



Factors Associated with Newborn Hearing Screening Follow-up



Vickie Thomson, Ph.D.
Director, Newborn Screening
Programs
Colorado Department of Public
Health and Environment
Children with Special Health Care
Needs

The Colorado Infant Hearing Program



- Legislation passed in 1997
- CDPHE-HCP lead agency
- 56 birthing hospitals
- 70,000 births



Role of Public Health in EHDI Programs

- Using science as a basis for decision-making and action;
- Expanding the quest for social equity;
- Performing effectively as a service agency;
- Making efforts outcome-oriented; and
- Being accountable

* CDC Operating Principles for Program Evaluation



Evaluating Universal Newborn Hearing Screening in Colorado: From
Population Determinants to System-Improvement Actions
Christensen, Thomson, & Letson

- Initial Screen Results
 - Infants who had 5 minute Apgar scores >7 were 9 times more likely to receive the screen
 - Infants who weighted more than 2,500 gms were 3.5 times more likely to receive the screen
- Rescreen Results
 - Interaction between hospital rescreen rates, mother's education, race/ethnicity



2005 Stats

- Births = 69,474
- Screened = 67,466 (97%)
- Hospital births screened = 67,261 (98.2%)
- Not Passed = 3,144 (4.6%)
- Rescreened = 2,531 (80.5%)
- Not Rescreened = 622 (19.8%)
- Confirmed Hearing Loss = 115



FACTORS THAT AFFECT RESCREEN RATES

- Demographic variables from the EBC
 - Race
 - Ethnicity=Hispanic, Non-Hispanic
 - Gender
 - Gestational Age=>36 wks, <36 wks
 - Birth Weight =>2500 gms, <2500gms
 - Apgar Score at 5 minutes=>7, <7
 - Mother's age at birth=11-19, 20-24, 25+
 - Marital Status
 - Mother's education=<12, >13



FACTORS THAT AFFECT RESCREEN RATES

- Hospital Variables
 - Number of births=4 groups
 - Nursery Level=Well baby, NICU II, NICU III
 - Audiologist Involved
 - Technology=OAE, AABR, Both
 - Refer Rates=0-5%, 5-10%, >10%
 - Screening Personnel=Nurse, Technicians, Volunteers
 - Scheduling the Follow-up Appt=Hospital, parents
 - Charge for the Outpatient Rescreen
 - Location of the Outpatient Rescreen=Nursery, Audiology, Community
 - Rescreen Rates=>90%, 80-90%, <79%



Regression Analysis for Whether an Infant Failed to Receive the Follow-up Outpatient Rescreen

- Demographic Variables
 - All significant at $p < .01$ except for birth weight and gestational age
- Hospital Variables
 - Significant at $p < .0001$
 - Audiologist Involved
 - Rescreen Rates (80-90%, <79%)
 - Parents scheduling the outpatient rescreen appt.
 - Refer out of the hospital for rescreen



HOSPITAL VARIABLES

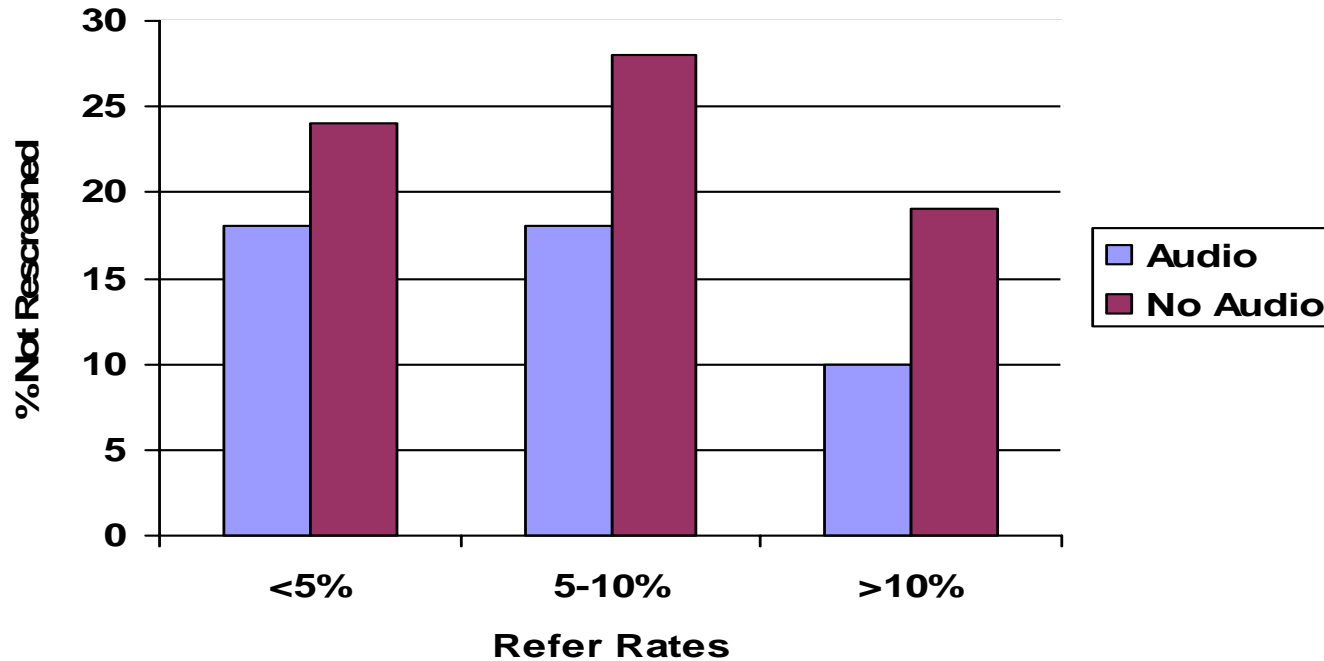
- Infants born in hospitals without an audiologist involved are 63% less likely to receive the outpatient rescreen than those born in hospitals with an audiologist involved.
 - 56 Birthing Hospitals
 - 24 Yes (12 on staff)
 - 32 No



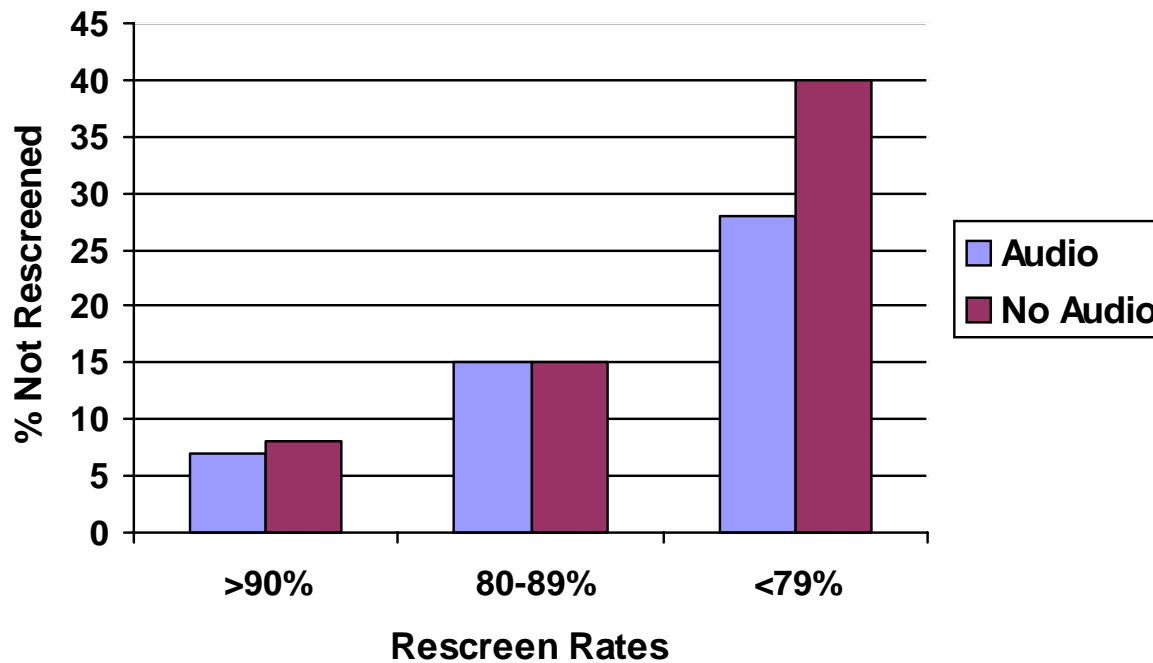
HOSPITAL VARIABLES

- Infants born in hospitals with rescreen rates between 80-90% are 2.4 times less likely to receive the outpatient rescreen than infants born in hospitals with rescreen rate $>90\%$.
- Infants born in hospitals with rescreen rates $<79\%$ are 6.3 times less likely to receive the outpatient rescreen.

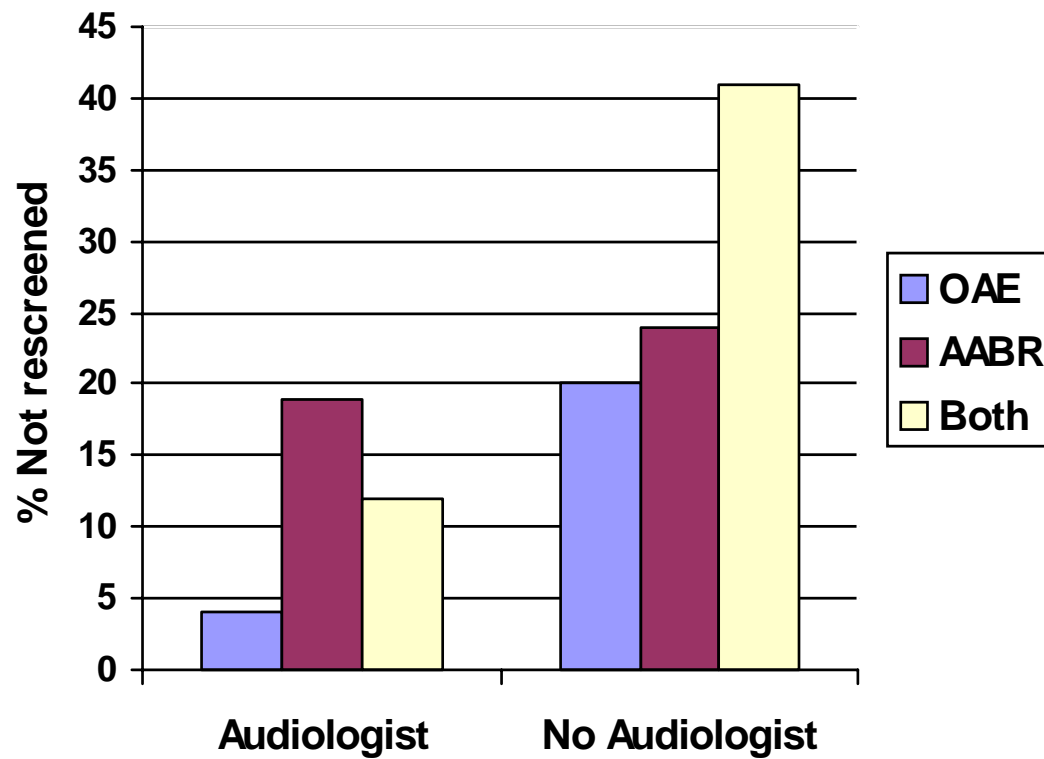
Audiologist & Refer Rates



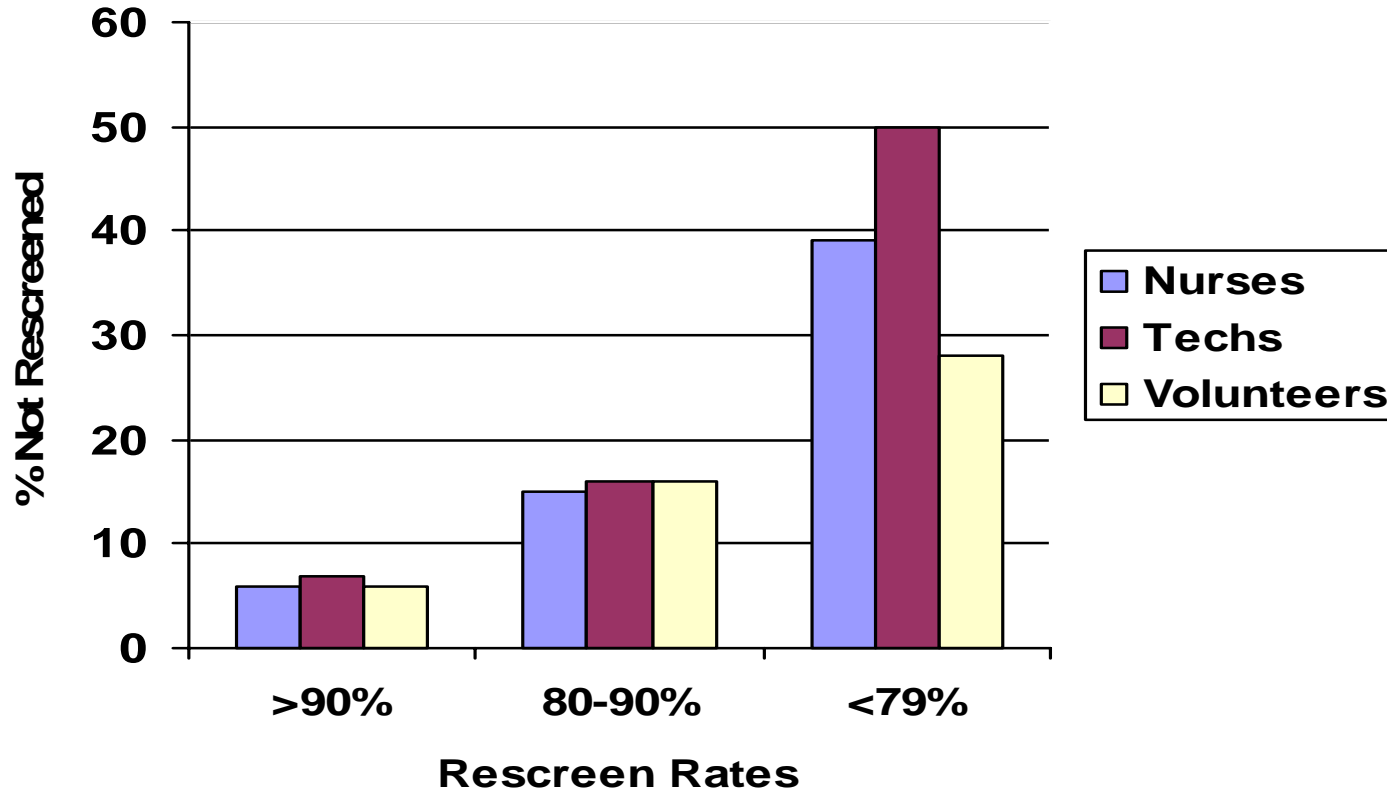
Audiologist & Rescreen Rates



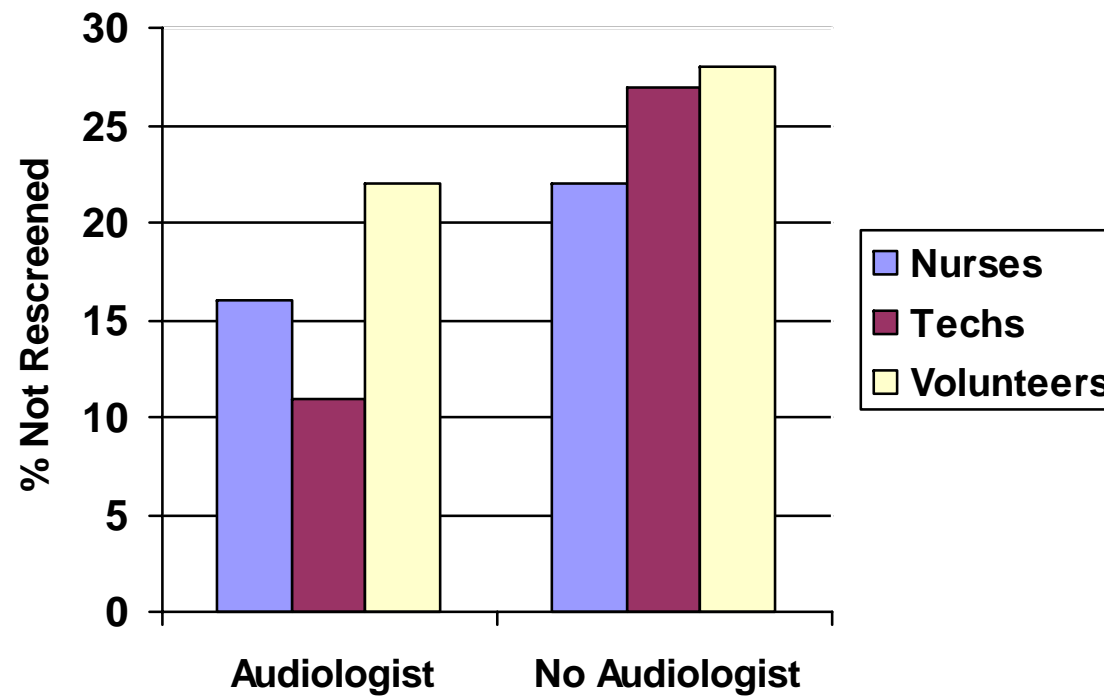
AUDIOLOGISTS AND TECHNOLOGY



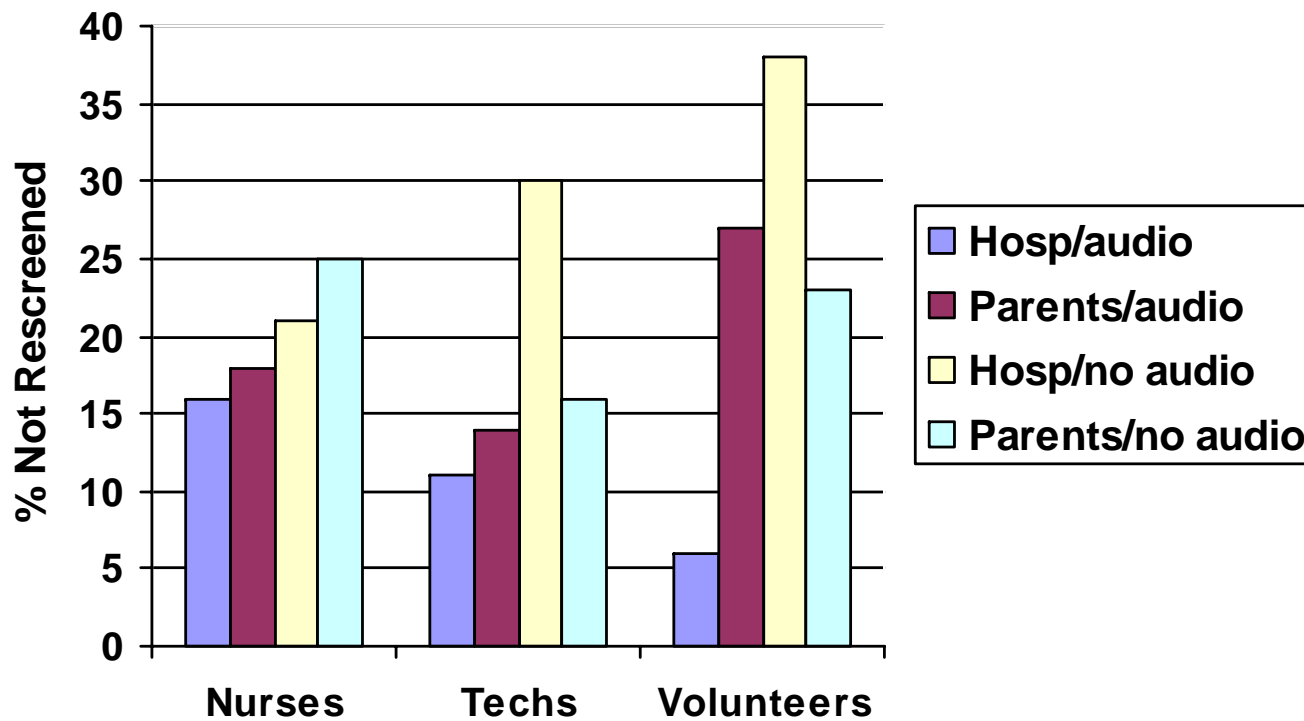
Rescreen Rates & Screening Personnel



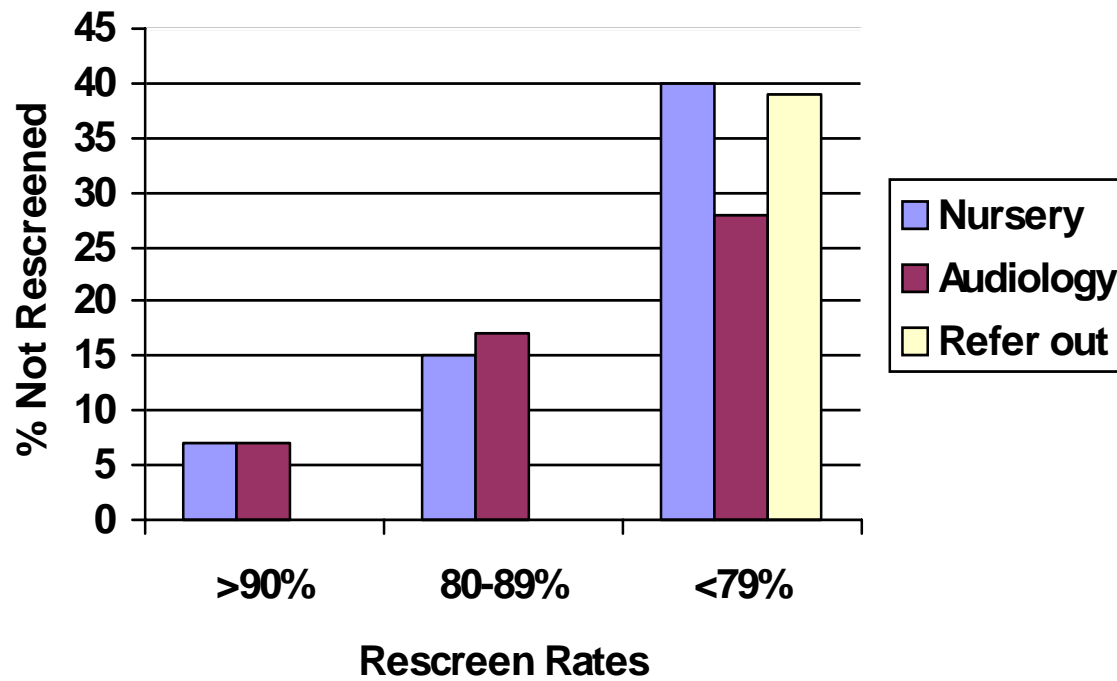
Rescreen Rates & Audiologists



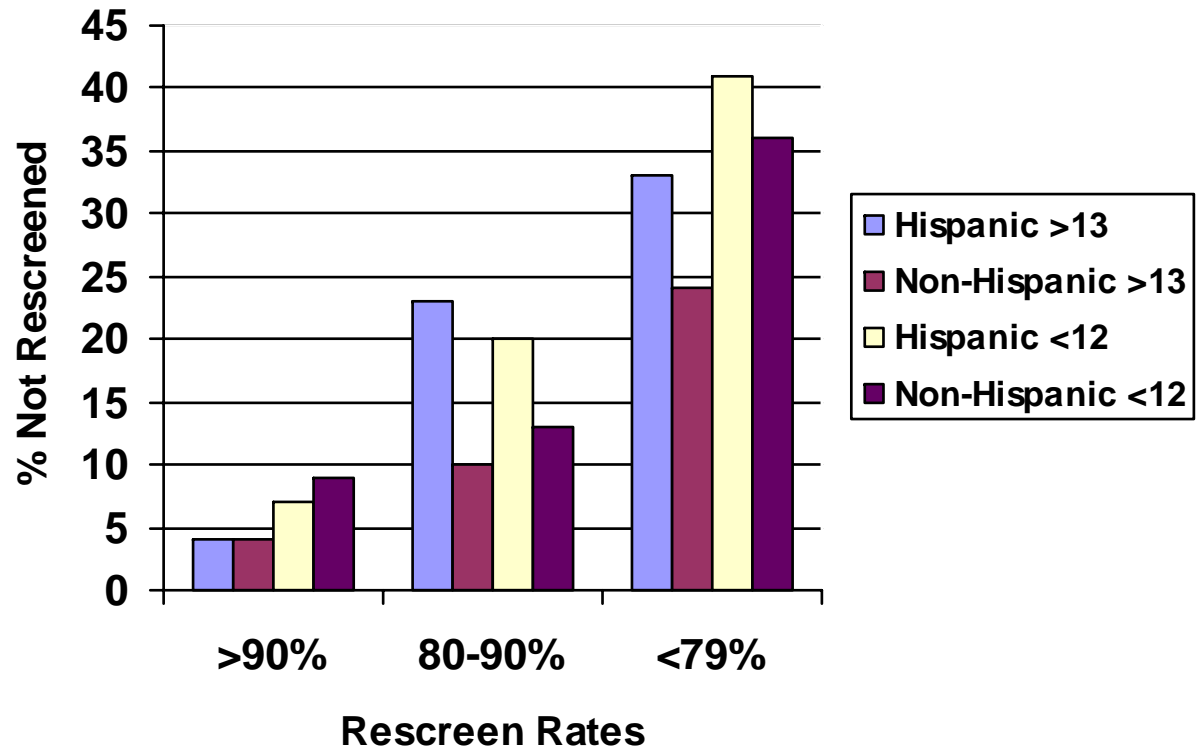
Follow-up Scheduling



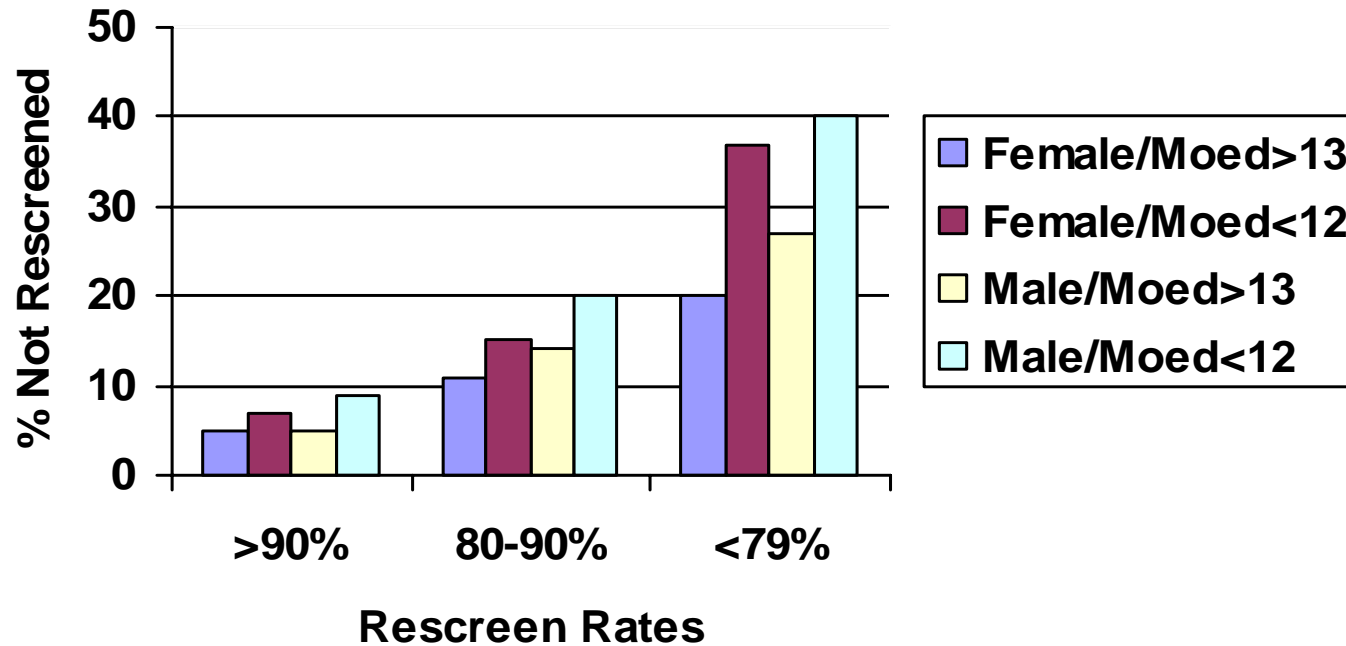
Location of the Rescreen



Demographic Variables



Demographic Variables





Health Disparities at a Glance!

- Mother's age

- 11-19 Years
 - Population=8%
 - Not rescreened=14%

- Marital Status

- Unmarried
 - Population=27%
 - Not rescreened=39%

- Education Level

- 12 years or less
 - Population=48%
 - Not rescreened=64%

- Ethnicity

- Hispanic
 - Population=32%
 - Not rescreened=46%



CONCLUSIONS

- Target specific populations for education
- Target specific hospitals for technical support
- Increase the role of the Audiology Regional Coordinator
- Increase the role of the Parent Coordinator
- Increase efficiencies in the data management system
- Engage the Medical Home!



FUTURE DIRECTIONS

- A true integrated data system
- Telemedicine for audiology, early intervention, and genetic consultation
- Increase State General Funds to support newborn hearing screening in Colorado
- Continue research on late onset hearing loss



Outcomes: Happy, Healthy Families

- Comprehensive
- Community Based
- Culturally Competent
- Seamless
- Knowledgeable Providers
- Parent to Parent Support

