Chapter 3
The Importance of Physical Health: The Impact of Otitis Media on Hearing Loss and Education Outcomes

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Abstract  Hearing is the sense that most structures our social engagement. Conductive hearing loss is caused by middle ear disease which is the most common reason young children visit doctors in the Western world. Yet, 90% of the burden of conductive hearing loss is in developing countries, especially among disadvantaged communities. Indigenous people in Australia have one of the worst profiles of ear disease and hearing loss in the world. However, the access to first-world audio- logical and medical resources has catalogued the associated problems in ways that have occurred little elsewhere. An unidentified mild to moderate hearing loss usually leads to persistent negative social interactions. It also disrupts classroom learning that relies primarily on ‘teacher talk’. Growing up in crowded noisy houses, both spreads ear infections as well as exacerbating the impact of hearing loss by having many others in the family with a hearing loss. When hearing loss is experienced early in life it influences the development of social skills, psychological well-being and educational engagement. Children do develop compensatory communication skills, such as visual observation and analysis. However, this is most effective if the people they communicate with also use visually rich communication strategies. Teacher training and access to classroom support from familiar local community members are the least expensive support interventions, while improving school acoustics and use of sound field systems are also valuable. The work with Indigenous people in Australia gives both information that can be useful elsewhere, as well as pitfalls to avoid. A health only focus, which aims to prevent and treat ear disease, while neglecting efforts to mitigate the adverse impacts of hearing loss should be avoided. A holistic and collaborative partnership involving health, education and other agencies is ideal.
Introduction

Hearing is the sense that most structures our social engagement. An unidentified mild-to-moderate hearing loss usually leads to persistent negative social interactions for children, especially in school where regular compliance with verbal instructions is more often demanded. Children may be criticized for not responding to directions they did not hear. They may be isolated and rejected by their peers. They often experience confusion and embarrassment when they do not know or cannot understand what is happening in the social context of which they are a part. Their educational outcomes can be compromised because of difficulties learning from verbal/auditory teaching styles.

Other chapters in this book have described global, self-perpetuating inequalities in health and education. This chapter explains how a disease of disadvantage, middle ear disease or Otitis Media, causes hearing loss that has a detrimental effect on education outcomes. It adds a further layer of understanding to the reciprocal relationship between health and education.

It is estimated that 90% of hearing loss, related to childhood middle ear disease, occurs in developing countries, where children from disadvantaged groups experience more severe forms of the disease, for longer than in most in developed nations (World Health Organization 2017). Factors, such as crowded housing, promote ear infections by many children being in close proximity to each other, accompanied by overburdened plumbing and washing facilities, leading to poor hygiene (Burns and Thompson 2013). More prevalent and more severe ear disease in childhood means children are likely have some degree of permanent hearing loss and ongoing auditory processing problems throughout life. Crowded housing also shapes noisy listening environments that compound the adverse communication effects of hearing loss from ear disease (Howard 2011). However, despite the burden of ear disease being greatest among impoverished groups in developing nations, the majority of research on the issue has taken place in developed nations, where fewer children experience milder forms of the disease, for less time during their childhood (Su et al. in press). The results of this research have been inconsistent, leading to concerns about how the longer term impacts of early childhood ear disease can being minimized.

Unlike other Australians, Indigenous Australians, especially those living in remote areas, experience levels of disadvantage, similar or greater than that experienced by many people living in developing nations. Research carried out with this group of disadvantaged Australian has helped to reveal a different outcome of ear disease than occurs among advantaged populations. These findings have resulted in consistent evidence of major adverse outcomes from ear disease related hearing loss.

This research has shown that Indigenous Australians have the worst ear health of anywhere in the world (World Health Organization 2017). The ear disease can start very early in a young child’s life and can have a triple impact.
• First, it commonly results in a mild to moderate degree of fluctuating conductive hearing loss when fluid in the middle ear, or perforations of the ear drum, create a temporary fluctuating hearing loss. It is estimated that Indigenous children in Australia experience ear disease on average for 2.4 years during childhood, compared with an average of 3 months for non-Indigenous Australian children.
• Second, this hearing loss can affect critical periods of development in children’s auditory, cognitive and psychosocial competencies. While a child’s hearing may return to normal, they can be left with diminished auditory processing and other competencies.¹
• Third, by damaging middle ear structures, persistent ear disease can result in a permanent hearing loss.

**Impact of Hearing Loss/Auditory Processing Problems**

The educational and psycho-social outcomes of hearing loss depend on when it first occurs. Most people who are hard of hearing in developed nations have an occupational or recreational noise induced hearing loss, only experienced later in life—80% of non-indigenous people who are hard of hearing in Australia are over 50. Their hearing loss occurs long after they have completed their schooling and occupational training. They have already developed the psychosocial competencies that enable them to navigate major milestones in life. In contrast, for those who experience early onset hearing loss in childhood, hearing loss influences their navigation through these life passages.

The impact of early onset hearing loss from ear disease varies according to the severity and frequency of episodes, but research suggests children, who experience multiple episodes of ear disease-related hearing loss before starting school, subsequently encounter difficulties with the development of auditory discrimination and processing skills, phonological awareness, short-term auditory memory skills and auditory sequential memory skills (Holte 2003; Lowell 1994; New South Wales Health Department 1996; Walker and Wigglesworth 2001). Ultimately, this can affect a child’s learning to read and write and contributes to poor overall educational outcomes (Couzos et al. 2003; Howard 2004; Lowell 1993).

There are two types of hearing loss. Sensorinueral hearing loss results from damage to the electrochemical transmission of sound through the cochlear that connects the ear to the brain. People who are deaf have this kind of severe to profound hearing loss which once it occurs is permanent. Conductive hearing loss refers to the way sound is mechanically ‘conducted’ through the outer parts of the ear. Middle ear disease can cause temporary obstruction of sound when the middle ear is filled with fluid or the ear drum bursts. This can be temporary, while a child has ear disease,

¹What is described in this chapter related to hard of hearing children may also apply to children with no current hearing loss but who have auditory processing problems related to past hearing loss.
or permanent if middle ear structures are damaged and not repaired. This kind of hearing loss is usually in the mild to moderate range.

The conductive hearing loss experienced by children due to ear disease may frequently fluctuate: as a result, a child may hear normally at times, but not at others. Under these conditions, they receive variable language input (Galloway 2008). They may hear different forms of the same word at different times. This poses additional difficulties for children as they try to develop language-learning strategies and can lead to fatigue, frustration and frequent withdrawal from interaction with others (Lowell 1993). Research is increasingly pointing to negative outcomes from early childhood ear disease. These include poorer school performance and lower attendance rates (Su et al. in press). Children with early hearing loss can, however, develop compensatory communication strategies, especially visual strategies (Howard 2006a). This means that both the visual and the auditory environments become very important in mediating the specific impact hearing loss has in any situation.

**Acoustic and Visual Environments**

Learning activities for hard of hearing children need to be rich in visual and auditory information. For this information to be most accessible, the environment needs to have minimal background noise or visual distractions. The quality of verbal information available to a listener is measured by the signal-to-noise ratio. This defines the difference between the level of the sound someone is listening to (the ‘signal’) and the level of the background noise (the ‘noise’). The greater the difference between the signal and the background noise, the easier the signal is to ‘hear’. Sound is measured in decibels (dB) and it is recommended that the acoustic ‘signal’ is 15 dB greater than the background ‘noise’ for classrooms and other environments, where children interact as a group. However, this ideal is rarely achieved (Crandell et al. 1995). Hard of hearing children need an even better signal to noise ratio to cope. So poor acoustic environments will impact on their communication more so than for other children.

A number of features contribute to background noise levels in homes, childcare and schools.

- First, there is the sound generated by the equipment in the room and noise intruding from outside the room.
- Second, there are the acoustic properties of the space, including the degree to which furnishings absorb or reflect sound.
- Third, there is the noise generated by people in the space. Background chatter is more disruptive to school performance than other noise (Walker/Jones 1989). Talking among children masks speech perception more than any other source of noise (Crandell et al. 1995).
The home listening environments are often far from ideal for many Indigenous families. Poverty contributes to crowded living conditions and higher levels of background noise in homes (Howard 2011). Further, if a high number of residents in a crowded house have hearing loss, this contributes to even higher levels of background noise, as these residents talk more loudly and/or listen to TV and other electronic equipment at a higher volume (Howard 2011). So, the same conditions of disadvantage that lead to children experiencing more ear disease related hearing loss also contribute to difficult acoustic conditions in homes. These poor acoustic conditions in homes then exacerbate the impact on communication for hard of hearing residents, especially children, who have less facility with language.

In schools there is often an artificially polarized noise environment. The congregation of many children in confined spaces leads to regular periods of high noise levels, as many children speak at the times they are permitted to. Hard of hearing students find it difficult to listen and converse at these times. They are socially isolated by the combination of hearing loss and high levels of noise. As a result, they may be seen as having poor social skills.

It is quietest in classrooms when teachers enforce relative silence, so they can engage students in talk-focused learning. These are the times in classrooms that provide the best opportunity for children with hearing loss to converse with peers. Many grasp the opportunity to avoid social isolation at school. However, this means breaking classroom and teacher expectations. Teachers see students who do this as displaying behavior problems (Howard 2006a). Students conversational overtures are often rejected by peers who wish to comply with teacher expectations. So, hard of hearing children in the polarized noise settings of classrooms are liable to be socially isolated, or, if they try to converse when not permitted, may be rejected by peers and disciplined by teachers.

Often children from disadvantaged backgrounds with hearing loss move between noisy home environments, which inhibit verbal communication, and classrooms, where their opportunity to converse when they can best understand what others say is restricted. An Australian study found that Indigenous students who were hard of hearing were less engaged in learning and displayed more behavior problems as noise levels increased in their classrooms (Howard 2006a).

In some crowded home environments, there is even a risk of excessive noise exposure causing permanent sensorineural hearing loss; that is the home environment can regularly exceed the accepted standard for adult workers in an occupational context (Howard 2011). Moreover, people spend longer than the standard 8 hours, 5 days a week in their home environment. Young children, not just adults of working age, can be exposed to extended periods of loud noise.

The visual environment is also important for hard-of-hearing children to understand what is said. They rely more on visual information to compensate for diminished access to acoustic information. Compensatory visual communication systems have been most examined with the Deaf community. For example, Deaf parents of Deaf children cultivate visual cueing to focus a child’s visual attention on important events and information (Hauser et al. 2010). However, Indigenous families, where inter-generational partial hearing loss from ear disease is common, often use visual
cues in combination with verbal language to facilitate more effective communication (Jody Barney, personal communication, 2019). For example, people touch the person or make gestures to get their visual attention before speaking. In addition, they often show how to do something, while talking about it. Observing, as well as gaining further explanation from peers is also encouraged.

The use of compensatory visual learning and monitoring strategies are also evident in schools (Howard 2006a). Indigenous students who are hard of hearing use more visual learning strategies and rely more on peer support than other students. Hard-of-hearing students also visually monitor their school environment to a greater extent than children with normal hearing (Howard 2006a).

- Hearing impaired children can hear something is happening in their environment, but may not hear well enough to monitor what is happening through listening alone.
- Students with normal hearing may look up from what they are engaged in to initially observe some new event, such as someone entering the room. However, they then return to their work, only looking up to again observe events if they hear something different has happened.
- Students who are hard of hearing look up to observe new events and will then continue their visual observation of what is happening for much longer (Howard 2006a, b).

An event-filled environment is potentially more distracting for children who are hard of hearing.

- First, they spend less time engaged in the learning activities while they visually monitor.
- Second, because they need to be fully focused on listening and watching to succeed with learning activities, they find it more difficult to reengage with learning after being distracted (Howard 2006a).

Children with hearing loss need carers and educators, skilled in using complementary visual and auditory communication strategies. As will be discussed later, current education systems mostly fail to effectively educate professionals in the skills they need to work with hard of hearing children.

**Thinking Listening Skill**

Another compensatory communication skill, commonly developed to a greater extent by hard-of-hearing children is ‘thinking listening’ (Howard 2019). Hard-of-hearing children often need to make a best guess as to the meaning of what others are saying on the basis of the various types of information available to them. This involves coordinating available auditory and visual input, their knowledge from past experiences, as well as their anticipations about what the person speaking is likely to
want to communicate. This is a cognitively demanding process and hard-of-hearing children frequently experience listening overload, especially at school. After school they may arrive home irritable and tired and either have an emotional reaction or withdraw from any verbal interaction for a time.

Hard-of-hearing children need to be able to fully deploy their cognitive abilities for ‘thinking listening’ to be successful. Anything that distracts form a child’s capacity to deploy their cognitive abilities can diminish communication outcomes. Tiredness or physical ill health can do this. Also being anxious, depressed or having experienced trauma can detract from a child’s capacity to effectively coordinate available information in order to consistently make the best guess of what others mean. These internal states influence communication in a way analogous to how external background noise lessens the capacity to accurately understand what others say.

**Educational Opportunity and Hearing Loss**

Education that relies primarily on ‘teacher talk’ is not easily accessible for those with hearing loss, especially in environments that are noisy or visually cluttered. Children may often not understand what is said, or may avoid engagement in learning because of fear of shame from communicative failure (Howard in press). Indigenous students with hearing loss speak less in class and are absent more often. When they have difficulty performing classroom tasks they may become disinterested in learning, seek to further avoid engagement in learning activities and attend school less regularly (Burrow et al. 2009; Howard 1994). While use of such avoidance tactics diminish immediate anxiety about the risk of being shamed, when used regularly over time they deprive a child of educational opportunities. What begins as ‘difficulty understanding what is said’ ends up as ‘difficulty understanding what is heard’ (Howard 2018). The child’s store of knowledge about the world does not develop as much as it does with other children. This means the communication of older children and adults who are hard of hearing will be affected not only by any current hearing loss, but also by their diminished educational attainments and limited general store of knowledge about the world because of repeated past avoidance. Ultimately, hearing loss and avoidance tactics can contribute to absenteeism, failure at school, dropping out of school at an early age and reduced employment opportunities (Wallace and Hooper 1997; Howard 2019).

This means that minimizing avoidance related to anxiety about fear of failure is crucial to mitigate the current and future adverse effects of hearing loss. This includes preparing children for what to expect so as to minimize their anxiety. Not making inappropriate critical judgements about children’s motivation or intelligence

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2Use of thinking listening strategies is often evident in ‘intelligent mistakes’. This is where the answer to a question is not related to what was actually asked about, but indicates the listener has constructed an entirely different scenario of what they thought they were being asked about.
is also crucial. Such judgements are more likely to be made when hearing loss is unidentified (Howard 2018). A 'strength focused’ approach is often essential to keep children successfully engaged in learning and willing to risk asking what they fear may be seen as ‘dumb questions’.

**Psychosocial Effects of Hearing Loss**

As noted earlier, hearing is the sense that most structures our social engagement. Hard of hearing students often regularly experience negative interactions with others. There is increasing evidence of adverse social and emotional outcomes associated with a history of ear disease (Hogan et al. 2012; Zubrick et al. 2006) and hearing loss (He et al. 2019). Hearing loss has long-term negative social impacts, including limited employment options, increased risk of anti-social behavior (Howard 2005; Lowell 1994; Nienhuys and Burnip 1988) and involvement with the criminal justice system (Preston 1994; Vanderpoll and Howard 2012).

The psychosocial impacts of hearing loss can be two-way. Carers, especially mothers, are also more likely to experience negative effects on their mental health, as a result of children’s hearing loss (Howard and Hampton 2006). This can be as a result of a sense of failure at their difficulties engaging with their child, or ‘self-blame’ about their child’s hearing-related problem behaviors. When they feel like this, their reactions can have a further negative impact on their relationship with their children. One indigenous mother described this situation.

I (earlier) felt depressed and frustrated because I didn’t know what was going on. I was blaming myself. I thought it was my fault and I was a bad mother. I felt like I was letting her down. I was trying to figure out what to do. The behaviour problem (related to hearing loss) came at school. They never suggested anything and it was depressing not knowing what to do ... but it was getting me down and it was the stress levels. I was growling at her and yelling. I was pushing her away because I didn’t know how to deal with it. It made us grow apart. I did not want to be around her. (Howard and Hampton 2006, p. 10)

This parent has described her response to a school’s concern for her child’s hearing loss related behaviour problems at school. Her stress and self-blame undermined her relationship with her daughter.

When this happens families can become caught in a cycle of increasing social problems among children and decreasing social and emotional well-being for the families overall. This in turn can diminish support available for children. It can result in more child protection reports made about children with hearing loss. More than half of children who had child protection reports made about them in remote Northern Territory communities were found to have a history of hearing loss. Hearing loss and having child protection reports made were both associated with youth offending (He et al. 2019). Currently, neither pre-service or in-service training of child protection workers in Australia includes any information on hearing loss impacting negatively on family communication and how to help mitigate these effects in at home or out of home care.
Not Being Understood

Children with hearing loss not only have problems with understanding what others say to them. They will also often have difficulties in making themselves understood by others. A critical factor contributing to poor psychosocial outcomes for children with hearing loss is their inability to make themselves understood within the family (Fellinger et al. 2009).

Children who are hard of hearing can experience high levels of frustration and distress as a result of difficulties in making themselves understood. The following description by an Indigenous mother of a four-year-old girl with hearing loss illustrates this.

She gets upset when we can’t understand her. When she’s not feeling well or she’s trying to express that she wants something, she can’t say it. So she’ll either throw a tantrum, get upset because we’re not understanding, get upset because she’s trying to tell us something. As well she is obviously getting frustrated with herself because she can’t communicate properly with us and [get] what she actually wants. (Howard 2012, p. 21).

Negative Synergies When Many Have Hearing Loss

The demands on a family, where many of the children have hearing loss, can strain the capacity of family members to provide adequate support. This results in a magnified impact of hearing loss due to insufficient support being available. In addition, the fact that many adults in the family also have hearing loss can limit their capacity to provide support (Jody Barney, personal communication, 2019). A high proportion of family members with hearing loss can even contribute to the breakdown of family support systems and contribute to dysfunctional family dynamics (Howard and Hampton 2006). As discussed earlier, this may prompt involvement by child welfare services. Indigenous children with hearing loss are more likely to be involved in child protection orders.

Similar group processes occur in classrooms. When a teacher’s time is diverted to the provision of more individual support or to managing the disruptive behavior of many hard of hearing children, there is less teacher time available to help or encourage students with normal hearing (Howard 2004). This means when a high proportion of children in a class group have hearing loss, the teaching support for all the students in class can be diminished. In addition, when a high proportion of family members or class groups have hearing loss there are negative synergies that engulf all in the group. The communication and well-being of the whole family, as well the educational outcomes of all students, are affected.

Over time, there is a downward spiral of psycho-social well-being that is driven by interacting factors related to social disadvantage. Crowded housing (see Fig. 3.1) contributes, first, to many residents having conductive hearing loss because of ear disease. Second, environments that inhibit communication are fostered and, third,
long-term exposure to excessive noise may contribute to additional sensorinueral hearing loss. Lastly, there is diminished communication support available for children with hearing loss when many in a household experience hearing loss.
Successful Communication Despite Hearing Loss

A number of factors can contribute to improved communication outcomes for children who have early onset fluctuating hearing loss. As outlined earlier, the acoustic and visual environment is important, as are the nature of social processes within that environment. Familiarity and predictability are helpful for communication success. Unfamiliar people and social processes are more challenging to deal with those who hard of hearing. They commonly experience greater uncertainty and anxiety in new situations, than those who have better auditory input available to them (Howard in press).

Familiarity is an especially important element for hard-of-hearing children from minority populations who undertake their schooling in unfamiliar mainstream cultural and linguistic contexts (Jacobs 1986; Lowell 1994; Howard 2004, 2007). Student outcomes are better for children who are hard of hearing, when social processes at school are more like those at home (Howard 2004).

Children with early onset hearing loss respond dynamically to their communication challenges. Their responses may include making greater use of visual observation, peer learning and thinking listening strategies (Howard 2005). These are most effective if matched by complimentary teaching strategies, such as teachers incorporating visual content to help understand verbal explanations, providing observational opportunities in class and enabling peer learning. However, formal teacher training tends to mainly focus on auditory/verbal teaching styles. Teachers may have low ‘visual literacy’; an understanding of the importance for some students of being able to access visual information and how they can effectively convey information visually. Teachers may be critical of local education workers who, having grown up in communities where there is widespread hearing loss, have developed more visual communication/teaching strategies. Such strategies are often more effective with children who are hard of hearing. Despite this, teachers may sometimes try to enforce the use of ‘talk only teaching’ strategies (Howard 2004). They may see children’s peer-oriented learning as ‘disruptive’ (Howard 2005). School practices may also obstruct peer-oriented learning—for instance, by streaming students into groups with similar achievement levels. This congregates children with hearing loss in lower achieving groups and deprives them of peer support and opportunities to observe more capable learners (Howard 1994).

Other chapters in this book report how, even when equivalent schooling opportunities are provided to all, children from disadvantaged backgrounds often do not gain as much educationally as other students do. In Australia, the evidence suggests that, for many children from disadvantaged Indigenous communities, a barrier to accessing educational opportunities provided by mainstream schooling is their experience of hearing loss and the lack of responsiveness to their needs by the education system. Training that enables educators to more effectively meet the learning needs of children who are hard of hearing can make educational opportunities more accessible for these children. The Australian Medical Association has recommended that all those working with Indigenous Australians receive hearing loss responsive communication
training (AMA 2017). Another way of providing better educational opportunities for children with hearing loss in disadvantaged communities is to recruit and support teachers who come from those communities. These educational workers can be more effective because children from disadvantaged minorities engage most easily when they and their teacher have a shared language and socio-cultural context (Malin 1994). Teachers from the same cultural group are also less likely to hold negative cultural stereotypes that lead them to judge a child as unmotivated or unintelligent, because of hearing loss related communication difficulties. Such judgements, even if not expressed verbally, are often evident from nonverbal cues which are quickly observed by visually astute hard of hearing students. This can prompt children to limit future engagement with the teacher, the class or the school (Howard in press).

Targeted training, as well as recruitment of local teachers, are steps that can contribute to disrupting the cycle of intergenerational disadvantage arising from the impacts of hearing loss.

**Directions and Viable Solutions**

The reality experienced by children with conductive hearing loss from disadvantaged populations has long been obscured by the inconsistent results of research carried out with children from advantaged backgrounds. This reality is shaped by social determinants, such as crowded housing, which initially contributes to poor hygiene and easier transmission of infections leading to hearing loss. Also assembled within crowded houses are adverse acoustic and visual environments that act to inhibit communication for those residents with hearing loss. Further, when many in families and classrooms have hearing loss, this can add a further layer of diminished social and learning support to the amalgam of exacerbating factors that exist for children from disadvantaged communities.

Divergent long-term ear disease outcomes in different socio economic contexts suggests questioning the relevance for disadvantaged populations of the results of research that has been conducted among more advantaged population groups. This is the case in regard to ear disease and may also be the case for other health conditions. Furthermore, the reported results of research among indigenous Australians, who experience similar or greater levels of disadvantage compared to many in developing nations, are likely to be relevant to these contexts, where this kind of research has yet to be conducted.

But there are also things to learn about some unproductive directions of the work carried out in Australia. Foremost, among these is the need for a holistic approach that breaks out of research and service delivery ‘silos’. A ‘health alone’ approach has been a feature of work in Australia. Most research and service delivery has focused on preventing and treating ear disease. Work on identifying and mitigating the impacts of hearing loss has been more limited, although it is the focus of this chapter. The common response about what to do about this issue is ‘how can we prevent and treat ear disease’, while mitigating the impact of hearing loss has been
more neglected in both research and service delivery. A holistic approach involves a focus on prevention, treatment, as well as mitigation. It is like a tripod, If one leg is weak the whole structure tips over.

If evidence of the often, adverse long-term outcomes of ear disease is not available, ear disease can be seen as a lower priority than other health conditions that have a more immediate and obvious impact on health. It is the evidence of impacts of hearing loss in education, employment and criminal justice that helps inform the provision of more aggressive health treatment for children at risk of persistent ear disease. It also helps to secure adequate resources for research and intervention programs. Long-term adverse outcomes of ear disease have been consistently referenced as justification for funding for treatment and prevention programs in government announcements in Australia.

Additionally, for effective prevention and treatment of ear disease, the family and community need to be engaged, if the best possible outcomes are to be achieved. However, when ear disease is seen mainly as an obscure health condition it can be difficult for families and communities to understand why it is important that they actively engage in prevention, treatment and mitigation regimes. Families become more engaged when they know that ear disease is linked to things they care passionately about, such as child development and educational and employment opportunities (Howard 2012). However, in Australia, community health promotion about ear disease has often focused on the health condition (Howard 2012), while alluding only briefly to the consequences of ear disease and hearing loss. Similarly, in the education sector, the early training for teachers has focused mainly on how ear disease occurs and how it causes conductive hearing loss, with little information on what educators could do to assist affected children. This type of training often served only to convince teachers that the issue is primarily a health issue, and not something that they should be concerned about as educators.

A ‘what we are concerned about’ approach is needed to attract the interest of families and teachers so they understand the relevance of hearing loss to things that concern them, as well as what they personally can do about it.

- For families, ‘what we are concerned about’ is long-term success in life for their children. The ‘what we can do’ includes engagement in prevention and treatment regimens and working to improve the way they communicate with affected children.
- For educators, the ‘what we are concerned about’ is children’s engagement in learning and the management of behavior problems that disrupt learning. The ‘what we can do’ is to improve the way they communicate with hard of hearing students through using teaching strategies that complement the compensatory strengths developed by these children. They can, as well, better manage the learning environment and social processes within it, to provide optimal access to communication and learning opportunities.
Collaboration Between Health and Education

Breaking out of silos also involves health and education sectors working collaboratively to help each achieve their goals. Education and childcare workers can help foster early treatment and better prevention, while health workers can support better education outcomes. The early identification of ear disease illustrates this.

Early Identification

Early identification of ear disease and hearing loss is crucial to minimize both the time a child has hearing loss and preventing the adverse outcomes that frequently arise from unidentified hearing loss. Early identification can alert families of the need to seek treatment that can limit the time a child spends with impaired hearing. Childcare workers and educators are often in the best position to identify the learning and social difficulties a child has in group contexts that signify the presence of ear disease and related hearing problems (McPherson 1995). Educators can alert families to the need for prompt treatment if they know what to look for in behavioral indicators of hearing loss. They can also regularly check for hearing loss by using simple screening tools (Howard 2006b).

Early identification of hearing loss can also lessen the likelihood of children developing psychosocial problems (Laugen et al. 2016). When people are aware that a child often can’t fully understand what is said they are less likely to have the negative reactions that otherwise occur.

Currently health practitioners who treat ear disease are not expected to tell families, nor are they themselves aware, of the kinds of communication and social difficulties that affected children will often experience. If families know of these potential difficulties (and in turn make sure that teachers also know) it can prevent some of the negative experiences affected children otherwise experience, such as regular admonishments or punishments because it is thought children are willfully ignoring spoken directions (see Fig. 3.2).

Adverse family dynamics arising from conductive hearing loss may be minimized if information on common communication problems that stem from conductive hearing loss is provided to families by health workers and audiologists when identifying ear disease in children.

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3 Another reason that much research to identify the outcomes of ear disease was flawed in advantaged communities was that longitudinal studies regularly examined children for ear disease and/or hearing loss. This informed researchers and parents when children had ear disease and hearing loss. This meant the research itself was an intervention that acted to limit the very adverse psychosocial outcomes being examined.
Fig. 3.2 Family relationships

Children are likely to be seen as willfully ignoring carers when they have an unidentified hearing loss.

Carers may reprimand or punish children for being defiant or disobedient.

Families can be helped to understand that children often can’t hear. They can be shown how they can communicate more effectively with children and improve family relationships.

When ear disease is identified by health workers, it is an opportunity to intervene to prevent such responses which distress children and damage family relationships.
Population Health and Well-Being

Population health interventions (such as better sewage management) have helped to prevent diseases that would otherwise require extensive and costly individual treatment. Where ear disease is concerned, population health approaches would largely involve expensive interventions, such as improvements in housing conditions. These have been hard to achieve in an affluent developed nation like Australia. In developing countries, limited resources make this type of intervention even more difficult. Also, individual interventions such as the provision of hearing aids are often not viable in developing nations. Even for those with severe levels of hearing loss, needed audiological resources are commonly not available (McPherson 2014). In any case they are also not an appropriate option for most individuals with mild to moderate hearing loss.

There is much that could be done, however, on a ‘population’ level to address the communication, educational and wellbeing issues related to conductive hearing loss. Population-based communication and education strategies would involve such things as more targeted training of teachers and health workers and providing families with relevant information. These are approaches that do not depend on expensive, resource intensive programs that present challenges for developing nations (McPherson 2014). Using existing educational and health resources in more diverse ways is a more viable initial solution in developing nations to address the effects of widespread childhood ear disease and resultant hearing loss. They are also solutions still needing to be adequately implemented for Indigenous people in Australia.

References

Australian Medical Association. (2017). AMA report card on Indigenous health—a national strategic approach to ending chronic otitis media and its life-long impacts in Indigenous communities. Retrieved December 05, 2017, from https://ama.com.au/article/2017-ama-report-card-indigenous-health-national-strategic-approaching-chronic-otitis.

Burns, J., & Thomson, N. (2013). Review of ear health and hearing among Indigenous Australians. Perth, WA: Australian Indigenous Health InfoNet, Edith Cowan University. Retrieved December 05, 2017, from https://healthinfonet.ecu.edu.au/.

Burrow, S., Galloway, A., & Weissofner, N. (2009). Review of educational and other approaches to hearing loss among indigenous people. Retrieved December 05, 2017, from https://www.healthinfonet.ecu.edu.au/other-health-conditions/ear/reviews/our-review-education.

Couzos, S., Lea, T., Mueller, R., Murray, R., & Culbong, M. (2003). NACCHO ear trial and school attendance project. Deakin, ACT: National Aboriginal Community Controlled Health Organisation.

4Sound field systems that amplify a teachers voice to all students in a classroom are appropriate and effective with children with mild to moderate hearing loss, but are expensive. FM systems that amplify the teachers voice to individual students are also commonly used with children with auditory processing problems—but these too are an expensive option. See McPherson 2014 for an outline of amplification challenges in developing countries.
Laugen, N. J., Jacobsen, K. H., Rieffe, C., & Wichstrøm, L. (2016). Predictors of psychosocial outcomes in hard-of-hearing preschool children. *Journal of Deaf Studies and Deaf Education, 21*(3), 259–267.

Lowell, A. (1993). Otitis media and Australian Aboriginal children: The influence of conductive hearing loss in the classroom. *Ngoonjook: A Journal of Australian Indigenous Issues, 8*, 21–32.

Lowell, A. (1994). Communication and learning in an Aboriginal school: The influence of conductive hearing loss. Unpublished Ph.D. thesis, University of Sydney, Sydney, NSW.

Malin, M. (1994). Why is life so hard for aboriginal students in urban classrooms? *The Australian Journal of Indigenous Education, 22*(2), 141–154. https://doi.org/10.1017/S0310582200006362

McPherson, D. B. (1995). Identification of hearing loss in urban Indigenous school children. Unpublished Ph.D. Thesis, University of Queensland, Brisbane, QLD.

McPherson, B. (2014). Hearing assistive technologies in developing countries: background, achievements and challenges. *Disability and Rehabilitation: Assistive Technology, 9*(5), 360–364.

Morris, P. S. (1998). A systematic review of clinical research addressing the prevalence, aetiology, diagnosis, prognosis and therapy of otitis media in Australian Aboriginal children. *Journal of Paediatrics and Child Health, 34*(6), 487–497.

New South Wales Health Department. (1996). Guidelines on the prevention and control of otitis media and its sequelae in Aboriginal children. *Medical Journal of Australia, 164*(Supplement), S1–S17.

Nienhuys, T., & Burnip, L. (1988). Conductive hearing loss and the Aboriginal child at school. *Australian Teacher of the Deaf, 29*, 4–17.

Preston, G. (1994). Hearing health needs for aboriginal and Torres Strait Islander people. *Australian Family Physician, 23*(1), 51–53.

Su, J.-Y., Guthridge, S. L., He, V. Y. F., Howard, D., & Leach, A. (in press). The impact of hearing impairment on school readiness for aboriginal children—A data linkage study. Journal?

Vanderpoll, T., & Howard, D. (2012). Massive prevalence of hearing loss among aboriginal inmates in the Northern Territory. *Indigenous Law Bulletin, 7*(28), 3–11.

Walker, L. (1989). TVEI: All change or small change. In N. Jones (Ed.), *School management and pupil behavior* (pp. 171-186). Lewes, ES: Falmer Press.

Walker, N., & Wigglesworth, G. (2001). The effect of conductive hearing loss on phonological awareness, reading and spelling of urban aboriginal students. *Australian and New Zealand Journal of Audiology, 23*(1), 37–51.

Wallace, I. F., & Hooper, S. R. (1997). Otitis media and its impact on cognitive, academic and behavioral outcomes. In J. E. Roberts, I. F. Wallace, F. W. Henderson (Eds.), *Otitis media in young children: Medical, developmental and educational considerations* (pp. 93–108). Baltimore, MD: Paul Brookes Publishing Company.

World Health Organization. (2017). *Preferred profile for hearing-aid technology suitable for low- and middle-income countries*. Geneva, Switz: Author.

Zubrick, S. R., Silburn, S. R., De Maio, J. A., Shepherd, C., Griffin, J. A., Dalby, R. B., et al. (2006). The Western Australian aboriginal child health survey. In *Improving the educational experiences of Aboriginal children and young people* (Vol. 3). Perth, WA: Curtin University of Technology and Telethon Institute for Child Health Research.