

TENNESSEE EHDI WORK PLAN

STATE AIM: By March 31, 2017, Tennessee Early Hearing Detection and Intervention (EHDI) (In Tennessee it known as the Newborn Hearing Screening NHS) Program will use quality improvement methodology, in partnership with a variety of stakeholders, to reduce the percentage of infants lost-to-follow-up (LTF) and/or lost-to-documentation (LTD) after a referred newborn hearing screen, as reported on the CDC annual EHDI survey, from 31% (2011) to 16% in 2017 (average of 5% reduction per grant year).

1. HOSPITAL AIM STATEMENT 1

By March 31, 2015, Tennessee hospitals, in partnership with the NHS program, will develop, test, and implement change strategies that address LTF/LTD for babies who refer on their newborn hearing screen to decrease the state LFU/LTD rate by 5%. Data will be reported to and measured by the NHS Neometrics system.

YEAR 1					
<ul style="list-style-type: none"> Vanderbilt University Medical Center (VUMC), Nashville and The Regional Medical Center (MED), Memphis newborn hearing screening programs will select at least one change strategy from a prepared Change Packet to test within their facility for a designated period of time. (NOTE: Change Packet includes previously proven change strategies for reducing LTF/LTD. Change strategies listed below in 1.1 and 1.2 are examples of one that VUMC may select to “test”.) 					
Changes / Activities	Start Date	Estimated Completion Date	Lead Staff and Partner Support	Process Measures	Outcome Measures
1.1 One discharge nurse at MED newborn nursery will obtain a second point of contact for the family and verify the PCP prior to discharge for one week. Increase	4/1/2014	4/8/2014	LS: Jessica Lucas, well baby audiologist; Jehan Ellis, discharge planner PS: NHSProgram staff	<ul style="list-style-type: none"> NHS Program will “count” the number of successful and unsuccessful phone contacts for babies discharged by this nurse. Compare data with contact outcomes for another discharge nurse who is not getting 2nd point of contact/verifying PCP. 	NHS Program will have fewer LTF due to reason of: a) “unable to locate/contact” family b) “no PCP”
1.1 - Year 1 PDSA Expansions Expand to increase the number of MED discharge nurses until all using same change strategy.	05/01/2014	8/01/2014	LS: Remaining MED Discharge Nurses PS: NHS Program staff	<ul style="list-style-type: none"> As more discharge nurses are trained in this change strategy, continue to examine LTF data for babies born at MED 	NHS Program will have more success reaching families and/or PCP of MED babies when attempting to make phone contact after a failed newborn hearing screen
1.2 Screeners in VUMC well baby nursery will receive training on the utilization of a scripted message to advise parents of need for follow-up after	6/1/2014	6/14/2014	LS: Mary Edwards, VUMC audiologist PS: NHS Program staff	<ul style="list-style-type: none"> MHS Program will track completed follow-up appointments on babies discharged from 6/15/2014 – 6/30/2014 Data will be compared to 	As a result of receiving a message that emphasizes timely follow-up, families with babies who refer on their NHS will make a rescreening appointment more frequently than previously documented.

a referred hearing screen (“script training”).				VUMC’s LTF data prior to the script training.	
1.2 – Year 1 PDSA Expansions Expand script training with additional targeted hospitals.	07/01/2014	03/31/2015	LS: NHS Coordinators and/or nursing staff at other targeted hospitals. PS: NHS Program staff	<ul style="list-style-type: none"> As this PDSA is expanded to other hospitals, the NHS Program can examine LTF data for these facilities. 	As a result of receiving a message that emphasizes timely follow-up, families with babies who refer on their NHS will follow through with their rescreening appointment more frequently than previously documented.

YEAR 2/3

- Based on outcomes from PDSAs targeted in Year 1, NHS will continue to partner with additional hospitals to test, implement, and spread change strategies that are presented to hospitals in the Change Packet. NHS Program staff will support hospitals as they select change strategies that are best suited to the needs of their facilities, conduct small tests of change with those strategies, monitor progress over time and make needed adjustments to strategies, and expand implementation until spread has been achieved. Successful changes will be incorporated into hospital hearing screening guidelines.
- In Year 2, hospitals will participate in training for TN’s Neometrics Data System module for Remote Data Entry (RDE). RDE will allow hospitals to directly input hearing screening results electronically. PDSAs will be used to test the training first at one hospital, then expanding to other targeted hospitals, until the training can be spread to all birthing hospitals in the state.

2. AUDIOLOGIST AIM STATEMENT

By March 31, 2015, Tennessee audiologists, in partnership with NHS Program, will develop, test, and implement change strategies using quality improvement methodologies for infants who refer on their newborn hearing screen to decrease the state LFU/LTD rate by 5%. Data will be reported to and measured by the NHS Neometrics system.

YEAR 1

- At least 10 pediatric audiologists will select at least one change strategy from the Change Packet to test within their facility for a designated period of time, with the expectation that their audiology center will implement the change if success is noted during the test phase. The NHS Program has already received interest from pediatric audiologists who want to partner with NHS to test change strategies. (NOTE: Change Packet includes the previously proven change strategies for reducing LTF. Change strategies listed below in 2.1 and 2.2 are examples of that partner audiologists may select to “test”.)

Changes / Activities	Start Date	Estimated Completion Date	Lead Staff and Partner Support	Process Measures	Outcome Measures
2.1 UT Medical Center Knoxville (UTMCK) and will make pre-appointment reminder calls to families of pediatric clients for one month.	04/01/2014	4/30/2014	LS: Receptionists at UTMCK Audiology Center PS: Kristy Hoffecker, UTMCK Audiologist; NHS Program staff	<ul style="list-style-type: none"> UTMCK will document no-show rate for the designated week. Data will be compared to UTMCK’s previous no-show rate. 	As a result of pre-appointment reminder calls, UTMCK’s no-show rate will decrease for appointments in April 2014.
2.2 Audiologists from LeBonheur Children’s Hospital (LCH), Memphis will share the Findings and Audiology Next Steps	4/01/2014	4/15/2014	LS: Tracey Ambrose and Cindy Gore, LCH audiologists PS: NHS Program Staff	<ul style="list-style-type: none"> LCH audiologists will document return rate for families who receive FANS Checklist Data will be compared to 	Families who receive written documentation of results and next steps recommendations will return for subsequent appointments at LCH.

(FANS) Checklist with families before leaving their appointment.				LCH's previous return rate for appointments	
2.1 and 2.2 Year 1 PDSA Expansions Assist at least 10 targeted pediatric audiology centers to test changes to reduce no-show rates.	05/01/2014	03/31/2015	LS: Audiologists and staff from other pediatric audiology centers PS: NHS Program staff	<ul style="list-style-type: none"> NHS will share formula and excel form for documenting monthly no-show rate Centers will document no-show rate prior to and during change strategy "test" Centers will share run charts of no-show rates with NHS 	LTF change strategies selected by pediatric audiology centers will reduce no-show rates.
2.3 Two audiologists from Vanderbilt Bill Wilkerson Center (VBWC) will follow rescreening and diagnostic reporting guidelines as outlined in the NHS Audiology Reporting Algorithm for two weeks.	04/01/2014	4/15/2014	LS: Mary Edwards and Cathi Hayes, audiologists at VBWC PS: NHS Program staff	<ul style="list-style-type: none"> NHS Program will document the number of incoming rescreening and diagnostic reports from VBWC for the designated two week period. Data will be compared to VBWC's reporting data prior to use of algorithm 	As a result of following clearly stated guidelines for reporting, audiologists at VBWC will consistently report results of rescreens and diagnostics to the NHS Program.
2.3 - Year 1 PDSA Expansions Will include: a) testing and utilization of reporting algorithm at VBWC with all audiologists; b) test and implement algorithm with at least 10 targeted audiology centers.	05/01/2014	03/31/2015	LS: Audiologists and staff at VBWC and other targeted audiology centers PS: NHS Program staff	<ul style="list-style-type: none"> NHS Program will document the number of incoming reports from participating audiology centers Data will be compared to reporting data prior to use of algorithm 	NHS Program will see an increase in reporting (decrease in LTD) when participating audiology centers are using the reporting algorithm.

YEAR 2/3

- Based on outcomes from PDSAs targeted in Year 1, NHS will continue to partner with audiologists in Year 2/3 to test, implement, and spread change strategies that target reducing no-show rates that are included in, but not limited to, the Change Packet. NHS Program staff will support audiologists as they select change strategies that are best suited to the needs of their facilities, conduct small tests of change with those strategies, monitor progress over time and make needed adjustments to strategies, and expand implementation until spread has been achieved. Successful changes will be incorporated into the audiology guidelines.
- In Year 2, audiologists will also participate in training for TN's Neometrics Data System module for Remote Data Entry (RDE). RDE will allow hospitals to directly input screening results electronically. PDSAs will be used to test the training first with one audiologist, then expanding to other targeted audiologists, until

the training can be spread to all pediatric audiologists in the state.

3. WIC AIM STATEMENT

By March 31, 2015, WIC staff, in partnership with the NHS Program, will develop, test, and implement change strategies using quality improvement methodologies that address Lost to Follow-up and Lost to Documentation (LTF/LTD) for babies who refer on their newborn hearing screen. Data will be reported to and measured by the NHS Neometrics system.

YEAR 1					
<ul style="list-style-type: none"> NHS Program staff began some preliminary work with one WIC clinic during the 2013 NICHQ experience. The activities listed below are an expansion of the improvement noted during the NICHQ PDSAs. 					
Changes / Activities	Start Date	Estimated Completion Date	Lead Staff and Partner Support	Process Measures	Outcome Measures
<p>3.1 For one rural WIC Clinic, flag the charts of babies from that area who are LTF/LTD. As families come into the clinic from 3/1/2014 - 3/31/2014, WIC staff will:</p> <p>a) document results on those babies who went for follow-up;</p> <p>b) obtain a current PCP contact and instruct family to contact PCP</p> <p>c) provide as list of audiologist in area instruct to call for an appointment;</p> <p>d) give literature and etter and parent letter encouraging timely follow-up or;</p> <p>d) report findings to EHDI Program.</p>	04/01/2014	04/31/2014	<p>LS: To be determined (rural WIC clinic)</p> <p>PS: NHS Program staff</p>	<ul style="list-style-type: none"> NHS will document the number of flagged WIC LTF/LTD babies with the number who completed follow-up. WIC will: <ul style="list-style-type: none"> a) document number of babies whose parents report have already been rescreened/tested b) document number of babies who were referred to an audiologist for testing 	<p>With the assistance of WIC staff :</p> <p>a) NHS will discover babies who were previously judged to be LTD;</p> <p>b) infants still needing follow-up will be advised to contact their PCP or audiology center to schedule diagnostic appointment.</p>
<p>3.2 In one of the Nashville Metro WIC Clinics, conduct a “visual blitz” public awareness campaign from 07/01/2014 o</p>	07/01/2014	07/31/2014	<p>LS: WIC Clinic staff</p> <p>PS: NHS Program staff</p>	<ul style="list-style-type: none"> WIC staff will be asked to survey five families for feedback on poster (three probe questions). Responses to questions 	<p>As a captive audience in WIC waiting rooms, families will have an opportunity to view poster content and learn more about the importance of timely follow-up for hearing-related concerns.</p>

07/31/2014 with posters relating to hearing follow-up .				will suggest effectiveness of visual materials.	
3.1 and 3.2 Year 1 PDSA Expansions Will include spread change strategy to other WIC offices across state; evaluate effectiveness in each office.	3.1 05/01/2014 3.2 08/01/2014	3.1 03/31/2015 3.2 03/31/2015	LS: WIC Clinic staff PS: NHS Program staff	<ul style="list-style-type: none"> 3.1 Examination of follow-up data for flagged babies in participating WIC county offices 3.2 Continued feedback from families – may get varying feedback from different WIC locations 	3.1 WIC staff efforts to support families will lead to increased hearing follow-up. 3.2 Strategically placed public awareness materials will allow families to learn more about timely follow-up for hearing related concerns.

YEAR 2/3

- During the NICHQ experience, even though the partnership resulted in a positive change, making collaborative arrangements between NHS and the first participating WIC office did take some time. It is anticipated that spread of these change strategies within the WIC facilities, especially 3.1, may last until the end of Year 2. By Year 3, these partnerships should be mature enough to work collaboratively to explore new PDSA opportunities with WIC.

4. COMMUNITY PROVIDER AIM STATEMENT

By March 31, 2015, community providers, in partnership with NHS Program, will develop, test, and implement change strategies using quality improvement methodologies for infants who refer on their newborn hearing screen to decrease the state LFU/LTD rate by 5%. Data will be reported to and measured by the NHS Neometrics system.

YEAR 1

- NHS will access already established partnerships with community NHS stakeholders (identified below) to target change strategies that include public awareness efforts, data sharing, and phone follow-up.

Changes / Activities	Start Date	Estimated Completion Date	Lead Staff and Partner Support	Process Measures	Outcome Measures
4.1 Early Head Start (EHS): Telamon Migrant EHS Program will share results from OAE screens for the 2013/14 school year with the state EHDl Program. This EHS program was selected for first round of sharing due to its small size and existing relationship between the NHS Audiology Consultant and	06/01/2014	06/14/2014	LS: Telamon EHS Health Coordinator, Tiffany Baker PS: NHS Program staff	<ul style="list-style-type: none"> The NHS Program will cross reference EHS results log sheets for “hits” on babies who: <ol style="list-style-type: none"> referred on their NHS and have not completed follow-up; babies who missed a NHS ; or babies who have completed the EHS OAE protocol and have been 	By accessing OAE screening results from EHS Programs, NHS will be able to determine the screening status of babies who were LTF or LTD.

EHS Health Coordinator.				diagnosed with permanent hearing loss.	
4.1 – Year 1 PDSA Expansions will most likely include testing of data sharing protocol with up to 4 other targeted EHS programs	07/01/2014	03/31/2015	LS: Health Coordinators at participating EHS Programs PS: NHS Program staff	<ul style="list-style-type: none"> Cross reference EHS results log sheet with NHS data system for “hits” as described in above section. 	See above.
4.2 Physicians: Partner with Hands and Voices (H&V) to share “LTF elevator speech” via phone with physicians in one pediatric group in Memphis for one month.	05/01/2014	05/31/2014	LS: H&V Parent Volunteers PS: Memphis pediatric practice; NHS Program staff	<ul style="list-style-type: none"> H&V will send a short survey to physicians who were successfully contacted for feedback related to hearing follow-up. 	Physicians who engage with parents of a child with hearing loss and who receive a LTF message will consider hearing loss to be a medical emergency and stress this to families who are in need of hearing follow-up.
4.2 – Year 1 PDSA Expansions May include partnering with H&V parents to continue to select high LTF regions for “elevator speech” phone campaigns.	06/01/2014	03/31/2015	LS: H&V Parent Volunteers PS: Selected pediatric practices; NHS Program staff	<ul style="list-style-type: none"> Short surveys will be utilized to assess opinions related to hearing follow-up 	See above.
4.3 University Audiology Programs: AuD practicum students will be utilized to make phone follow-up calls to parents, PCPs, and audiologists in one city of the state (Memphis).	04/01/2014	05/31/2014	LS: Meredith Alvey and Samantha Wallenstein, AuD students from the University of Tennessee Health Sciences Center Audiology Program PS: NHS Program staff	<ul style="list-style-type: none"> NHS Program will compare number of successful contacts made from 4/1 through 5/31 with the number of successful contacts made during the same time frame in 2013 when only one person was making calls. 	Increasing the manpower dedicated to phone follow-up will lead to more successful contacts and reduce the amount of time it takes to successfully reach parents/providers with guidance.
4.3 – Year 1 PDSA Expansions AuD students will learn about small tests of change related to quality improvement. They will be asked to develop and test their own change strategies related to their phone	04/01/2014	03/31/2015	LS: UTHSC AuD students; Julie Beeler, NHS practicum supervisor PS: NHS Program staff	<ul style="list-style-type: none"> To be determined as part of practicum requirement. 	Small tests of change (yet to be determined) applied to phone follow-up for babies who refer on their NHS will lead to more successful family contacts.

follow-up as part of their practicum requirement.					
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<p>YEAR 2/3</p> <ul style="list-style-type: none"> In Year 2, physicians will participate in training for TN’s Neometrics for Remote Diagnostic Entry to allow physicians to directly input hearing screening results electronically. PDSAs will be used to test the training first with one pediatric practice that is conducting OAE screens, then expanding to other targeted practices, until the training can be spread to all physicians in the state. If practicum experience with AuD students proves to be successful, consideration for expanded ways to utilize student manpower for NHS program work will be considered for Year 2/3. In Year 2/3, NHS will attempt to reach out to community partners who were previously unconnected with EHDI (e.g. EHS programs who have never submitted screening data, medical providers who conduct OAE screens but do not report, home visiting programs, midwives). As new partnerships are established, NHS will support these providers in conducting needs assessments and developing PDSAs that encompass NHSs LTF/LD goals.

5. FAMILY SUPPORT AIM STATEMENT

By March 31, 2015, Family Voices (FV), in partnership with the NHS program, will develop, test, and implement change strategies using quality improvement methodologies that address the provision of family-centered support to parents with a child who is deaf or hard-of-hearing by providing a home visit to at least 20 families. Data will be reported to and measured by the NHS Neometrics system.

YEAR 1
 NHS will work with Family Voices sub-contract parent support staff to target change strategies improve home visiting services to English and Spanish speaking families of children with hearing loss to increase timely reporting of activities.

Changes / Activities	Start Date	Estimated Completion Date	Lead Staff and Partner Support	Process Measures	Outcome Measures
5.1 A Family Voices Parent Consultant in the Middle Tennessee region will text 5 families with children who have been recently identified with hearing loss at Vanderbilt Bill Wilkerson Audiology Clinic (VBWAC) (after a signed release) to introduce herself and share services offered by FV of Tennessee.	04/01/2014	05/30/2014	LS: Tonya Bowman, Family Voices Newborn Hearing Parent Consultant, Middle TN PS: Cathi Hayes, VBWAC audiologist; NHS Program staff	<ul style="list-style-type: none"> Family Voices Parent Consultant will document: <ul style="list-style-type: none"> a) the number of families who responded to the text; b) the number of families who accepted the offer for a home visit 	Families who are contacted via text messaging by a parent consultant will respond positively and will be more likely to accept an offer of a home visit.
5.1 – Year 1 PDSA Expansions The East TN Family Voices Parents Consultant will test the “text to families” strategy in two areas within	06/01/2014	07/31/2014	LS: Camille Keck, Family Voices Newborn Hearing Parent Consultant, East TN PS: Kristen Vreiswyk,	See above.	See above.

her region: a) Chattanooga; and b) Kingsport			audiologist, Chattanooga Speech and Hearing Center. Danielle Combs, audiologist Wellmont Holston Valley Hearing Center		
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YEAR 2/3

- Expand home visiting strategies to a region with Spanish speaking families identified by the audiology center and NHS. Develop small tests of change to share follow-up data from the FV Sales Force data system to Neometrics.

6. PART C TENNESSEE EARLY INTERVENTION (TEIS) AIM STATEMENT

By March 31,2015, Part C, in partnership with the NHS program, will develop, test, and implement change strategies using quality improvement methodologies for infants who refer on their newborn hearing screen to decrease the state LFU/LTD rate by 5%.

YEAR 1 YEAR 1 TEIS in partnership with NHS will track infants reported as lost to follow-up due to moving, name change or no primary care provider by searching additional data systems available to NBS by CDC EHDI matching reports.

Changes / Activities	Start Date	Estimated Completion Date	Lead Staff and Partner Support	Process Measures	Outcome Measures
6.1 The Part C/TEIS Newborn Hearing Follow-Up Coordinator will contact families of infants with no hearing follow-up up reported lost to follow-up due to a change of address.	5-1-14	5-31-14	LS: Claudia Weber, TEIS PS: NHS program	<ul style="list-style-type: none"> • Search NHS data base with matches to vital records, TennCare and PTBMIS to locate new addresses/phone/name for children. Target 10 families in the Nashville and Memphis area. • Expand to other targeted area of infants reported as lost due to moving or letters being returned. 	<ul style="list-style-type: none"> • Reduce the lost to follow-up due to a poor address or name change.
6.2 Part C/TEIS will obtain a release of information on infants referred with hearing loss by the NHS program and report hearing related services provided.	8-1-14	8-30-14	LS: Linda Hartbarger, Department of Education, and Joan Kennedy , TEIS director. PS: NHS Staff, TEIS NHS consultant	<ul style="list-style-type: none"> • Meet with TEIS staff to advise of the benefits to families the reporting dates and types of service provided by TEIS after a referral form NHS 	<ul style="list-style-type: none"> • Each child referred to TEIS from NHS with a hearing loss will have signed release/consent to share the date and type of service provided with NHS. .

YEAR 2/3

- By March 2016, develop small steps of change to implement at least three of the 12 goals outlined in the Joint Commission on Infant Hearing (JCIH) 2013 Supplement Statement for children birth – 3 years of age with hearing loss in regard to timely access, parent support and service by a qualified provider.

Summary Progress Report

Summary for April 1, 2010 to March 31, 2014 grant period. Reported in December 2013.

The Tennessee Department of Health Early Intervention System, known as the Newborn Hearing Screening (NHS) program, was successful in meeting many of the goals and objectives from 2010 to 2013. The contribution of external partners and stakeholders was essential in developing and implementing improvement strategies.

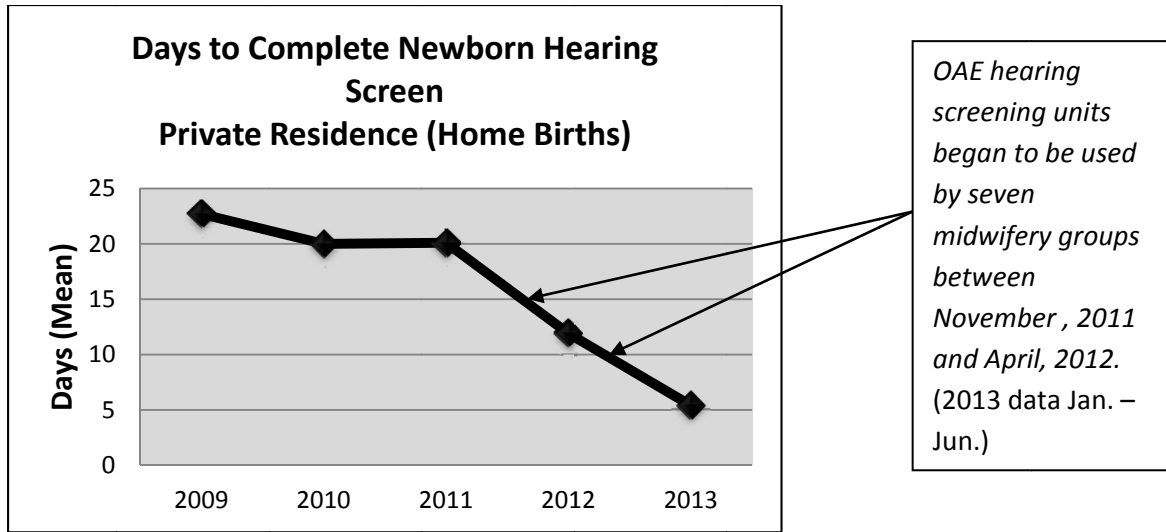
Goal 1: By January 2014, decrease from 2.2% to 1%, the number of infants that do not receive a hearing screen prior to one month of age.

In 2012, the overall percent of infants screened increased by 0.7% from 97.2% in 2010. Of the 2,136 infants not screened: 7% declined the screen; 11% were still in the hospital; 9% discharged or transferred; 4% expired; and 12 were unable to test; for 68% the reason was not available.

TN Early Hearing Detection and Intervention (EHDI) 1-3-6 Goals							
Percent of Infants	2010 Baseline	2011	2012	2013 (Jan -Jun)	State Goal	EHDI Goal	HP 2020
% Hearing Screens	97.2	97.5	97.9	97.2	95		
Prior to 1 month of age	98.4	98.5	98.3	98.2		95	90.2

To improve the quality of hospital reporting, monthly reports were sent to hospitals requesting missing results in one or both ears for infants born at that hospital per vital records. Attempts were made to track infants transferred to another hospital. Letters were sent to parents that did not have a hearing screen reported; 25% of parents responded that tests were completed at another location. Hospitals that experienced equipment challenges received consultation from the program Audiology Consultant regarding alternative procedures to have infants return for screening or to access another facility for hearing screening.

To increase the number of infants screened, seven midwifery groups received five sets of Otoacoustic Emissions (OAE) screening equipment to share. The percent of home births that received a hearing screen increased from 35.5% (2012) to 41.3% (2013). In 2013, 76.2% of the infants served by the seven groups received a screening, and the number of days to obtain a hearing screen dropped from 20.1 days (2011) to 5.4 days (2013).



Goal 2: By January 2014, increase from 69.8% to 80%, the number of infants that received follow-up after an initial screen prior to 3 months of age.

The percentage of hearing follow-up reported prior to 3 months increased to 84.3% (2012) and the number of lost to follow-up/lost to documentation (LTF/LTD) increased to 35% in 2012. However, the LTF/LTD decreased to 25.6% in 2013 after implementing strategies using the Plan-Do- Study-Act (PDSA) method of small steps of change. This began with 2-3 centers and was disseminated to others.

TN Early Hearing Detection and Intervention (EHDI) 1-3-6 Goals							
Percent of Infants	2010 Baseline	2011	2012	2013 (Jan -Jun)	State Goal	EHDI Goal	HP 2020
% Refers Completed Follow-up	74.7	69.0	65.0	74.4	75		
LTF/LTD	25.7	31.0	35.0	25.6	20		
Prior to 3 months of age	77.1	85.8	84.3	83.9		90	72.6

The newborn hearing Diagnostic Equipment Loan Program provided three audiology groups across the state with Vivosonic Integrity Diagnostic Auditory Brainstem Response (ABR) equipment on a time-share schedule. With this equipment there is no need for sedation. Seventy-five children, birth to 3 years of age, from 12 rural counties, were tested due to an initial referred screen or for risk-based follow-up. Conclusive results were achieved on 94% of these children; 6% were referred to a larger diagnostic center for further evaluation. Julie Beeler, Audiology Consultant, coordinated calibration of two Natus Echo OAE/AABR units placed in locations that did not have access to ABR screening to use for follow-up. The consultant continued training with the Tennessee Early Head Start (EHS) Early Childhood Hearing Outreach (ECHO) OAE screening program, the Telamon Head Start Program and to other states in collaboration with the NCHAM ECHO project. Reporting by EHS of follow-up to NHS has not yet been implemented to track the effect of LTF.

The Tennessee Department of Education, Part C Early Intervention System (TEIS) partners with the hearing program to locate infants in need of follow-up after a referred screen. Initial follow-up letters are sent to the PCP and family. Notification letters for all 9 TEIS Districts are sent to the TEIS contact if no follow-up is reported within 6 weeks. In October 2012, TEIS follow-up letters for the infants living in Northwest and Southwest TN were assigned to the West TN Teleaudiology contact person to contact families for follow-up.

A pilot teleaudiology project was implemented February 2013 in at a Regional Health Office in rural Northwest TN to reduce the number of infants lost to follow-up due to lack of access to an audiologist. The project was in collaboration with Anne Marie Tharpe, Ph.D., Professor and Chair, Department of Hearing and Speech Sciences, Vanderbilt Bill Wilkerson Center and with the West TN Regional Health Office (WTRO). The initiative was made possible in part by two training grants totaling \$2.5 million from the U.S. Department of Education and from the Maternal and Child Health Bureau's Leadership Education in Neurodevelopmental Disabilities (LEND) grant to the Vanderbilt Department of Pediatrics that teaches pediatric audiology and pediatric speech language pathology students to treat patients remotely. A trained local health department staff member applied the equipment for evaluation. The technology enabled the audiologist, 181 miles away, to use a remote computer to interact with the family and technician as if they were standing side-by-side. There is currently no charge for this service. To increase awareness of the new services, hospitals and primary care providers (PCPs) in the target area were contacted. Services are provided one time a month; nine infants have been evaluated and one referred to a larger center for additional evaluation. Nine children from six rural counties were scheduled from March – November 2013; 2 were referred for additional testing and passed, 6 passed; 1 cancelled due to illness, 1 did not show for the appointment. No hearing loss was identified. The pilot was expanded to June 2014 to collect additional data to evaluate effectiveness on reducing loss to follow-up. The program will expand to two clients/month. The pilot will extend through July 30, 2014. Further expansion to other sites will be explored.

In mid 2013, in an attempt to reduce LTF/LTD follow-up from 61.4% in 2012, the Regional Medical Center, in cooperation with the Shelby County Health Department, and Newborn Screening Program, agreed to change their longstanding procedure of listing the health department as the medical provider on all newborns. This was to enable the metabolic and hearing follow-up program to directly contact the provider in a timely manner to track follow-up. Data are being tracked bi-monthly for improvement and supports the need for continued efforts to identify a medical provider.

The Early Childhood Hearing Outreach (ECHO) Project for Early Head Start (EHS) is active in all 25 EHS centers. The Audiology Consultant, in collaboration with the NCHAM ECHO staff, conducted five training sessions in 2012. The consultant provided phone support to increase screening and reporting in 2013. Two training sessions were conducted for the nine Part C/TEIS district offices on how to implement OAE assessment into their developmental assessments. To decrease the LTF/LTD, EHS centers conduct OAE screens or rescreens on infants in need of an initial screen or requiring follow-up in areas that lack audiology services. The Memphis LeBonheur Hospital audiology staff work with EHS to provide screens at several locations in Memphis.

Goal 3: By January 2014, increase the percentage of hearing screens and decrease the percentage of lost to follow-up in special populations including African American, Hispanic, and home births.

In 2012 there were 85,580 live births in Tennessee: 68% non-Hispanic White; 20% non-Hispanic African American; 8% Hispanic any race; 4% other or unknown Race/Ethnicity. There was not a significant difference in the percent of all races/ethnicities that received a hearing screen. Non-Hispanic African Americans had the highest rate of LTF/LTD (49.3%) after a referred hearing screen, followed by Hispanics (38.7%); and Whites (29.1%) compared to statewide (35%). However, all African Americans with hearing loss were enrolled into Part C/TEIS; Hispanics had a rate of LTF 25%; statewide LTF for enrollment into TEIS was 6.6%. Prior to 2013, Family Voices (FV) parent consultants relied on referrals for family support of children newly identified with hearing loss from PCPs, TEIS, and audiologists. Spanish speaking families were referred to the Hispanic parent consultant. In January 2013, the hearing program began to make direct referrals of children with hearing loss to Family Voices. The Hispanic parent consultant made 150 contacts to Spanish speaking families of children requiring follow-up or who had a hearing loss. The percentage of home births that were lost to follow-up decreased from 42% in 2011 to 23% in 2012.

Goal 4: By 2013, assess the effectiveness of the Newborn Hearing Program by participating in the Learning Collaborative for the National Initiative on Child Health Quality (NICHQ) as required by the HRSA grant.

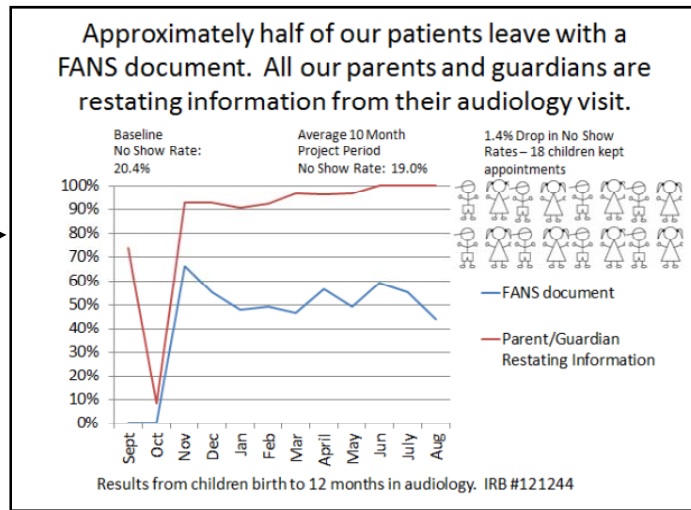
Tennessee had a six-member team participate in the NICHQ Improving Hearing Screening and Intervention Systems (IHSIS) August 2012 – September 2013. The team members included Jacque Cundall, RN, BSN, EHDI director; Yinmei Li, Ph.D., CDC EHDI epidemiologist; Julie Beeler, EHDI Audiology Consultant; Tamala Bradham, Ph.D., Audiology Professor, Vanderbilt Bill Wilkerson Center; Tonya Bowman, Family Voices/Hands and Voices Parent Consultant; and Claudia Weber, ME, SW, Part C/TEIS Hearing Follow-up Coordinator. Members were active in recruiting extended partners that included TEIS, audiology centers, individual audiologists, a WIC clinic, and parents of children with hearing loss. Initial data collection and assessment activities focused on tracking and reporting of family participation by audiologists and early intervention to reduce the lost to follow-up.

The team's initial AIM 1: By August 2013, IHSIS Team Tennessee will improve the quality, timeliness, and documentation of hearing diagnostic evaluation, identification of permanent hearing loss, and enrollment into early intervention (EI) so that: 1) 50% or more of families whose infant has undergone an audiological diagnostic evaluation will leave each appointment with written documentation of the results and "next steps" for hearing care; 2) 60% or more of families whose infant is enrolled into Tennessee Early Intervention System/Part C will be given information about parent support opportunities through Family Voices of TN and/or TN Hands & Voices during the EI intake process; and 3) Audiology centers will internally document that audiologic diagnostic results were reported to the NHS program on at least 75% of children seen for NHS follow-up.

Three audiology centers agreed to collect the initial data and two centers completed the project. Audiology centers implemented small steps of change to improve. The group developed a number of PDSAs to implement small steps of change and continued to build and expand on successful strategies. Activities included: 1) determining if having a fax machine close to the audiologist would increase the ease of reporting results to the state, 2) providing families with written results and next steps and 3) designating a specific location in the chart to document the family was provided with verbal and written documentation of the visit and documenting referral to Part C/TEIS. Documents developed and being tested include: 1) “Findings and Audiology Next Steps” (FANS) checklist to provide families with audiological results and recommendations. A brief “elevator” speech was developed as a mechanism to promote the use of the checklist with other centers; and 2) Additional reporting guidelines for audiologists to clearly define reporting criteria for children birth – three years of age to the State program. Documents were distributed to additional audiology centers for testing. After additional modifications, these documents will be incorporated into the state audiology guidelines.

Vanderbilt Bill Wilkerson
Audiology Center

Tracking the results of the use of the NICHQ PDSA “FANS” document provided to families with hearing results and next steps after a clinic evaluation.



The NICHQ team developed a PDSA to track LTF/LTD infants through one of the Nashville Metro WIC clinics with the intent of identifying families in need of additional support in obtaining follow-up. One clinic in South Nashville with a high rate of Hispanic clients was selected. WIC was given a list of 19 infant born in Jan. – Mar. 2013 to track. One-third of the infants had passed a follow-up but it had not been reported; two thirds were not aware of the need for follow-up. This project will be expanded in 2014. Outputs developed for expansion included a letter for WIC parents written by a parent of a child with hearing loss to encourage follow-up and a poster to be placed in WIC clinic to encourage hearing follow-up.

The percentage of infants diagnosed with hearing loss that were enrolled in Part C/TEIS increased from 50% in 2010 to 93.4% in 2012 after providing the TEIS hearing consultant access to the Newborn Screening Neometrics data system. All infants diagnosed with hearing loss are referred to TEIS and are tracked by the consultant for enrollment status only. TEIS district service coordinators do not report information to the hearing program other than a written acknowledgement of the receipt of a referral. Attempts to have TEIS obtain a release of information to share the information have been unsuccessful. Attempts to implement small tests of change with Part C/TEIS to document family referrals for family support were not successful. However, the TEIS hearing coordinator successfully tracked enrollment and documented dates of IFSP into the State Neometrics data system.

TN Early Hearing Detection and Intervention (EHDI) 1-3-6 Goals							
Percent of Infants	2010 Baseline	2011	2012	2013 (Jan -Jun)	State Goal	EHDI Goal	HP 2020
% Hearing Loss Enrolled in EI	50.0	79.4	93.4	87.2	50		
LTF/LTD	50	20.6	6.6				
Prior to 6 months of age	29.0	34.8	59.0	50.0		90	55.0
Number with Hearing Loss	67	66	83	32			
Incidence per 1000 births	0.78	0.75	0.89	0.44		2-3.0	

In 2012, 83 infants were identified with hearing loss and 93.4% were enrolled in the Part C Early Intervention System (TEIS). The number of infants with hearing loss identified each year continues to be less than 1:1000. It is anticipated that the reduction in the percentage of LTF/LTD after a referred hearing screen or a “Pending” audiology may identify additional infants with hearing loss.

Family support provided by Family Voices (FV) parent consultants was restructured in February 2013 to provide a referral on each infant diagnosed with hearing loss and to offer a home visit. Protocols advise contacting families within two weeks of the referral, reporting in the FV “Sales Force” data system, and faxing the “Family Support Newborn Hearing Intake Form” to the state NHS program. From July 2012 to June 2013 parent consultants participated in 191 outreach activities; provided 585 contacts to parents; conducted/participated in 40 trainings. Fifty-one families were provided a copy of the Book of Choice and 359 copies of the “Parent Notebook” were distributed. Seventy families of children with hearing loss were contacted from Feb. – to Jun. 2013; the number of home visits to this population continues to increase. Forty-two families responded to the Family Survey of children with hearing loss conducted in 2012/2013. Preliminary data indicated that 79% of the families were aware of where to obtain follow-up testing; 64% received materials regarding communication choices and technologies during in the first year; 45% were aware of the FV parent support network; and 45% received the Parent Notebook. Results will be used to develop strategies for improvement.

Tennessee Hands and Voices (H&V) became a nationally recognized chapter in September 2011 and became a 501 (c) 3 agency in May 2013. Family Voices' parent consultants and NHS staff work closely with H&V and some have served as board members. Joint activities included regional family picnics, training, activities for the siblings, and outreach to families of children with hearing loss. Jennifer Williams conducts the "Sib Shops".

PROJECT NARRATIVE

Introduction

The Tennessee Department of Health (TDH) Early Hearing Detection and Intervention system is known as the Newborn Hearing Screening (NHS) program. The primary aim for the three year cycle of this grant is to focus efforts to reduce the lost to follow-up/lost to documentation (LTF/LTD) rate by 5% for each of the three years for infants who have not passed a physiologic newborn hearing screening examination prior to discharge. NHS will utilize quality improvement methodology to achieve measurable improvement with specifically targeted and measurable interventions. NHS will partner with a number of stakeholders including but not limited to at least three regional teams of audiologists, hospitals, early intervention professionals, medical providers, and parents of children with hearing loss. Teams will be supported and data will be collected, reviewed, and assessed by the NHS program and the epidemiologist supported by the Centers for Disease Control and Prevention (CDC) Early Hearing Detection and Intervention (EHDI) grant. Tennessee participated in the National Initiative for Children's Healthcare Quality (NICHQ) Learning Initiative for Improving Hearing Screening and Intervention Systems (IHSIS) from August 2011 – November 2013. Improvement activities and techniques learned will be utilized to develop statewide and regional teams to develop targeted small steps of change with the goal to institutionalize and disseminate statewide those successful strategies as a best practice.

Needs Assessment

The estimated 2012 population of Tennessee was 6,456,243. In 2012, there were 85,580 births at 75 birthing hospitals/facilities; there were 764 home births. The state is geographically and constitutionally divided into three Grand Divisions: East, Middle and West Tennessee. The East region's two urban areas, Knoxville and Chattanooga, are the 3rd and 4th largest cities in the state. Other cities include the Tri-Cities of Bristol, Johnson City, and Kingsport located in the northeastern most part of the state. Middle Tennessee's major city, Nashville, is the state capital and second largest city. The largest city in West Tennessee and the state is Memphis. West Tennessee is distinct from Middle and East Tennessee in that African-Americans make up a large percent of the population. The most sparsely populated counties are primarily in rural Middle and West Tennessee. Health departments are located in each of Tennessee's 95 counties; however, service delivery is impacted due to a mix of topography, population, resource clusters, distances, and transportation difficulties. The 19 rural counties of the West TN region have few birthing hospitals and one hearing provider. The majority of births and services in that region are located in the 2 metropolitan counties of Memphis/Shelby and Jackson/Madison.

TN Early Hearing Detection and Intervention (EHDl) 1-3-6 Goals						
Percent of Infants	2010 Baseline	2011	2012	State Goal	EHDl Goal	HP 2020 Goal
% Hearing Screens	97.2	97.5	97.9	95		
Prior to 1 month of age	98.4	98.5	98.3		95	90.2
% Refers Completed Follow-up	74.7	69.0	65.0	75		
LTF/LTD	25.7	31.0	35.0	20		
Prior to 3 months of age	77.1	85.8	84.3		90	72.6
% Hearing Loss Enrolled in EI	50.0	79.4	93.4	50		
LTF/LTD	50	20.6	6.6			
Prior to 6 months of age	29.0	34.8	59.0		90	55.0
Number with Hearing Loss	67	66	83			
Incidence per 1000 births	0.78	0.75	0.89		2-3.0	

2012 data indicate a need to increase the number of infants that completed a hearing follow-up after a referred hearing screen from 65% and to increase the percentage that received the follow-up before 3 months of age from 84.3%.

A pilot teleaudiology project was implemented in February 2013 in the Regional Health Office in rural Northwest TN to reduce the number of infants lost to follow-up due to lack of access to an audiologist. The project was in collaboration with Anne Marie Tharpe, Ph.D., Professor and Chair, Department of Hearing and Speech Sciences, Vanderbilt Bill Wilkerson Center and with the West TN Regional Health Office (WTRO). Nine children from six rural counties were scheduled from March – November 2013; 2 were referred for additional testing and passed; 6 passed; 1 cancelled due to illness; 1 did not show for the appointment. No hearing loss was identified. The pilot was expanded to June 2014 to collect additional data to evaluate effectiveness on reducing loss to follow-up.

In mid 2013, in an attempt to reduce LTF/LTD follow-up rate of 61.4% in 2012, the Regional Medical Center in Memphis, in cooperation with the Shelby County Health Department and Newborn Screening Program, agreed to change their long-standing procedure of listing the health department as the medical provider on all newborns. This enabled the metabolic and hearing follow-up program to directly contact the primary care provider in a timely manner to track follow-up. Data are being tracked bi-monthly for improvement and support the need for continued efforts to identify a medical provider. **Attachment 8 – Table and Charts – Charts A and B.**

In 2012, there were 85,580 live births in Tennessee: 68% non-Hispanic White; 20% non-Hispanic African American; 8% Hispanic any race; 4% other or unknown Race/Ethnicity. There was not a significant difference in the percent of all races/ethnicities that received a hearing screen. Non-Hispanic African Americans had the highest rate of LTF/LTD (49.3%) after a referred hearing screen, followed by Hispanics (38.7%); and Whites (29.1%) compared to

statewide (35%). However, all African Americans with hearing loss were enrolled into Part C/TEIS; Hispanics had a rate of LTF of 25%; statewide LTF for enrollment into TEIS was 6.6%. Spanish speaking families were referred to the Hispanic parent consultant. In January 2013, the hearing program began to make direct referrals of children with hearing loss to Family Voices. The Hispanic parent consultant at Family Voices made 150 contacts to Spanish speaking families of children requiring follow-up or who had a hearing loss. The percentage of home births that were lost to follow-up decreased from 42% in 2011 to 23% in 2012. **Attachment 8 – Table and Charts – Charts C and D.**

The percentage of infants diagnosed with hearing loss that were documented as enrolled in Part C Tennessee Early Intervention System (TEIS) increased from 50% in 2010 to 93.4% in 2012 after providing the TEIS hearing consultant access to the Newborn Screening Neometrics data system. All infants diagnosed with hearing loss are referred to TEIS and are tracked by the consultant for enrollment status only. There continues to be a need for development of an agreement to obtain parent consent to release data related to intervention and to assess parent support. The number of infants with hearing loss identified each year continues to be less than 1:1000. It is anticipated that the reduction in the percentage of LTF/LTD after a referred hearing screen or a “Pending” audiology may identify additional infants with hearing loss.

Tennessee had a six-member team participate in the National Initiative for Children’s Healthcare Quality (NICHQ) Improving Hearing Screening and Intervention Systems (IHSIS) August 2012 – September 2013. The team members included Jacque Cundall, RN, BSN, EHDI director; Yinmei Li, Ph.D., CDC EHDI epidemiologist; Julie Beeler, EHDI Audiology Consultant; Tamala Bradham, Ph.D., Associate Director of Services of the National Center for Childhood Deafness and Family Communication (Bill Wilkerson Center); Tonya Bowman, Family Voices/Hands and Voices Parent Consultant and Claudia Weber, ME, SW, Part C/TEIS Hearing Follow-up Coordinator. Members were active in recruiting extended partners that included TEIS, audiology centers, individual audiologists, a WIC clinic, and parents of children with hearing loss. Initial data collection and assessment activities focused on tracking and reporting of family participation by audiologists. The following paragraphs describe some of the opportunities identified for continued improvement.

Two hospitals exhibited high rates of LTF/LTD: both are large hospitals with sizeable Neonatal Intensive Care Units (NICUs). The Regional Medical Center (MED) well-baby nursery in Memphis had a LTF rate of 52% (312 refers) in 2011. The MED serves the greatest number of low income and African American families. In 2011, Vanderbilt University Medical Center (VUMC) well-baby nursery in Nashville had a LTF rate of 22% (272 refers). To seek additional audiology partners, NHS sent an email invitation early in December 2013 to pediatric audiologists to identify additional providers interested in partnering on small tests of change to address LTF/LTD issues. Nineteen audiologists agreed to participate. NHS will develop a Change Packet with each audiologist so they may determine which change strategy they would like to test within their own clinic using the Plan-Do-Study-Act (PDSA) format. Julie Beeler, NHS Audiology Consultant, will work with individuals and Regional Teams, and audiology partners to identify current gaps in services and devise change strategies to test within their practices. One common finding was that many audiology centers do not have a method to collect

data on their monthly show/no-show (S/NS) rates for babies who are scheduled for a rescreen or diagnostic appointment after a refer on the initial screen.

Bill Wilkerson Center (BWC) audiologists submitted data to the NICHQ project in 2013. The center tested a Findings and Audiology Next Steps (FANS) Checklist. BWC routinely reports follow-up to NHS (259 in 2011 and 412 in 2012). A need for specific reporting requirements in regard to multiple testing and risk follow-up was indicated. The current State Pediatric Audiology and Amplification Guidelines states “providers should report all cases of confirmed hearing loss on infants, toddlers, and children.” A Report of Infant Hearing Rescreen/Diagnostic (fax-back) is available. NHS created an Audiology Reporting Algorithm with a list of frequently asked questions related to reporting. The algorithm includes: a) acceptable methods for reporting to NHS; b) the timeline for sharing reports; and c) scenario-specific guidelines for reporting. The algorithm has been reviewed by audiologists at BWC and content was modified. It will continue to be tested with other centers before dissemination or incorporated into the guidelines.

The Women, Infants, and Children (WIC) Special Supplemental Nutrition Program partnered with the Metro Nashville Health Department (MNHD) during the NICHQ collaborative to address LTF/LTD issues. In February 2013, staff from one MNHD WIC Clinic received names of babies that TN EHDI judged to be LTF/LTD from that region. Out of the total number of flagged babies who came to the WIC Clinic during the test period, WIC staff identified one-third who had completed hearing follow-up, but the results were not reported to NHS. WIC staff identified two-thirds of flagged babies who were unaware of the need for hearing follow-up. The positive outcome of this test provide a basis for exploring opportunities to expand this change strategy to additional WIC clinics in counties with a high rate of LTF.

Late in 2011, NHS partnered with Early Head Start (EHS) Programs statewide in the Early Childhood Hearing Outreach (ECHO) Initiative. Early in 2012, Julie Beeler, Audiology Consultant and ECHO trainer, held regional trainings for 16 EHS Programs in TN to prepare EHS health services staff to conduct OAE screens on children enrolled into EHS and then annually until age 3. All EHS programs in TN are equipped with their own OAE screening unit, purchased through a collaborative agreement between EHS and TN’s Part C Program. Ms. Beeler’s training included documentation of screening results on an ECHO reporting log. The latest version of the ECHO log has fields that include the child’s a) date of birth; b) mother’s name; and c) birthing hospital. These fields allow for ease of data sharing between the EHS and NHS programs, as NHS can cross reference EHS children with babies in their database that have been judged to be LTF/LTD. Cross referencing of data from EHS programs has not yet occurred in Tennessee. Ms. Beeler identified that several EHS programs submitted OAE result logs after their first year of screening, but the logs were often incomplete. Some EHS programs had not obtained parental consent to share results. Ms. Beeler is now working with each EHS program that submitted insufficient result logs and/or had consent issues to assist them so OAE results may be shared in a seamless manner in the future.

The Family Voices (FV) agency conducted a survey of families with children identified with hearing loss in 2012/2013. Surveys were mailed to families of children with hearing loss identified by the program; or completed by families at the audiologist’s office; or completed on-line. Forty-two families responded. Preliminary results indicated that 79% of the families were

aware of where to obtain follow-up testing; 64% received materials regarding communication choices and technologies in the first year; 45% were aware of the FV parent support network; and 45% received the Family Voices Parent Notebook. Survey results were used to develop strategies for improvement.

A national survey of primary care providers was conducted by the National Center for Hearing Assessment and Management (NCHAM) and Boys Town National Research Hospital in 2012. Physicians reported their level of knowledge of newborn hearing screening, referrals for evaluation, hearing loss, intervention and reporting to the state program. Tennessee had 42 physicians complete the survey. When questioned about earliest age a child should be retested if not passing the screen, 81.1% responded that follow-up testing should occur prior to 3 months of age. Almost 64% reported that infants must be over 4 months of age before being fitted for a hearing aid. Only 34% reported their training had prepared them to adequately meet the needs of infants with a hearing loss. Survey data were used to develop strategies for improvement.

Methodology

Tennessee will utilize the Model of Improvement utilized during participation in the National Initiative for Children's Healthcare Quality (NICHQ) Learning Initiative for Improving Hearing Screening and Intervention Systems (IHSIS). The state NICHQ team will continue to meet and additional regional teams will be formed to identify and address challenges using small tests of change with the Plan-Do-Study-Act (PDSA) model. NHS will continue to refine some of the PDSA cycles it began in 2013, test successful strategies as listed in the grant, and develop new PDSAs driven by the regional teams. Training will be provided to regional team members in the quality improvement method to develop aims statements and PDSAs. Invitations to participate in the teams have been sent to parents, early intervention staff, audiologists (hospital screening and diagnostic), local health departments, and community partners. Three West TN regional team meetings have been scheduled for January 2014. Outreach for additional partners will include outreach to additional home-visiting programs to implement follow-up strategies and to the county health councils to increase their awareness of the importance of the early identification of hearing loss in their efforts to address regional health needs.

The TN newborn screening program (metabolic blood spot, hearing program, and critical congenital heart disease) utilizes the Natus Neometrics data system. It has the capability to capture data and generate follow-up actions (letters, phone calls, reports) to track infants and contact families, medical providers, specialty providers (genetic, hematology, endocrinology, audiology), Part C/early intervention, and hospitals. The TN Neometrics system is transitioning to an internet-based system in phases. In June 2013, Phase I Secured Remote Viewer (SRV) was implemented and enables medical providers to view and print newborn screening results; the service was extended to audiologists in November 2013. The case management documentation (iCMS) component will be implemented in January 2014. Hearing sub-contract partners will be provided access to document hearing follow-up. In early 2014, Phase II for Remote Data Entry (RDE) of newborn screening demographics will be implemented by hospitals. Specific fields will be required to improve the quality of hearing data and facilitate follow-up such as a hearing result for each ear, a second medical provider for Neonatal Intensive Care Unit (NICU) infants, and a second family contact. Phase III - Remote Diagnostic Entry (RDx) will allow entry of

diagnostic evaluations by genetic centers and audiologists. Phase IV - Device Case Management System (dCMS) will allow hospital hearing results to be uploaded directly from the screening equipment. Dates of implementation have not yet been set for RDx or dCMS.

The Newborn Screening Task Force is not a mandated committee but has been active in advisement to the NHS program since 1997. Participants from the August 2013 meeting included 4 NHS central office staff, 15 audiologists (hospital, private practice, university based), 2 Part C early intervention program representatives, 6 parents, 1 midwife, 2 geneticists, 2 epidemiologists, 1 Title V Children's Special Service home visiting program staff member, 1 State Early Head Start staff member, and 3 representatives from the Deaf and Hard of Hearing community. Members of the Task Force serve as a sub-committee to the mandated State Newborn Screening Genetic Advisory Committee (GAC). Additionally, the parent of a child with hearing loss serves on the GAC.

To sustain improvement, successful strategies will be promoted as "Best Practice" and incorporated into the statewide Newborn Hearing Screening Guidelines for hospitals, audiologists, early intervention staff, primary care providers and family support programs. In addition, the program will promote successful strategies to be considered for implementation by various departmental home visiting programs.

Work Plan

The Newborn Hearing Screening (NHS) program will expand quality improvement activities by partnering with stakeholders to carry out small tests of change. When improvement is noted these will lead to statewide implementation of strategies that will reduce Tennessee's overall LTF/LTD to 15% by March 2017. NHS has chosen six stakeholder groups to partner with in Year 1, with the understanding that other stakeholder groups may be identified in subsequent years of the grant: hospitals, audiologists, WIC, community providers (including Early Head Start, physicians, and university Doctor of Audiology programs), family support entities, and Part C/TEIS. (**Attachment 1 - Work Plan**)

State AIM 1: By March 31, 2017, Tennessee NHS Program will use quality improvement methodology, in partnership with a variety of NHS stakeholders, so that Lost-to-Follow-Up (LTF)/Lost-to-Documentation (LTD) after a referred newborn hearing screen, as reported on the CDC annual EHDI survey, is decreased from 31% (2011) to 15% (average of 5% reduction per grant year).

Hospital Partnerships Year 1 AIM: By March 31, 2015, Tennessee hospitals, in partnership with the NHS program, will develop, test, and implement change strategies for infants who refer on their newborn hearing screen to decrease the state LFU/LTD rate by 5%. Data will be reported to and measured by the NHS Neometrics system. Vanderbilt University Medical Center (VUMC), Nashville and The Regional Medical Center (MED), Memphis newborn hearing screening programs will select one change strategy from a to be developed Change Packet to test within their facility for a designated period of time. The Change Packet will include previously proven change strategies to reduce the LTF as well as newly proposed ideas.

Hospital 1: In March 2014, NHS will share the Change Packet with the Regional Medical Center (MED). The MED will begin testing the following change strategy described below. For one week in April, one discharge nurse from the MED well-baby nursery will obtain a second point of family contact and verify the newborn's primary care physician (PCP) prior to discharge. It is predicted that the hospital will have fewer infants that are reported to NHS as "unable to contact/unknown" and have fewer reports of "no PCP". Data will track the percent of successful follow-up on these infants during the test week. Data will be compared to follow-up for the infants that did not have the information confirmed. If the data indicates a greater percent of successful family and PCP contacts for babies in the test group, the small test will be determined as successful. In May, the PDSA activity would then be expanded to include additional nurses to try the process for two weeks, and then spread to all discharge nurses for the MED's well baby nursery in June 2014. Documentation will continue for several months to monitor the sustainability of the improvement. An increase in successful contacts for MED babies should result in decreases in LTF. If the change strategy does not result in improvement, the MED and NHS will explore reasons why improvement was not noted (e.g., second point of contact not accurate, PCP not accurate, nurse unclear about test methods, etc). Modifications will be made for subsequent tests. It is anticipated that the expansion and spread of this change strategy could reach full implementation at the MED by August 2014. In September, an additional strategy would be added and the process continued for two week intervals. As an expansion in Year 1, the test of change would be expanded to additional hospitals with a high LTF rate.

Hospital 2: In May 2014, NHS will share the Change Packet with Vanderbilt University Medical Center (VUMC) to introduce proven change strategies for improving LTF/LTD rates. VUMC will begin by "testing" the following change strategy described below. The NHS program will devise a simple script and train nurses and/or hearing screeners about verbally sharing results of the newborn hearing screen with families in June 2014. Two staff will use the scripts for two weeks. It is predicted that if the VUMC well baby nursery staff receives script training and provides clear messaging to the families about the need for immediate follow-up on a referred NHS then more families will seek timely follow-up. Data will be collected to calculate the percent of completed follow-up appointments for babies discharged for two weeks after the training is completed (06/15/14 – 06/30/2014). Data will be compared to VUMC's LTF rate prior to script training. If the NHS finds a lower LTF percent for babies discharged during the two-week course of the activity, then it can be concluded that the script training resulted in greater follow-up compliance. VUMC and NHS will maintain run charts for the remainder of Year 1 in order to document that the sustainable effect on LTF. If script training does not result in improved compliance for follow-up, VUMC staff together with NHS will need to a) determine if nurses are sharing scripts in desired manner; b) determine if some element of the training is not effective and modify the training; and c) continue to test until an improvement is noted or the change strategy is deemed to be ineffective. If results of script training at VUMC are positive, NHS will expand the test in a select number of other hospitals with higher than expected LTF rates. The MED will be first among those other targeted hospitals for script training.

In Years 2/3, NHS will examine outcomes from change strategies/PDSAs targeted in Year 1 and continue to partner with additional hospitals to test, implement, and spread change strategies that are presented to hospitals in the Change Packet. NHS staff will support hospitals as they select change strategies that are best suited to the needs of their facilities, conduct small tests of change

with those strategies, monitor progress over time, make needed adjustments to strategies, and expand implementation until spread is achieved. Successful changes will be incorporated into hospital hearing screening guidelines. In Year 2 of the grant cycle, hospitals will participate in training for TN's Neometrics Data System module for Remote Data Entry (RDE). RDE will allow hospitals to directly input hearing screening results electronically. PDSAs will be used to test the training at one hospital and then expanded to other targeted hospitals, until the training can be spread to all birthing hospitals in the state.

Audiology Partnerships – Year 1 AIM: By March 31, 2015, Tennessee audiologists, in partnership with the NHS program, will develop, test, and implement change strategies using quality improvement for infants who refer on their newborn hearing screen to decrease the state LFU/LTD rate by 5%. Data will be reported to and measured by the NHS Neometrics system. These will address LTF/LTD for babies who refer on their newborn hearing screen. By March 2015, at least 10 pediatric audiologists will select one change strategy from the Change Packet to test within their facility with the expectation that their audiology center will reduce the LTF in their region by 5% and will implement the change if successful. The NHS program will create a formula for partner audiologists to use in calculating their clinic's monthly show/no show (S/NS) rate, beginning in January 2014. Run charts will capture monthly S/NS data as they begin to test and implement change strategies. The following describes change strategies that select audiology partners have agreed to test in Year 1.

Center 1: From 04/01/14-04/30/2014, University of Tennessee Medical Center Knoxville (UTK) receptionists will make pre-appointment reminder calls to families of pediatric clients for one month. During the test period, reminder calls/voice mails will be made one business day in advance of the appointment. It is predicted that UTK will see a decrease in their no-show rate when pre-appointment reminder calls are made. To evaluate the outcome of this test, UTK will document their show/no show (S/NS) rate for babies scheduled in April 2014. Outcome data will be compared to UTK S/NS rate for three previous months. If the data from April appointments indicate a higher number of completed appointments, then the pre-appointment reminder calls resulted in an improved show rate. If the data does not indicate a positive change in the S/NS rate for April, UTK and NHS will identify reasons why the calls did not result in more completed appointments (e.g., many families not reachable by phone, large number of voicemail messages, time of day calls are made, script used by receptionist, weather-related issues, etc.). If the outcome of the pre-appointment calls results in an improved show rate, then UTK will: a) make pre-appointment reminder calls for subsequent months and b) evaluate monthly S/NS data to see if the change strategy results in a sustainable improvement. NHS will disseminate successful outcomes of this change strategy with other audiology partners and encourage those who do not currently make pre-appointment reminder calls to implement this strategy in their own facilities for the remainder of Year 1.

Center 2: Audiologists from LeBonheur Children's Hospital (LCH) in Memphis will partner with NHS to expand the Findings and Audiology Next Steps (FANS) Checklist. LCH is not a birthing hospital but has the largest NICU in the multiple state area. LCH's audiology program conducts initial hearing screens, rescreens, and diagnostic services on children from across the Southwest TN region. LCH serves a large number of low income, African American and out-of state infants. Accurate no show data are not available. To obtain baseline data, they will document

monthly S/NS rate using the NHS S/NS formula beginning in January 2014. During TN's recent NICHQ experience, the FANS Checklist was tested and implemented in seven audiology centers across the state with success, but not implemented statewide. It is comprised of one section for documentation of rescreening or diagnostic results and another section for child-specific recommendations following the appointment. LCH audiologists do not currently share written results and recommendations with families before they leave their child's appointment. For two weeks, beginning April 1, 2014, two LCH audiologists, Dr. Tracey Ambrose and Cindy Gore, will share the FANS Checklist with families. It is predicted that LCH will see an increased return rate if families are given written documentation of their child's next steps. To collect comparison data for pre/post evaluation, LCH will document S/NS rates for all audiology appointments, not just returns after a NHS refer. LCH will document the return rate for families who receive the checklist and compare the data to the program's previous return rate for appointments. If the return rate increases, it will be concluded that the Checklist is a successful tool. If the return rate does not change, the tool may be discontinued. Additional strategies will then be initiated. A parent survey may assess the benefit of the tool to families. Comments from parents about the Checklist in the previous NICHQ test were positive. This will be the first time data has been collected in regard to the Checklist's effect on return rates. Previous PDSAs with the FANS Checklist have proven its usefulness as a communication tool for both audiologists and parents. Once LCH has tested the Checklist, it will be disseminated to other audiology clinics statewide during Year 1.

Center 3: Vanderbilt Bill Wilkerson Center (BWC) in Nashville has 15 pediatric audiologists. From 04/01/14 – 04/15/2014, the audiology reporting algorithm developed in 2013 will be used by Dr. Mary Edwards. She will fax-back the electronic version of the Reporting Form for cases based on the algorithm. It is predicted that the algorithm's specific guidelines for reporting will lead to more standardized reporting and less variability in decision making for individual reports. After the two week test period, EHDI will survey Dr. Edwards to assess the functionality of the algorithm. Based on her feedback, the algorithm may need to be modified before continued testing with additional BWC audiologists. For the next three months (05/01/14 – 7/31/2014), NHS will compare the number of incoming, monthly rescreen/diagnostic reports from BWC and compare it to their 2013 monthly reporting prior to implementation of the tool. Several outcomes will be considered as an improvement when evaluating results of this change strategy: a) audiologists report having a better understanding of when to report results to NHS; b) the number of reports from BWC will increase (LTD will decrease); and/or c) there are fewer duplicate reports from BWC. Run charts of monthly reporting from BWC will demonstrate sustainable change over time. Outcomes of this test will be evaluated by NHS and disseminated to at least 10 other audiology centers who will be encouraged to test and implement the algorithm during Year 1 using similar PDSAs.

NHS will continue to partner with audiologists in Year 2/3 to test, implement, and spread change strategies that target reducing no-show rates that included, but are not limited to, those in the Change Packet. NHS will support audiologists as they select change strategies that are best suited to the needs of their facilities, conduct small tests of change with those strategies, monitor progress over time, make needed adjustments to strategies, and expand implementation until spread has been achieved. Successful changes will be incorporated into the audiology guidelines. In Year 2, hospital audiologists will also participate in training for TN's Neometrics Data System

module for Remote Data Entry (RDE). RDE will allow hospitals to directly input initial and follow-up screening results electronically. PDSAs will be used to test the training first with one audiologist, then expanding to other targeted audiologists, until the training can be spread to all pediatric audiologists in the state.

Women Infant and Children’s (WIC) Special Supplemental Nutrition Program – Year 1

AIM: By March 31, 2105, WIC staff, in partnership with the NHS program, will develop, test, and implement change strategies using quality improvement methodologies for infants who refer on their newborn hearing screen to decrease the state LFU/LTD rate by 5%. Data will be reported to and measured by the NHS Neometrics system. Prior to 04/01/2014, NHS will identify infants who are LTF/LTD by county. A list of infants will be provided for one metro and one rural county that have a high rate. WIC will flag the charts of infants scheduled for clinic from 04/01/14 – 04/31/2014. WIC staff will: a) document the hearing result for those babies who completed follow-up; b) identify babies who have not completed hearing follow-up and obtain the name of the PCP; c) give a list of hearing providers to families whose babies have not gone for follow-up; and d) report findings to the NHS Program. A packet of materials will be prepared for WIC staff to provide parents: 1) list of hearing providers by region; 2) letter from a parent of a child with hearing loss to encourage follow-up; and 3) hearing brochure on follow-up. WIC staff will be instructed to provide materials, encourage the need for follow-up and fax finding to NHS. Predicted outcomes 1) NHS will locate babies that were previously judged to be LTF/LTD; 2) the follow-up status on located babies will be determined; 3) babies who need hearing follow-up will schedule rescreen or diagnostic appointment; and 4) the correct PCP will be identified for contact. WIC’s data collection for this test will include a) documentation of flagged babies who report that hearing follow-up was completed and b) documentation of flagged babies who report that hearing follow-up was not completed and were advised to contact their PCP or make an audiologist appointment. WIC will fax information back to NHS. If this change strategy is successful, subsequent tests will involve the creation of an ongoing system to communicate flagged babies with this particular clinic. If improvements are seen from the test at the WIC Clinic, expansion will be proposed to additional target clinics during Year 1 and possibly into subsequent years of the grant cycle. If improvements are not seen with this test or is determined by WIC to not be practical, new strategies may be addressed or discontinued.

Community Partnerships -Year 1 AIM: By March 31, 2015, community providers, in partnership with the NHS program, will develop, test, and implement change strategies using quality improvement methodologies for infants who refer on their newborn hearing screen to decrease the state LFU/LTD rate by 5%. Data will be reported to and measured by the NHS Neometrics system. NHS will access already established partnerships with community stakeholders (identified below) to target LTF/LTD change strategies that include data sharing, public awareness efforts, and phone follow-up.

Partner 1 - Early Head Start (EHS): The Telamon Migrant EHS Program indicated an interest in partnering with NHS to test data sharing of OAE results. Telamon, one of the smallest EHS programs in the state, serves the Hispanic migrant population across three sites in East Tennessee. Telamon will submit their OAE screening logs for the 2012/2013 school year to NHS by 06/01/2014. For the next month, NHS will cross-reference Telamon EHS results logs with the Neometrics database to identify babies and children from Telamon who: a) referred on their NHS

and have not completed follow-up; b) missed a NHS while in the hospital; or c) have completed the EHS OAE protocol and have gone on to be identified with hearing loss. It is predicted that access to Telamon (or any) EHS OAE screening logs will allow NHS to obtain the screening status of babies who were previously judged to be LTF/LTD or identified with hearing loss. Based on reports from other state EHDI programs who share data with EHS Programs, NHS predicts that this test should reduce LTD. Spread of this change strategy will involve incorporating results data from at least four other EHS Programs that have expressed an interest in partnership and been receptive to constructive support regarding future OAE log entries. It is anticipated that by Year 2 of the grant cycle, the Neometrics data system will be ready for direct entry of results from a variety of providers. Early Head Start Programs will certainly be included as a group of providers who will be encouraged to directly enter their OAE screening results into the Neometrics hearing screening database. PDSAs will be devised for Year 2/3 that will focus on training sites on direct data entry.

Partner 2 – Tennessee Hands and Voices (H&V): From 05/01 – 05/31/2014, two H&V parents will share a prepared “Elevator Speech” by phone with physicians in one pediatric group in Memphis to encourage physicians to treat a referred hearing screen as a medical emergency. The speech will be developed in cooperation with Mark Gaylord, MD, AAP Newborn Hearing Chapter Champion. A short survey of participating physicians will evaluate effectiveness before expanding calls to additional providers in the Memphis area. NHS will work collaboratively with H&V to 1) identify and train additional parent volunteers; 2) identify specific pediatric practices to target; and 3) evaluate pre/post survey results. If the “elevator speech” change strategy proves to be successful in Memphis over the course of Year 1, TN EHDI will work with TN H&V to identify other cities with higher than expected LTF rates so they may be incorporated into additional physician awareness PDSAs in Year 2/3 of the grant. In Year 2, physicians will also participate in training for TN’s Neometrics Data System module for Remote Data Entry (RDE). RDE will allow physicians to directly input hearing screening results electronically. PDSAs will be used to test the training approach, first with one pediatric practice that is conducting OAE screens, and then expanding to other targeted practices who conduct OAE screens, until the training can be spread to primary care physicians in the state.

Family Support Partnerships – Year 1 AIM: By March 31, 2015, Family Voices (FV), in partnership with the NHS program, will develop, test, and implement change strategies using quality improvement methodologies that address the provision of family-centered support to parents with a child who is deaf or hard-of-hearing by providing a home visit to at least 20 families. Data will be reported to and measured by the NHS Neometrics system. Between 04/01/14 – 5/30/2014, Tonya Bowman, FV Parent Consultant for Middle TN, will work collaboratively with Dr. Cathi Hayes at BWC Nashville to text five families of children who have been identified with hearing loss. Dr. Hayes will share information about FV and indicate that Ms. Bowman will be reaching out to the families via text. Within two days of the appointment, Ms. Bowman will use a scripted text message to introduce herself and offer a personal phone call. It is predicted that parents may be more responsive to FV’s offers of support and ultimately accept invitations for a home visit if a trusted audiologist recommends a FV connection and families are first contacted by FV via text messaging. FV will document the number of families who respond to the text and the number of successful home visits. Susie McCamy, NHS Deaf Education/Family Support Consultant will collaborate with FV to collect

data. If the test results in an improvement, the data should show an increased number of initial successful contacts using text messaging as compared to phone calls and/or an increased number of families ultimately accepting a home visit. If the PDSA for this change strategy does not show an increase in successful contacts and/or home visits, then FV will explore reasons why the texts may not have been successful. The test will be expanded in June 2014, to Camille Keck, FV, East TN to families served by Dr. Kristen Vreiswyk, Director of Audiology at Chattanooga Speech and Hearing Center, and Dr. Danielle Combs, Lead Audiologist at Wellmont Holston Valley Hearing Center in Kingsport. Successful outcomes will be expanded to additional parent consultants. In Year 2, FV Parent Consultants will participate in training for TN's Neometrics Data System module for Remote Data Entry (RDE). Since there are currently a very small number of Parent Consultants, NHS will work closely with FV to develop new PDSAs relating to direct data entry of information gathered during phone contacts or home visits. In Year 2/3, NHS will also attempt to reach out to community home visiting partners who are not currently connected with NHS. These connections might include EHS programs who have never submitted screening data, medical providers who conduct OAE screens but do not report, home visiting programs that could incorporate the LTF message during visits, and midwives. As new partnerships are established, NHS will support these providers in conducting needs assessments, developing PDSAs, and testing change strategies that encompass NHS's LTF/LTD goals.

Tennessee Early Intervention (TEIS)– Part C Partnerships Year 1 AMI: By March 31,2015, Part C, in partnership with the NHS program, will develop, test, and implement change strategies using quality improvement methodologies for infants who refer on their newborn hearing screen to decrease the state LFU/LTD rate by 5%. Data will be reported to and measured by the NHS Neometrics system. From 5/1/14 to 5/31/14, the TEIS NHS coordinator will work with NHS to utilize the NHS data matching report and systems (vital records, health department, TennCare) to locate new addresses, phone numbers for families. Year 2: By March 2016, TEIS will implement at least three of the 12 goals outlined in the Joint Commission on Infant Hearing (JCIH) 2013 Supplement Statement for children birth – 3 years of age with hearing loss in regard to timely access, parent support and service by a qualified provider. The initial PDSA will begin June 2014 and target collection of baseline data for service coordinators with specialized knowledge and skills related to working with individuals that are deaf or hard of hearing. Additional PDSAs will be developed to track documentation of families referred for family support. Years 2 and 3 will expand implementation of additional JCIH goals into the TEIS program and promote documentation of enrollment for children identified with hearing loss. **Attachment 1 – Work Plan.**

Resolution of Challenges

The Newborn Hearing Screening program has a history of active and supportive stakeholders. Regional teams will identify challenges and to develop, test and implement quality improvement strategies. These will promote the creation of “Best Practices” to be institutionalized and disseminated. It is anticipated that agencies and providers presented with time limited small tests of change will be less reluctant to commit to participation in an activity (PDSA). The program will assist participants to develop data collection tools. When community individuals and facilities are able to document results, it will assist them to make recommendation for changes to decision makers. A challenge will be staff time required to compile, cross reference data, and

evaluate data collected in the numerous PDSA cycles that are proposed. Administrative and staff support time have been traditional challenges. The current administration actively supports the use of data to identify and support policy change.

Evaluation and Technical Support Capacity

The program will be supported by the TN EHDI CDC grant staff directed by Yinmei Le, PhD epidemiologist with the Division of Policy Planning and Assessment. During the period from July 1, 2011 to December 31st 2012, activities will focus on four main areas: 1) continuing to provide and expand epidemiologic and surveillance support to the TN Newborn Hearing Screening (NHS) program and its EHDI activities; 2) gaining access to Children's Special Services (CSS) data related to hearing intervention; 3) collaborating with the Department of Health's Division of Family Health and Wellness (FHW) and the Natus Medicals' Division of Neometrics (the vendor for the current Neometrics system the Department of Health is using for newborn metabolic and hearing screening) to incorporate the internet Case Management System (iCMS) into the current EHDI-IS system; 4) collaborating with the Department of Health's Information Technology Services Division (ITSD) to identify gaps in the compatibility of the current EHDI-IS with nationally recognized Electronic Health Records System (EHR-S) standards.

Hearing data are matched with vital records weekly and with the State Patient Tracking and Billing Management Information System (PTBMIS) monthly. PTBMIS enables matching to WIC and CSS clients to validate new demographic data to track infants and identify children with hearing loss enrolled in CSS that may not have been reported to NHS. Reports have been developed to validate accuracy of data as the child progresses through the three components of screening, diagnosis and intervention to meet the 1 month, 3 month, 6 month timeline criteria for follow-up. Evaluation and tracking reports are developed using the Neometric Crystal reports and Statistical Analysis Software (SAS). Routine reports include monthly reports to hospitals to track infants missing results in one or both ears; data checking reports for discrepancies in diagnosis and final disposition; quarterly detailed reports for hospitals on screening, referral, follow-up, hearing loss and early intervention enrollment rates; and tracking the number of follow-ups reported by hearing providers and medical providers. Reports of the follow-up rates by race, ethnicity, mother's age and education will be tracked. Trend charts of data from 2009-2012 were presented to the Genetic Advisory Committee and the Newborn Hearing Screening Task Force. Data has been utilized to direct program activities to reduce hospital referral rates, reduce lost to follow-up/lost to reporting after a failed screened, track pending diagnostic evaluations by audiologists, track reporting practices by primary care providers, and target specific populations for improvement activities. **Attachment 2 – Staffing Plan and Job Descriptions, Attachment 3 – Biographical Sketches, Attachment 4 – Letters for Agreement, Attachment 5 – Program Organization Chart, Attachment 8 – Other Letters of Support.**

Organizational Information

The Tennessee Department of Health's mission is to protect, promote, and improve the health and prosperity of people in Tennessee. Organizationally, Title V Maternal and Child Health

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(MCH) services in Tennessee are coordinated centrally by the Department of Health's Division of Family Health and Wellness (FHW). One of the programs in FHW is the newly designed Pediatric Case Management and Follow-up Program (PCM) that includes newborn hearing screening, newborn bloodspot screening, newborn critical congenital heart disease screening and lead screening.

The FHW Central Office provides programmatic guidance and technical assistance to MCH programs. Direct services are generally carried out at the local level (in health departments in all 95 counties) and contracted agencies. Title V programs offered through the county health departments include women's health and family planning, services for children with special health care needs, home visiting programs, TennCare Early Periodic Screening Diagnosis and Treatment examinations (EPSDT), Women Infant and Children (WIC) services, and dental services for pregnant women and children. Public health partnerships expanded in recent years to incorporate county health councils to address specific county health problems based on data; communicable and environmental disease surveillance; and intervention and emergency preparedness. MCH continues to work on developing the levels of the health system pyramid model concentrating especially on population based and infrastructure services through the health department structure. The Newborn Hearing Screening program is a population based service.

The Newborn Hearing Program structure includes central office staff, sub-contract staff, and collaborative staff with other Health Department and State Department programs. (**Attachment 5 - Project Organizational Chart**). Central office staff members include the project director, Jacque Cundall, RN, BSN, who is responsible for the overall hearing program, including administration of the sub-contracts, collaboration with contract staff, development and collaboration of quality improvement reports, collaboration with partners, and assistance with integrated newborn screening bloodspot program. She has worked with the hearing program since late 1996. Rebecca Walls, RN, has public health experience with providing home visits for children with special needs and with the Deaf and Hard of Hearing community. As the hearing follow-up coordinator, she is responsible for data entry, tracking of follow-up and providing quality improvement reports to hospitals. Other Case Management program RN staff provide data entry of follow-up and will be assigned additional roles. NHS administers two sub-contracts to provide team members not available through the State system (audiologist, deaf educator, and parents). The contract with the University of Tennessee – Knoxville Center of Deafness provides an audiology consultant (.75 FTE), a family outreach consultant/deaf educator (.25 FTE), and is charged with developing and conducting statewide training as requested by the program. J. Beeler, audiologist, has 15 years of experience as a pediatric audiologist and participated in the TN NICHQ Team for quality improvement. She provides phone and onsite consultation and training to hospitals, audiologists, primary care providers, midwives, families, early intervention, Early Head Start, and other organizations. She assisted the National Center for Hearing Assessment (NCHAM) with the Early Childhood Hearing Outreach (ECHO) training for additional state Early Head Start agencies. She will participate in the regional teams for quality improvement. S. McCamy, deaf educator, has 37 years of experience as a deaf educator (14 years as in-home early intervention services to deaf/blind children). She conducts individualized follow-up with families of children with hearing loss; provides training on working with children and families with hearing loss for the parent consultants; and coordinates activities with TN

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Hands and Voices (H&V). The NHS program also contracts with Tennessee Disability Coalition for Family Voices support services. Five parent consultants (2 FTE) conduct community outreach and training to promote newborn hearing screening and follow-up; conduct family networking activities to link families of children with hearing loss; provide calls/home visits to families of children newly diagnosed with hearing loss; and provide materials and consultation to promote non-biased selection of communication methods and early intervention services. Consultants are parents of children or family members with hearing loss. One consultant is Hispanic and bi-lingual. Parent consultants also serve as board members with TN H&V. All sub-contract staff members participate in the Newborn Hearing Task Force and in the development of program goals, procedures and guidelines. Members participate in local, state and national conferences such as EHDI and the Hands and Voices Leadership Conference. The Department of Education Part C Early Intervention System (TEIS) is required, by mandate, to assist with follow-up of infants that did not pass the newborn hearing screen or that are at risk for hearing loss. All infants with hearing loss are eligible for TEIS services. Claudia Weber, SW (1 FTE) is the TEIS hearing screening coordinator and is responsible for contacting families in need of hearing follow-up. An integral part of the program is the collaboration with Yinmei Li, PhD and Fenyuan Xiao, PhD, epidemiologists with the TN EDHI CDC grant, who develop data systems and reports to evaluate program services and develop improvement strategies. In addition, there is a no-cost sub-contract with Vanderbilt University, Department of Hearing and Speech Science, Bill Wilkerson Center to conduct a Teleaudiology pilot project in rural West TN. All of the above individuals are considered to be core members of the Newborn Hearing team.

The TN Department of Health administration strongly supports quality improvement activities to measure and track program performance. Staff training was conducted in 2011-13 for program managers on developing SMART goals and objectives, evidence based decision making, managing change, team building and collaboration. In 2012, each FHW program developed a poster with at least one goal, quarterly data (process measure), trend graph, and strategies for improvement. These were posted quarterly and shared with the Commissioner of Health.

Attachment 6 – Data Tables and Charts – Chart E.

Successful strategies to reduce loss to follow-up and loss to documentation after a failed newborn hearing screening will be incorporated into the program guidelines for hospitals, audiologists, early intervention systems, primary care providers and family support programs and disseminated by mail and listed on the Department of Health website.