CLOSING THE GAP THROUGH HEARING

CONFERENCE ABSTRACTS

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Oral Abstracts

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Oral Abstracts

Workshop

Ms Heather D’Antoine and Ms Rose Walley

Working together: sharing stories about OM research – what should the priorities be

We would like to invite indigenous researchers to come together and share stories about working well with Aboriginal and Torres Strait Islander communities. This informal workshop is for Aboriginal community researchers and others to share their stories and ideas about improving the way we work together and the priorities for future OM research. By uniting as one voice, we can offer strong ideas for better ways to work together in research.

Workshop & Industry Presentation

Dr Gavin Wilkie, Illumina

Overcoming challenges in applying next generation sequencing technologies to otitis media specimen types

Next generation sequencing provides previously unimagined opportunity to investigate the microbiology and host responses in otitis media. Applying these technologies can be challenging though, as otitis media specimen types are commonly low volume and yield lower amounts of nucleic acids than other sample types. High proportions of human cells compared to microbial cells can also be problematic in studies focused on microbial functions.

This workshop aims to provide a forum for discussing current strategies for overcoming these issues. The session will include a presentation by Dr Gavin Wilkie from Illumina that will be titled “Next Generation Sequencing Applications for Microbiology”. Gavin joined Illumina as a Field Applications Scientist in March 2017 after moving to Queensland from Scotland. He previously managed a lab that specialised in sequencing human and animal viruses. Gavin has extensive experience in sample preparation, microbial genome assembly, metagenomics and transcriptomics. His previous positions include Research Fellowships in cell biology, genetics and biochemistry, and also experience in clinical genetics. Gavin is an author on over 50 peer-reviewed articles. He studied at the University of Edinburgh, gaining his BSc in 1994 and a PhD in 2001. As an Illumina product specialist, Gavin will speak about sample preparation for 16S sequencing and metagenomics; methods to enrich samples for microbial DNA; techniques for preparing libraries from small amounts of DNA and methods for analysis of metagenomic datasets.

Gavin’s presentation will be followed by an open discussion about the strategies needed to ensure robust data are generated by “OMICs”-based otitis media studies.

Workshop

Prof Amanda Leach, A. Prof Kelvin Kong

Service Delivery: Hearing for Learning Initiative discussion.

What innovative service delivery models are currently being tested? This workshop discusses ways that the standard service delivery model could be innovated, and outlines a new program which aims to test such innovations. Feedback and comments from the audience are encouraged.
Oral Abstracts

Otitis Media and Developmental Delay in remote Indigenous Infants

Abstract 32
Ms Beth Louise Arrowsmith
Menzies School of Health Research

Other Authors:
Nicole Wilson, Peta Hamilton, Jen Jansen, Jemima Beissbarth, Peter Morris, Amanda Leach
Menzies School of Health Research, Child Health Division, Darwin NT. Australia

Aboriginal children living in remote communities have a high rate of otitis media. Developmental impairments of a lasting nature have been attributed to prolonged or repeated episodes of otitis media occurring during the first one to Three years of life. The aim of this report is to present an analysis of the Developmental outcomes of Indigenous infants at 18 months of age who have Met one of the criteria for Hearing Services referral through the Northern Territory Government guidelines.

Aboriginal infants, enrolled from one month of age in the Menzies PREVIX_COMBO, PREV-IX_BOOST and PREV-IX_VOICES randomized controlled Trials (RCTs) of pneumococcal conjugate vaccines, were included in this Analysis if they met guidelines for hearing test referral of OME for longer than 3 Months, recurrent AOM (3 episodes in the last 6 months or 4 episodes in the last 12 months), or CSOM for longer than 3 months as per the Northern Territory Government Hearing Health Program.

Data included audiology referrals, scheduled research nurse collected data on ear assessments and developmental milestones (6 monthly from 1-3 years using age-appropriate International Standards for Milestone Assessment tool, ISMA), assessed by staff and parents. Of 200 infants enrolled in the RCT and seen to 18 months of age, 159 infants had developmental assessments. There were 136 participants who met the Criteria for hearing assessment at least once. At 18 months of age, 50 infants referred for hearing assessment had detectable delays in one or more domains Of the ISMA developmental assessment tool, according to parent or researcher reporting.

The findings of this report indicate that developmental delay at 18 months is Evident in the 34% of infants that met the clinical criteria for hearing assessment. Follow-up to 3 years of age is ongoing.

Improving phonological awareness of Indigenous Australian school children with and without otitis media and hearing loss

Abstract 45
Dr Lydia Timms
Curtin University

Other Authors:
Cori Williams

The literacy vulnerability of many Aboriginal children is said to be heightened by possibly links between health and education. Literature has long discussed links between early Otis Media (OM) and co-occurring hearing loss (HL) and later Difficulties with later literacy development. Aboriginal children continue to have OM and HL into their early school years and therefore continue to be Disadvantaged during a period of education where phonological awareness skills are explicitly taught. This paper is the result of a larger study of Aboriginal children in four metropolitan primary schools. Of these children, 40% presented with at least one Episodes of OM and HL in their first years of school. Literacy outcomes of these children were poor, compared to their non-Aboriginal peers, regardless of their recent ear health. This paper aimed to address the conclusion that, in the presence and absence of OM and HL, an early literacy intervention was needed.

A Speech-language-pathologist designed 15 culturally appropriate sessions, presented twice weekly to small groups of students. The sessions were based On the Gail Gillon Phonological Awareness Program. Thirty-four (pre-primary to Year two) of the original participants received this intervention and their literacy Skills were assessed, prior to, immediately after and one year after the Intervention. Generalized linear mixed model analyses revealed that the children’s spelling, Reading, letter knowledge and phonological awareness performance improved significantly following the intervention and remained high in the year following the Intervention. Intervention blocks were staggered and interaction analyses indicated that the student improvement in phonological awareness was significantly beyond improvement from classroom literacy alone. Students with and without OM and HL in early school years improved at similar rates.

This study discusses the implications of OM and HL continuing through the early Years of school and documents a successful literacy intervention for these Children and their Aboriginal peers without OM. The intervention is simple, culturally adapted and based on established phonological awareness literature and has the potential to be an accessible package for education officers or Student support officers to carry out as part of literacy curriculum in classrooms with Aboriginal enrolment.
Oral Abstracts

Diagnosis - Treatment - Follow-up

Abstract 21
Ms Nicole Wilson
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Other Authors:
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Menzies School of Health Research

Prevention and best practice management of early onset acute otitis media (AOM) and chronic suppurative otitis media (CSOM) are priority issues for Australian Indigenous children. Guidelines recommend weekly follow-up for these conditions until resolved.

Objective: To monitor clinical follow-up and evidence-based management of AOM and CSOM diagnosed in infants from 1 month to 3 years of age.

All infants enrolled in either of two randomised control trials and seen by research nurses at study visits 4, 6, 7, 12, 18, 24, 30 and 36 months or clinic staffs were eligible. We reviewed follow-up medical records of those with a diagnosis of AOM or CSOM. We defined management according to guidelines i) Follow-up visit date documented ii) follow-up clinical assessment documented iii) Follow-up treatment documented and according to Guidelines. We defined appropriate follow-up as occurring within 10 days of diagnosis. Visits within 10 Days that did not include an ear assessment were considered inappropriate. 425 Infants were randomised at one month and followed to 7 months. ~200 infants were randomised at 12 months and followed to 18 months of age, 70 have been seen to 3 years of age. All had a diagnosis of AOM or CSOM at least once. Approximately 2000 ear assessments at which with a diagnosis of AOM or CSOM were made by research and clinic staff. Of these, ~270 (13%) received an ear assessment within 10 days, ~ 360 (18%) were seen within 10 days but had no documented ear assessment. Thus ~1730 (86%) diagnoses were not managed according to recommended Guidelines.

Failure may be associated with multiple barriers such as transport issues for families, health service resources for home visiting, limited knowledge of ear disease and its impacts on social and educational opportunities. More research and resources for implementation of best practice guidelines are needed.

Nasopharyngeal carriage in the first months of life among Aboriginal infants enrolled in a RCT of Synflorix, Prevenar13 and a combination schedule: PREVIX_COMBO Part III

Abstract 1
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Menzies School of Health Research

The PREVIX-COMBO randomised control trial, conducted in northern Australia from 2011-2018 randomised Indigenous children (1:1:1) to: i) PHiD-CV10 at 2-4- 6 months; ii) PCV13 at 2-4-6 months; or iii) a combination schedule of PHiDCV10 at 1-2-4 months and PCV13 at -6 months.

Nasopharyngeal (Np) swabs were collected at 1, 2, 4, 6, and 7 months of age. S.pneumoniae (Spn) isolated through microbiological culture were tested for antimicrobial susceptibilities and serotyped by the Quellung method. Nontypeable Haemophilus influenzae (NTHi) were cultured and identified by Standard methods, as were Moraxella catarhalis and Staphylococcus aureus. Preliminary data show overall carriage of Spn and NTHi were each ~33% at 1 Month (N=244), increasing to 70% and 60% respectively at 7 months (N=393). There was no statistically significant difference in Np carriage rates of capsular spn or NTHi between the vaccine groups. Including all time points, over 90% Spn serotypes were non-vaccine types, with 55 different serotypes isolated. Overall, 9% of Spn positive swabs (N=1091) had a penicillin-resistant isolate.

Further analysis of these data will include comparison of proportions of vaccine and non-vaccine types between the randomised groups at each time point. Serotype trends and resistance patterns over time and between randomisation Groups will also be reported.
Oral Abstracts

Testing the hearing of toddlers in the community

Abstract 30
Mr Simon McCormack
Deadly Ears
Other Authors:
April Lyons, Deadly Ears

Early diagnosis of hearing loss is critical for effective management of the impacts for children. The key challenges for audiologists in providing an accurate diagnostic hearing test for many Aboriginal and Torres Strait Islander children under the age of 2 include cultural, travel, acoustic and cost considerations. In this study we aimed to evaluate the efficacy of an assessment protocol for diagnostic Visual Reinforcement Audiometry (VRA) conducted in a non-sound-treated room that could be utilised in any community health Centre.

30 children aged 8 to 18 months were assessed using this protocol at two sites in standard, non-sound treated offices. Outcomes were categorised as complete, incomplete or unable to test. 46% of children were able to provide partial test results at the first appointment.

Currently few Audiology services in community settings are able to provide diagnostic assessments for this age group, so this represents a marked improvement in service provision. Deadly Ears Audiology has begun implementation of this protocol into its routine service provision in 3 of our ENT outreach clinics. Provision of this service will allow for appropriate and timelier triaging of children less than 2 years of age into tertiary/rehabilitation services, reduce some of the access issues facing families and reduce the burden on hospital audiology waiting lists.

Urban Indigenous Ear and Hearing Health: A report from South-East Queensland

Abstract 21
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Kristy Moore, Claire Illman, Sarah Duke - Institute for Urban Indigenous Health (IUIH)

The Institute for Urban Indigenous Health (IUIH) leads the planning, development and delivery of comprehensive primary health care services to Aboriginal and/or Torres Strait Islander people in South East Queensland (SEQ). With the fastest growing Indigenous population in Australia, the SEQ region has rapidly expanded the number of community controlled primary health care clinics from 5 to 22 since 2009.

IUIH is the biggest employer of Aboriginal and/or Torres Strait Islander people in SEQ and offers over 10 visiting allied health services across the region including Audiology. IUIH Audiology offers services to people across the lifespan, from birth to seniors and acts as a diagnostic Audiology service and a hub to assist with facilitating further care for patients required hearing aid fitting, ENT, or tertiary Audiology care in a hospital setting.

Since beginning in June 2014 the Audiology service has provided 4648 assessments from GP referrals for symptomatic patients. At the first appointment for these symptomatic patients, an otitis media rate of 20.1% has been noted in children (N=480 of 2383) and a hearing loss rate of 86.4% in adults of 50 years of age (N=463 of 536). This presentation will expand further on the hearing loss and otitis media prevalence rates in a large urban Indigenous population.

Challenges for our Audiology service have included: adapting to conditions in a GP clinic; acquiring new equipment; upskilling and supporting clinics to provide routine hearing screening for children as part of annual health checks; lengthy waiting times for public ENT; and overcoming breakdowns in communication for patients being referred on for further care.
Oral Abstracts

PREVIX - A novel mixed schedule of pneumococcal conjugate vaccines (Synflorix and Prevenar13) to provide early, broader protection from otitis media Pathogens: Part II. - Patterns of otitis media in the first 12 months of life.

Abstract 16
Dr Michael J Binks, PhD.
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Menzies School of Health Research

Indigenous children have poor education and social outcomes related to high Rates of otitis media (OM) and conductive hearing loss. OM commences within Weeks of birth following nasopharyngeal colonisation with Streptococcus Pneumoniae and non-typeable Haemophilus influenzae. Prevention of early and Recurrent OM is essential.

DESIGN: Randomised controlled trial (RCT). POPULATION: Indigenous infants in Northern Australia. RANDOMISATION: Synflorix (SSS) or Prevenar13 (PPP) at 2-4-6 months of age or Synflorix at 1-2-4 months PLUS Prevenar13 at 6 Months of age (SSSP). OUTCOMES: Ear diagnoses at 1, 2 (tympanometry only), 4, 6, 7 and 12 (tympanometry and otoscopy) months of age: Normal, OM With effusion (OME), acute OM (AOM) and OM with perforation (OMwiP). Analysis: We compared (1) the OM risk at 4 months, and (2) the diagnostic Transitions from 4 months, in the SSSP versus SSS and PPP groups. Of 425 infants randomised, ear exams were performed on 415, 407, 401, 399, 405 and 226 infants at the respective visits. At 4 months, there was no difference in the prevalence of any OM among SSSP (8%), SSS (8%) and PPP (8%) Vaccines. Across all infants, bilaterally normal ears declined by visit (57%, 43%, 18% (4mo), 13%, 11%, 7%, 9%). Of 74 infants with normal ears at 4 months, 30% remained normal and 70% transitioned to a worse diagnosis – 35% (26/74) to OME, 28% (21/74) to AOM, 7% (5/74) to OMwiP - at 6 months. Of 316 infants with OM at 4 months, 8% returned to normal - 11% (18/167) from OME, 6% (8/140) from AOM, 0% (0/9) from OMwiP - and 92% continued with OM at 6 Months. There were no transition differences between vaccine groups.

Despite early PCV coverage and protective antibody responses, 80% of infants had OM by 4 months and were more likely to deteriorate than improve. Further Transition modelling is underway.

Longitudinal Study of Otitis Media, hearing loss and amplification requirements For Indigenous Infants in remote Northern Territory Communities

Abstract 28
Ms Peta Hamilton
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Otitis media (OM) is highly prevalent and a major source of ear disease among Indigenous children. Ear disease and its associated hearing loss is a large Contributor to poor educational achievement. The impacts of hearing loss can affect speech, language and cognitive development and the recurrent nature of the disease can also lead to permanent hearing loss.

The aim of this report is to analyse the levels of hearing loss associated with OM and referral for amplification for infants from the PREV-IX_COMBO and PREVIX-BOOST (n=425). A database search was carried out on all infants enrolled in PREV-IX Randomised Controlled Trials (RCTs) using both the Patient Care Information System (PCIS) and RCTs database. Preliminary results show of the 137 infants now aged ≥ 3.5years as at 1st March 2018, 68% (94/137) have been referred to the Northern Territory Government (NTG) Hearing Health Outreach Services for audiological assessment. This indicates that as per the referral Pathway that these infants have experienced prolonged episodes of OME (8), AOM (32), OMwiP (26) and CSOM (28). Of the 94 infants referred for Audiological testing, 87 have been tested by NTG or Menzies audiology teams.

Initial analysis of audiology assessments show that 6% (5/87) of children that Were referred to audiological services due to a disabling conductive hearing loss Of ≥ 50dB that requires a personal amplification device to aid with listening and learning at school. A further 18% (16/87) of children require the aid of classroom Amplification due to a disabling conductive hearing loss of ≥ 40dB to be able to Participate in classroom activities and achieve educational goals.
Assessing the appropriateness of the management of Otitis Media in Australia: a population-based sample survey.

Abstract 24
Dr Jacqueline H Stephens
University of South Australia

Other Authors:
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Australian Institute of Health Innovation/ Macquarie University, Southern Adelaide Local Health Network, Menzies Health Institute Queensland, Bupa ANZ, Sydney

Health care systems increasingly recognise the importance of allocating the available resources to ‘appropriate care’. This care should be in line with evidence- or consensus-based recommendations. Care Track Kids (CTK) was developed to determine the care provided to Australian children aged 0 to 15 years during 2012 and 2013 for 17 common childhood conditions. Otitis media was one of the conditions examined during the CTK program, and the results are presented herein.

Seven otitis media Clinical Practice Guidelines were identified, from which 54 Recommendations were extracted. From these, draft indicators were developed via a modified Delphi internal review. The final set of 11 otitis media indicators were formatted into 37 binary audits (Yes/No) questions. Appropriateness is not reported for 15 of the 37 indicators, because they had less than 25 surveys. There were 1063 children with otitis media who had one or more clinical Encounters eligible for survey for compliance.

The majorities (68.5%) were aged under four-years-old, and 53.4% were male. Eligible surveys were conducted in 80 GP and 6 specialist practices, 34 emergency departments and 17 hospital Inpatient providers. For the 22 indicators where appropriateness was reported, compliance ranged from 7.4% to 99.1%. Of note, only 7.4% surveys where the child did not have Hearing loss complied with not prescribing medication, 8.8% had the doctor Recommend 48-hours of watchful waiting, and only 27.4% complied with Recommending children aged 1-2 year were provided systemic analgesia. Appropriateness varied by the type of health care provider.

This study identified that care varied by healthcare provider type and that compliance with evidence and consensus-based appropriate care for otitis media was variable. The research has important implications and provides a strong rationale for prioritising interventions to improve the management of otitis media in Australian children.

Otitis Media Screening in Aboriginal Children: An Audit of a Regional WA Aboriginal Health Service

Ms Julie-Ann Dowdell
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Other Authors:
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University of Notre Dame School of Medicine (Fremantle)

Australian Aboriginal children have some of the highest rates of chronic otitis media in the world, significantly impacting their language development, and thus future wellbeing. Yet in Western Australia (WA) the use of uniform ear health screening guidelines is inconsistent, and nationally, evaluation of screening programmes has been lacking. WA Health recommends the use of the Enhanced Aboriginal Child Health Schedule (EACHS) which includes 11 child Health checks before the age of four. In 2017, Kwilinap, South West Aboriginal Medical Service’s (SWAMS) Maternal and Child Health Team in Bunbury (WA), agreed to an audit of its ear health screening programme in an effort to improve on its already collaborative community approach to ear health.

The objective of the audit was to assess what proportion of Aboriginal children Aged between two and four-years-old, whom were regular patients at SWAMS? Had at least two EACHS ear health checks recorded in the clinical database? This retrospective cohort study included a random selection of 20 two-year-old and 20 three-year-old patients. It also noted the number of otoscopies, environmental risk factor assessments, tympanometries and episodes of Otitis Media recorded for these children. The audit found 42.5% of children had at least one episode of Otitis Media in Their lives, yet only 15% had at least two EACHS ear health checks recorded. Otoscopies were performed at 73.14% of ear health checks, environmental risk factor assessments at 18.25% and tympanometry at 0.005%.

The low ear health check rates reflect the fact children may visit numerous Aboriginal health services yet there is no shared clinical database, uniform screening guidelines or consistent ways of recording the data. This provides an ongoing challenge for follow-up of ear health issues and makes it difficult to evaluate services’ ear health programmes and thus implement improvements. These results support Western Australia’s new child health ear strategies priorities for more uniform screening guidelines, continued evidence gathering on screening programmes, and a transition to shared patient databases between Aboriginal health services.
Dear PM(s) - lend us your ears...?

Mr Paul David Higginbotham
Earbus Foundation of WA

In March 2014 a letter to new Prime Minister Tony Abbott listed 7 priorities for addressing Indigenous Ear Health. The letter was signed by eminent ENTs, expoliticians and researchers. In 2016 an updated version was sent to new PM Malcolm Turnbull. The first letter elicited a response after 18 months the second letter has not had a reply.

Identifying 7 major initiatives the two letters sought to set a national agenda for addressing Otitis media in Aboriginal communities across the nation.

In the context of the national OM strategy push being led by RACS, the AMA and AIDA this presentation measures how far we have come in the past 4 years in raising national awareness of OM and tracks the journey so far.

A cohort study investigating prevalence and risk factors of otitis media in Aboriginal infants living in Perth, Western Australia.

Abstract 18
Ms June Doyle
Telethon Kids Institute
Other Presenting Authors:
Valerie Swift, Natasha Morrison - Telethon Kids Institute
Other Authors:
Deborah Lehmann, Chris Brennan-Jones, Sharon Weeks - Telethon Kids Institute/University of Western Australia,
Peter Richmond School of Paediatrics and Child Health, University of Western Australia, Telethon Kids Institute/University of Western Australia,
Francis Lannigan Ear Nose and Throat Specialist Nedlands, Western Australia

In rural and remote areas Aboriginal Australian children suffer high rates of otitis media (OM) within weeks of birth. The disease is often asymptomatic until discharge or impaired speech and language are noted. While there are more Aboriginal children living in Perth’s South Metropolitan region than in the Kimberley region of WA and high rates of OM have been reported in urban Aboriginal schoolchildren, the prevalence and risk factors of OM in urban Aboriginal infants are unknown.

This is a prospective cohort study of 252 Aboriginal infants residing in the Perth South Metropolitan area. Potential participants are identified by word of mouth (Noongar grapevine), through community-based Aboriginal antenatal programs and in hospital post-delivery. Families are visited in their homes as soon as possible after birth; if consent is given, obstetric, newborn hearing screening (NBHS), demographic and socio-environmental data are collected. Otoscopy, tympanometry and general health assessments are undertaken in the home at 2, 6 and 12 months of age and an audiologist examines children once at age 9- 12 months.

To date 37 mothers have been contacted, 7 were ineligible, 1 declined and 29 enrolled (69% male). 69% of mothers were non-smokers. 83% of babies passed NBHS, 2 infants referred. At age 2 months 31% were fully breast-fed, 42% had unilateral or bilateral type B tympanogram; only 4/12 of repeat tympanograms conducted 4-6 weeks later were normal. 1 participant and their older sibling have already had ventilation tubes inserted.

The program has been welcomed by the community given their concerns about poor hearing and language development in their children. The study has already identified a significant burden of OM in the urban population and every family has a story about their own ear health journey.
Challenges in Otitis Media Microbiome Research

Abstract 20
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Other Authors:
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Chronic supportive otitis media and otitis media with effusion are thought to be mediated by the microbial populations (the “microbiome”) within the upper respiratory tract and middle ear. The mechanisms and microbial interactions however are not fully understood, in part due to the small number of microbiological studies focusing on Indigenous ear health. Powerful modern technological advancements such as 16s rRNA and Metagenomic sequencing is revolutionising microbiology, but also pose new challenges in producing Accurate, unbiased and comparable data. Microbiome methods have been developed to investigate microbial populations in a wide variety of settings, from the human gut to the environment but may not be applicable to low-biomass samples such as those found in the upper airways and ear.

The quality of the input material will dictate the quality of the output sequencing data, so therefore we chose to focus our initial efforts on evaluating sample processing methodologies. DNA extraction methods, including enzymatic pretreatment, were compared using mixtures of otopathogenic bacteria? (Streptococcus pneumoniae, Staphlococcus aureus, Moraxella catarrhalis, Haemophilus influenza) spiked onto flocked swabs. Enzymatic pre-treatment did not affect the yield of any gram-positive or gram-negative spike in bacteria. However did increase the overall bacterial 16s rRNA contamination by approximately 250-fold. Presence of human DNA reduced the bacterial DNA Yield by nearly 10-fold. Little difference in bacterial DNA yield was found between manual bead-beating columns based and automated paramagnetic Bead-based extraction methods. The impact of human DNA was evaluated on a Range of upper respiratory tract swabs using paired-end 150bp HiSeq Metagenomic shotgun sequencing at a median depth of 50 million reads/sample. Overall, the human DNA burden was excessively high with average read proportions of approximately 96% (nasal vestibule), 98.8% (middle meatus), 98.8% (nasopharynx) and 89.9% (throat). Magnetic bead hybridisation capture using biotinylated random-PCR products did not reduce human DNA quantities from clinical purified DNA.

Existing microbiome methodologies are not well suited to upper respiratory tract Samples due to low microbial concentrations being overwhelmed by human and Exogenous DNA contaminants. Bespoke solutions are needed to address the Biological realities of sampling the upper respiratory tract and inner ear, particularly in studies focusing on regional and remote populations where Laboratory resources may be limited.

TeleFIT, year three: progress and lessons learned

Abstract 42
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Australian Hearing

Other Authors:
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Deadly Ears, Australian Hearing

In 2016, Australian Hearing and Deadly Ears commenced a one year trial of eleFIT in three remote QLD communities. TeleFIT is a teleservice program designed to assist with reducing the age of first hearing aid fittings for Aboriginal and Torres Strait Islander children with hearing loss relating to chronic ear disease. After a successful pilot year, TeleFIT became business-as-usual in the three communities in the second year. In year three, three more QLD communities were added, and discussions began with a second diagnostic Audiology service.

Families of children identified as candidates for hearing aid services by the visiting diagnostic audiology team are invited to attend a second appointment within the next couple of days with both the diagnostic and Australian Hearing audiologist, who video-conferences in. After family and audiologists talk together about results and the family’s concerns and observations, a hearing aid fitting is carried out straight away if appropriate and desired, with the assistance of the diagnostic audiologist. TeleFIT has resulted in a significant increase in the number of children in the three initial communities fitted with hearing aids within their first five years. It has also had unexpected impacts within Australian Hearing’s regular Outreach services in the three communities. Theories as to why it has been successful will be discussed, as well as challenges and solutions.

TeleFIT has potential for expansion, and it is hoped that it will contribute to lowering the peak age of first hearing aid fitting for Aboriginal and Torres Strait Islander children.
AutoAud, Sound Scouts and collaborative ways of working

Abstract 37
Ms Samantha Harkus
Australian Hearing

Other Presenting Authors:
Mark Mitchell
Queensland Aboriginal and Islander Health Council

Kuranda District State School, Mulungu Aboriginal Health Service, the Queensland Aboriginal and Islander Health Council, the National Acoustic Laboratories and Australian Hearing collaborated to trial a range of new Approaches to assess ear health, hearing and processing abilities with large Number of Aboriginal & Torres Strait Islander students at Kuranda District State School. Students were assessed with a set of tests including pure tone audiometry, LiSNs, and the applications Sound Scouts and AutoAud. Both Auto Aud and Sound Scouts were administered by the Hearing Health Worker from Mulungu Health Service. Overall, hearing loss, predominantly conductive, was present for 8% of the students. Moderate correlations were found between pure tone audiometry and the results of the automated tests of peripheral hearing (SoundScouts and AutoAud), and between LiSN-S and SoundScouts. In the school context, AutoAud and Sound Scouts were found to be easy to administer. Results, observations and challenges will be discussed.

By working collaboratively, a large body of work was carried out efficiently. Data was collected that assisted significantly with the process of validating the two automated hearing test applications. All stakeholders were able to identify benefits. The QAIHC Hearing Health Project Officer was the key in bringing stakeholders together to discuss and agree on the parameters of the project.

School screening is often thought of as the appropriate response to perceived listening, learning and behaviour issues among Aboriginal & Torres Strait Islander students. There are known limitations to this approach, and there is increasing desire to find alternate ways of both identifying children with hearing loss earlier and supporting schools’ needs to understand their students’ hearing ability. A request for school screening from Kuranda District State School led to a collaborative project to evaluate a selection of alternative hearing test applications that might inform future approaches.

Prevalence of hearing loss and spatial processing disorder in Aboriginal and Torres Strait Islander children from schools varying in location and socioeducational Advantage

Abstract 26
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Other Authors:
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Australian Hearing, National Acoustic Laboratories; (University of Manchester)

Aboriginal and Torres Strait Islander children are more susceptible to chronic otitis media in early childhood than non-Indigenous Australian children. This can lead to higher levels of hearing loss and spatial processing disorder (SPD) in this population, which is likely to impact their educational outcomes. Therefore, there is a need for hearing and SPD testing and remediation in this population. The aim of this study was to investigate the prevalence of hearing-related problems in Aboriginal students from three different primary schools varying in location and socio-educational advantage.

A total of 297 Aboriginal students across three primary schools took part in the study. There were 120 students from an urban south-western Sydney school, 118 students from a regional Queensland school, and 59 students from a regional/remote South Australian school. The students completed an audiological assessment, the Listening in Spatialized Noise – Sentences test (LiSN-S), and the self-administered Sound Scouts hearing test app. Students diagnosed with SPD were given the opportunity to complete a validated SPD auditory training remediation program (Sound Storm). Overall, hearing loss as defined by a 4FAHL > 20 dB HL in worse ear was present in 20% of students and was predominantly conductive. Higher rates of hearing loss were found in schools with a lower socio-educational advantage. The prevalence of spatial processing disorder varied depending on the location of the school (9% for the urban school, 15% for the regional school, and 15% for the regional/remote school). Children’s speech-in-quiet and speech-in-noise scores on Sound Scouts were skewed towards poorer-than-average performance for all schools.

Prevalence of hearing loss and SPD in Aboriginal primary students is much higher than in non-Indigenous Australian students, and varies by the remoteness/socio-educational advantage of the school. Suggestions for testing and remediation of hearing loss and SPD in this population will be discussed.
What do Aboriginal parents know and believe about hearing loss and hearing aids in under six year olds?

Abstract 35
Ms Samantha Harkus
Australian Hearing

Access to hearing tests for Aboriginal and Torres Strait Islander children who have developed chronic otitis media and hearing loss in the post neo-natal period can be difficult until the age of at least 3 years. Emerging automated screening applications do not cater well for this age group. Earlier identification of ‘important’ hearing loss requiring referral is strongly reliant on the skill and clinical judgement of the individual primary health practitioners. There is a lack of reliable and validated tools available to help them identify hearing loss earlier. This study will evaluate and validate a parent-report tool for use by primary health practitioners.

Access to hearing tests for Aboriginal and Torres Strait Islander children who have developed chronic otitis media and hearing loss in the post neo-natal period can be difficult until the age of at least 3 years. Emerging automated screening applications do not cater well for this age group. Earlier identification of ‘important’ hearing loss requiring referral is strongly reliant on the skill and clinical judgement of the individual primary health practitioners. There is a lack of reliable and validated tools available to help them identify hearing loss earlier. This study will evaluate and validate a parent-report tool for use by primary health practitioners.

It is hoped that the PLUM and HAT tools will provide primary health staff with a validated tool to reliably identify children at risk of listening difficulties and language delays, so that they can be referred for surgical or audiological evaluation and speech pathology support earlier.

Establishment of a murine model of NTHi colonisation and otitis media to evaluate preventative therapies

Abstract 7
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Nontypeable Haemophilus influenzae (NTHi) is a major otitis media (OM) pathogen. We have shown in vitro that Haemophilus haemolyticus (Hh), a closely related commensal, can prevent NTHi colonisation and infection of respiratory epithelium. We have now established a murine ascension model of NTHi colonisation and OM using influenza A (IAV) challenge to drive development of OM.

BALB/c mice were intranasally (i.n.) challenged with 1x10^4.5 plaque-forming units of IAV (strain MEM, H1N3) on Day 0 followed by i.n. challenge on Day 3 with 5x10^7 colony-forming units (CFU) of log-phase NTHi (spectinomycin resistant strain R2866SpecR). Nasal washes, middle ear and lung tissue were collected on Day 7. Homogenised tissue and nasal washes were plated onto selective media for viable counts. All mice were successfully colonised with NTHi (18/18). The median density of NTHi colonisation was 3.5x10^4 CFU/mL (range = 1.4x10^3 - 8.3x10^5). NTHi was detected in the middle ear of 55% of mice (10/18) with a median density of 2.8x10^2 CFU/mL (range = 1.7x10^1- 6.8x10^6). NTHi and IAV challenge was well tolerated, with a maximal weight loss of 15% at Day 5.

We identified Actinobacillus muris colonisation in mice in our animal house through 16S DNA sequencing of ‘Haemophilus-like’ isolates from control mice. A. muris is a member of the Pastuerellaceae family that Haemophilus spp. Also belong to. We found that A. muris density increased in the respiratory tract upon IAV challenge, and that Hh colonisation was not possible. We have demonstrated that enrofloxacin in the drinking water for 14 days decolonises mice from A. muris for at least 14 days post cessation of antibiotics.

We will now evaluate whether pre-colonisation of antibiotic-treated mice with Hh can prevent NTHi colonisation and/or OM using this model. In summary, our murine model is suitable for investigation into NTHi OM pathogenesis and development of preventative therapies.
Oral Abstracts

Kimberley Experience Overview challenges and aspirations

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Kimberley Regional Ear Health Strategic Plan provides ear health service Delivery whose guiding principles and core values are collaboration between KAMS and WACHS and the Aboriginal Ear Health Programs Voluntary Framework. The strategic plan is comprised of 9 elements. These critical cores Elements will be addressed from the perspectives of KAMS and WACHS Experiences as told by the KAMS ear health facilitator and WACHS ear health Coordinators.

The KAMS and WACHS ear health coordinators will address the nine elements:
1. Regular monitoring, screening / surveillance and early diagnosis of ear disease
2. Comprehensive follows up of children with ear disease using evidence-based Guidelines and Best practice standards
3. Support for training responsive to needs and local capacity
4. Promoting listening, healthy ears and normal hearing as norms
5. Primary prevention of ear disease through a broad-based approach to health Promotion
6. Program evaluation, quality improvement and transparent reporting of key Performance Indicators
7. Community ownership, engagement and partnership
8. Accessible services to other community members outside the target age Group with Opportunistic ear health checks and hearing assessment wherever possible
9. Innovative approaches to challenges

Sustainability and partnerships, paving the pathway to better ear health in the Kimberley. Future endeavors and aspirations.

Is Dolosigranulum a potential microbiome therapeutic for otitis media?

Abstract 15
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The authors obtained eight D. pigrum isolates from the noses of four clinically Well Aboriginal/ Torres Strait Islander children from a remote community. We tested the BI properties of these isolates using inverted agar overlay against 24 strains of each of the three main otopathogens, Haemophilus influenzae, Streptococcus pneumoniae, and Moraxella catarrhalis, also obtained from the upper airways of Aboriginal/ Torres Strait Islander children from the same community. We used MALDI-TOF to identify the bacteria prior to BI, as well as after BI for the otopathogens. The BI effects were variable between each of the D. pigrum strains. Most strains inhibited the growth of M. catarrhalis to some degree. Five of the D. pigrum strains partially inhibited the growth of S. pneumoniae. In contrast, all D. pigrum strains enhanced the growth of H. influenzae. This was particularly apparent when H. influenzae were grown on a non-preferred media.

Preliminary BI experiments reveal that D. pigrum can at least partially inhibit the growth of 2/3 of the main otopathogens. Of concern however, it promoted the growth of H. influenzae, thought to be one of the main drivers of OM in aboriginal and Torres Strait Islander children. Previous studies have implicated D. pigrum as a possible pathogen in sepsis, pneumonia and keratitis. Its role as friend or foe in the development of OM, and the conditions promoting each of these states warrants further investigation.
Oral Abstracts

Nasopharyngeal microbiota in Indigenous infants at 4-weeks of age

Abstract 17
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Nasopharyngeal (NP) colonisation by respiratory pathogens during the first weeks of life is associated with early-onset otitis media (OM) in Indigenous children. No studies to date have investigated the wider NP microbiota in Indigenous children during the first weeks of life; however, studies from non-Indigenous populations have consistently found that dominance of the NP flora by Corynebacterium and Dolosigranulum species is associated with reduced risk of otitis media and respiratory infection. The aim of this study is to investigate the NP microbiota in 1-month old Indigenous children and determine: i) whether the NP microfotas are significantly different in those with and without signs of OM; and ii) whether potentially protective commensal taxa are absent in children with OM.

Baseline NP swabs from 111 Indigenous children enrolled in a vaccine trial were tested. All children were recruited from the Northern Territory (NT). No child had received pneumococcal vaccination prior to sampling. OM was diagnosed in 37/111 (33%) children based on tympanometry. Low total bacterial load (<10^3 genome equivalents/μL DNA) was detected in 33% of NP swabs; however, total bacterial load did not differ among children with or without OM. Analysis of microbiota sequence data is in progress. Preliminary analysis has identified a Dolosigranulum OTU that is reduced in children with early-onset OM.

Our analysis is ongoing; however, data to date are consistent with NP dysbiosis in the infants who developed otitis media by 4 weeks of age.

Standard practice of reporting Paediatric epidemiology in 5-year age-bands Conceals important age-related differences: A case study of Tympanostomy Tube Insertion in Australian Children.

Abstract 42
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The University of South Australia

Otitis media (OM) is ubiquitous in childhood. When conservative management and repetitive antibiotics fail to provide symptom relief for repeated OM episodes, children are often referred for surgical intervention with Tympanostomy tube insertion - the fifth most common surgical procedure in Australia. Epidemiological conventions include the reporting of medical conditions, diseases and surgical procedures in five year age groups. The aim of this study was to examine the Australian epidemiology of Tympanostomy tube insertion to highlight the importance of reporting Paediatric conditions at a more granular level.

A cross-sectional study of five Australian states was conducted to examine paediatric hospital separations that occurred between July 2001 and June 2009 and involved a uni- or bilateral tympanostomy tube insertion. The age and sex-specific incidence profiles for each state were markedly different. Poisson regression showed that incidence was strongly influenced by age, sex and state of residence (p<0.0001). South Australia had the highest incidence of the surgery (11.00 per 1000 child-years), while Tasmania had the lowest incidence 3.88 per 1000 child-year.

Ages in epidemiological reports are typically aggregated into five-year age groups. This is a practice that is widely accepted and used throughout the health literature including by prominent public health agencies, such as the WHO, CDC, and AIHW. However, this analytical practice can be problematic. In research that is specifically describing medical conditions, and the related surgical procedures that affect young children the coarseness of 5-year age group aggregation should be avoided. Aggregated age groups clearly lack finesse and conceal the detail necessary for accurate comparisons of the management practices of young children between different communities. While the reasons for these marked differences needs to be further explored, these results will prove useful for surgeons and healthcare providers in the planning of service delivery.
Oral Abstracts

The burden of otitis media, hearing impairment, and associated determinants in Urban Aboriginal children: findings from the SEARCH study

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Otitis media (OM) is highly prevalent in Aboriginal children in remote areas but little is known of the prevalence and risk factors in urban areas. The Study of Environment on Aboriginal Resilience and Child Health (SEARCH) aimed to investigate the ear health of urban Aboriginal children and any associated Factors. Comprehensive ear health assessments were conducted by audiologists in four Aboriginal Community Controlled Health Services (ACCHS) in NSW. Otoscopy, pneumatic otoscopy, tympanometry, and audiometry were performed. Questionnaire data was also collected to capture demographic, social and environmental level data.

1480 children (median 7 years) received an ear health assessment. Of these, 30% had OM at the time of assessment. The most common diagnoses were OM with effusion (OME) (9%), acute OM (AOM) without perforation (8%), and OM undifferentiated (8%). There were small proportions of children with chronic OM with effusion (2%), dry perforation (1%), and chronic supplicative OM (1%) and less than 1% of diagnoses at the child level of AOM with perforation or recurrent AOM. There were no diagnoses at the child level of AOM with perforation or recurrent AOM. The audiometry results indicated that 12% of children had unilateral and 13% had bilateral hearing impairment. 81% of children with conductive hearing impairment had OM at the time of assessment. The relationship between ear health status and demographic, socioeconomic, environmental and health related factors of both the children and their carers is currently being explored.

Predictors of abnormal ear health status will be discussed in detail at OMOZ 2018.

Our findings indicate a high burden of OM and hearing impairment in urban Aboriginal children. These impairments are common in children under 7 years of age, a critical period for speech and language development. Untreated, such impairment is likely to impact on children’s ability to attain key developmental milestones and to influence opportunities across the lifespan.

Riding the wave of eHealth: Successes and challenges in establishing a Teleotology program

Abstract 31
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Telehealth represents an effective way of addressing gaps in service delivery and improving efficiencies of ENT services for children in remote areas. In Queensland, there were restrictions in IT functionality restricting the use of teleotology. Most teleotology services send clinical results and image files via email or file sharing applications, which have limitations in data security and size restrictions for images. These options do not easily allow for joint care planning and case management. To address this need, the state-wide hearing database (QChild) was enhanced with the development of a teleotology application.

A teleotology application was developed in the QChild database to enable the following functionality:
- Multi-user access;
- Delivery of images, clinical notes and audiology assessments;
- Secure data;
- Fast and easy access- desktop /mobile device;
- Caseload management with teleotology embedded in the longitudinal record of care for each child;
- Live monitoring progression through the service for reporting and auditing;
- Allocation of cases to ENT for review in bulk or individually.

The teleotology application in QChild has resulted in specialist otological review able to be conducted more frequently, on more children, in more locations while reducing the need to find and fund ENT travel and labour.

It is clear that with the elimination of need for travel for ENT consultants, efficiencies in this model can be found. Additionally, the establishment of an application that allows for the joint care planning between nursing, audiology and ENT clinicians means that service gaps are likely to be minimised. However, while clear efficiencies are evident, there have been bumps along the road.
Koorlungkas Yarning – children talking, a video ethnographic project

Abstract 33
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Language acquisition occurs within a socio-cultural context. The ways in which families engage with babies are culturally driven and influence the particular communication and social behaviours that are valued and reinforced even before children begin to talk. These values and practices may not be reflected in current early childhood assessments and interventions and so even with the best intentions “…cultural protocols may be broken, values negated, tests failed and key people ignored” [Tuhiwai Smith, 2012, Decolonising Methodologies: research and Indigenous Peoples].

Using video ethnography the Koorlungkas Yarning (children talking) project gives a voice to six Aboriginal families in south-metropolitan Perth to tell their own story about values they have, protocols they know, and the people to be included in raising children to be good communicators in a cultural context and to talk ‘proper way’. We have used a strengths-based approach to collaboratively identify strategies used to encourage communication in babies as they learn ways of connecting with family, with community, and with place.

In a Participatory Action Research framework our participants are also researchers in the project. They are involved in collecting the data they wish to share, interpreting that data, identifying what’s important. Then we invite them to join yarning circles with extended family and Elders to identify key strategies they believe should be promoted across the urban Aboriginal community, and to inform early intervention services and Speech Pathology practices. This presentation will explain the process of working with families as well as some initial observations/findings.

Surgical outcomes in the Pilbara and Goldfields Earbus programs (2015-2018)

Abstract 40
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Earbus Foundation is a not-for-profit children’s charity providing ear health screening, surveillance and treatment programs to children in the Pilbara and Goldfields regions of Western Australia. The majority of children seen in these programs across both regions are managed at a primary health care level whilst approximately 8% of children enrolled into the program require ENT specialist intervention. The majority of children who attend ENT appointments require surgical intervention to correct or restore hearing levels as a result of otitis media, perforations of the eardrum or other middle ear pathology.

Retrospective analysis of all Earbus surgical cases will be undertaken and broken down into type of surgery and results following surgery at 3 and 6 months. Rates of discharge following the insertion of grommets will be analysed to evaluate whether there are significant trends relating to patient demographic or pathology. Myringoplasty outcomes will also be explored with reference to recent surgical outcomes in the Kimberley region of Western Australia. Results will be compared to the surgical outcomes of other similar programs where available.

The data presented will highlight clinical case management and surgical outcomes in 2 regions of Western Australia.
Oral Abstracts

Myringoplasty outcomes of Indigenous Australians in the West Kimberley region Of Western Australia.

Abstract 38
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Chronic suppurative otitis media (CSOM) is disproportionately prevalent in Indigenous Australians, and is associated with reduced hearing, alongside negative education and developmental outcomes. Myringoplasty is performed to close the perforation, improve hearing, and water proof the ear. This is the first paper published on Myringoplasty outcomes in Indigenous Australians in the Kimberley region for over a decade. Aim was to review myringoplasty outcomes for Indigenous Australians in the West Kimberley region.

Methodology Retrospective chart review of clinical, operative, and audiometric data in patients undergoing myringoplasty at Broome and Derby hospitals from 2004-2014 was performed. The primary outcome ‘success’ was defined as closure of the perforation with an air-bone gap of less than 25 dB at six months or greater post-surgery. Results of the 419 ears undergoing myringoplasty, only 90 (21.5%) had complete follow-up. Simple closure was seen in 39% of ears, with higher rates seen in female patients, small to medium perforations, and ears with normal pre-operative hearing. Closure of the tympanic membrane with normal hearing was seen in 29% of ears, with a higher success rates seen in those with dry ears preoperatively.

Follow-up and outcomes for myringoplasty were poor compared to nonindigenous patients. Standardised prospective data recording and integration will minimise data attrition. Patient attrition will remain a challenge requiring ongoing investment and education. Improvements in ear and hearing outcome are more likely to arise from health improvements over patient selection and operative technique. Despite extensive resources and expenditure myringoplasty outcomes are poor compared to non-Aboriginal populations. Until issues of follow-up, mobile populations and chronic infection are addressed, these poor outcomes will continue.

Genetic variability of Moraxella catarrhalis strains

Abstract 11
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Moraxella catarrhalis is one of the major bacterial causes of otitis media. However, vaccine development against this pathogen is a work in progress, and definitive causative factors for virulence have not been fully characterised. Our work focuses on the genetic diversity present in M. catarrhalis, and how this diversity may affect the disease-causing potential of strains. Our work shows that restriction modification systems vary between strains, and their distribution is associated with the population structure of M. catarrhalis. In addition to this work, we focus on phase variable elements, which are proteins whose expression switches on or off depending on high frequency mutation of repetitive genome sequence.

To identify the phase variable elements in M. catarrhalis, we compared the DNA sequences for five closed genomes and assessed whether sequence varied in the same locations between the different strains. We have designed assays to assess whether these elements are in phase on or phase off (i.e. expressed or not), and whether growth under conditions mimicking the infectious process causes switching between phases.

This work identified known phase variable genes, including modM, uspA1 and uspA2 and MID/Hag; as well as new candidates such as a restriction modification methyltransferase, glutathione disulphide reductase and a hypothetical permease protein.
A microbiome case-control study on recurrent acute otitis media identified potentially protective bacterial genera

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Recurrent acute otitis media (rAOM, recurrent ear infection) is a common childhood disease caused by bacteria known as otopathogens, for which current treatments have limited effectiveness. Generic probiotic therapies have shown promise, but seem to lack specificity. We hypothesised those healthy children with no history of rAOM carry protective commensal bacteria that could be translated into a specific probiotic therapy to break the cycle of re-infection. We characterised the nasopharyngeal microbiome of these children in comparison to children with rAOM to identify potentially protective bacteria. As some children with rAOM do not appear to carry any of the known otopathogens, we also hypothesised that characterisation of the middle ear microbiome could identify novel otopathogens, which may also guide the development of more effective therapies.

We recruited children undergoing ventilation tube insertion for rAOM as cases, and age- and season-matched children with no history of AOM despite exposure to major risk factors (i.e. attendance at day care) as controls. Middle ear fluids, middle ear rinses and ear canal swabs from the cases and nasopharyngeal swabs from both groups underwent 16S rRNA gene sequencing, and a subset of samples underwent metagenomic shotgun sequencing. All middle ear fluids and nasopharyngeal swabs were also tested for respiratory viruses. The nasopharyngeal microbiomes of cases and controls were distinct. We observed a significantly higher abundance of Corynebacterium and Dolosigranulum in the nasopharynx of controls. Alloilococcus, Staphylococcus and Turicella were abundant in the middle ear and ear canal of cases, but were uncommon in the nasopharynx of both groups. Gemella and Neisseria were characteristic of the case nasopharynx, but were not prevalent in the middle ear. No additional genera were detected by metagenomic shotgun sequencing, which was taxonomically similar to the profiles produced by 16S rRNA gene sequencing.

Corynebacterium and Dolosigranulum are characteristic of a healthy nasopharyngeal microbiome. Alloilococcus, Staphylococcus and Turicella are possible novel otopathogens, though their rarity in the nasopharynx and prevalence in the ear canal means that their role as normal aural flora cannot be ruled out. Gemella and Neisseria are unlikely to be novel otopathogens as they do not appear to colonise the middle ear in children with rAOM.

Partnersing for success: The Earbus/Starlight partnership addressing Otitis Media in WA Aboriginal Communities.

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In 2015, a partnership was formed between the Starlight Children’s Foundation (Starlight) and Earbus Foundation of Western Australia (Earbus) to enhance the delivery of ear health clinics. Starlight provides programs, in partnership with health professionals, which support the total care of children, young people and their families who are living with a serious illness or a chronic health condition. Earbus mobile ear health clinics provide comprehensive screening to Aboriginal children in schools, day-cares, kindergartens and playgroups, employing GPs, audiologists and ENTs to reduce the incidence of middle ear disease in this population.

Since 2015, Captain Starlights have been accompanying the Earbus team on approximately half of their visits to WA communities, enhancing the healthcare experience for children attending ear clinics. Captain Starlights are professional performers from a range of backgrounds, who engage with children through activities such as art, music, story-telling, comedy and games. They assist to create a more positive and engaging environment, alleviate boredom and reduce the anxiety of those about to undergo procedures. Anecdotal feedback from schools and health professionals about the Earbus- Starlight partnership has been overwhelmingly positive, highlighting the impact the Captains involvement has had on reducing children’s anxiety, assisting with the smooth and efficient running of the clinics, and creating a more positive health care experience for children. In 2018, a formal evaluation of the partnership and its’ impact on the ear health of Aboriginal children in the communities visited was undertaken. Combining quantitative and qualitative methods, the evaluation includes clinical data collection and analysis, as well as stakeholder interviews.

The evaluation findings, which will be shared in this presentation, will assist in informing the future development of the partnership and in ensuring the program enhances the health care experiences for Aboriginal children, and ultimately contributes to improving middle ear health for this group.
Oral Abstracts

PINA KARNBI PILOT PROJECT – THE KALGOORLIE-BOULDER ABORIGINAL BIRTH TO SCHOOL AGE EAR HEALTH PILOT PROJECT

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Introduction: Otitis media (OM) starts within weeks of birth is often asymptomatic and can affect hearing, sometimes leading to delayed speech, and poor education outcomes and poor quality of life in adulthood. WA Country Health Service, Bega Garnbirringu Health Service (Bega) and Telethon Kids Institute have partnered together to reduce the incidence and prevalence of undetected chronic OM in Aboriginal children. Our target group is Aboriginal children aged 0-5 years living in Kalgoorlie-Boulder presenting to a clinic for immunisation.

Since October 2017 tympanometry has been offered to all Aboriginal children presenting to Bega or Population Health for childhood immunisations at 2, 4, 6, 12, 18 months and 4 years of age. Referrals to a general practitioner, audiologist or ENT specialist and follow-ups are conducted according to standardised protocols outlined in flow charts. Health promotion messages are provided at each visit. Clinical staff and a broader Working Group each meet monthly to monitor the project’s progress. Results: To date 66 children have been seen. A type B tympanogram was detected in 10% (1/10) of children at age 2 months, 18% (2/11) at 4 months, 46% (6/13) at 6 months, 40% (4/10) at 12 months, 40% (6/15) at 18 months, and 33% (3/9) at 4 years. Some staff has indicated that it can be challenging to do ear checks at the time of immunisation if the clinic is busy but, overall, staff are gaining confidence in doing tympanometry on young children. Although some Families expressed frustration at further tests when they are coming for Immunization, most indicate appreciation for early ear checks with only 1 decline.

Though in its very early stages, the Pina Karnbi pilot project is based on inter-organisational collaboration and has been welcomed by staff and families as a way of identifying OM early in life to prevent the serious consequences of OM.

Community Hearing Workers Project: Partnership Project between Department of Health and department of Education in the Northern Territory

Abstract 8
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Top End Health Services

The Department of Health (DoH), Hearing Services Outreach aims to reduce the prevalence and incidence of ear disease among Aboriginal children in the Northern Territory. Hearing Services Outreach follows an integrated program that works in partnership with families from prevention of ear disease, initial diagnosis and treatment through to surgical and rehabilitation pathways if required. As part of treatment and rehabilitation, it is important for families to understand that Otitis Media and associated hearing loss in children is preventable and that early identification, intervention and management can help to minimise long-term adverse impacts. In 2016 the DoH in partnership with the Department of Education (DoE) established the Community Hearing Workers Project to deliver health promoting hearing messages within a non-clinical setting and to promote listening based play activities and first language acquisition.

The DoH employed 4 FTE Community Hearing Workers (CHWs) in four pilot communities. The CHWs work under the direction and supervision of the DoE Family Educators within an early years’ setting delivering health promotion messages to mothers and carers of children 0-5 years old. During clinical trips, CHWs work with Clinical Nurse Specialists and audiologists at the clinics to support the clinicians and the families to get the best outcomes for the patients. Results Hearing Services has developed effective relationships with families in the pilot communities and a series of findings are presented based on the outcomes of the relationships.

Results demonstrate that strong relationship with communities enabled Hearing Services Outreach to build community members’ skills of preventing ear disease.
Oral Abstracts

Topical and systemic interventions for chronic suppurative otitis media: A suite of Cochrane reviews
Abstract 34
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A previous scoping review and consultation process including patients, clinicians and researchers involved in the care of children and adults with CSOM from across the world has been used to prioritise topics for a suite of Cochrane reviews of non-surgical CSOM interventions. As a result of this consultation seven clinical questions were prioritised relating to the effectiveness of i) topical antibiotics, ii) topical antibiotics with steroids, iii) systemic antibiotics, iv) topical versus systemic antibiotics, v) antiseptics, vi) topical antibiotics versus topical antiseptics and vii) aural toileting for treating CSOM.

We are conducting a suite of seven Cochrane systematic reviews according to the Cochrane Handbook methodology. We have included randomised controlled trials, including cluster-randomised trials where the unit of randomisation is the setting or operator and quasi-randomised trials and where patients were followed up for at least one week. Participants of included studies were adults and children who had CSOM or chronic ear discharge of unknown cause. We excluded studies where the majority (more than 50%) of participants had an alternative diagnosis to CSOM (e.g. otitis externa), had underlying cholesteatoma, had ear surgery within the last 6 weeks. Primary outcomes: Complete resolution of ear discharge, health-related quality of life and ear pain (otalgia), discomfort or local irritation. Secondary outcomes included hearing loss, serious complications (e.g. intracranial complications) and ototoxicity.

This current suite of CSOM reviews will provide a comprehensive update of the effectiveness of interventions to treat CSOM from a global perspective. The same methods and outcome measures will be shared across the reviews allowing evidence for all treatment options to be compared for relative effectiveness and quality of evidence. Importantly, in addition to examining topical and systemic antibiotic treatments, this suite of Cochrane reviews will examine the effectiveness of non-antibiotic interventions (aural toileting and topical antiseptics). If non-antibiotic treatments are shown to be effective they could be administered by community health workers and facilitate better access to effective CSOM treatment in resource limited settings.

Structural violence and chronic ear disease in Jumla, Nepal
Abstract 2
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Our research examines the intersection of chronic suppurative otitis media (CSOM) in children and the structural violence of poverty in Jumla, Nepal. CSOM, the commonest cause of preventable hearing loss, is a disease of poverty and its determinants, malnutrition, overcrowding, lack of access to sanitation, clean water, education and healthcare.

We used mixed methods to explore the cultural context and deliver an intervention to improve the ear health of children in Jumla. In interviews, women demonstrated that, although they lived under the structural violence of poverty, they defied the stereotype of the illiterate, powerless, rural Nepali woman – they were pragmatic, seized autonomy and embraced change. This finding informed our cluster randomised trial using WHO Hearing and Ear Care Resource in women’s groups. At baseline we surveyed 508 women and examined the ears of 937 of their children. At 12 month follow-up mean difference survey score between intervention and control groups, 0.14, 95% CI [-0.1 to 0.38], p = 0.25. Odds ratio for prevalence CSOM in intervention and control groups, 1.10, 95%CI [0.62 to 1.84], p = 0.75. However, there was a significant improvement in survey score at follow-up in the combined intervention and control groups (mean difference = -0.51, 95% CI [-0.71 to -0.31], p < 0.0001), and in prevalence of CSOM from 11.2% to 7.1% (p < 0.0001).

Health promotion to women did not reduce the prevalence of CSOM in their children, since the main problem was the circumstances of their lives. Adding value to local health services by offering good quality free village clinics, raising awareness among health workers and stocking health posts did improve the ear health of the children. Chronic ear infections are a complex condition requiring a multifaceted response which must address not only health system inadequacies but the underlying structural violence of poverty.
Oral Abstracts

An Audit of the Victorian Aboriginal Health Services – Royal Victorian Eye & Ear Hospital Paediatric ENT Clinic (2012-2016)

Abstract 36
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University of Melbourne, Royal Victorian Eye & Ear Hospital/ University of Melbourne , University of Melbourne, Victorian Aboriginal Health Service, Victorian Aboriginal Health Service, Victorian Aboriginal Health Service

The Victorian Aboriginal Health Service (VAHS) and the Eye and Ear have partnered since 2012 to run an ENT clinic for children and young people, aged 2-21 years. The Healthy Ears Outreach Clinic was established to address the delay in Aboriginal children accessing treatment and to provide services in a culturally safe environment. ENT specialists and a multidisciplinary team run monthly sessions at VAHS so Aboriginal children receive specialist appointments and go on surgery waiting lists sooner, resulting in more timely treatment.

In order to evaluate the effectiveness of this service, a retrospective clinical audit was conducted through the review and analysis of patient records. The primary aims of this audit were to assess the extent to which the partnership between VAHS and RVEEH provides timely access to Indigenous children and young people and to assess whether the treatment for the major childhood conditions seen in the clinic (otitis media with effusion and issues relating to the tonsils and adenoids (recurrent tonsillitis and obstructive sleep apnoea) were successful.

Data analysis of patient records revealed that patients were able to access timely care to specialist service and were discharged at rates greater than that seen in public hospitals. The findings of the audit also validate the Clinic as one that can provide a sustainable service and is a model that can be replicated in other urban healthcare settings that seek to improve service delivery to Australian Aboriginal communities. The findings also call for benchmarking of service models targeted at improving service access to Indigenous peoples living in urban settings at a national level.

A novel mixed schedule of pneumococcal conjugate vaccines (Synflorix and Prevenar13) to provide early, broader protection from otitis media pathogens: Part I. immunogenicity.

Abstract 14
Professor Amanda Jane Leach
Menzies School of Health Research

Otitis media (OM) commences within weeks of birth and persists throughout childhood in almost all Aboriginal infants living in remote areas of the Northern Territory (NT). Non-type able Haemophilus influenzae (NTHi) and Streptococcus pneumoniae are major pathogens.

METHODS: Eligible Aboriginal infants were allocated (1:1:1) at 28 to 38 days of age, to i) Synflorix™ at 2-4-6 months (_SSS), ii) Prevenar13™ at 2-4-6 months (_PPP), or iii) Synflorix at 1-2-4- months plus Prevenar13 at 6 months (SSSP). Children were assessed at 1, 2, 4, 6, and 7 months of age. Primary outcomes are immunogenicity at 7 months. Secondary outcomes at 2 and 4 months, and clinical and microbiology at each age. This abstract reports immunogenicity outcomes within the first 7 months.

Results: In groups _PPP, _SSS and SSSP we had 69, 72 and 68 sera at 2 months, 65, 59 and 66 at 4 months, and 117, 115 and 120 at 7 months, respectively. Early vaccination in the SSSP group provided superior above threshold GMCs at 2 and 4 months of age. At 4 months, _SSS was superior or not significantly different compared to _PPP for 9 of 13 serotypes, including 6A and 19A but not serotype 3. compared to _PPP whereas at 7 months the SSSP schedule achieved superior or not significantly different GMCs to the _PPP group for all serotypes other than 6A (non-inferior). HiD assays are ongoing.

Pneumococcal immunogenicity of the early combination schedule (SSSP) was superior overall to standard schedules (_SSS or _PPP), other than for 6A for which response were inferior yet above thresholds for 87%. Of note, the SSSP group had superior GMCs for serotypes 3, 6B, 19F and 23F. Determination of overall superiority awaits results of anti-HiD assays.
Oral Abstracts

The 2017 Otitis Media Guidelines – an upgrade and an OM-app to improve Access to evidence based strategies for the prevention and treatment of OM and Hearing loss in Aboriginal and Torres Strait Islander children.

Abstract 25
Professor Amanda Jane Leach
Menzies School of Health Research
Other Authors:
Amanda Leach, Kelvin Kong, Peter Morris, Peter Richmond, Hasantha Gunasekera, Ngiare Brown, Deborah Lehmann, Paul Torzillo, Kim Mulholland, Anne Chang and the OM Guideline Technical Advisory Group (OM-Chris Perry, David Isaacs, Deborah Lehmann, Harvey Coates, Hasantha Gunasekera, Jarod Pak, Jennifer Reath, Jessica Sommer, Judith Boswell, Katherine Jarosz, Kathy Currie, Kelvin Kong, Paul Torzillo, Peter Morris, Peter Richmond, Sam Brophy-Williams, Samantha Harkus, Stephen O’Leary.

Otitis media (OM) and associated hearing loss in the early years causes speech and language delays, social isolation, behaviour problems and educational disadvantage resulting in lifelong impacts on employment and wellbeing. In remote areas 90% of children <3 years have OM (either ‘glue ear’, bulging or perforated ear drums), and up to 20% have chronic suppurative OM (‘runny ears’ or CSOM). Improvements in evidence-based diagnosis and management of all forms of OM are essential to tackling this massive public health crisis.

METHODS: A multidisciplinary, geographically representative expert Technical Advisory Group (TAG) including Indigenous leaders has applied the GRADE approach (Grading Recommendations, Assessment, Development and Evaluation) to an upgrade of the 2010 OM Guideline. Phase I: search strategies applied and Cochrane, Revman5 and GRADEpro used to undertake metaanalyses, construct Evidence Profiles including quality ranking and effect sizes, and Summary of Findings (SOF) tables, with “what happens” statements and number needed to treat. The TAG determined Strength of Recommendations for priority questions. Phase II: baseline stakeholder survey of 2010 Guideline, seek preferences of GPs, nurses and Aboriginal Health Practitioners in urban, rural and remote regions for the 2017 version and OM-app. The digital multi-platform OM-app will include diagnostic aides (manual, video and image gallery including tympanograms). Phase III: finalise OM-app. Phase IV: evaluate and monitor impact of the OM-app, secure ongoing support for education and real-time updates according to GRADE standards. Phase V: incorporate a diversity of culturally appropriate information and advice for families in multiple languages. Phase I is complete including prototype OM-app. We have 43 Summary of Findings tables incorporating 250 PICOT questions on OM prevention and treatment strategies (medical, audiological and surgical) for eight clinical conditions (Episodic OME, persistent OME, AOMwoP, recurrent AOMwoP, AOMwiP, CSOM, Dry Perforation and Tymanostomy Tube ototrrhoea).

The GRADE approach to evidence-based guideline development requires substantial investment and expertise, and should be evaluated.
Impact of PCV10 on nasopharyngeal density of NTHi in a New Zealand otitisprone cohort

Abstract 3
Ms Camilla De Gier
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Other Authors:
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Nontypeable Haemophilus influenzae (NTHi) is a major otopathogen. Nasopharyngeal carriage of NTHi is a prerequisite for otitis media (OM) development, with dense colonization shown to correlate with onset of disease. Hence, reduction in OM prevalence may be achieved by reducing NTHi density in the nasopharynx through vaccination or other preventive strategies. In New Zealand (NZ), the 10-valent pneumococcal conjugate vaccine (PCV10) replaced the 7-valent PCV in 2011. PCV10 covers 3 additional Streptococcus pneumoniae serotypes and uses NTHi Protein D as the conjugate protein for 8/10 serotypes. From an OM prevention point of view, it is of particular interest to determine whether PCV10 impacts on NTHi carriage and OM. A recent Phase IV clinical trial in the Northern Territory showed that PCV10 immunisation reduced the incidence of NTHi OM in Aboriginal children. While studies in Europe have shown that PCV10 has no impact on NTHi carriage in healthy children at lower risk of developing NTHi OM.

To determine whether PCV10 has an impact on NTHi carriage density in high-risk populations, we are assessing NTHi density in the nasopharynx of age matched otitis-prone and non-otitis-prone NZ children, pre- and post-PCV10 immunisation. These samples have already been assessed by culture, revealing no difference in NTHi carriage rates pre- and post-PCV10 (60% and 40% among otitis-prone and non-otitis-prone children respectively). However, determining NTHi density, rather than presence, may provide a more in-depth assessment of any PCV10 impact on NTHi colonisation. Nasopharyngeal swabs (263 cases and 249 controls) and middle ear effusions (from cases only) were collected from 512 children (255 pre-PCV10 and 257 post-PCV10 introduction). Genomic DNA has been extracted from 950 samples (475 from each pre- and Post-PCV10 period).

Quantitative PCR for NTHi using our published duplex assay are underway. Data will be unblinded and assessed for presentation at the conference.

Delivering positive outcomes for Aboriginal communities

Abstract 29
Ms Anne-Marie Banfield
Winda-Mara Aboriginal Corporation

Otitis media is at least ten times more common among Aboriginal children than among non-Aboriginal children. As many as eight out of ten Aboriginal children could have a middle-ear infection and associated hearing loss at some time during their life time. The impact of hearing loss can cause delays in the classroom and affect the child’s emotional world, because they will miss vital verbal cues in conversations.

In regional Victoria, Winda-Mara Regional Eye and Ear program helps combat Otitis media and to reduce the risks of negative educational outcomes we provide annual hearing screenings within the local schools and regular community health promotions on otitis media, with a focus on the community being aware of the signs and symptoms of middle ear disease and how best to support the child to have the best educational and life outcomes. Winda-Mara Regional Eye and Ear program provides the local ATSI community with regularly diagnosis services, follow-up and referrals options for children and adults affect by middle ear disease. Winda-Mara Regional Eye and Ear program focuses health promotions on education of middle ear disease, effective nose blowing techniques, school screenings and effective referral pathways. School screenings are offer to all local schools, with the results being provided to the school, parents and local Aboriginal Community Controlled health organisations. To ensure effective and appropriate follow up services.

The 4 local Aboriginal Community Controlled Health Organisations are invited to participate in joint health promotions and regular clinics are run at the local Aboriginal Community Controlled Health Organisations to ensure that culturally safe services and practices are upheld. Winda-Mara regional eye and ear program provide Aboriginal people with early intervention, education on middle ear disease, access to appropriate and culturally sensitive services, effective referral options and follow up services.
Oral Abstracts

Contrasting the otitis-status and upper airway microbiota of two distinct Aboriginal and Torres Strait Islander communities: Implications for generalisation

Abstract 13
Dr Andrea Coleman
The University of Queensland
Other Presenting Authors:
Chantal Hunter
Mulungu Aboriginal Corporation Medical Centre

The aim of this presentation is to contrast the upper airway microbiota in relation to otitis media (OM) in children from 2 distinct Aboriginal and Torres Strait Islander (A & TSI) communities.

We recruited 2-7 year-old A & TSI children from 2 communities; community A was a remote, arid, economically disadvantaged community. Community B was rural, tropical, less economically disadvantaged. Otitis-status was classified as per Kong et al, 2000. We took swabs of the nasal cavity, tonsils and buccal. Swabs were grown on selective media with MALDI-TOF identification. Analysis was conducted using Fisher’s exact test. Results are available for 59 children from community A (mean age = 57 months) and 44 from community B (mean age = 56 months). The season of sample collection was similar for both communities. Housing occupancy rates (community A mean occupancy= 5, community B mean occupancy= 6) and childcare/school attendance (community A n=6 (10%), community B n=1 (2%) (p=0.14) were similar across both communities. Children from community A were more likely to be otitis-prone (OP) n= 18 (31%) compared to those from community B n=5 (11%) (p=0.03). Children from community A had higher rates of colonization with the 3 main otopathogens when compared to children from community B: Haemophilus influenzae n=40 (68%) vs n=13 (29%); Streptococcus pneumoniae n=28(48%) vs n=6 (13%); Moraxella catarrhalis n=34 (58%) vs n=5 (11%) for community A vs community B respectively (p<0.001 for all). Community A had a more homogenous microbiota across otitis-status compared to community B.

The results highlight the possible impact of socioeconomic factors on the risk of being OP and being colonised with otopathogens. The initial data suggests that generalising microbiology results across communities with different geographical and socioeconomic situations may not be appropriate, and warrants further investigation.

Caregiver perspectives of otitis media in a remote Aboriginal community in the Northern Territory

Abstract 10
Dr Anna Stephen
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Other Authors:
Peter Morris
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The aim of this study was to gain an understanding of Aboriginal caregivers’ Perspectives of otitis media to identify important ideological features that may Promote or inhibit preventative behaviours and uptake of treatments for otitis Media.

Methodology: The study was conducted in a remote Aboriginal community in the Northern Territory in 2012. 20 parents of children known to have otitis media were consulted to develop a multiple choice survey that was to be delivered to a larger sample of caregivers in the community. The survey was designed to explore caregivers’ perceptions of OM in terms of: i) aetiology; ii) symptoms; iii) prevalence and susceptibility; IV) risk factors; v) consequences; vi) administering treatments and vii) the efficacy of treatments. Maximum variation sampling was used to achieve diversity across specific attributes such age, education and employment status. 158 caregivers completed the survey. Results: Overall, people’s understanding of the aetiology of OM was limited and few respondents associated OM with a bacterial infection. Whilst nasal discharge and sputum were perceived as symptoms of OM they may not be recognised as sources of infection. Significant inter-correlations were detected in responses on different survey sections. Some correlations were consistent with principles of the Health Belief Model whilst other correlations were inconsistent. Factors such as age, employment status, caregiver history of CSOM, and relationship status were not found to influence people’s knowledge of OM. However, results showed that females were more likely to be aware of potential risk factors such as smoking compared to males.

Widespread misunderstandings of the aetiology of OM are likely to inhibit the efficacy of OM prevention programs. Further investigations of caregivers' perceptions of OM are needed so that more engaging health education programs can be developed.
Oral Abstracts

Prevalence of conductive hearing loss in Cape York primary school aged Children

Abstract 24
Ms Kris Tregenza
Apunipima Cape York Health Council
Other Authors:
Susan Jacups
Apunipima Cape York Health Council & James Cook University

Data regarding the prevalence of Otitis Media (OM) are readily available nationally (ABS) by Indigenous status and from Indigenous communities in the Northern Territory (NT), where they are often presented as a representative sample of all Australian Indigenous populations. Furthermore, rates of conductive hearing loss were once reported along-side OM disease rates in the NT, but hearing loss is now rarely included in studies. Presently, no publications exist on OM disease rates or conductive hearing loss from Cape York communities.

Apunipima’s audiologist and Australian Hearing staff provide routine diagnostic hearing assessments for referred children. Apunipima also provides whole of class hearing assessment in some community schools. In addition to this, during the years 2011-2015, several Cape York schools participated in whole school Child Health Checks, including a hearing screen. Audits of these clinical data were conducted, to describe the prevalence of conductive hearing loss, associated with middle ear pathology, among primary school aged children from nine Cape York communities for the years 2010-2015. Summaries of clinical findings will be calculated, including

• Percentage of children with unilateral and bilateral hearing loss
• Percentage of children with diagnosis of mild or moderate hearing loss
• Percentage eligible for bone conductor hearing aid fitting
• Percentage of children with perforated eardrums
• Percentage with discharging ears

It is proposed that these findings will prove valuable for service planning and delivery within the region, as well as providing evidence towards the allocation of resources in health and education across Queensland.

A framework for cultural governance in research.

Abstract 6
Ms Valerie Swift
Telethon Kids Institute, University of Western Australia, Perth Western Australia
Other Presenting Authors:
Natasha Morrison Telethon Kids Institute, University of Western Australia
Other Authors:
Deborah Lehmann, June Doyle, Natasha Morrison Telethon Kids Institute.

The Urban Aboriginal Ear Health Epidemiology project set about consultation at an early stage after the community identified the need to develop an Urban Aboriginal Ear Health Program in Perth’s South Metropolitan region.

Two Aboriginal researchers were employed on the Epidemiology team. To encourage people to join the project and continue the required follow-up, we ensured the Aboriginal community had a strong understanding of the potential benefits and inconveniences of the research program. We held community forums and established an Aboriginal Community Advisory Group (ACAG) who developed their own Terms of Reference that guide us to ensure cultural governance. The ACAG reviews all project documentation and provides feedback to guarantee appropriate language and cultural safety.

This process was the commencement of strong relationships and partnerships. To guarantee true working partnerships with the Aboriginal community and organisations we must consider being in the ‘Third Space’, in our case adapted for working with the Aboriginal population. The work environment offers an ongoing opportunity for 2-way learning, both from a cultural understanding and skills transfer perspective. The three staff members are constantly working in the third space where sharing of world views and understanding of those differing views assist us undertake our work in a safe space and ensures the families we work with are comfortable and safe as well.

This presentation by Aboriginal Researchers will propose some key areas to be considered when planning to conduct research with Aboriginal families/communities. In addition to examples above, we will share others such as: (1) identifying key Elders in the community who you know will open doors, support the project, and offer ideas on families that may be interested in participating and; (2) allowing time to hear stories as this connects you to other families and opportunities.
The susceptibility of nasal cells from otitis media (OM)-prone children to Respiratory viral infection

Abstract 5
Professor Kirsten Spann
Queensland University of Technology
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Queensland University of Technology, University of Queensland

Respiratory viruses' cause of inflammation and damage within the upper airways that extends to the middle ear causes fluid accumulation and encourages the colonisation of bacterial otopathogens. Developing treatments that target viral infection is therefore a logical approach to controlling otitis media (OM). So how will we do this? There is clinical evidence that OM-prone children are more susceptible to viral infections than non-OM-prone children. This suggests a defect in the innate antiviral response at the first site of infection; the nasal epithelium. If we can understand what these defects are, then we can develop novel treatments to overcome them and fight viral infection before they lead to OM.

To address this we have developed two culture models of nasal cells from children with- and without- OM in the laboratory and infected them with respiratory syncytial virus (RSV), which is a common childhood respiratory virus and also significantly associated with OM. The models are: 1. Submerged monolayers of nasal cells, and 2. novel 3D, differentiated cultures in which nasal cells have formed layers of ciliated apical cells, mucus producing cells and basal cells, and are therefore functionally very similarly to an epithelium. In this study, both models demonstrated that nasal epithelial cells from children prone to OM are more susceptible to infection and carry a higher viral load within the first 3-4 days after infection, compared to cells from children not prone to OM.

This clinically relevant 3D model has been used by us and others to study asthma, although this is the first time it has been used to mimic the nasal epithelium of OM-prone children. We are now using this model to identify the potential defects in the antiviral immune response that underlie this susceptibility as the first step towards novel treatments.

Statewide trial of smartphone hearing screening technology

Abstract 39
Ms Heidi Louise Jorgensen
Deadly Ears - Queensland Health
Other Authors:
Maggie Allan
Advanced Audiologist Deadly Ears

Recent developments in smartphone hearing screening technology that is low cost, easy to use and clinically valid has the potential to revolutionise hearing Outcomes for Aboriginal and Torres Strait Islander children. Primary healthcare clinicians can now access technology to reliably detect hearing difficulties and empower them to make timely and appropriate decisions regarding the management of otitis media and hearing loss, including onward referral into specialist hearing services.

1. A range of primary healthcare clinicians from across Queensland participated in a trial of a hearing screening app on a mobile smart phone (hearScreen™).
2. Clinicians completed a pre-trial questionnaire about their current hearing screening practices, skills and confidence.
3. Clinicians were provided with hearScreen™ to use for 3-9 months with screening data collected in the application and stored in a secure online database.
4. Clinicians then completed a post-trial questionnaire to review changes in their screening practice, skills and confidence with availability of hearScreen™.
5. Screening outcomes from the online database were analysed to support recommendations for use of hearScreen™ statewide.

This trial has helped identify barriers and enablers to primary health clinicians conducting hearing screening as a part of routine and opportunistic child health checks in Queensland. Understanding these factors as well as continued investment and trials of new technology such as hearScreen™ can significantly improve the efficiency, accuracy and consistency of hearing screening conducted by primary healthcare clinicians. As a result we hope to see an increase in rates of accurate early identification and subsequent management of hearing loss which can dramatically reduce the impact on language development and learning opportunities for Aboriginal and Torres Strait Islander children.
Managing otitis media in Aboriginal & Torres Strait Islander Children: Update on The WATCH & INFLATE Trials

Abstract 12
Ms Letitia Campbell
Kalwun Health Service
Other Presenting Authors:
Sissy Tyson, Aaron West
Southern Queensland Centre of Excellence in Aboriginal and Torres Strait Islander Primary Health Care (Inala Indigenous Health Service, Winnunga Nimmityjah Aboriginal Medical Service, ACT

Site-based Research Officers will report on the progress of the WATCH and INFLATE clinical trials, including ongoing experiences and learning through our clinical trials network of 5 urban Aboriginal health services

Through the WATCH trial we are investigating the management of acute otitis media (AOM), and determining if watchful waiting is non-inferior to immediate antibiotics in children aged 18 months to 16 years. This trial started in 2013 and recruitment will continue till 2020. Additional projects undertaken in conjunction with this trial in 2017-2018 have been an examination of the utility of AOM symptom scales and qualitative exploration of parent/carers views on the use of antibiotics in AOM. Through the INFLATE trial, we are investigating the management of bilateral otitis media with effusion, and determining if the use of a nasal balloon will increase resolution of this condition in children aged 3 to 16. INFLATE commenced in November 2017 and recruitment has commenced.

Research Officers will discuss their perspectives on how to undertake ear research in the community setting, and the benefits and challenges they have encountered in their work roles and in their professional development.

A visual presentation of the adventures of a Hearing Health Program Outreach Team.

Abstract 43
Ms Theresa O’Byrne
Department of Health, Top End Health services, Hearing Health Program
Other Presenting Authors: Full names & institutions
To be advised. The co presenter will be either a Clinical Nurse coordinator or a Clinical Nurse Specialist working for department of Health, Top End Health Services, and Hearing Health Program.

Hearing Services has an outreach program that delivers ear and hearing health care to remote communities across the Top End and Central Australia. Hearing Services Outreach is a unique service provider that works in conjunction with primary centres to deliver high quality clinical care, audiology and ENT services. Outreach is work with a difference as each trip and each community bring their own surprises and challenges. The adventure can start at the beginning flying through stormy wet season skies in a small twin engine aircraft or passing road trains on dusty outback roads, being met on community by an array of animals that adopt us or scare us, being surprised by our accommodation and working in whatever space made available to us. We can be surrounded by water, red dust, mountain ranges or endless flat plains. It can be bucketing with rain or over 40 degrees but the work goes on and the local people make us welcome. There are many obstacles to overcome but the overall experience is one of personal and professional character building that makes one realise how lucky we are to have such opportunities in our career journey. This visual presentation highlights the adventures and entertainment encountered by Hearing Services clinicians travelling on outreach.

Traveling in teams of two, an Audiologist and a nurse, sometimes having never met before, the HHP team members embark on a 4 day journey to bring Hearing Services to the doorstep of indigenous Australians living in remote communities. Each community and each trip has its own quirks and brings its own surprises that can require some quick thinking and flexibility. This can bring out our strengths and sense of humour and our resourcefulness. Bringing ear and hearing health to remote communities gives team members the opportunity to meet new people and to work in a variety settings and situations. It is this variety that makes the work interesting and fulfilling and creates strong bonds and memories of rich experiences between team members. At the end of the day we may go to bed exhausted asking ourselves if the day really happened like it did, however at the end of the week we go home satisfied that we have done our best and completed another trip that we can happily wonder if it was more adventure than work.

Pictures tell a thousand words so it’s with our cameras that we try to capture the Rich experiences of remote outreach work.
Oral Abstracts

Pathways for Aboriginal and Torres Strait Islander babies with Conductive Hearing Loss from Newborn Hearing Screen

Abstract 22
Ms Alison Collins
Children's Health Queensland, Deadly Ear’s
Other Authors:
Maggie Allen, Rachael Beswick, Gavin Bott
Children's Health Queensland, Deadly Ear's, Children's Health Queensland, Deadly Ear's, Children's Health Queensland, Healthy Hearing, Children's Health Queensland, Healthy Hearing

For babies born with a conductive hearing loss, guidelines for assessment and intervention are often limited. Emerging research suggests that a conductive hearing loss present through critical periods of development can have significant impacts on a broad range of developmental outcomes leading to poorer social, educational and vocational opportunities later in life. Through Universal Newborn Hearing Screening (UNHS), a unique opportunity exists to identify and support children at high risk of conductive hearing loss and implement ways to reduce these developmental impacts from an early age.

Through partnership with the Healthy Hearing program in Queensland, this project will review the journey of Aboriginal and Torres Strait Islander children through UNHS identified with conductive hearing loss. Review of current lost to contact and fail to attend rates and hearing outcomes from newborn screening for Aboriginal and Torres Strait Islander babies will be investigated. In response, care pathways will be developed to ensure Aboriginal and Torres Strait Islander children identified through UNHS have timely access to culturally appropriate care and early intervention services.

It are anticipated that these alternate pathways will improve access to early intervention options for Aboriginal and Torres Strait Islander babies born with conductive hearing loss.

Improving Curriculum Access by Creating Inclusive Classrooms

Abstract 44
Ms Alice Louise Csabi
Department of Education - Lajamanu School
Other Presenting Authors:
Latha Ramesh
Hearing Australia

Creating inclusive classrooms in which all students can access the curriculum should be a priority for every school and teacher. Supporting students with hearing loss and constant ear infections is possible in all settings, even the very remote. This can be achieved by empowering school staff and teachers with knowledge about the issue, and providing them with steps they can implement to overcome the challenges. The prevalence of chronic middle ear disease and related hearing loss is high in Aboriginal children, particularly in remote Australia. Australian Hearing provides audiological and rehabilitative services to bridge the gap and making learning easy where appropriate, children diagnosed with fluctuating conductive hearing loss are fitted with bone conduction hearing aids, to optimise their hearing. Teachers play a critical role in creating a supportive environment for use of these devices during school hours. This abstract focuses on the positive steps that Lajamanu School has taken to create inclusive classrooms and learning experiences for their students with hearing loss. Lajamanu School is located approximately 560 km south west of Katherine on the northern edge of the Tanami Desert.

Lajamanu School in the very remote N.T. has been able to support indigenous students with hearing loss working together with Australian Hearing, and dedication to creating inclusive classrooms. Some of the strategies that have been successfully implemented include:

• Thinking carefully about student placement during learning tasks and seating arrangements
• The creation of the ‘Hearing Station’ and implementation in each classroom in which it is needed
• Developing a positive health routine in the Early Years to encourage overall health and manage discharging ears
• Providing specialist teachers with ‘learning bags’ for each student who wears a hearing headbands so that they can easily take it from class to class
• Including the use of cued articulation when teaching literacy (especially phonics) so that students have a visual cue for each sound

Through these changes every student in the classroom is empowered to achieve to the best of their ability.
Oral Abstracts

Do microbiological features of ear discharge in CSOM predict clinical outcome (failure to improve or resolve ear discharge)?

Abstract 9

Ms Celestine Aho
Menzies School of Health Research

Other Authors:
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A randomised control trial comparing topical ciprofloxacin (CIP) versus topical framycetin-gramicidin-dexamethasone (FGD) in the treatment of chronic suppurative otitis media (CSOM) found both treatments equally ineffective in 97 Indigenous Australian children who had failed standard treatment of FGD. Ear discharge (ED) failed to resolve in 70% vs 72% and failed to improve in 52% and 59% of the children in the CIP and FGD groups respectively, following 6-8 weeks therapy. Culture-based microbiology suggested there were fewer H. influenzae and more fungi in the CIP group after treatment. As culture of ED for respiratory bacteria lacks sensitivity, our aim was to use quantitative PCR on ED to identify microbiological features that may predict clinical outcome in CSOM.

Quantitative PCR was used to measure total and pathogen specific loads in ED specimens at baseline and following 6-8 weeks of therapy. Preliminary analysis showed H. influenzae culture (p<0.05) and H. influenzae PCR (p=0.057) detection at baseline to be associated with worse outcome. We will describe microbiological features within the treatment groups at baseline and at end of treatment for each treatment group. Differences in bacterial loads between the treatment groups will be plotted using a two way scatter plot and median relative abundance for total bacterial load and pathogen specific load will be compared between the 2 treatment groups. We will also compare difference in proportions at end of therapy between treatment groups adjusting for baseline characteristics.

The day-to-day experience of Aboriginal researchers working with Aboriginal families participating in the Urban Aboriginal Ear Health Program, Perth, Western Australia: lessons we are learning!

Abstract 4

Ms Natasha Rose Morrison
Telethon Kids Institute

Other Presenting Authors:
Valerie Swift
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Other Authors:
June Doyle Telethon Kids Institute, Deborah Lehmann Telethon Kids Institute, University Of Western Australia, Perth Western Australia.

Researchers can come from a variety of backgrounds with diverse skills. However, Aboriginal researchers come with a skill set that is married to the Aboriginal community and allows for a way of working that is respectful, transparent and truthful. Aboriginal researchers may not have a formal qualification; however, we come with a qualification that ensures the way we work is culturally safe and enables families to feel included, valued and respected.

Every day can be different in the life of an Aboriginal researcher. We try and plan our day as per organisational structure, but often things don’t go to plan as per Aboriginal community life. One of the advantages of being Aboriginal and working in the community that we live in, is that we have a real understanding of, and empathy with, the families we work with.

This presentation by Aboriginal researchers will outline the lessons we are learning from community and some strategies that help us do our work. For example: use of appropriate language, persistence without being bossy, home visiting and conducting ear health checks in the home. We will discuss some of the challenges and how we try and overcome these. Through this presentation, the audience will gain some practical helpful hints that may assist them when conducting research with Aboriginal families. OMOZ 2018 provides an excellent opportunity to share such experiences and lessons learnt with others and to exchange ideas on how to improve conduct of research, particularly in the area of ear health, in Aboriginal communities.
Oral Abstracts

The trouble with (ear health) data

Mr Matthew Brown

Plenary 15

Deadly Ears Program

Is anyone better off as a result of our work? This question is central to the ongoing work of the Deadly Ears Program. This is a journey through the Program's data. The gathering of data is important and we want to see changes in ear and hearing health outcomes as a result of our work. Our program depends upon local primary health services regularly checking ears and hearing, managing problems at the front line, and referring kids to our visiting ENT program. These services need to ensure families have their appointments and come and see us when we are in town. They also need to ensure relevant follow up occurs after we leave. So our ability to see high need children (and collect good outcomes data) is heavily influenced by these local services. This presentation will show the complexities of gathering meaningful ear health data at the community level. It might look like you are improving health outcomes - but what if you've just seen the healthy kids who the local service could easily bring to your clinic?

This presentation will look at the various data sets collected by the Deadly Ears Program and which are used to guide its work. This data includes:

- Rate of appropriate referrals from Primary Health Services (in line with the National OM guidelines);

- Numbers of “new” referrals, especially for 0-4s;

- Rate of kids who attend appointments;

- What we see at clinic, how we track change, and how we are trying to get better at measuring outcomes.

Robust primary health care is integral in improving ear and hearing health outcomes. However, without also addressing the social determinants of health, we risk returning children into an unhealthy environment which compromises our gains. It is also important to consider what “reasonable outcomes” look like for a population with chronically unhealthy ears and hearing. For example, the outcomes from many ear health surgeries are largely normed to the general (and much healthier) population.
Oral Abstracts

Beyond the middle ear: considering cultural and contextual influences supporting Aboriginal children’s development.

Plenary 16
Prof Anne Lowell

Extensive research has demonstrated the high prevalence of otitis media and associated conductive hearing loss in Aboriginal children. However, the wide range of cultural and contextual factors that interact with hearing loss to influence actual developmental outcomes has received little attention in remote Aboriginal contexts.

A longitudinal qualitative study in one remote Northern Territory community has explored the strengths and challenges in early child development from the perspectives of families and other community members. Methods included video reflexive ethnography, recording every day interactions of six children and their families over 5 years, and cross-sectional data from in-depth interviews with 50 other community members. A project website is being developed to facilitate dissemination of findings and will serve as an educational resource for early childhood educators and others, as well as a repository for cultural knowledge.

Collaborative analysis with participants and community researchers has revealed a range of themes. Findings with particular relevance to this presentation include consistent and intensive communication with children from birth by many family members. Families assess functional hearing as well as receptive and expressive speech and language development through frequent teaching and testing routines and accommodate the different communication needs of individual children through language simplification and visual support including use of community sign language. Important cultural differences in listening behaviour and a focus on simultaneous processing, rather than promoting selective attention, were also identified.

Research, assessment and support in Indigenous early childhood contexts are often ethnocentric and deficit focused; cultural strengths and protective factors are therefore easily missed and cultural differences misinterpreted as deficits. A deeper understanding of cultural strengths and differences can support more accurate assessment and identification of children’s needs and inform more effective, culturally responsive management strategies.

Hearing Loss Responsive Communication - a need for researchers and service providers as well as prevention and treatment

Plenary 6
Mr Damien Howard

Research is increasingly pointing to the multiple and long term impacts on Indigenous people of hearing loss caused by middle ear disease. However, efforts at mitigation of these outcomes remain the neglected Cinderella in endeavours around ear disease and hearing loss. To date there has been little funded research into how those working in health, child protection, employment and criminal justice can act to mitigate the increasingly visible long term impacts of hearing loss on communication and engagement. Presently those working in these sectors almost universally have no awareness of the prevalence of hearing loss, or its influence on communication among the Indigenous people they work with, let alone how to mitigate that influence. The 2017 AMA health report recommended that all those providing services to Indigenous people should have training in hearing loss responsive communication strategies. This paper describes the critical elements of this type of training, as well as describing the first of this type of training carried out with NDIS providers in the NT.
Oral Abstracts

A summary of OM progress since the first Omoz meeting

Plenary 3

Dr Lea-Ann Kirkham

Did we listen? A summary of progress on otitis media research since the first OMOZ meeting.

As we commence with the 5th biennial national otitis media conference (OMOZ), I will take the opportunity to reflect on the progress that we, the ear health research community, have made since the inaugural meeting in Darwin in May 2010. At the first meeting, six topics were identified as the key to reducing the burden of otitis media (OM) in Australia: Prevention, Intervention, Treatment, Investigation, Participation and Communication. I will provide an update on our national efforts over the last eight years to address these action points; identifying the successes, research advances and the remaining knowledge gaps that need to be addressed to improve ear health in Australia.


NT Ear Health Program overview- Hearing Health Program

Plenary 12

Ms Gypsy De Jonge

Continuous Quality Improvement (CQI) Manager, Hearing Services

NT Hearing was established in 1988 and was the sole provider of urban and remote audiology services across the Northern Territory (NT). In 2007 the Commonwealth Government initiated the Northern Territory Emergency Response (NTER) as a result of the 'Little Children are Sacred' report which resulted in the Australian Government Intervention (AGI). Through the AGI, Child Health Checks were completed which highlighted the significant gaps in health outcomes for Aboriginal children and the substantial need for ear and hearing health services to be implemented. In 2009, funding was allocated to provide audiology and Ear, Nose and Throat (ENT) services across the NT to identify and monitor children with ear disease and hearing loss. However this model was costly and unsustainable. In 2010 funding agreements were altered and a new, innovative, integrated hearing services pathway. This program included both Audiology and TeleOtology outreach. The program was renamed numerous times between 2009 and 2016, and is now known as Hearing Services which incorporates NT Hearing. Since its inception, the program has continued to develop and evolve. Stringent data collection has enabled the program to constantly monitor and evaluate service provision and assist with changes in the service model. Hearing Services have a key focus on working in a primary prevention and health promotion model to reduce the impact of ear disease and hearing loss with a key focus on Aboriginal children in remote communities through prevention and case management, health promotion, community based workers and collaboration with key stakeholders.
From the community to the lab: a specimen journey

Plenary 18

Mr Adam Thompson
Menzies School of Health Research

The PREVIX clinical trial is a large project with fieldwork in four remote communities and lab work focused at Menzies School of Health in Darwin. With research combined across many different fields, few will experience all areas of the project directly. Those working in the lab may never see what happens in the communities, and the nurses working in the field may never see all that takes place in the lab. A short documentary of the project was produced in order to share these two sides of the project. The documentary was aimed at a wide audience and intended to be used in many different forums. It was a challenge to incorporate all the aspects of a complex project into a brief documentary, but, the producers hope the video will provide a different perspective for all of those involved, including the communities in which the trial is taking place.

Video produced by Adam Thompson
Laboratory sections of the video produced with Amy Llewellyn
Community fieldwork sections of the video produced with Beth Arrowsmith
Special thanks to the communities of Wurrumiyanga and Wadeye for their involvement.

The impact of Hearing Impatient on the Trajectory of Childhood Development and Education- a Data Linkaget Study

Plenary 4

Prof Steven Guthridge
Jiunn-Yih Su, Vincent He, Steve Guthridge
Centre for Child Development and Education, Menzies School of Health Research, Darwin

This study investigated the association between hearing impairment (HI) and the trajectory of childhood development and education using linked hearing health assessment data and administrative datasets for health and education.

The study cohorts consisted of NT born Aboriginal children living in remote NT communities. The predictor variable was HI defined by audiometry or clinical examination with normal-hearing children as controls. The outcome measures included: developmental vulnerability at the age of 5 years as assessed with the Australian Early Development Census (AEDC); school attendance rate in Year 1; and the results of National Assessment Program – Literacy and Numeracy (NAPLAN) in Year 3.

In the study cohorts, HI was associated with increased risk for developmental vulnerability at the age of 5; decreased attendance in Year 1; and lower academic achievement in Year 3. These findings have important implications for service provision and resource allocation in both health and education sectors.
Urban Child

Plenary 7

A. Prof Hasantha Gunasekera

Children's Hospital Westmead Clinical School University of Sydney

The massive burden of middle ear disease in remote Australian Aboriginal and Torres Strait Islander communities has been well documented for many decades. However, there are scant data on urban and metropolitan settings, where the majority of Australian Aboriginal and Torres Strait Islander children live. It has been estimated that 60% of the total Aboriginal health gap in Australia is in the urban setting and so more work is needed in this space, along with the high quality work in remote settings.

There are several federal and state based initiatives designed to tackle the burden of middle ear disease in Aboriginal children, including Care for Kids Ears, Deadly Ears in Queensland, Hearing ear health and Language Services (HEALS) in NSW and the Ear busses in WA.

SA Ear Health Programs overview

Plenary 14

Prof Trish MacFarlane

Ear and hearing health for Aboriginal children living in in South Australia is receiving increasing attention and efforts are being made to improve the ear and hearing health for all Aboriginal children regardless of where they live.

Many different stakeholders representing public and private interests, community controlled health services, government departments and community groups are all coming together to coordinate care and resources tailored to the specific needs of Aboriginal children living in SA. Despite improvements, there are ongoing barriers to care that are identified consistently by stakeholders including equity in access to resources, funding, data sharing and ability to audit results to ensure improvements are being made.