The Audiology Conundrum

Audiological Pathways
Appropriate Technologies in Low Resource Settings
Impacts & Sustainability

Joy.Rosenberg@oxfordaud.co.uk

Aims

- Convey our experiences related to deafness and development
  - Joy Rosenberg
  - Kelvin Hawker
  - Suheir Albadarneh
- Work together in small groups to investigate issues
  - Audiological Pathways
  - Appropriate Technologies in Low Resource Settings
  - Impacts & Sustainability
- Take back key points to larger group

Intro

- Teacher of the Deaf and Audiologist
- Have worked in: USA, RP, UK, Nepal
- Programme Manager for UK Postgraduate courses training ToD, Audiologists and Early Years interventionists
  - Acknowledgement and terminology: McPherson's *Audiology in Developing Countries*, 2008.

  Photos: JRosenberg, Mary Hare

Audiology and Education of the Deaf

- History
  - Audiology – half century
  - Ed of Deaf – millennia (relationship to views in dev'g countries)
- Present need (McPherson, 2008)
  - Imbalance 66% of 300 million with hrng loss live in less developed countries
  - 1 million of needed 30 million HA are fit each year
- WHO demographics – coming up (KH)

Prevalence and Causes of HL

- Childhood hearing loss (McPherson, 2008)
  - Developed Countries: 0.05 to 0.23 %
  - Developing Countries: 0.2 to 0.42 %

- Causes of HL in Children (not exhaustive)
  - Genetics, ante/perinatal issues, disease and infection, ototoxicity
  - Impacts of each differ depending on development of region

Types and Impact of Hearing Loss

- Temporary and permanent
- Mild to Profound
- Medical, educational, and cultural models
  - Access to develop language – crucial, with impact on educational, social and economic life

UK model

- UNHS (2006 – England) – using OAE and ABR
- Diagnosis and HA fit by 6 mos
- Early support immediately after diagnosis – comm options
- School
  - ToD professional assigned from infancy throughout
  - Options: fully mainstream to special school
- Technology
  - CI often by age 12 mos for profound losses
  - Digital hearing aids
  - Radio Aids in classrooms
- Professional Training Unis: 5 ToD, 5 Audiologists, 1 ED Aud and EY

Sustainable training models?

Available professionals (McPherson 2008)

Developing countries - 1 audiologist per .5 million people

Developed countries – 1 audiologist per 20k people

Teachers of the Deaf?

- Online? E.g. MOOCs
- Trained audiologists travel and teach overseas? (Nepal model)
- Health workers from developing countries receive training overseas and return to cascade? (RP model)
- Particular to environment and economy/history

Diagnostics in developing regions

- Screening – consider ethics related to rehabilitation opportunities
- Pilot programmes in dev'g countries - feasible
- Test environments and instruments
    - Observation and history-taking
    - Rigorous technique (training)
    - Sensitivity to local culture and language

Rehabilitation in developing regions

- Instrument fitting (if desired)
  - Adequate fitting?
  - Surgical (e.g. CI)
- Counselling
- Communication interventions
- Follow-up – sustainability questions
  - Maintenance (batteries, earmoulds, repairs)
  - Managing fit
  - Managing individual development

Suheir Albadarneh

- Introduction

- A teacher for deaf (1996-2000)

- Head of the Total Communication Center(2001-2009)

- Head of the Rehabilitation and Ability Development dept at PRCS(2010-now)

HL in Palestine

-The percentage of disability in Palestine 2.7% -7% (PCBS 2011) depending on the definition used(wide or narrow)

- No.of PWDs is 114,000-300,000
- The percentage of hearing disability is 14.2 % amongst other disabilities
- No.of PWHL is 17,000-42,000

Major causes of hearing loss

common ones in Palestine

- **Congenital hearing loss- hearing loss at birth**

- genetic(one deaf parent, two deaf parents, hearing parents but deaf grandparents , deaf parents and deaf grand parents)- close marriage- most common cases

-mother illness during pregnancy

- Premature babies

- **Acquired hearing loss,**

-Ear infections

- Diseases meningitis, chicken pox,

-head injury

Early detection in Palestine

- **No national data that shows the age of detection for HL among children, but experience in the field points to:**

- Limited No. of children with HL are identified by age 2

- Most of the children who are identified early are children with risk factors(mainly children in families with history of hearing loss)

- Most of the children with HL are not identified before the age of preschool or a later stage

- Screening and full hearing evaluation

ABR , OAE , Tympanometry , play audiometer and Conventional Screening Audiometer are used

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Challenges to early detection

- *The health system doesn't guarantee that all new born babies are screened before leaving the birth hospital or at the first month of age-NOT Apriority*

- The absence of a national system for the early detection of hearing disabilities
- Lack of resources: Financial , Human recourses
- Lack of awareness

-families and care givers

- Decision makers
- Health and CBR workers

Implication of late detection

- Delay in the development of speech and oral language – limitation of the oral communication or not at all(if the detection is delayed till age 4 or 5
- Delay in rehabilitation
- Negative impact on the social and emotional development
- Limitation of the educational opportunities and choices(inclusion or special education)
- Limitation of work opportunities and community participation
- Financial burden on the family

Interventions

Regardless of the age of detection of the HL, the following interventions are available but not guaranteed for all identified children

- Hearing aid fitting
- Cochlear implants
- Speech , auditory and lip reading training(oral communication training)
- Family counseling and training
- FM systems-
- Education(3-18 years)
- Sign language

Interventions - challenges

- **Hearing aid fitting**

  The first thing to do is to fit the child with HL with the hearing aids which are suitable for the level and type of HL, **BUT**, they are not fitted on time for most of the children

- Not provided by the government
- High cost(purchasing , maintenance, batteries – most of the families couldn't offer

Interventions -challenges

- **Cochlear implantation**
- **Limited No of cochlear implants since 1996**

- Most of the CIs is done by missions from outside
- Some were done in the Arab countries or in Israel

- Problems or challenges

- CI is a high cost technology and the MOH doesn't provide or cover the cost
- No team to follow the process of CI in all phases i
- There is lack of centers and specialists who will follow the **post cochlear child**
- **Lack of awareness of the families and the care givers of their** about the whole process
- Mapping is not available for the implants done outside- the family and child have to travel
- Spare units+ maintenance are not available
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Interventions- challenges

Speech , auditory and lip reading training

- Most of the centers are located in the cities- limited access to persons with HL from the villages and rural areas
- Lack of training tools codified to the Palestinian environment
- Lack of human resources
- Lack of training: families, rehabilitation and CBR workers
- The cost of fees for the sessions and transportation is not covered by the Gov. and most of the families couldn't offer-mainly families who have more than 1 child with HL
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PRCS experience -

- PRCS provides H. AIDS for free for about 300-500 persons with HL-depends on projects
- waiting list of 1000 PWHL – limited recourses
- 5 centers for speech and hearing
- Early detection –OAEs ,ABR
- Hearing tests (audiometery , Tempanometery
- Screening days in the remote and rural areas(local councils, kindergarten ,schools and other organizations)
- Speech and language training
- Early intervention (1 month-3 years)- 2 centers
- Preschool age for the deaf(3-6 years)
- Deaf education (6-18 years)
- Sign language training and interpreting
- Sign language development

Kelvin Hawker

Cochlear implants in a low-resourced setting

Dr Kelvin Hawker, Clinical Specialist

Hear now. And always

Cochlear®

Today's Presentation

Part 1

- What is a cochlear Implant?

Part 2

- Who is suitable?

Part 3

- Resources required to establish a CI Programme

What is a cochlear implant?

Part

1

Hearing aids versus Cochlear Implants

- Cochlear implants provide access to sound if hearing aids cannot provide sufficient benefit.
- Suitable for severe to profound hearing loss

Implant

Sound Processor

What is a Cochlear Implant?

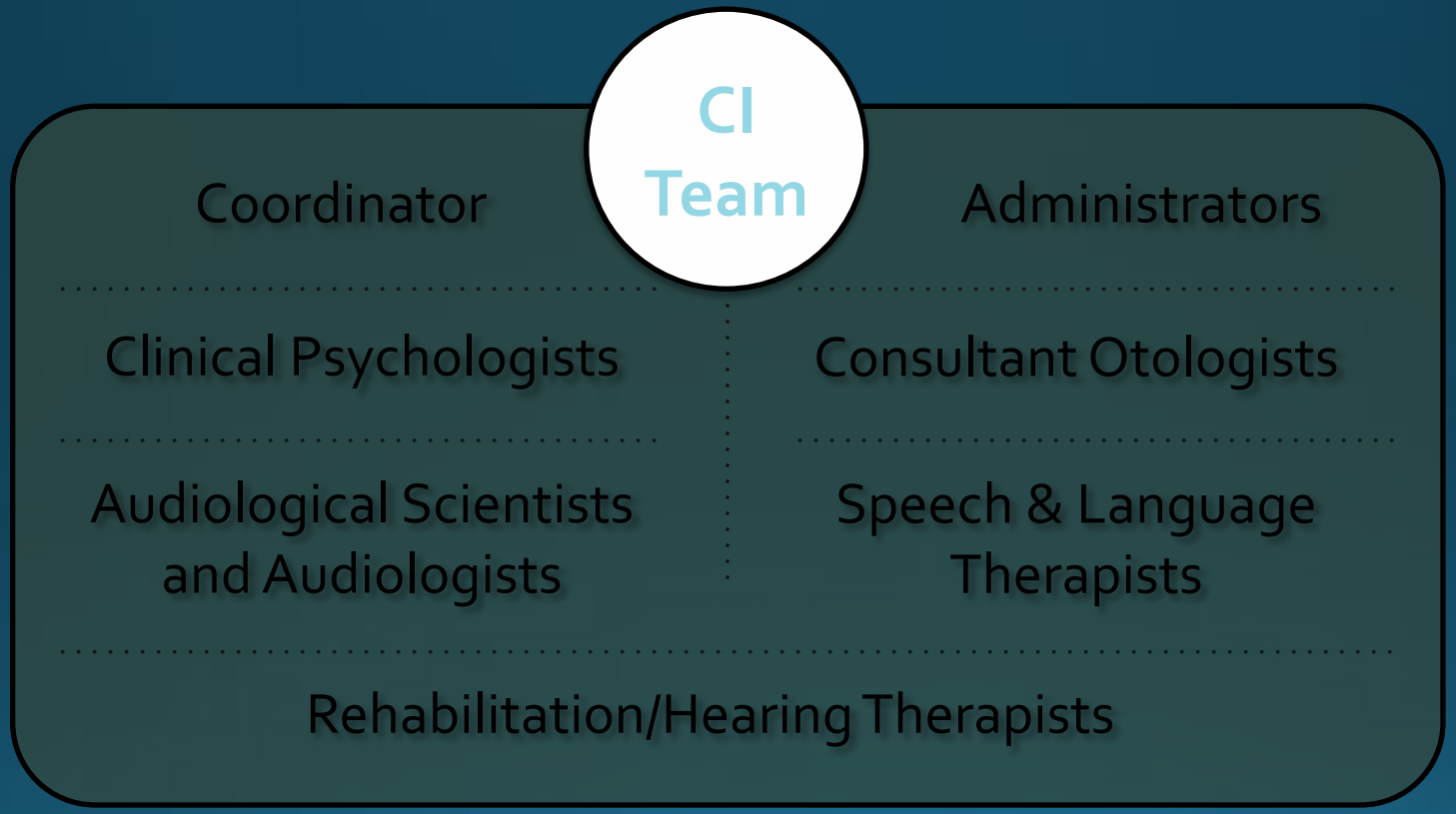
1. Sound detected by processor microphone
2. Coded signal transmitted across intact skin
3. Coded signals processed and converted to short current pulses directed to electrodes
4. Current pulses delivered to appropriate intracochlear electrodes
5. Spiral ganglion cells stimulated and auditory information passes to higher auditory centres

Who is suitable ?

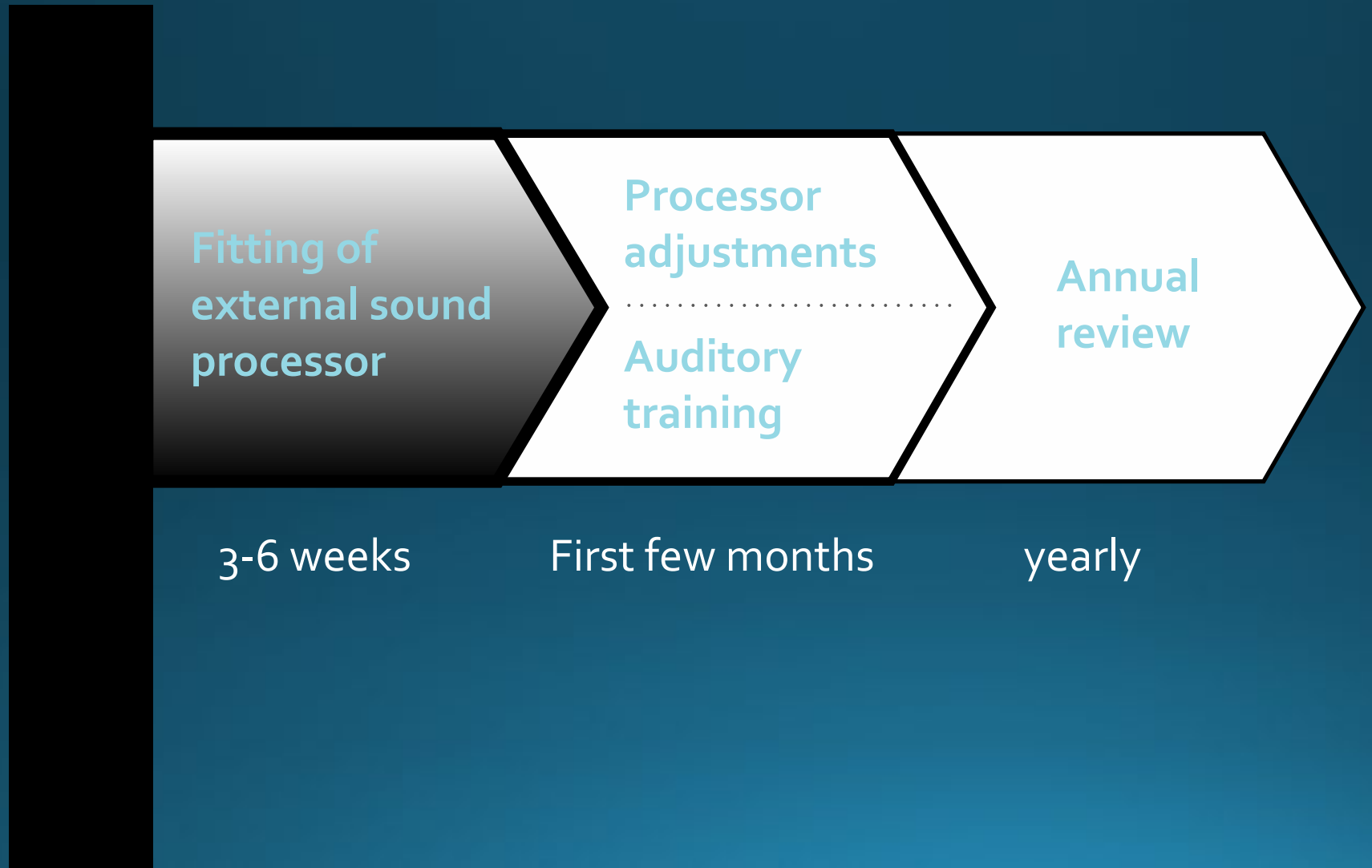
Part

2

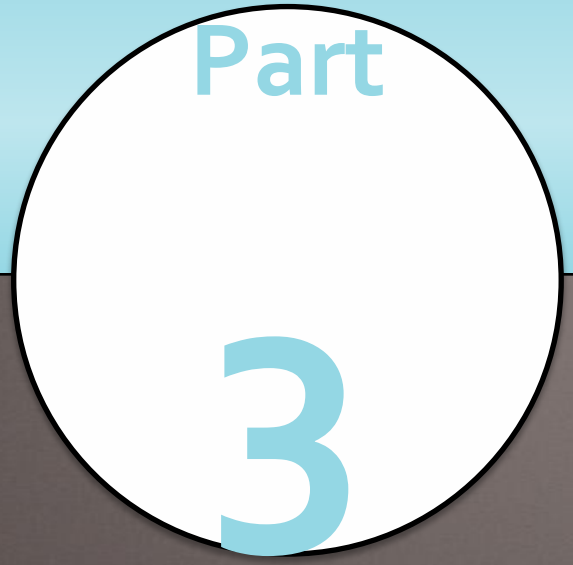
The Multidisciplinary CI Team



After Surgery



Resources required to establish a CI Programme



Hearing Loss in Developing Nations

- WHO estimates there are 360 million people worldwide living with a disabling hearing loss.
- 4 in 10 000 live births result in a profound hearing loss
- A lifetime of repercussions
- 80% of the global hearing loss burden falls on low-middle-income countries

Can CI be cost-effective in low income countries?

- Cochlear implantation is expensive- typically £30-40k

- How can this be justified?

  - Benefits seen over a lifetime
  - Language development
  - Opportunities for a better education
  - Improved employment and pay
  - Improved quality of life and less social isolation.

Can it be done?

Yes!

Case Study from Malawi

- Malawi is one of the world's most poorest nations
- Population of 16 million
- Life expectancy of just over 50 years
- Only two ENT surgeons in the whole country

The Key: Collaboration

- Support from UK ENT surgeons
- Support from a CI manufacturer
- Presence of audiologists from charitable organisations
- Charitable support to develop ENT infrastructure
- Charitable donation of two drill systems

The Result

- 4 post-lingually deafened children have now been implanted (2 very recently)
- Collaboration has led to improved resources and infrastructure
- 4 students from Malawi now have an MSc in Audiology from Manchester and have visited Yorkshire Auditory Implant Service
- Further CI surgery planned for October 2016 and March 2017.

Photos and case study kindly provided Mr D Strachen, YAIS

Workshop Task

- Small groups
- Discuss given question/s using suggested web resources if you wish
- Record key points and feedback to larger group.

14:25 Audiological Pathways

- Ques 1: To what extent can we consider screening/diagnosis legitimately whilst awaiting intervention to be in place?
- Ques 2: Consider cultural and local leadership views toward deafness and disability in regions with which you are familiar.

- Web resources 1 UNESCO SUSTAINABLE GOALS http://www.un.org/sustainabledevelopment/education/
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- Web resource 2 NHSP Quality Standards
- http://webarchive.nationalarchives.gov.uk/20150408175925/http://hearing.screening.nhs.uk/standardsandprotocols
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1440 Appropriate Technologies in Low Resource Settings

- Ques 1: Consider the value as well as disadvantages of donated or second hand as well as first hand (e.g. cochlear implants, but possibly with no intervention) technology in developing countries.
- Ques 2: Consider the merits of signing and oral/technology methods in low resource settings (e.g. In countries where the government doesn't provide hearing aids to the infants as soon as the hearing disability is detected, how could we help?)

- Web resource 1: http://solarear.com.br

- Web resource 2 www.starkeyhearingfoundation.org

1455 Impacts & Sustainability

- Ques 1: How can local professional training be implemented and sustained?
- Ques 2: How can the CBR workers or health community workers support the families of the hearing impaired children in either an urban or rural setting (e.g. monitoring hearing aid use, maintaining hearing aids)?
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- Web resource 1**Deafness in the 21st Century (Coursera)MOOC**
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- Web resource 2 MESH Guides http://www.meshguides.org/guides/node/138

Workshop Wrap Up

- Share key points with larger workshop group
- Will be passed on to conference-wide group

References/Resources

- *Audacity* (British Society of Audiology magazine) – Case Studies each issue on audiology in developing countries
- *British Academy of Audiology magazine* Case Studies each issue on audiology in developing countries
- *International Journal of Audiology* – features articles from S Africa, Nigeria and India etc
- McPherson B, Brouillette R (2008) *Audiology in Developing Countries*. Nova Science Publishers
- Niemen S, Greenstein D, David D (2004) *Helping Children Who Are Deaf - Family and community support for children who do not hear well.* Hesparian Foundation

THANK YOU

- Our contacts:
- Joy Rosenberg: Joy.Rosenberg@oxfordaud.co.uk
- Suheir Albadarneh: **tcc_admin@palestinercs.org**
- **Kelvin Hawker: khawker@cochlear.com**