

1 Problem

Step 1. Define the Problem		
What	Problem(s)	Newborns misdiagnosed for auditory neuropathy; Permanent hearing damage
When	Date	Proactive
	Different, unusual, unique	Symptoms mimic common hearing loss
Where	Facility, site	Maternity ward
	Task being performed	Routine hearing screenings on newborns
Impact to the Goals	Patient Safety	Possible permanent hearing damage
	Patient Safety	Early treatment to aid development
	Compliance	Possible state regulation for screening
Frequency		~15% of hearing problems in newborns are AN

DIAGNOSING HEARING LOSS IN BABIES

Auditory Neuropathy

Little is known about auditory neuropathy (AN) spectrum disorder. However a new study suggests that it is far more common than was previously thought. And traditional treatments, such as hearing aids, may quickly cause more harm than realized. This Cause Map explores one of the unintended consequences of newborn hearing screening.

"There are cases where hearing aids have actually destroyed the hearing of children with auditory neuropathy." - Dr. Charles Berlin

Cause Mapping is a Root Cause Analysis method that captures basic cause-and-effect relationships supported with evidence.

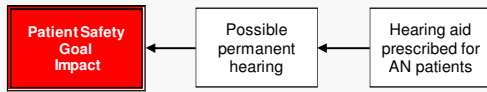
CAUSE MAPPING

Problem Solving • Incident Investigation • Root Cause Analysis

- Step 1 **Problem** What's the Problem?
- Step 2 **Analysis** Why did it happen?
- Step 3 **Solutions** What will be done?

2 Analysis

Basic Level Cause Map - Start with simple Why questions.



Basic Cause-and-Effect

Little is known about AN, including what causes it and how to treat it. Because AN is relatively rare, most doctors and audiologists prescribe hearing aids as the first course of treatment. Unfortunately this treatment, which amplified sound entering the ear canal, can be exactly the wrong treatment for some types of AN. For those with damage to the hearing nerve, blasting noise into the ear canal simply damages the external, working portions of the ear.

More Detailed Cause-and-Effect

All new parents wait to hear that first wail in the delivery room, followed by a quick counting of fingers and toes. Satisfied with their healthy new baby and exhausted from delivery, few notice the battery of tests newborns face in their first few days of life. Thanks to these tests, many serious problems can be detected and treated before they become life-threatening.

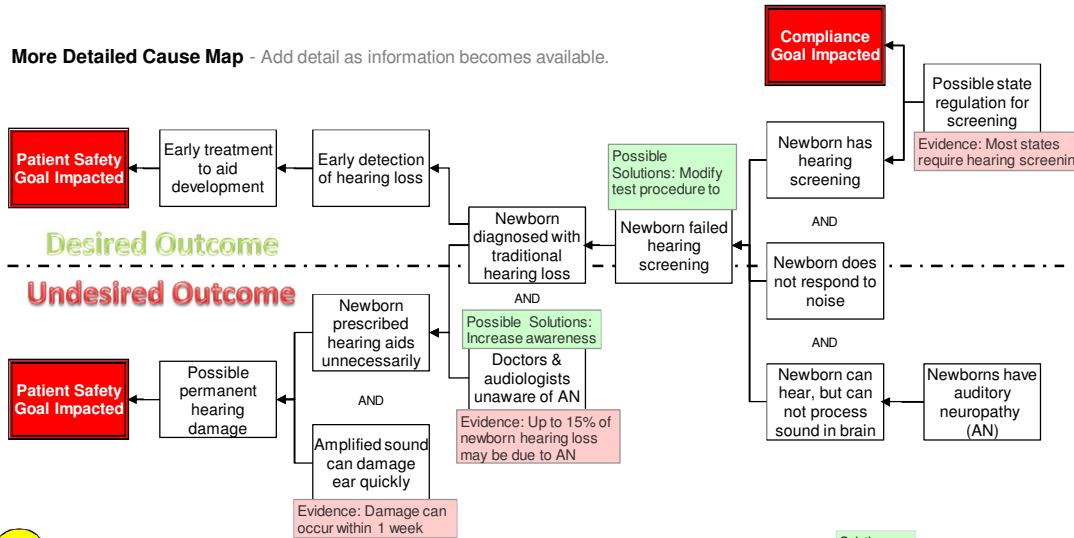
Many states now mandate hearing screening at birth. Even minor hearing loss, if not caught early, can seriously impede language and social development. Nearly 2% of babies fail their initial screening, prompting more through testing. Approximately 0.2% of children born in the U.S. will be diagnosed with hearing loss. While most children with hearing loss have conductive (outer or middle ear) or sensorineural (inner ear) hearing loss, there is another type of hearing loss. With auditory neuropathy (AN) spectrum disorder, sound enters the ear normally; but because of damage to the inner ear or hearing nerve, the brain isn't able to understand the signal. The sound is similar to what you might hear underwater or on radio with a lot of static.

A Cause Map can help sort out the factors contributing to this problem. The top of the Cause Map shows the desired outcome. Mandatory or recommended screening in infancy results in earlier diagnoses of hearing loss, which limits developmental delays further down the road. However the bottom portion of the Cause Map shows how current screening practices can often lead to misdiagnosis and the wrong treatment. By focusing on this area of the Cause Map, solutions can be identified to eliminate the unintended effect.

Two such potential solutions have been identified. First, changes to the screening process might identify AN early on. Considering that up to 15% of hearing loss may be caused by AN, this may be a more feasible solution than previously thought. Second, an awareness campaign may help doctors and audiologists become more aware of AN and how to properly treat it.

With more research and greater awareness, there is hope that those with auditory neuropathy spectrum disorder will not accidentally suffer more.

More Detailed Cause Map - Add detail as information becomes available.



3 Solutions

No.	Action Item	Cause
1	Increase awareness	Doctors & audiologists unaware of AN
2	Modify test procedure to screen for AN	Newborn failed hearing screening