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CHRONIC SUPPURATIVE OTITIS MEDIA: A DISEASE STILL WAITING FOR SOLUTIONS

Jose M Acuin MD MSc
Professor in Otolaryngology
De La Salle University
Health Sciences Institute
Dasmarinas Cavite
Philippines

Few preventable causes of hearing loss defy understanding and treatment as much as chronic suppurative otitis media (CSOM). Recurrent discharge from the middle ear through a persistent perforation of the eardrum is the hallmark of this disease. It is virtually non-existent in the developed world. However, it still afflicts children and adults in many developing countries in Africa, Asia, Latin America and in India. Some ethnic sub-populations, probably through shared genetic and environmental risk factors, have been particularly prone to develop this disease. The most

well - documented examples are ethnic minorities in developed countries, such as the Australian Aborigines and the Alaskan Inuits.

Development of CSOM

How does CSOM develop? There may have been an acute episode of disease during which the eardrum perforates, such as acute otitis media (AOM). However, AOM is widely known to be a self-limiting infection: the ear discharge subsides and the perforated eardrum heals, usually with no permanent sequelae (conditions resulting from the disease). Patients with CSOM, however, turn up in clinics and community-based surveys. Often the disease is identified only incidentally, as



A health worker mops the ear canal of a child with chronic suppurative otitis media in Madagascar

Photo: Andrew Smith

people may have learned to live with the condition, tolerated its discomforts and turned their attention to other illnesses perceived to be worse. Among children with frequent illnesses, such as tonsillitis or pneumonia, parents would tolerate the episodes of ear discharge as a natural accompaniment of the disease. Both children and adults may present with eardrum perforations of varying sizes and hearing difficulties of varying degrees. The majority of adults and parents of children would only vaguely recall the onset of the disease. It is not clear, therefore, if CSOM is part of the



Chronic suppurative otitis media in an African child

Photo: Piet van Hasselt

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otitis media disease continuum or if it is, from its onset, different from AOM with its own prognosis and sequelae. What is clear, however, is that once ear infection has established itself in the middle ear mucosa, it is very hard to remove and patients with CSOM may have to live with the disease for the rest of their lives.

CSOM: Active and Inactive Cholesteatoma

Because the effects of CSOM range widely from mild to lethal, the detection and management of the disease can be difficult. CSOM can present as *active* inflammation of the middle ear and mastoid mucosa manifested primarily by recurrent ear discharge and hearing loss.

Indeed, CSOM is a frequent cause of preventable hearing loss in developing countries. CSOM can also present as *inactive* disease in which ear discharge has already been absent for years but the eardrum perforation and the consequent hearing loss has remained as evidence of previously active disease. The third form also presents as active disease but is accompanied by potentially lethal complications such as intracranial infections, soft tissue abscesses, and facial nerve paralysis. This serious form of active disease is associated with the presence of squamous epithelium (skin) and / or granulation tissues invading the soft and bony tissues of the middle ear and mastoid cavities. A special term for this destructive form of squamous epithelium is *cholesteatoma*.*

Its invasive nature brings the inflammation into direct contact with the nerves, blood vessels, organs and parts of the brain that lie adjacent to the middle ear and mastoid.

In a small proportion of CSOM patients, the perforation completely heals and the ear discharge disappears without any form of surgery, although hearing loss may linger due to eardrum scarring, injury to the middle ear ossicles or inner ear involvement. The factors that are responsible for healing of CSOM are unknown.

CSOM: Surveys

The goals of managing CSOM are early detection and timely, appropriate intervention. Routine otoscopic examinations during clinic visits and regular community-based surveys that target specific

populations at high risk for CSOM are needed to determine the prevalence of the disease and the need for treatment. School-based prevalence estimates of CSOM range from 0.3% to 14%. Population-based surveys yield estimates ranging from 0.2% to 10.6%.¹ According to experts, when the prevalence of CSOM is 3% or higher, it must be targeted as a high priority disease.²

CSOM: Surgical Interventions and Antibiotics

Interventions for CSOM aim at eradicating the disease permanently and, if this is not possible, reducing its effects - ear discharge and hearing loss.

In terms of surgical indications, all patients with destructive cholesteatoma or granulation tissues must undergo radical surgery and some form of hearing reconstruction, if possible. Mastoidectomy with or without tympanoplasty is the currently available procedure. This form of surgery is done under local or general anaesthesia, takes about 1 to 3 hours and is primarily intended to completely remove infected tissues. It requires a trained ENT specialist, an operating microscope and fine ear instruments. Depending on the extent of middle ear reconstruction, post-surgical patients may have to be followed-up regularly for prolonged periods. Those who have undergone radical mastoidectomy without any form of reconstruction would have a sizable surgical cavity to take care of for the rest of their lives. Even those who have achieved closure of their eardrum perforations would also need specialised follow-up care since some post-surgical sequelae, such as recurrence of inflammation or cholesteatoma, may require surgical revision.

Mastoidectomy with or without tympanoplasty is also indicated for CSOM patients with active inflammation but without cholesteatoma or granulation tissues. The type of surgical reconstruction needed to restore hearing varies - depending on:

- The amount of eardrum and middle ear ossicles left
- The probability of complete eradication of infection
- Anatomical factors
- Patient preferences.

However, many patients may not have access to or may not desire the procedure. This is particularly common in developing countries where curative health care is mainly financed from personal money. The aims of treatment are still the same. Medical treatment provides topical (usually) and systemic (sometimes) antibiotic coverage, with the purpose of controlling the infection and, hopefully, allowing the body's immune defenses to stop and reverse disease progression. Topical quinolone antibiotics and even topical antiseptics, given for about two to four weeks, have been shown to be effective in reducing ear discharge for the short term.³ Intensive systemic antibiotics may be even more effective but require confinement and higher costs of treatment. The long term effectiveness of both topical and systemic treatments, particularly on prolonged or repeated usage, has not been supported by good evidence. Of course, middle ear discharge and any retained debris must be adequately removed before instillation of any topical treatment. The methods for cleaning the ear vary from ear wicking to suctioning under microscopic control, but what is important is always determining, through otoscopic visualisation, that the topical antimicrobial can gain entry into the middle ear through the perforation.⁴ In addition, patients are advised to avoid getting dirt in the middle ear and to have any upper respiratory inflammatory disease adequately treated. Children who are especially prone to these may have to receive influenza and pneumococcal vaccines.

CSOM and Developing Countries

While adequate antibiotic treatment and timely surgery may cure CSOM, decreasing the burden of disease ultimately requires addressing the factors that are responsible for its onset. The concentration of CSOM in developing countries and marginalised sub-populations have led researchers to infer that poor living conditions, malnutrition, sub-standard hygiene, frequent upper respiratory infections and under-resourced health care may be risk factors for this disease. However, there is limited evidence that improving these conditions would significantly reduce the burden of disease from CSOM.⁵ Although it has been claimed that the dramatic reduction in mortality

**Cholesteatoma - A benign condition involving an expanding mass of cholesterol crystals and keratinised skin in the middle ear space - of unknown cause*

from AOM in previous decades could be traced to the discovery of antibiotics and the development of surgical technologies,⁶ the same might not necessarily be true for CSOM. In any case, concurrent socioeconomic improvements can act as confounding factors when assessing reductions in CSOM prevalence among high risk groups.

CSOM and Hearing Loss

Lowering the burden of hearing loss from CSOM is another worthwhile goal, even as we try to prevent CSOM. While middle ear reconstruction may be advised for any CSOM patient with persistent perforation, hearing amplification through hearing aids is also a valid alternative for those who desire some hearing rehabilitation. The very high costs of hearing aids, however, and the stream of costs to which patients with hearing aids are liable, may still make surgical reconstruction a cost-effective option, despite variable success rates and the risks of anaesthesia.

CSOM: Responsibilities in Health Care

CSOM, like any chronic disease, can limit one's employability and quality of life. People with CSOM are particularly disadvantaged because living in developing countries may expose them to scarcity of work, poor living conditions and limited health care. When health care delivery fails to target high risk groups by providing access to effective treatments, then infections like CSOM can persist. Improving equal access to good health care and ensuring that health programmes respond appropriately to real health needs are critical to ultimately ridding the world of this disease.

References

1. Chronic suppurative otitis media: Burden of disease and management options. World Health Organization: Geneva, Switzerland, 2004.
2. World Health Organization. Prevention of hearing impairment from chronic

otitis media. Report of a WHO/CIBA Foundation Workshop. Geneva, 1998.

3. Topical antibiotics without steroids for chronically discharging ears with underlying eardrum perforations. Macfadyen CA, Acuin JM, Gamble C. *In The Cochrane Library*, Issue 4, 2005. Chichester, UK: John Wiley & Sons, Ltd.
4. Chronic suppurative otitis media. Acuin J. *In Clinical Evidence*. BMJ Publishing Group, 2006.
5. New Zealand Health Technology Assessment Clearing House. Screening programmes for the detection of otitis media with effusion and conductive hearing loss in pre-school and new entrant school children: a critical appraisal of the literature (NZHTA REPORT 3). Christchurch, New Zealand, June 1998. <http://nzhta.chmeds.ac.nz/screen.htm> (last accessed 21 July 2003).
6. Otitis media in developing countries. Berman S. *Pediatrics*. 1995; **96**:126-131.

CSOM

CHRONIC SUPPURATIVE OTITIS MEDIA

Piet van Hasselt MD PhD

Ear Nose Throat Surgeon
Prof. Rogierstraat 10
6524NL Nijmegen
The Netherlands

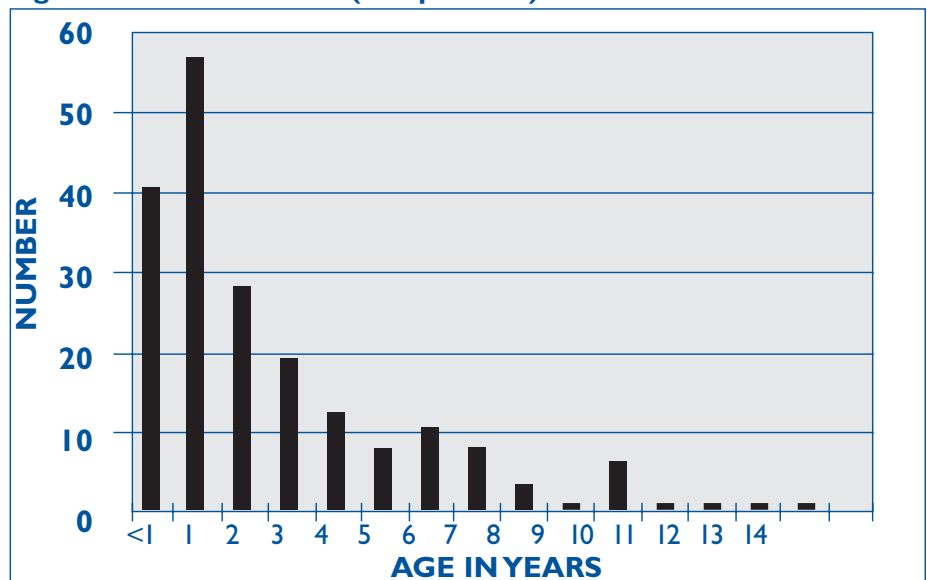
E-mail: pvhasselt@gmail.com

Chronic Suppurative Otitis Media (CSOM) is a bacterial infection of the middle ear, with a continuous or intermittent discharge of pus that is running through a hole (perforation) in the eardrum, into the ear canal. Chronic means that the discharge has been going on for at least two weeks. This duration of two weeks makes CSOM distinct from Acute Otitis Media (AOM), where the discharge (if any) is shorter lived. After two weeks, other strains of bacteria play a role in the ongoing infection. This makes treatment of CSOM different from the treatment of AOM.

Causes

In most instances, CSOM is preceded by an AOM that didn't heal and has left an eardrum perforation, with a runny ear. Less often, CSOM is caused by a non-healed, traumatic (accidental) perfora-

Age Distribution CSOM (353 patients)



Dr P van Hasselt, Ear Clinic, Ramotswa, 1995-1996

tion where the middle ear has become infected by dirty water getting into the ear, by a cholesteatoma* (see definition) or by infections, such as measles, scarlet fever or tuberculosis. Bacteria causing AOM are most commonly upper respiratory tract bacteria - *Streptococcus pneumoniae*, *Moraxella catarrhalis* and *Haemophilus influenzae*, and, less frequently, *Staphylococcus aureus* and others. In CSOM, these bacteria are

being 'overgrown' by so-called outside invaders that enter the middle ear via the ear canal, including *Pseudomonas aeruginosa* (from contaminated water or skin), *Staphylococcus aureus* (from the skin) and *E. coli* and *Proteus species* (from faeces via hands, face and dirty clothing).

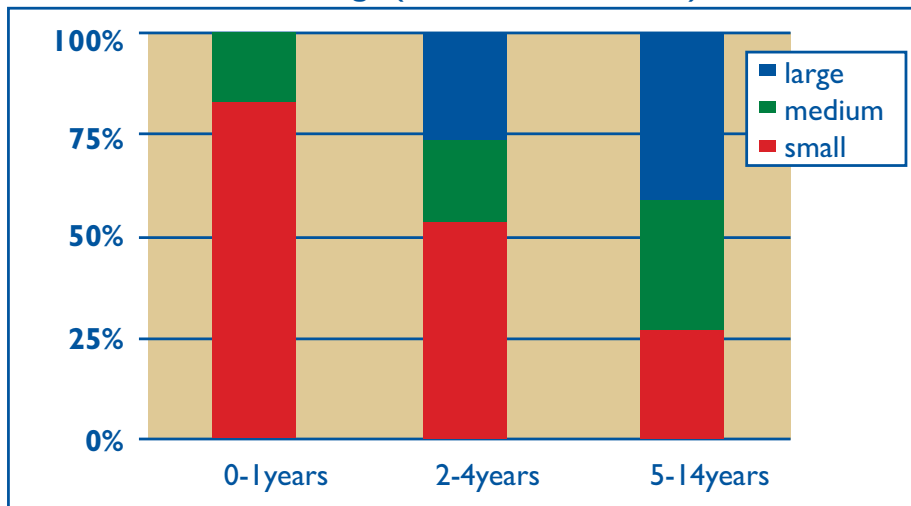
Prevalence

CSOM most often starts in the first two years of life after AOM. CSOM is

*Cholesteatoma -See definition on page 18

CSOM: Chronic Suppurative Otitis Media

Perforation Size versus Age (362 ears with CSOM)



Dr P van Hasselt, Malawi, 1998

the most common cause of mild and moderate hearing impairment in children in developing countries (around 1-4% prevalence, although there are some exceptional areas where the prevalence runs into tens of percents). In some cases, however, CSOM may lead to severe hearing impairment and even deafness. In about half the cases, CSOM is one-sided. Over the years, eardrum perforations get larger, but the ears also tend to dry up. Therefore, in children one sees more wet perforations and in adults more dry perforations.

Signs and Symptoms

- Mucopurulent, sometimes malodorous (unpleasant, bad smell) ear discharge for at least two weeks
- Absence of earache or fever, unless there is an acute exacerbation with deep earache (danger sign of intracranial complication!)
- Eardrum perforation
- Thickened middle ear mucosa, often with granulations
- Combined conductive and sensorineural hearing loss.

Diagnosis

The best way to make a proper diagnosis is with the help of an otoscope. To see the perforation clearly, it is often necessary to clean out the ear canal first, with mopping or suction under good vision. This way, other causes of ear discharge can be excluded, like a foreign body in the ear canal, otitis externa or eczema. Without the otoscope one still can make a tentative diagnosis. If the pus is mucoid, then it certainly comes from the middle

ear, as the ear canal doesn't contain mucoid glands. Also, when the discharge is profuse it most certainly arises from the middle ear. External Otitis causes a scanty discharge. Fungal External Otitis can be easily recognised.

Treatment

The aim of treatment is to get the discharging ears dry, to stop further deterioration of the hearing and to prevent complications. In selected cases, repair of the ear drum and middle ear ossicles can be done and the hearing restored. The current treatment of CSOM consists of ear cleaning and instillation of antibiotic ear drops. Antiseptics are not very effective. The antibiotics of choice nowadays are quinolones, e.g., ciprofloxacin and ofloxacin, which are available as eye/ear drops. These antibiotics are not ototoxic, contrary to older ototopicals such as neomycin, polymyxin B, gentamicin and

soframycin, which should be avoided. Antibiotic eardrops are effective, because a vastly higher concentration of antibiotic can be delivered to the middle ear compared to oral antibiotics. For instance, the middle ear concentration of the usual 0.3 % quinolone eardrops is 3000mcg/ml, whereas, for a high dose amoxicillin 90mg/kg, this would be only 6-10 mcg/ml. For the same reason, topical quinolones are more effective than intravenous quinolones.

Treatment regimen:

- Dry-mopping/wicking or suction before instillation of the ear drops
- Instill antibiotic ear drops, as prescribed, three times daily, 3-4 drops for two weeks
- Oral antibiotics are not so effective and should not be given
- Refer to ear nurse or ear specialist, if the ear is not dry after two weeks
- Refer to the ear specialist in case of pain (a danger sign of intra-cranial complications)
- Advise the patient to avoid water entering into the ear.

Complications of Otitis Media

Acute and chronic otitis media can give rise to serious and even fatal complications. The infection can spread from the **middle ear** to the **mastoid**, the **facial nerve**, the **labyrinth**, the **lateral sinus**, the **meninges** and the **brain**, causing:

- **Mastoid abscess**
- **Facial nerve paralysis**



Ear Clinic in Morondava, Madagascar. A whole family with CSOM

Photo: Piet van Hasselt

- Deafness and vertigo
- Lateral sinus thrombosis
- Meningitis
- Subdural or epidural abscess
- Brain abscess

Warning signs of impending intracranial complications are a malodorous ear discharge, earache in the setting of a chronic ear disease, fever and headache.

If the following is present – refer!

- Painful swelling behind the ear
- Increased fever
- Headache
- Neck stiffness
- Sudden deafness
- Vertigo
- Facial nerve paralysis
- Ataxia
- Disturbance of consciousness.

REFER IMMEDIATELY to the hospital! Especially, brain abscesses which have a high rate of mortality.

Prevention of CSOM

AOM will resolve spontaneously without treatment in the majority of cases, but too often a neglected AOM will lead to a CSOM. We want to prevent the rupturing of a bulging ear drum due to the pressure of pus in the middle ear. This may result in a chronic ear discharge and increasing damage to the ear drum and middle ear, with subsequent hearing impairment.

CSOM is one example of an ear condition that can very well be prevented at the Primary Health Care level. In many other instances, serious ear diseases, complications and deafness can be prevented by adequate Primary Ear Care. Prevention of Deafness and Hearing Impairment programmes will have the greatest impact at the Primary Health Care level. Patients need to have rapid access to Primary Health Care with skilled community health workers, nurses and doctors. Treating patients successfully for AOM, to prevent CSOM, does have a greater impact on the health of a population than waiting until an

operation is required to repair perforated eardrums.

The reality is that in developing countries, ear and hearing problems have a low priority and are often neglected, not only because of insufficient manpower, facilities and medicines, but also because of insufficient knowledge and skills. To overcome this deficiency, training of Primary Health Care cadres is absolutely required. The WHO Primary Ear and Hearing Care Training Resource is a great help. The Resource is available in English. Official WHO translations into Spanish, Portuguese, French and Chinese are on their way.

Further Reading

1. Treatment of chronic suppurative otitis media with ofloxacin in hydroxypropyl methylcellulose eardrops: a clinical/bacteriological study in a rural area of Malawi. Van Hasselt P, Van Kregten E. *International Journal of Pediatric Otorhinolaryngology* 2002; **63**: 49-56.

PDF download from <http://www.earhealth4all.org>

2. Otolology in Botswana and Malawi. Van Hasselt P. *ENT News* 2003; **12**: 46-48.



Training in Primary Ear and Hearing Care in Lusaka, Zambia
Photo: Piet van Hasselt

PDF download from <http://www.earhealth4all.org>

3. Otological antibiotics. Billings KR. *eMedicine* 2006.

Download from <http://www.emedicine.com/ent/topic362.htm>

4. Training for Primary and Advanced Ear and Hearing Care. Van Hasselt P. *Community Ear and Hearing Health* 2004; **1**: 8-9.

PDF download from <http://www.earhealth4all.org> and from <http://www.ictesworldcare.com>

5. Primary Ear and Hearing Care Training Resource. Advanced Level. WHO 2006. Information at: http://www.who.int/pbd/deafness/activities/hearing_care/en/index.html



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Contact: Dr Murray McGavin
ICTHES World Care, PO BOX 4101
Glasgow G53 9AF Scotland, UK

Tel: +44 (0)141 332 1707

E-mail: info@ictesworldcare.com

Please state: Name, Full Postal Address, E-mail Address & Occupation



PREVENTION AND MANAGEMENT OF CHRONIC SUPPURATIVE OTITIS MEDIA IN ABORIGINAL CHILDREN: A PRACTICAL APPROACH

Peter S Morris FRACP PhD

Head, Ear Health and Education Unit
Menzies School of Health Research
PO Box 41096
Casuarina, NT, Australia 0811

E-mail: peterm@menzies.edu.au

Also:

Institute of Advanced Studies
Charles Darwin University, Australia
Northern Territory Clinical School
Flinders University, Darwin, Australia

Amanda J Leach MAgSc PhD

Ear Health and Education Unit
Menzies School of Health Research
PO Box 41096
Casuarina, NT, Australia 0811

Also:

Institute of Advanced Studies
Charles Darwin University, Australia

The Enormous Burden of Disease

Indigenous Australians (Aborigines and Torres Strait Islanders) make up 2% of the total Australian population. Compared to non-Indigenous Australians, they are much more likely to live in rural and remote areas, have a low family income, live in a crowded household, have reduced access to health services, and experience limited educational and employment opportunities. Many living in remote areas will speak English as a second language. Bacterial infections are relatively common (especially in children).

Nearly all Australian children will experience some ear infections (otitis media) early in their life. Suppurative ear infections associated with tympanic membrane perforation are now rare in Australian non-Aboriginal children. Unfortunately, this is not the case in Australian Aboriginal children. Chronic suppurative otitis media (CSOM) is one of the most important health problems facing Indigenous children (especially those living in rural and remote communities). In the Australian evidence-based guidelines, which address the clinical management of otitis media in Aboriginal and Torres Strait Islander Populations, CSOM is defined as, 'persist-

ent discharge through a tympanic membrane perforation for greater than 6 weeks, despite appropriate treatment for acute otitis media with perforation (AOMwiP).¹ In a large survey of over 700 children, aged 6 to 30 months (living in 29 communities in Central and Northern Australia), 15% already had CSOM. Another 2% had dry perforations, 7% had AOMwiP and 26% had acute otitis media without perforation (AOMwoP).² In a recent review of visiting paediatric services to Northern Queensland, CSOM was the most important reason for referral to a paediatrician (accounting for 24% of 3562 referrals).³

Episodes of AOMwiP that do not receive appropriate antibiotic treatment are likely to progress to CSOM. Once established, CSOM is an extremely difficult condition to manage. Medical treatment generally needs to be continued for many weeks. Even when the perforation is dry, children are at risk of further episodes of discharge until the tympanic membrane has healed.

The hearing loss associated with CSOM is nearly always significant. For most children, this means that voices, at a conversational level, sound like whispers. In the more severely affected children, voices at a conversational level will not be heard at all. The hearing loss associated with CSOM tends to be more severe than that associated with other types of otitis media. Therefore, young children with this condition will nearly always need additional audiological and educational support.

Preventing the Onset of CSOM

Most young Aboriginal children from remote communities will have persistent ear disease starting in the first months of life. Unless ear discharge is present, the diagnosis is often difficult. Young children (less than two years old) with new



A young Aboriginal boy with chronic suppurative otitis media

Photo: Ear Health and Education Unit, MSHR

ear discharge (AOM with perforation) should be the highest priority for antibiotic treatment and weekly follow-up.

The bacteria that most commonly cause AOM (*Streptococcus pneumoniae*, *Haemophilus influenzae*) are very effectively spread by children with chronic, nasal discharge. In these Aboriginal children, these bacteria are also carried on the skin of the hands. Reducing exposure and susceptibility to these pathogens will reduce the frequency of AOM, the risk of perforation, and, thus, ultimately lead to lower rates of CSOM. Therefore, preventive strategies should include:

- Education and support for additional hygiene interventions
- Efficient immunisation programmes (including the new 7 valent conjugate pneumococcal vaccine)
- Early identification and appropriate antibiotic treatment for AOMwoP and AOMwiP.

In Australian Aboriginal children, acute otitis media without perforation (AOMwoP) most commonly occurs in the first two years of life. It is best identified by the presence of a bulging tympanic membrane and is often asymptomatic. The more severe infections are associated with the development of a pinhole perforation. In the early stages, this perforation heals and re-perforates. This is the time when the benefits of aggressive antibiotic treatment with amoxicillin or cotrimoxazole

Chronic Suppurative Otitis Media: A Practical Approach

are likely to be greatest.⁴ Often higher doses and more prolonged courses of treatment are needed. Topical antibiotics such as ciprofloxacin or (if unavailable) gramicidin-framycetin-dexamethasone (Sofradex) are recommended if the perforation and discharge persists. A diagnosis of CSOM should be reserved for those children who have discharging perforation(s) for at least 6 weeks plus a perforation size of at least 2% of the tympanic membrane. Antibiotic treatment and weekly follow-up should continue until the signs of AOM (bulging of the tympanic membrane or recent discharge) have resolved.

Effective Management of CSOM

The current algorithm* for the management of CSOM in Australian Aboriginal children is shown in Figure 1. The assessment of children with discharging ears can be difficult. In young children, visualisation of the perforation (or recently healed perforation) requires removal of all discharge from the ear canal. This can be done by dry mopping (either under direct vision or with tissue spears) or syringing. Clinicians should resist the temptation of making a diagnosis of CSOM without identifying the site and size of the perforation.

CSOM is a bacterial infection that often involves several different pathogenic and opportunistic organisms. The most important of these is *Pseudomonas aeruginosa* which is relatively resistant to antibiotic treatment. In addition, the extensive tissue damage in the middle ear mucosa and mastoid bone are likely

to contribute to the need for prolonged or intensive treatment regimes. The principles of treatment are the same for all chronic suppurative diseases - remove the pus and deliver appropriate antibiotics to the site of infection. For topical antibiotics, this means ensuring the medication passes through the perforation into the middle ear space.

The largest, community-based intervention studies involving children have been conducted in Africa.⁵ In this region, around 1% of the population is affected by CSOM. These studies have shown that topical quinolones are more effective than topical antiseptics and that dry mopping followed by topical antibiotic drops is more effective than dry mopping alone. However, in one study, even the benefits of regular treatment with antibiotic drops were not evident until children had received at least 12-16 weeks treatment. More intensive hospital-based studies of daily debridement by an ENT surgeon plus intravenous antibiotics have documented that 2-3 weeks of therapy are required to treat this infection. The need for such intensive or prolonged treatment represents a major barrier to good outcomes in Aboriginal children. Furthermore, those who achieve dry ears after their initial treatment will be at risk of further episodes of discharge until their tympanic membrane perforation heals. A recent randomised trial in Australian Aboriginal children found that topical ciprofloxacin drops were more effective than topical Sofradex drops.⁶ This treatment has now been approved for use in Australian Aboriginal children.

more actively involved in their choice of medical treatment. Families should be informed of the likely benefits and harms of all medical interventions. Ideally, the following important information should be discussed:

1. Explain that the chronic discharge continues to damage the eardrum and cause hearing loss even if the child isn't sick.
2. Draw a picture of the hole to help the family follow whether the perforation is getting larger or smaller. Using pictures, models or videos of the ear may help people understand the treatments.
3. Many of the recommendations involve antibiotic treatment for long periods. Although this is the best treatment, it may not always be possible. Think about how likely the child is to complete a course of antibiotics.
4. Explain that topical antibiotic drops are the most important part of treatment, but that they will only work if you get the pus out first.
5. Make sure the parent knows how to make the tissue spears. If you have time, get them to show you how they clean the ears before applying the antibiotic drops. Good ear canal cleaning can help a child hear and learn, even if pus behind the eardrum builds up again.
6. Eardrops work best if 'pumped through to the middle ear'. Show the family how to press repeatedly (10 times) on the stiff tag in front of the ear opening (tragus).
7. Explain that referral to an ENT surgeon for eardrum repair (tympanoplasty) is most helpful in children with a hearing loss greater than 35dB (especially if they have a large perforation).
8. In follow-up of children with ear problems, emphasise that both the disease and the hearing loss must be managed. Give some examples showing how communication with children can be improved, even if they have a hearing loss.

Families should be encouraged to combine this information with their own personal preferences for health care. This is only feasible in clinics that are able to sustain primary health care services that

*Algorithm – A set of steps for solving a particular problem



John Martin checks the ears of a schoolgirl as part of a school-based ear health programme. The programme provided regular surveillance and treatment at the Primary in Nguuu (Tiwi Islands, Northern Australia)

Photo: Ear Health and Education Unit, MSHR

Given the intensity of treatment often needed, additional education for families about the importance of this condition and the need for close follow-up by health clinic staff is required.

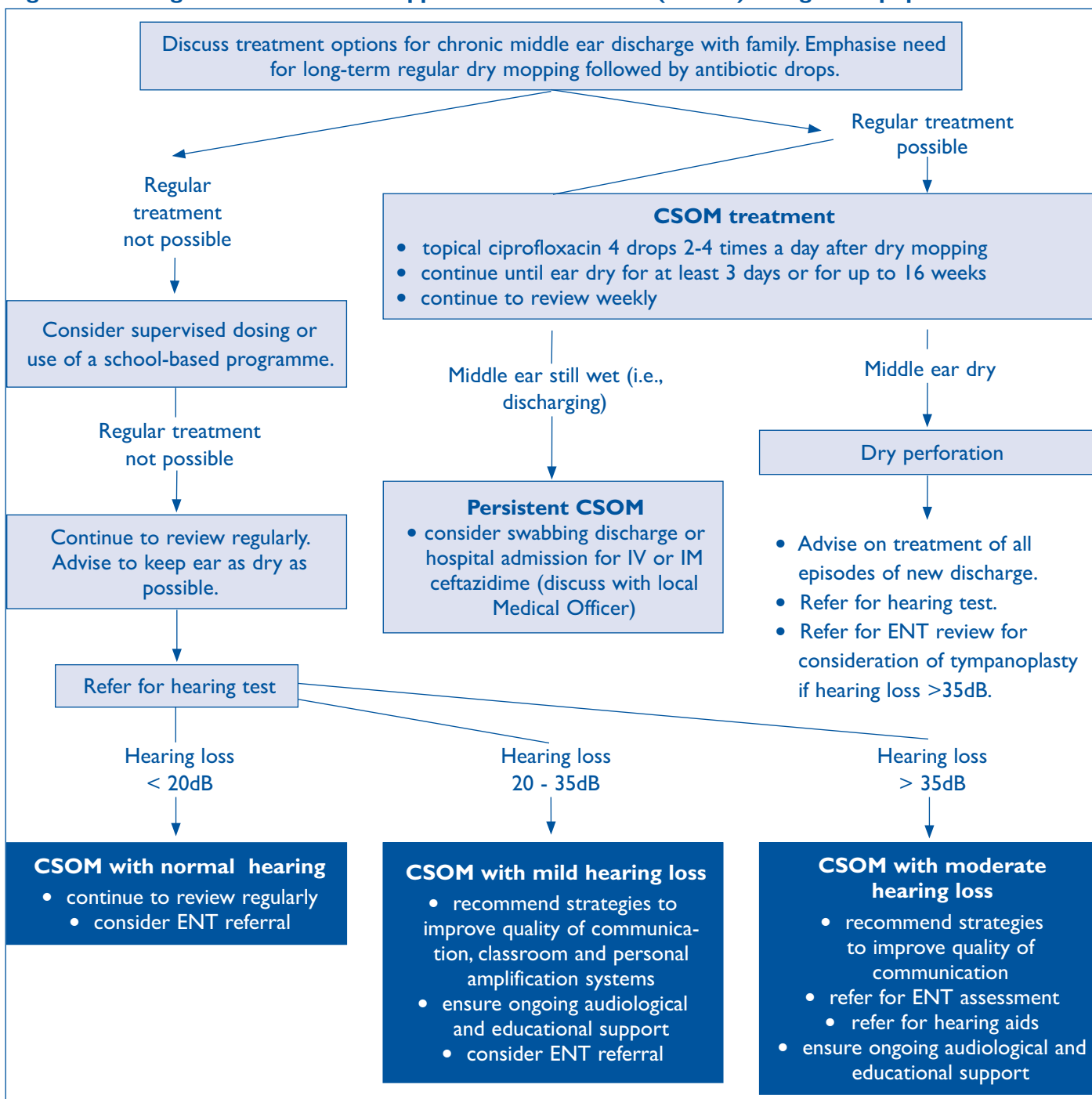
Sometimes treatment and follow-up can be improved by also working with the child care centre and schools (see photographs).

Working with Families

Recently, Aboriginal families have become

Chronic Suppurative Otitis Media: A Practical Approach

Figure 1: Management of Chronic Suppurative Otitis Media (CSOM) in high-risk populations



support effective communication and a patient-centred approach to chronic disease management.

How to Get More Information

The Australian Indigenous Health Info Net (www.healthinonet.edu.edu.au/) is an innovative web resource that makes knowledge and information on Indigenous health easily accessible to inform practice and policy. Recently, a site specifically devoted to providing relevant information to health staff and teachers concerning the management of otitis media and hearing loss has been developed.⁷ This is described

as a 'one-stop shop' for people working, studying or interested in otitis media (middle ear disease) and hearing loss in the Indigenous population. The site aims to provide health and education workers with quality information and resources about how to prevent and manage ear disease and hearing problems. Topics covered include:

- Reviews
- Guidelines
- Policies and strategies
- Publications
- Resources and equipment
- Programmes

- Projects and lessons
- Services and organisations.

Many of the freely available resources would be suitable to be adapted and used with other high-risk populations.

While improvements in primary health care services are urgently needed, CSOM is best regarded as a disease of poverty. In the long-term, a substantial investment in education and employment opportunities for Australian Aboriginal and Torres Strait Islander populations will be needed to address the vast inequalities in health outcomes.

References

1. Recommendations for Clinical Care Guidelines on the Management of Otitis Media in Aboriginal and Torres Strait Islander Populations. Morris P, Ballinger D, Leach A, Koops H, Hayhurst B, Stubbs L et al. Canberra: Office of Aboriginal and Torres Strait Islander Health, 2001.
2. Otitis media in young Aboriginal children from remote communities in Northern and Central Australia: a cross-sectional survey. Morris PS, Leach AJ, Silberberg P, Mellon G, Wilson C, Hamilton E et al. *BMC Pediatr.* 2005; **5**: 27.
3. Health of Aboriginal and Torres Strait Islander children in remote Far North Queensland: findings of the Paediatric Outreach Service. Rothstein J, Heazlewood R, Fraser M. *Med J Aust.* 2007; **186**: 519-521.
4. Antibiotics for the prevention of acute and chronic suppurative otitis media in children. Leach AJ, Morris PS. *Cochrane Database Syst Rev.* 2006; CD004401.
5. Chronic suppurative otitis media. Acuin J. *Clin Evid.* 2006; **15**: 772-787.
6. Effectiveness of ototopical antibiotics for chronic suppurative otitis media in Aboriginal children: a community-based, multicentre, double-blind randomised controlled trial. Couzos S, Lea T, Mueller R, Murray R, Culbong M. *Med J Aust.* 2003; **179**:185-190.
7. The Australian Indigenous Ear *InfoNet* (accessed at www.healthinfonet.ecu.edu.au/ on 29th October 2007). School of Indigenous Australian Studies at Edith Cowan University, 2007. □

Childhood Hearing Impairment

PROMOTING A GLOBAL HEALTH AGENDA FOR PERMANENT CHILDHOOD HEARING IMPAIRMENT

Bolajoko O Olusanya
MBBS FMCPaed FRCPCH

*Unit of Audiological Medicine
Institute of Child Health
University College London
London WC1N 1EH
United Kingdom*

*Institute of Child Health and Primary
Care
College of Medicine
University of Lagos
Lagos
Nigeria*

E-mail: b.olusanya@ich.ucl.ac.uk

Valerie E Newton MD FRCPCH

*Emeritus Professor of Audiological
Medicine
University of Manchester
Manchester
M13 9PL
United Kingdom*

As we celebrate the 30th anniversary of the Alma Ata Declaration this year, there is little doubt that the goal of 'Health for All' is yet to be realised for the vast majority of the populations in the developing world.¹ Fatal conditions such as HIV/AIDS, tuberculosis, measles, malaria and poliomyelitis still remain dominant in the global health agenda for the attainment of the Millennium Development Goals (MDGs).² Mortality rates associated with these conditions have declined in the last decade and this trend is likely to continue for the foreseeable future, at the current record levels of funding by major donor agencies. Unfortunately, life-long

morbidity and disability associated with the attack and treatment of some of these fatal diseases still remain largely neglected, even though there is a growing interest in the prevention of non-communicable and chronic diseases.^{3,4}

For instance, WHO global estimate for disabling hearing impairment (of a degree of severity >40 dBHL) has more than doubled from 120 million people in 1995 to at least 278 million in 2005.⁵⁻⁷ For mild hearing impairment, the figure is 364 million, while a total of 642 million is estimated to have some level of hearing impairment and 80% of them live in low and middle income countries.⁷ About two to four babies per 1,000 live births are born annually in developed countries with permanent or sensorineural hearing impairment. This range may extend to six per 1,000 live births within the neonatal period in developing countries.⁵

Without objective routine screening, detection often occurs as late as 5 years, with significant adverse impact on cognitive and psychosocial development, when speech and language defects become evident. At school-age, permanent hearing impairment substantially undermines educational achievement and limits vocational attainment. Affected children are often neglected and also suffer substantial social stigma, physical, emotional and sexual abuse well into adulthood.⁸⁻⁹ Such adverse childhood experiences cause significant short and long-term medical and psychosocial problems, at great costs to the individual, the family and the society - particu-

larly against the backdrop of an average life expectancy of 65 years in developing countries.¹⁰

Permanent childhood hearing impairment is aetiologically heterogeneous and attributable to genetic and environmental causes. Primary prevention through immunisation, health education, and improved maternal and child health services is useful for addressing environmental causes of childhood hearing impairment. But such prevention services have limited effectiveness for hearing impairment attributable to genetic, hereditary and idiopathic aetiologies, thus making early detection through infant hearing screening a vital and complementary secondary prevention strategy. Although prioritisation remains an essential process, optimal time-bound interventions for non-fatal but disabling conditions, such as childhood hearing impairment, deserve urgent attention.

Current Disease Control Priorities for Developing Countries

Prioritising health care needs is a daunting task for many developing countries coping with competing health needs, in the face of limited and diminishing resources. For these countries, achieving the Millennium Development Goals is virtually impossible without the help of the World Bank, WHO, UNICEF and other developmental partners. Hence, these countries often exclusively focus on projects that are consistent with or prescribed by the major donor institutions. For instance, the Disease Control Priorities project of the World Bank

grouped health conditions under their relative 'burden', cost-effectiveness of interventions for international resource mobilisation to the developing world, and towards the attainment of the MDGs.¹¹ The Global Burden of Disease (GBD) report, a related publication, ranked communicable and non-communicable diseases and injuries according to their associated mortality and disability-adjusted life years (DALYs).¹²

The concept of the 'burden of disease' was introduced to rectify the disparity associated with the exclusive use of mortality as the summary measure of population health. The burden of disease, indexed by disability-adjusted life years (DALYs), was, therefore, intended to measure the state of health from the state of complete health to mortality. However, the ranking of diseases based only on the burden of disease and cost effectiveness of intervention - to establish their relative priorities for resource mobilisation in the developing world till 2015, and more recently till 2030,¹³ has been the subject of debate.¹⁴⁻¹⁶

This approach has been faulted on the grounds of significant distortion, omission or outright neglect of important conditions, some of which are supported by resolutions of the World Health Assembly (WHA). For instance, WHA resolution 48.9 of 1995 urged action plans in the early detection and management of permanent hearing impairment in infants, babies and toddlers, yet this condition is not reflected in any global health agenda.¹⁷ Such omissions not only under-represent the global burden of many developmental health-related conditions, but also foreclose the determination of possible cost-effective interventions. Thus, meaningful prospects for addressing these conditions before the 2015 target of the millennium development project are diminished.

For example, the ranking of childhood diseases alongside adult diseases in the GBD report portrays children as 'young adults' and distracts from diseases and conditions that have significant impacts on optimal early childhood development. Hearing loss of childhood-onset, though not a leading cause of mortality, also causes substantial life-long morbidity. Yet, data on years-of-life lived with disability (YLDs) and DALYs are not available for hearing loss of childhood-onset. The Global Burden of Disease database

addresses only hearing impairment of adult onset, while treating childhood-onset hearing impairment as sequelae of other diseases. A significant number of diseases and health conditions associated with early childhood hearing impairment, such as meningitis, neonatal jaundice and sepsis were also not considered in the report. A recent initiative to address current flaws in the GBD report is, therefore, a welcome development, although it is still uncertain if the previous work on adult-onset hearing impairment will be expanded to include hearing impairment of childhood onset.¹⁸

DALYs are difficult to compute where there is a scarcity of sound epidemiological data on the morbidity pattern of diseases, especially in developing countries. Hence, without information on DALYs, cost-effectiveness of available effective interventions will be impracticable, and comparison with other diseases contained in the Global Burden of Disease (GBD) report will not be possible.

Neglected Cost-effective Interventions for Hearing Loss of Childhood-onset

In a recent Lancet article, we set out a range of simple and cost-effective interventions that can be readily implemented in many countries.⁵ For example, premarital and continuing genetic counselling should be valuable in populations in which consanguineous marriages are prevalent. Similarly, community-based counselling on the use (or misuse) of ototoxic drugs, ear syringing for impacted wax and vaccinations of school girls, aged 10 years, against rubella should help to reduce the burden of childhood hearing impairment. The recently published WHO training manual for primary ear care also contains several achievable cost-effective interventions.⁶ As these primary interventions are complemented with early hearing detection and intervention programmes for infants, preschool-aged, and school-aged children, noted as an important and achievable goal for all countries, the health gains will be maximised. While measuring the cost-effectiveness of infant hearing screening compared to other child health interventions, such as MMR vaccinations, neonatal vitamin A supplementation or hyperbilirubinaemia, screening in developing countries may not be readily achieved



Easy Access to Rehabilitation Services (EARS) programme by Better Hearing Philippines, Inc.

Photo: Better Hearing Philippines Inc.

due to the lack of sound epidemiological data, the cost-effectiveness analysis of identifying a child with congenital hearing impairment can still be reliably undertaken. Such an analysis would allow us to compare various intervention options, such as targeted versus universal screening, one-stage versus multi-stage screening, or hospital-based versus community-based screening.

Development and Provision for Hearing Healthcare Services

Private expenditure, substantially derived from 'out-of-pocket' expenses, accounts for at least 75% of total health expenditure in many developing countries, unlike the experience in many developed countries. This practice extends to virtually all health care services, including fatal diseases and emergency care. Private provision of services has been criticised for selecting individuals based on their ability to pay for services. This argument has also been advanced as a possible deterrent to the development and provision of services for non-fatal conditions, such as hearing health care in developing countries.¹⁹ However, current data from the region confirms the inability of the poor to access health care services, even where it is meant to be provided free, thus underscoring a health seeking behaviour often incongruent with personal income status. For example, societal preferences

may encourage investing in conditions with high burden, but low or unproven 'cost-effective' interventions. Similarly, a community may choose to support time-bound, but costly intervention that provides children with chronic but non-fatal conditions the best start in their early crucial years for optimal development, rather than invest in certain lifestyle related diseases in the adult population. In some communities, socially stigmatised diseases may be considered more important than non-stigmatised diseases.²⁰ Health priorities must, therefore, reflect important socio-cultural factors, relevant to the target population and the willingness of individuals to take advantage of effective time-bound health interventions from their personal, if limited resources.

Public-private partnership has evolved as an alternative funding strategy for low- and middle-income countries because of the inability of their governments to provide for diverse health needs with limited budgets. However, the government still has a most important role in capacity building and the overall development of health systems. Recently, the International Finance Corporation, the private sector arm of the World Bank, released its funding strategy for the private sector in Africa to improve health - in recognition of the growing concern about the effectiveness of public sector-driven provision of health care services.²¹ Similarly, a global partnership under the aegis (guidance, direction) of WWHearing (Worldwide Hearing Care for Developing Countries) is currently working with WHO towards the provision of affordable hearing aids and services to governments in developing countries. In addition, notable charitable organisations, such as Christoffel-Blindenmission, Lions Club, and Rotary International, already have networks for supporting individuals with hearing impairment in many developing countries. This interest and concern can be channelled towards early hearing detection services. Emerging evidence from ongoing pilot programmes in countries such as Nigeria, South Africa, Malaysia, Brazil, and Poland demonstrate the effectiveness of different models of service delivery through public-private partnerships.

The GBD principle still provides a valuable platform for initiating equitable access to available, effective and time-bound

interventions for children with permanent hearing impairment, as experienced by their counterparts in the developed world. However, in seeking to promote a more equitable disease prioritisation, global health priorities should seek to preserve the collective / representative legitimacy of WHA resolutions for non-fatal but disabling conditions, such as permanent childhood hearing impairment. This understanding of 'health' recognises a state of complete physical, mental and social well-being and not simply the absence of disease or infirmity. This will be a timely and worthy tribute to the Alma Ata Declaration on its 30th anniversary.

References

- World Health Organization. Declaration of Alma-Ata: international conference on primary health care, Alma-Ata, USSR, Sept 6–12, 1978. http://www.who.int/hpr/NPH/docs/declaration_almaata.pdf (accessed January 18, 2008).
- United Nations. *The Millennium Development Goals Report 2005*. New York, NY: United Nations Department of Public Information; May 2005. <http://millenniumindicators.un.org/unsd/mi/pdf/MDG%20Book.pdf> (Accessed January 18, 2008).
- World Health Organization. Preventing chronic diseases: a vital investment: WHO global report. Geneva 2005. http://www.who.int/chp/chronic_disease_report/en/ (Accessed January, 18 2008).
- Prevention of chronic diseases: a call to action. Beaglehole R, Ebrahim S, Reddy S, Voûte J, Leeder S; Chronic Disease Action Group. *Lancet*. 2007; **370**: 2152-2157.
- Global burden of childhood hearing impairment and disease control priorities for developing countries. Olusanya BO, Newton VE. *Lancet*. 2007; **369**: 1314-1317.
- World Health Organization Primary Ear and Hearing Care Training Resource: Advanced level. http://www.who.int/entity/pbd/deafness/activities/hearing_care/advanced.pdf (Accessed January 18, 2008).
- Update on Burden of Hearing Impairment and Progress of WHO/WWH Hearing Aids Initiative. Smith AW. WHO/WWHearing Fifth Workshop on the Provision of Hearing Aids and Services for Developing Countries. Geneva, 2007.
- Disciplinary choices of mothers of deaf children and mothers of normally hearing children. Knutson JE, Johnson CR, Sullivan PM. *Child Abuse Negl*. 2004; **28**: 925-927.
- Sexual abuse of deaf children. A retrospective analysis of the prevalence and characteristics of childhood sexual abuse among deaf adults in Norway. Kvam MH. *Child Abuse Negl*. 2004; **28**: 241-251.
- The economic costs of congenital bilateral permanent childhood hearing impairment. Schroeder L, Petrou S, Kennedy C, McCann D, Law C, Watkin PM, Worsfold S, Yuen HM. *Pediatrics*. 2006; **117**: 1101-1112.
- Jamison DT, Breman JG, Measham AR, et al; Eds. *Disease control priorities in developing countries*. 2nd Edn. New York: Oxford University Press, 2006.
- Lopez AD, Mathers CD, Ezzati M, Jamison DT, Murray CJL, Eds. *Global burden of disease and risk factors*. New York: Oxford University Press, 2006.
- Mathers CD, Loncar D. Projections of global mortality and burden of disease from 2002 to 2030. *PLoS Med* 2006. **3**: e442. doi:10.1371/journal.pmed.0030442.
- The value of DALY life: Problems with ethics and validity of disability-adjusted life years. Arnesen T, Nord E. *BMJ*. 1999; **319**: 1423-1425.
- Disease burden in sub-Saharan Africa: What should we conclude in the absence of data? Cooper RS, Osotimehin B, Kaufman JS, Forrester T. *Lancet*. 1998; **351**: 208-210.
- Olusanya BO. "The right stuff": the global burden of disease. *PLoS Med* 2007. **4**(2).e84.
- World Health Organization. Prevention of hearing impairment. Resolution of the 48th World Health Assembly; WHA 48.9. Geneva 1995. http://www.who.int/pbd/publications/wha_eb/wha48_9/en/ (accessed January 18, 2008)
- Global burden of disease 2005: call for collaborators. Murray CJ, Lopez AD, Black R, Mathers CD, Shibuya K, Ezzati M, Salomon JA, Michaud CM, Walker N, Vos T. *Lancet*. 2007; **370**: 109-110.
- Reply to Olusanya et al: The role of the JCIH in the global expansion of newborn hearing screening. White KR. *J Am Acad of Audiol* 2006; **17**: 295-296.
- Whose priorities count? Comparison of community-identified health problems and Burden-of-Disease-assessed health priorities in a district in Uganda. Kapiriri L, Norheim OF. *Health Expect*. 2002; **5**: 55-62.
- The Economist. Healthcare in Africa: of markets and medicines. *Economist* 2007; Dec 22: 144.



EAR AND HEARING CARE COMMUNITY BASED STUDIES BY THE PHILIPPINE ACADEMY OF NEUROTOLOGY, OTOTOLOGY AND AUDIOLOGY (PANOA)

Christopher Malorre E Calaquian MD

Otolaryngologist and
Head & Neck Surgeon
Clinical Associate Professor
Philippine General Hospital

Head of Advocacy Committee
Philippine Academy of Neurotology,
Otology & Audiology

Charlotte M Chiong MD

Professor in Otolaryngology
University of the Philippines, Manila
Philippines

PANOA

Following the initiative and support given by the ASEAN Academy of Neuro-Oto-Audiology (AANO), in September 2006, the Philippine Academy of Neurotology, Otology, and Audiology, or PANOA, was created. Loaded with a vision of being a 'community of scholars dedicated to the highest standards of professional practice and scientific pursuit in the field of neurotology, otology and audiology', the PANOA collectively started and coordinated a string of community-based studies and activities concerning ear and hearing care in the Philippines, as part of its advocacy.

The Community on Boracay

In line with the vision of PANOA, one of the community-based studies that was initiated was in the island of Boracay, the famous tourist spot in the Philippines.



Orientation of school nurses in tuning fork testing. Training took place in Teachers' Camp, Baguio, Philippines

Photo: PNEI



Ati community in Boracay, Aklan, being interviewed for demographic data by the Philippine National Ear Institute (PNEI)

Photo: PNEI

Otosopic and audiologic examinations in an Ati community was led by Dr Regilyn Santos-Cortez, to determine:

- The prevalence of hearing loss among the endogenous Ati or Aeta community in its small town, Bolabog
- Their common ear problems
- Their hearing sensitivity using screening audiometry.



Hearing screening audiometry examination on an Ati woman
Photo: PNEI

Their results showed that chronic suppurative otitis media was prevalent in 18 (43.90%) children and 8 (36.36%) adults. Genetic predisposition of certain ethnic communities (or those who have a restricted gene pool due to relative isolation) to chronic otitis media could someday be a thing of the past.

PANOA: Training of School Nurses

To provide a holistic approach to its vision,

of a penlight and the mean sound pressure level produced by the common 512hz tuning fork. This was achieved by on-site training in the use of a penlight and tuning fork testing by the otorhinolaryngologist.

Results revealed that school nurses may be effectively trained in ear examination, using the penlight. With the method taught, they can detect ear wax and ear discharge, two of the most important signs of ear conditions in Filipino school children that can cause significant hearing loss. These are impacted cerumen (ear wax) and otitis media.



The penlight used to train school nurses in ear inspection

Photo: PNEI

The tuning fork test, as taught to the school nurses, was found to be useful in detecting moderate to severe hearing losses in school children, which certainly warrant referral to the physician. Consequently, such a study could recommend cheap alternative instruments in diagnosing ear and hearing problems, such as otitis media and cerumen in the provinces, especially those where an otologist is unavailable.

PANOA and School Children

In connection with the training of school nurses, PANOA then directed its focus towards school children, who are very suitable subjects in pilot studies by otologists in the country, due to the



Hearing screening of children in a public school in Daet, Naga, Philippines

Photo: PNEI



The 512 Hz tuning fork used to train school nurses in hearing screening

Photo: PNEI

impact of ear and hearing care during their school age years. As we all know, certain ear diseases do become prevalent during these formative years of a child's life. Thus, from 2003 to the present, school children from different parts of the country (i.e., Pateros, Rizal and Daet, Naga) underwent ear examinations, using a penlight for ear examination, and a tuning fork for hearing testing. These examinations were then confirmed, respectively, by otoscopic ear examinations and screening audiometry tests. This specific study aims to determine the prevalence of hearing loss in school children, and their causes, and provides a preview and some evidence of the likely number of children in the entire country having hearing loss, with impacted cerumen as the most common aetiology. In addition, this study could very well justify the need for training school nurses in provinces using the ordinary penlight and 512hz tuning fork.

The Environment and Hearing Loss

Environmental factors affecting hearing were also a concern of the people of PANOA. In 2002, a US National Institutes of Health (NIH) and US Environmental Protection Agency (EPA) grant was obtained by the Wayne State University College of Medicine, in collaboration with the Institute of Child Health and Development, the NIH Philippines and the Philippine National Ear Institute - to carry out a population - based study on exposure to pollutants and infant outcomes, with a follow-up period of two years. Pregnant

mothers were identified and followed-up until delivery at secondary, provincial hospitals. Hearing screening was performed with evoked Otoacoustic Emissions (OAEs) and Auditory Brainstem Response (ABR). Mental development was determined using the Griffiths Mental Development Scales (GMDS) where sub-scales of locomotor, personal-social, hearing and speech, hand and eye coordination and performance tests of infants were assessed at 6 and 12 months.

Bilateral Hearing Impairment

Reported prevalence of bilateral, permanent hearing impairment is slightly higher (1:724) in this study than the 1:1000 reported in the literature. Moreover, it was noted that, in a community - based approach, 77% were brought in for testing within 3 months, 7% from 4-6 months and 14.4% from 6-9 months - that is, 84% within 6 months and 99% within 9 months, showing how effective this is compared to the hospital-based screening employed in the previous studies. This means community-based hearing screening should be seriously considered, given the results of this study.

Deafness Awareness Week

Lastly, the Deafness Awareness Week, an event observed by the whole country in co-operation with government and non-government agencies, has had significant participation by PANOA. This important annual activity, held from November 10 to 16, 2007, was celebrated by the different Oto-Rhino-Laryngology (ORL) institutions of the country and co-ordination by PANOA. In this one week of observance, otologists offered free hearing and ear examinations to the public, provided lay forums, gave out pamphlets on common ear diseases, demonstrated the five minute hearing assessment, newborn hearing screening - in shopping malls, and involved TV, radio and print media in spreading awareness.

All of the above-mentioned studies and activities of the PANOA are just a few examples of its mission in helping the plight of Filipinos in their continuing battle against ear diseases, especially otitis media and impacted cerumen. It is envisioned that, someday, all these efforts will be translated into ear health policies and ear health laws, so that these activities become a national undertaking in the near future. □

HANDBOOK OF (CENTRAL) AUDITORY PROCESSING DISORDER: VOLUMES 1 & 2

Frank E Musiek & Gail D Chermak (Eds.)

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Plural Publishing Inc.
5521 Ruffin Road
San Diego, CA 92123
USA

E-mail:
information@pluralpublishing.com

Tel: 001 858 492 1555

Europe:
Plural Publishing Inc.
49 Bath Street
Abingdon
Oxfordshire OX14 1EA
UK

E-mail:
noelmcperson@pluralpublishing.com

Tel: +44 (0) 1235 527311

Central auditory processing disorder (CAPD) is a relatively common condition, occurring in perhaps 2-5% of school-aged children and in at least similar numbers of elderly persons. Over the past decade it has become more commonly identified and managed in developed countries, partly due to the publication of widely read

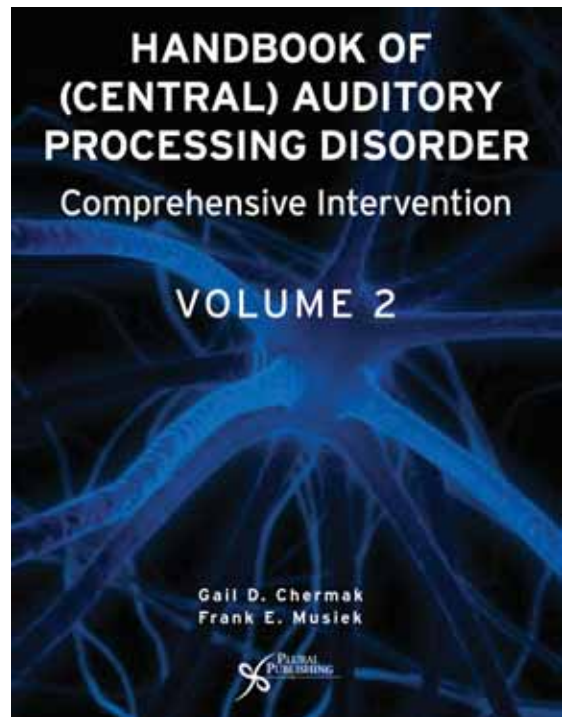
professional position papers and technical reports on the topic.

Reading the two impressive volumes (870 pages in total) of this comprehensive new handbook left this reviewer with two main thoughts. One reflection was that there is now a large body of well-conducted scientific research work that supports the notion that CAPD is a distinct clinical disorder with well established procedures for diagnosis and treatment.

Volume 1 provides a complete overview of the physiological and psychoacoustic foundations of work in this area, as well as a detailed description of CAPD assessment techniques. The chapters on the differential diagnosis of CAPD, attention deficit disorder, auditory neuropathy and language disorders are especially useful for the clinician.

Volume 2 provides possibly the most detailed coverage to date of treatment options for children and adults with CAPD. These include auditory training, cognitive training (such as techniques for improving memory and attention) and improving the auditory environment (such as via personal FM systems and classroom loudspeakers). All the chapters in both volumes are written to a very high standard and the Handbook is an essential guide for experienced professionals who work extensively with persons with CAPD.

The second notion occurring to this reviewer was the question, 'Does this relate to the needs of individuals with hearing impairment in developing countries?' My answer was, 'Yes, it does.' Workers in developing countries are often at risk of exposure to industrial solvents (see Issue No. 4 of this Journal) that cause CAPD and impair speech understanding abilities in everyday life. Those of us who work in developing coun-



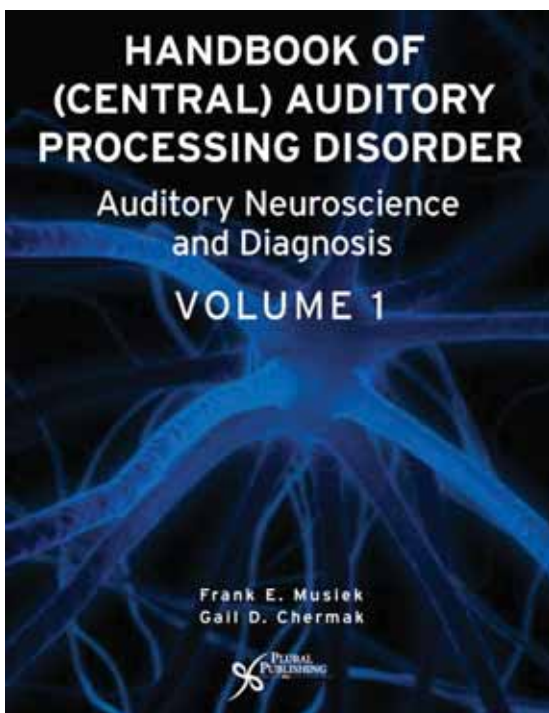
tries need to be alert to this ototoxic effect and consider ways we can provide prevention, assessment and rehabilitation options for exposed workers. In addition, school children in developing countries are often attending large, crowded and noisy classes - precisely the environments where CAPD will have the most adverse impacts.

Chapters 7 and 8 in Volume 2 give very practical advice on improvements that can help all children (but especially those with CAPD) gain better hearing in the classroom. Many of these enhancements involve collaborating with teachers to make low-cost, common sense changes to the classroom environment. In the years to come, CAPD is likely to be more frequently considered by those working in developing as well as developed countries. The Handbook of (Central) Auditory Processing Disorder fully describes our current knowledge of aetiology, assessment and treatment in this emerging area of clinical hearing health care practice.

Bradley McPherson
PhD FAAA MAudSocA

Centre for Communication Disorders
University of Hong Kong
Hong Kong

E-mail: dbmcphe@hkucc.hku.hk



Sensorineural hearing loss in chronic suppurative otitis media with and without cholesteatoma

de Azevedo AF, Pinto DC, de Souza NJ, Greco DB, Gonçalves DU

Sensorineural hearing loss (SNHL) related to chronic suppurative otitis media (CSOM) was studied to clarify the involvement of cholesteatomas in this context.

Aim: to evaluate SNHL related to CSOM and its association with cholesteatomas, disease duration and patients ages.

Methods: Retrospective analysis of 115

patients with CSOM, with and without cholesteatoma, submitted to surgical treatment. Inclusion criteria were active unilateral disease, normal contralateral ear and age below 60 years.

Results: The average age was 26.3 years, 58 males and 57 females. The duration of ear disease was, in average, 12.4 years. The average threshold of hearing was 40 dB in CSOM ear and 22 dB in the normal contralateral ear ($P=0.002$). CSOM with cholesteatoma occurred in 78 of 115 cases. In the abnormal ear,

SNHL was seen in 15 cases, being 6 cases of profound loss, that correlated with adjusted-age ($P=0.003$) and absence of cholesteatoma ($P=0.01$), but not with disease duration ($P=0.458$).

Conclusion: SNHL occurred in 13% of the patients with CSOM, and was correlated with older age, but not with the presence of cholesteatoma or longer duration of ear disease.

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Effect of climate on the bacteriology of chronic suppurative otitis media

Yildirim A, Erdem H, Kilic S, Yetiser S, Pahsa A

Objectives: We evaluated the correlation between the microbial content of chronic suppurative otitis media (CSOM) and regional climatic parameters.

Methods: We assessed the interrelations between monthly mean records of temperature, maximum temperature, atmospheric pressure, and humidity and the aerobic microbial flora in CSOM.

Results: Forty-three bacteria of *Enterobacteriaceae*, 67 *Staphylococcal spp*, 51 *Pseudomonas aeruginosa*, 9 *Streptococcus pneumoniae*, 1 alpha-hemolytic *Streptococcus*, 1 *Enterococcus sp*, and 2 *Edwardsiella tarda* strains were recovered from 173 patients with CSOM. There was a good relationship between enteric bacteria and monthly mean temperature ($r = 0.501$) and significant colonization rates due to increasing monthly mean temperature ($p = .040$)

and monthly mean maximum temperature values ($p = .048$).

Conclusions: When the weather warmed, the frequency of isolation of enteric bacteria increased significantly. Temperature changes may affect the enteric bacterial colonization of CSOM.

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Bacteriological profile in chronic suppurative otitis media in Eastern Nepal

Sharma S, Rehan HS, Goyal A, Jha AK, Upadhyaya S, Mishra SC

Aural swabs were collected from 250 patients with chronic suppurative otitis media (CSOM) (tubotympanic disease). Duration of ear discharge was more than 6 months for culture and sensitivity test. The disease was unilateral in 178 (71.2%) and bilateral in 72 (28.8%) patients. From a total of 322 aural swab

cultures, 324 organisms were isolated with predominance of *Pseudomonas aeruginosa* (36.4%) followed by *Staphylococcus aureus* (30.2%). All the isolated Gram-negative organisms showed in vitro sensitivity to ciprofloxacin, amikacin, ofloxacin, and gentamycin, whereas cloxacillin, ofloxacin, erythromycin, ciprofloxacin, gentamicin and tetracycline were more effective against Gram-

positive isolates. Most isolates were resistant to amoxicillin. It is concluded that ciprofloxacin is preferred to aminoglycosides as an important tool in the treatment of CSOM because of its lower cost, lack of ototoxicity and availability as topical oral preparations.

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Effectiveness of ototopical antibiotics for chronic suppurative otitis media in Aboriginal children: a community-based, multicentre, double-blind randomised controlled trial

Couzos S, Lea T, Mueller R, Murray R, Culbong M

Objectives: To compare the effectiveness of ototopical ciprofloxacin (0.3%; CIP) with framycetin (0.5%), gramicidin, dexamethasone (FGD) eardrops (5 drops twice daily for 9 days), together with povidone-iodine (0.5%) ear cleaning, as treatments for chronic suppurative otitis media (CSOM) in Aboriginal children.

Design and Participants: Aboriginal community-controlled, community-based, multicentre, double-blind, randomised

controlled trial in eight Aboriginal Community Controlled Health Services across northern Australia, involving 147 Aboriginal children with CSOM.

Main Outcome Measures: Resolution of otorrhoea (clinical cure), proportion of children with healed perforated tympanic membrane (TM) and improved hearing, 10-21 days after starting treatment.

Results: 111 children aged 1-14 years (CIP, 55; FGD, 56) completed treatment. CSOM cures occurred in 64% (CIP, 76.4%; FGD, 51.8%), with a significantly higher rate in the ciprofloxacin group ($P = 0.009$, absolute difference of 24.6%

[95% CI, 15.8%-33.4%]). TM perforation size and the level of hearing impairment did not change. *Pseudomonas aeruginosa* was the most common bacterial pathogen (in 47.6%), while respiratory pathogens were rare (in 5.7%).

Conclusions: Twice-daily ear cleaning and topical ciprofloxacin are effective at community-level in achieving cure for CSOM. Healthcare providers to Aboriginal children with CSOM should be given special access to provide ototopical ciprofloxacin as first-line treatment.

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Health of Aboriginal and Torres Strait Islander children in remote Far North Queensland: findings of the Paediatric Outreach Service

Rothstein J, Heazlewood R, Fraser M; Paediatric Outreach Service

Aim: To describe the pattern of disease and other health problems in children living in remote Far North Queensland (FNQ).

Design, Setting and Participants: Retrospective review of the FNQ Paediatric Outreach Service's Medical Director database for the period June 2001 to February 2006. Three subpopulations were compared: children from predominantly Aboriginal communities, predominantly Torres Strait Islander communities, and other communities. All children referred to the service during the study period were reviewed.

Main Outcome Measures: Number of children seen and common diagnoses.

Results: 3562 children were referred during the study period, and a total of 3932 diagnoses were made; 56% of the paediatric population of the Aboriginal communities and 23% of the paediatric

population of Torres Strait Islander communities were seen. Of 40 separate diseases/health problems reviewed, the three most common reasons for presentation were chronic suppurative otitis media, suspected child abuse and neglect, and failure to thrive. In the paediatric population of Aboriginal communities, the prevalence of fetal alcohol spectrum disorder was at least 15/1000 (1.5%), and in Torres Strait Islander children, rheumatic heart disease prevalence was at least 6/1000 (0.6%). Rheumatic fever rates were among the highest in Australia.

Conclusion: Rates of preventable complex and chronic health problems in Aboriginal and Torres Strait Islander children in remote FNQ are alarmingly high. Areas requiring urgent public health intervention include alcohol-related conditions and rheumatic fever.

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COMMUNITY EAR AND HEARING HEALTH

Aim

- To promote ear and hearing health in developing countries

Objectives

- To facilitate continuing education for all levels of health worker, particularly in developing countries
- To provide a forum for the exchange of ideas, experience and information in order to encourage improvements in the delivery of ear and hearing health care and rehabilitation.

Guidelines for Authors

Please see Issue No. 1.

Also online at: www.ictesworldcare.com

Correspondence/Enquiries to:

ICTHES World Care, PO BOX 4101, Glasgow G53 9AF, Scotland, UK

Tel: +44 (0)141 332 1707

E-mail: m.mcgvain@ictesworldcare.com or andrew.smith@lshtm.ac.uk

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