10 years of UNHS: Quality Improvement is Perpetual for Parkland Universal Hearing Screening Program

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UT SOUTHWESTERN MEDICAL CENTER ¹DEPT. OF OTOLARYNGOLOGY ²DEPARTMENT OF PEDIATRICS PARKLAND HOSPITAL NEWBORN NURSERY







Introduction to Parkland Health & Hospital System (PHHS)

PARKLAND HOSPITAL WAS ESTABLISHED IN 1894 TO MEET THE HEALTH CARE NEEDS OF POOR AND MEDICALLY INDIGENT PATIENTS IN DALLAS COUNTY.

TODAY, IT IS AN INTERNATIONALLY RECOGNIZED MEDICAL SYSTEM ACCREDITED BY THE JOINT COMMISSION ON ACCREDITATION OF HEALTHCARE ORGANIZATIONS.

MORE THAN 1 MILLION PATIENTS ARE CARED FOR ANNUALLY.



"After many years of waiting, the citizens of Dallas can congratulate themselves on having a place for the care of their sick, second to none which exists in the state." – Hospital Archives Opening Day Ceremonies May 19,1894

Parkland Hospital then.....

Parkland Hospital now.....



Dedicated to the health and well-being of individuals and communities entrusted to our care.

http://www.parklandhospital.com/whoweare/milestones/milestones1872_94.html

In the United States, Parkland has...

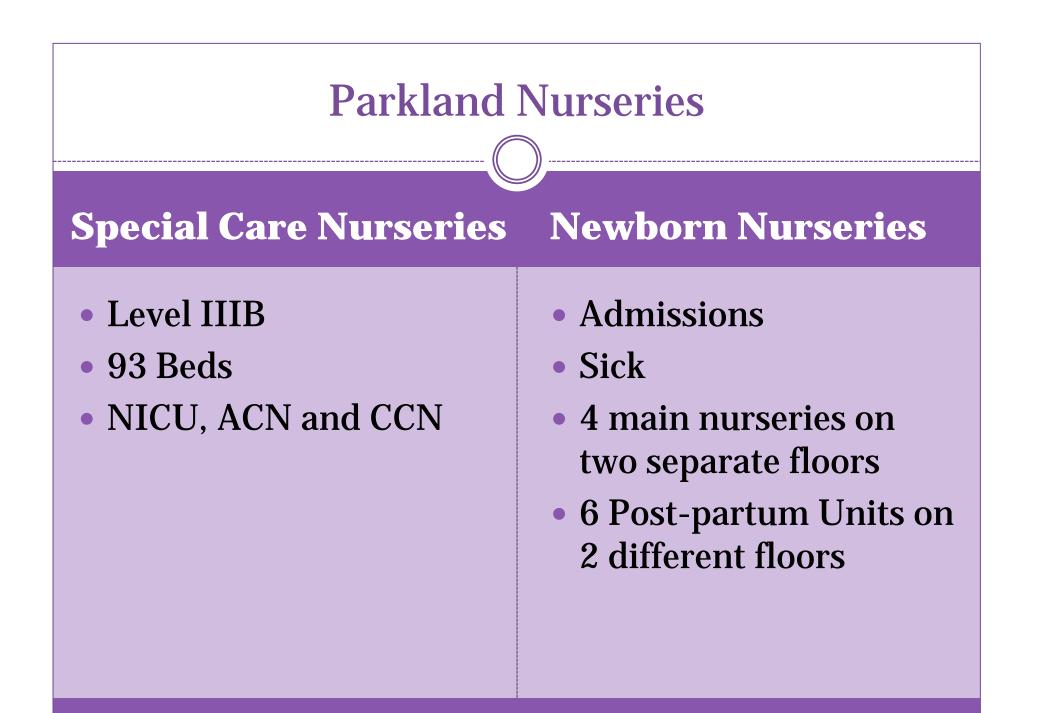
- The second busiest Civilian Burn Unit
- One of the busiest Emergency Rooms
- Largest single-site birthing hospital



Pam Ford, RN, Newborn Nursery Manager, parklandhospital.com

Parkland Newborn Population

- 79% Hispanic
- 15% Black
- 67.2% Medicaid
- 2.3% Commercial insurance
- Maternal age is <20 years in 20% of the patients
- 95% receive prenatal care



Parkland Newborn Hearing Screening Program

~1986 - PARKLAND BEGAN SCREENING BABIES AT RISK FOR HEARING LOSS IN THE NEWBORN AND SPECIAL CARE NURSERIES (UTILIZING THE HIGH RISK REGISTER).

A GROUP OF WOMEN FROM THE NATIONAL COUNCIL OF JEWISH WOMEN (NCJW) AGREED TO ORGANIZE AND PROVIDE FINANCIAL ASSISTANCE TO BEGIN THE HEARING SCREENING PROGRAM.

~1991/1992 – PARKLAND BEGAN SCREENING ALL BABIES IN THE SPECIAL CARE NURSERY AND CONTINUED TO SCREEN ALL BABIES AT RISK FOR HEARING LOSS IN THE NEWBORN NURSERIES.



Left to right: Barbara Franklin, Bette Morchower, Rachel Emmett, Roberta Schwartz, Karen Kurzman, Zara Wettreich, Marlene Rene & Barbara DuBois (Not pictured: Phyllis Steinhart, the 1st volunteer & Sara Albert)

UNHS at Parkland

- 1997: Parkland organized a committee of representatives from every discipline involved in the nursery and hearing screening program to begin planning for a UNHS Program.
- April 1999 Parkland began a pilot program in preparation for moving to a UNHS Program.
- September 1, 1999 –

Parkland began screening all babies' hearing prior to discharge from the hospital.

Texas HB 714 was implemented requiring hospitals to screen all babies prior to discharge.

Parkland UNHS Mission Statement, 1999-Present

- To provide every baby born at or transferred to Parkland with a hearing screening prior to discharge from the hospital;
- To connect babies referred by the hearing screening program with appropriate diagnostic services and examinations;
- To facilitate connection with early intervention services;
- To serve as a conduit of information to parents, other professionals, and the community regarding normal auditory behavior, speech and language development, and the importance of early intervention.

Texas Goals for UNHS Programs

- TAC Title 25 Part 1 Chapter 37 Subchapter S Rule §37.505
 - Minimum acceptable levels of performance include:
 - × 95% of newborns shall be screened
 - × 90% of newborns shall pass
 - Goals for program performance shall include:
 - × 98% of newborns shall be screened
 - × 95% of newborns shall pass

National Standards for UNHS Programs

• Joint Committee on Infant Hearing, 2007

Quality Indicators for Screening

- Percentage of all newborn infants who complete screening by 1 month of age; the recommended benchmark is more than 95% (age correction for pre-term infants is acceptable).
- Percentage of all newborn infants who fail initial screening and fail any subsequent rescreening before comprehensive audiological evaluation; the recommended benchmark is less than 4%.

Quality Indicators for Confirmation of Hearing Loss

 Of infants who fail initial screening and any subsequent rescreening, the percentage who complete a comprehensive audiological evaluation by 3 months of age; the recommended benchmark is 90%.

How Does Parkland UNHS Rate?

	TX Min.	TX Goal	JCIH 2007	Parkland
% Screened	>95%	>98%	>95%	>99%
%Pass	>90%	>95%	>96%	>99%
% Return for Follow-up			>90%	>97%

- Parkland Maintains Distinguished Certification
- Parkland exceeds Texas and national standards

How is Parkland UNHS Doing?

	2007	2008	2009	<u>1999-2009</u>	TX 2007
#screened	16,237	15,646	14,796	158,180	380,625
%screened	99.98	99.99	99	99.2	98.8
# ReferIP	189	165	176	1356	6388
% ReferIP	1.16	1.05	1.19	0.86	1.68
#ReferOP	71	70	75	659	
%ReferOP	0.44	0.45	0.51	0.42	
# with AI	53	53	65	522	250
% with AI	0.33	0.34	0.44	0.33	0.07
#LTFU	2	3	3	40	5598
%LTFU	1.06	1.82	1.7	2.95	87.6
PPV	74.6	75.7	86.5	79.21	3.91
PPV: Bilateral AI	40.8	47	40.5	40.36	

***Data for Texas taken from the CDC website http://www.cdc.gov/ncbddd/EHDI/data.htm

How did we get here?

LESSONS LEARNED ALONG THE WAY...

ANÝONE WHO HAS NEVER MADE A MISTAKE HAS NEVER TRIED ANÝTHING NEW.

--- ALBERT EINSTEIN

CHALLENGE I

ACHIEVE A TEAM APPROACH WITH OTHER STAFF, REFERRAL SOURCES, COMMUNITY AND FAMILIES.

ENHANCE RECOGNITION OF IMPORTANCE OF HEARING SCREENING AND INCORPORATE UNHS INTO THE CULTURE OF CARE IN AN ALREADY VERY BUSY NURSERY.

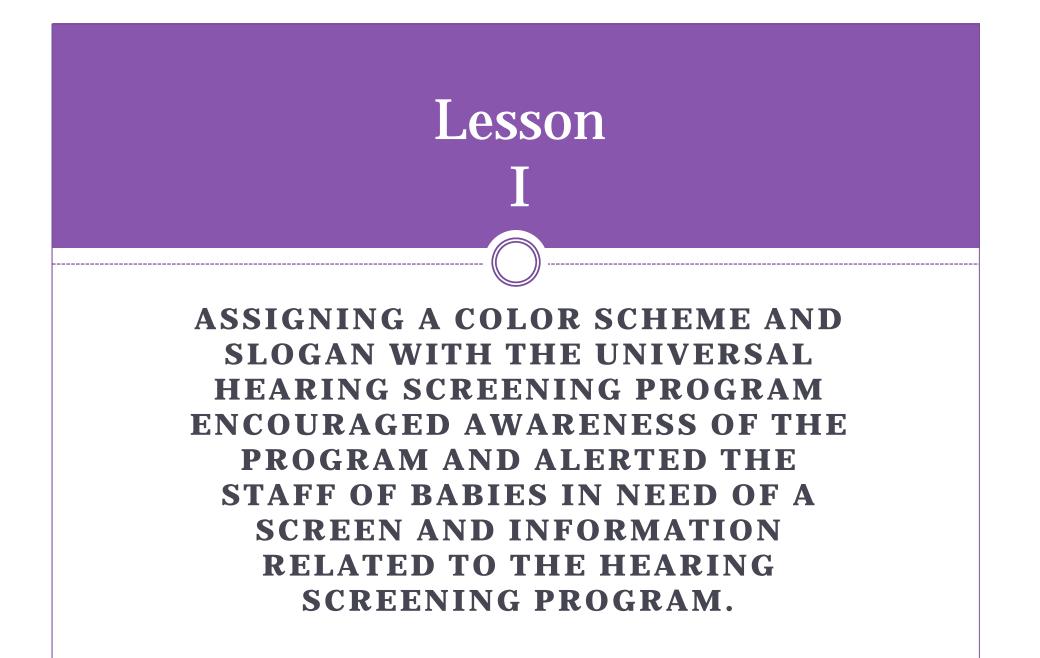
Branding the Parkland UNHS Program





- Logo, slogan and color
- Program color used for bee, all forms and communications
- Bee stamped on every baby's name tag once HS completed
- Purpose

Assist staff Assist families



CHALLENGE II

ACHIEVE HEARING SCREENING OF ALL INFANTS WITH A CONSISTENT, ACCEPTABLE REFER RATE.

UNHS Staff

• Special Care Nursery: The NCJW volunteers continued to screen babies in the special care nurseries.

Newborn Nursery

Initially, Parkland began with two Hearing Screening Technicians and volunteers to screen babies in the newborn nursery.

We learned very quickly that the NCJW volunteers were special – Their dedication and commitment to the program was unique. We had trained over 20 volunteers before we realized consistent and experienced staff resulted in best possible screening outcomes. If the volunteers were not able to come in, it was a bit difficult to catch up with 33-70 (average ~42) babies born a day.

UNHS Staff

- We found having a Hearing Screening Technician staff member for each shift (7-3, 3-11, 11-7) worked best for our newborn nurseries.
- We have 6 Hearing Screening Technicians and 6 additional nursery staff trained to cover the Hearing Screening position as needed.
- All staff members are certified Patient Care Assistants.

Training

- Hearing Screening Technicians and replacement staff must complete a written and performance exam before working independently.
- Every 5 years the staff is re-certified with a training session and written exam.
- Performance is monitored on a daily basis and retraining/intervention is executed as needed.
- There is a learning curve in which a new staff member's rate of refers is high, but with practice and experience the rate of refers improves.

Average refer rate of new technician: 11-13% Average refer rate of trained, experienced technician: 3-6%



TRAINED STAFF DESIGNATED TO COMPLETE HEARING SCREENS ON A CONSISTENT BASIS RESULTS IN BETTER SCREENING OUTCOMES.

MONITORING PERFORMANCE, PROVIDING FEEDBACK AND FOLLOW-UP TRAINING ASSIST IN REDUCING FALSE POSITIVES AND OBTAINING OPTIMUM SCREENING RESULTS.



UTILIZE STAFF TIME EFFICIENTLY IN A HIGH-VOLUME SCREENING PROGRAM.

UNHS Protocols: Special Care Nursery

Initial screen

Completed by NCJW Volunteers Typically, babies are screened close to discharge. At least 34 weeks GA

• Babies with a refer result receive a repeat hearing screen by an Audiologist prior to discharge.

UNHS Protocols: NBN

 Originally, the Hearing Screening Technicians would screen the babies at about 6 hours of age (once the baby had been transported to a nursery).

The Technicians quickly realized they were running around and spending more time moving from nursery to nursery than screening.

The noise level in the nurseries had an impact on the screening time. Nurseries with several upset babies had a longer screening time than babies in a quieter nursery.

UNHS Protocols: NBN

- Opportunity: Babies were staying in Admissions nursery up to 4 hours (the last 1 hour was in an open bed in the middle of the nursery for observation).
 - The Techs began screening these babies during the observation period prior to transport to a nursery. The babies were more relaxed for the screening and the screening time was reduced.

Lesson III

SELECTING A TIME AND LOCATION WHICH ALLOWS EASY ACCESS TO THE BABIES AND THE ABILITY TO CONTROL THE NOISE LEVEL OF THE SCREENING ENVIRONMENT MAY RESULT IN IMPROVED SCREENING CONDITIONS AND MORE EFFICIENT USE OF STAFF SERVICES.



INSURE SCREENING VERY EARLY AFTER BIRTH, TECHNICAL ISSUES, AND POSSIBLE HIGHER REFER RATE OF NEW HEARING SCREENERS DOES NOT NEGATIVELY IMPACT OUTCOMES OR LEAD TO INCREASED UNNECESSARY STRESS TO FAMILIES.

UNHS Protocols: NBN

- Currently, babies stay a maximum of 3 hours in Admissions and the initial hearing screen in newborn nursery is completed within the first 3 hours of life. The Hearing Screening Technicians screen an average of 15 babies per shift (26-31 on busy days).
- Babies in newborn nursery with a refer result receive a rescreen at ~24 hours of age by a Hearing Screening Technician.
- Babies with a refer result on the ~24 hour rescreen receive a final screen by an Audiologist prior to discharge.
- An Audiologist counsels the parents regarding the results.

EFFECT OF PLANNED RESCREENS ON REFER RATE & PPV: 1999-2009

	%REFER	PPV: BILATERAL AI	PPV: ALL AI
INITIAL IP SCREEN	5.34	3.15	6.18
24-HR RESCREEN	2.09	8.05	15.79
AUDIOLOGY IP SCREEN	0.86	19.62	38.5
OUTPATIENT RESCREEN	0.42	40.36	79.21



WITH THE USE OF LIMITED, PLANNED RESCREENS FALSE-POSITIVES CAN BE REDUCED.

POSITIVE UNINTENDED CONSEQUENCE: SUPPORT FROM PRIMARY CARE PROVIDERS FOR UNHS.



Follow-up

- Originally, all babies were referred to an outside facility for diagnostic testing. An appointment was given to the family prior to discharge.
- The follow-up outcomes indicated a lost to followup rate of >40%. This was not acceptable and a meeting was held to discuss options for improvement.

Follow-up

• It was decided to implement an outpatient rescreen:

Babies would return to Parkland for a rescreen 10-12 days post discharge.

An Audiologist would counsel the parents and schedule the outpatient appointment prior to discharge (the parents would be given the appointment before they left the hospital).

Reducing Loss to Follow-up

• Overall LTFU for 1999-2009: 3.47%

Lost to follow-up for babies returning to Parkland for an outpatient screen is <1%

Lost to follow-up for babies referred for diagnostic testing improved from 44% to 6%.

Follow-up: Special Care Nurseries

Follow-up is determined on a case by case basis.

Outpatient hearing screen

Diagnostic evaluation (older babies or babies with a complicated medical history)

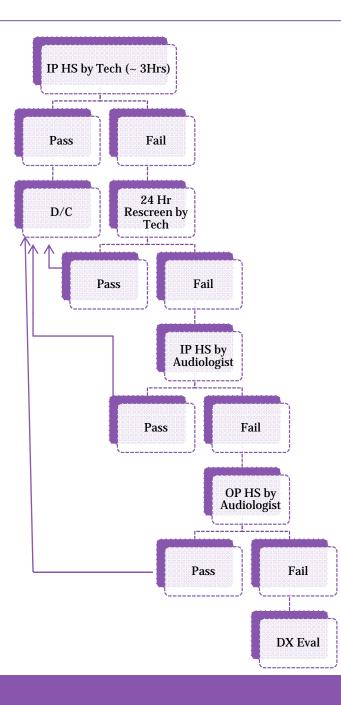
• 4-12 babies per year with a refer result will receive a diagnostic ABR prior to discharge.

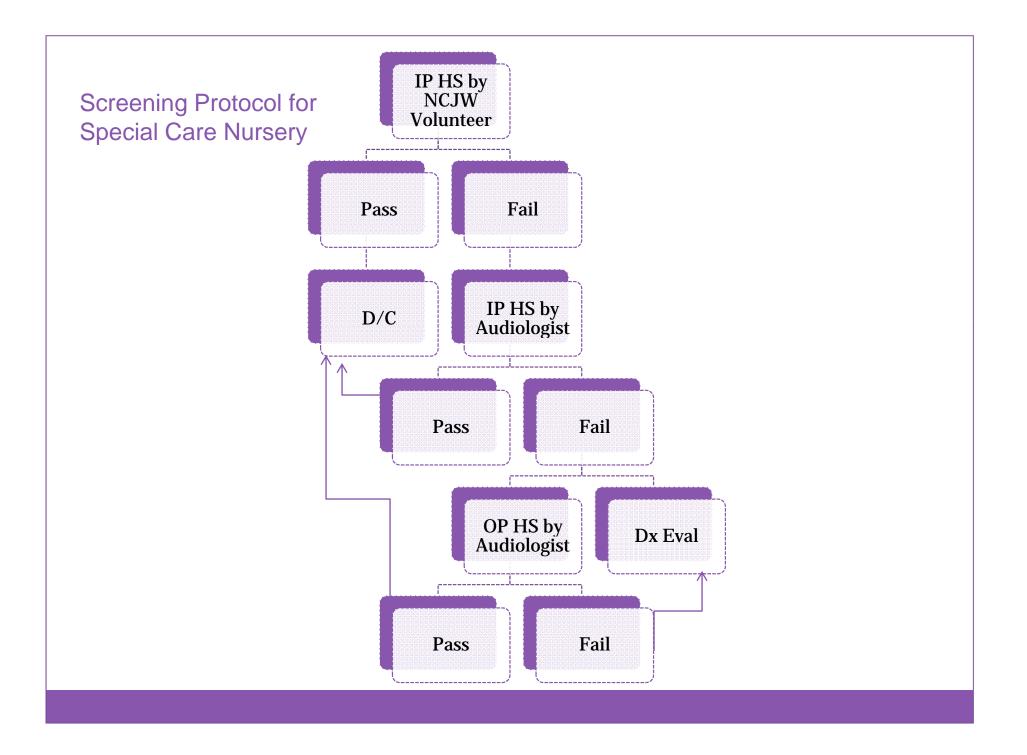
Follow-up: NBN

- Most babies are scheduled for an outpatient hearing screen.
 - Parents are instructed to return to the newborn nursery for the outpatient screen.
 - Exceptions may include babies with aural atresia, strong family history, etc. These babies are scheduled for a diagnostic evaluation at an outside facility.
- Babies with a refer result on the outpatient screen are scheduled for a diagnostic evaluation within 2 weeks and are given an appointment before they leave their outpatient visit.



Screening Protocol for Newborn Nursery







INSURE APPROPRIATE DOCUMENTATION OF SCREENING RESULTS.

Documentation QA

- A QA checklist is included on each hearing history sheet and the Techs must check off each step as it is performed.
- A chart check is completed each day to ensure documentation is correct.
- We recently moved to Electronic Medical Record (12/2009) and each patient file is checked to ensure the results are documented correctly.

Documentation QA

- The census and discharge summary is checked daily to ensure all babies receive a hearing screen prior to discharge and documentation of the screen is in place.
- Data is checked monthly to ensure screening results match the final result in the database.

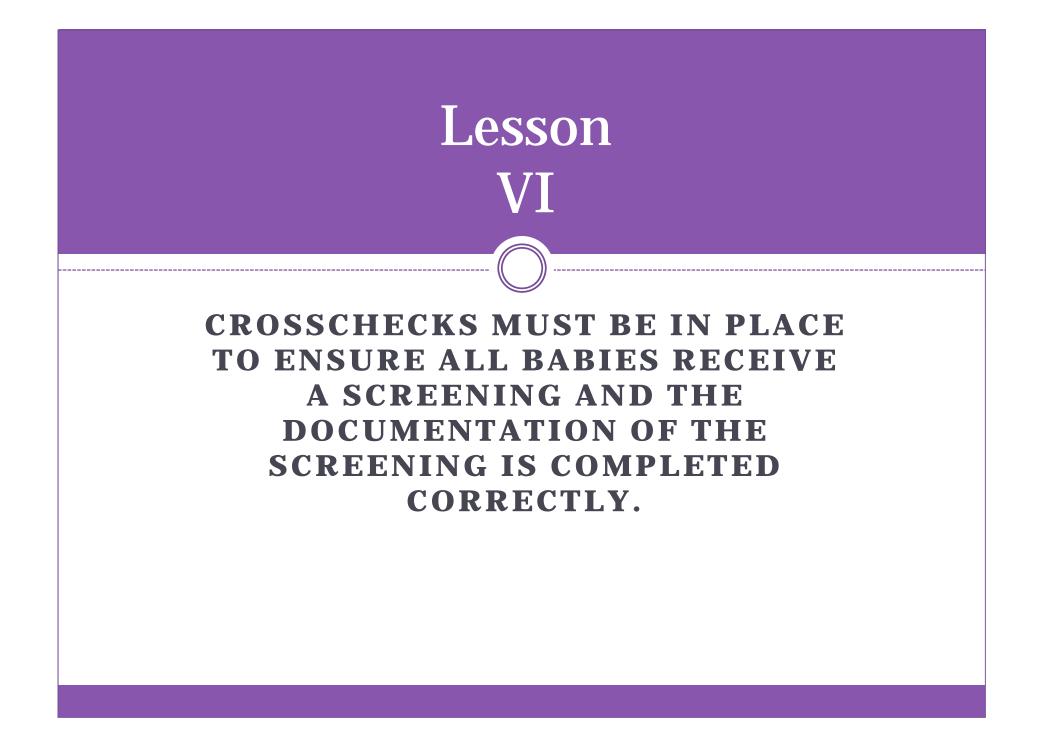
Documentation QA

 These measures allow us to screen >99% of infants born at Parkland.

Of the 1272 not screened, 1217 expired, were transferred out for other medical services, or were deferred due to health status per MD.

Only 55 (0.03%) true misses have occurred in 10 years:

- ★ 36 of the misses occurred in the 1st year of the screening program (0.23% missed for the year).
- **×** More inclusive cross-checks were implemented.
- **×** Miss rate of 0.01% for the subsequent 9 years.



CHALLENGE VII

SOME INFANTS WITH ABNORMAL AABR SCREENING RESULTS MAY HAVE ABNORMAL NERVOUS SYSTEM FUNCTION OR CNS PATHOLOGY.

Screening Technology

- Parkland is aware of several babies that would have been missed if technology other than AABR was utilized.
 - Example: In the first week of the Parkland UNHSP, a baby in the newborn nursery referred on the inpatient hearing screen.
 - The baby went home with Mom and had no risk factors.
 - Diagnostic audiological results revealed an abnormal ABR and robust OAEs.
 - The baby was diagnosed with a brainstem lesion and received intervention services early in life due to a refer result on an AABR screening.

Screening Technology

By nursery

Identification of AN

- Special Care Nurseries: 2 Algo 3 systems
- 3rd floor NBN (near admissions): 3 Algo 3 systems
- 4th floor NBN: 1 Algo 3 system

- 1 in 3752 screened
- 1 in 11.7 of those with HI
- Well baby

Prevalence: 0.02%/1:5612 14% bilateral/86% unilateral

• NICU

Prevalence: 0.2%/1:605 69% bilateral/31% unilateral Lesson VII.A

AUDITORY NEUROPATHY SPECTRUM DOES OCCUR IN WELL BABIES WITHOUT RISK FACTORS FOR HEARING LOSS OR CNS PATHOLOGY.

ANS IN THE WELL BABY POPULATION IS MORE FREQUENTLY UNILATERAL, WHEREAS ANS IN THE NICU POPULATION IS MORE FREQUENTLY BILATERAL.

Equipment

• Two babies were screened with the AABR ALGO 3 and the system would not complete the screen (it would halt the screening and request the clip placement be checked to verify the clips/electrodes were not reversed). Both babies were in newborn nursery and went home with Mom.

The first baby had nystagmus, but no other reported medical problems. The diagnostic ABR revealed a Wave I only response with robust OAEs. A work-up several weeks later revealed an unusual demyelinating disease.

The second baby did not have any noted medical concerns and was in the newborn nursery. Based on our previous experience, a diagnostic ABR was completed prior to discharge and once again the results were consistent with a Wave I only response. Several diagnostic ABRs were completed and an improvement was noted. Testing completed at 3 months of age indicated a synchronous response within normal limits for both ears (Wave I-V).

• Both babies are in our monitoring program.

Lesson VII.B

WHEN AN ERROR MESSAGE SUGGESTING THE CLIPS MAY BE REVERSED ON THE NATUS ALGO 3 AABR IS NOTED AND STAFF IS UNABLE TO PROCEED WITH THE SCREEN, CORRECT PLACEMENT SHOULD BE VERIFIED AND SCREENING ATTEMPTED AGAIN.

IF THE ERROR MESSAGE REOCCURS, IT IS RECOMMENDED THAT FURTHER ATTEMPTS AT SCREENING BE DEFERRED AND THE BABY RECEIVE A DIAGNOSTIC ABR PRIOR TO DISCHARGE OR BE REFERRED DIRECTLY FOR A DIAGNOSTIC ABR UPON DISCHARGE.

Parkland – Beyond UNHS....

CYTOMEGALOVIRUS SCREENING FOR BABIES WITH A REFER RESULT

PARKLAND PROGRESSIVE HEARING LOSS PROGRAM

PARKLAND PARENT AWARENESS CAMPAIGN

CHALLENGE VIII

IDENTIFICATION OF CMV IN INFANTS WITH A REFER RESULT ON HEARING SCREENING.

Screen for CMV

- Cytomegalovirus (CMV) occurs in ~1% of all live births in the U.S. and is the leading nongenetic cause of hearing impairment in infancy.
- Purpose of CMV screen for infants that refer on UNHS at Parkland:
 - Identify infants with congenital CMV
 - Determine which infants with possible congenital hearing loss have congenital CMV
 - Assist with making appropriate treatment recommendations and referrals
 - × Institute an appropriate monitoring plan
 - **×** Provide prognostic information

Screen for CMV

- All babies with a refer result on an inpatient screen receive a CMV screen prior to discharge.
- Parents are counseled prior to discharge about the CMV screen .
- Results are reviewed at the time of the outpatient visit. If the results are positive, a provider will discuss the results and follow-up recommendations (i.e. head sono, ophthalmology evaluation, etc.) with the parents.

Screens for CMV

• From September 1999 – August 2004:

483 of referred infants (84%) received a CMV screen.

24 (5%) were positive and 16 of these had confirmed hearing loss (6% of confirmed HL).

This would equate to only 0.02% of the infants born at Parkland during the time period.

Stehel EK, Shoup AG, Owen KE et al (2008). Pediatrics, Volume 121: 970-975.

Lesson VIII

A CMV SCREEN FOR ALL INFANTS WHO REFER ON HEARING SCREENING CAN PROVIDE VALUABLE INFORMATION FOR MANAGING THOSE IDENTIFIED WITH HEARING LOSS.

CMV SCREENING OF ONLY THOSE INFANTS WHO REFER ON HEARING SCREENING WILL MISS MANY WITH CONGENITAL CMV.



MONITOR HEARING FOR INFANTS AT RISK FOR PROGRESSIVE OR LATE-ONSET HEARING LOSS.

Parkland Progressive HL Program

- Goal: Provide education to families and monitor babies at risk for progressive hearing loss.
- Patients at risk for progressive hearing loss were identified and scheduled to return in 6 months for a follow-up screen.
- Concerns: Difficulty reaching patients, poor show rate (20-30%), time and resource intensive.

Current protocol was re-evaluated and options for increasing return for follow-up were reviewed.

Decreased the follow-up period from 6 months to 3 months to determine if a shorter time span would increase return for follow-up.

Effect of Modification of Follow-up Protocol
on Patience Compliance

	Year 1 (6 mo f/u)	Year 2 (3 mo f/u)
#(%) with PI	732 (4.79%)	815 (4.97%)
#(%) Returned for follow-up	153 (21% of PI)	261 (32% of PI)

•Results indicated no significant improvement

•For the 1st 10 years of UNHS, ~7,000 (4.42%) infants have been identified with a progressive indicator for HL. Approximately 40% have returned for follow-up. Of these, no infants have been identified with progressive hearing loss.

Parkland Progressive HL Program

- The team met again and decided a different approach may be needed. Outcomes to date had not identified one baby with a progressive loss. The time needed to schedule appointments, track the follow-up, contact families to reschedule if they did not show was significant.
- New Goal: To educate the parents and providers of the at risk for progressive hearing loss status - The parents and provider would be responsible for scheduling and keeping the recommended 6 month follow-up evaluation.

Lesson ΤX **ALTHOUGH THE EXPERIENCE AT PARKLAND** AND THE EVIDENCE IN THE LITERATURE DO **NOT PROVIDE STRONG SUPPORT FOR EXPENDITURE OF HEALTH CARE RESOURCES IN MONITORING OF PROGRESSIVE HEARING LOSS, A COST-EFFECTIVE PROGRAM CAN BE IMPLEMENTED BY FOCUSING ON PARENT** AND PRIMARY CARE PROVIDER EDUCATION **PAIRED WITH AN OPPORTUNITY FOR**

RETURN FOR FOLLOW-UP TESTING.



Parkland Parent Awareness Campaign

- Results of an informal survey indicated some parents were not aware of a hearing screening being done nor the results of the screen.
- A Parent Awareness Campaign was developed to increase parent awareness of hearing screening, details of the hearing screen procedure and interpretation of the hearing screen results.
- The goal of the Parent Awareness campaign : 100% awareness of hearing screening and results with a minimum acceptance of 95%.

Parkland Parent Awareness Campaign: Phase I

• Determine parent knowledge base about the hearing screen:

A short survey of 5 questions about the birth experience at Parkland, including 2 questions on hearing screening, was conducted on patients following discharge teaching and instructions.

The results of the survey indicated 81% of 358 parents were aware a hearing screen was performed and 73% were aware of the results of their baby's hearing screen.

Parkland Parent Awareness Campaign: Phase II

Educating parents and staff:

Part A - A Hearing Screening poster was developed and placed on each maternity unit at Parkland and in the community prenatal clinics around the Dallas Metroplex. Feedback after the placement of the posters was encouraging and indicated an increase in awareness.

Part B – Parkland has an information TV channel available to all inpatients. Plan: Develop a short video which would include information about the program, a demonstration of the screening and how the parents can obtain results of the screen.

Part C – Conduct bi-annual staff in-services to provide updates, outcomes and reviews of protocol and importance of informing parents of results.

Parkland Parent Awareness Campaign

- Phase III: Community outreach and education about the importance of hearing screening and early identification
- We have completed Phase II Part A and are requesting funding to complete Part B and C.

Lesson X WHEN STRIVING TO MEET STATISTICAL STANDARDS, DO NOT LOOSE SIGHT OF THE PURPOSE FOR THE PROGRAM...

IDENTIFY MEANS TO OBTAIN TARGETED INFORMATION FROM FAMILIES AND OTHER STAKEHOLDERS TO GUIDE PROGRAM IMPROVEMENTS.

THE IMPORTANT THING IS TO NOT STOP QUESTIONING.

---&LBERT EINSTEIN