



Targeted Approach to Improve Hospital Newborn Hearing Screening Fail Rates

Dr. Brittany Day, Hilary Fryman, Charles Lechner, and Holli Allen

Disclosures

Brittany Day

- Financial Disclosures: *Dr. Day receives a salary provided by Vanderbilt University Medical Center, a portion of which is funded through a grant from the Tennessee Department of Health.*
- Non-Financial Disclosures: *None*

Project Goals

1

Educate hospitals
on hearing
screening best
practices

2

Support hospitals
with inpatient
fail rate of $\geq 5\%$

3

Decrease
statewide lost to
follow-up
incidence rate

Background

Efforts began in 2020 – reviewing hospitals with low initial screening rates and high fail rates for initial screenings

Tennessee Department of Health epidemiologist created targeted reports for a few identified hospitals

Child-level data tracked by birth hospital – needed real-time data

Internal tableau dashboard created to monitor real-time data

Dashboard Development

Pull screening data from case management system

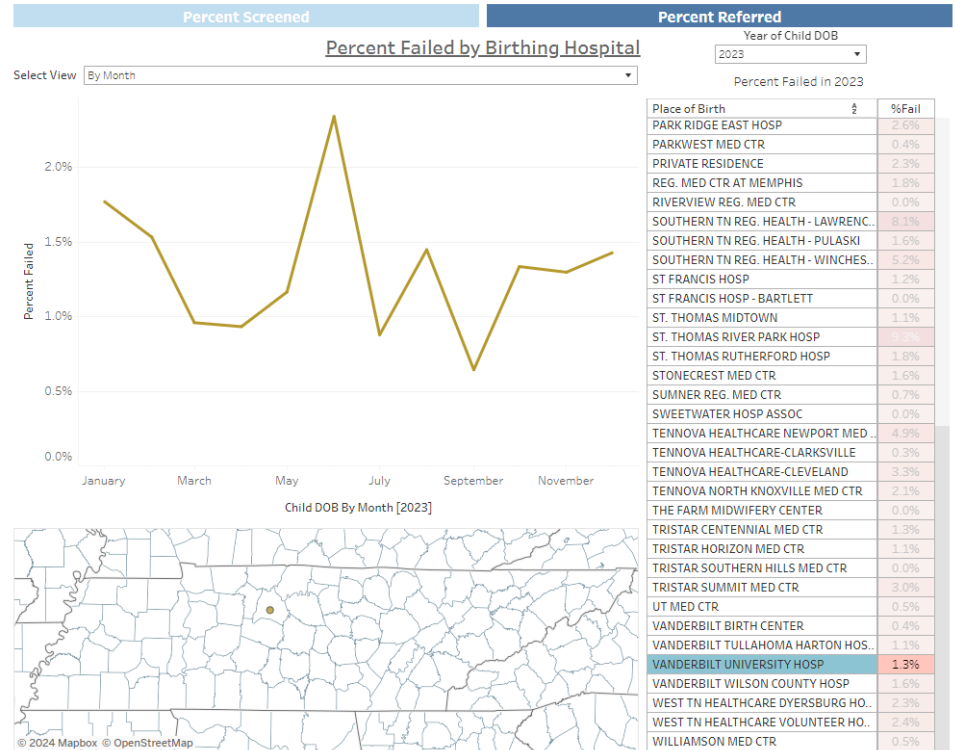


Calculate hospitals' monthly screening and failure rates



Import data into Tableau and visualize with trend charts and yearly tables

Tennessee Hospitals - Referral and Screening by [Charles Lechner](#)



Implementation and Review Process



Formally started data project in August 2022



Dissemination of Best Practice documents



Creation of Hospital Hearing Guidelines manual

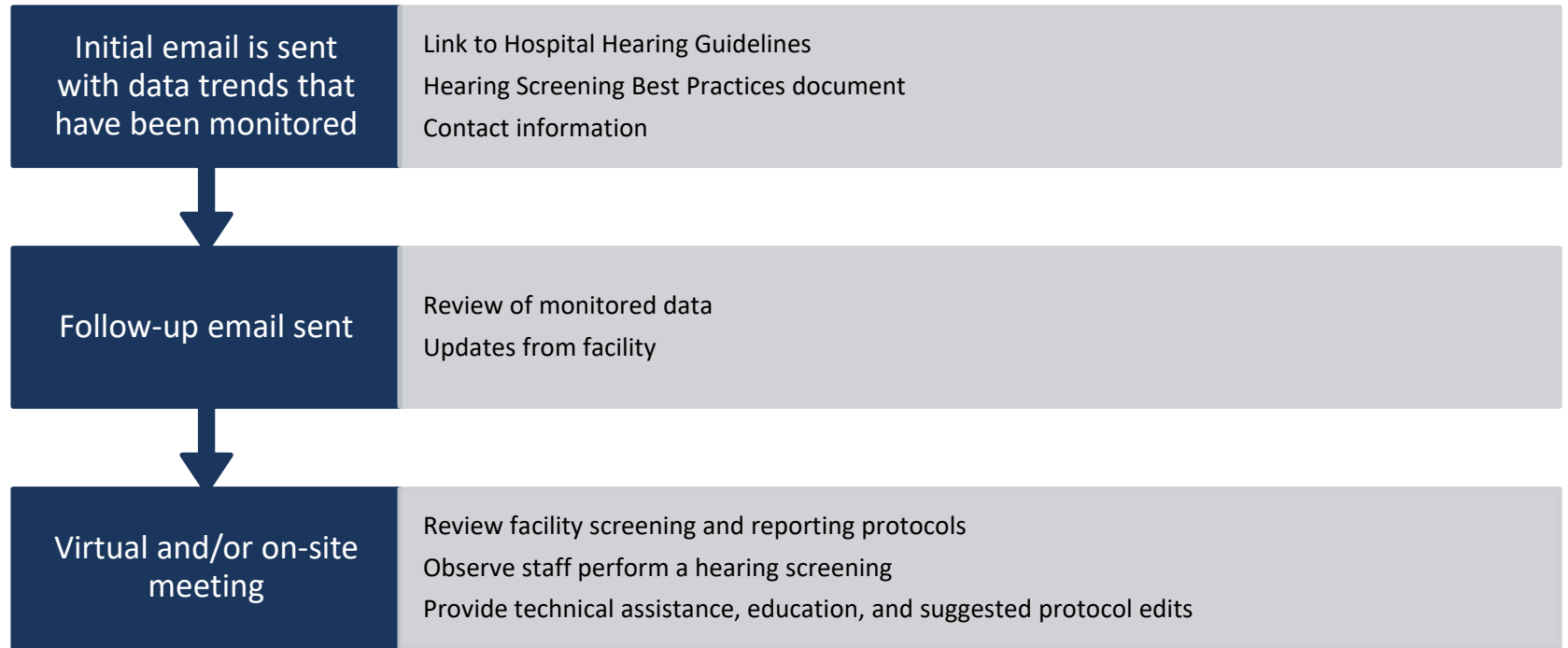


Monthly data review meetings to monitor birth rate and initial failed screening trends by facility

Data

Birth Facility	NICU	Pediatrix	OP r/s	AVG	AVG	JAN				FEB				MAR				APR				MAY				JUN				JUL		
				CUMUL	INITIAL	1 mo	3 mo	6 mo	1 mo	3 mo	6 mo	1 mo	3 mo	6 mo	1 mo	3 mo	6 mo	1 mo	3 mo	6 mo	1 mo	3 mo	6 mo	1 mo	3 mo	6 mo	1 mo	3 mo	6 mo	1 mo	3 mo	6 mo
				13-Feb	28-Apr	12-Jul	28-Mar	7-May	11-Aug	14-Feb	28-Apr	6-Jun	11-Sep	14-Feb	7-May	12-Jul	10-Oct	14-Feb	6-Jun	11-Aug	9-Nov	14-Feb	12-Jul	11-Sep	11-Dec	14-Feb	11-Aug	10-Oct	9-Jan			
Athens Reg Med Ctr			x	3.3	7.9	5.3	5.0	0.0	0.0	0.0	0.0	15.4	12.0	12.0	12.0	0.0	0.0	0.0	17.6	8.0	8.0	8.0	14.3	0.0	0.0	0.0	6.3	4.5	4.5			
Ballad Health Bristol Reg Med Ctr		x	x	0.6	1.7	0.0	0.9	0.9	2.5	2.6	2.6	0.8	0.8	0.0	0.0	1.0	1.0	1.0	5.7	0.8	0.8	0.8	1.9	0.0	0.0	0.0	0.0	0.8	0.8			
Baptist Mem Hosp - Union City			x	6.1	14.7	11.3	7.7	4.6	5.7	3.8	3.8	14.0	10.5	7.0	5.3	3.3	3.3	3.3	6.9	4.3	2.1	2.1	14.3	7.5	3.8	3.8	14.0	7.0	4.2			
Baptist Memorial Hosp Memphis	III		x	0.4	1.0	0.3	0.0	0.2	0.5	0.0	0.0	0.0	0.2	0.2	0.2	0.2	0.2	0.2	3.0	0.2	0.2	0.2	0.3	0.2	0.4	0.4	1.7	0.9	0.9			
Baptist Memorial Hosp - Tipton				12.1	20.3	13.6	8.3	8.3	16.6	10.7	10.7	23.8	23.8	14.3	14.3	0.0	0.0	0.0	22.2	9.1	9.1	9.1	25.0	16.7	6.7	3.3	18.2	10.8	8.1			
Blanchfield Army Communy Hosp			x	1.0	6.8	4.0	0.0	0.0	4.5	0.0	0.0	1.8	0.0	0.0	0.0	0.9	0.9	0.9	13.2	1.3	2.6	2.6	11.0	0.9	0.9	0.9	2.0	0.0	0.0			
Blount Memorial Hosp		x	x	1.3	2.5	2.2	2.2	2.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	2.0	2.0	5.0	1.9	1.9	1.9	0.0	0.0	0.0	0.0	2.6	0.0	0.0			
Cookeville Reg Medical				3.3	4.3	7.8	7.3	6.4	1.8	0.9	0.9	1.5	1.5	1.5	1.5	1.7	1.7	1.7	2.3	1.7	0.9	0.9	7.7	5.3	3.8	3.8	6.4	4.9	4.2			
Cumberland Med Ctr		x	x	0.4	1.4	3.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.1	2.1	2.0	2.0	1.9	1.7	1.6	1.6	3.4	0.0	0.0			
Erlanger East Women's Services	II			5.1	11.7	15.0	6.6	6.3	9.7	3.5	3.5	6.6	5.7	4.7	4.3	2.1	1.7	1.7	12.2	4.0	3.2	2.9	17.9	8.2	6.1	6.1	11.3	4.5	4.2			
Erlanger Med Ctr	IV			4.0	9.0	9.2	5.1	4.6	9.3	2.2	2.3	4.9	4.5	2.5	2.5	6.7	6.3	5.7	12.2	3.6	2.3	2.3	4.5	2.2	2.1	1.6	10.5	3.7	2.7			
Franklin Woods Community Hosp		x	x	0.3	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.7	0.7	1.9	0.8	0.8	0.8	0.0	0.0	0.0	0.0	1.7	1.3	1.3			
Ft Sanders Reg Med Ctr		x	x	0.3	1.4	3.3	0.9	0.9	0.8	0.4	0.4	1.1	1.1	1.0	0.3	0.0	0.0	0.0	2.7	0.7	0.7	0.7	3.9	0.0	0.0	0.0	0.9	0.3	0.3			
Greeneville Community Hosp East			x	3.8	8.8	11.1	5.6	5.6	15.2	2.9	2.9	0.0	0.0	0.0	0.0	3.3	3.3	3.3	0.0	0.0	0.0	0.0	8.3	3.4	3.4	0.0	17.9	7.7	7.7			
Hardin Med Ctr				7.6	13.2	3.3	3.3	3.3	11.5	7.7	7.7	3.8	0.0	0.0	0.0	3.2	3.2	3.2	10.6	3.7	3.7	3.7	30.4	32.0	15.4	15.4	28.0	19.5	16.7			
Hendersonville Med Ctr (Tristar)	II	x	x	2.0	4.3	1.0	0.0	0.0	0.0	0.0	0.0	1.1	1.1	0.0	0.0	1.2	1.2	1.2	7.4	0.9	0.9	0.9	4.6	0.9	0.9	0.9	1.1	0.0	0.0			
Henry County Med Ctr				3.0	4.2	8.3	7.7	7.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.6	3.6	3.6	8.8	4.8	4.8	4.8	5.7	5.3	5.3	5.3	0.0	0.0	0.0			
Indian Path Community Hosp		x	x	0.2	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
Jackson-Madison Co Gen Hosp	III	x	x	1.4	3.0	2.8	2.0	2.0	1.7	0.8	0.4	0.7	0.0	0.7	0.7	1.3	0.9	0.9	3.8	2.7	2.7	2.7	5.1	0.7	0.4	0.4	3.3	1.1	1.1			
Johnson City Med Ctr	III	x	x	1.6	2.3	2.6	2.3	2.3	2.2	2.2	2.2	3.0	2.9	2.9	2.9	2.6	2.5	2.5	5.0	2.8	2.7	2.7	3.8	3.4	2.2	2.2	4.8	2.0	2.0			
Leconte Med Ctr		x	x	0.9	2.3	1.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.6	5.4	5.4	5.4	6.4	1.8	1.8	1.8	2.2	0.0	0.0			
Lincoln Med Ctr			x	5.9	5.9	12.5	4.2	4.2	23.5	16.7	16.7	4.2	4.2	4.2	4.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.2	4.2			
Livingston Reg Hosp			x	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
Maury Reg Hosp	II	x	x	0.4	1.8	2.0	0.6	0.6	0.8	0.0	0.0	0.7	0.7	0.7	0.7	0.7	0.7	0.7	4.4	1.7	0.9	0.9	3.9	0.0	0.0	0.0	1.7	1.3	1.3			
Methodist LeBonheur - Germantown	III	x	x	0.9	1.6	1.1	0.7	1.1	1.1	0.4	0.4	0.0	0.7	0.7	0.7	1.3	0.7	0.7	4.2	3.2	2.3	2.3	2.8	1.9	0.6	0.6	4.1	1.3	1.0			
Methodist Hosp - South	II	x		2.8	6.1	9.4	3.5	1.8	12.8	4.2	4.2	3.6	1.2	1.8	1.8	2.3	2.3	2.3	11.1	8.9	4.4	4.4	5.9	4.4	2.2	2.2	4.0	2.3	0.0			
Methodist Med Ctr Oak Ridge		x	x	0.6	2.5	6.4	2.0	2.1	6.1	1.0	0.0	0.0	0.0	0.0	0.0	2.6	2.6	2.6	0.0	0.0	0.0	0.0	2.3	0.0	0.0	0.0	3.8	0.0	0.0			
Metro Nashville General Hosp	II			3.1	5.1	9.4	5.7	5.9	3.7	0.0	0.0	3.1	3.1	3.1	0.0	6.7	3.3	3.2	9.1	6.3	6.3	6.3	3.8	0.0	0.0	0.0	3.1	0.0	0.0			
Morristown-Hamblen Healthcare		x	x	0.6	1.9	1.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.1	0.0	0.0	0.0	1.9	1.7	0.0	0.0	1.7	1.4	1.4			
Northcrest Med Ctr				11.9	28.0														33.3	0.0	0.0	0.0	20.0	16.7	0.0	0.0	12.5	14.3	14.3			
Parkridge East Hosp	III			2.6	5.7	2.3	1.5	1.5	9.3	3.5	3.0	6.9	4.5	3.9	3.9	4.0	3.4	3.4	10.1	5.2	2.3	2.3	7.7	3.7	3.2	3.2	4.7	2.8	2.2			
Parkwest Med Ctr		x	x	0.4	1.4	1.5	0.0	0.0	2.4	1.5	1.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.3	1.9	1.9	1.9	1.0	0.0	0.0	0.0	0.0	0.0	0.0			
Reg One Med Ctr at Memphis	III			1.8	2.9	2.7	3.3	2.3	4.2	2.6	1.6	11.0	9.1	4.9	4.4	8.8	6.3	6.3	0.8	0.5	0.5	0.5	0.0	1.0	1.4	1.4	0.7	1.5	1.9			
Riverview Reg Med Ctr			x	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
Southern TN Reg Health - Lawrenceburg				8.1	20.9	5.3	5.0	5.0	41.7	23.1	23.1	8.3	8.3	8.3	4.2	0.0	0.0	0.0	62.5	21.4	14.3	14.3	11.0	10.5	10.5	10.5	6.7	10.0	0.0			

Outreach



Outcomes

Number of facilities contacted

- 14 individual hospitals
- Some hospitals have had multiple trainings

Number of facility visits (in-person and virtual)

- 11 in person
- 2 virtual

Improved mean fail rate for the contacted facilities

- 8.3% in 2020
- 5.7% in 2023

Increasing statewide lost to follow-up rate

- 21.2% in 2020
- 46.8% in 2022
- Preliminary rate for 2023 similar to 2022's rate

Observations

Initial email outreach

- Facilitation of communication between Tennessee Department of Health and facility
- Benchmark for facilities to begin to examine their own data and processes

Hospital visits (in-person and/or virtual)

- Provide an opportunity for one-on-one training/education and hands-on demonstration
- Highlight areas for improvement to protocols and equipment needs
- Higher level of accountability

Information Learned

Hearing screenings were being completed earlier than recommended

Screenings were being repeated more than two times inpatient

High staff turnover (screeners and nursery leadership)

Smaller hospitals with nursing staff performing screenings tend to have higher fail rate

Difficulty with equipment

Inpatient rescreens not being reported in a timely manner

Referral pathways

Wins

Facility 1

- Moved to in-house screenings
- First facility to receive in-person training
- Great fail rates

Facility 2

- Time of screening
- Screener staffing
- Access to medical records
- Communication between hospital and contractor

Facility 3

- Time of screening
- Proper use of equipment

Facility 4

- Communication between Tennessee Department of Health and facility while transitioning to in-house screening



Ongoing Challenges



Various staffing models



Timely and consistent/accurate reporting



Aging equipment



Lack of reciprocal communication



Leadership turnover

Future Project Goals

Examine data as
inpatient vs
outpatient
screenings

Identify “super
screeners” for
facilities that utilize
nurse screening

Meet with facilities
that have abnormally
low fail rates

Monitor screening
rates

Investigate
increasing lost to
follow-up rates

Referral pathways

“Audiology deserts”

Contact Us

Tennessee Department of Health

Holli Allen, EHDI Program Coordinator

Holli.N.Allen@tn.gov

615-291-5914

Hilary Fryman, Newborn Screening Nurse Educator

Hilary.Fryman@tn.gov

615-253-4129

Charles Lechner, Epidemiologist

Charles.R.Lechner@tn.gov

615-532-4514

Vanderbilt University Medical Center

Brittany Day, Mama Lere Hearing Programs Director

brittany.day@vumc.org

615-322-6292