

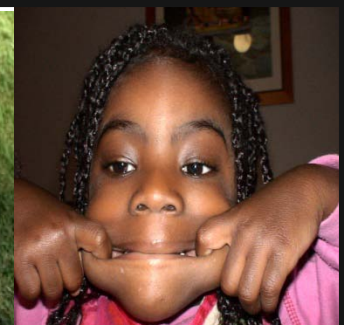
Child Outcomes: from birth to school

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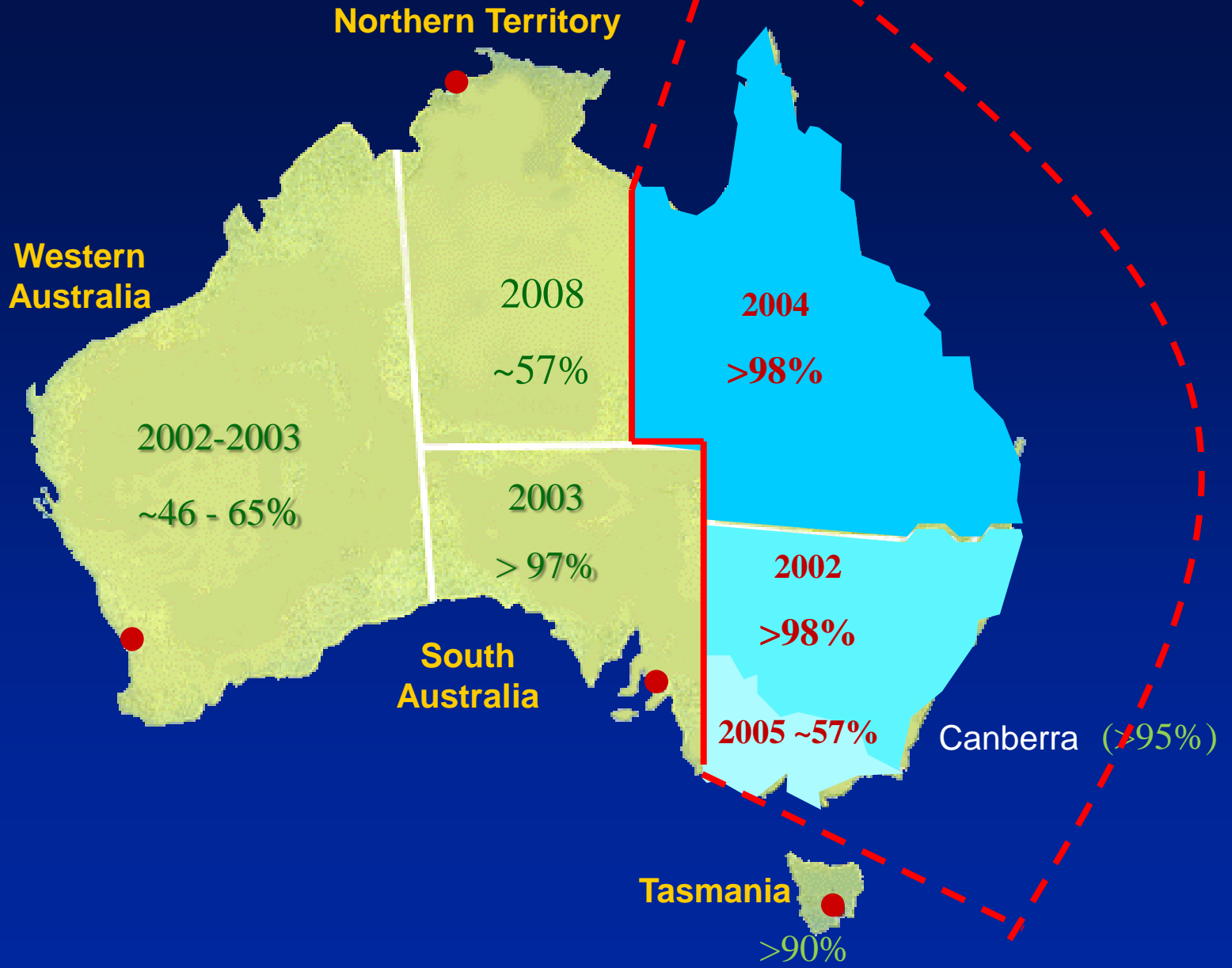
NSW Ministerial Standing Committee on Hearing, Sydney, 3 Sept, 2009.

creating sound value™



Motivation

- ◆ 1-2 children/1000 have a permanent hearing loss (Russ et al, 2003; Ching et al, 2006)
- ◆ Hearing loss impacts negatively on children's
 - Communication development
 - Language and Literacy (Moeller et al, 2007)
 - Speech recognition and production (Eisenberg, 2007)
 - Perceptual processing (Jerger, 2007; Rudner et al, 2007)
 - Psychosocial development (Watson et al, 1990; Moeller, 2007)
 - Educational attainment (Punch et al, 2004)
- ◆ No prospective study that directly examined whether early intervention results in improved language development (USPSTF, 2001).



In 2005, we commenced ...

Longitudinal

Outcomes of

Children with

Hearing

Impairment ...



www.outcomes.nal.gov.au

Aims

- ◆ Directly compare outcomes of early- and later-identified children;
- ◆ Examine the effect of a range of factors, including child, family, intervention, device setting and etiology, on different outcomes.
- ◆ Examine factors affecting individual development prospectively.

Factors and Outcomes

Child Factors

- *Age of intervention*
- *Aetiology*
- *Hearing thresholds*
- *Maternal education*
- *Socio-economic status*
- *Cognitive ability*
- *Additional needs*
- *Communication mode*

Device Factors

- *Hearing aid prescription*
- *Cochlear implant parameters*

Intervention Factors

- *Age of enrolment*
- *Type and amount*
- *Family involvement*

Child Outcomes

Speech production

Speech intelligibility

Binaural speech perception

Receptive and expressive

Language

Vocabulary development

Phonological awareness

Reading and writing

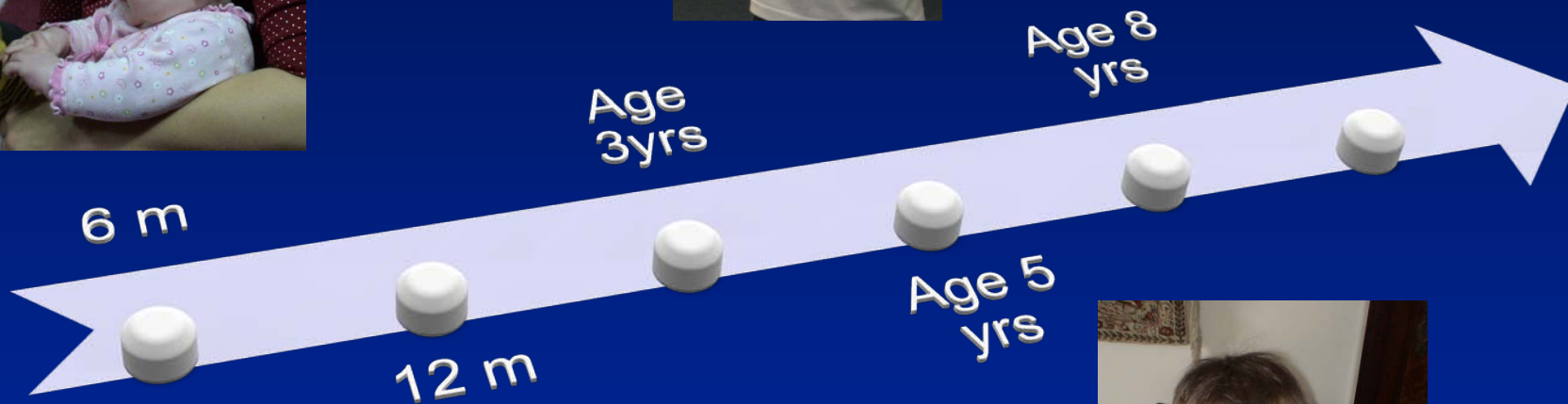
Functional performance

Psycho-social skills

Educational attainment



Method

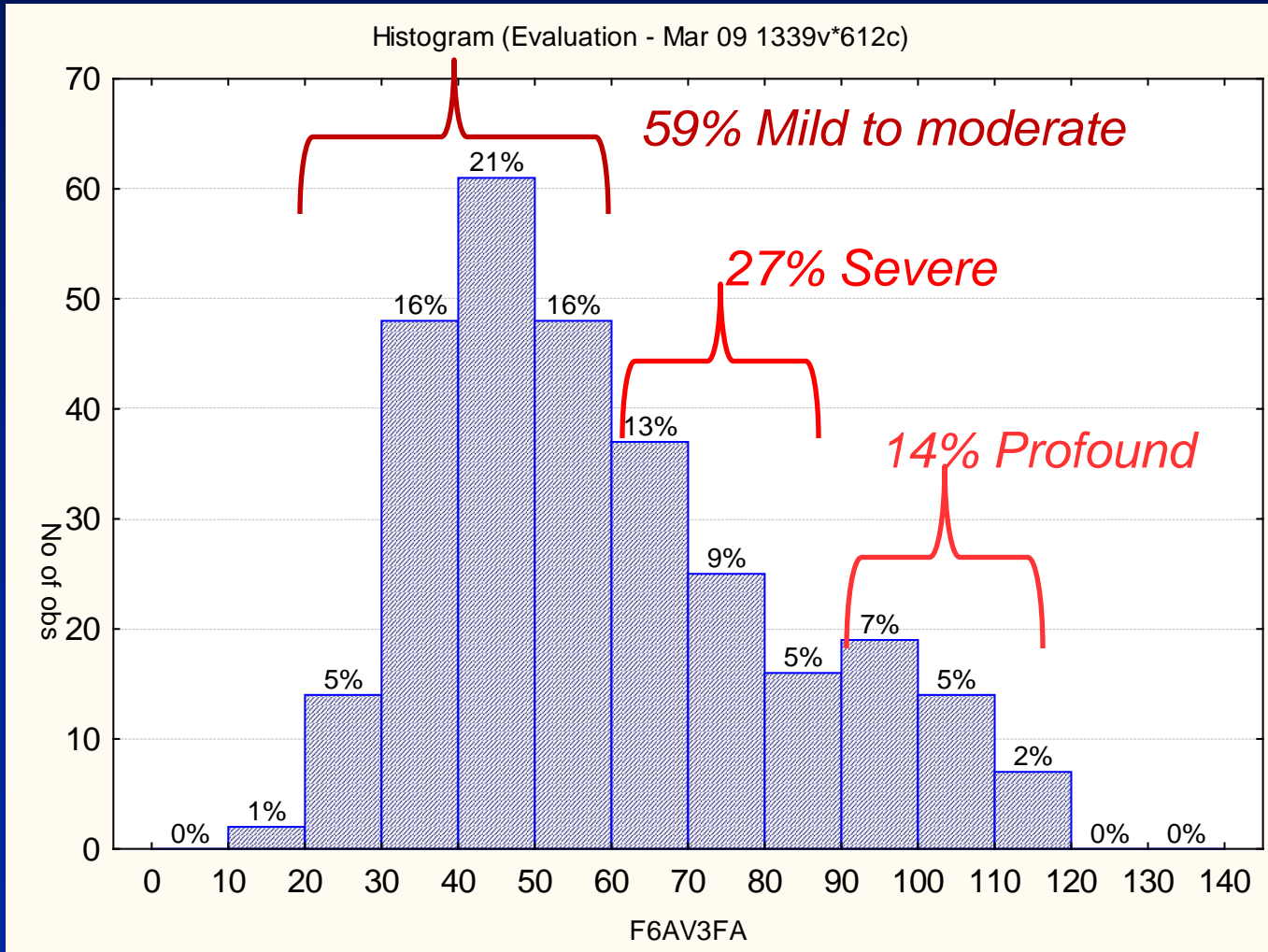


Participants

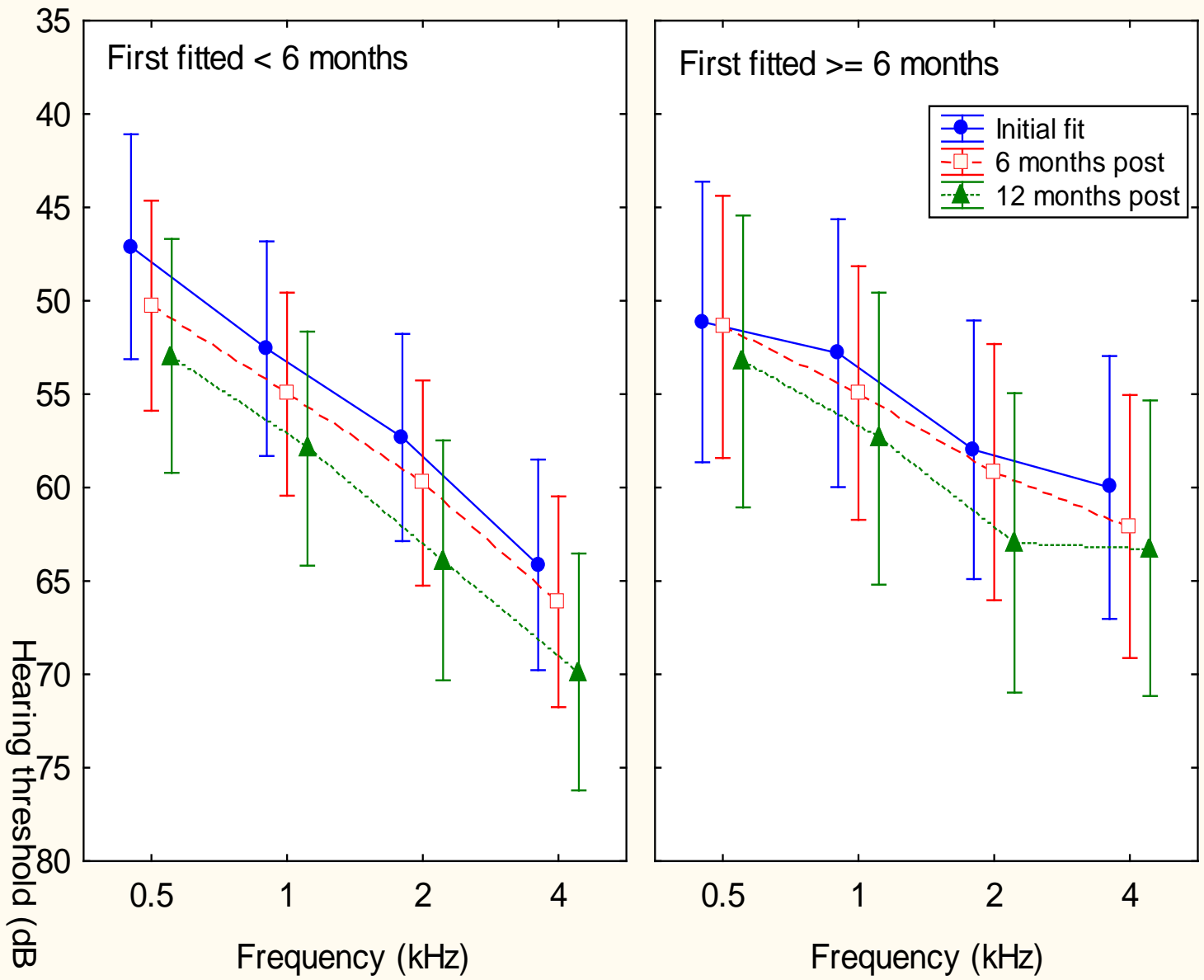
- ◆ About 475 children and families (234 in NSW, 137 in Vic, 104 in Qld)
 - 122 reported additional disabilities
 - 54 reported developmental delay
- ◆ 338 use hearing aids
- ◆ 137 use cochlear implants
 - 85 in one ear, 52 in both ears



Distribution of hearing loss



Hearing loss: first 12 months after initial diagnosis



Children with hearing aids



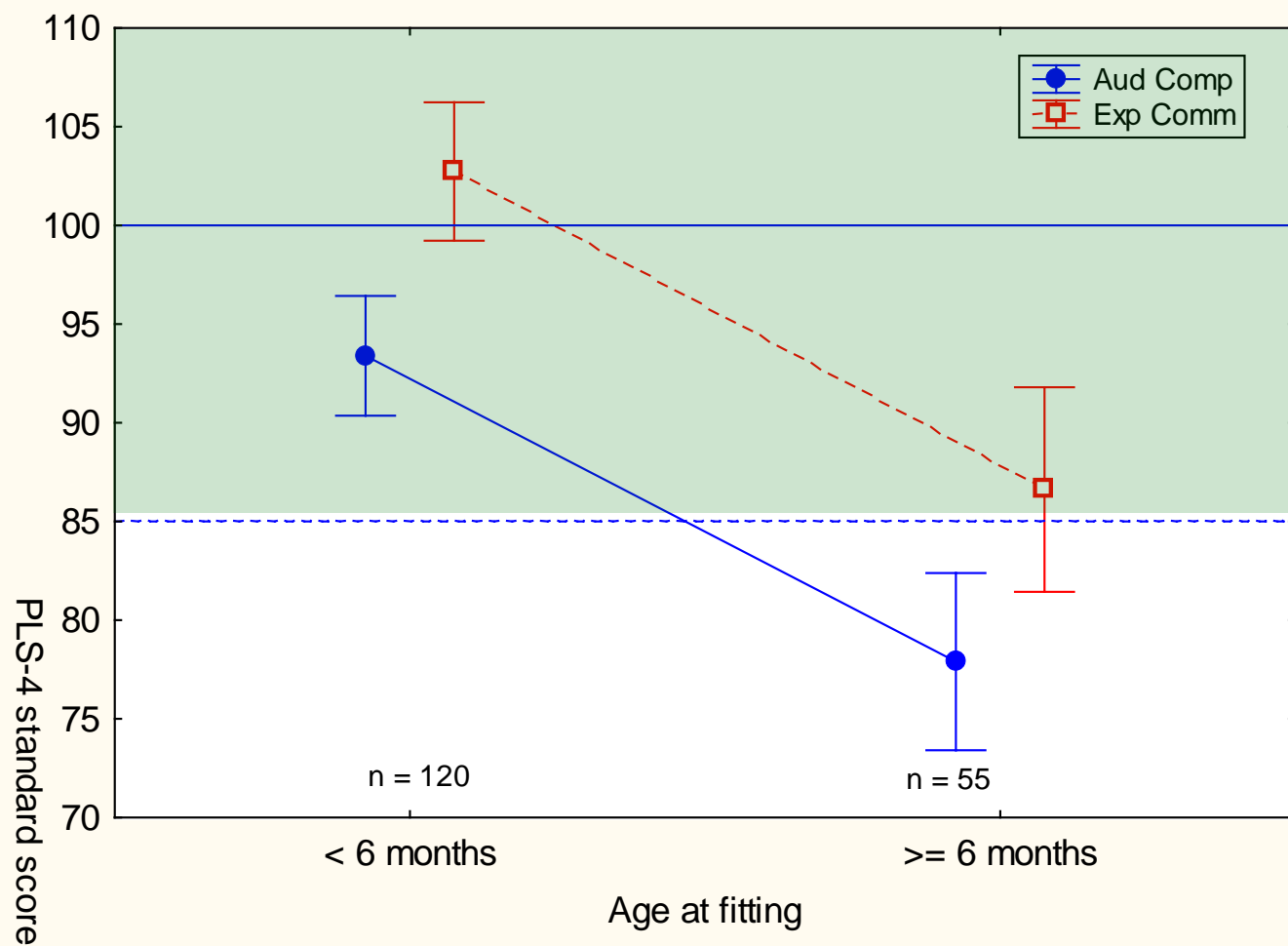


Language at 6 months after fitting

Covariate means:
F6AV3FAMD: 57.61124

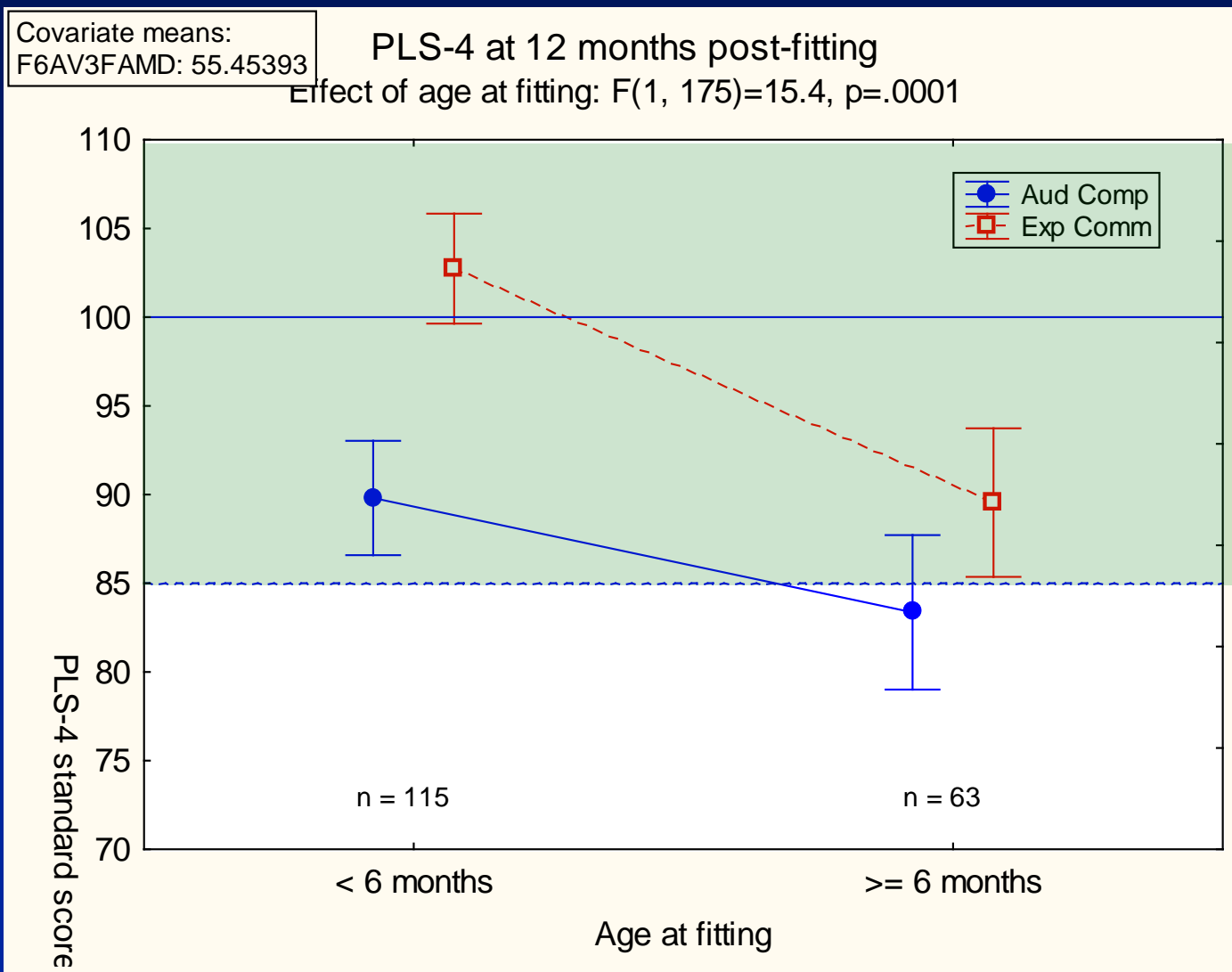
PLS-4 at 6 months post-fitting

Effect of age at fitting: $F(1, 172)=32.7, p < 0.0001$





Language at 12 months after fitting



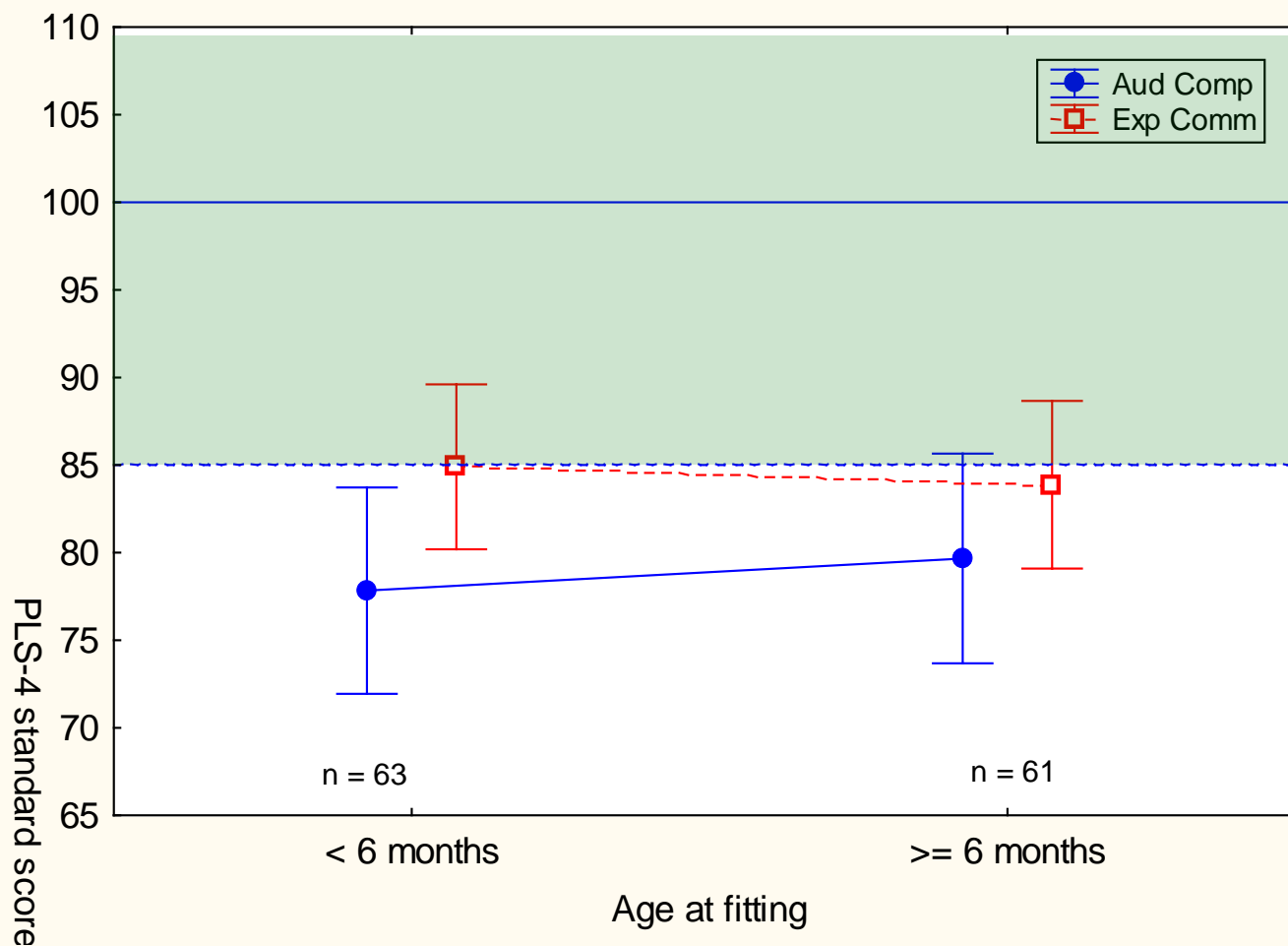


Language at age 3 years

Covariate means:
F6AV3FAMD: 54.58522

PLS-4 at Age 3 years

Effect of age at fitting: $F(1, 121)=0.012, p=.912$



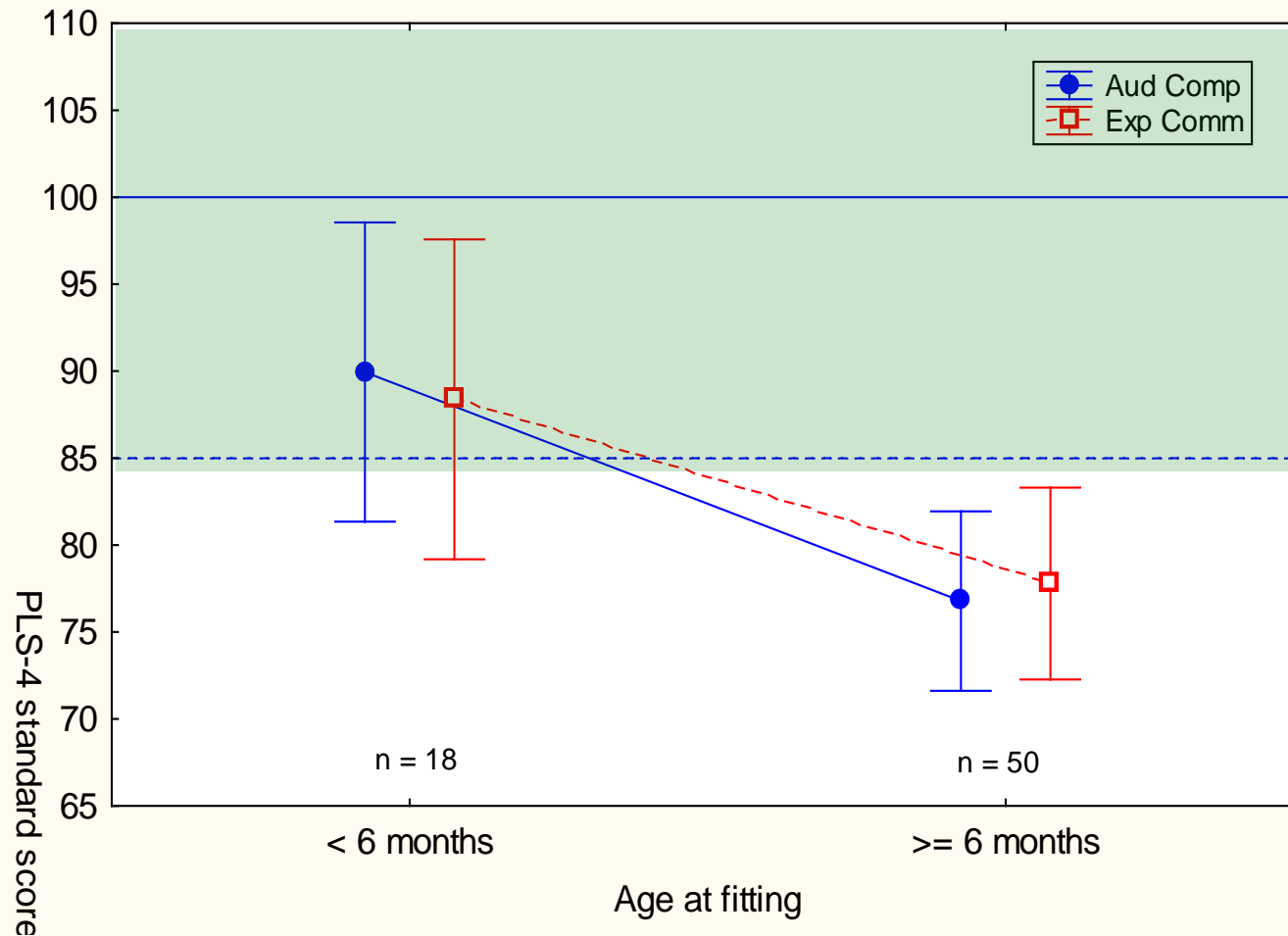


Language at age 5 years

Covariate means:
F6AV3FAMD: 54.65441

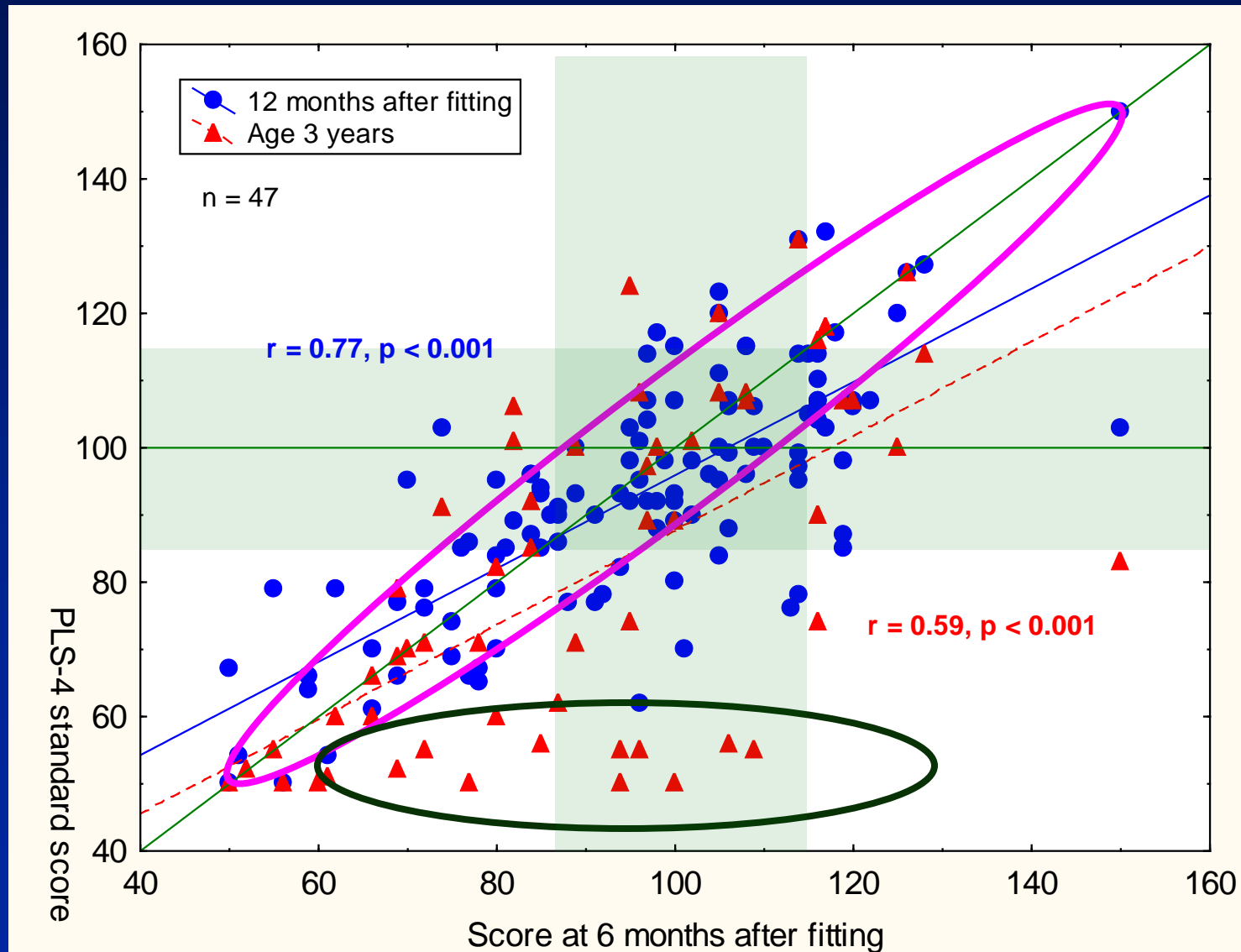
PLS-4 at Age 5 years

Effect of age at fitting: $F(1, 65)=5.47, p=.022$

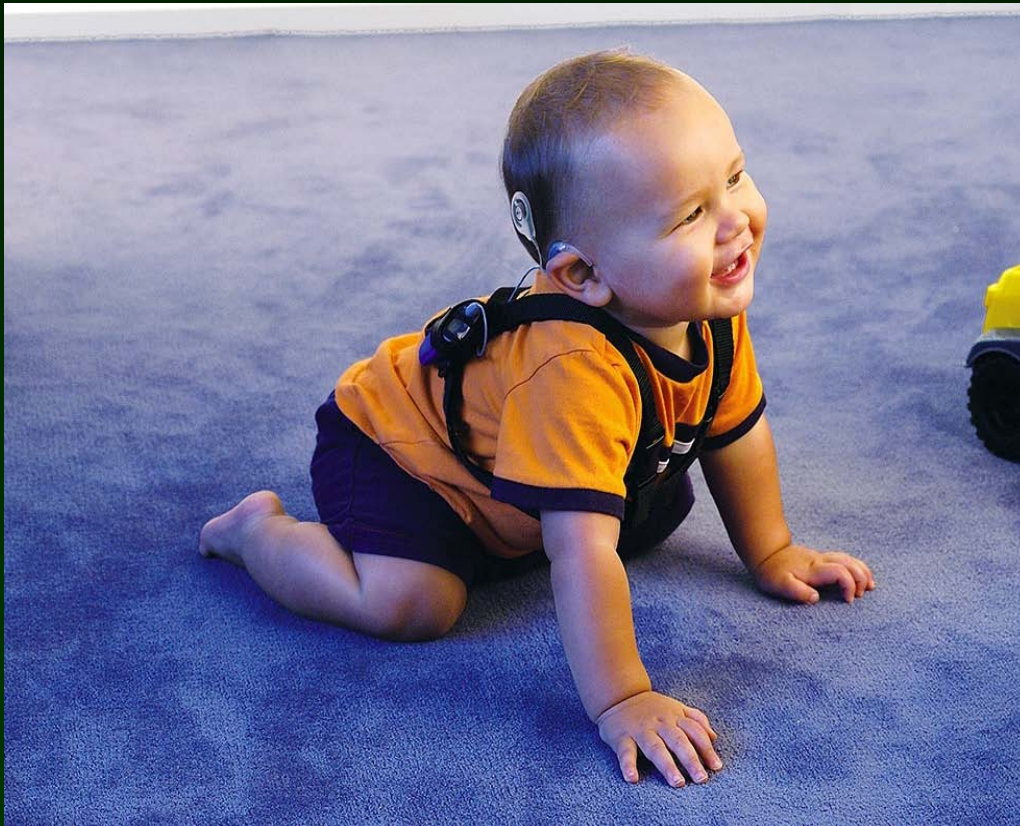




6 months vs 12 m and age 3 years

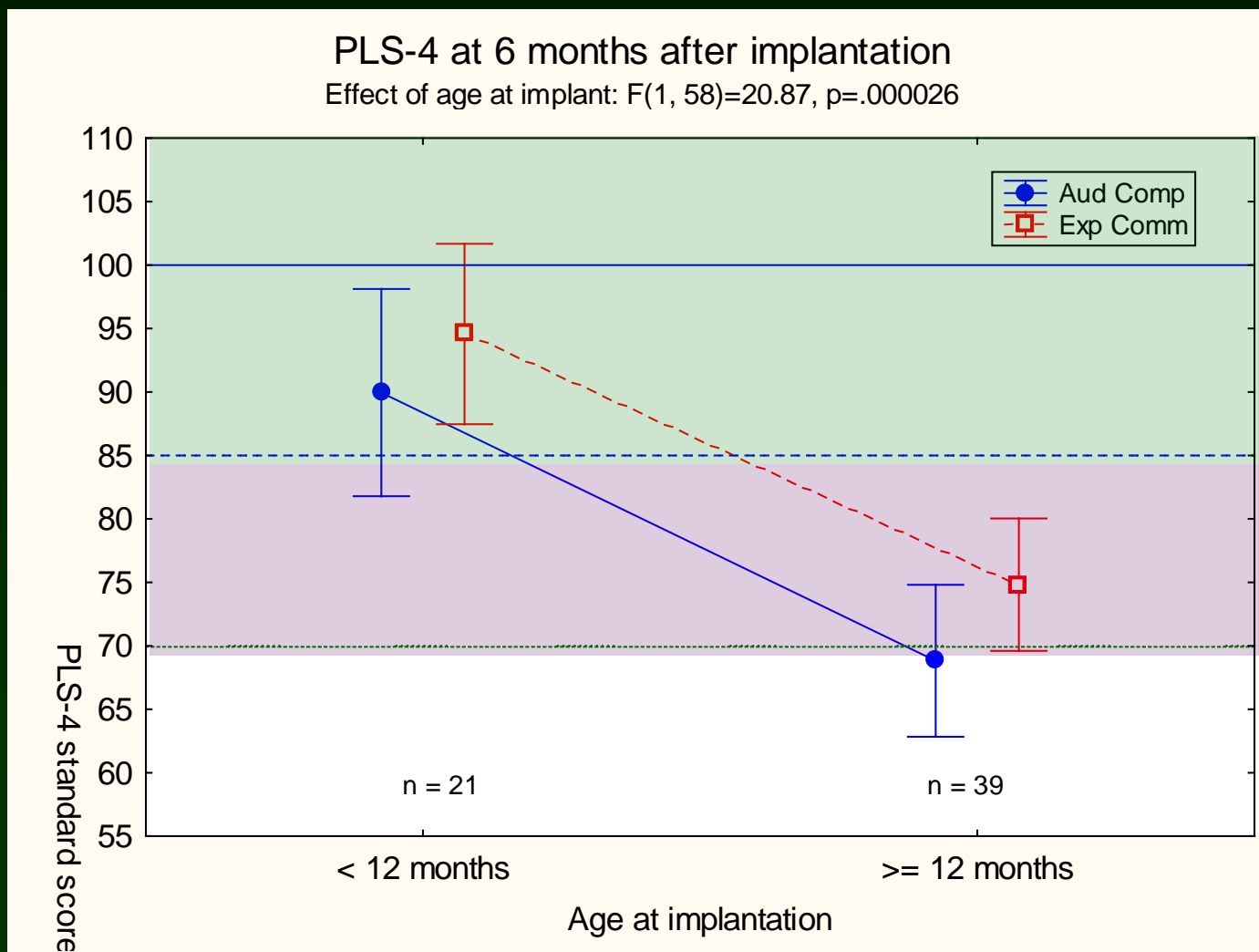


Children with Cochlear Implants



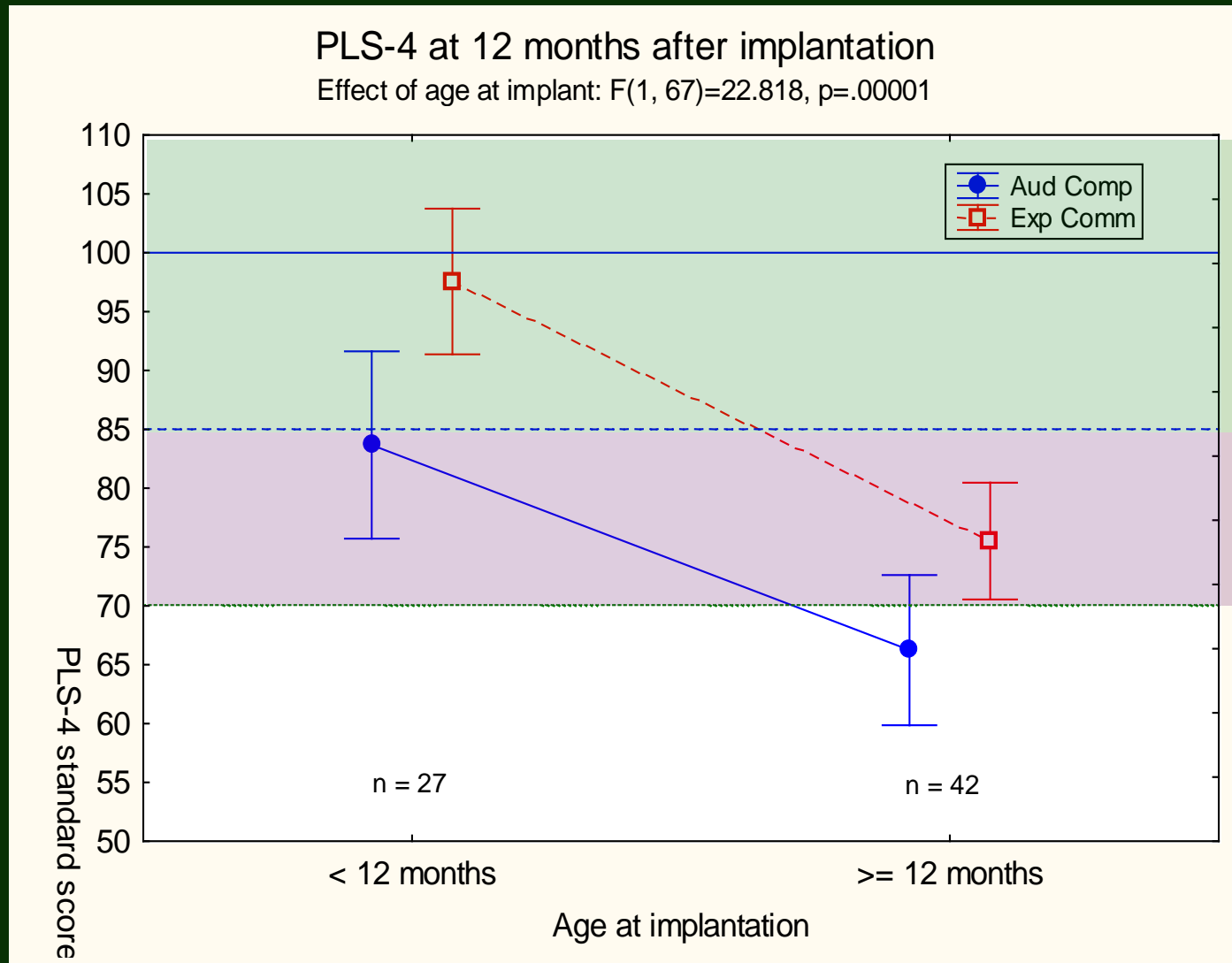


Language at 6 months after implantation



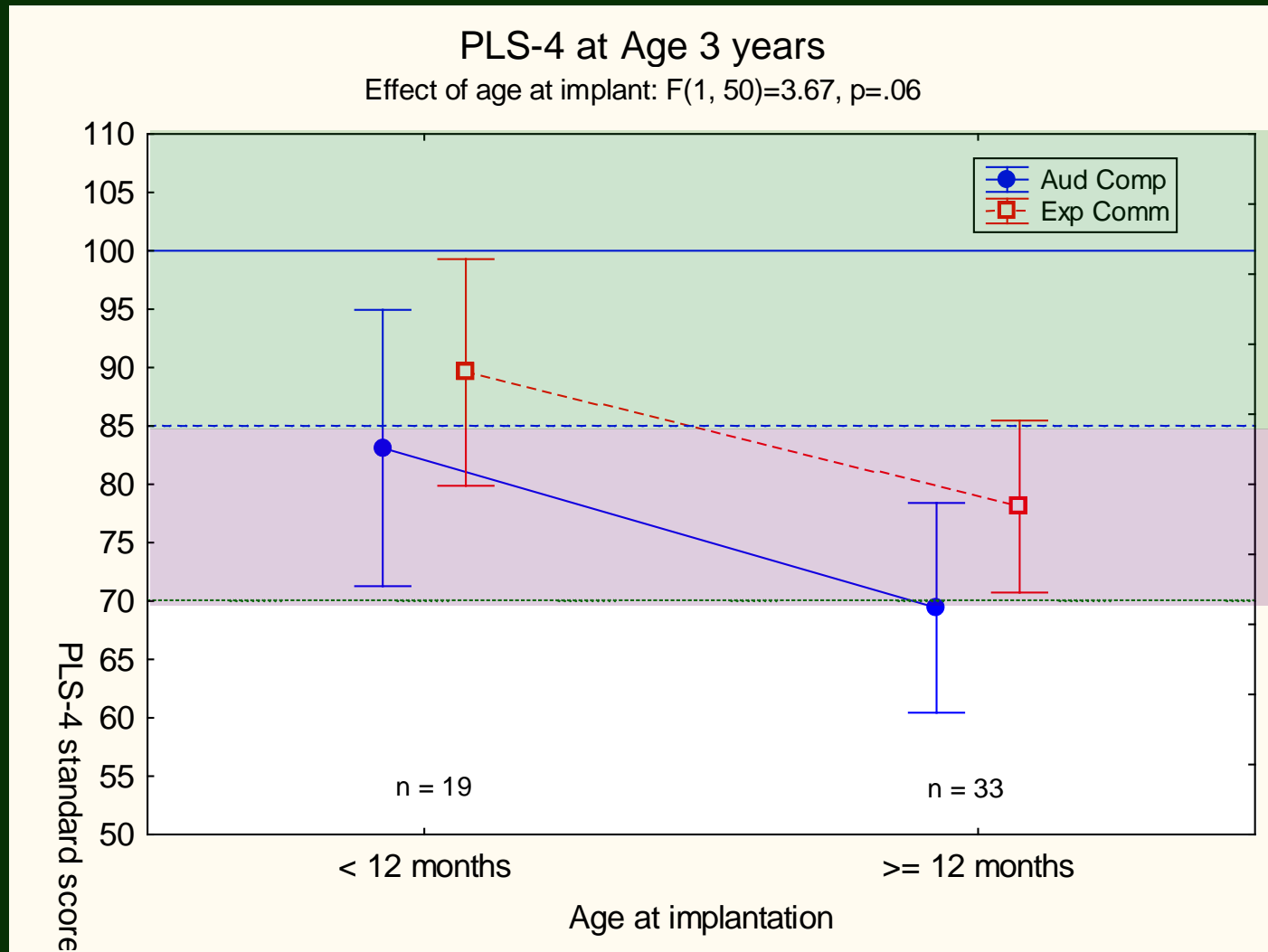


Language at 12 months after implantation



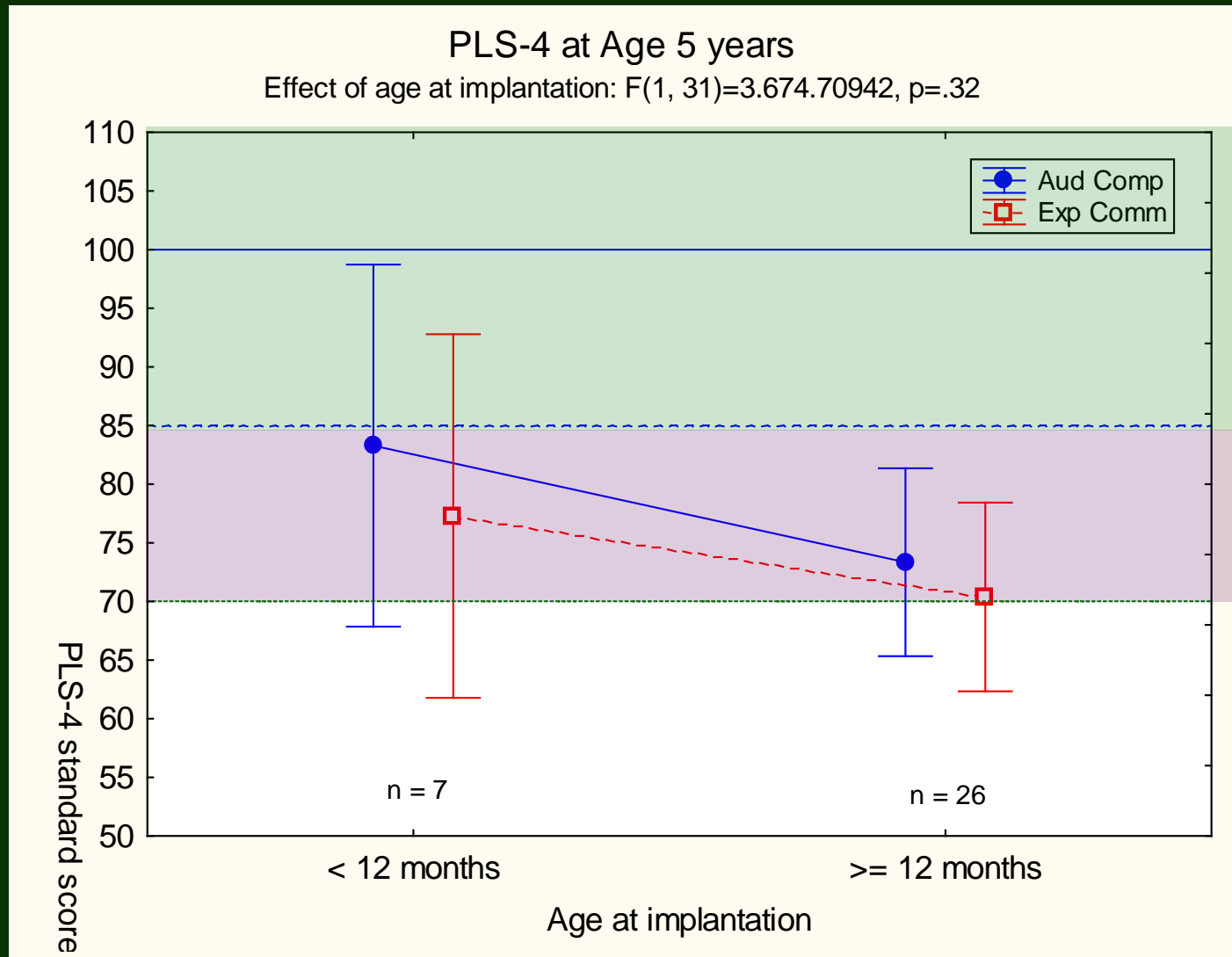


Language at age 3 years



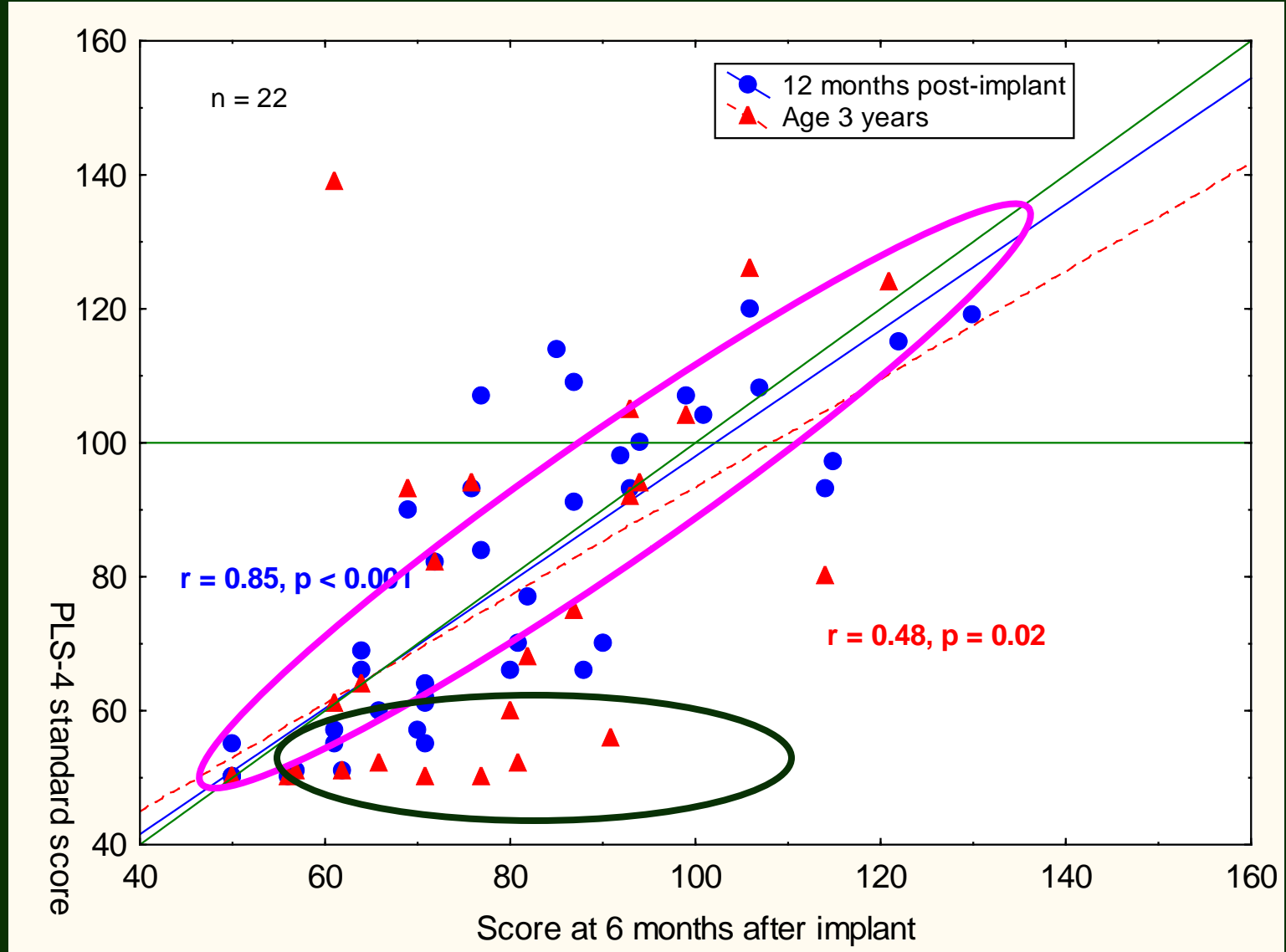


Language at age 5 years







6 months vs 12 m and age 3 years



Summary (tentative, incomplete): effect of age of fitting / implantation

	6 months	12 months	Age 3 years	Age 5 years
Hearing aid 	97.7 vs 83.0 N = 175 P = 0.00001** ✓	96.3 vs 86.5 N = 178 P = 0.0001** ✓	81.9 vs 81.3 N = 124 P = 0.9 ✓	88.7 vs 77.2 N = 122 P = 0.0001** ✓
Cochlear implant 	92.3 vs 71.8 N = 60 P = 0.00001** ✓	90.0 vs 71.8 N = 60 P = 0.00001** ✓	81.5 vs 73.3 N = 52 P = 0.06 ✓	80.3 vs 71.9 N = 33 P = 0.32 ✓

Many confounding factors still to be allowed for

Summary of interim findings:

- ◆ Early detection and intervention enabled children to make a good head start in language development.
- ◆ Longer term effects of early intervention will be investigated when all data are available.
- ◆ Multiple factors affect level of attainment and rate of development.



“My first child was not diagnosed until almost 3 yrs of age; born before SWISH,... Terrible time before ... Unable to communicate, frustrated, tantrums, etc My second child was diagnosed at birth, we skipped all this, and he could communicate beautifully.”

Support needed by families:

- ◆ Felt guilty that they weren't doing enough for their child with a hearing loss
- ◆ From the beginning,
 - Assign *Support person* to family when they left hospital to assist them in managing over the first few weeks
 - Information about *Options* for services and waiting times
 - Information about *Benefits*, particularly carers allowance
 - *Signing* support, free AUSLAN classes
- ◆ Better services for residents in non-metropolitan areas
- ◆ Information services on
 - Managing a child with hearing loss
 - Up-to-date research
- ◆ Speech pathology services
- ◆ Better designed HA and CI

Acknowledgements



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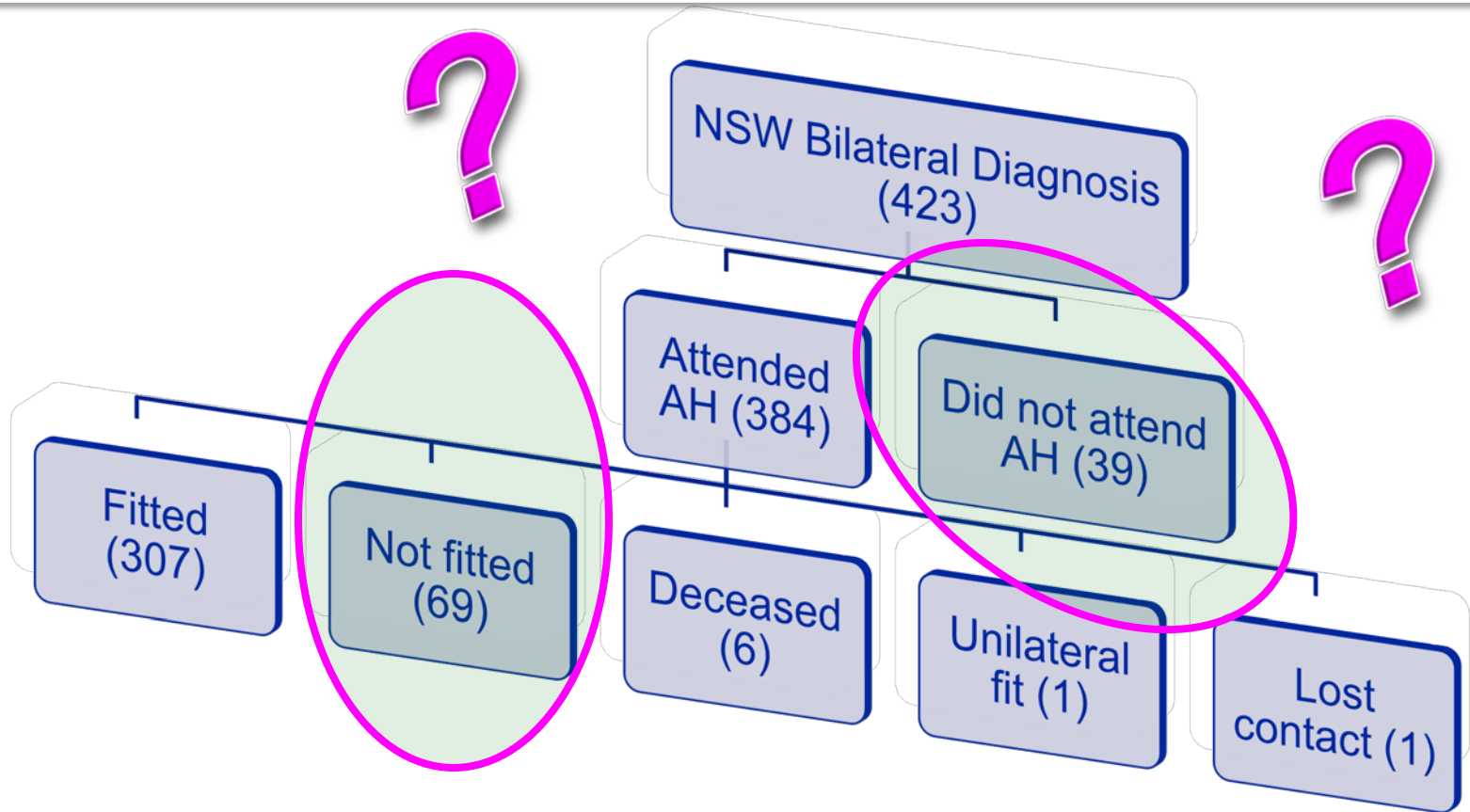
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FROM DIAGNOSIS TO INTERVENTION

National database

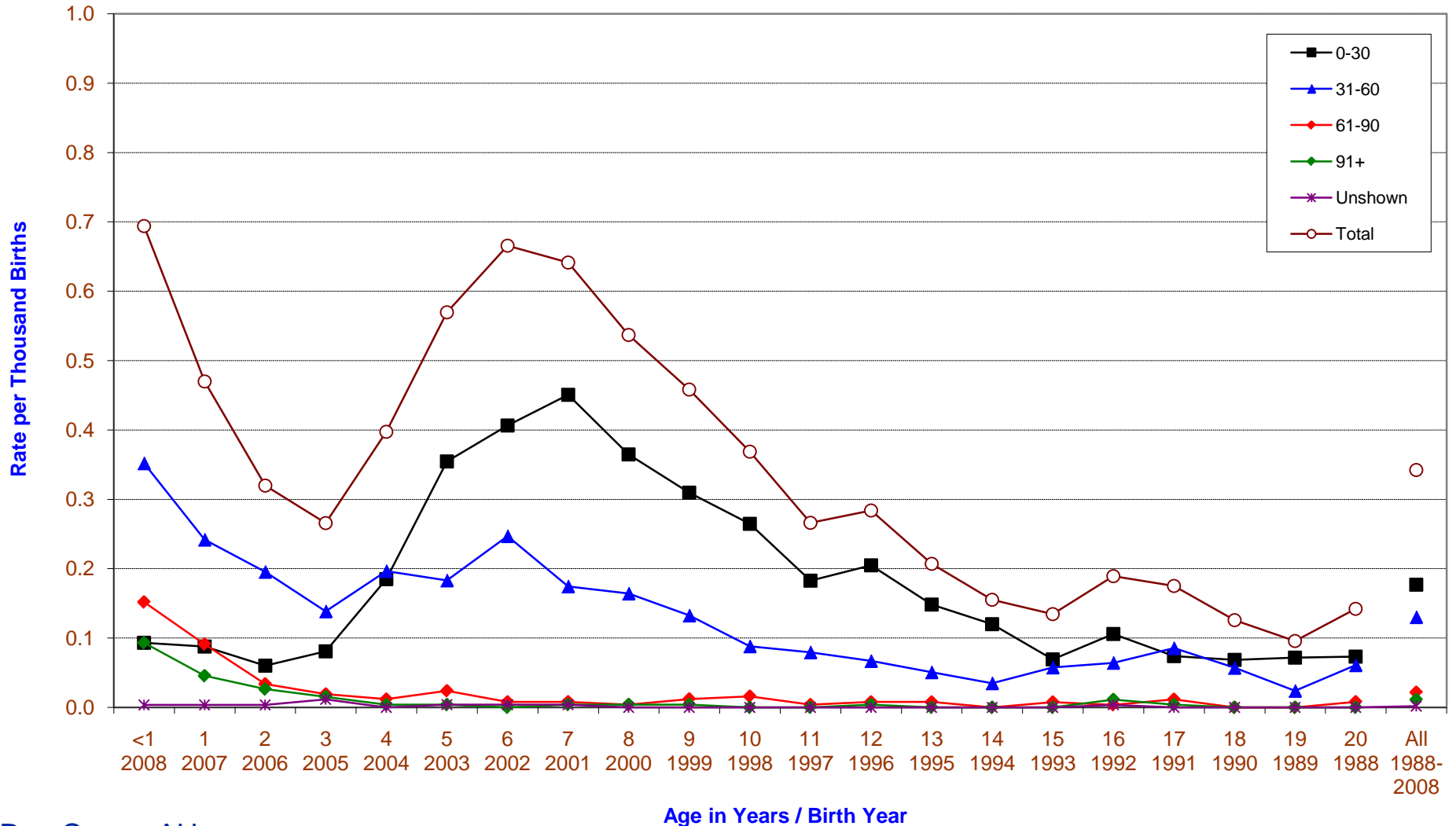
Screening ~ diagnosis ~ intervention



PROGRESSIVE AND ACQUIRED LOSS

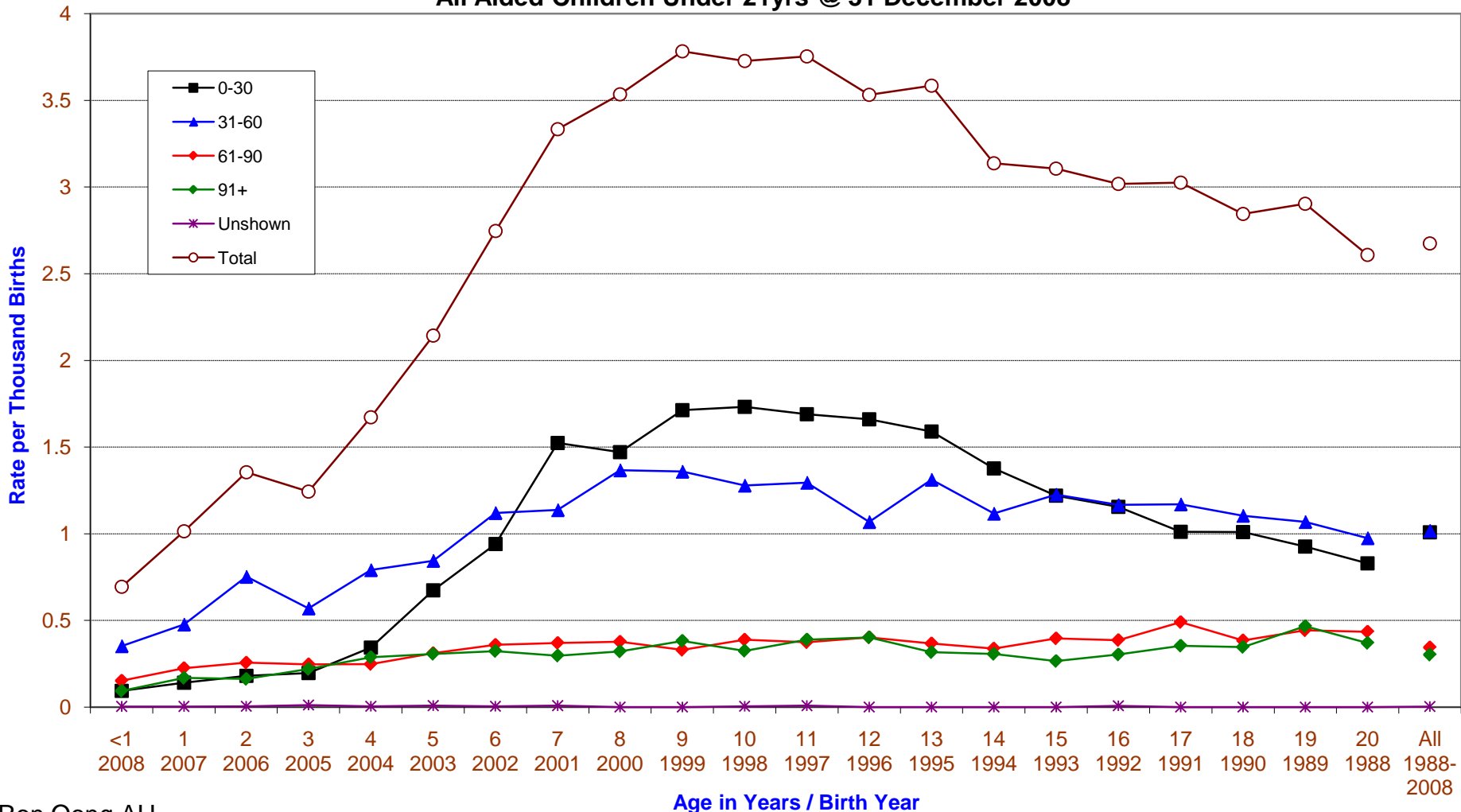
First fitted in 2008

Rate per Thousand Births
by 3FAHL Better Ear Group and Birth Year
Aided Children Under 21yrs First Fitted in Calendar Year 2008



All aided children

Rate per Thousand Births
by 3FAHL Better Ear Group and Birth Year
All Aided Children Under 21yrs @ 31 December 2008



To view slides:

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