
Work Related Gradual Process Hearing Loss

Social, accounting and actuarial issues from an ACC perspective

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Abstract

Recently work related gradual process hearing loss claims have become a hot topic at ACC. Changes to the account allocation and hence funding requirements for these claims have led to them being analysed in some detail.

This paper looks at a number of aspects of gradual process hearing loss claims from an ACC perspective namely:

- The impact of changes in ACC legislation;
- Policy and practice both by ACC and external agencies in the handling of these claims;
- Accounting and actuarial treatment of these claims with a particular emphasis on reserving;
- Setting levy rates for gradual process hearing loss claims; and
- Modelling the costs of these claims.

The aspects outlined above are all interrelated and as such the handling of gradual process hearing loss claims is a complex issue for ACC. The paper examines the development of the current situation. It then looks at the current situation from a variety of angles and considers some of the implications of potential future developments.

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Social, accounting and actuarial issues from an ACC perspective

1 Introduction

Gradual process claims in general are nothing new and actuaries have been aware of their potential impact on liabilities and solvency for some time. An example of these types of claims which have received a lot of media attention over recent years is asbestos related illnesses.

Being aware of the existence of these types of claims does not always translate into having a sound understanding of their causes and costs. This fact has recently been demonstrated to the Accident Compensation Corporation (ACC) in respect of its funding of work related gradual process hearing loss claims.

Increases in the numbers of claimants with work related gradual process hearing loss and the amounts paid to these claimants coupled with a change in ACC legislation has resulted in these claims becoming the subject of some scrutiny. This scrutiny has uncovered some interesting facts about the drivers of these claims. It has also led to some interesting discussions around the handling of these claims.

This paper examines some of the aspects of work related gradual process hearing loss claims from an ACC perspective. The issues covered include:

- **ACC legislation;** Recent changes to ACC legislation have changed the way gradual process claims in general, and work related gradual process hearing loss claims specifically, are treated. This has potential impacts for reserving and funding.
- **Providers;** Providers of hearing loss related services (e.g. audiologists, hearing aid manufacturers, etc.) to claimants on ACC's behalf are motivated by factors over which ACC has little or no control. These factors can influence both the numbers and costs of eventual claims to ACC.
- **Policy;** ACC policy on the provision of entitlements to hearing loss claimants is caught between the conflicting objectives of providing appropriate compensation and trying to control scheme spending. The current practices in this area have been recognised as a problem in need

of controls but at the same time there are issues of access meaning not everyone who is entitled to compensation is receiving it.

- **Standards;** The treatment of gradual process claims under current and future accounting standards is open to interpretation. Actuarial professional standards provide some additional guidance on the claims that should be included in balance sheet liabilities but there is still room for debate.
- **Reserving;** The issue of whether or not a liability for these claims needs to be included in the balance sheet based on the date(s) of exposure was debated by ACC and its auditors. This issue relates both to the intent of the current ACC legislation as well as standard accounting and actuarial practice.
- **Levy rating;** Recent changes in ACC legislation have changed the account that some gradual process claims are allocated to. This impacts the way in which these claims are funded and hence the levy rates for the accounts involved.
- **Modelling;** A stochastic model was developed to estimate the costs of as yet unreported work related gradual process hearing loss claims. The assumptions underlying the model provide some interesting information on the nature of these claims.

Many of the above issues are related so while each will be examined in turn they should not be thought of as independent. There are undoubtedly other issues effecting work related gradual process hearing loss which are not considered in this paper. Some issues will come to light only as others are dealt with so this paper should not be thought of as a definitive guide to all of the issues relating to these types of claims.

Throughout the remainder of this paper work related gradual process hearing loss will, unless otherwise specifically stated, be referred to as simply hearing loss.

2 Hearing loss claims and ACC

Since 1 April 1974 compensation for personal injuries in New Zealand has been provided on a comprehensive no-fault basis. Whereas no-fault compensation from workplace and motor vehicle accidents is not uncommon, only ACC extends this to accidents from any cause.

To receive compensation the person must have suffered an injury for which they have cover under the Injury Prevention, Rehabilitation, and Compensation Act 2001, including any subsequent amendments.

The personal injury must be a physical injury, a fatal accident, a mental injury resulting from a physical cause or damage to dentures or prostheses. The injury must arise as the result of an accident or a work related gradual process, disease or infection. Recently (2005) injuries resulting from twisting or the ingestion of fungi have also been included under ACC's cover definitions.

2.1 Work related gradual process hearing loss

ACC cover includes treatment and compensation for people who experience hearing loss due to prolonged exposure to noise in the workplace. Some part of this exposure to noise in the workplace must usually have occurred after 1 April 1974 (the start of the ACC scheme).

These claims differ from hearing loss claims that arise as a result of sudden or shock noise exposure. For shock noise exposure the cause is clearly related to a single event and the affect can usually be isolated from other hearing loss (e.g. age related hearing loss).

Work related gradual process hearing loss is typically the result of symmetrical exposure to noise (i.e. effecting both ears or binaural) and is always sensorineural, effecting the hair cells in the inner ear (ACOEM 2002). The following figures show healthy and noise damaged hair cells in the ear.

Figure 2.1; Healthy cochlear hair cells in the ear

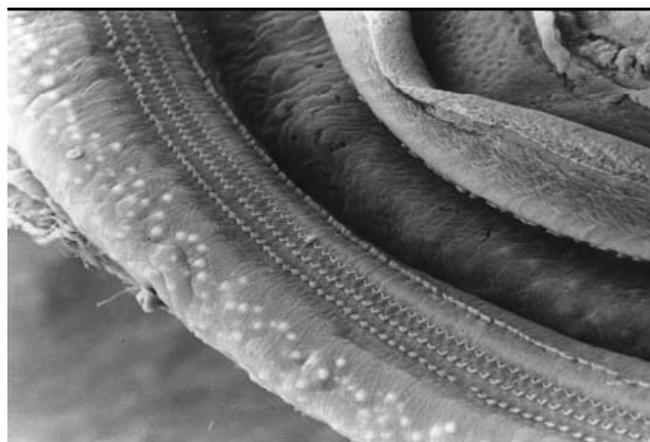
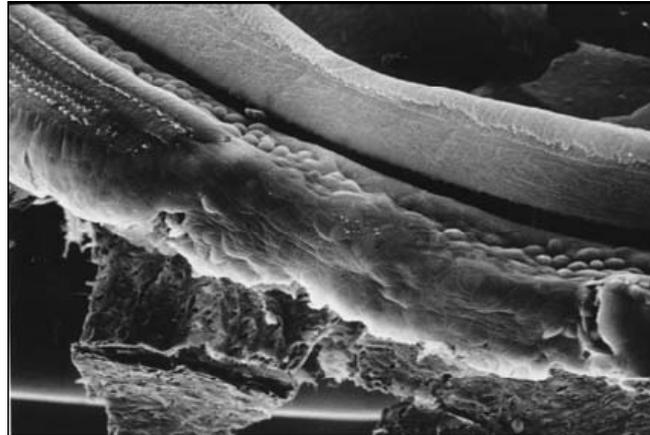


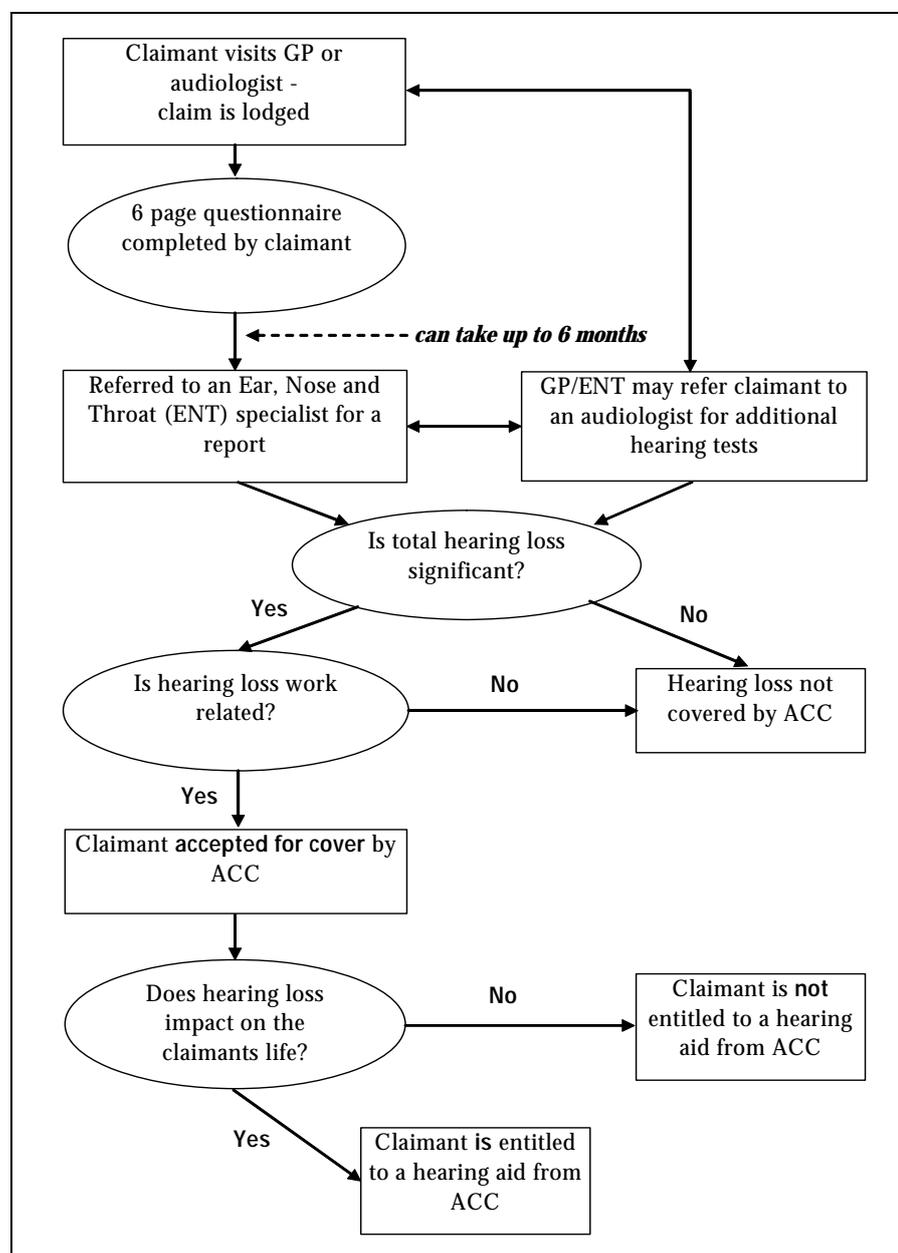
Figure 2.2; Noise damaged cochlear hair cells in the ear



For a gradual process hearing loss claim the exposure to noise in the workplace may have occurred over a period as short as one month or as long as 50 years. There may also be significant delays between the end of the noise exposure and the realisation that hearing loss has occurred. Claims are often reported towards the end of a claimant's career or even after they have retired. Age related hearing loss can therefore add to the total hearing loss.

The process for determining cover under the ACC scheme is outlined in the following diagram.

Figure 2.3; Determining cover for gradual process hearing loss



The ENT specialist report includes a diagnosis, causation and an opinion on whether or not hearing aids are needed due to the work related noise induced hearing loss.

There are currently no formal guidelines for determining cover and/or entitlement for hearing loss claims. The individual nature of these claims, with regards to the impact the injury has on the claimant’s life, makes establishing a standard set of guidelines difficult.

2.2 Hearing loss entitlements offered by ACC

Hearing loss claimants accepted for cover by ACC are entitled to the following benefits:

Weekly compensation non fatal – Weekly income replacement benefits to the value of 80% of pre-injury earnings (up to a maximum set in regulation each year) are payable if the hearing loss prevents the claimant from working. In many cases the claimants with noise induced hearing loss are already retired. Where this is not the case the provision of a hearing aid usually facilitates the claimants return to work. This type of benefit is therefore not substantial in relation to other benefits for this group of claimants.

General practitioner (GP) fees – Claimants usually visit a GP initially, at which time their claim is lodged.

Audiologist fees – Audiology costs include hearing tests, hearing aid fittings, hearing aid tuning, and hearing aid repair and replacement consultations. The current cost of a hearing aid fitting for a monaural device is approximately \$1,200 and for a binaural device the cost is approximately \$2,000.

Ear, nose and throat (ENT) specialist fees – Claimants visit an ENT specialist to establish the level of work related hearing loss and hence establish whether or not they have cover under the ACC scheme. Subsequent visits to the ENT specialist are possible if the level of hearing loss is thought to have changed.

Hearing aids – If the threshold for entitlement is reached ACC will fund the provision of hearing aids to claimants with work related noise induced hearing loss. Aids are currently replaced on a five year cycle and are replaced or repaired earlier if necessary.

Hearing aid batteries – ACC has recently started paying for hearing aid batteries for claimants provided with an ACC subsidised hearing aid.

Lump sums and independence allowance – Awarded to claimants who are in excess of 10% permanently bodily impaired according to American Medical Association (AMA) guidelines (i.e. their injury constitutes an impairment to at least 10% of normal functional ability under the AMA scale). Depending on the level of total hearing loss claimants may qualify for these entitlements. The decision as to whether the claimant is eligible for a lump sum rather than independence allowance is based on the date they were last exposed to significant levels of noise in the workplace.

The hearing aid costs and audiologist fees are the biggest components of the cost for hearing loss claims in general.

2.3 Date of personal injury

Under current ACC legislation a claim can only be covered if a personal injury has occurred. If a personal injury has occurred then there must be a personal injury date. However the definition of this date depends on the type of claim being considered.

Under “normal” circumstances the date of personal injury is defined as “*the date on which a person suffers*

- (a) *death;*
- (b) *physical injuries (e.g. a sprain or strain);*
- (c) *mental injuries of specified types; or*
- (d) *damage (other than wear and tear) to dentures or prostheses that replace a part of the human body.”*

For gradual process claims, sensitive claims and treatment injury claims the date of personal injury is defined differently. For gradual process claims the date of personal injury is defined as follows¹:

“The date on which a person suffers personal injury caused by a work-related gradual process, disease, or infection is the earlier of the following dates:

- (a) *the date on which the person first receives treatment from a medical practitioner for that personal injury as that personal injury; or*
- (b) *the date on which the personal injury first results in the person's incapacity.”*

So in general a personal injury date usually relates closely to the date the accident or event that caused the injury occurred. However for gradual process claims the personal injury date is usually more closely related to the date the claim is lodged as this is generally around the time treatment is first sought or when incapacity occurs. This is not unreasonable as, by definition, a gradual process injury occurs over a period of time and therefore cannot be related to a single accident date.

The way in which the personal injury date for gradual process claims is defined has implications for both funding and reserving. These implications will be examined in more detail later in this paper (sections 4 and 5 of this paper).

¹ Injury Prevention, Rehabilitation, and Compensation Act (IPRC Act) 2001 section 37(1).

2.4 Allocation of hearing loss claims to accounts

For funding and analysis purposes, ACC claims are allocated to an account. The allocation depends on the cause of the accident and the work status of the claimant at the time of the accident. The entitlements ACC provides vary only slightly by account.

All gradual process hearing loss claims covered by ACC are necessarily work related. As such they are allocated to one of the following accounts:

- Employers' Account;
- Self-Employed Work Account; or
- Residual Claims Account.

The Residual Claims Account was established to run off all claims from employed or self-employed New Zealanders with personal injury dates prior to 1 July 1999 for work related injuries and 1 July 1992 for non-work injuries. It was necessary to establish this account when ACC's work accounts were opened up to private insurers on 1 July 1999.

Following the disestablishment of the private workers compensation market in New Zealand on 1 April 2000 the Employers' Account was established. Employers were allowed to return to ACC from this date but had to return by 1 July 2000. The Self-Employed Work Account came into existence on 1 July 1999 as self-employed people were given the option to remain with ACC during the period of privatisation.

2.4.1 Allocation prior to 1 July 2005

Prior to 1 July 2005 claims were allocated between the three work accounts listed above based on their personal injury date and a self-employed work indicator (to differentiate between Employers' Account claims and Self-Employed Work Account claims). A Crown Law opinion in September 2004 stated that claims should be allocated to accounts based on the status of the claimant at the personal accident date (e.g. if the claimant was retired at the personal injury date the claim should have been allocated to the Non-Earners' Account). However, allocation decisions on this basis were rarely made.

Where the personal injury date was prior to 1 July 1999 the claim would be allocated to the Residual Claims Account.

This allocation based on personal injury date has meant that gradual process hearing loss claims with personal injury dates after 1 July 1999 have been allocated to the Employers' and Self-Employed Work Accounts. It is often the case that these claimants are no longer working and in many cases the

claimant has ceased working, at least in noisy environments, prior to 1 July 1999.

The allocation of claims to accounts based on personal injury dates has been incorporated into ACC's claims management computer systems. The account is determined by the system based on the information about the claim that is entered by the case manager. At one time it was believed that gradual process hearing loss claims were being allocated to the non-work accounts (September 2004 Crown Law opinion) as many claimants were no longer working when they lodged their claim. This was not the case as most of these claims were flagged as being work related and hence allocated to a work account.

2.4.2 Allocation after 1 July 2005

For many gradual process hearing loss claims the exposure to noisy workplaces ended before 1 July 1999. The tendency for people to work in noisier occupations at earlier stages of their career, and the lengthy latency periods between exposure to noise at work and lodging a claim for hearing loss, has led to many claims with pre July 1999 exposure being lodged after 1 July 1999.

A High Court decision relating to asbestos claims and lump sum entitlements added to the perceived inequity of having claims relating to pre July 1999 events in the Employers' and Self-Employed Work Accounts. The result of these two influences led to an amendment to the IPRC Act in 2005. The amendment covered a number of aspects of the scheme but specifically it described the allocation of gradual process claims to accounts.

After amendment section 192(6) of the IPRC Act reads as follows:

"192(6) The funds in the Residual Claims Account must also be applied to meet the costs of entitlements for personal injury caused by work-related gradual process, disease, or infection if—

(a) the employment task, or employment in the particular environment, giving rise to that personal injury was performed or occurred before 1 July 1999; and

(b) the claimant was an employee or self-employed when performing that task or in that environment (regardless of whether the claimant was an employee or self-employed at the date on which the personal injury is regarded as having been suffered)."

The amendment came into force on 1 July 2005 and by its wording precludes gradual process hearing loss claims from being placed into non-work accounts. It also specified which of the work accounts each claim was to be allocated to based on the date the claimant was last exposed to noise in the

workplace (and in some cases the period over which they were exposed to workplace noise).

The amendment does not change the date of personal injury for gradual process claims. Hence there are now claims being funded by the Residual Claims Account with personal injury dates after 1 July 1999. ACC's systems have been slower to respond to the change in legislation so the account on the system is still being derived based on the personal injury date. Therefore the account on the system has to be manually changed for gradual process claims.

For claims where the exposure to work related noise has included both pre and post 1 July 1999 periods the legislation indicates that the cost of each claim should be apportioned between the Residual Claims Account and either the Employers' or Self-Employed Work Account. The apportionment should be based on the proportion of exposure in the pre and post 1 July 1999 periods respectively.

The amended legislation gives rise to other problems as it has not been common practice to capture exposure information on gradual process claims in electronic form. Thus, a simple change in legislation has resulted in the need to alter systems and adjust ACC's data capture processes.

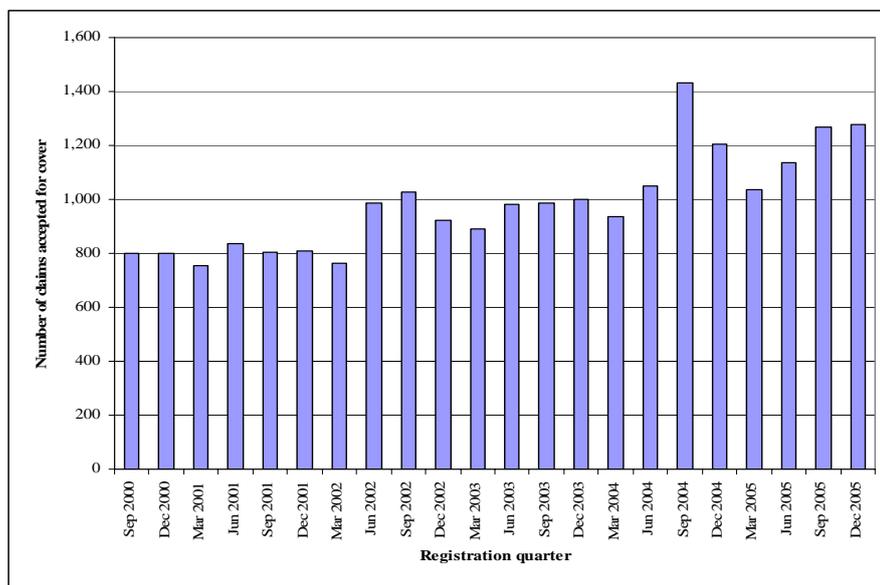
The movement of gradual process hearing loss claims to the Residual Claims Account has significant funding implications. This is discussed in more detail in section 5 of this paper.

3 Factors influencing claim volumes

ACC has received and approved for cover approximately 50,000 claims in respect of work related gradual process hearing loss. Since the end of the period during which the ACC work accounts were privatised (1 July 1999 to 30 June 2000) approximately 22,000 gradual process hearing loss claims have been accepted for cover.

The following graph shows the numbers of claims accepted for cover each quarter since 1 July 2000.

Figure 3.1; Numbers of gradual process hearing loss claims accepted for cover



The number of claims being registered each quarter has been climbing slowly but steadily across this period. The most recent registration quarters are affected by both reporting delays and the time it takes to have a claim accepted (up to six months as outlined in Figure 2.3).

Since 2003 the claim registrations have increased at a faster rate than had been observed in the past. The rest of this section looks at some of the drivers of these increases.

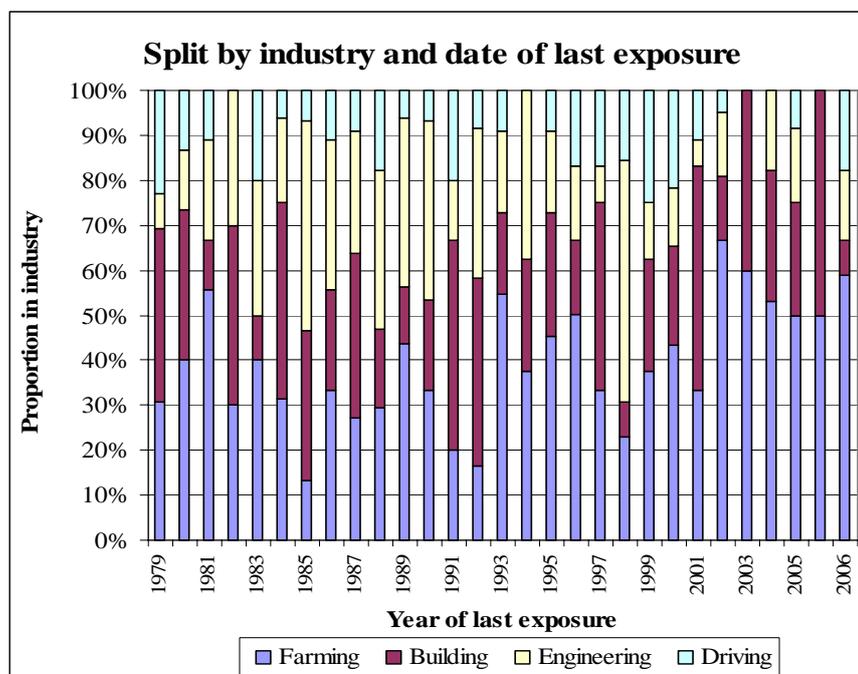
3.1 Industry practices

It is difficult to determine how experience at the industry level has been changing over time. There is little “hard” data in this area on which to perform analysis. While it might be expected that greater understanding of the risks and better hearing protection devices should have reduced the incidence of noise induced hearing loss in some of the traditionally noisy industries, there is little evidence to back this up. Changes in occupational health and safety regulations may also have improved the injury prevention initiatives taken in some industries.

A summary of the main industries which have given rise to the current work related gradual process hearing loss claims accepted by ACC can be found in section 6.1.1.3 of this paper. Briefly these industries are farming, construction, engineering/factory work and tractor/truck driving.

The following graph shows the split by industry in ACC gradual process hearing loss claims.

Figure 3.2; Split of gradual process hearing loss claims by industry



At first glance it appears that the proportion of claims arising in the farming sector has been increasing over time. However, because the graph is by date of last exposure this distorts the results. That is, since farmers tend to be self-employed they tend to work past standard retirement age and as such their last exposure could be the day they lodge their claim. In other industries the date of last exposure is often a number of years prior to the claim being lodged.

The above figure does lend some support to anecdotal evidence that noise exposure in engineering/factory work is being reduced. There could however be other factors at work which are distorting these results (e.g. there may be reductions in the numbers of employees in these areas as companies move to more automated processes).

While the levels of hearing loss claims associated with some of the more traditional “noisy” industries may be reducing there is a possibility that other industries may take their place. For example, the hospitality industry, where people have to work around loud music with limited opportunity to protect their hearing, may be a major contributor to future work related gradual process hearing loss claims. Similarly fire fighters have also been identified as another high risk group (see section 6.1.1.3 and Ameratunga 2006).

There may also be factors influencing the total level of hearing loss which have not been major contributors in the past. Personal music players have

grown in popularity with the introduction of smaller MP3 players. Separating the damage caused by prolonged use of such a device and subsequent work in, for example, a bar or nightclub may not be possible. This would result in ACC covering the total hearing loss when in fact only a portion of it would have been work related.

This is an area where substantial additional research is required.

3.2 Ageing

The worst work related damage to a person's hearing usually occurs early in their careers (ACOEM 2002). This is due to a combination of poorer safety measures being taken by younger workers, as they do not realise that damage is being done to their hearing because they cannot detect it, and the fact that once hearing has been damaged it is harder to damage it further, i.e. it takes a higher level of noise to achieve a damage threshold once some initial damage has occurred (ACOEM 2002).

Given that most damage tends to occur early in a person's career the fact that it is not until around retirement age that the hearing loss is detected and assessed as requiring artificial support (i.e. a hearing aid) makes handling these claims difficult. Although the most damage is done early on it is not until further deterioration occurs over time that the damage becomes noticeable to the individual. Age related hearing loss will also impact on the total level of hearing loss and hence it's potential to be detected.

The rate of hearing loss due to noise exposure decreases as the hearing threshold increases which is the opposite of what happens for age related hearing loss (ACOEM 2002). Age related hearing loss is not covered by ACC, however the increase in hearing loss associated with aging can lead to levels of loss which are noticeable and impact on a person's life. This in turn can lead the individual to seek treatment resulting in the work related component of the loss being detected and hence increasing the number of claims lodged with ACC.

3.3 Hearing loss detection

In the past hearing loss may have gone undetected, and hence unreported, for longer than it does now. Hence more claims are being reported even though the average latency period for these claims looks to be increasing (see section 6.1.1.2 of this paper).

The increase in the reported numbers of gradual process hearing loss cases could be in part attributed to better detection methods. The technology associated with detecting hearing loss and the frequencies of loss have changed in recent years. More research has helped refine the methodology for detecting hearing loss (i.e. click-evoked otoacoustic emission testing) and

has resulted in better quantification of the work related components of the loss (Ameratunga 2006).

Adding to the improved quality of detection methods is the increase in the range of places where hearing loss can be assessed. In some cases general practitioners have been provided with mobile hearing loss detection kits and encouraged to test all of their patients. There have also been incidences of mobile hearing loss detection units being set up outside workplaces to test employees as they enter or leave (similar to the asbestos “scan vans” operated in the UK).

Increased detection of hearing loss may just result in cases being reported earlier than they would have otherwise. However, the sooner a claim is reported the longer the entitlements will potentially last and the higher the total cost will end up being.

The increasing average age and latency period of the current claimants does not support the theory of earlier detection. As such the additional detection opportunities may be producing cases that would otherwise never have been reported.

3.4 Marketing

There are a number of ways marketing impacts on hearing loss claim numbers and the associated costs. These include:

- ACC’s publishing and promotion of entitlements;
- Hearing aid manufacturers promotion of their products; and
- Audiologists’ promotion of their services.

These are covered in more detail below.

ACC is charged with the provision of appropriate rehabilitation and compensation to the victims of accidental injury. To this end it is necessary to actively inform and promote the services ACC provides. This is as true with regards to gradual process hearing loss as it is with some of the more common types of claims.

A natural consequence of the establishment of injury prevention initiatives is an increased awareness of the potential for injury as a result of exposure to noise and an increased understanding of the entitlements provided by ACC for these types of injuries. While this is in line with ACC’s goal of providing cover in all eligible cases, it does increase claim numbers. Attempts to remove perceived barriers to the access of entitlements and to reach traditionally under-represented segments of the population could further increase claim numbers.

Another marketing aspect that contributes to ACC's hearing aid costs is the marketing undertaken by hearing aid manufacturers. Hearing aid manufacturers make their living from the sale of hearing aids. Not surprisingly then manufacturers will seek to promote their products above others. It is also not surprising that they would promote the newer more technologically advanced appliances, which are often more expensive.

It is not possible to say whether the manufacturers marketing of the latest and best technology is motivated by the belief that these appliances will provide people with the best quality of life possible, or if the motivation is profit based. Either way the consequence for ACC is that the average cost of prescribed hearing aids has not been significantly reducing over recent years. So, while advances in technology may have resulted in cheaper hearing aids that deliver the same level of performance as their more expensive predecessors, the cost savings have not flowed through to ACC as the more advanced aids have been prescribed instead.

Some manufacturers have offered incentives to audiologists to promote the prescription of their appliances. These incentives have included a percentage of the cost of the appliance being paid to the audiologist. These payments have not, in general, made their way back to ACC.

The final link in the marketing chain is with the audiologists. In this case, as with the hearing aid manufacturers, the livelihoods of the people involved in this profession depend on the number of services they are able to provide. It is in their interest that potential patients are identified and aware of their entitlements.

The costs associated with the treatment of hearing loss (see section 6.1.2) can form a barrier to people seeking and accepting treatment in all but the most severe cases. However, if the injured party is aware that ACC will cover the full costs of their treatment, provided the hearing loss meets the required thresholds, they are more likely to seek treatment (or at least assessment by an audiologist). Consequently audiologists sometimes make a point of advertising the entitlements ACC offers. For example, the following quote was taken from the Bay Audiology website (www.audiology.co.nz):

“ACC provide hearing aids for people who have gradually damaged their Hearing in the workplace or through accident or injury. Among those likely to have noise induced hearing loss are farmers, builders, factory workers, machinery operators and boilermakers. War Pensioners can also obtain hearing aid funding if their army service has resulted in hearing loss.

If you have worked in a noisy place or served in the armed forces your Audiologist can advise whether ACC or War Pensions funding for hearing aids may be available to you. Small government subsidies can also be available for people who fund their hearing aids themselves and some people in full time employment may receive partial funding. To enquire whether any types of funding may be available to you phone”

Bay Audiology is one of New Zealand’s largest suppliers of audiology services so this message would reach a significant proportion of people seeking treatment for hearing loss.

3.5 Societal attitudes

In the past hearing aids have been bulky devices which were not able to provide the improvement in hearing offered by today’s digital devices. As the size has decreased and the effectiveness has increased people have become more inclined to use hearing aids. There is also an increased range of devices which allows individuals to select the device that best suits their needs.

Figure 3.3; Example of modern hearing aids



Modern devices range from very small in the ear appliances (above left) to the bigger behind the ear devices (above right). In theory the needs of the individual and the environments in which they operate should determine the type of hearing aid they are provided with.

Coupled with, or perhaps because of, the change in hearing aids is a change in society’s attitude towards hearing loss. In the past there has been somewhat of a stigma attached to the use of hearing aids. This is especially true in younger working age people where hearing loss and hearing aids have traditionally been labelled as a sign of old age.

As society’s attitudes change and the quality of hearing aids continues to improve the number of people seeking hearing loss related entitlements is likely to increase. Hopefully this will be coupled with an increased awareness of the potential dangers of prolonged exposure to noise which should result in more precautions being taken.

3.6 Alternatives

Currently there are four alternative methods, excluding private insurance, of funding hearing aid purchases other than ACC. These are:

- Self purchase: Given that hearing aids can cost between \$1,000 and \$7,000 and are recommended to be replaced every five or so years self purchasing is not an option for many people. This is especially

true given that the hearing loss generally manifests after retirement when sources of income are greatly reduced.

- War pension: Individuals exposed to noise through high-powered rifle or artillery fire and who served in the armed services may be eligible for funding of a hearing aid or aids. Eligibility depends on a number of factors, including whether the person receives a War Pension, and the degree of any assessed disability.
- Environmental support services: Work and Income New Zealand (WINZ) provide partial funding of hearing aids for people who are in full-time study, employment, or who are unemployed but registered as seeking work. Funding may also be available to allow people to remain independent within their own homes. The eligibility criterion for funding varies by health region.
- Health funding: All adult patients who purchase a hearing aid and do not receive funding from any other source are eligible for a Universal Hearing Aid Subsidy. The subsidy is currently set at \$198 for a single appliance and \$396 for two appliances. It is available to individuals every 5 years. Given the current average cost of a hearing aid this level of subsidy leaves the claimant with a significant portion of the cost.

Other than the war pension none of these options provide the level of cover, and hence peace of mind, offered by ACC. This means that ACC is usually the first option for cover where possible. While it is ACC's responsibility to compensate victims of work related hearing loss the current structure usually means that ACC covers the total hearing loss of entitled claimants.

3.7 ACC policy

ACC policy on gradual process hearing loss and other entitlement related matters is bound by legislation. This often results in difficulties determining the intention of the legislation and how best to apply it. It can also leave ACC trying to strike a balance between providing appropriate compensation for an injury and controlling the costs associated with these entitlements.

For example, it has recently been identified that the claim lodgement and approval process associated with gradual process hearing loss may act as a barrier to the attainment of fair compensation in some cases. There is a six page questionnaire to be completed in which some of the language is not straightforward. There is also a significant time delay between the lodgement of a claim and its eventual acceptance (see figure 2.3). Both of these factors may prevent people from being able to access the benefits to which they are entitled under ACC legislation.

Since these potential barriers to access were identified ACC has been examining ways in which to remove or at least minimise them. This will however have a flow on effect to costs which are already increasing.

In an effort to address the issues associated with gradual process hearing loss ACC has established a number of committees to examine various aspects of this issue. Among the options being considered by ACC are:

- Establishing a framework to cover all aspects of gradual process hearing loss. This would include addressing the issues of entitlements, access and costs.
- Providing cover for the portion of hearing loss that is work related only. This could involve cost sharing arrangements with other organisations (i.e. Ministry of Health).
- Implementing needs assessments to establish which type(s) of hearing aids are required for each individual. These would be based on lifestyle and levels of hearing loss.
- Direct or preferred supplier purchasing of hearing aids. This may help control costs and would allow ACC to determine if the use of new technology was appropriate.

There is no quick fix in this area and any solutions package will need to be rigorously trialled and consulted on with stakeholders.

4 Standards and reserving

The treatment of gradual process claims in general, and noise induced hearing loss specifically, in a company's balance sheet is influenced by accounting and actuarial standards. The first thing to consider is the structure of the contract under which the claim has arisen.

4.1 Contract structure

In general insurance there are two ways of defining the claims covered by an insurance contract.

- 1) Where the premium paid for a period of insurance covers all of the claims reported during the period. This is called a "*claims made*" policy.
- 2) Where the premium paid for a period of insurance covers all of the claims resulting from events that occur during the period. This is called a "*claims incurred*" policy.

Under a “*claims made*” policy the event that gives rise to a claim may have occurred years before the policy was written. It is the time at which the claim is reported that determines which levy payers ultimately pay for it. This type of contract is often used for liability insurance such as professional indemnity cover. These policies are usually renewed annually by a relatively stable group of policyholders. Hence the claims that are reported in a year are generally in respect of policyholders who have been and are still currently paying premiums.

Under a “*claims incurred*” policy there may be significant delays between the claim event occurring and the claim being reported. So the premium paid in a year covers all of the claim events occurring during that year even if they are not reported or settled until many years later. These types of contracts are commonly used for lower cost types of insurance with shorter settlement times such as private motor or household policies.

Given the definition of personal injury date for gradual process claims (section 2.3) it would be logical to treat these claims as arising under a *claims made* contract structure. This is consistent with ACC’s current treatment of gradual process and occupational disease claims.

The rationale for this treatment was that in order to have an ACC claim the claimant must have suffered a personal injury via an accident in accordance with section 20 of the IPRC Act. To have a personal injury there must exist a personal injury date. So if no personal injury date exists until approximately the time the claim is reported, then no personal injury can have occurred until this time.

This was the intent of the legislation and it is consistent with subsequent legal opinions on the topic.

4.2 Contract structure and reserving

The two types of contracts described in section 4.1 receive different treatment when establishing outstanding claims reserves.

- 1) **Claims made:** For this type of contract the outstanding claim reserve at a given valuation date includes a liability in respect of those claims that have been reported but not finalised as at the valuation date. There is only a very small liability for claims that have yet to be reported (i.e. if the claim has been reported but has not yet shown up on the system) even if the event that will ultimately give rise to the claim has already occurred.
- 2) **Claims incurred:** For this type of contract the outstanding claims reserve at a given valuation date includes a liability in respect of:
 - reported claims not yet finalised as at the valuation date;

- claims where the insured event has occurred but the claim has not yet been reported (incurred but not reported, IBNR); and
- re-opened claims and claims where insufficient amounts have been reported.

The key difference is that only very small amounts of IBNR reserves are held for claims made policies. Even if the exposure that may ultimately lead to the claim has occurred, until the claim is reported no liability is held in the accounts for it.

The above treatment of claims under a “claims made” contract structure and the conclusion of section 4.1 implies the following. ACC need not hold a liability in its balance sheet for gradual process claims which have not been reported prior to the balance sheet date. This needs to be considered in conjunction with current accounting standards.

4.3 Accounting standards

The liability held in the balance sheet for gradual process claims is informed by the contract structure and any applicable accounting standards.

4.3.1 Current New Zealand accounting standards

The current New Zealand accounting standard for general insurance businesses, New Zealand Financial Reporting Standard 35 (FRS 35) – Financial Reporting of Insurance Activities, states that:

“5.18 A liability for outstanding claims must be recognised in respect of both direct business and inwards reinsurance business and must be measured as the present value of the expected future payments.”

While it does not talk specifically about claims made and claims incurred contracts it does include the following statement about gradual process claims.

“5.29 ... there may also be claims incurred but not reported (IBNR) at the end of the particular reporting period. This includes events which have occurred and will give rise to claims but have yet to be reported at the end of the reporting period and events which are occurring which will give rise to a claim in the future, such as gradual process injuries developing in the workplace.”

This would suggest that a liability should be held for gradual process claims as soon as the exposure has occurred rather than when the claim is eventually reported. However, in the comments following 5.18 in FRS 35 the following statement is made.

“5.19 ... The amount recognised as the liability for outstanding claims is to be the estimate of the expenditure required to settle the present obligation at the reporting date. The risks and uncertainties that inevitably surround claims are to be taken into account in reaching the best estimate of the outstanding claims liability.”

So it would appear that the liability only exists once there is an obligation to the claimant. The question then becomes, when does the obligation arise? Is it when the exposure giving rise to the injury has occurred or once the injury has manifested or once the insurer has been notified of the claim and accepted it for cover?

Adding to the debate is the statement made in 5.25 of FRS 35.

“5.25 ... Future events that may affect the amount required to settle a particular outstanding claims liability are only to be included where there is sufficient objective evidence that they will occur.”

So even if there is an obligation to the claimant there needs to be sufficient evidence that the claim will occur. Now the question becomes one of measuring the sufficiency of the evidence associated with claim occurrence. This is not a trivial exercise for gradual process claims which by their very nature can involve long latency periods which result in reporting patterns which are difficult to predict.

Finally 5.32 of FRS 35 states:

“5.32 The recognition as expenses and liabilities of the components of the ultimate cost of settling claims also depends on whether they can be measured reliably ...”

So there needs to be sufficient evidence of the existence of a claim and the costs associated with it then need to be reliably measured.

Analysis of FRS 35 does not clearly indicate the appropriate balance sheet treatment of gradual process claims. While on the one hand the standard clearly states that a liability for these claims must be held whether or not they have been reported (5.29 of FRS 35), on the other hand the conditions that must be satisfied in order to establish the extent of the liability (5.19, 5.25 and 5.32 of FRS 35) are such that holding the liability in the balance sheet may not be possible.

4.3.2 Future New Zealand accounting standards

The New Zealand equivalent to International Financial Reporting Standard 4 – Insurance Contracts (NZ IFRS 4) comes into force for reporting periods beginning on or after 1 January 2007. NZ IFRS 4 states that:

*”5.2.4 An outstanding claims liability shall be recognised in respect of direct business and reinsurance business and shall be measured as the central estimate of the present value of the expected future payments for **claims incurred** with an additional risk margin to allow for the inherent uncertainty in the central estimate.”*

Claims incurred are defined as:

“Claims that have occurred prior to the reporting date; the claims could be reported or unreported at the reporting date.”

Expected future payments include:

- Amounts in relation to unpaid reported claims;
- Claims incurred but not reported (IBNR);
- Claims incurred but not enough reported (IBNER); and
- Costs, including claims handling costs, which the insurer expects to incur in settling these incurred costs.

NZ IFRS 4 then goes on to describe the differences between a “**claims incurred**” basis and a “**claims made**” basis.

“5.2.4 ... For contracts written on a claims-incurred basis, claims arise from insured events that occur during the insurance contract period.”

“5.2.5 For contracts written on a claims-made basis, claims arise in respect of claims reported during the insurance contract period.”

On a claims-incurred basis the claims liability includes IBNR, IBNER and reopened claims costs. However under a claims-made basis there is no liability for IBNR claims.

So while current New Zealand accounting standards are somewhat open to interpretation the new accounting standards (NZ IFRS 4) make the treatment of claims incurred and claims made contracts very clear.

4.4 Actuarial standards

4.4.1 New Zealand actuarial standards

The New Zealand Society of Actuaries sets professional standards and guidance notes to assist its membership in the completion of their professional duties. The current standard covering general insurance reserving and reporting is “*Professional Standard 4: General Insurance Business*” (PS4).

Section 4.15 of PS4 states that the discount rate used to determine the present value of the outstanding claims liability should be determined in line with the current accounting standard, FRS 35. In fact PS4 was written with FRS 35 in mind to ensure the two standards were consistent.

PS4 goes on to state:

“7.2 Outstanding Claims Liabilities must cover, unless specifically excluded:

- *amounts in relation to unpaid reported claims,*
- *amounts in relation to claims incurred but not yet reported,*
- *adjustments in the light of the most recently available information on claims development, for claims incurred but not enough reported,*
- *amounts in relation to claims which have been administratively finalised but which may be reopened, and*
- *direct and indirect costs that the Actuary expects the Insurer to incur in settling these claims.”*

There is no mention of a separate treatment of claims under a *claims made* contract structure. However, the amounts outlined in section 7.2 of PS4 are exactly the same as those included in the definition of claims incurred in NZ IFRS 4. When PS4 is updated (scheduled for second half 2006) it is likely that the update will be written with NZ IFRS 4 in mind. This will probably lead to explicit treatment of contracts under claims incurred and claims made contracts.

4.4.2 Australian actuarial standards

The Institute of Actuaries of Australia published Professional Standard 300 Actuarial Reports and Advice on General Insurance Technical Liabilities (PS300) in April 2002. PS300 defines the outstanding claims liability as:

“An insurer's outstanding claim liabilities at a given date (the valuation date) are equal to the value of claim payments to be made after the valuation date, in respect of claims which, under the terms of its contracts, arose on or before the valuation date for which the insurer is expected to be liable...”

The standard goes further to say:

“For each class of business, the actuary should be conversant with the general characteristics which may have a material bearing on the estimation of the liabilities. This may include familiarity with the contractual terms and legislated benefits payable under policies written, differences between the

unexpired risk exposure (that exposure underlying the premium liabilities) and the exposure underlying the outstanding claim liabilities, changes in underwriting standards, changes in premium rates, case estimation procedures, as well as other attributes, such as deductibles, policy limits and reinsurance arrangements.”

So while there is no specific reference to claims incurred and claims made contracts the wording of PS300 indicates that the relevant contractual structure should be taken into account.

4.5 Reserving for gradual process claims

In summary current accounting and actuarial standards are inconclusive on the subject of the extent of the liability that needs to be held in the balance sheet of an entity for gradual process claims. The new accounting standards due to be implemented from 1 January 2007 do provide some clarification on the treatment of claims incurred and claims made contracts.

As mentioned in section 4.1 current practice at ACC is to hold a liability for a gradual process claim only once the personal injury has occurred. In general this equates to approximately the same time that the claim is reported.

This treatment of gradual process claims has been debated both internally and with external parties leading up to each of the last two balance sheet dates. In each case the decision to hold a liability for gradual process claims only once they have been reported has been upheld.

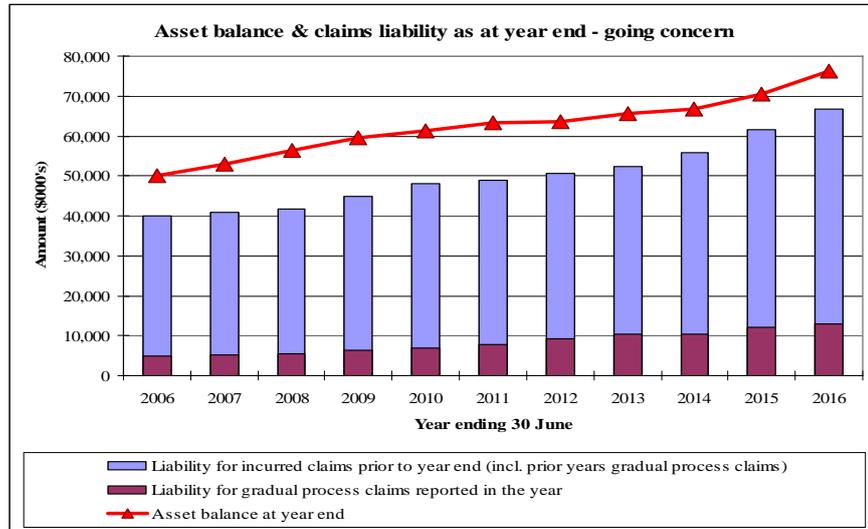
4.5.1 Reserve funds

A question that could be asked is what would happen if ACC closed its doors tomorrow? If components of the scheme were privatised again the question would become far more pressing. Arguably ACC would still have a liability for gradual process claims relating to exposure prior to the wind up of the scheme. Since no reserves were set aside in the balance sheet for these as yet unreported gradual process claims there could well be a funding shortfall.

Following standard accounting concepts balance sheets must be prepared on a **going concern** basis. That is, unless the company is in run-off or is being wound up the liabilities in the balance sheet must be estimated assuming the company will continue to write new business.

The following figure, which is based on artificial data, illustrates how increasing assets as a result of continued inflows of premium can offset the continued inflow of gradual process claims.

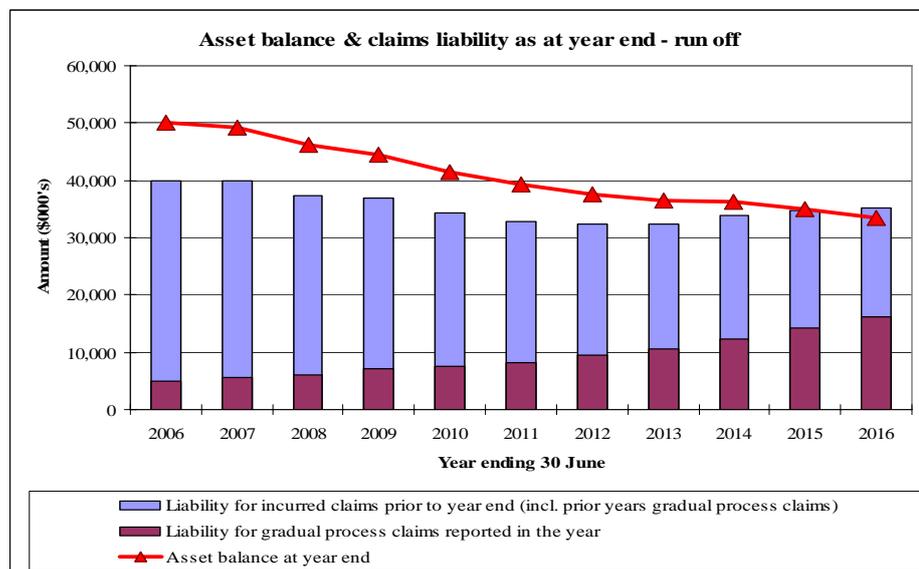
Figure 4.1; Example of funding under a going concern



If a company was being wound up or placed in run-off the treatment of gradual process claims would be likely to be different. Since no new revenue could be expected to offset claims being reported in the future a reserve would need to be established to pay for gradual process claims prior to the company’s wind up. This has been the case in the UK where the collapse of insurer Chester Street Insurance Holdings Ltd. in 2001 resulted in the Policyholder Protection Board (a scheme operated under the Department of the Environment, Trade and Regions) and former employers becoming liable for asbestos claims formally covered by Chester Street (British Asbestos Newsletter 2001).

The next figure illustrates the problem which can occur when there is no longer an inflow of premium income to offset the continued reporting of gradual process claims.

Figure 4.2; Example of funding shortfall



The above figure shows how gradual process claims can become an increasing proportion of the total liability when a book of business is closed. This occurs because the liability for existing claims reduces when no new cover is being written but the gradual process exposure has already occurred.

Since this potential funding shortfall exists there is an argument for setting aside reserves, albeit independently of the balance sheet claims liabilities, to cover future gradual process claims. The key difficulty in establishing these reserves is the uncertainty around the future incidence of these types of claims. The sources of gradual process injuries are not always obvious and there could easily be claims in the future as a result of as yet undiagnosed exposures occurring now (e.g. cell phone use or prolonged exposure to computer monitor radiation).

However, just because something is difficult does not mean that it should not be done. There are a number of examples of reserve funds being established for gradual process claims and other event related liabilities in the current market. These include:

- The Fairness in Asbestos Injury Resolution Act (the FAIR Act) in the US aims to establish a no-fault trust fund to pay compensation to victims of asbestos related diseases. The trust would be funded by defendant companies and insurers involved in asbestos liability disputes (Gravelsons et al 2004).

The FAIR Act has not yet become law and has met with some opposition from insurers on the grounds that it does not provide closure on the issue of liability.

- In December 2004 Australian company James Hardie Industries agreed to establish an asbestos liability fund of up to AUS\$4.5 billion. Under the agreement the company agreed to make annual payments, initially capped at 35% of the company's free cash flow, into a special fund to compensate victims.
- Chemical company Dow Corning paid US\$3.2 billion into a fund with the aim of settling claims for ruptured implants and claimed autoimmune disease symptoms. The settlement was made in 1998 and Dow Corning was placed in bankruptcy protection for nine years.
- A number of workers compensation schemes in Canada hold reserve funds for occupational disease liabilities, earthquake liabilities and investment fluctuations. Specifically in the 2005 accounts of the Workers Compensation Board of British Columbia a reserve of \$200 million (45% of the total reserve) is held for latent occupational disease claims. The Workers Compensation Board of Alberta also holds a reserve of \$283 million for such claims.

4.5.2 Auditors and the final decision

The treatment of gradual process claims impacts on a number of areas of the business and as such affects a number of stakeholders. There are implications in terms of the company's solvency position, premium/levy rates, profit and loss and even its data requirements.

In terms of the balance sheet the objective is to present a true and fair picture of the company and to receive an unqualified sign off from the auditors. Any decision on the treatment of gradual process claims needs to be made in consultation with the key stakeholders.

Having made the decision not to hold a liability for unreported gradual process claims at the balance sheet date ACC was faced with another decision about the funding of these claims.

5 Levy rates

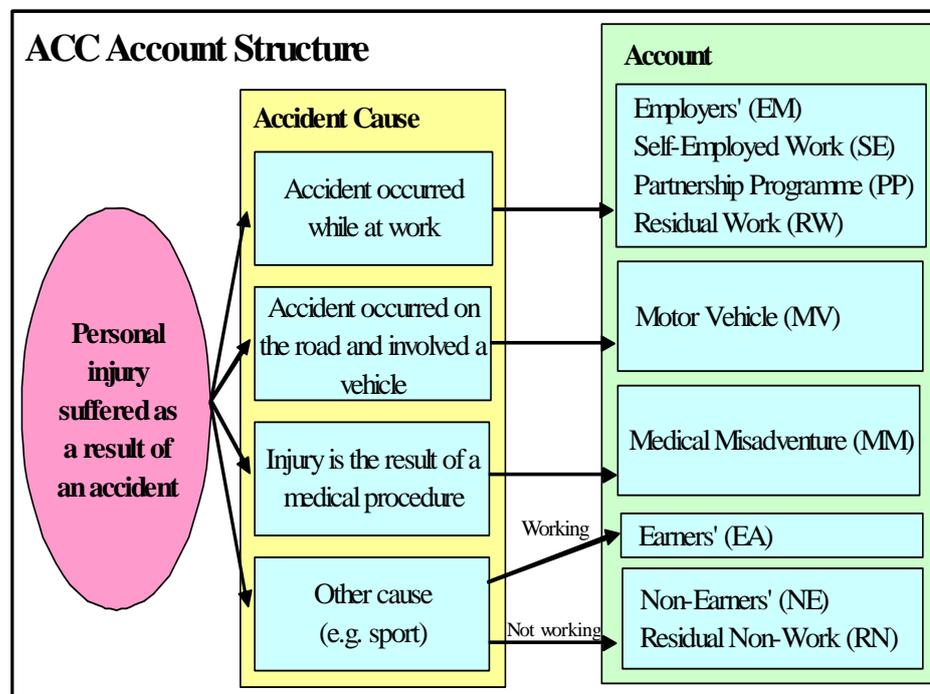
The issue of which claim costs necessitate a liability in the balance sheet and which need to be funded via the collection of levies involve the consideration of different factors. While the balance sheet liabilities are informed by professional standards and the contract structure behind the claims, the levy rates are determined by the funding policy associated with the accounts the claims are allocated to.

5.1 Account structure at ACC

ACC assesses its funding position, performs reporting and sets levy rates separately for a number of accounts. The account structure is designed to attempt to ensure that the people getting cover, or who have the most control over the risk, in a certain situation are also the people paying the levy rates for the cover being provided.

The following diagram illustrates the current account structure at ACC.

Figure 5.1; Account structure at ACC



5.2 Claim allocation

5.2.1 Historic claim allocation

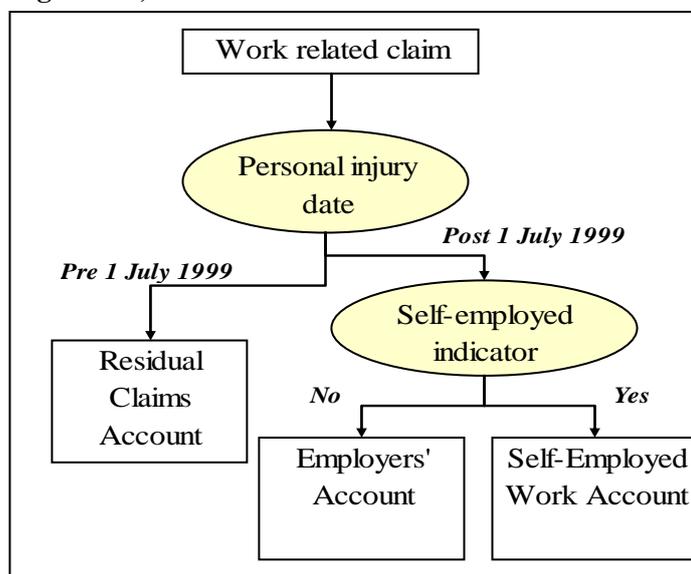
In the past claims have been allocated to accounts based on a number of pieces of information. This information included:

- Personal injury date;
- At work indicator (i.e. did the accident occur at work – yes/no);
- Self-employed indicator (i.e. was the claimant self-employed at the date of accident – yes/no);
- On the road indicator (i.e. did the accident involve a moving vehicle on a public New Zealand road – yes/no);
- Medical error indicator (i.e. was the accident the result of a medical error – yes/no); and
- Sensitive claim indicator (i.e. was the claim the result of abuse or another sensitive issue – yes/no).

The following diagram illustrates the allocation of work related claims (those with the “at work” indicator checked). The date of 1 July 1999 was the

commencement of the period during which the ACC work accounts were privatised. This was also the date on which the Residual Claims Account was established.

Figure 5.2; Allocation of work related claims



The same allocation algorithm was applied to gradual process claims and non-gradual process claims. The algorithm was built into ACC’s systems so that the account would be determined automatically based on the other information entered about the claim. This automation was implemented to reduce the number of incorrect account allocations.

5.2.2 Current claim allocation

A Supplementary Order Paper to the Injury Prevention, Rehabilitation, and Compensation Amendment Bill (No 3) has changed the way in which gradual process and occupational disease claims are funded. Section 28A (6) which amends section 192 (6) of the IPRC Act states:

“The funds in the Residual Claims Account must also be applied to meet the costs of entitlements for personal injury caused by work-related gradual process, disease or infection if

- (a) the employment task, or employment in the particular environment, giving rise to that personal injury was performed or occurred before 1 July 1999; and*
- (b) the claimant was an employee or self-employed when performing that task or in that environment (regardless of whether the claimant was an employee or self-employed at the date on which the personal injury is regarded as having been suffered).”*

This sub-section modifies the connection between the Residual Claims Account and the personal injury date for gradual process and occupational disease claims.

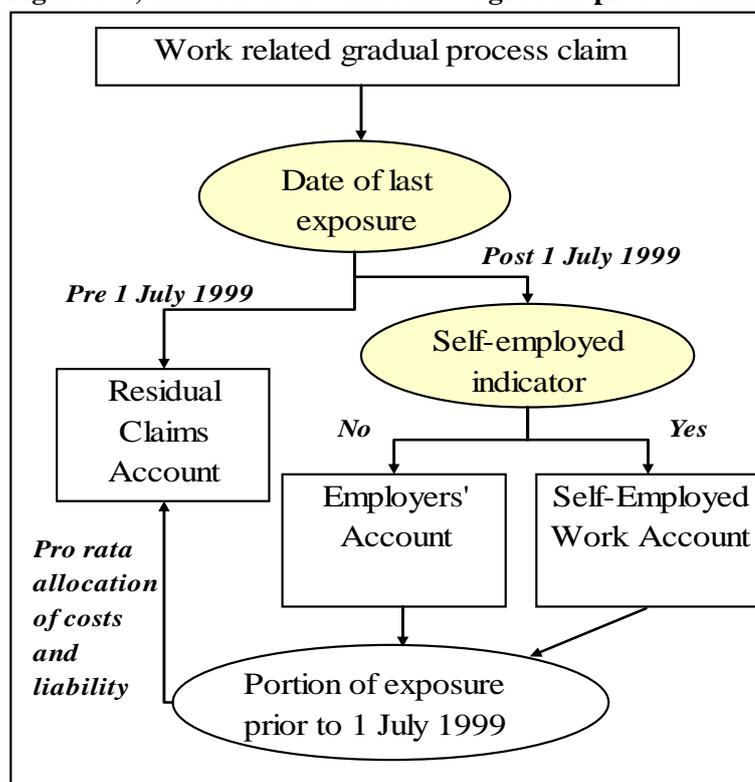
The IPRC Act was further amended to allow the apportionment of gradual process claims between accounts depending on when the exposure that gave rise to the injury occurred. Section 274 (3A) of the IPRC Act states:

“The costs of claims for personal injury caused by work-related gradual process, disease, or infection to which section 167 (4) or section 192 (6) or section 201 (4) applies may be apportioned to the Employers’ Account, the Residual Claims Account, and the Self-Employed Work Account in a way that the Corporation considers appropriate having regard to the exposure period of the claimant to the injury-causing agent.”

An ACC legal opinion has confirmed that the “may” in the above section of the Act applies to the apportionment method. That is, claims must be apportioned where appropriate but the method of apportionment has a discretionary element to it provided the period of exposure is considered.

Following these amendments gradual process claims are now allocated to accounts in a different way to non-gradual process claims. The following figure sets out the allocation algorithm for gradual process claims.

Figure 5.3; Allocation of work related gradual process claims



Unfortunately, although the legislation pertaining to the allocation of gradual process claims was amended, ACC’s systems were not. Hence gradual

process claims continued to be allocated to accounts based on their personal injury dates. In fact ACC’s systems were not designed to capture the date of last exposure for gradual process claims. Neither were they designed to capture information about the periods of exposure pre and post 1 July 1999. As such changing the allocation method is difficult and apportioning claims between accounts is almost impossible.

The old allocation algorithm is applied to gradual process claims so they are allocated based on personal injury date. This allocation then needs to be manually overridden to place claims into accounts based on their date of last exposure. Data extraction systems also had to be modified so that they would not overwrite the manual account changes.

5.2.3 Allocation of gradual process hearing loss claims

In order to assess the numbers of gradual process hearing loss claims which had been incorrectly allocated to the Employers’ and Self-Employed Work Accounts a random sample of 837 such claims were reviewed. To be eligible for inclusion in the sample a claim needed to have been identified as a gradual process hearing loss claims with a personal injury date after 1 July 1999. The claim also needed to have been allocated to either the Employers’ Account or the Self-Employed Work Account.

The claim lodgement records including the specialist reports were retrieved for each of the sampled claims. From these paper files it was possible to approximate not only the date of last exposure to workplace noise but also the periods of exposure for each claim. The findings of this review are set out in the following figures.

Figure 5.4; Proportional split of sample based on date of last exposure

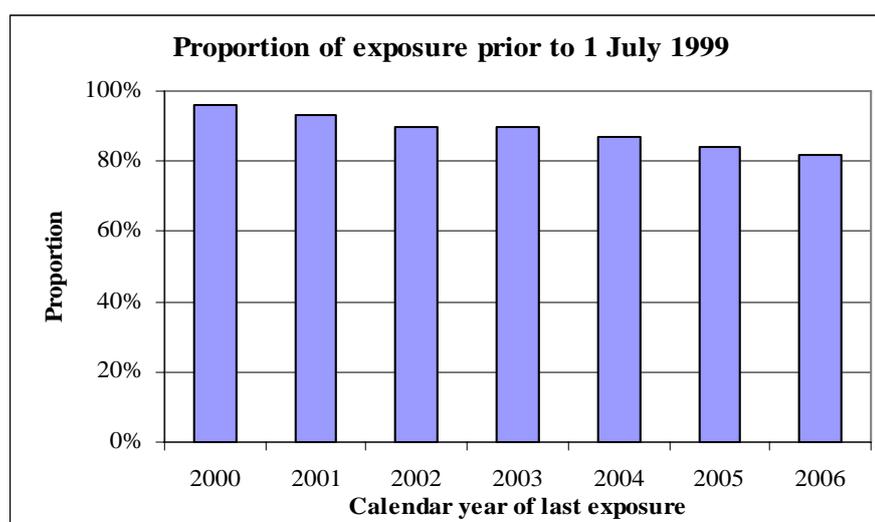


Not surprisingly there was a far higher proportion of self-employed with dates of last exposure after 1 July 1999. This is consistent with evidence of

self-employed people working beyond standard retirement age (Bruin et al 2001 – NZ experience; Burkhouser et al 1998 – US experience). A high proportion of the self-employed people with noise exposure after 1 July 1999 were working in the farming and building sectors.

For those claims with a date of last exposure after 1 July 1999 the periods over which the exposure occurred were analysed.

Figure 5.5; Average proportions of exposure prior to 1 July 1999



As expected the proportion is decreasing over time. There was very little difference in the proportions for each of the two accounts. Based on the current rate of reduction in this proportion the pre 1 July 1999 proportion of exposure would not be expected to fall below 50% for another 17 years. That is, based on the observed trend above it will not be until 2023 that the gradual process claims being reported will consistently have more than half of their exposure occurring after 1 July 1999.

The above assumption has significant implications for the funding of the scheme and the difficulty in allocating claims to accounts correctly. However there is still great uncertainty around the rate at which these claims will continue to be reported.

The average delay between the date of last exposure and the personal injury date also varies by account. For the Employers’ Account the average delay is 8.8 years while for the Self-Employed Work Account it is only 2.7 years. Given the propensity for self-employed people to work longer this is not surprising. Overall the average delay is approximately 7.4 years.

Further information on the characteristics of gradual process hearing loss can be found in section 6.

5.3 Levy rating

The major implication of the amendments to the IPRC Act pertaining to the allocation of gradual process claims to accounts is that even though the Residual Claims Account has been closed since 1 July 1999 there are now new claims being lodged in this account each year. That is, prior to this amendment there were no Residual Claims Account claims with personal injury dates later than 30 June 1999. Subsequent to this amendment there can be claims with personal injury dates as recent as today and there is an expectation that claims will continue to come into the Residual Claims Account for at least the next 20-30 years.

This creates a conflict with the current funding policy which states that no further Residual Claims Account levies can be raised after 30 June 2014. The result of this is the same as the run off scenario outlined in section 4.5.1. Hence if no allowance is made for these future claims a funding shortfall is likely to occur.

As an example, ACC is currently receiving approximately 4,500 gradual process hearing loss claims per year which go on to receive hearing aid payments. It is estimated that each of these claims has a lifetime cost of approximately \$20-30,000 in today's dollars (see section 6). This equates to a fully funded cost of approximately \$90-135 million each year. These costs are now being placed in the Residual Claims Account and it is uncertain how many more of these claims are yet to be reported. This alone makes the question of how gradual process claims are funded a significant one.

There are a number of options available to fund future gradual process claim costs:

1. Take account of the costs of future gradual process claims now in setting the current Residual Claims Account levy rates, even though these gradual process claims will not be reported until, and will have a personal injury date, some time in the future. This would result in a significant increase in the Residual Claims Account levy rate but then, all else being equal, flat rates through to 2014.
2. On the basis that gradual process claims will continue to be attributed to the Residual Claims Account and that the account needs to be fully funded by 2014, gradually increase the Residual Claims Account levy rates from now through to 2014 so that the resulting levy income covers the cash cost of gradual process claims until 2014 and also builds up sufficient reserves so that the account is fully funded by 30 June 2014. Note that being fully funded by 30 June 2014 implies holding sufficient assets at this time to fund gradual process claims reported after this date that will be attributed to the Residual Claims Account. There are various ways in which the Residual Claims Account levy rates can be calculated to achieve this funding target.

3. Change the legislation so that gradual process claims are attributed to the appropriate account based on the claimant's status at the date of last exposure (i.e. most likely the Employers' or Self-Employed Work Account). These claims could then be funded on a "claims made" basis without significant impact on the levy rates of any of the accounts concerned.

If either of options 1 or 2 are selected it becomes necessary to estimate the costs associated with future claims (i.e. those claims whose exposure has occurred but which have not yet been reported).

A similar issue arises if reserve funds are to be established for accounts which are not closed. The problem is somewhat lessened in this case by the inflows of premium/levy income.

6 Modelling and forecasting

If reserves are required for as yet unreported gradual process claims, either for balance sheet reporting, establishing reserve funds or for setting premium/levy rates, then estimates of the future incidence and costs of these claims need to be made.

In this section of the paper the modelling of ACC's work related gradual process noise induced hearing loss (NIHL) claims reported after 1 July 1999 will be examined.

6.1 Characteristics of NIHL claims

ACC has currently accepted for cover and paid hearing aid related entitlements to approximately 13,500 NIHL claims with personal injury dates after 1 July 1999. These claims form a subset of the 22,000 claims accepted for cover (i.e. have at least 6% hearing loss with at least 20% of the loss being work related) as mentioned in section 3. So, between 60% and 65% of all accepted claims could be expected to go on to be accepted for entitlement (i.e. the amount of work related hearing loss is at least 6%).

The statistics and results presented in this section are all based on this group of 13,500 claims. That is, the model only projects costs for claims which will receive hearing aid entitlements. Claims which are accepted for cover but not for entitlement incur audiologist and specialist costs during their assessment but these are not modelled. A loading based on the proportion of claims which are not eligible for entitlement and the average audiology and specialist costs could be added to the simulated results.

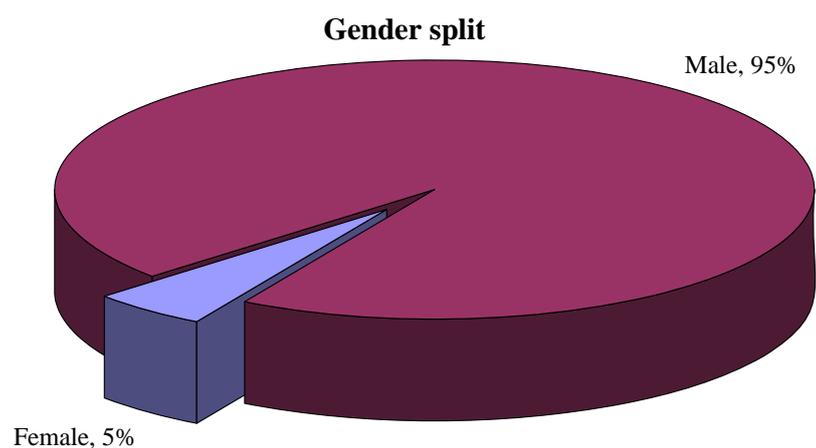
6.1.1 Demographic statistics

In order to model NIHL claims it is necessary to understand the characteristics of the claimants with these injuries. Due to the long latency periods associated with this type of gradual process injury and the occupations that involve prolonged exposure to noise, the characteristics of these claimants are significantly different when compared to the characteristics of non-gradual process claimants.

6.1.1.1 Gender

NIHL claimants are predominantly male. This is not unexpected given the occupations that give rise to work related gradual process hearing loss (see section 6.1.1.3). Of the 13,500 claims with personal injury dates after 1 July 1999 which are receiving hearing aid entitlements only 5% were female.

Figure 6.1; Gender split of NIHL claims



6.1.1.2 Age

Age at the date of personal injury was examined both for the claimants receiving hearing aid entitlement and for all NIHL claims (including those accepted but not entitled to hearing aid benefits) with personal injury dates after 1 July 1999. The following table shows the average ages by gender.

Figure 6.2; Average age by gender (post 1 July 1999 claims)

Group	Female	Male	Combined
All NIHL claims accepted for cover	66.1	63.6	63.8
NIHL claims receiving entitlements	67.7	65.5	65.6

Interestingly the average age of accepted claims is lower than the average age of entitled claims. This could indicate that age related hearing deterioration is contributing to claims passing from being accepted to being entitled. Alternatively it may indicate that more serious hearing loss has a slower reporting pattern, which is possibly linked to the environments where it arises.

Self-employed NIHL claimants are on average three years younger when they report their gradual process hearing loss claim than their employed counterparts. So although self-employed people work for longer they have shorter average latency periods (2.7 years versus 8.8 years for employees) resulting in younger average ages at the date of personal injury.

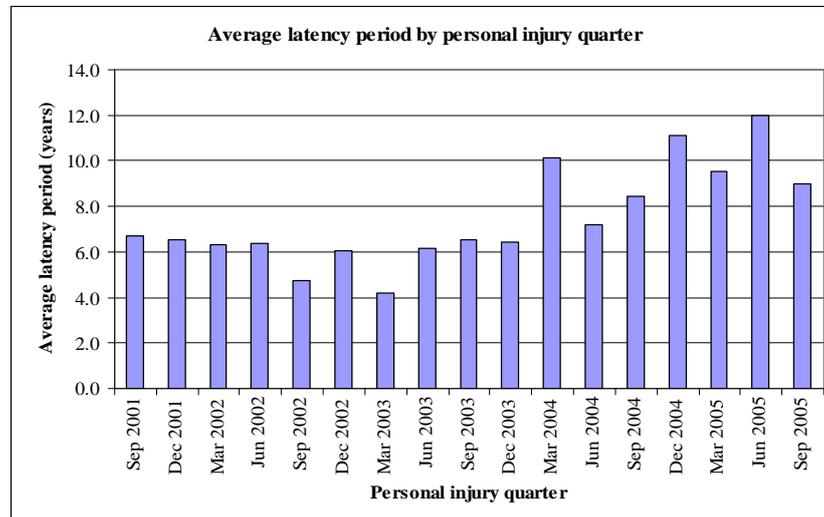
Over time the average age is increasing as indicated in the following figure.

Figure 6.3; Average age by personal injury year (male & female combined)

Group	2003	2004	2005	2006
All NIHL claims accepted for cover	62.7	63.4	64.6	65.3
NIHL claims receiving entitlements	64.7	65.7	66.7	67.4

This increase in average ages over time may have important implications. An increasing average age may imply that the claims being reported in recent years all relate to exposures that ceased at approximately the same time. That is, it may indicate that work environments have changed and the incidence of NIHL will reduce in the future. This is reinforced by an observed increase in the average latency period over the last few years.

Figure 6.4; Average latency period over time



However the increase in average age may also be a result of longer latency periods due to better awareness of workplace noise and more use of sound muffling devices causing onset of hearing loss to be delayed but not prevented. This is supported by research which has found that “*personal hearing protection devices are an imperfect solution to excessive noise exposure on their own*” (Ameratunga et al 2006).

The age distributions for female and male claimants in the group of 13,500 NIHL claims receiving entitlements are shown in the following two figures.

Figure 6.5; Female age distribution

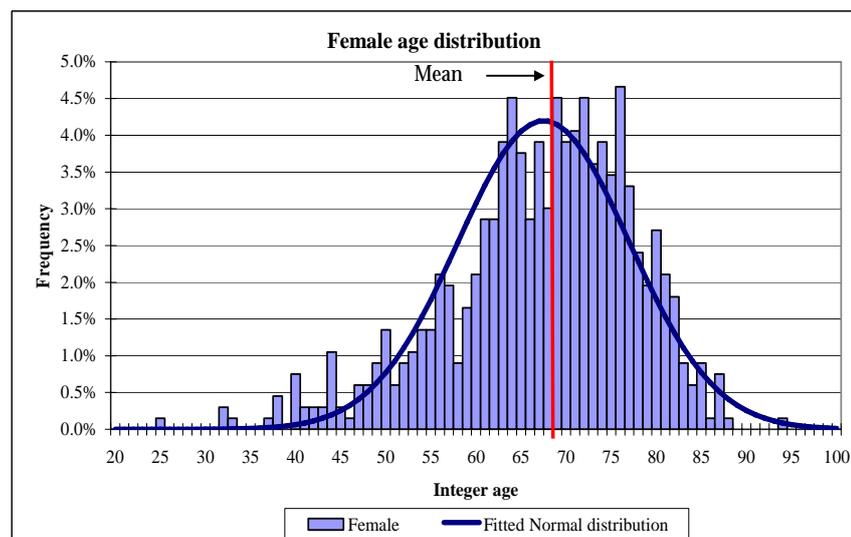
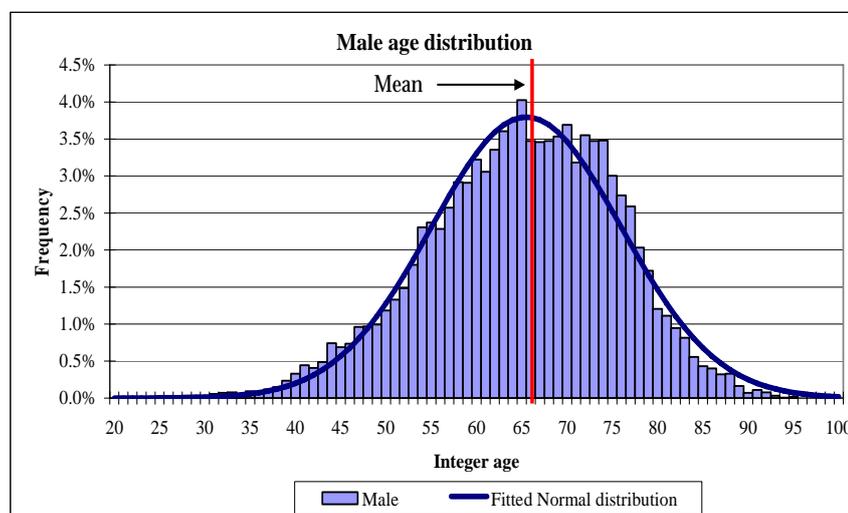


Figure 6.6; Male age distribution



The standard deviations of the age distributions are reasonably similar across genders, accounts and personal injury years.

The fitted Normal distributions are used in the simulation model described in section 6.3 of this paper.

6.1.1.3 Occupation

The primary industries where levels of workplace noise exposure are such that they can give rise to gradual process hearing loss have been identified as agriculture and fisheries, trade industries (e.g. building and construction) and machine operators and assemblers (Ameratunga 2006). This is not unexpected given the levels of noise exposure in these professions. It also fits with the observation that the majority of claims for NIHL are lodged by males.

Analysis of the sampled claims (see section 5.2.3) revealed a similar breakdown by occupation. This is shown in the following table.

Figure 6.7; Main occupations for sampled NIHL claims

Occupation	Proportion of sampled claims in occupation
Farming (agriculture)	32%
Building and construction	25%
Engineering/factory work	21%
Truck/tractor driving	10%
Other occupations	12%

Hearing loss in different occupations can arise from different sources. Some of the sources of hearing loss for the key occupations, and some potentially new at risk occupations, are outlined below (Ameratunga 2006).

Agriculture

In general, the agriculture industry experiences noise exposure at levels just above recommended safe standards. Activities such as operation of chainsaws, feeding pigs, discharging firearms and driving cables tractors gave rise to a substantial proportion of the noise exposure.

The low levels of noise exposure results in gradual hearing loss which is difficult to detect at first. It also makes it more difficult to identify the sources of harmful noise.

Building and construction

The use of power tools, especially hand held power tools, air blowers and jack hammers, are the primary sources of excessive noise in this industry. This is compounded by the lack of safety precautions taken in these fields (due to safety fears associated with wearing hearing protection devices).

Engineering/factory work

Working noisy machines or being in a noisy environment for a substantial portion of each day can have a prolonged effect on hearing. While the risks in this area are understood the protection available does not eliminate the source of the damage.

Fire fighters

The noise levels associated with sirens or the interior of a burning building can result in hearing damage. The danger of hearing loss is often overshadowed by the risk of injury and death.

Hospitality workers

Amplified music in many venues can put employees at risk of hearing loss. There are few options with regards to hearing protection in this type of employment due to the need to communicate with patrons.

6.1.2 Entitlement statistics

As outlined in section 2.2 of this paper there are a number of entitlements offered to hearing loss claimants. The simulation model estimates costs for all but the Non-Fatal Weekly Compensation and Independence Allowance costs. These two entitlements were excluded as most of the claimants were post retirement age at the date they had their personal injury and the level of hearing loss required to be classified as significantly bodily impaired was quite high.

6.1.2.1 Audiology costs

Audiology costs fall into two broad groups:

- General consultations; and
- Hearing aid fittings (at issue and replacement).

The first of these two groups of costs occur at irregular intervals during the life of a claim. They are associated with check-ups and visits to have aids modified slightly or repaired. The average cost of a payment in this group is approximately \$35.

The second type of cost is incurred every time a hearing aid is fitted. The cost covers initial consultations as well as making moulds of the ear. The fitting of the hearing aid and the subsequent tweaks to get the reception and fit correct are all a part of this fee. The average cost of a payment in this group is approximately \$1,200 for a monaural fitting and \$2,000 for a binaural fitting.

Each group of costs was fitted separately using log-normal distributions. The model then simulated costs from the first group in projection quarters where no aid was provided and from the second group when an aid was also provided.

6.1.2.2 Hearing aid costs

Based on observed payments hearing aid payments appear to fall into three distinct groups.

- Those with an average cost under \$2,750;
- Those with an average cost between \$2,750 and \$3,500; and
- Those with an average cost over \$3,500.

Each of these groups was modelled separately so that the fitted distributions would better reflect the data.

The cost groups roughly reflect the different types of hearing aids provided. The under \$2,750 group covers cheaper monaural devices and some repair and modification costs. The costs between \$2,750 and \$3,500 relate to digital monaural devices and some discounted binaural devices. The over \$3,000 group includes the double (binaural) devices supplied to claimants with hearing loss in both ears.

The model allowed for 10% of claimants to fall into the under \$2,750 hearing aid group and 75% to fall into the over \$3,500 hearing aid group. This proportional split was based on observed data over the last four years.

Work related gradual process hearing loss is usually binaural (see section 2.1) so it would be expected that the bulk of the hearing aids provided would be dual devices, i.e. fitted in both ears. The cost differentiator would then be the quality of the aids provided. For example, the sensitivity of the receptors or the number of settings. The quality of the device provided should in theory be based on the needs of the claimant.

6.1.2.3 Battery costs

Where a hearing aid is provided ACC also covers the cost of providing batteries for the aid. On average the per claimant spend on hearing aid batteries was \$14.50 per quarter. Some of these costs will be the transport and handling of the batteries.

When a hearing aid is fitted a supply of batteries is generally also provided. This leads to significant periods where entitled claimants have \$0 battery costs. These have been excluded and non-zero battery costs were modelled using a log-normal distribution.

6.1.2.4 Other costs

The remaining costs simulated by the model relate to specialist consultations and hearing aid maintenance.

The specialist (ear, nose and throat surgeon) visit associated with establishing cover is modelled as a one off cost averaging \$335 occurring at the commencement of the claim.

Other hearing aid related costs, such as maintenance and repairs, are modelled via a discrete stepwise distribution with average costs per quarter of \$80. Not all claimants receive these payments so the model randomly allocates these costs to 90% of the claims.

6.1.2.5 Other model parameters

Period until first specialist payment

The one-off specialist consultation cost associated with a visit to an ENT (ear, nose and throat) surgeon occurs at the beginning of the life of a hearing loss claim. Usually a GP or an audiologist refers the claimant to an ENT specialist when the claimant presents with symptoms of hearing loss. It can then take four to six months to get an appointment with the ENT specialist. Until the specialist has signed off on the proportion of the hearing loss that is work related no further action is taken on the claim.

The data supports the assertion that the average delay until the specialist visit is approximately four months. The model simulates the delay until the specialist visit from a Poisson distribution.

Period until first hearing aid payment

As outlined in section 2.1 of this paper the period from a claim being reported to ACC paying for their hearing aid is on average nine months. The duration between lodging a claim and receiving a hearing aid related payment has been getting longer in more recent payment years. However, the delays in these payments make recent years more uncertain which is evidenced by the increasing variation around the average delay.

The model assumes an average of three quarters until the first hearing aid payment. For each claim the delay is simulated from a Poisson distribution. The simulated delay is further constrained to be at least as long as the delay until the specialist visit simulated above.

Re-aiding period

The model also needs to assume the length of time between receiving a hearing aid and it being replaced (the “*re-aiding period*”). Given that the payment history used in the model only covers a five year period it was not possible to reliably estimate the “*re-aiding*” period from the data. A consideration of earlier gradual process claims indicated a re-aiding period of approximately six years.

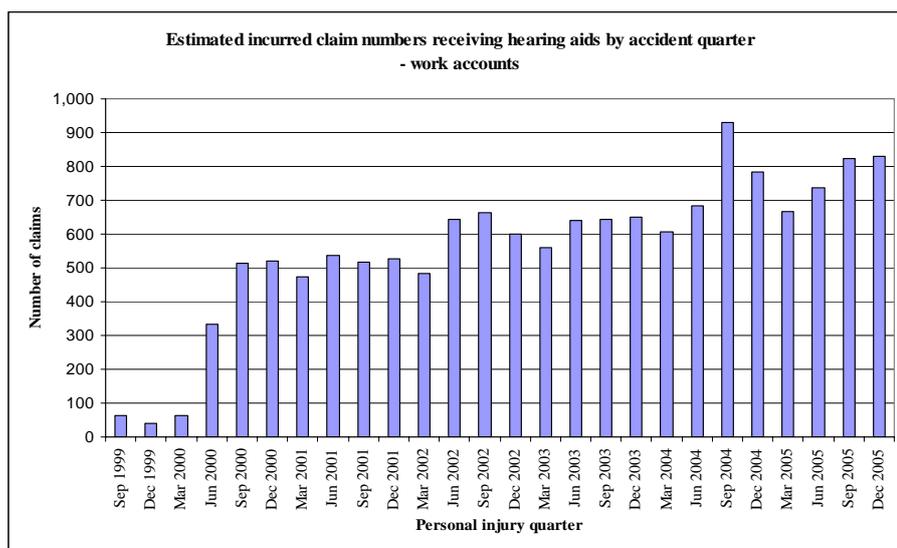
The modelling data indicated that the re-aiding delay was increasing in each payment year. This is not unexpected as each payment year extends the payment history of existing claims as well as adding a new accident year. For the March 2006 payment year the re-aiding delay was on average 2.2 years. The standard deviation around this figure was also just over two years.

Anecdotal information also indicates that the average re-aiding period is about five years. Until a longer more stable history of claims re-aiding is available an assumed re-aiding period of five years will have to suffice. A change in ACC policy and controls could also help to solidify this assumption.

6.2 Claim incidence rates

Figure 3.1 of section 3 shows the numbers of gradual process claims accepted for cover each quarter for the last five years. It has already been mentioned (section 6.1) that approximately 65% of claims accepted for cover are also accepted for, and paid, entitlements. This equates to approximately 800 NIHL claims per quarter being reported, accepted and receiving entitlements. The following figure shows the reporting pattern of these claims over the last six years.

Figure 6.8; Reporting of covered & entitled NIHL claims



It should be noted that the numbers in the above graph are estimates of ultimate incurred claim numbers. The delays between personal injury date and lodgement date are, by definition, short (in general 100% reported within one or two years) but there will still be some claims that are not lodged until some time after their personal injury date. This is especially true in the most recent personal injury quarters.

6.2.1 Projected reported claim numbers

Claim numbers have been growing at approximately 10% per annum for the last three years. This type of growth cannot continue forever so a decision needs to be made as to the volume of as yet unreported claims based on those that have been reported. There are strong indicators that the growth in claim

numbers will continue in the short term but the duration of this future growth is still highly uncertain.

The change in ACC's legislation outlined in section 5.2.2 has made it necessary to estimate the future costs of gradual process hearing loss claims that will be allocated to the Residual Claims Account (those with a date of last exposure prior to 1 July 1999). The allocation of costs, and hence liabilities, between accounts also necessitates estimating the amount of funding those proportions of NIHL costs allocated to the Residual Claims Account will require.

At this time there is no need to estimate the future costs associated with gradual process claims where the exposure occurred entirely after 1 July 1999. These claims would be allocated to current accounts with ongoing funding and as such they would be funded on a "claims made" basis. That is, a liability will only be held for them once they have had a personal injury.

So, the model needs to estimate the numbers of claims yet to be reported whose exposure to workplace noise occurred either entirely, or at least substantially, prior to 1 July 1999. This allows the numbers of reported claims to decrease to zero after a number of years.

As discussed in section 5.2.3 approximately half of the gradual process hearing loss claims with personal injury dates after 1 July 1999 have had all of their exposure to workplace noise prior to 1 July 1999. The other half of the claims in this group have had on average 90% of their exposure prior to 1 July 1999. The rate of decrease in the proportion of exposure prior to 1 July 1999 suggests that it may be another 17 years before the claims being reported have a 50:50 split of pre and post 1 July 1999 exposure.

The growth in current claim volumes combined with the legislation allowing claims to be apportioned across account makes forecasting the numbers of future claims difficult. It is widely expected that the growth in claim volumes will continue but the level and duration of this growth is uncertain. There must also be a tapering off in the number of claims reported as more and more of the exposure relates to post 1 July 1999 periods. When this tapering off will begin and how long it will last is also uncertain.

ACC's aggregate valuation at June 2006 (as produced by PricewaterhouseCoopers) has allowed for a further three years of growth in gradual process hearing loss claim expenditure in the Residual Claims Account. This assumption was set in consultation with ACC and based on the expectation that changes in ACC policy or processes would control future cost increases.

For example either of the following two graphs may illustrate possible future reporting patterns.

Figure 6.9; First possible future claims reporting pattern

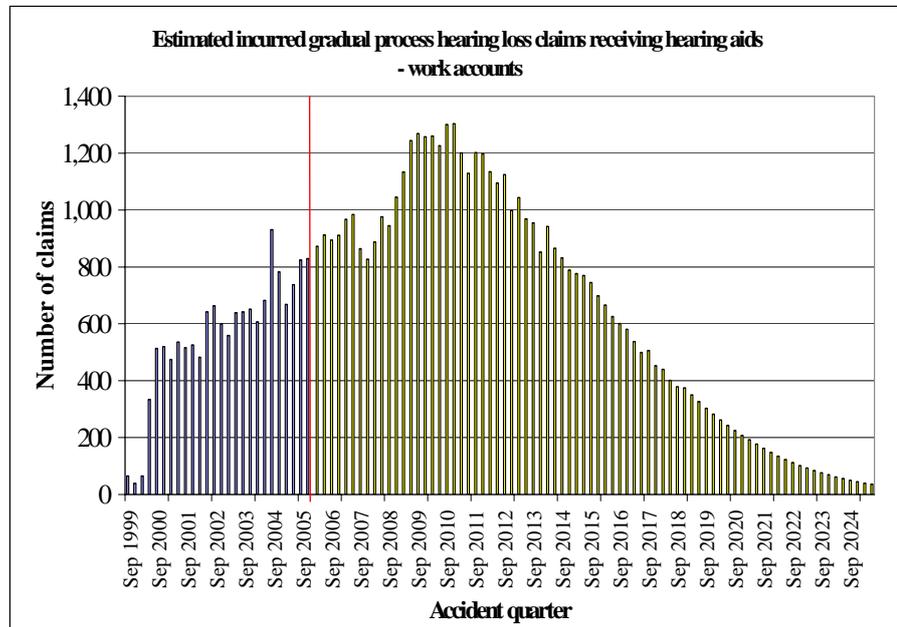
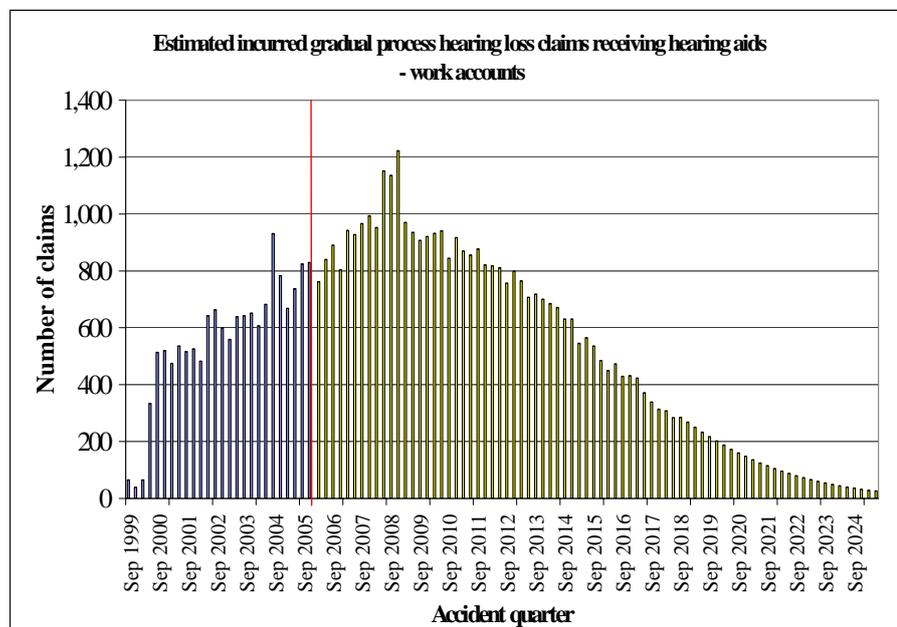


Figure 6.10; Second possible future claims reporting pattern



The apportionment of claims between accounts means that the reporting pattern may stretch even further into the future than either of the above graphs indicates.

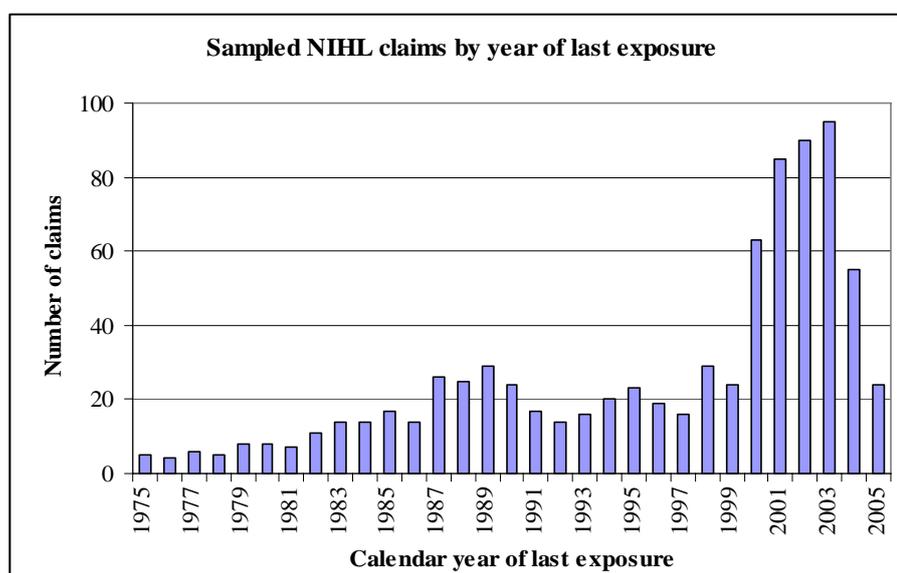
6.2.2 Sample data and estimated future claims

Since ACC’s systems currently do not capture dates of exposure for gradual process claims an analysis of the sampled claims (see section 5.2.3) was performed in order to try and establish a relationship between the date of last exposure and the date at which a claim gets reported. 837 claims with accident dates after 1 July 1999 were sampled and studied.

The dates of last exposure for the sampled claims ranged from 1945 (even though claims whose exposure ceased prior to 1 April 1974 should, in theory, not be covered) right through to the present day. This means that the 837 claims were spread over 60 plus years of last exposure. The result of this was that there was a sparsity of data in many of the exposure years. This makes inferences about the future reporting patterns difficult.

Entitlement decision delays left the latest two years of last exposure under represented in the sampled data. An adjustment had to be made to the information in these years’ based on past patterns. This also contributes to the difficulty in estimating the numbers of future claims based on the sampled data. The following graph shows the reported gradual process hearing loss claims by the calendar year of last exposure in the sample.

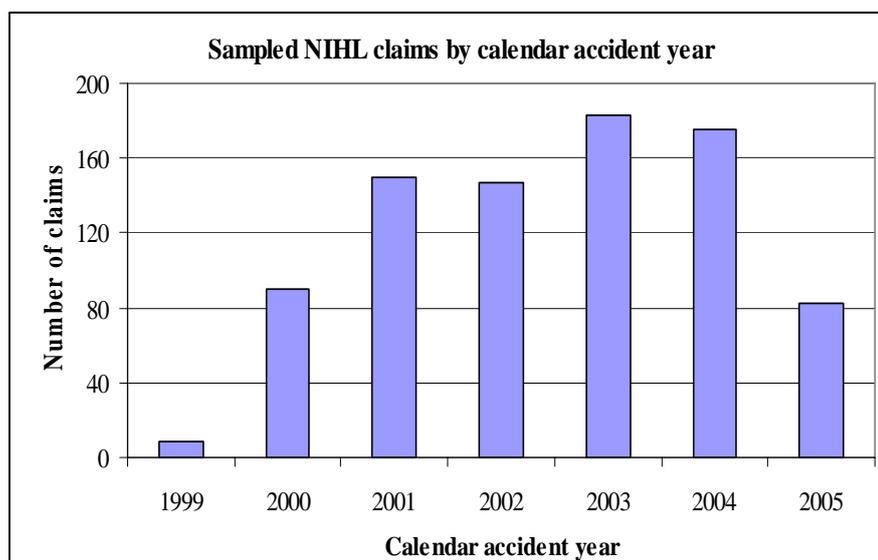
Figure 6.11; Sampled NIHL claims by date of last exposure to workplace noise



This clearly shows the under-reporting in the latest two years of last exposure. It should be recalled that all of the claims in the above graph were reported, and hence had accident dates after, 1 July 1999. This contributes to the much greater numbers of claims with last exposure in the 2000 calendar year and later.

The following graph shows the same claims but by calendar accident year. Again the delays related to approval of entitlement are obvious in the latest accident years.

Figure 6.12; Sampled NIHL claims by calendar accident year

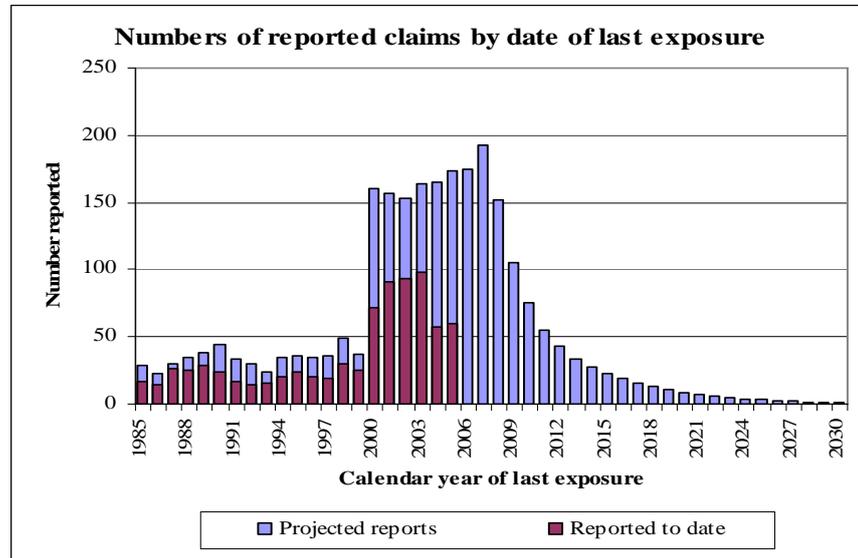


The objective of estimating the future number of gradual process hearing loss claims was to estimate the total costs incurred, and hence levies required, in the Residual Claims Account. As such the estimate of future claims only needed to cover those claims that had at least half of their exposure to workplace noise prior to 1 July 1999. This led to a projection period of 17 years (see section 5.2.3) with the latest assumed calendar year of last exposure being 2022. The average age of claimants towards the end of this projection period would be in the 80's.

After analysing the output the projection period was extended for another eight years to 2030. This was done to allow for the potentially younger claimants from the farming sector whose exposure may have occurred over a 40 or 50 year period.

Allowing for projected claim incidence for the next 25 years the following graph shows the estimated claim numbers by the calendar year of last exposure. It should be noted that the past reported numbers have been adjusted in some years to remove the impact of the delays mentioned above.

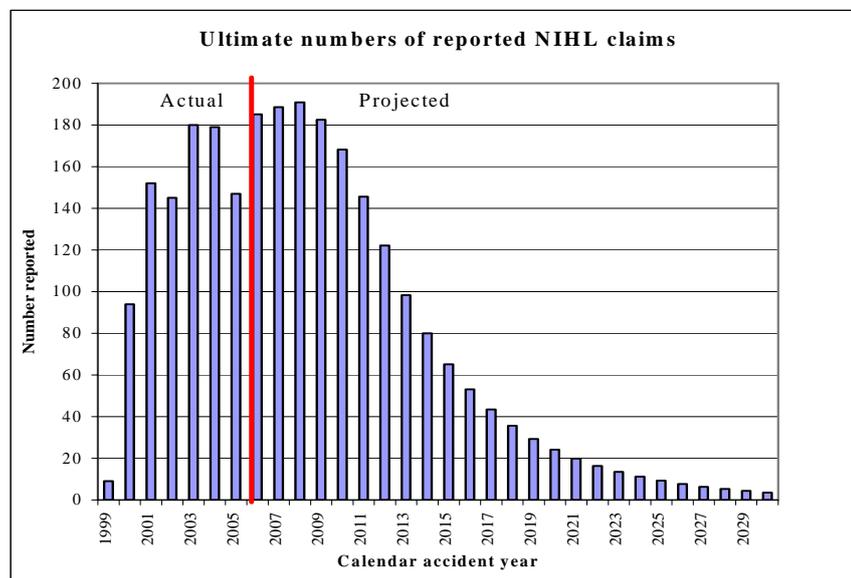
Figure 6.13; Projected NIHL claims by calendar year of last exposure (based on the sampled claims)



The assumed tapering off in claim numbers is apparent in the above graph. This should be consistent with fewer claims having at least half of their workplace noise exposure prior to 1 July 1999 as the date of last exposure gets further into the future.

Since the objective was to estimate the outstanding numbers of claims which will be reported after 1 July 1999 but have at least half of their workplace noise exposure prior to 1 July 1999, it is not surprising that very few of the yet to be reported claims have a calendar year of last exposure prior to 2000. This is evident in the reported claims as well.

Figure 6.14; Projected NIHL claims by calendar accident year (based on the sampled claims)



The actual numbers in the above graph have been adjusted in the most recent years to allow for the entitlement delays. Again the drop off in claim numbers is evident as fewer claims meet the criteria for being placed in the Residual Claims Account.

The projected numbers of claims were estimated via an examination of the past patterns and a mixture of assumptions about the future. The most subjective and influential assumption made was with regard to the future growth in claim numbers. Figure 6.14 shows a further three years of growth in the numbers of claims being reported. This could end up being one or ten years.

The decay pattern is also subjective but it would not be expected to be linear as there will inevitably be claims “trickling” in for a period of time after the bulk have been reported. Changing the assumed growth period from three years would alter the shape of the decay (assuming the same projection period was used). While this is possible the current assumptions do not look unreasonable. Different assumed growth periods will be examined in section 6.4.2 (scenarios).

Based on the above assumptions the sampled and projected numbers of claims are shown in the following table.

Figure 6.15; Sampled actual and projected NIHL claim numbers

Calendar year of last exposure	Reported	Outstanding	Total	Proportion outstanding
Pre 2000	434	229	663	35%
2000 – 2005	472	499	971	51%
Post 2005	0	983	983	100%
Total	906	1,712	2,618	65%

Note: The reported numbers in the above table have been adjusted for reporting and entitlement delays.

The next table shows the actual and projected numbers of claims for the population of gradual process hearing loss claimants in the Residual Claims Account. These numbers assume the same proportional split between reported and outstanding claims as was determined from the sampled claims.

Figure 6.16; Population actual and projected NIHL claim numbers

Calendar year of last exposure	Reported	Outstanding	Total	Proportion outstanding
Pre 2000	6,443	3,687	10,130	35%
2000 – 2005	7,007	8,015	15,023	51%
Post 2005	0	15,804	15,804	100%
Total	14,559	27,506	40,956	65%

Note: The reported numbers in the above table have been adjusted for reporting and entitlement delays.

So, it was expected that as at 31 December 2005 there would be an additional 27,506 gradual process hearing loss claims yet to be reported which would be allocated to the Residual Claims Account. Hence only 35% of the total expected numbers of claims have been reported. This has a large influence on the potential outstanding costs and hence the required levy rates.

6.2.3 Uncertainty in the future reporting pattern

As mentioned above the numbers of claims yet to be reported is the main source of uncertainty in forecasting the future costs of unreported NIHL claims. Some of the factors effecting claim volumes are outside ACC's control (see section 3) and some are dependent on ACC policy now and in the future (see section 4).

The key factors affecting the uncertainty are:

- The size of the exposed workforce (i.e. the total numbers of people in the population who have experienced significant workplace noise);
- The latency period between the noise exposure and seeking treatment for hearing loss;
- Lack of data on the period of exposure;
- Service provider practices (e.g. production of cheaper longer lasting hearing aids);
- Changes in workplace safety practices over time; and
- Changes in ACC policy (e.g. the current six page application form is viewed as a barrier to access. The removal of this barrier may result in many more claims being reported).

To allow for this uncertainty a number of future claim volume scenarios have been run.

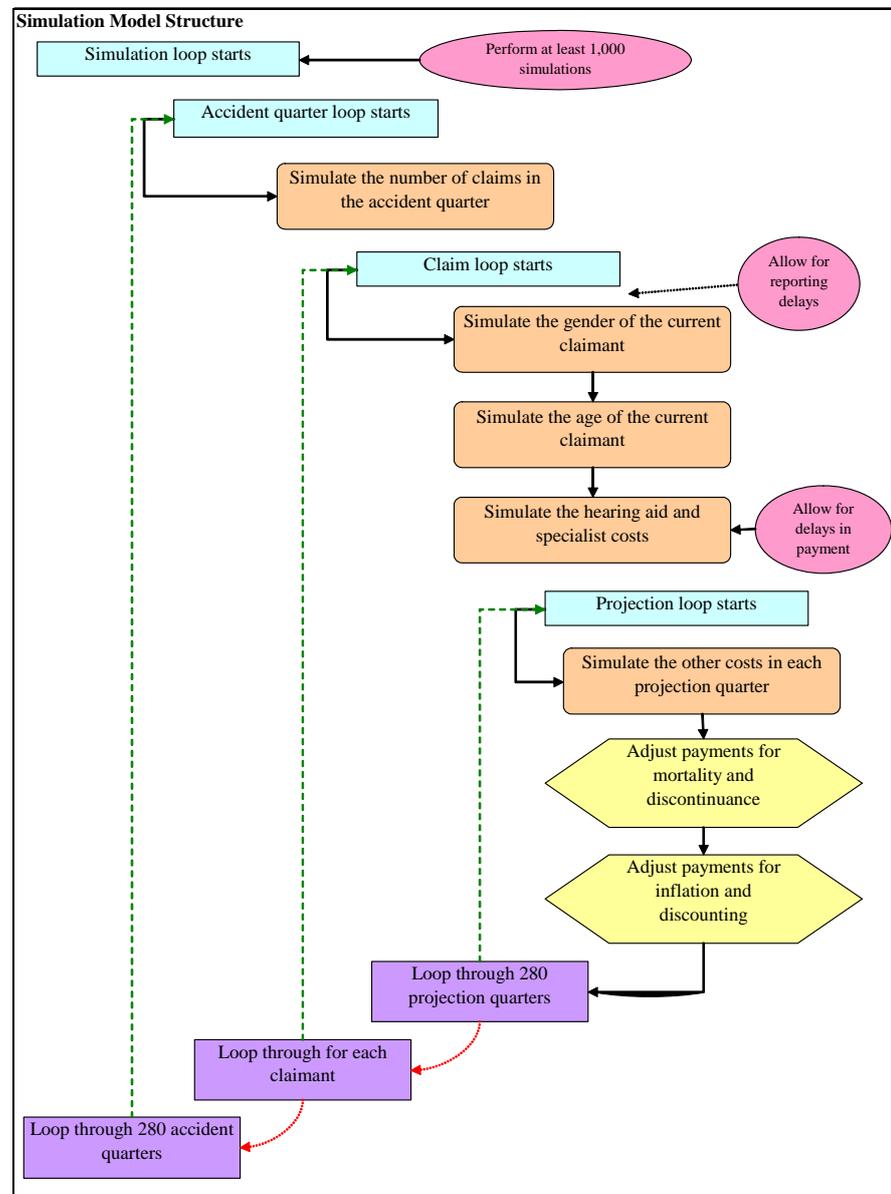
6.3 Model structure

The model used to estimate the costs associated with future hearing loss claims works by simulating a number of claims in each future period and then simulates the costs associated with each of those claims.

Between 1,000 and 5,000 independent simulations are performed using the model and the results are analysed by fitting a distribution to them. This is another way of saying that the model used is stochastic in nature.

The process used by the model is outlined in the following figure.

Figure 6.17; Simulation model process



The majority of the uncertainty in the model results is due to the uncertainty in the claim incidence rates. This is in part due to the fixed nature of the entitlements. It is also influenced by the fact that exits from entitlement occur primarily as a result of mortality.

6.4 Results

Running the model described in the previous section several thousand times produces an estimate of ACC’s liability for as yet unreported gradual process hearing loss claims with at least 50% of the exposure to workplace noise occurring prior to 1 July 1999. It also produces an estimate of the variability in the results.

Due to the uncertainty in some of the model assumptions, specifically the future claim numbers and the time between receiving an initial hearing aid and subsequent replacement aids, it is necessary to produce results on a number of bases. These are outlined in section 6.4.2 of this paper.

6.4.1 Estimated costs

Assuming that the number of as yet unreported NIHL claims is as shown in figure 6.16 (i.e. a further three years of growth in claim numbers before they begin to decline) yields the following results.

Figure 6.18; Model results

Statistic	Result
Expected number of claims	27,700
Expected aggregate cost (inflated & discounted)	\$434 million
Standard deviation of aggregate cost	\$5 million
90 th percentile aggregate cost	\$445 million

The expected number of claims was slightly higher than was suggested by the analysis of the sampled claims. However given the uncertainty in this number the difference was not viewed as material.

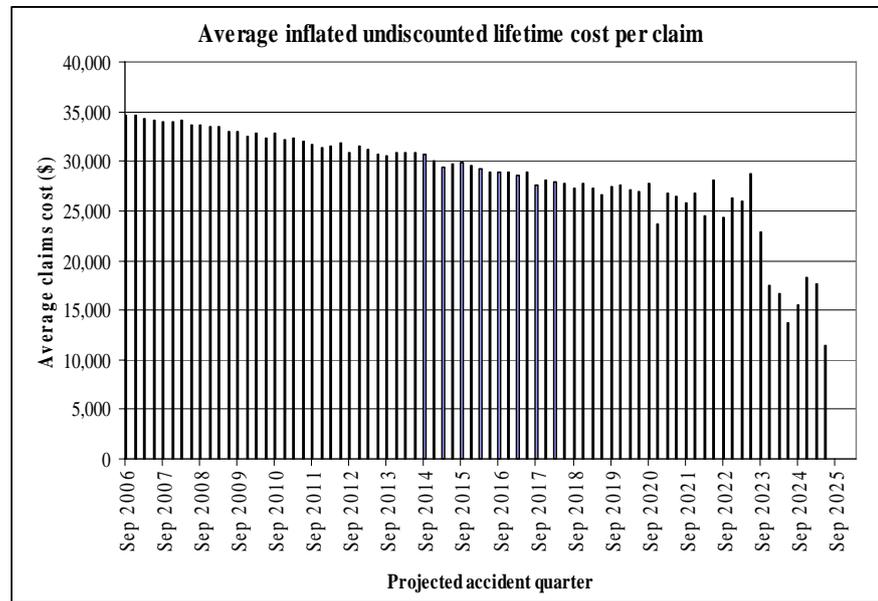
The low standard deviation reflects the structured nature of the entitlements received by this type of claimant. Once entitlement is determined the claimant receives a regular supply of hearing aids and batteries accompanied by audiologist visits until they die. This produces relatively stable cashflows and hence a low standard deviation.

The majority of the variability is in the expected number of future claims. This is easily seen in section 6.4.2, scenario testing.

The discount rate used to derive the estimate of aggregate costs was 5.83% per annum. This was the discount rate used in ACC's 30 June 2006 valuation of outstanding claims liabilities.

The average lifetime cost per claim decreases with age as would be expected. As the future life expectancy of a claimant reduces the number of hearing aids they can receive reduces lowering their expected lifetime cost. This can be seen in the following graph.

Figure 6.19; Average inflated undiscounted cost per claim

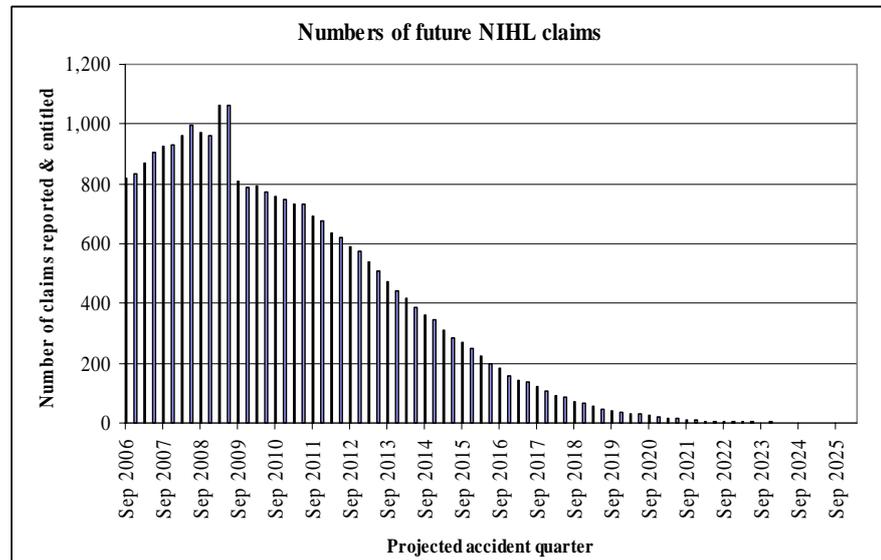


The average age of claimants at the beginning of the projection period was approximately 66 years old. A person this age could reasonably be expected to live for a further 15 or 20 years. This leads to at least four hearing aids being provided, on average, over the course of the claimant’s life. Assuming an average hearing aid cost of \$4,500 and an associated audiologist fee of \$2,000 gives an average expected lifetime cost of \$26,000. Adjusting this for inflation and adding in battery costs and other associated costs give the \$35,000 lifetime cost shown in the above graph.

By 2025 (i.e. in 19 years time) the average age of the claimants commencing entitlement will be approximately 85 years old. Life expectancy at this age would result in at most two hearing aids being provided to a claimant assuming a re-aiding period of five years. This is apparent in the above graph where the average inflated lifetime cost for these claimants is trending towards \$10,000.

An example of the projected claim numbers produced by the model is shown in the next graph.

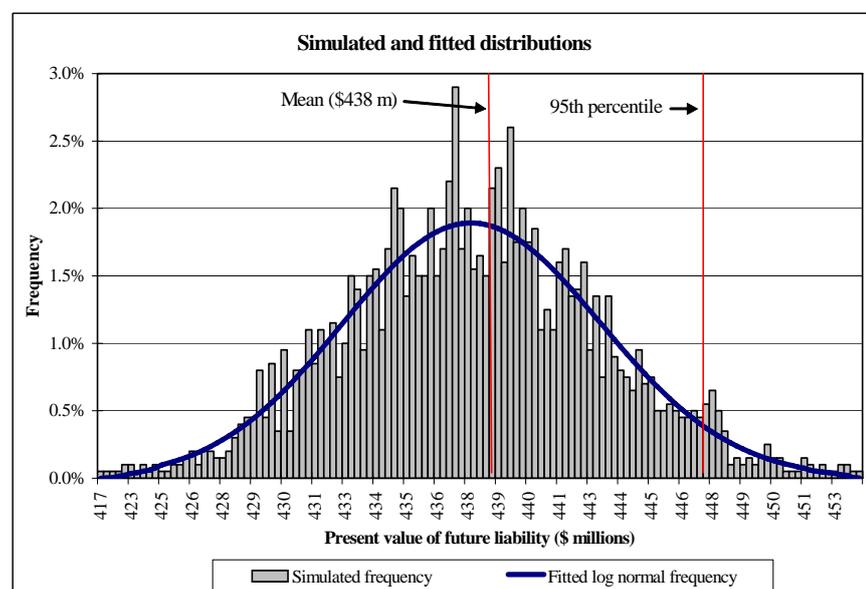
Figure 6.20; Projected claim numbers – an example



The drop off in claims after three years is very evident in the above graph. Over a large number of simulations this change would be smoothed out. Also evident in the above graph is the reduction in claim numbers leading to the end of the 17 year projection period.

The aggregate costs were fitted by a log-normal distribution. They could equally well have been fitted by a normal distribution but the log-normal has the advantage of eliminating the possibility of negative values. The following graph shows the simulated and fitted distributions of aggregate costs.

Figure 6.21; Simulated and fitted distributions of aggregate costs



Although the fitted distribution is not perfect it is also not unreasonable. The model projects each claim through each payment quarter until death for each accident quarter over the next 20 years. It does this for each simulation resulting in each run using significant amounts of processor time. This limited the number of simulations that could be run for each scenario however the low standard deviations observed suggest that this is not a significant issue.

6.4.2 Scenarios

In order to test the sensitivity of the model results to some of the assumptions used a number of different scenarios were run. The most significant assumptions related to:

- the numbers of future claims; and
- the average time between the receipt of each hearing aid.

It was these assumptions that were examined in the scenario tests.

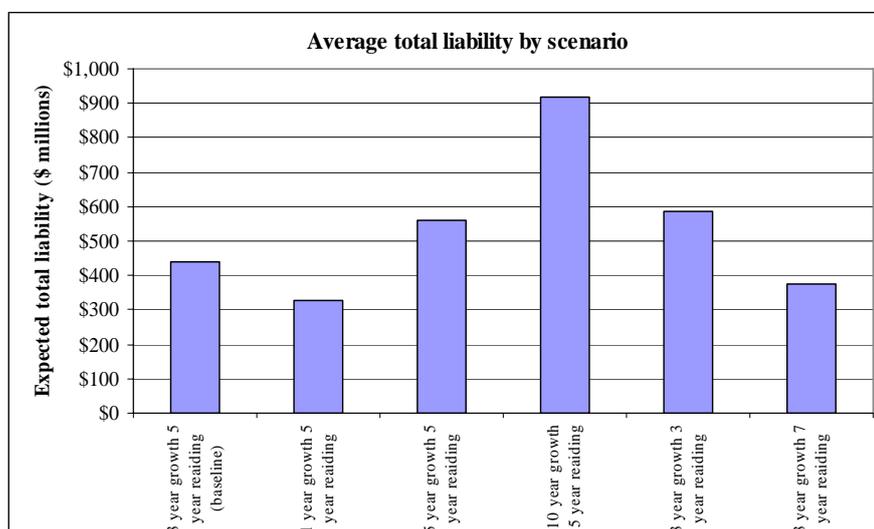
The following table shows the results of the scenario tests and how they compare to the “baseline” results discussed in section 6.4.1 above.

Figure 6.22; Scenario test results

Scenario	Expected aggregate cost (\$ millions)	Difference from “baseline” results (\$ millions)	Percentage difference from “baseline” results
3 years claim number growth 5 year re-aiding period (“baseline”)	438	0	0%
1 year claim number growth 5 year re-aiding period	328	-110	-25%
5 years claim number growth 5 year re-aiding period	560	122	28%
10 years claim number growth 5 year re-aiding period	916	479	109%
3 years claim number growth 3 year re-aiding period	587	149	34%
3 years claim number growth 7 year re-aiding period	375	-63	-14%

Graphically this is as follows.

Figure 6.23; Aggregate costs from scenario tests



The impact of the uncertainty in the claim numbers is evident in the above results. Assuming an additional two years of claim number growth increases the aggregate costs by 25%.

Changing the re-aiding period also has a significant affect on the aggregate costs. Not unexpectedly increasing the period between the receipt of each hearing aids results in a smaller reduction in the aggregate costs than the comparable increase that results from decreasing the period between each aid being provided. This occurs because hearing aids are provided “in advance”. That is, the first aid is provided at the beginning of the claim regardless of the re-aiding period. Hence increasing the re-aiding period has a lesser impact on the aggregate cost because it has no impact on the provision of the initial aids.

Close monitoring of the number of NIHL claims will be required to try and establish the validity of the claim number growth assumptions in the model.

6.4.3 Weaknesses

The major weakness of the model is the uncertainty around the number of NIHL claims yet to be reported. This is a problem that can only be fixed by additional research into the industries and latency periods associated with these types of claims. This weakness is somewhat addressed by the production of results for a number of claim volume scenarios.

At this time the model does not allow for transitions between types of hearing aids. For example, as a claimant ages their hearing is likely to deteriorate further. Since ACC covers the whole loss once entitlement has been established, this further deterioration will be covered and may result in a

better quality hearing aid being required. Currently most claimants receive top of the line devices anyway so this should not be a major weakness at this time.

Hearing aid costs are assumed to grow in line with inflation. Arguably these costs may grow much faster with advances in technology. However it is also possible that technological advances will reduce the cost of the current high end devices. These two effects offset each other somewhat.

There is no allowance for the potentially changing industry characteristics of the claimant population over time. If the industry mix of claimants is changing over time this may lead to changes in other claimant characteristics such as average age, gender or degree of hearing loss. These changes may then flow through to changes in the costs associated with these types of claims.

There is potential for the re-aiding period to vary with the duration of each claim. For instance, as a claimant ages they may be less concerned with replacing their hearing aid every five years. Alternatively, as a claimant ages they may lose or break their hearing aid more often. There is currently not enough data to reliably estimate these effects so they have been excluded from the model.

7 Conclusion

Gradual process work related noise induced hearing loss is a multidimensional issue for ACC. Not only are costs a major concern but the social, policy, political, reserving, rating and modelling aspects of the issue all need to be addressed. All of these areas are interrelated so changing any one aspect of the issue has flow on effects which may not be obvious at first.

Given the complexity of the issue there are no quick fix answers. Effectively dealing with this issue requires a well structured framework which spans all of the areas related to NIHL claims. Such a framework has been developed by ACC and is currently being discussed with other parties.

The source of the greatest uncertainty is the future claim incidence rates. Analysis of the sample of claims referred to earlier in this paper has given some insight into the potential numbers of claims yet to be reported from pre 1 July 1999 exposure. As more data becomes available a clearer picture of the development of these claim numbers should become available. Gradual process hearing loss claims from more recent exposures are still somewhat of an unknown. New sources of workplace noise exposure and small amounts of historic data make estimating these claim numbers very difficult.

Despite the difficulty, estimates of future claim numbers are required for funding purposes. The model outlined in this paper goes some way to

answering the question about the numbers of claims yet to be reported from pre 1 July 1999 exposure to workplace noise. However there are still significant areas of uncertainty in these estimates and so further research is required.

ACC is in the process of performing a review of hearing loss related entitlements. This review is being conducted in consultation with audiologists and aims to produce a framework for the assessment and treatment of gradual process hearing loss. This should help understand costs and make estimating future expenditure more structured. However such a review will take time.

Initiatives around the prevention of future exposure to workplace noise are also being investigated. Given the uncertainty about the possible industries where future exposure may arise, the production of a standard injury prevention framework will be difficult. The long latency periods attached to these claims will also mean it may be some time until the true effectiveness of any injury prevention initiatives can be established.

Due to the funding deadline for the Residual Claims Account the estimated cost of gradual process hearing loss claims to be reported after 2014 in this account have been factored into the levy rates. In essence this establishes a reserve fund for these claims within the Residual Claims Account although the funds are not separately identified. Between now and 2014 gradual process hearing loss claims will be funded on a claims made basis. As more information becomes available the estimates of future costs will be refined and the required funding adjusted.

In order to reassess costs and determine the effectiveness of future policy changes good quality data is essential. It is fundamental to the ongoing projects in this area that data on gradual process hearing loss claims continue to be collected and analysed. A consequence of this is that systems changes are likely to become necessary.

As more data becomes available the modelling of gradual process hearing loss claims could be refined. Assumptions about the costs, re-aiding periods and future claim numbers could all be adjusted based on new data. This may lead to changes in the funding requirements.

There is still more work to do in this area but significant first steps have been taken in the analysis and management of gradual process hearing loss claims.

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