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.

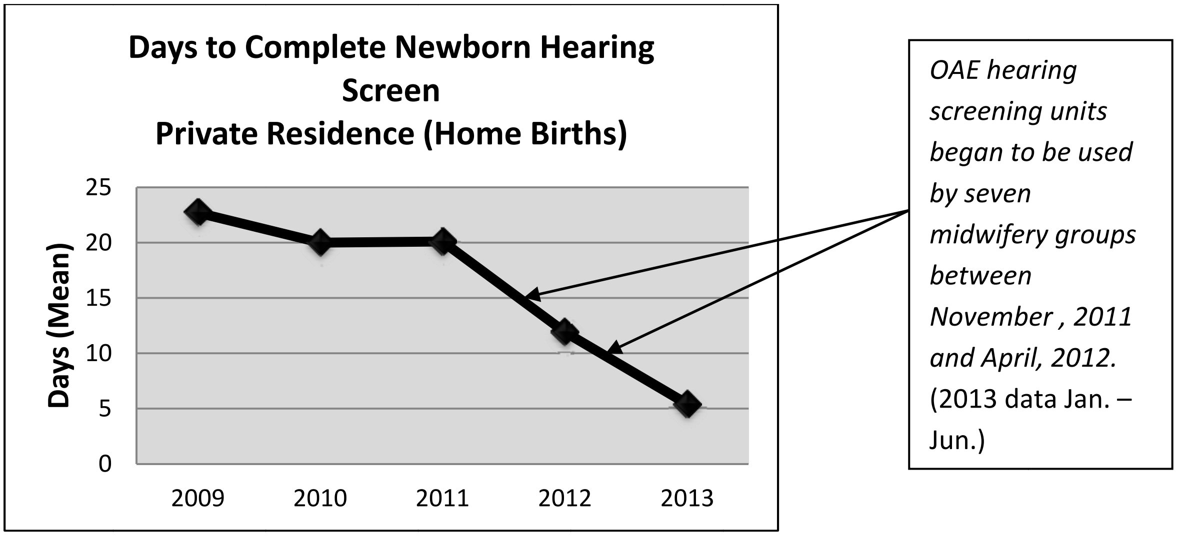
In 2012, the overall percent of infants screened increased by 0.7% from 97.2% in 2010. Of the 2,136 infants not screened: 7% declined the screen; 11% were still in the hospital; 9% discharged or transferred; 4% expired; and 12 were unable to test; for 68% the reason was not available.

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).



OAE hearing screening units began to be used by seven midwifery groups between November , 2011 and April, 2012. (2013 data Jan. – Jun.)

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 [redacted] 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.

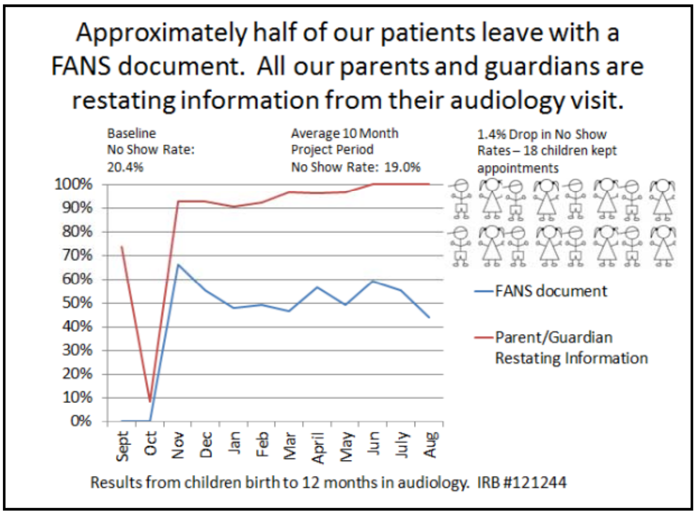
Tennessee had a six-member team participate in the NICHQ Improving Hearing Screening and Intervention Systems (IHSIS) August 2012 – September 2013. The team members included Jacque Cundall, RN, BSN, EHDI director; Yinmei Li, Ph.D., CDC EHDI epidemiologist; Julie Beeler, EHDI Audiology Consultant; Tamala 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.


Approximately half of our patients leave with a FANS document. All our parents and guardians are restating information from their audiology visit.

Results from children birth to 12 months in audiology. IRB #121244

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".