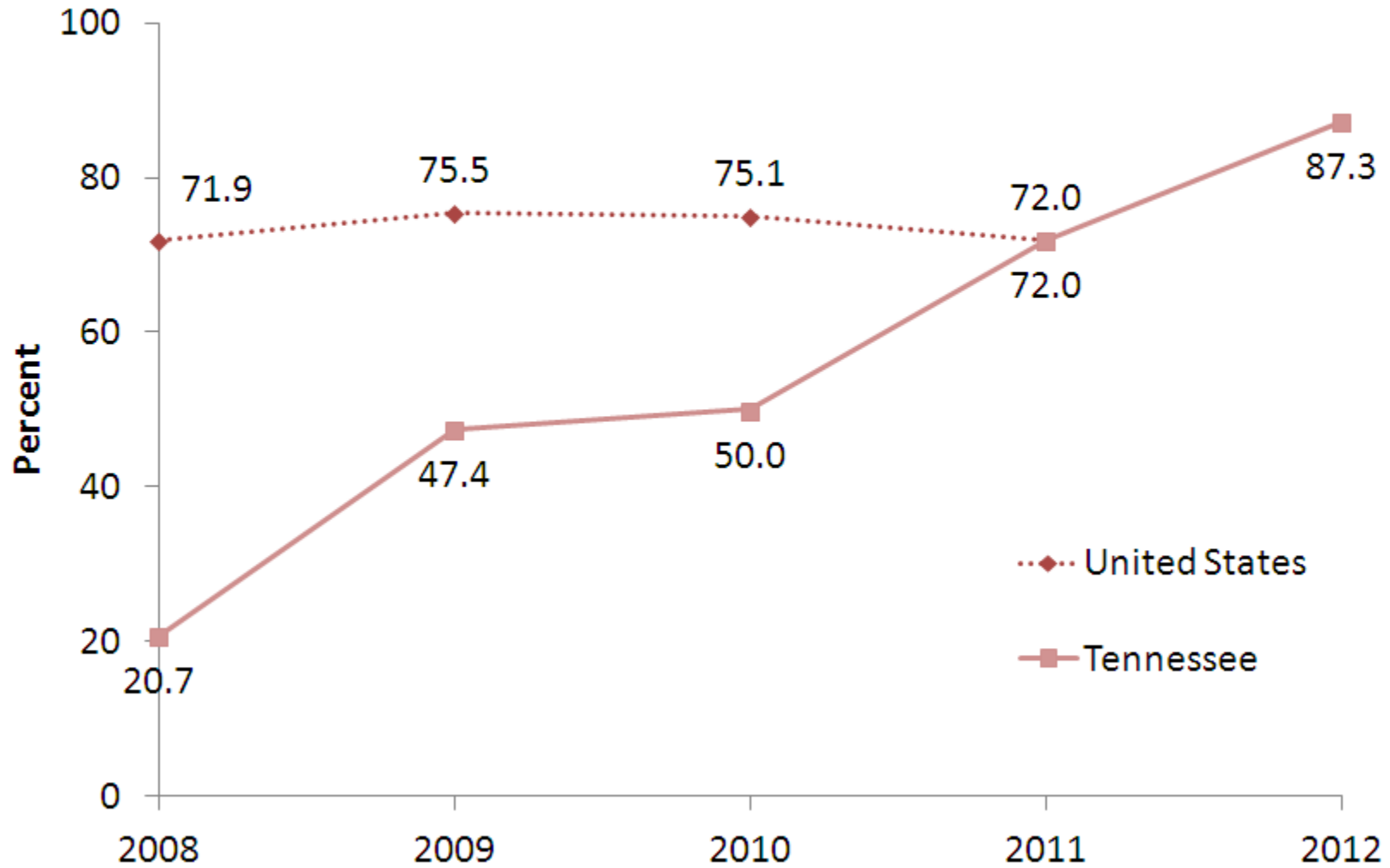
Follow up data as of Feb 2014

Data sources:

US Data: CDC EHDI ([www.cdc.gov/ncbddd/hearingloss/ehdi-data.html](http://www.cdc.gov/ncbddd/hearingloss/ehdi-data.html))

TN Data: TN EHDI-IS

## Rate of Follow-up to Early Intervention Among Children with Hearing Loss



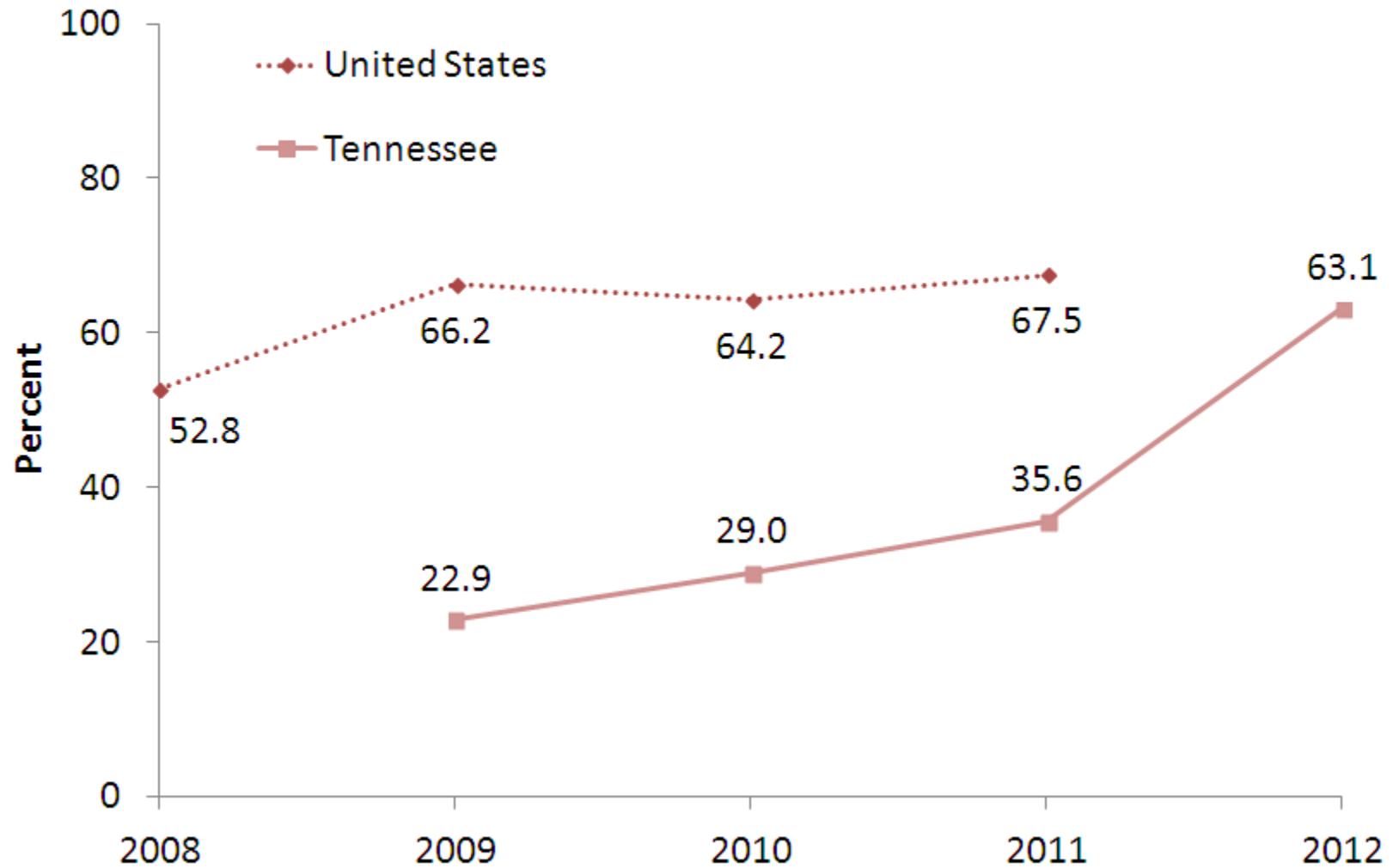
Follow up data as of Feb 2014

Data sources:

US Data: CDC EHDl ([www.cdc.gov/ncbddd/hearingloss/ehdi-data.html](http://www.cdc.gov/ncbddd/hearingloss/ehdi-data.html))

TN Data: TN EHDl-IS

## EI Received Before 6 Months of Age Among Children with Hearing Loss



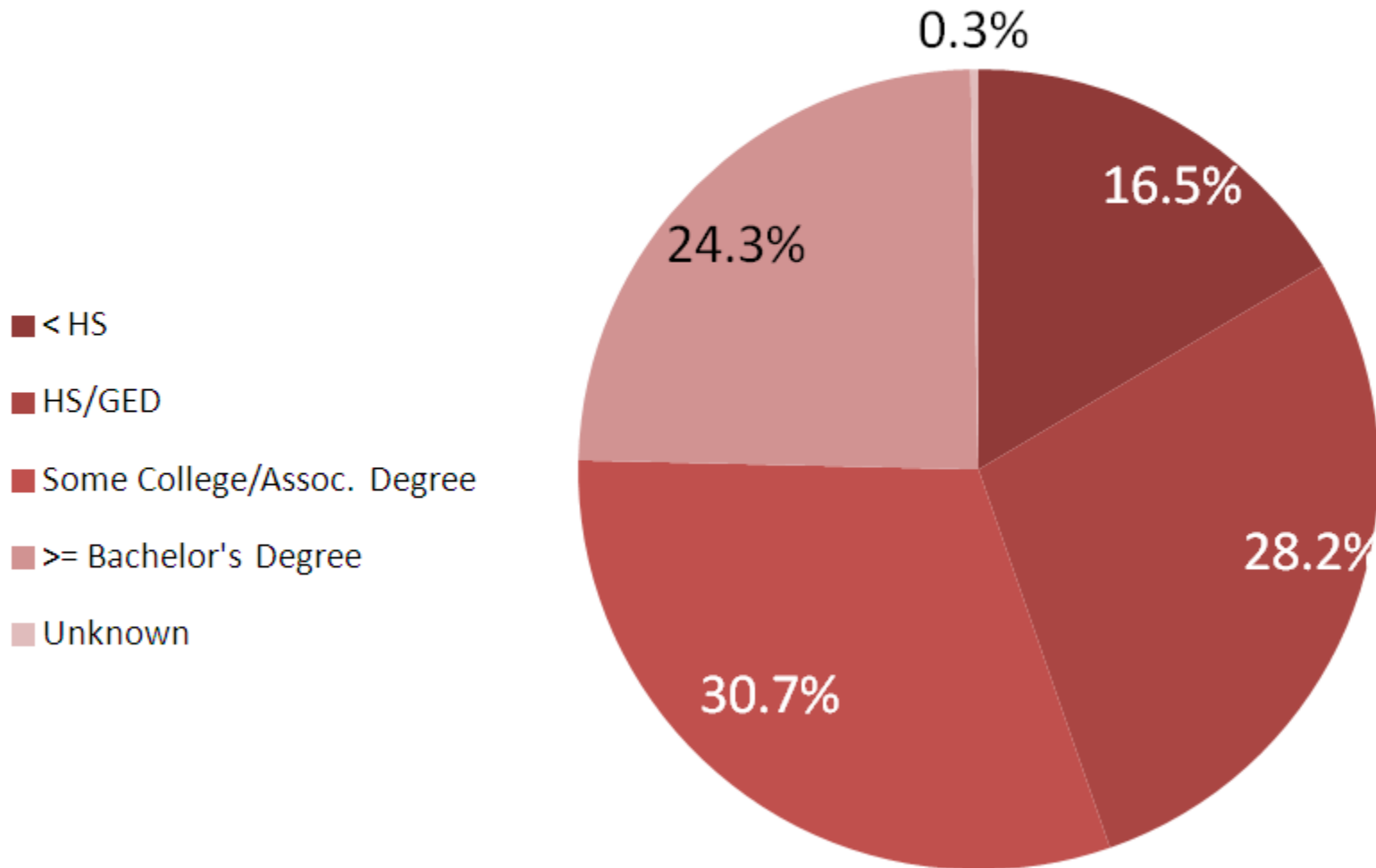
Follow up data as of Feb 2014

Data sources:

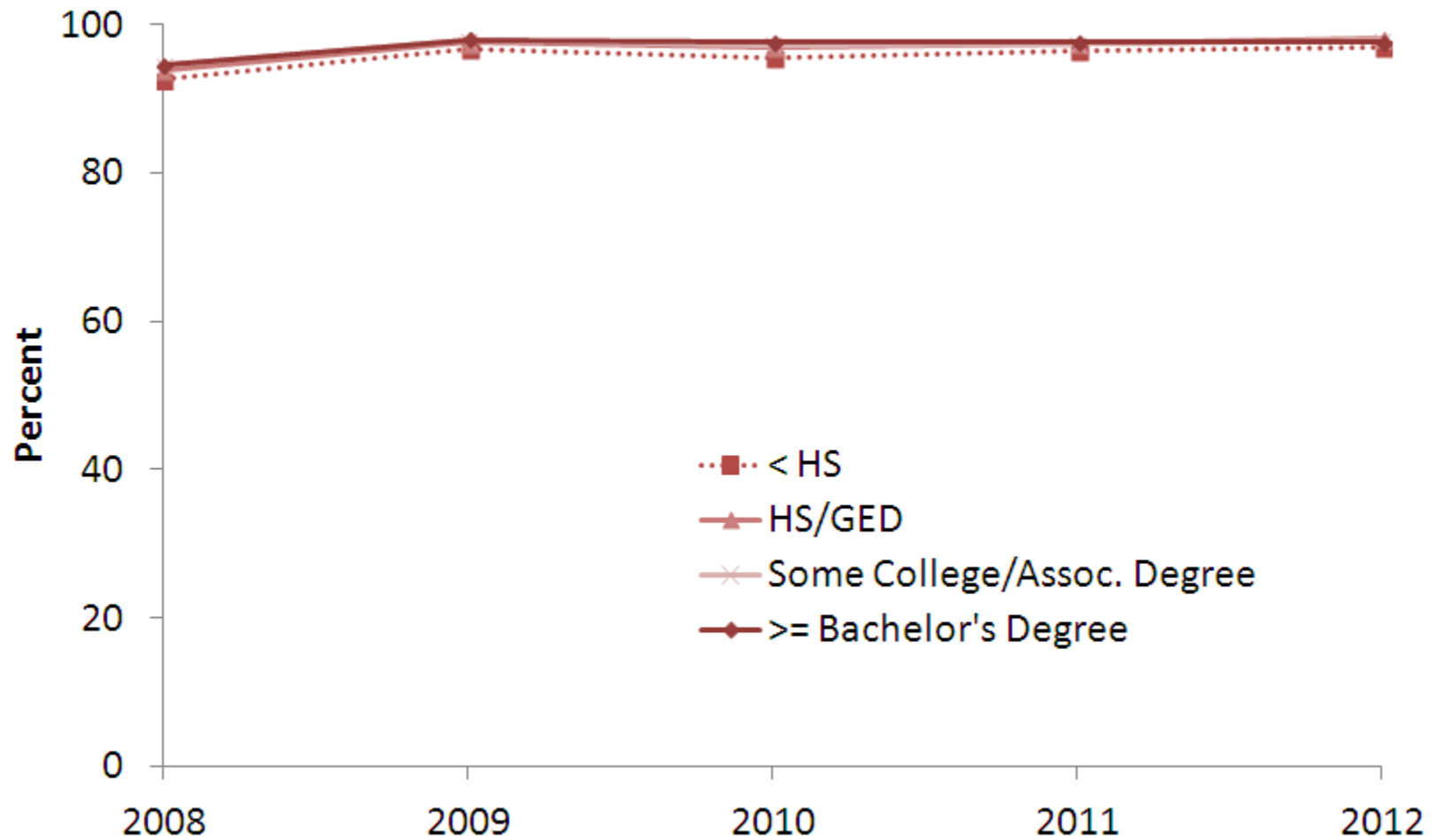
US Data: CDC EHDI ([www.cdc.gov/ncbddd/hearingloss/ehdi-data.html](http://www.cdc.gov/ncbddd/hearingloss/ehdi-data.html))

TN Data: TN EHDI-IS

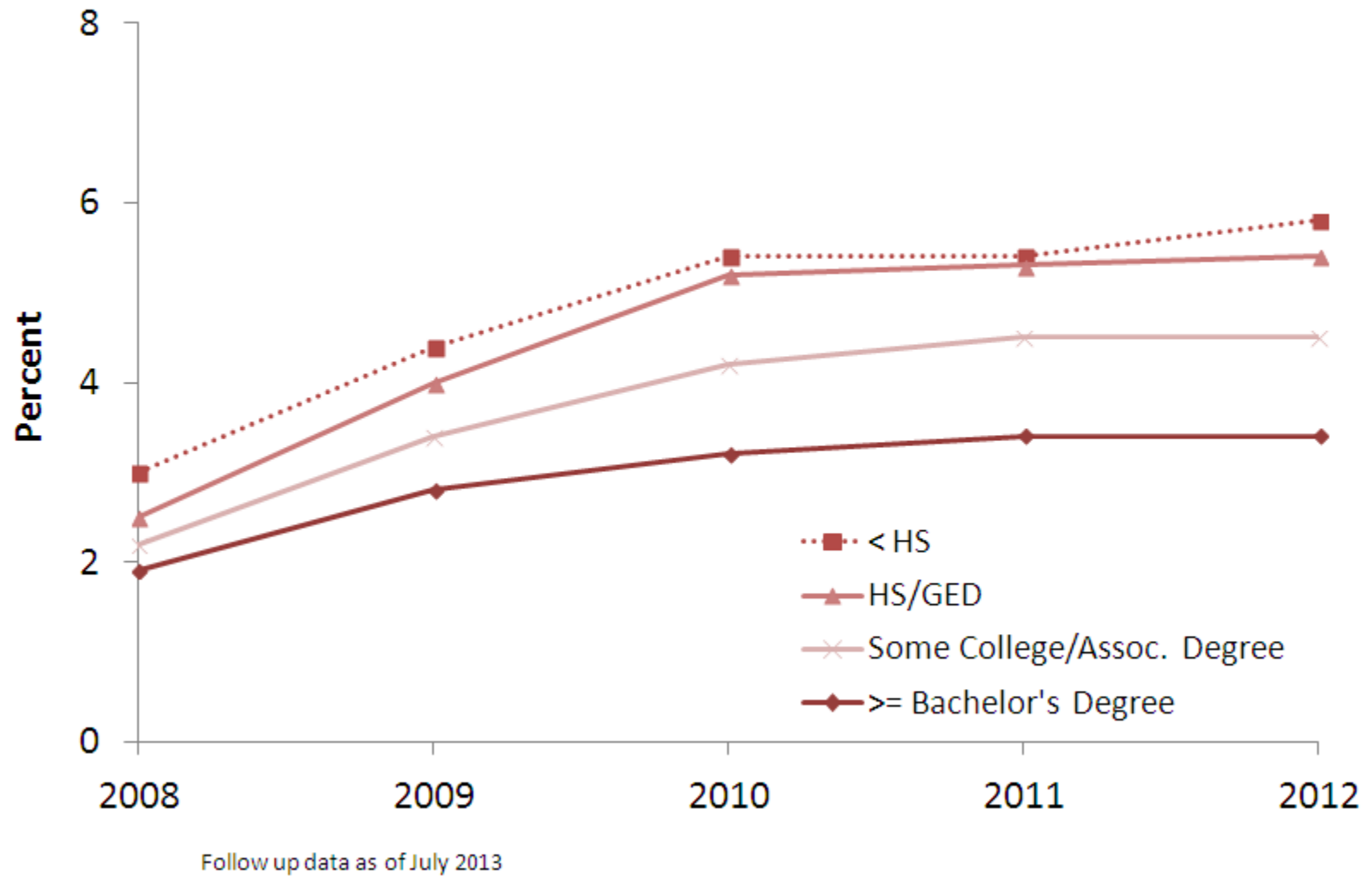
## Live Births by Maternal Education Tennessee In-state Births, 2012



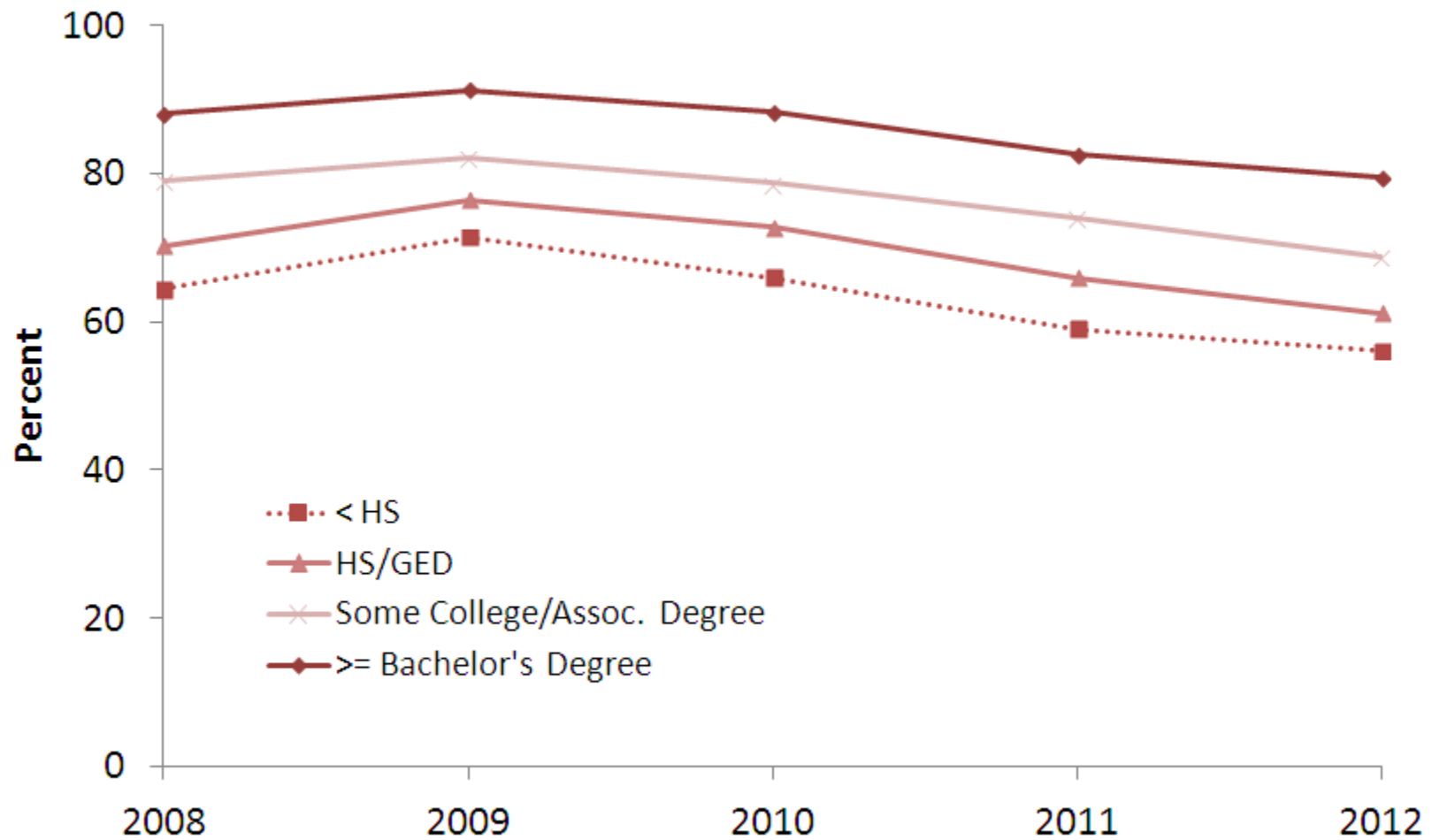
## Rate of Newborn Hearing Screening By Maternal Education, Tennessee, 2008-2012



## Hearing Screening Refer Rate By Maternal Education, Tennessee, 2008-2012



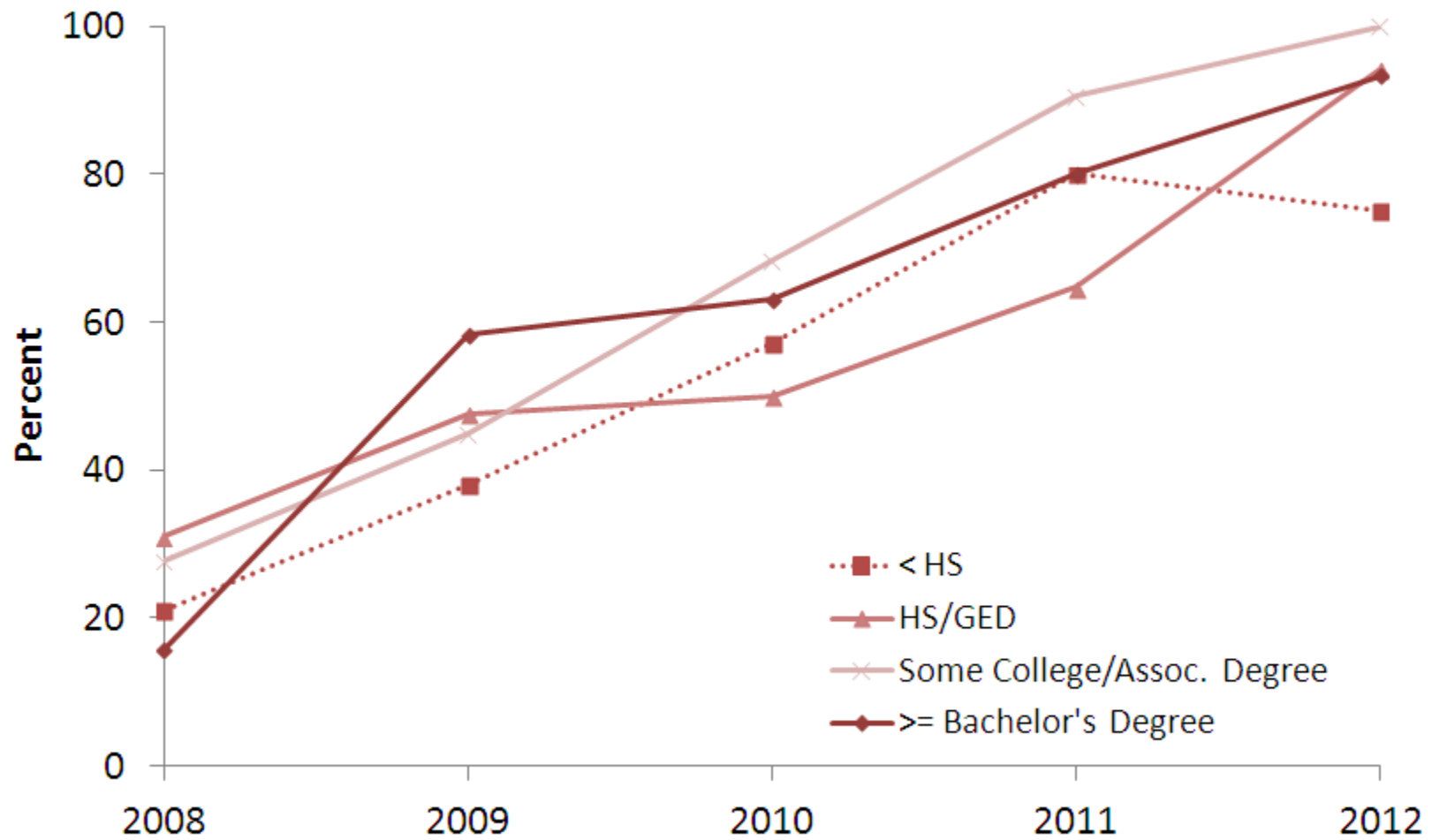
## Rate of Follow-up to Hearing Diagnosis By Maternal Education, Tennessee, 2008-2012



Follow up data as of July 2013

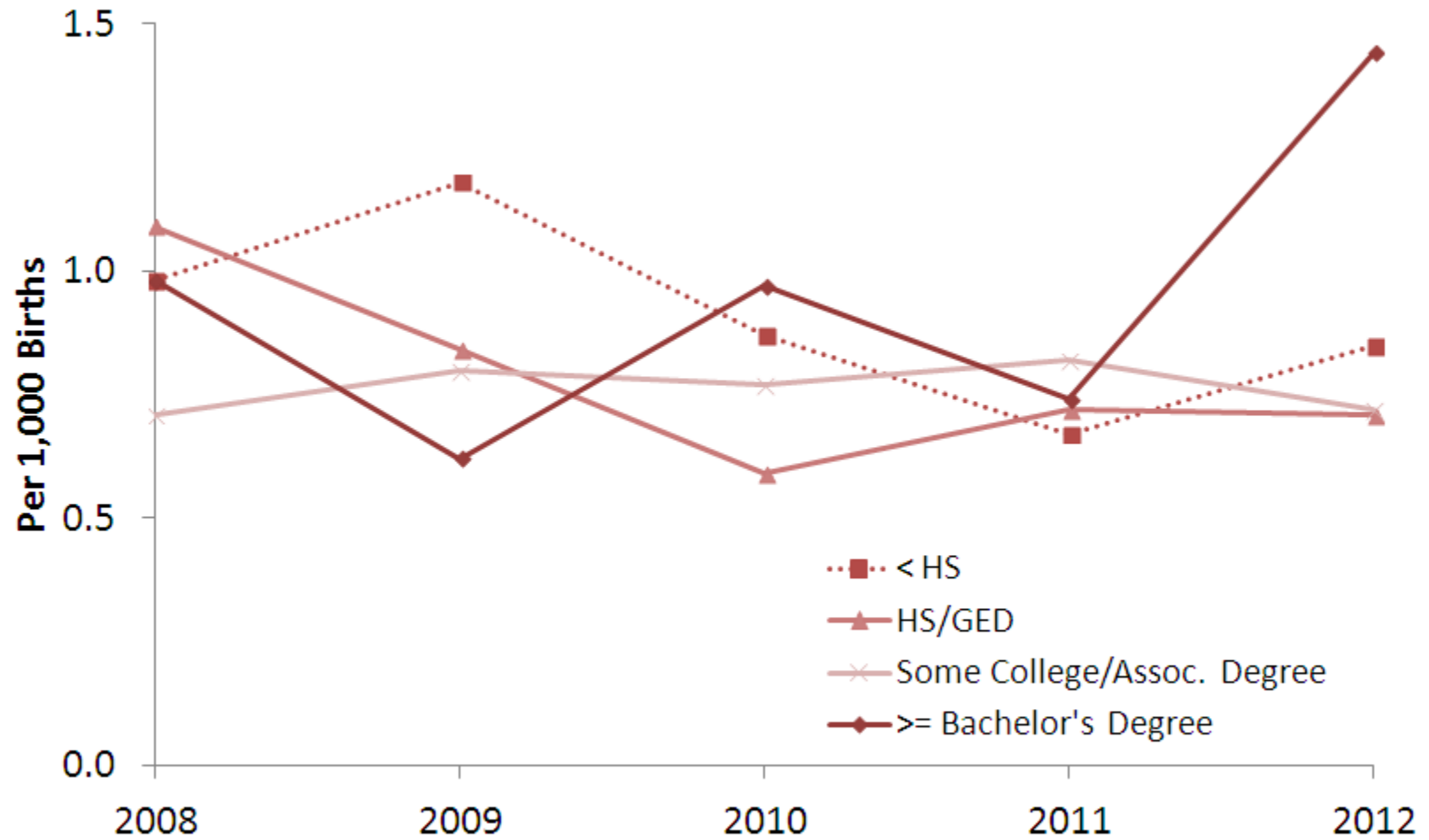


## Rate of Follow-up to Early Intervention By Maternal Education, Tennessee, 2008-2012



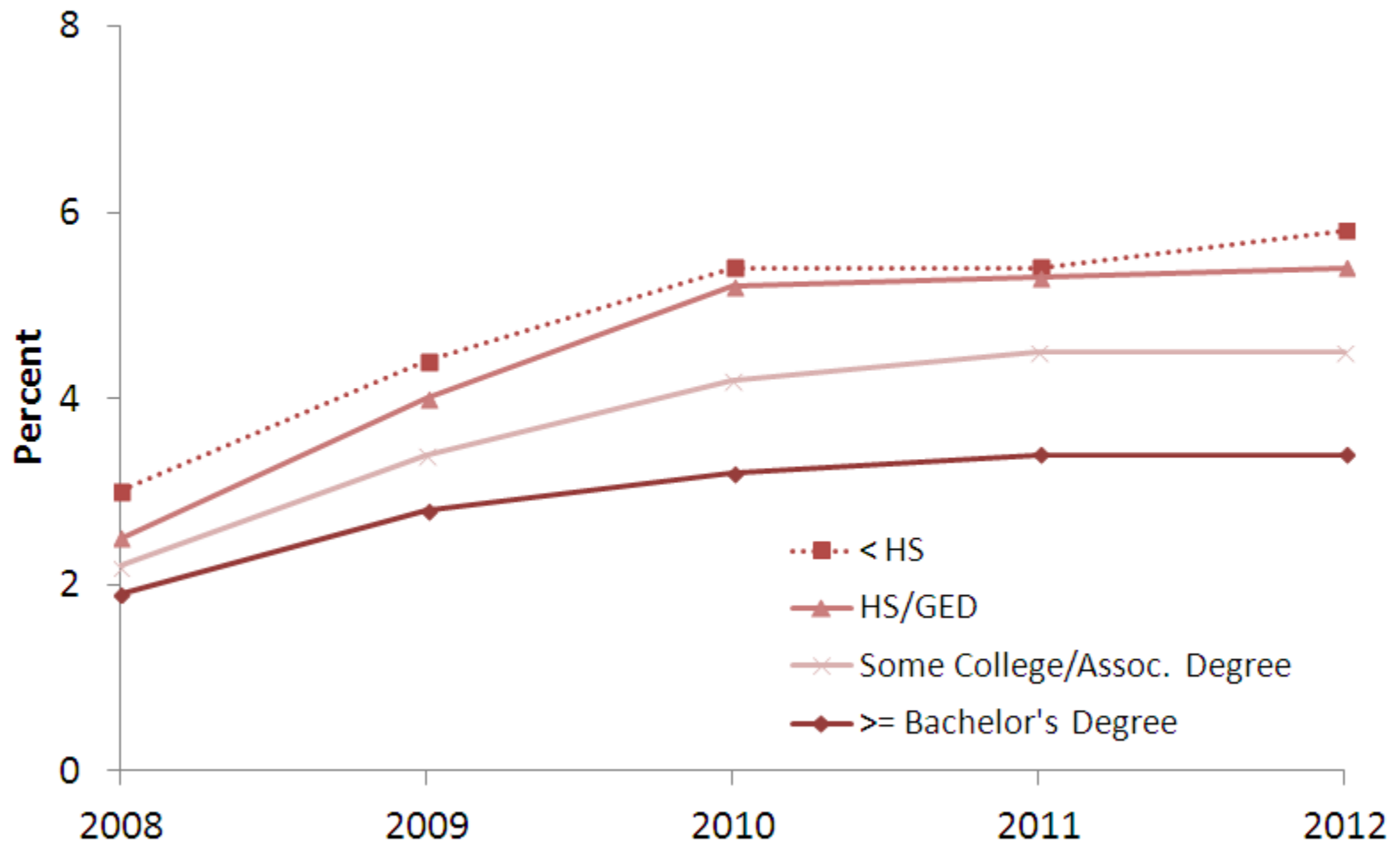
Follow up data as of July 2013

## Hearing Loss Incidence Rate By Maternal Education, Tennessee, 2008-2012



Follow up data as of July 2013

## Prevalence of Hearing Loss Risk Factors By Maternal Education, Tennessee, 2008-2012



# Many Thanks to...

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- Fenyuan Xiao, TN EHDI-IS Epidemiologist
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- Claudia Weber, TN Early Intervention System
- John Hutcheson, PTBMIS Coordinator
- Other partners:
  - ▣ TN hospitals, physicians, and audiologists
  - ▣ Parents and families
- CDC EHDI

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13<sup>th</sup> EHDI Meeting. April 13-15, 2014. Jacksonville, Florida