

# The Nebraska EHDI Electronic Data System and Follow-up

Jim Beavers and Jeff Hoffman

2011 EHDI Conference

Atlanta, GA

# NE-EHDI Data System (ERS-II)

## Learning objectives

- 1) List the advantages of integrating hearing records with birth records
- 2) Identify key data needed for adequate tracking and follow-up
- 3) Define important factors to construct a quality assurance report.

# Goals

- Module of Nebraska Vital Records System (ERS-II)
- Create from birth record
- Collect only data needed for follow-up, quality and reports
- Minimize time and effort of reporters
- “Work in progress”

# Development

- Vital records RFP, contract - 2004
- Preliminary planning - 2004
- CDC cooperative agreement – 2005
- Business analyst – 2006
- Screening module – 2007 (Rollout)
- Data edits, Audiology module – 2008
- Enhanced reports, Risk factors – 2009
- Date calculations, Case Summary – 2010

# ERS-II Description

- Electronic Registration System-II (ERS-II)
  - SQL Server Database / Citrix-Internet
- QS Technologies, Inc. ->  
Netsmart Technologies, Inc
- Three tables (records) for Hearing Information
  - HINFO record (summary record)
  - HSCREENING record (detail record linked to HINFO)
  - HAUDIO record (detail record linked to HINFO)

# Hearing Information (HINFO) Summary Record

(> 250 data items)

***Populated from birth record***

- Birthing facility, baby, maternal demographic information

***Data entered at hospital***

- Inpatient and outpatient hearing screening results
- Date of Hepatitis B vaccine (for immunizations)

***Data entered by NE-EHDI staff***

- “Transfer” screening results / outpatient results
- Diagnostic audiologic evaluations

# ERS-II Examples

- One **HINFO** record – pass of inpatient hearing screening

## Detail Records Linked to HINFO Record:

- Three **HSCREENING** records – details of inpatient events and all outpatient hearing screening events (some data copied to HINFO record)
- One **HAUDIO** record – details of audio evaluation (some data copied to HINFO record)

# HINFO Record (“Quick Record”)

Birth Facility

Facility Name  
Alegent Lakeside Hospital

Type  
HOSPITAL

City  
Omaha

State  
Nebraska

NICU (more than 5 days)

---

Quick Record of Passed Final Hearing Screening prior to Discharge

Date of Final Screening with Pass Result on Both Ears  
01/30/2011

Parent Educated about hearing screening, hearing loss, etc? (Y,N)  
 Y



# HSCREENING Detail Record

## HSCREENING (> 70 data items)

- Inpatient *Refer* hearing screening results
- Inpatient non-screening events
  - Discharge without a screening
  - Refusals
  - Expired
  - Transfers to NICU, other hospital
- Outpatient *Pass* or *Refer* hearing screening results
- Outpatient non-screening events

# HSCREENING Details Screen

## Inpatient Refer Right ear

System	Details	Flags
FACILITY DETAILS		
Screening Facility		Type of Screening
Childrens Hospital		ABR
ENTER data in SCREENING DETAILS OR SCREENING NOT GIVEN section		
--- SCREENING DETAILS --- (If no screening, skip to "Screening Not Given" section)		
Complete INPATIENT -OR- OUTPATIENT Details:		
INPATIENT Screening Date	12/20/2010	
Right Ear Results (P-Pass,R-Refer,N-Not Screened)		Left Ear Results (P-Pass,R-Refer,N-Not Screened)
R		P
OR		
OUTPATIENT Screening Date	/ /	
Right Ear Results (P-Pass,R-Refer,N-Not Screened)		Left Ear Results (P-Pass,R-Refer,N-Not Screened)

# HSCREENING Details Screen

## Outpatient Refer

--- SCREENING DETAILS --- (If no screening, skip to "Screening Not Given" section)

Complete INPATIENT -OR- OUTPATIENT Details:

INPATIENT Screening Date

Right Ear Results (P-Pass,R-Refer,N-Not Screened)

Left Ear Results (P-Pass,R-Refer,N-Not Screened)

-- OR --

OUTPATIENT Screening Date

Right Ear Results (P-Pass,R-Refer,N-Not Screened)

Left Ear Results (P-Pass,R-Refer,N-Not Screened)

# HSCREENING – Details Screen

## Transfer to Another Hospital

SCREENING NOT GIVEN / NOT COMPLETED

Date of internal/external transfer or other non-screening action) 12/13/2010

Check level of care: Inpatient  Outpatient

Transferred to another hospital Receiving Hospital (Ctrl + Z to clear the field)

Childrens Hospital

-- OR --

Infant in birth hospital NICU > 5 days

-- OR --

Adopted  
Could not test  
Discharge without screening  
Expired  
Homebirth  
Other  
Parent(s) refused  
Technical problems

Incomplete Test Code

T

# HSCREENING Details Screen

## (Parent Details, Disposition, Notes)

PARENT(S) DETAILS ----- (Ctrl + Z to clear any field) -----

Parent(s) educated about hearing screening, etc? (Y/N)

Y

Primary Language  Phone (free form number)  Other Phone

DISPOSITION

Primary Care Provider Name (PCP)

Newborn's Primary Care Provider Notified of results.

Recommend monitoring, intervention, and follow up care.

Re-screen at same screening facility.

Appointment date

Recommend re-screen/diagnostic evaluation at audiology clinic.

Appointment date

Audiologist/Clinic

NOTES

Baby born premature; Father has profound hearing loss;

# HAUDIO Detail Record

HAUDIO (> 200 data fields)

- Facility, audiologist information
- Description of test(s): date, type
- Evaluation results: degree/type/laterality of HL
- Disposition and Recommendations
- Key data copied to HINFO record
  - Initial, most recent, confirmatory results
  - Audio summary, amplification, disposition screens

# HAUDIO Record: Evaluation Screen

## Evaluation Type

Initial Evaluation

Routine Evaluation

Confirmatory Evaluation

Hearing Loss . Normal Hearing

Y

N

## Right Ear

Not Tested

Degree of hearing loss\* PROFOUND

Type of hearing loss . Sensorineural Hearing Loss

.

Comments (e.g., configuration)

## Left Ear

Not Tested

Degree of hearing loss\* NORMAL HEARING

Type of hearing loss .

.

Comments (e.g., configuration)

# HINFO: Case Summary (all events)

Parent educated about the hearing screening	Hearing Case Status	Date Closed	Hearing Code	<input type="checkbox"/> Non-Hospital Birth
<input checked="" type="checkbox"/> Y	DIAGNOSED	11	FD	
Birth Facility	Birth Facility City	Birth Facility County		
Alegent Lakeside Hospital	Omaha	Douglas		
Receiving Hospital	Transfer on Birth Cert	PCP Name Change #		
Childrens Hospital	<input checked="" type="checkbox"/> N	0		
PCP Name - 1st	PCP Name - 2nd			
Jay R. Allison MD				
PCP Name - 3rd	Transfer In	Transfer Out		
	<input type="checkbox"/>	<input checked="" type="checkbox"/> Y		

## -Hearing Status

Permanent Hearing Loss	Refer on IP	Refer on OP
<input checked="" type="checkbox"/> Y	<input checked="" type="checkbox"/> Y	<input checked="" type="checkbox"/> Y
Normal Hearing	Pass on IP	Pass on OP
<input checked="" type="checkbox"/> N	<input checked="" type="checkbox"/> N	<input checked="" type="checkbox"/> N

## -Days to Hearing Event

Days to Screening - Pass	Days to Refer Screening - IP Refer	Days to Refer Screening - OP Refer
	8	10
Days to First Evaluation	Days to Confirmatory Evaluation	Days to Last Evaluation
15	18	15



# HINFO – Other Screens

- Mother, Father Identifying Information
- Audiologic Evaluation – Disposition Summary
- Audiologic Evaluation – Amplification Summary
- Hearing Loss Risk Factors
- Maternal Demographics
  - Age, Marital Status, Education Level, Race, Ethnicity, Payment Source

# User Groups / Work Queues

- User groups (5)
  - Super User
  - Administrator
  - Birth clerk
  - Hearing clerk (birth hospital)
  - Hearing clerk (non-birth hospital)
- Work queues
  - Automatic
  - Incomplete records needing data entry

# Supplemental Data System

Microsoft® Access data system

- Letters to parents and PCPs
- Out-of-state births
- Out-of-hospital births without birth certificates
- Part C data
- Prototype for future ERS-II development

# ERS-II Reports

- Birthing Facility Reports
  - Detailed reports (all births at hospital for specified date range)
  - Aggregate reports (by date range using DOB)
    - Number/percent screened
    - Number/percent pass/refers
    - Number not screened and reason
    - Number in NICU
- Administrative Reports
  - Ad hoc reports (Shazam or Report Builder)

# ERS-II Data

- Delinquency reports – weekly and monthly
- Supplemental data
  - CDC's HSFS annual survey, including all maternal demographics
  - Annual legislative report
  - Periodic reports to NE-EHDI Advisory Committee
- Quality assurance reports
  - Semi-annual reports to birthing facilities
  - Summary statistics for individual facility
    - Includes outcomes, e.g., diagnosed HL, lost to follow-up, etc.
  - Comparison with state averages

# Newborn Hearing Screening Quality Assurance Report (Upper section of report)

## Birthing Facility (Jan-Dec 2009 DOB)

Type of Hearing Screening – OAE	
Number of live births	1377
(Percent of Nebraska births 5.1%)	
Expired	1
Transfers to another hospital	17
Number available for inpatient screening	1359
Number of inpatient screenings	1357
Percent of screenings completed	<b>99.9%</b>
Number of “Passes”	
Number of “Refers”	
“Refer” rate <b>10.5%</b>	
Inpatient screenings not completed	2
Percent not receiving inpatient screening	<b>0.1%</b>
Could not screen	0
Discharge without screening	2
Technical problems	0
Other/Parent Refused	0

## Comparison with State Statistics

**99.2%** - state average of hearing screenings completed

### Type of Screening | Average Refer Rate:

2-Step	3.8%
ABR	2.1%
OAE	<b>9.8%</b>

**.8%** - state average inpatient screening not received

# Newborn Hearing Screening Quality Assurance Report (Lower section of report)

## Birth Facility (Jan-Dec 2009)

Percent of parents educated about hearing screening, hearing loss and speech-language-auditory development **99.9%**

### Outcomes of Babies Needing Follow-up Services:

#### 144 Needing Follow-up Services

Normal Hearing :	131
Hearing Loss:	1
Other (in process, expired, moved, refused, etc.) :	2
Lost to Follow-up:	10
Lost to Follow-up rate (10/144) :	<b>6.9%</b>

## Comparison with State Statistics

Percent of parents educated about hearing screening, hearing loss and speech-language-auditory development **99.5%**

### Statewide Outcome Totals:

#### 1,323 Needing Follow-up Services

1,090 - Normal Hearing
39 - Permanent Congenital Hearing Loss
72 - Other (in process, expired, moved, etc.)
122 - Lost to Follow-up
<b>9.2%</b> - "Loss to Follow-up" state average rate (122/1323)

# ERS-II Benefits

## Timely, Complete and Accurate Data for All Babies

- Results entered quickly for all births:  
average is < 12 days
- More detail in ERS-II for all babies needing follow-up:
  - Parent phone number(s)
  - Primary language of parent
  - Primary health care provider (PCP)
  - Outpatient follow-up plans
- Letters and phone calls to PCPs and parents
- Outcomes, maternal demographics, calculation of “number of days” to screenings and evaluations



# ERS-II Benefits

27,199 births in 2009  
1360 newborns needed follow-up

- 209 were discharged prior to hearing screening
- 1151 did not pass hearing screening during birth admission



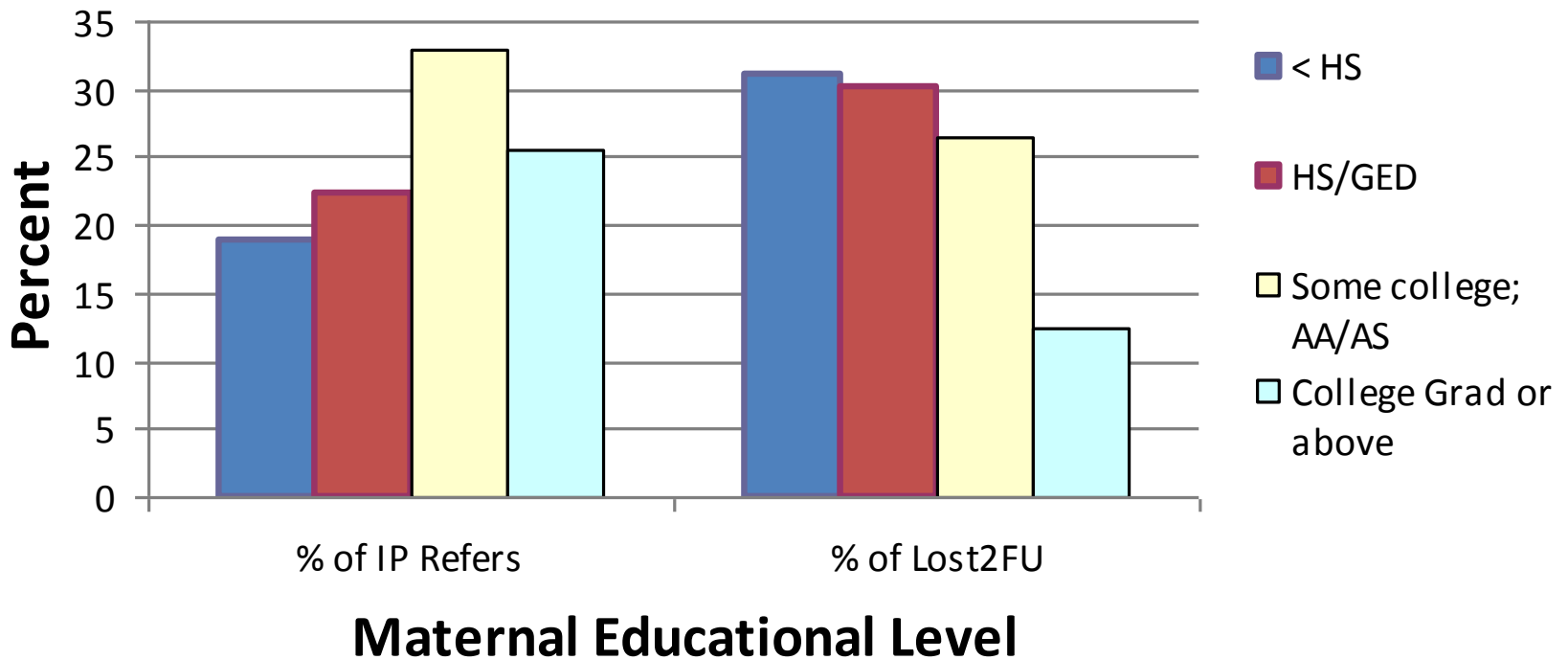
998 received one or more outpatient hearing screenings  
152 received one or more audiologic diagnostic evaluations  
65 received a combination of outpatient hearing screenings and audiologic diagnostic evaluations  
145 did not receive any hearing services or the services were not reported



1127 had normal hearing (outpatient pass, evaluation -> normal hearing)  
46 were diagnosed with permanent congenital hearing loss (PCHL)  
27 are still being evaluated  
122 were lost to system (did not receive or complete services or services were not reported)  
20 families moved with no forwarding address (did not receive or complete services)  
14 parents refused prior to outpatient hearing services initiated or completed  
4 expired prior to outpatient hearing services initiated or completed

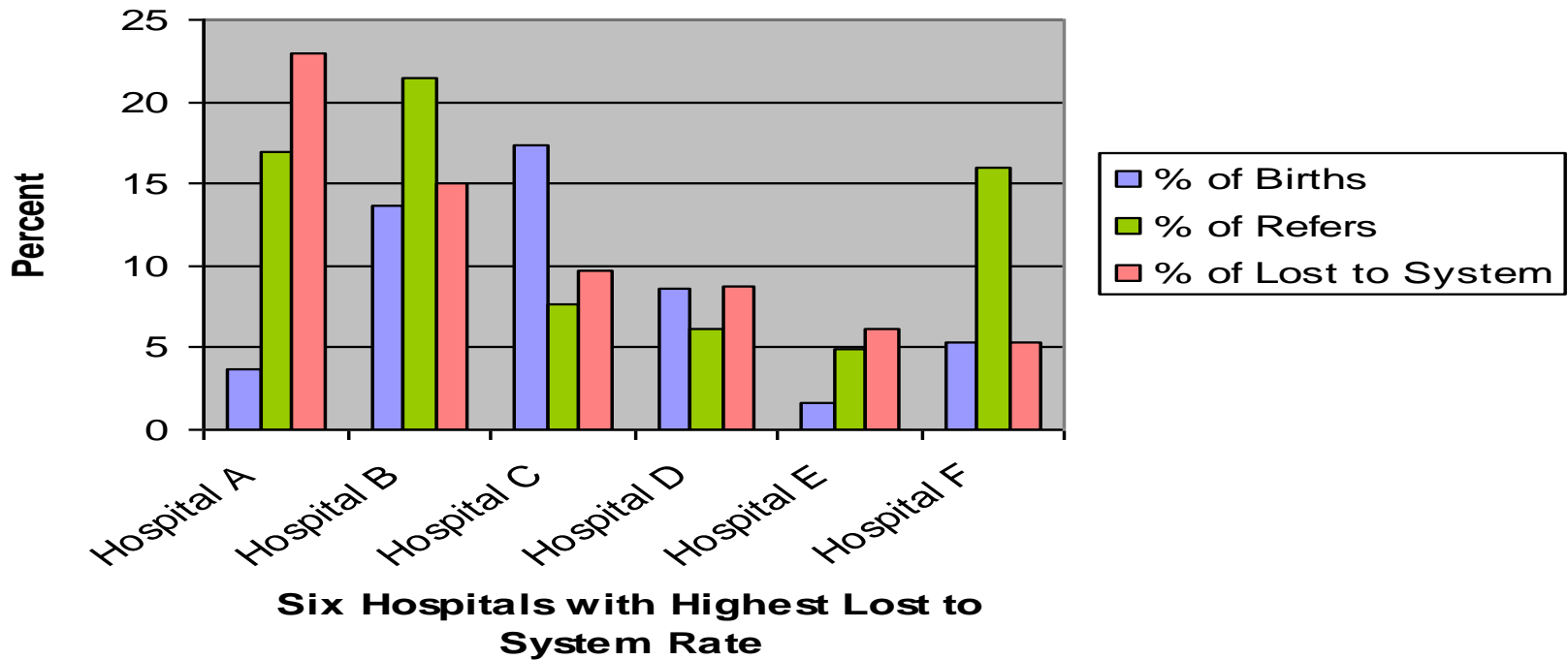
# ERS-II Benefits

## Lost to Follow-up by Maternal Education



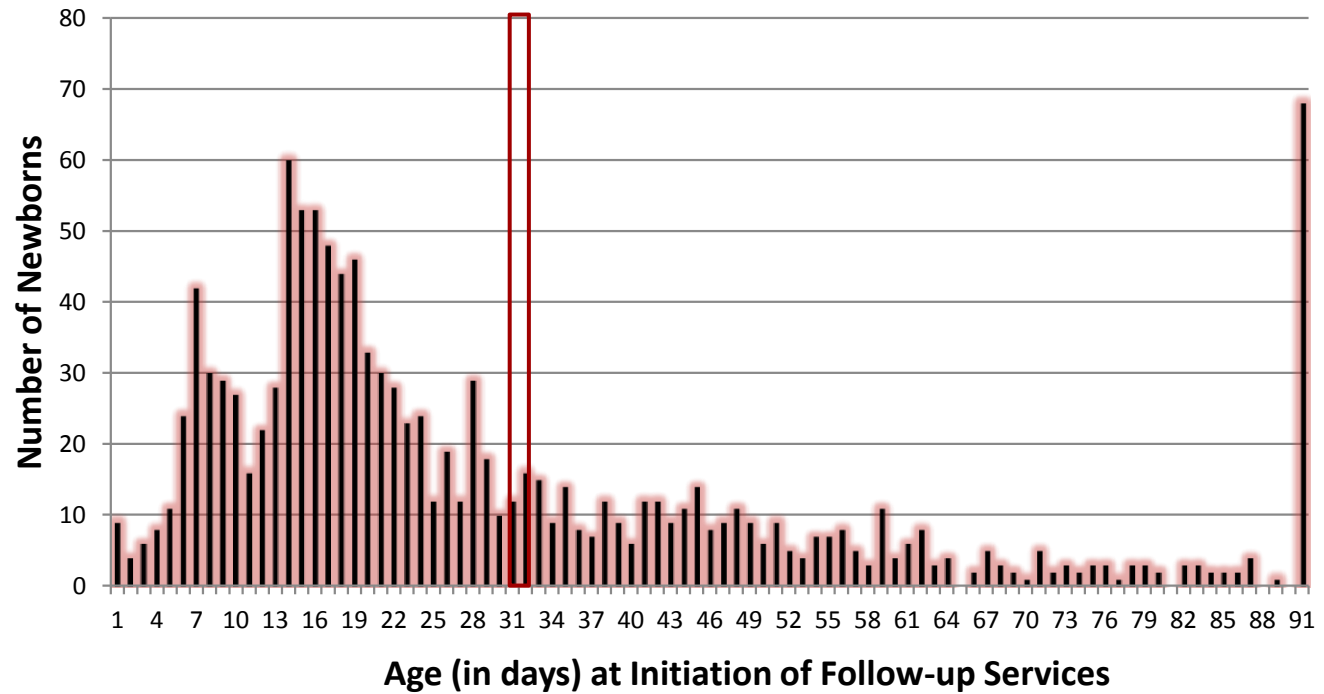
# ERS-II Benefits

**Comparison of Percent of Births, Refers and Lost to System for Selected Hospitals**



# ERS-II Benefits

Timeliness of Initiation of Follow-up Services - 2009



# NE-EHDI PROGRAM

Kathy Northrop, program manager

402-471-6770, [kathy.northrop@nebraska.gov](mailto:kathy.northrop@nebraska.gov)

Jim Beavers, program business analyst

402-471-1526, [jim.beavers@nebraska.gov](mailto:jim.beavers@nebraska.gov)

Jeff Hoffman, EHDI consultant

402-499-6063, [jeffhoffman.ehdi@gmail.com](mailto:jeffhoffman.ehdi@gmail.com)