



**health and
social development**

Department: Health and Social Development
GAUTENG PROVINCE

**Newborn Hearing Screening at Chris Hani
Baragwanath Academic Hospital (CHBara):
Current Practice & Challenges**

*UNICEF ECD KNOWLEDGE BUILDING SEMINAR
28th & 29th November 2011*



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- AIM for paediatric Audiology CHBara:

To early-identify & provide intervention for children with a hearing loss.



Hearing screening-WHY?

- Early identification of hearing loss & early intervention (EDHI) associated with improved language development (Yoshinago-Itano, Sedey, Coulter & Mehl, 1998).
- EDHI promotes linguistic, cognitive, social-emotional & literary development (JCIH, 2007).



Context

Chris Hani Baragwanath Academic Hospital

- Services Soweto Population of Gauteng
- Population=1,3 million (some believe higher).
- 43% of Johannesburg's population.
(Loots, 2008 -Joburg archive)
- 23 175 babies born at CHBara:2010
- Estimated S.A. births:2011= 1 059 417 (Stats SA, 2011)
- +/-2.2% of babies born in S.A./year born at CHBara



Context...cont...

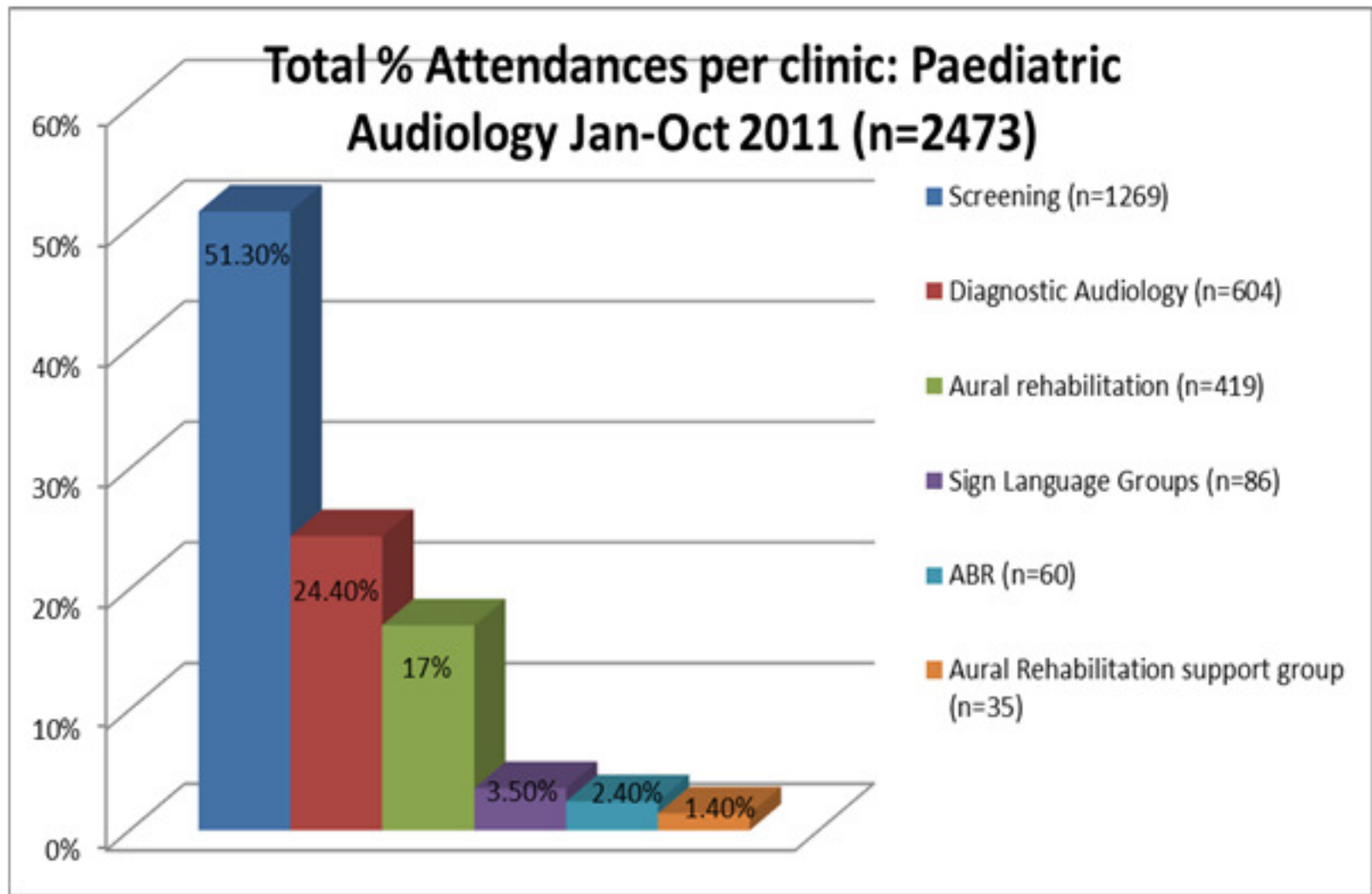
Staffing at CHBara Speech Therapy & Audiology:

- Currently 28 clinicians in total:
 - 1 X HOD
 - 3 X Chief clinicians (1 audio; 2 STA)
 - 9 X Senior clinicians (2 audio; 7 STA)
 - 5 X Junior clinicians (1 audio; 2 speech; 1 STA)
 - 7 Comm. serve. clinicians (1 audio; 1 speech; 5 STA)
 - 3 STA assistants

Services at CHBara



Paediatric Audiology Clinics





Context...cont...

- Estimated 6/1000 babies born with PCHI or acquire a PCHI in the first few weeks of life (Subsaharan Africa) (Olusanya, 2008)
- Therefore estimated 6357 born in SA/year (Using Stats SA 2011 birth estimates)
- 139 born at CHBara each year (based on 2010 birth stats)



Context...cont...

PRIVATE vs. PUBLIC: South Africa

- 16%: private healthcare via medical aids
- Another 16%: pay for private health care themselves (mainly for G.P's or pharmacy).
(Lloyd, Sanders & Lehmann, 2010)
- Due to costs: assume patients access Audiological services via medical aid or public health.
- Therefore 84% of the population use public health care for Audiology services.



Context...cont...

PRIVATE vs. PUBLIC South Africa...cont...

- Therefore of the 6357 children born with a permanent or early-acquiring a permanent hearing loss, 5340 will be born in the public sector/year.



South African & International Policy

○ South African guidelines

HPCSA, (2007) recommends that PCHI is:

- confirmed by 3 months
intervention provided by 6 months of age- Hospital
- identified by 4 months
intervention provided by 8 months of age- Clinic

○ International

American JCIH (2007) recommends that:

- hearing screened by 1 month of age,
- full audiological evaluation by 3 months of age,
- appropriate intervention by 6 months of age.

South African screening services

PUBLIC:

Theunissen & Swanepoel, (2008).

- Survey of 77% public hospitals-51% return rate (n=44)
- 27 % S.A. Hospitals completing newborn hearing screening.
- 2% (i.e. one hospital): Universal Screening, rest: screening for high risk babies & NICU graduates.

South African screening services

PRIVATE:

Meyer & Swanepoel (2011)

- 166 Private Obstetric units surveyed.
- 53% (n=87) providing hearing screening.
- Universal hearing screening: 14%.
- Challenges:
 - newborn hearing screening not included in birthing packages
 - not supported by other health care staff or medical aid schemes.

Study	<i>n</i>	Age at Identification	Age of enrollment in an EI programme	Age at initial hearing aid fitting
van der Spuy & Pottas (2008)	54	23 months (SD =17 months; range = 2-27 months)	31 months (+/-19SD)	28 months (SD = 19 months)
Strauss (2006)	35	27% younger than 6 months. 16% between 6-12 months. 24% between 12-24 months. 30% over 30 months.	--	Less than 50% in first year of life
Venter & Viljoen (2008) In Swanepoel, Störbeck & Friedland (2009)	20	31 months	43 months	39 months
Theunissen and Swanepoel (2008)	76	--	--	Less than 7% (5/76) by 6 months of age. 70% (53/76) older than 12 months

**Includes all initial fittings for permanent hearing losses fitted in 2011 (various aetiologies)*

Ages of identification of childhood hearing loss, initial hearing aid fitting and enrollment in an early intervention (EI) programme

Hearing Screening options

1. Otoacoustic Emissions: Test of cochlear outer hair cell function

Recommended for most screening. i.e. 'well babies'

-Cost efficient & quick screening method

2. Automated Auditory Brainstem response (AABR): Test of auditory nerve function. At-risk infants (Mason, 2004).

- Present OAE's and/or CM & absent ABR: Auditory Neuropathy Spectrum disorder may be present

(Berlin, 1999; Simmons, 2008; Mason, 2004).



High-risk register- Current screening at CHBara

- Joint Committee on Infant Hearing High Risk Register for Identification of Hearing Impairment (1994) In Davis, Mencher & Moorjani (2004).
- Infants (birth – 28 days):
 - Family History of hereditary childhood sensori-neural hearing loss (SNHL)
 - In utero Infections (CMV, Rhubella, syphilis, herpes, toxoplasmosis)
 - Cranio-facial Abnormalities
 - Birthweight less than 1500g
 - Hyperbilirubinaemia at a serum level requiring exchange transfusion
 - Ototoxic medication
 - Bacterial meningitis
 - Apgar score of 0-4 at one minute and 0-6 at five minutes
 - Mechanical ventilation for 5 days or more
 - Syndromes known to include SNHL & conductive hearing loss



Hearing Screening-Bara

- ***Automated Auditory Brainstem response (AABR)***

VIDEO-2 days old





Neonatal Hearing Screening

Audit January to October 2011:

- Overall increase in attendances of 122% in screening services for young babies and new-borns: compared to 2010
- Despite this: only 4.46% of children born at CHBara had their hearing screened.
 - 2.48% in 2010



Acceptable referral rates

Two-step hearing screening process (i.e. 2nd screening for those referring initial screening)

Acceptable referral rates for ***well-babies***:

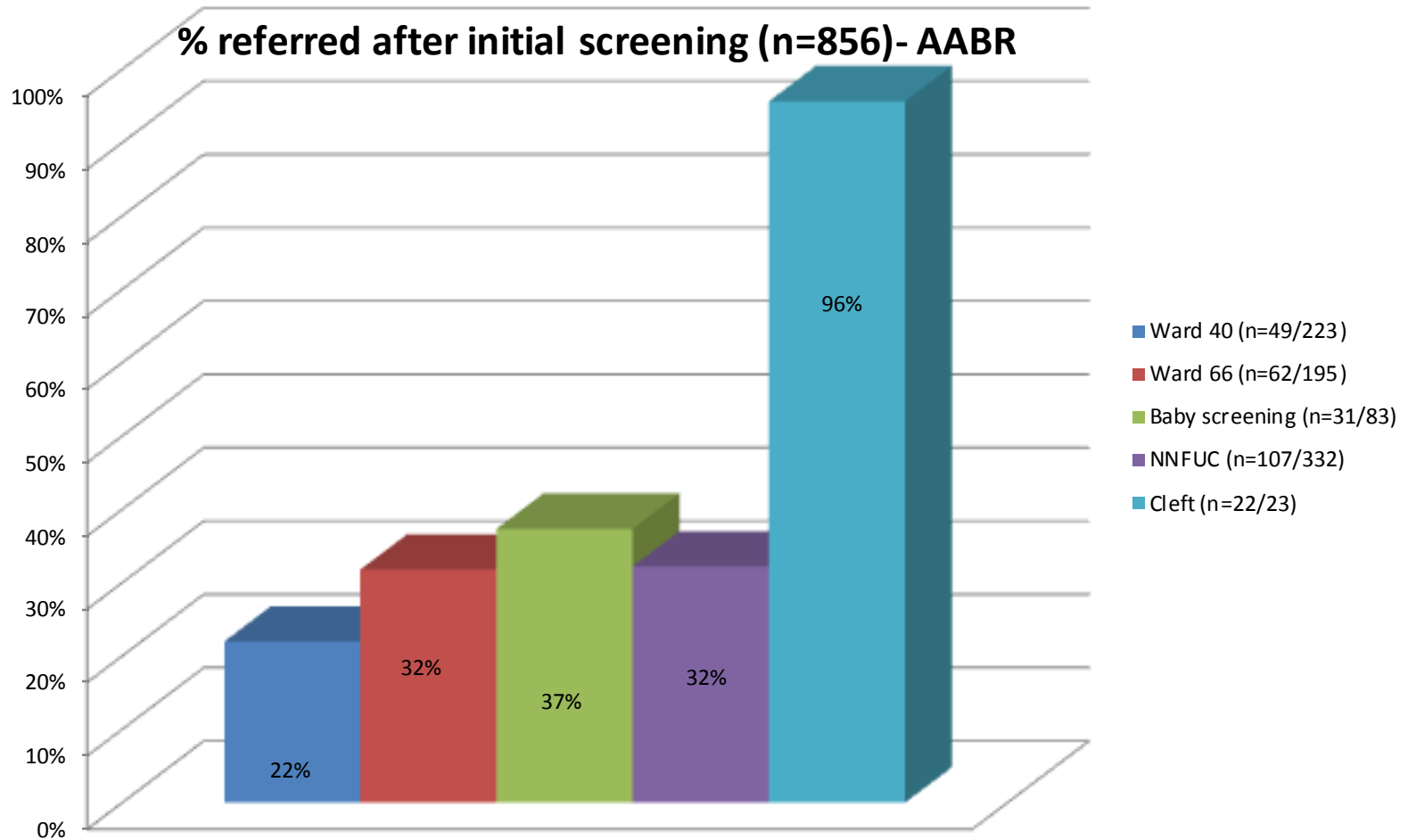
- AABR: 2-3%
- OAE: 6-10%

Sound Beginnings (2001)

- Korres et al (2008) study:

76,560 neonates screened (TEOAE's): 1,564 (2%) failed the initial screening.

Audit-Screening



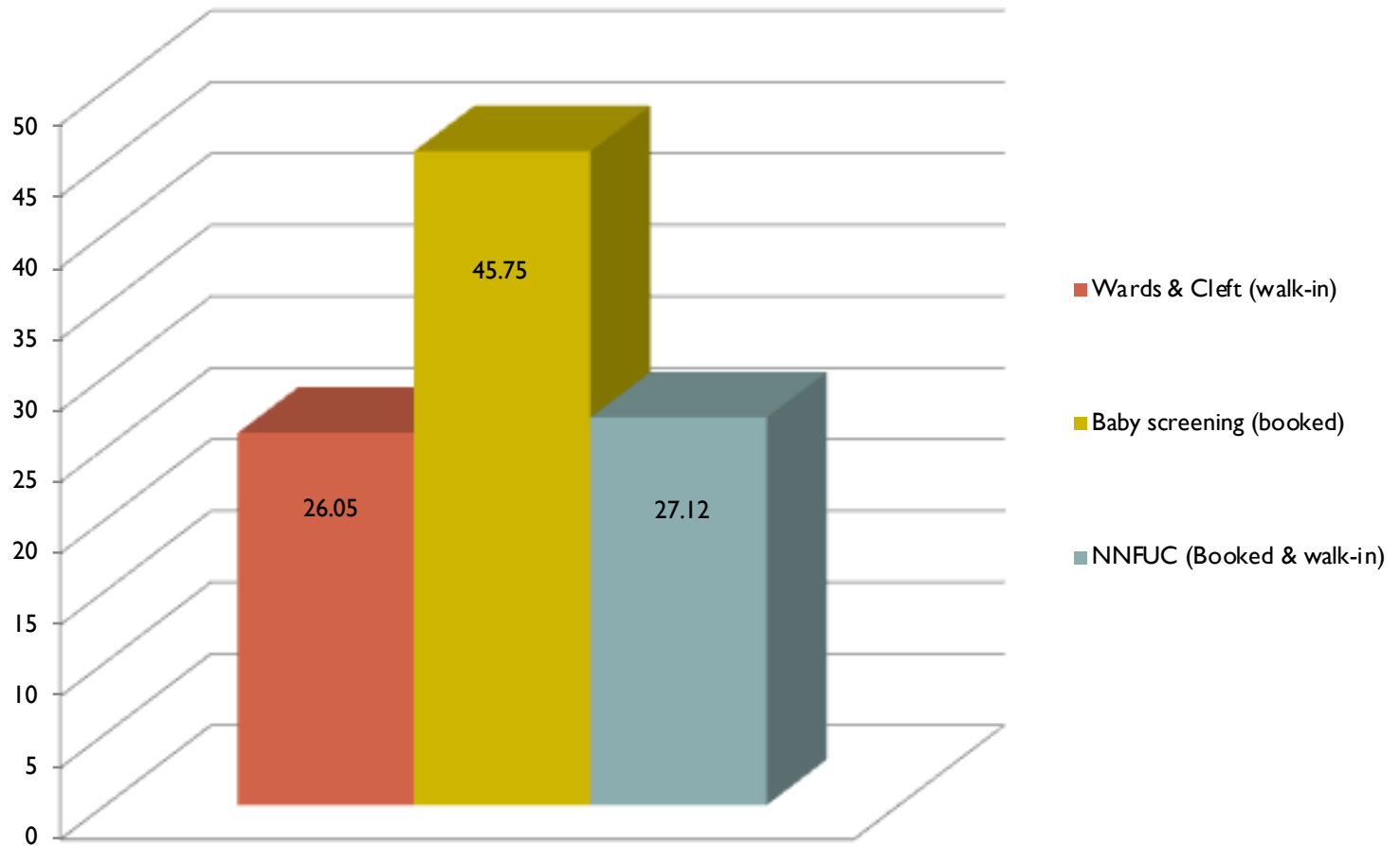


Possible reasons for high referral rates

- Only includes initial screening
 - Incomplete data to analyse after 2nd screen
- Some 'older' children, therefore CNT: movement & 2nd appointment booked
- Equipment malfunction for a short period-1 week
- High-risk children screened

Time Taken for screening

Time allocated/taken-for screening per child (minutes)





Testing only-AABR

- Current equipment (estimated times):
 - Pass: Minimum: 10-20 seconds
 - Refer: Minimum- 3 minutes
 - Maximum time: variable depending on movement of child

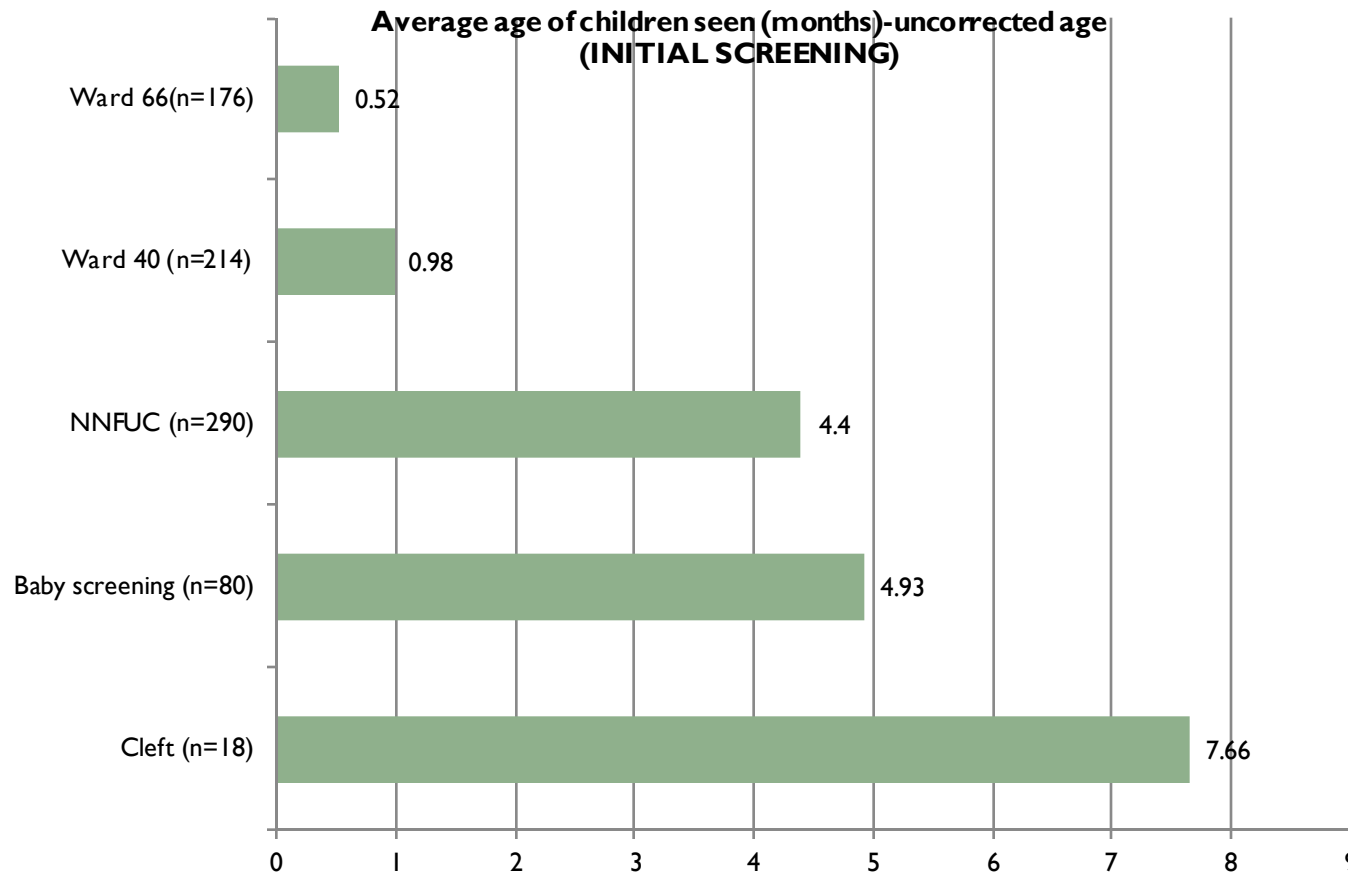


Time taken for screening..cont

(Lin, Shu, Chang & Bruna, 2002)

- *Method:* Wellborn infants using TEOAE screening. Ave. age at initial screening = 52 hours.
- *Results:* Average TEOAE screening time/ear=41.43 seconds.

Audit-Screening

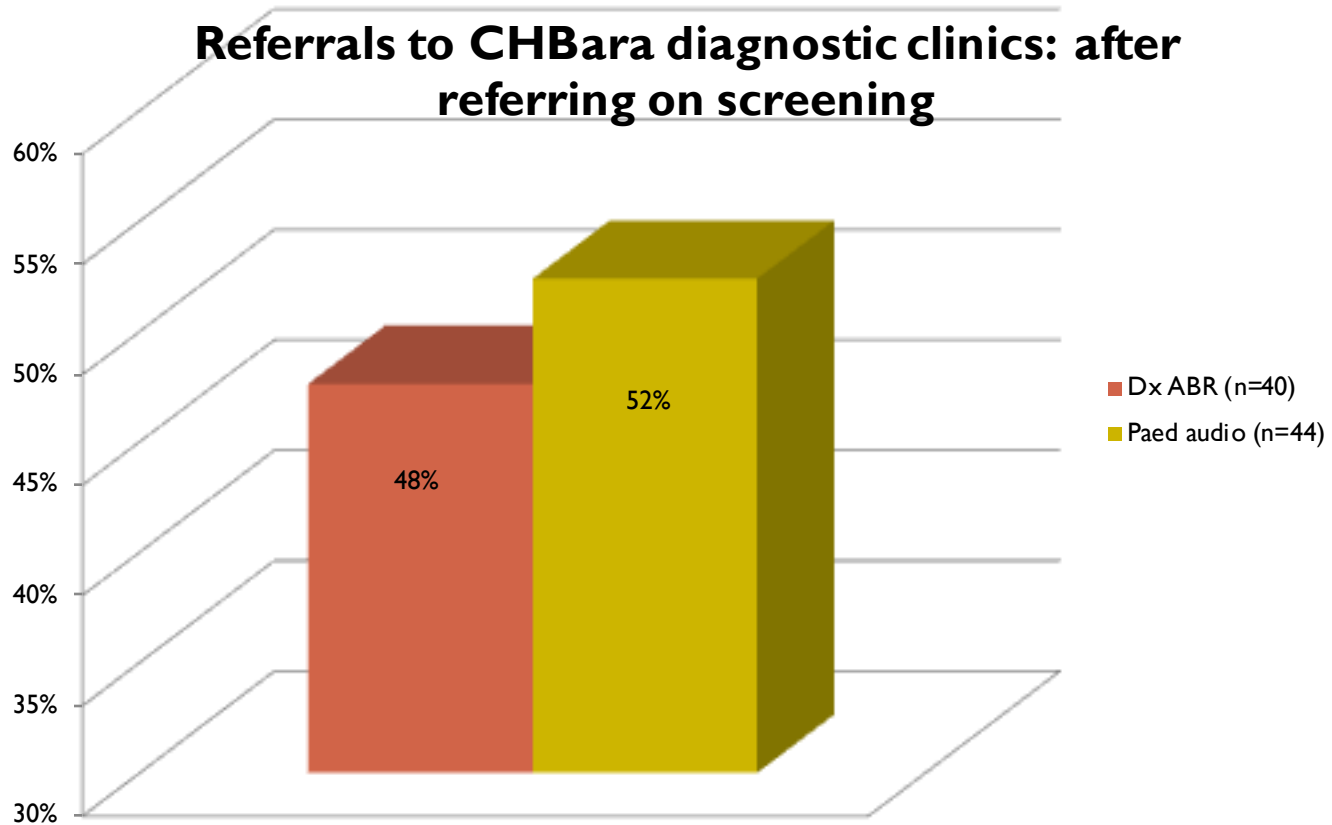


Infants should have their hearing screened by 1 month of age (JCIH, 2007)

Assessment of Hearing

- **Infants < 6 months:**
 - Electrophysiological measures. E.g ABR (Hall, 2004)
 - Or children unable to complete behavioural testing e.g. visual or developmental delay (Rance & Briggs, 2002).
- **From five to six months of age:**
 - Behavioural testing in the form of VRA can be included as part of the test battery (Madell, 2008).

Referral to diagnostic services



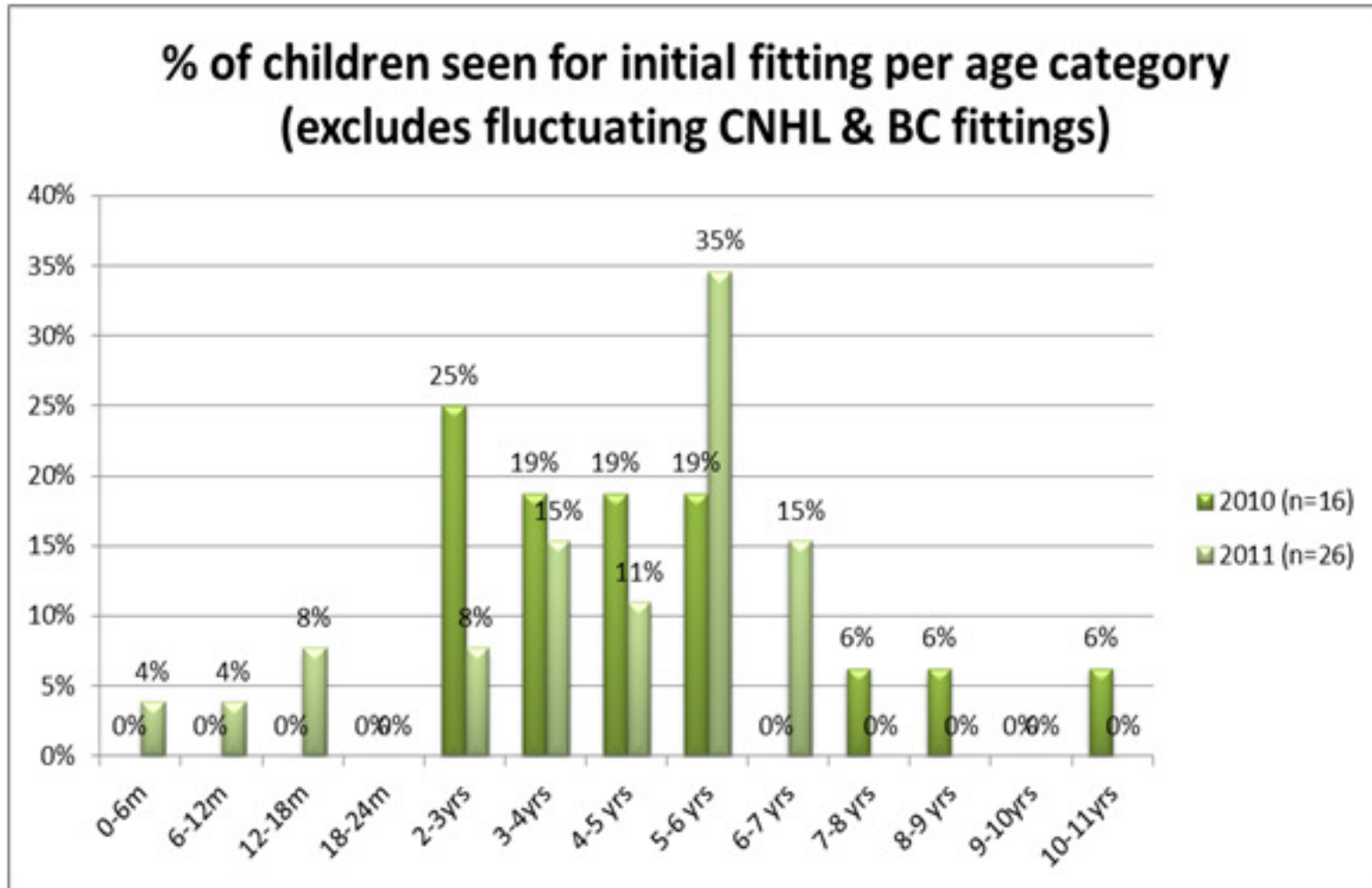


AUDIT: Ave age of initial fitting

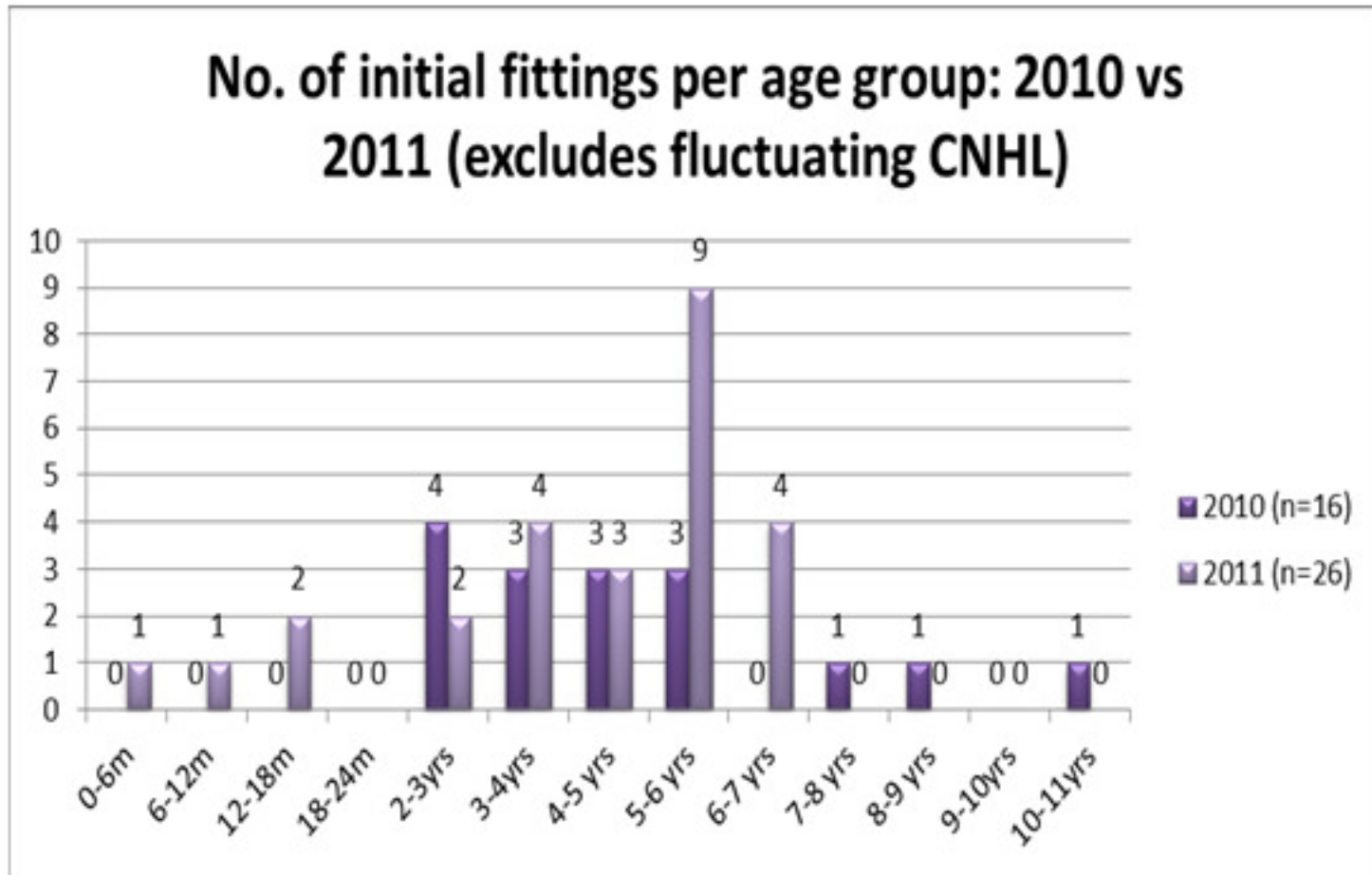
Audit: initial fittings for PCHI (acquired or congenital)

- 2010: 16 initial hearing aid (H.A) fittings
- 2011: 26 initial H.A. fittings
 - i.e. 62.5% increase in the number of initial H.A fittings from 2010 to 2011.
- No affect on average age of fitting:
 - 2010: 4.84 years
 - 2011: 4.31 years

Age at initial hearing aid fitting



Age at initial hearing aid fitting





Initial Fittings- 2011

- Only 4/26 children <18months
 - 2 had acquired hearing loss (meningitis)
 - 1 detected through screening services
 - 1 has atresia & absent/malformed pinnae-
Doctor referred



Affects on age of initial fittings

- Challenges in 2011:
 - ABR not available and then functioning for large part of year. Delayed Ax & diagnosis
 - ? See impact of increase in hearing screening on age of initial hearing aid fittings in 2012



Suggestions

- Proposal developed for Universal neonatal hearing screening at CHBara to hospital management
- Will need full screening service & more diagnostic services for those referring
- As children seen younger in wards, focus on ward screening
- Wards also 'walk-in' situation. Able to optimise use of clinical time

Hearing Screening: Implications on services

Haplin, Smith, Widen, & Chertoff, (2010)

- U.S.A.-Kansas: Newborn hearing screening= paediatric population undergoing audiological evaluation at younger ages
- Found clinical caseload of newborns increased from 25% to 80%, after UNHS introduced.

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