

USE AND MAINTENANCE OF ASSISTIVE LISTENING DEVICES IN
THE CHRISTCHURCH COMMUNITY

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ABSTRACT

Hearing loss is a disability that affects thousands of people in the world. It is estimated that there is 400,000 people with hearing difficulties in New Zealand (New Zealand Audiological Society, 2007). People with hearing loss have the right to access to information and communication (United Nations Enable, 2003). Without access to information and communication, the hearing impaired may encounter problems with emotional and social functioning, and consequently suffer with decreased quality of life. Clinical experience and investigations have revealed success with assistive listening devices (ALDs) where use of hearing aids has been unsuccessful. ALDs are devices that improve the communication function for the hearing impaired. ALDs can be used with or without hearing aids to overcome the negative effects of poor room acoustics. Currently, in the literature, little is known about the use and maintenance of ALDs in community organizations. This study investigates the use and maintenance of ALDs in the Christchurch community of New Zealand. A list of community organizations that provide ALDs to the public of Christchurch was also made available to individuals who have hearing impairment. The study found there is a lack of ALDs within the Christchurch community. Also that current ALD technology within the Christchurch community is not necessarily compatible with current hearing aid technology and that most organizations rely too heavily on PA systems. PA systems do not necessarily meet the needs of the hearing impaired and an ALD specifically targeting their hearing loss would improve their speech perception. Community organizations are not advertising enough that they offer ALDs which adds to the lack of awareness in Christchurch. Results found that most

ALDs in the Christchurch community are in working order, however, there is a need for organizations to be educated about their use and maintenance. Audiologists and other health professionals have a key role in providing appropriate recommendations in the use and benefits that ALDs have on speech perception. These will directly improve the listening situations that the hearing impaired have throughout their communities, thus improving their quality of life.

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1. INTRODUCTION

Hearing loss affects a large number of the people throughout the world. In New Zealand it is estimated that about 10% of the general population or 400,000 people have hearing difficulties (New Zealand Audiological Society, 2007). In Christchurch alone, this number is approximately 45,000. The United Nations Enable (2003) state people with hearing loss have the right to access information and communication. Without information and communication hearing impaired individuals may experience decreased social interaction and a poorer quality of life (Ross & Bakke 2000). Another consistent finding from research on the adverse affects of hearing loss is the negative impact hearing loss has on the emotional and social well being of hearing impaired individuals (Jerger, Chimel, Wilson, Luchi, 1995).

For someone who has a hearing loss listening to a speaker in a room filled with noise can be very challenging (Gelfand 2001). Noise masks the important speech signal that a hearing impaired person tries to listen to. Central to understanding speech in a noisy environment is the concept of signal to noise ratio (SNR) (Gelfand 2001). The higher the signal to noise ratio, the better will be the speech reception in noise. Research indicates that the signal to noise ratio for normal hearing adults would have to be at least 0 dB and those with sensorineural hearing loss require +4 to + 12 SNRs (Crandell & Smaldino., 1996; Killion, 1997; Moore, 1997). Also, the signal declines the further away the listener is from the speaker (Gelfand 2001). Sound in a room also reflects off surfaces including windows, walls and ceilings (Gelfand 2001). This is called reverberation and the collection of these reflections is perceived as an echo after the initial sound is heard.

For example, if someone claps their hands in a room they may notice the sound lingering afterwards. Reverberation has deleterious effects to speech understanding and affects people with a hearing loss more than normal hearing individuals. As the reverberation time gets longer, and noise increases, speech perception decreases. Amplification through hearing aids can make the problem worse (Gelfand 2001). Hearing aids pick up all sounds in a noisy and reverberant space, therefore amplifying noise and reverberation. However, clinical experience and investigation have revealed the hearing impaired having success using assistive listening devices (ALDs) where hearing aids have failed (Loovis, Schall, Teter 1997). Without ALDs, people with a hearing loss can feel depressed and withdrawn from society (Ross & Bakke 2000).

1.1 Assistive listening devices

Assistive listening technology is the use of any device that improves the communication functioning on a daily basis (American Speech and Language Hearing Association, 2005). Mann, Hurren, Tomita, & Charvat, (1995) conducted a study comparing the relationship between assistive devices (including hearing devices) and functional independence including age, sex, education, mental status, physical disability and visual impairment for non institutionalized elderly. The results indicated that increased use of assistive devices relates to increased functional independence. They can be used with or without hearing aids to overcome the negative effects of reverberation, and reduced signal to noise ratio (ASHLA, 2005). They can improve speech perception in some listening environments better than those obtained with or without hearing aids

(Ross & Bakke, 2000).

There are a number of different types of ALDs, and the differences between them relate to transmission mode, installation mode, type of interference and appropriateness of the venue (Ross & Bakke, 2000). However, all ALDs share three basic components: the microphone that is placed near the speaker, an amplifier that controls the sound and a receiver that delivers the amplified signal directly to the listener's ears (Gelfand, 2001). The overall difference between these systems has mainly to do with the way the message is picked up by the microphone and transmitted to the receiver in the listener's ear. It is important that the microphone is placed properly to pick up the speaker's speech. There are a number of microphones that can be used including lapel, lavalier, boom and environmental microphones (Gelfand, 2001).

The most common type of ALD is the frequency modulated (FM) system. FM systems can be used as a "stand alone" device or used in large venues such as auditoriums, theatres, churches, houses etc (Ross & Bakke, 2000). FM technology works just like a miniature radio (ASLHA, 2005). FM technology was initially designed for radio broadcasting and compared to the AM signal has signals relatively free from interference. In America, two bandwidths have been dedicated by the federal communications commission to use with FM amplification systems 72-76 MHz and 216-217 MHz, which can be broken down into 10 wide band channels and 40 narrow band channels (Ross & Bakke, 2000). The FM ALD audio signal is modulated by frequency onto a carrier wave by a transmitter that is sent to the receiver where it is demodulated and sent to the ears via headphones or direct audio input (DAI), on a hearing aid (Loovis, Schall, Teter, 1997).

FM receivers can be coupled to the bottom of the hearing aid by either direct audio input or induction (Gelfand, 2001).



Figure 1: A group FM receiver setup fed by a lone transmitter Ref: (Boys Town National Research Hospital, 2008).

Personal FM receivers are attached to the bottom of BTE hearing aids via an audio shoe. Older body worn FM receivers require a wire that plugs into both the FM receiver and hearing aid and the hearing aids need a direct audio input (DAI). Modern receivers smaller and plug directly into an audio shoe, which in turn connects onto a behind the ear (BTE) hearing aid. Induction coupling involves a FM receiver sending a signal to the telecoil within the hearing aid by the wearing of a personal worn inductor (Gelfand, 2001). They come in two different types, neck loop inductors and silhouette inductors. Neck inductors are worn around the listener's neck while silhouette inductors are a similar shape and size to a hearing aid and are worn next to the hearing aid itself

(Gelfand, 2001). A silhouette inductor may work better with people with a more severe hearing loss (Ross and Bakke, 2000).

The advantages of FM ALDs are that they allow direct transmission that minimizes sound distortion and interference and that they are highly portable (Warick, Clark, Dancer, Sinclair, 1994). FM ALDs are the most flexible of all the assistive listening device systems and can be found in a number of listening environments (Gelfand, 2001). The major problem with FM ALDs is that the radio signals are not contained within the room or facility from where they are being broadcasted. Here privacy may be compromised and leaked signals may interfere with other users (Ross & Bakke, 2000). An example is a patron at the movies could be listening to a comedy while watching a thriller (Ruling, 1995).

Another type of ALD is an infrared device. Infrared systems (IR) can be used in large settings like theatres and are popular for home use for listening to the television or stereo. IR receivers come in all shapes and sizes, from units that dangle around the neck to body receivers similar to those of FM receivers. Neck loops and silhouette inductors can be plugged into these units.

There are three basic parts to an infrared system, the modulator, emitter and receiver. The receiver contains a photo detector which picks up the light signal from the transmitter (Loovis, et al. 1997).



Figure 2: An infra-red ALD system Ref: (Centre of Deaf & Hard of Hearing, 2008).

An IR system transmits audio signals between 700-1000 nm and these signals are used to frequency modulate an RF sub-carrier that modulates the IR carrier (Leiske, 1994). The outcome is a double modulation of the IR light wave first FM then AM. The bandwidth of 50 nm gives a number of RF sub carriers that can be carried by the one IR light wave (Ross & Bakke, 2000). The infrared receiver converts light signals back into sound and the signals are transferred into the listener's ear.

Like FM systems, IR systems directly transmit signals with minimal distortion and interference and they are highly portable (Warick, Clark, Dancer, Sinclair, 1994). The major advantage of an IR system is that the transmission of the signal is contained within the room (Ross & Bakke, 2000). However, since they are basically light waves, they can be distorted by the texture of the room surfaces resulting in IR reflections. It is important that the listener gets a "line of site" of the emitter so as to receive the transmission (Ross & Bakke, 2000). Some complain that in certain listening arrangements, for example in a lecture hall, and in some seat positions, the IR signal is

weak or distorted. However this is often due to improper installation of the IR system itself (Ross & Bakke, 2000).

The oldest ALD system is the Induction Loop (IL) and today it is the least used, superseded in popularity by FM technology (Ross & Bakke, 2000).

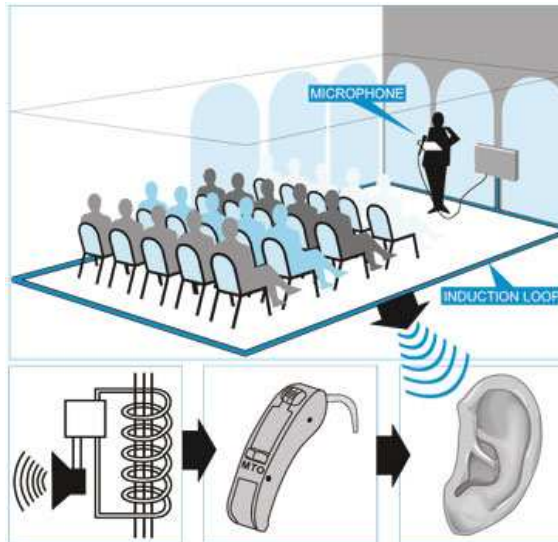


Figure 3: How an induction loop ALD system works Ref: (Hagger Electronics, 2008).

An induction loop ALD comprises an induction loop wire that is permanently installed. It can be a wire that runs under the carpet or all around the room (ASLHA, 2005). While the speaker talks into a microphone, it creates a current in the wire which becomes an electromagnetic field in the room. The microphone can be hardwired into the amplifier circuit or interfaced wirelessly to the amplifier enabling the speaker to move freely within the listening environment (Ross & Bakke, 2000). The electromagnetic field can be picked up by the telecoil on a hearing aid, and the volume can be adjusted through a volume control in the aid (ASLHA, 2005).

The telecoil inside the hearing aid user may be selected in the “M” or “MT” position on their hearing aid. The “T” position obtains the signal from the receiver in the aid and the “MT” position obtains the signal from the receiver, and from the microphone in the hearing aid at the same time so that the listener is able to monitor his/her own voice and listen to the ambient environment.

An advantage of the loop system is that once installed, it can be the most cost effective ALD (Loovis, et al. 1997). Its disadvantages include signal interference and variable signal strength, which depends upon the receiver position. The signal strength is highest near the loop wire. In the United States only 30% of modern hearing aids have a telecoil and with people opting for smaller and smaller hearing aids, the trend towards hearing aids without a telecoil is set to continue.

Telecoil placement within the hearing aid can affect how the signal is received also. For optimal sensitivity to an induction loop, the induction coil should be mounted perpendicular to the loop, however this differs from the optimal horizontal position essential for good telephone listening. Another problem with an induction loop system which uses an FM transmitter feeding a signal to the loop is that it is difficult to confine the electromagnetic field within the looped area and some of the signal can “spill over” to neighboring rooms. The most successful version of controlling “spill over” is the 3-D loop developed by the Oval Window Company (Lenderman & Hendricks, 1994). Here the wires are configured like a grid pattern and are embedded in a mat placed on the floor. The electromagnetic signal is not only contained within the looped area, but the electromagnetic pattern reduces the influence of the telecoils orientation within the hearing aid.

One of the simplest ALD systems is the Hardwired system (Gelfand, 2001). There are two forms of hardwired devices, direct audio input (DAI) and personal amplifier devices. All the components of the system are physically connected to each other. Hardwired systems are personal hearing aids or headphones connected directly to the remote microphone or amplifier by wires, which may have a plug connection to an audio shoe if a personal BTE aid is worn (Loovis, et al. 1997). The advantages to this system is that it can provide high sound levels with good fidelity and are relatively cheap to acquire and easy to fix. The main disadvantage to this system is that the speaker and listener are limited in their movements due to restricted cable length (Gelfand, 2001).

Another commonly used ALD is the sound amplification system which is basically a PA system.



Figure 4: A PA system Ref: (Cyber market, 2008).

The sound amplification system differs from the other types of assistive listening systems as it transmits amplified sound directly into the room (Gelfand, 2001). The goal is to keep the amplified speech 10dB above the ambient noise level of the room to optimize the reception of the speech signal (Gelfand, 2001). This system, however, is not suitable for use in highly reverberant spaces.

A one to one ALD is another type of ALD that is designed to make conversation between two people easier. It can be used in a lecture and meeting situation (ASLHA, 2005). Both the speaker and listener each use a microphone and a receiver to listen to the amplified signal.

There are many other types of ALDs including telephone amplifying devices for cell phones, digital and hard-wired phones; answering machines; telephone with different frequency response, paging systems, computers, and wake up alarms. Using replacement handsets are an inexpensive way of increasing the amplification of a telephone, which can increase the gain of the signal up to 20dB and with then addition of the telecoil in the hearing aid, can add another 20dB making 40dB of amplification (Loovis, et al. 1997).

The most common ALDs include FM, induction loop, and infra-red and PA systems. Nábelek, Donahue, Letowski, (1986) compared FM, induction, loop and infrared ALD to a standard PA system in a classroom with four adult subjects and found all ALDs provided equal benefit in speech perception compared to the PA system.

1.2 Assistive Listening Devices and Communities

A list of community organisations that have ALDs to use would be beneficial for the hearing impaired. Hearing impaired would be more likely to use community resources if they knew where ALDs were. In Auckland, New Zealand, Jerram and Purdy (1996) conducted a mail out survey to 197 hearing aid users to determine hearing aid use, benefit and accessibility of the Hearing Association services. They found that hearing aid benefit was moderate and that respondents of the survey wanted more information about hearing aid management and use of assistive listening devices.

Lewson and Cashman (1997) conducted a survey of residents of a long-term care facility to determine frequency of use of hearing aids and ALDs. If the devices were not used, they requested reasons for non-use. Lewis and Cashman (1997) also conducted a listening check of the hearing aids and ALDs to determine if the devices were in working order. The results of the study found that 88% of ALDs were used on a regular basis and 100% of ALD were in working order (Lewson & Cashman, 1997). The residents of the long-term care facility indicated that they used their ALDs with visitors, and for church and legion activities (Lewson & Cashman, 1997). The researchers ascribe the high rate of use and working devices to better awareness of devices by staff and regular follow-up from audiologists (Lewson & Cashman, 1997).

Pichora-Fuller & Robertson (1997) conducted a study of a rehabilitation program at a senior's home. A questionnaire was used to investigate the success of assistive

listening devices in everyday communication situations. They compared baseline measures with measures after the implementation of the program. The program was designed to modify the communication environments of the residents and staff behaviors. The results of the survey found that there was a remarkable increase in the familiarity of ALDs within the residents and the staff after the program. The residents were found more likely to attend social occasions after participating in the program.

1.3 Purpose

In the literature little is known about the use and maintenance of ALDs within communities. Despite ALDs being a very useful resource, it is possible that usage, maintenance and audiological support of these devices are limited. The above mentioned studies in medical care settings illustrate the importance of audiological support in the maintenance and use of ALDs.

In New Zealand the Building Act 1991 requires that new or extensively renovated public buildings be accessible for hearing impaired people by having an assistive listening system installed, either being an audio loop system, infrared and FM system (The National Foundation for the Deaf Inc, 2007). The Act applies to Public buildings with space for at least 250 people, for example, theatres, cinemas, public halls and assembly spaces in old peoples' homes occupied by more than 20 people (The National Foundation for the Deaf Inc, 2007). It would be beneficial to carry out a study that finds out how extensively complied this act is.

In Christchurch, New Zealand there are a number of community organizations

that provide assistive listening devices. These places include education centers, funeral homes, movie and other theatres, cinemas, museums, art galleries, places of worship, community halls, school halls, town halls, health care providers and retirement homes. The Hearing Association New Zealand, which is a non-profit organization that sells and offers support of ALDs to the hearing impaired is a contact point for the hearing, impaired who would like to find about or purchasing ALDs. The Christchurch branch of Hearing Association New Zealand is supporting the present study aimed at understanding the usage and maintenance of ALDs in the Christchurch community. The researcher will draw up a list of organizations using ALDs with the data we gather from the present study.

The present study is pivotal to determining the types of ALDs used in Christchurch community organizations and how accessible they are to the public. The study will ascertain whether ALDs are appropriately maintained and whether there is a need for audiological support in order to make possible their appropriate use. A list will be compiled of community organizations that provide ALDs to the public of Christchurch and it will be made available to individuals who have hearing impairment. The hearing impaired will therefore be aware of venues that offer ALDs and the particular system that particular community organizations have to offer. This will have spin off effects of improving the hearing impaired quality of life. It is also hoped that this project will renew interest in organizations that do not provide ALDs so that they may do so in the near future. In order to answer all this information a quantitative survey will be undertaken.

2. METHODS

2.1 Participants

The research involved contacting 219 community organizations within the Christchurch city, including, 100 places of worship, 63 conference centers, 32 community halls, 12 cinemas, 5 banks, 5 supermarkets and one art gallery. Community organizations that took part in the survey included 46 places of worship; 25 conference centers, 17 community halls, five cinemas, five banks, five supermarkets, and one gallery.

2.2 Apparatus

A Survey form which firstly asked questions about type of ALDs the organization had on their site. (**Appendix 1**). The survey asks organizations on how accessible their ALDs are to the public of Christchurch. There is a question in the survey asking how the organizations go about advertising to the hearing impaired public, that they offer ALDs. The survey then has a number of questions relating to how their organization maintains their ALDs. Lastly, there are questions relating to how often the public uses their organizations ALDs. At the end of the survey is a consent form. Here community organizations are given the choice to give permission or not to have their name published in a community handout that can be used by the hearing impaired (**Appendix 2**).

There were many reasons why community organizations did not want to take part in the survey and fill out the consent form. Reasons included not having enough time to

do so or that they were unavailable to take part in the survey, or that the telephone number and/or postal address listed in the phone book was unavailable or out of service. Many community organizations were able to answer most of the questions on the survey however; many were unable too, as many had little knowledge about ALDs within their organization or had no time in completing it.

2.3 Procedure

A list of community organizations of Christchurch was gathered from the yellow pages of the Christchurch telephone book. The list of community organization types included places of worship, community halls, conference centers, theatres, banks, supermarkets and an art gallery. Throughout the survey procedure, each community organization was contacted on several occasions. Initial contact was made by telephone during working office hours, where the researcher introduced himself to the community organization. While on the telephone, the researcher asked if he could talk to someone within the organization who has knowledge and manages the ALDs. During this telephone call, a rapport was built between the researcher and the community organization representative. The researcher then asked if the community organization representative if they would like to take part in a survey that would be sent out asking questions about type of ALDs on site, their accessibility, maintenance of and their frequency of use. They were told that the survey and consent form would take between 5-15 minutes. It was then during the call that the organizations either declined or decided to take part in the survey. If they decided to take part in the survey, a hard copy of the survey and consent form were sent out to

their mailing address. If the community organization was unavailable to take the first call, a message was left on their answer phone describing information about the researcher, the research been undertaken and that a hard copy of the survey and consent form including a self addressed return envelope was to be posted to their address. The process of making contact with community organizations took six weeks to complete. Some of the community organizations wanted to do the survey over the phone and for these organizations the consent form was posted to their address only. Other community organizations requested that the survey and consent form be sent to them electronically, for those who wanted to do the process over e-mail. After the initial phone call with the community organizations, the surveys and consent forms were posted. It took between one week to two months for the surveys to return back to the University of Canterbury. After the community organization returned their survey and consent forms, a follow-up phone call was made to them thanking them for taking part in the whole process.

2.4 Analysis of data

The researcher performed a qualitative analysis of the questionnaire to examine the number of ALDs used in the Christchurch community; types of devices used, the accessibility, their maintenance, and feedback of ALD device use by patrons. All data used throughout the survey was entered into a microsoft excel spreadsheet and the results were displayed in column diagrams. A list of community organizations that provide ALDs and their type was compiled and made available to the hearing impaired within the community (**Appendix 3**)

3. RESULTS

The researcher contacted in total 219 community organizations and 104 (47%) of them responded to the survey. Out of the 104 community organizations surveyed 53% (55) have an ALD, while 47% (49) do not offer their patrons an ALD.

This study not only incorporates ALD devices but services also. Examples of ALD services that assist the hearing impaired throughout the Christchurch community include offer of preferential seating, the internet, and signer/interpreter on request.

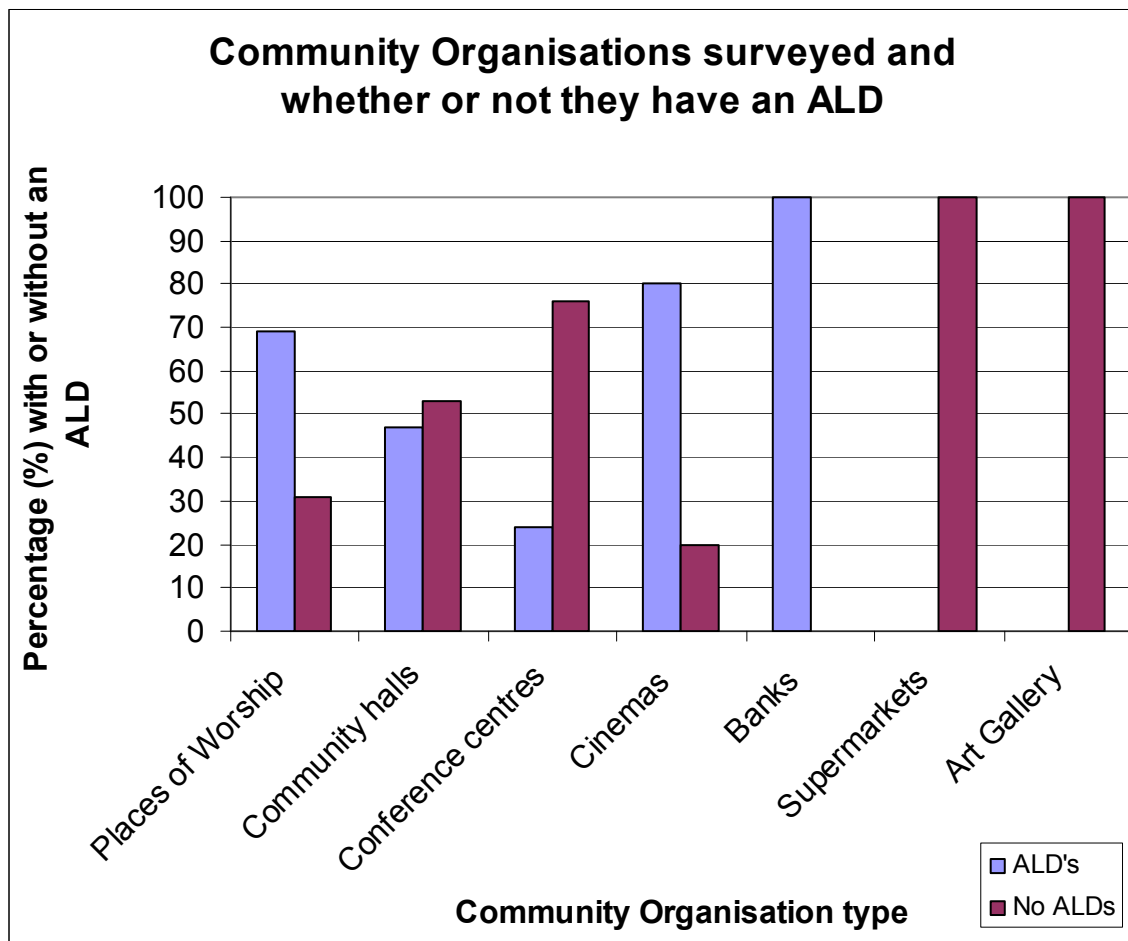


Figure 5: Proportion of community organizations with or without an ALD.

Of the Christchurch community organizations surveyed that offer an ALD, it was found that banks, cinemas and places of worship offer a higher proportion of ALDs to their patrons compared to conference facilities and town halls that offer substantially less ALDS. Neither supermarkets nor the one art gallery surveyed in the Christchurch community offer ALDs to their patrons.

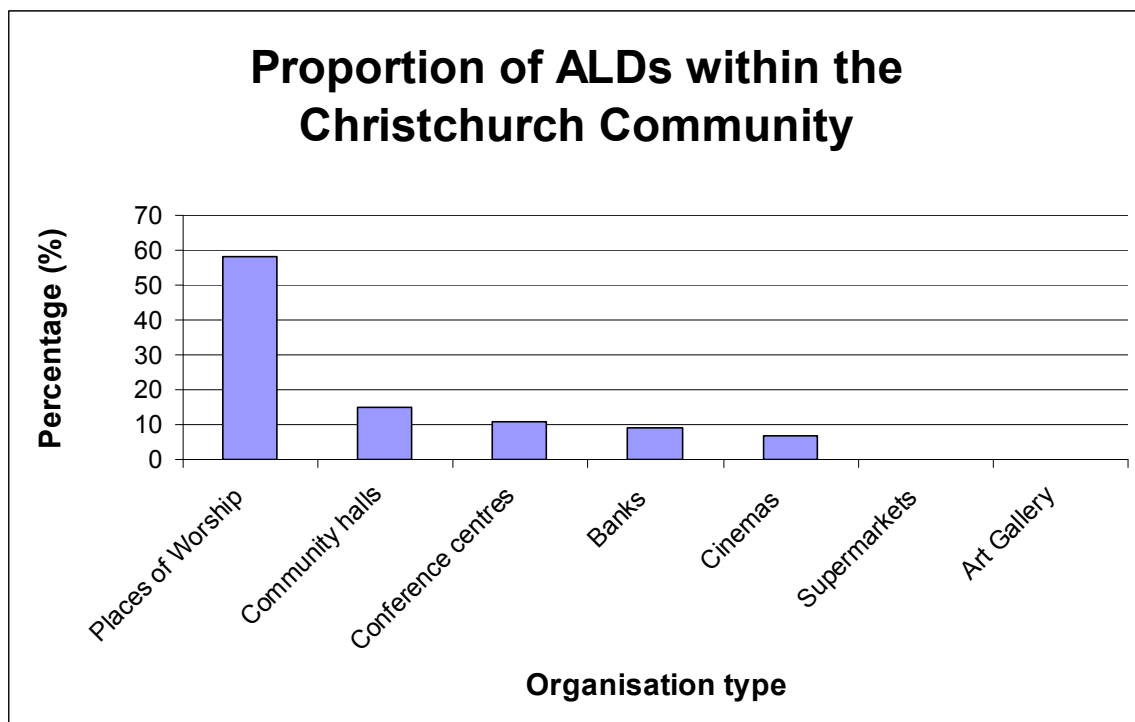


Figure 6: Where ALDs are distributed within the Christchurch Community.

Of the community organizations surveyed in Christchurch that offer ALDs places of worship carry over half of them at 58% (32). Compared to places of worship there are substantially less numbers of community halls, conference facilities, banks and cinemas throughout Christchurch and therefore the survey indicates they have a smaller proportion of ALDs. The supermarkets and one art gallery surveyed had no ALDs.

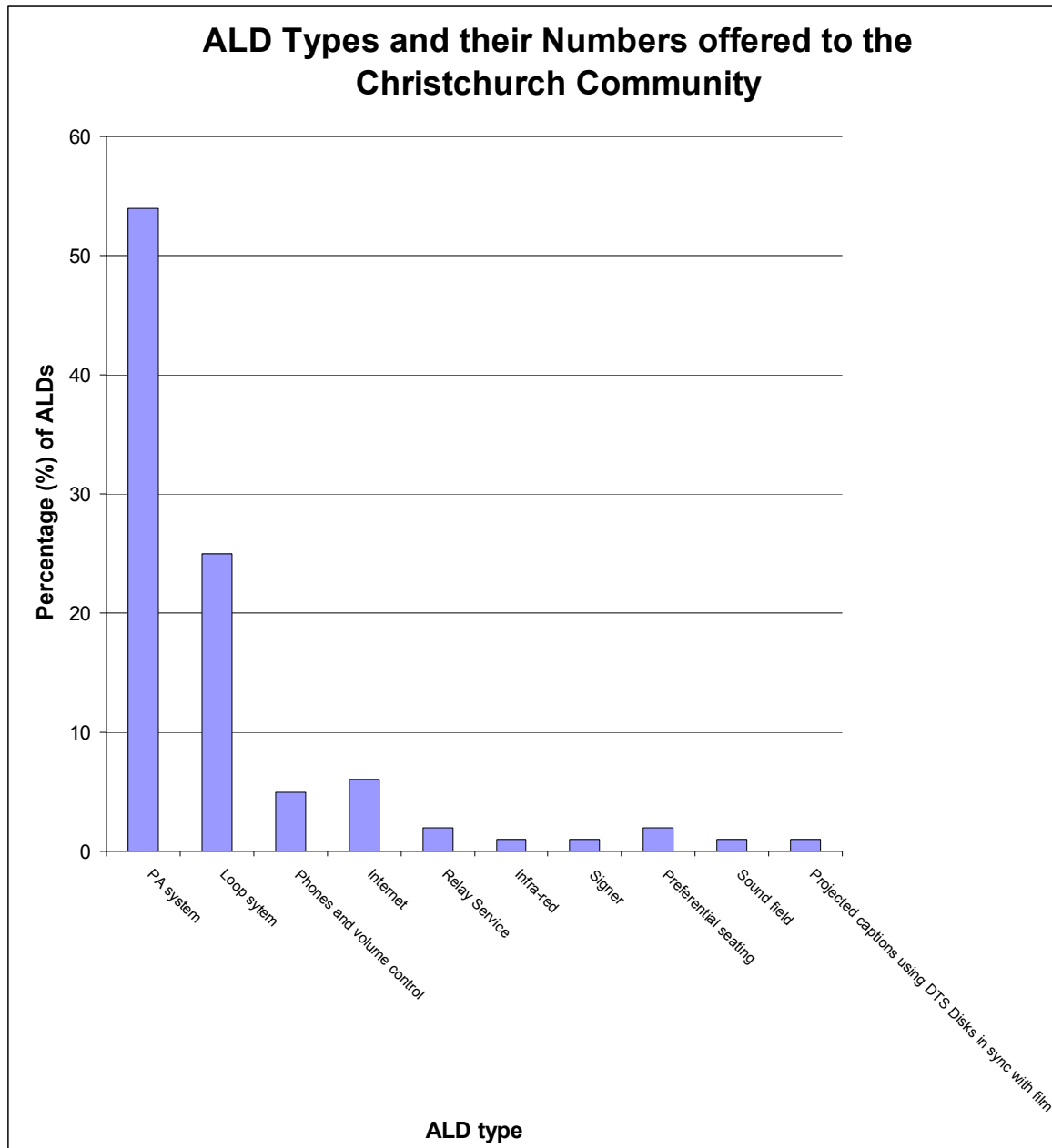


Figure 7: Proportion of ALDs and type offered to the Christchurch’s community.

Throughout the Christchurch community the most commonly used ALD type is the PA system. The next most commonly offered ALD type by community organizations in Christchurch is the induction loop system. All other ALD systems within the

Christchurch community are offered in much smaller proportions compared to the PA and induction loop system, for example each ALD type falls below a 6% threshold. One cinema surveyed offers projected captions using DTS Disks in sync with film. This system enables a hearing impaired person to read captioning text while they are watching a film at a cinema. The customer file alert system used in banks is computer based and alerts the bank teller that the customer in their presence has a hearing loss. Two of the banks surveyed offer a signer/interpreter on request for their patrons who are deaf or have no hearing at all and normally communicate through sign language.

Table 1: ALD type and number within community organizations of Christchurch.

	Places of Worship (n=34)	Cinemas (n=4)	Town Halls (n=8)	Conference Facilities (n=6)	Banks (n=5)
PA	32	-	8	5	-
Induction loop	16	3	-	2	-
PA & Induction loop	16	-	-	2	-
Phones & Volume Control	1	-	-	2	1
Sound Field	1	-	-	-	-
PA & Induction loop & Phones & Volume Control	1	-	-	-	-
PA & Sound Field Amplification	1	-	-	-	-
Infrared	-	1	-	-	-
Projected captions using DTS Disks in sync with film	-	1	-	-	-
Induction Loop & Projected captions using DTS Disks in sync with film	-	1	-	-	-
Internet	-	-	-	-	5
Relay Service	-	-	-	-	2
Internet & Relay	-	-	-	-	2
Signer/interpreter	-	-	-	-	1
Preferential seating	1	-	-	1	-

Generally the most offered ALD type within the Christchurch community is the PA system, however this is not the case for all community organization types. A PA system is the most common ALD type offered in places of worship, town halls and conference facilities. They are not used in cinemas or banks. The induction loop system is the next most offered ALD type in the Christchurch community; in places of worship, cinemas and conference facilities. Banks and town halls do not offer induction loop systems. Some places of worship and conference facilities offer both PA and induction loop systems and often if there is a PA system installed there is an induction loop system also. As supermarkets and the art gallery surveyed had no ALDs, their data was not illustrated in **table 1** above. The PA and induction loop system are the by the far the largest proportionately used ALD type used within the Christchurch community. Other ALD systems are offered in a much smaller numbers compared to PA and induction loop systems. Phones and volume control are sometimes offered by places of worship, conference facilities and banks. A sound field system is offered by a place of worship. A combination of PA & induction loop & Phones & Volume Control was offered by a place of worship and also PA & Sound Field Amplification combination by another. Cinemas were the only community organization type that offered an infrared system and projected captions using DTS Disks in sync with film. Compared to ALD devices, ALD services are offered in smaller numbers in the Christchurch community. All the banks surveyed provide the internet, while some provide the combination of relay service and the internet. One bank offered the combination of the internet, relay service and signer/interpreter. A place of worship and conference facility offered preferential seating.

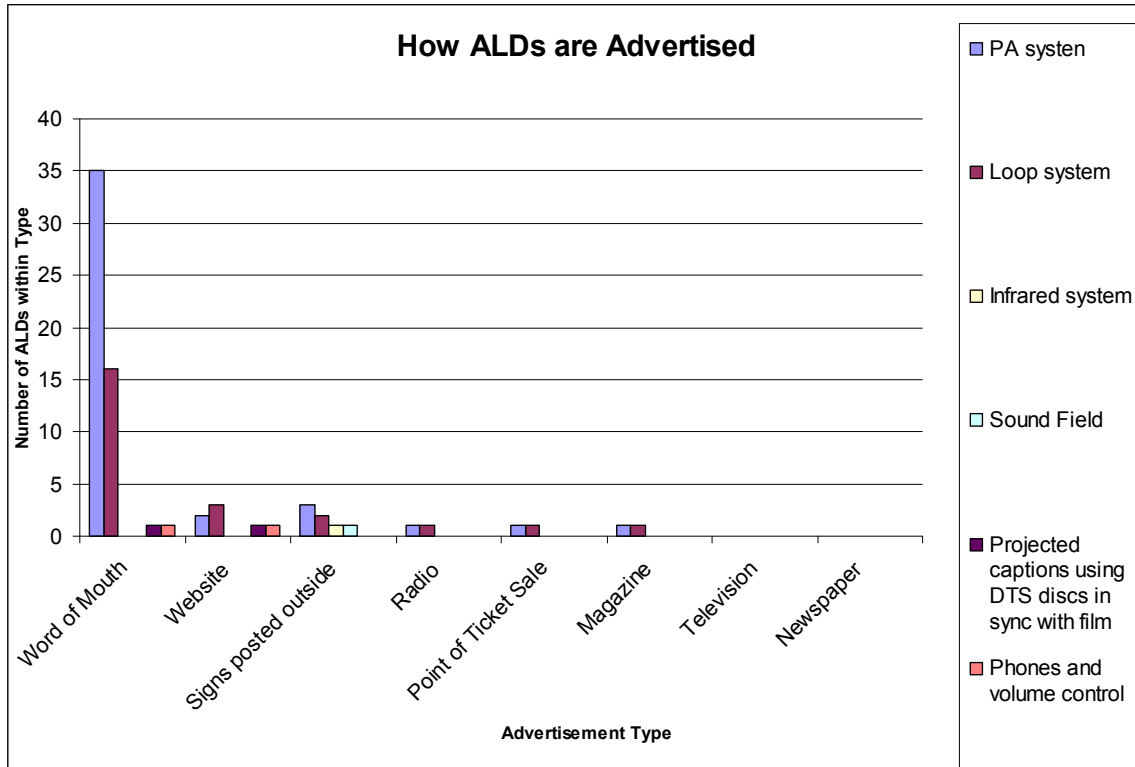


Figure 8: How Christchurch community organizations advertise that they offer ALDs.

The most used form of advertisement that Christchurch community organizations use to communicate to their patrons that they offer ALDs is word of mouth. Word of mouth is proportionately the highest form of advertising in the Christchurch community. Trailing a long way behind the word of mouth advertisement strategy is signage posted outside of the community organizations building. A few organizations advertise they offer ALDs during point of sales of tickets. A small number of Christchurch community organizations advertise they offer ALDs through a magazine or through the radio. None of the community organizations advertise they offer ALDs through the television or the newspaper.

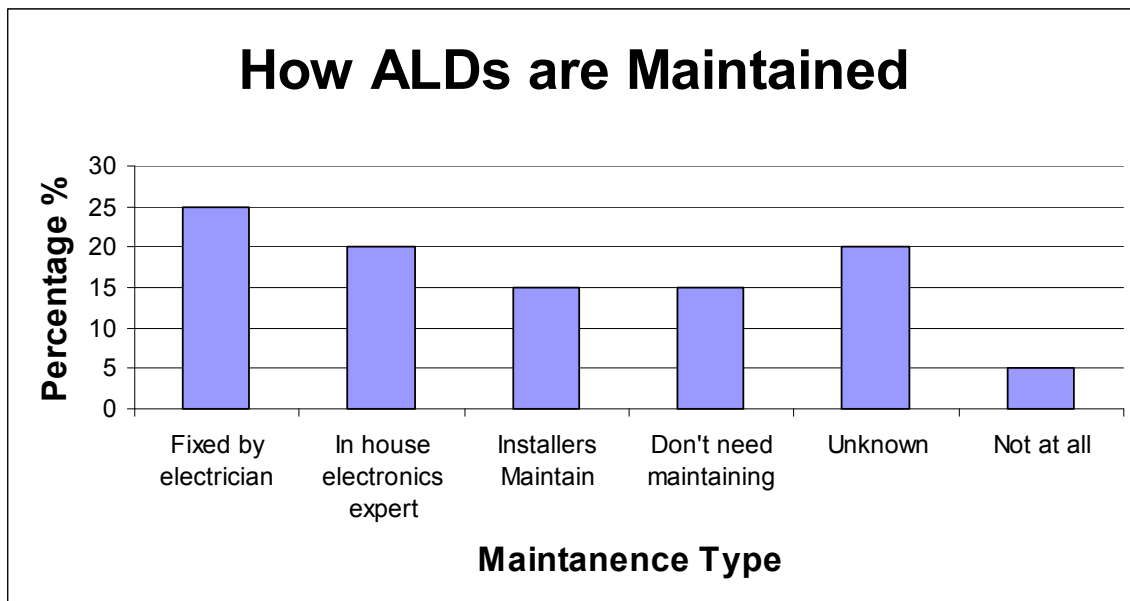


Figure 9: How ALDs are maintained within the community organizations of Christchurch.

Community organizations within Christchurch that offer ALDs were asked the question who maintains them. The survey found that they are maintained in different ways. The most common way is by an electrician. The next most common way that Christchurch community organizations maintain their ALDs is through their own in house “electronics expert”. A high number of community organizations said that their ALDs do not need maintaining at all. There are a number of reasons why community organizations said that they do not need to maintain their ALDs including that they were just newly installed or they were reliable enough that they did not need maintaining. A high number of respondents said they were unsure if their ALDs were maintained.

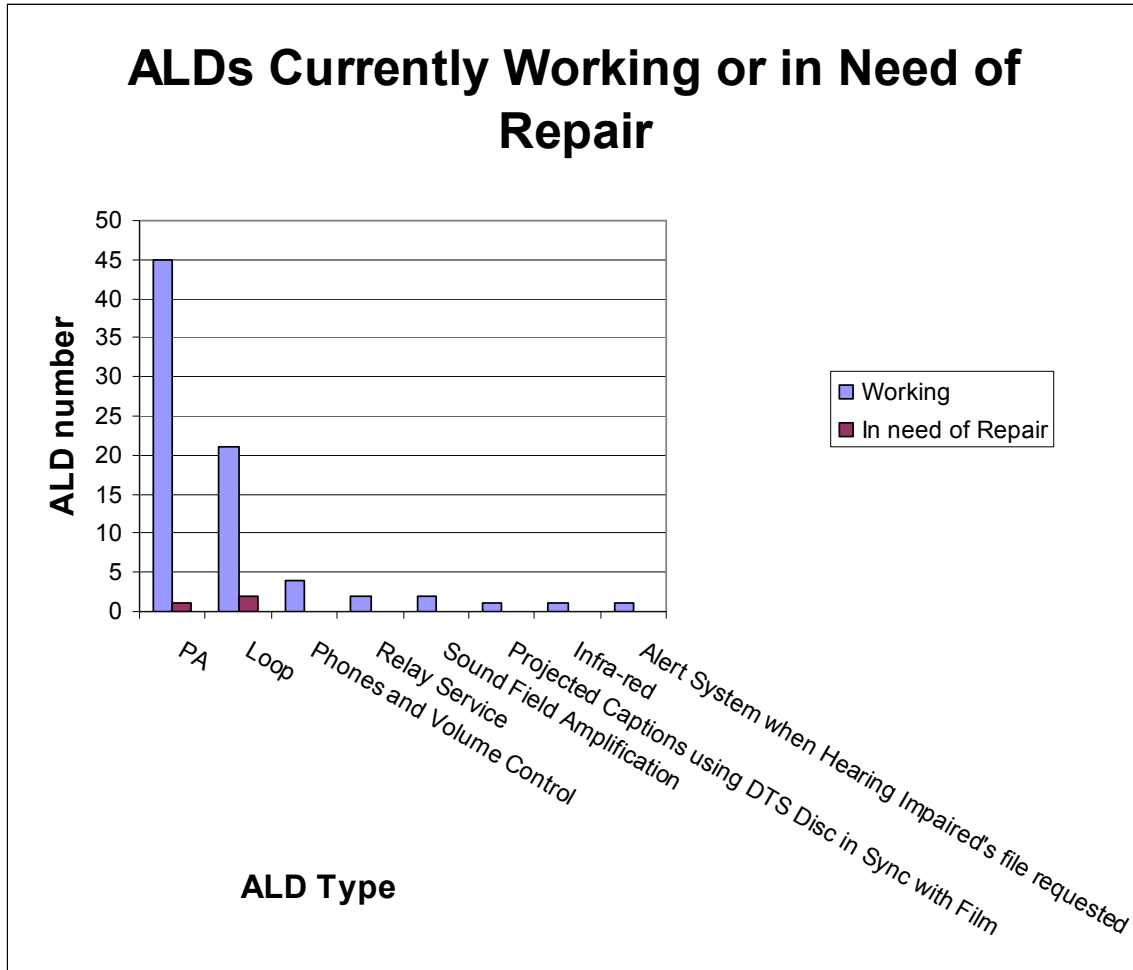


Figure 10: ALDs currently working or in need of repair.

Of all the PA systems found within the survey, 45 were in working order while 1 was not. Of all the induction loop systems surveyed 21 were working while 2 were not. All other ALD systems including phones and volume control, relay service, sound field amplification, projected captions using DTS Disc in Sync with film, infrared and alert system when a hearing impaired file is requested were in working order.

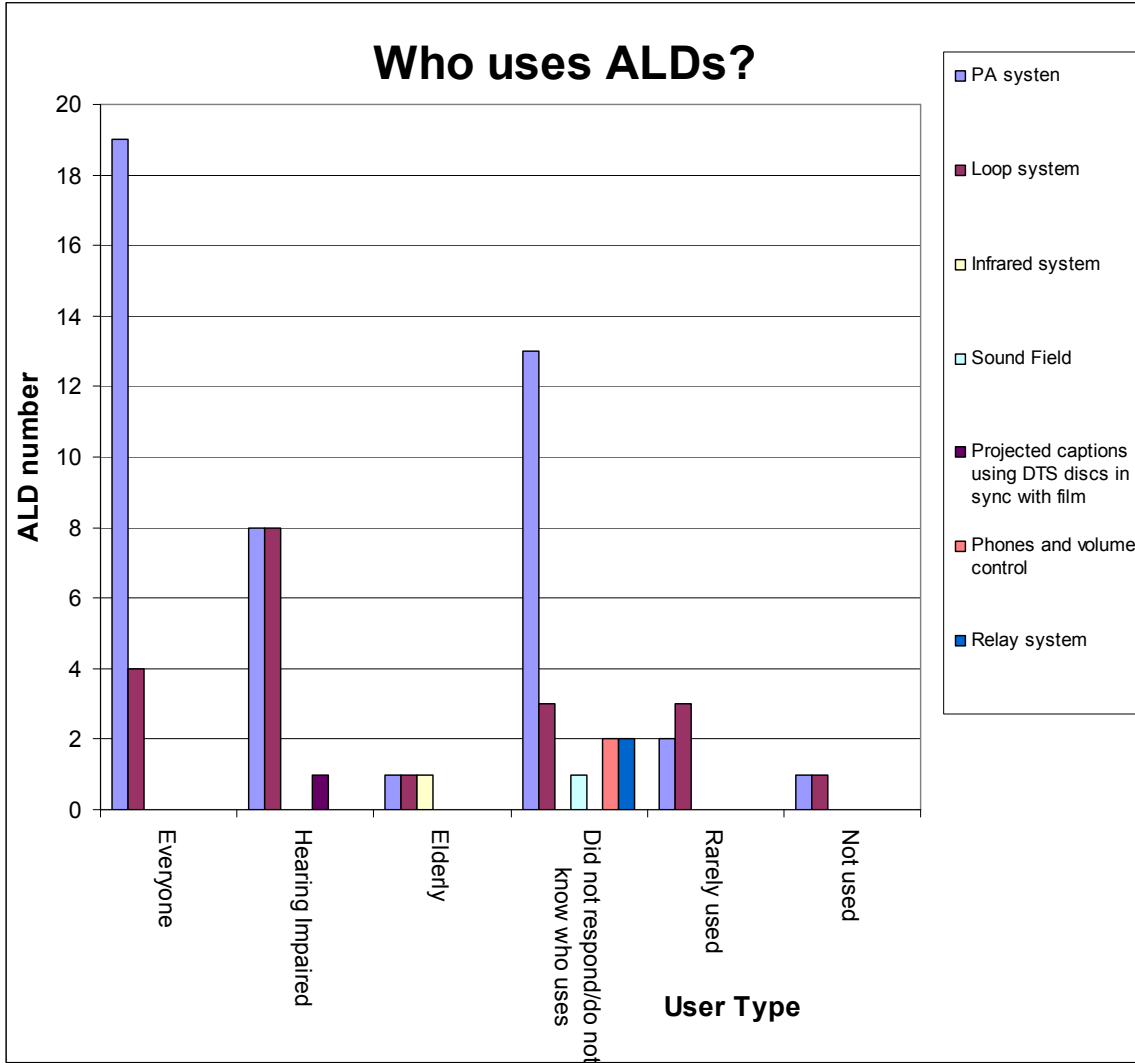


Figure 11: ALD type and who uses them.

The survey asked community organizations who they thought used their ALDs and a number of interesting points were found. The survey found that many community representatives thought that ALDs are used by everyone, for example, especially the PA system, however some respondents felt that the induction loop system is used by everyone also. Many community organization representatives said that ALDs were used by the hearing impaired within their organization. A small number of community

organization representatives thought that the elderly used their ALDs. There were a large number of respondents who felt that they were unsure who used their ALDs. Some community representative respondents commented that their ALDs are rarely used or not at all.

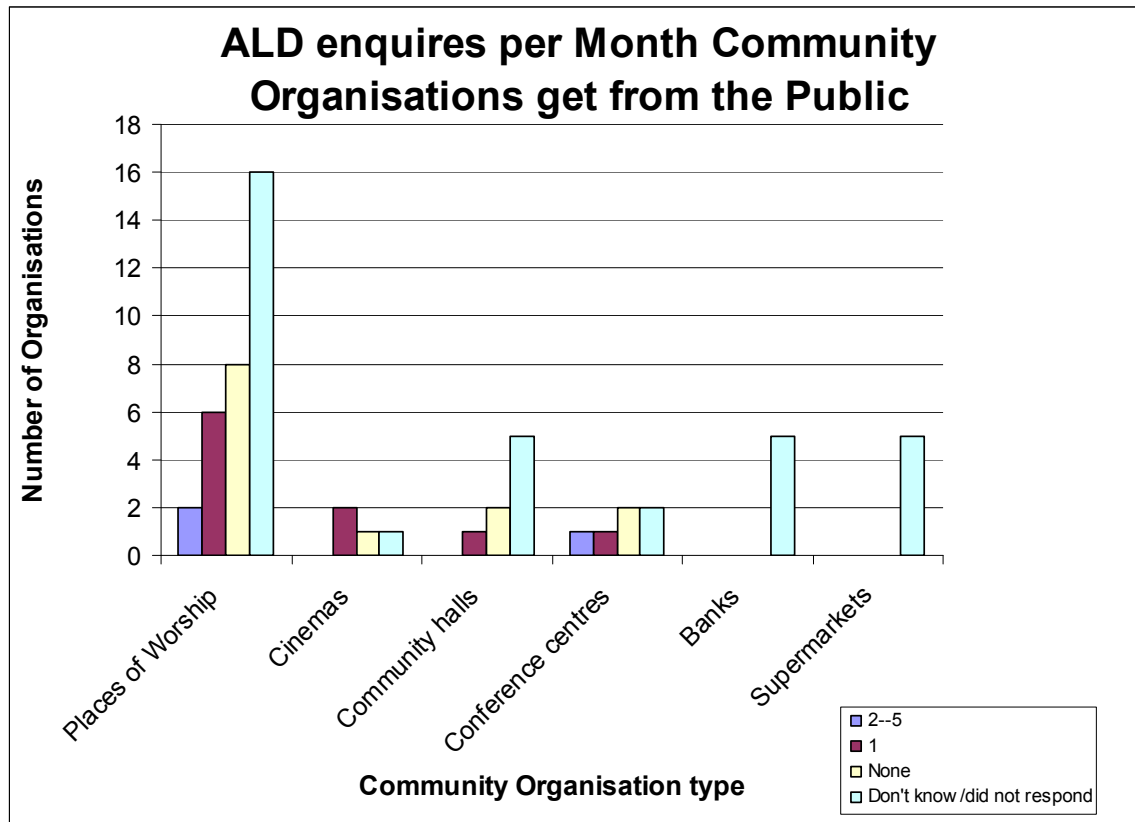


Figure 12: Number of ALD enquires a month community organizations received from the public.

Community organizations were asked the question how many ALD enquires a month they receive. It was found that places of worship get more enquires a month than other organization types. Community halls, conference facilities get generally less enquires a month than places of worship.

Table 2: Reasons that community organizations install ALDs for their patrons.

	Number of comments
For hearing impaired community	16
So all the audience can enjoy	2
For awareness	1
Public Service	2
To improve sound quality	6
Installed with building	2
Some speakers have small voices	1
For convenience	1
Members requested	1
Unsure	17

When the community organization representatives were asked the question why their organization installed an ALD for the public, a high number of respondents said they were installed for their hearing impaired patrons. A good number said they install ALDs to improve overall sound quality. Smaller numbers of community organization representatives commented that they installed ALDs for the following reasons: so that all can enjoy the listening experience; to promote awareness; for the public service; or that they were installed with the building; to improve the audibility of speakers with small voices; for convenience and due to a members request. Lastly a large number of community organization representatives were unsure why they got ALDs for their patrons.

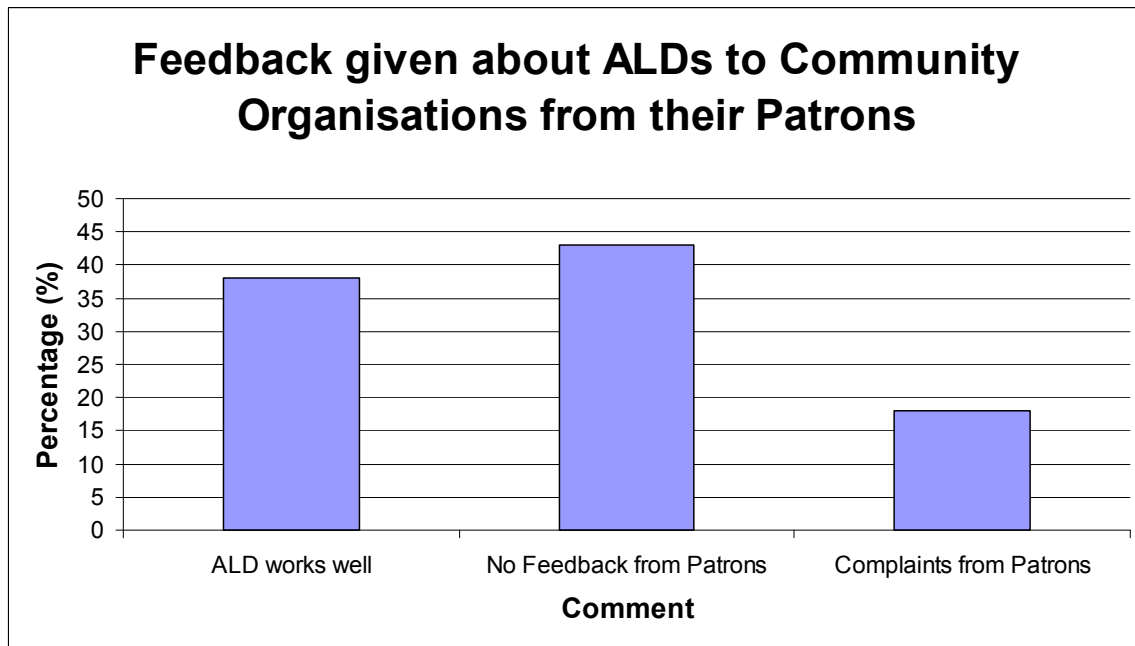


Figure 13: Feedback about ALDs from organization representative.

Table 3: Complaints patrons made about ALDs throughout the Christchurch community.

	PA system	Induction loop system
Have to move to sweet spot	1	2
Too loud	1	1
Too quiet	3	1
Difficulty with hearing Aids	1	-
Unknown reasons why patrons complain (3)	-	-

Christchurch community organizations were asked the question what sort of feedback they get from their patrons about their ALDs. Of the 55 organizations that offer an ALD 38% (21) surveyed had feedback from the hearing impaired that their ALDs worked well. Another 43% (24) of community organization said that they had no feedback from their patrons. Eighteen percent (10) of community organizations had complaints from their patrons while using their ALDs. Complaints ranged from: having to move to the sweet spot (comment while using the PA system and two comments for the induction loop system); finding the listening experience too loud (one comment for a PA system and one using the induction loop system); finding the listening experience too quiet (three comments for a PA system and one comment for the induction loop system); having difficulty with hearing aids when using ALDs (one comment when using the PA system). There were three complaints of unknown origin about ALD systems made by the hearing impaired.

4. DISCUSSION

The main objectives of this study were to determine Assistive Listening Device (ALD) usage in the Christchurch community by investigating: (1) the types of ALDs used in Christchurch community organizations and how accessible they are to the public; (2) whether ALDs within Christchurch are appropriately maintained; and (3) whether there is a need for audiological support in order to make possible their appropriate use. Another objective was to make a list of community organizations that provide ALDs to the public of Christchurch, and make it available to individuals who have hearing impairment.

To meet these objectives the survey asked specific questions including: whether organizations offer the public any ALDs; what type of ALDs they offer the public; in which rooms their ALDs reside; what percentage of seats within their organization their ALDs cover; how the organization maintain their ALDs; whether or not organizations test the functionality of their ALDs; who uses their ALDs; how many enquires the community organization gets per month about their ALDs; how long they have had their ALDs in use on their premises and what sort of feedback the hearing impaired give community organizations about their experience in using their ALDs.

Community organizations that were surveyed included places of worship, cinemas, community halls, conference facilities and services, banks, supermarkets and an art gallery. The researcher surveyed in total 104 community organizations in the Christchurch community. Out of the 104 community organizations surveyed 53% (55) had an ALD, while 47% (49) did not. This is a relatively low incidence of ALD use compared to the study performed by Currie, Gold, Slawsky, (2006). They performed a

study determining ALD use within the community Halifax Regional Municipal (HRM), Canada, and found that 75.29% community organizations surveyed reported having one or more ALDs. This raises the question why there is a difference between the two communities. Some community organizations surveyed in Christchurch described that they wanted to install an ALD for their hearing impaired patrons but after discussing options with companies that install them, felt the cost of doing so was too high. Another possibility could be a problem within New Zealand's legislation that manages the public with disabilities. One piece of legislation involved that could be improved upon is the New Zealand Building Act 1991, that requires new or extensively renovated public buildings to be accessible for hearing impaired people by having an assistive listening system installed, either being an audio loop, infrared and FM system (The National Foundation for the Deaf Inc, 2007). Although the Building Act 1991 mandates the provision of assistance, the legislation does not appear to be regulated adequately. With only 53% of buildings within Christchurch surveyed providing an ALD, it seems that the New Zealand Building Act 1991 does not go far enough in providing ALDs for the hearing impaired. Buildings built before 1991 that have not been extensively renovated are not required by law to have an ALD. It is argued that most building that have ALDs in the Christchurch city were built before 1991 and in these listening situations the hearing impaired will not have adequate amplification. In general, the situation needs to be investigated more to remedy the current situation of low ALD number within Christchurch.

Results from the survey indicate that the most used ALDs in Christchurch Community organizations is the public address system (PA system). According to Currie

et al (2006) a PA system covers everyone's listening needs; people without hearing loss, with personal amplification and with a hearing loss. However, a PA system alone is not enough for improving speech perception for the hearing impaired. Nábelek, Donahue, Letowski, (1986) compared FM, loop and infrared systems with a standard PA system in a medium classroom situation using four groups of listeners and generally found that ALDs improved word recognition scores more compared to standard PA systems. The next most commonly used ALD within the Christchurch community is the induction loop system. While in the past, behind the ear hearing aids (BTEs) with telecoils were the most commonly used hearing aid today, this may not be the case in Christchurch. This raises the question of whether or not current ALD technology used within Christchurch is compatible with current hearing aid technology. According to Currie et al. (2006) only 23% of hearing impaired Americans actually use their hearing aids. Often hearing aids have no built-in telecoil which is needed for the sound signal generated by an induction loop system to be heard. The induction loop signal is normally more easily heard while using BTE's than using in the ear hearing aids in the ear hearing aids (ITE's). In the USA, ITE hearing aids make up 70% of the hearing aid market (Kirkwood, 1997).

Of all the community organizations surveyed, places of worship had the most ALDs [58% (32)], followed by community halls [15% (8)], conference centers [11% (6)], banks [9 % (5)]. Supermarkets and the one art gallery surveyed had no ALDs. The type of ALDs offered is a reflection of the type organization that exist in Christchurch. There are more places of worship than community halls in the Christchurch community. Also the survey results suggest that some community organization types have more ALDs, for example banks have more compared to supermarkets.

Of the 104 community organizations surveyed, it was found that all the banks, most places of worship, most cinemas, and almost half of the conference centers offer ALDs to the public. The survey discovered that neither supermarkets nor the art gallery offer ALDs to the public. This is an important finding, as supermarkets are used by the whole community including the hearing impaired and the results suggest that the hearing impaired may struggle while using this organization type.

When comparing ALD numbers to organization type between the two communities of Christchurch and HRM, Canada, the survey in Christchurch found that banks had the highest proportion of ALDs or hearing services (100%) in Christchurch. The survey within Christchurch determined that 70% of places of worship offer ALDs to the community while Currie et al. (2006) found 92.9% of places of worship offer ALDs to the HRM community. The survey found that 80% of cinemas within Christchurch offer ALDs to the public while Currie et al. (2006) found that 92.86% of theatres in HRM offer them. The results from the survey in Christchurch indicate that supermarkets had the lowest proportion of ALDs compared to other organizations.

Within Christchurch's places of worship, the most commonly used ALD type is the PA system at 60% (32), then the loop system at 30 % (16) and combination of both at 30%. The survey determined that usually when there was a loop system installed there is a PA system. These results are similar to those found by Currie et al. (2006) that within places of worship in HRM, Canada, PA systems were the highest proportion of ALD type, followed by induction loop systems.

Of the cinemas surveyed within the Christchurch city, the highest proportionately used ALD offered is the induction loop system, followed by an infrared system. These

results differ from those found by Currie et al. (2006) where FM/Infrared systems were the most commonly used followed by PA systems. Ross & Bakke (2000) state that the induction loop is the oldest large area ALD system used and today it is the least used. The difference found between the Christchurch and HRM communities could be that loop systems are an older more established ALD technology in Christchurch and as yet not been superseded by newer technologies.

Results from the survey of Christchurch's Community Halls that offer ALDs found that 100% (8) provide a PA system but no other ALD type. In community halls the hearing impaired would have problems with speech perception in these environments. To improve the current situation for the hearing impaired, additional ALDs are needed to be installed in Christchurch's community halls.

Within Christchurch's Conference Centers, the most commonly used ALD is the PA system, followed by the induction loop system, while 20% offer a PA and loop system. The high proportion of PA systems compared to other ALD types within conference facilities, may reflect the younger age cohort using them, for example, places of worship have a more elderly audience. However, conference facilities should be providing more ALDs for their hearing impaired patrons as not all their patrons will have normal hearing.

The most commonly used ALD system used in banks throughout Christchurch and New Zealand is the internet, followed by the relay service. Banks provide the internet for normal and hearing impaired individuals, so that they can access their bank details from home. The internet is not considered an ALD but a service that the hearing impaired can use. It is important to note that this new technology is improving communication

between the hearing impaired and community organizations. Only one bank surveyed provides their hearing impaired customers with an ALD. It would be beneficial for the hearing impaired to have an ALD system in this organization type, without causing privacy issues. This therefore rules out using FM and infrared systems due to the signal possibly being able to be picked up by other hearing aid users. An option could be to use a cushion induction loop with neckloop to restrict signal to a more specifically contained area that only the teller and customer have access too.

The survey found that word of mouth was predominately the way that Christchurch's community organizations advertised to the hearing impaired public that they offer an ALD. The next method used was advertising through web site and/or signs posted outside or on the premises, which is a similar result to that reported by Currie et al. (2006). Generally, the two surveys suggest that community organizations are not doing enough in the way of advertising that they provide ALDs. The definition of advertising is "a one-way communication whose purpose is to inform potential customers about products and services and how to obtain them, and every major medium is used to deliver these messages, including: television, radio, movies, magazines, newspapers, video games, the internet" (Wikipedia, 2007). There needs to be more promotion by Christchurch community organizations that they offer ALDs for the hearing impaired. It is imagined by the researcher, that currently within many communities, the hearing impaired are presently unaware of the ALDs they could have access too. If community organizations advertised more there would be a greater awareness throughout the community that ALDs exist. However this would incur more costs to community organizations and some may struggle advertising if they are short of money. Bakke,

Compton, Ross, (2004) recommends that community organizations who provide ALDs advertise in newspapers or other media advertisements or by using recorded telephone information stating that they provide them and by use of clear and visible signage saying exactly where their ALDs are situated. Some methods are more cost effective than others. For example, recorded phone messages and signs posted outside would be cheaper options. Generally, no matter the budget a community organization has it can still advertise effectively.

The survey found that the ALDs found within Christchurch community organizations are maintained in different ways. The most common way is by an electrician. The next most common way that Christchurch community organizations maintain their ALDs is through their own in house 'electronics expert'. This reduces the community organizations' overheads. However due to the cost in maintaining ALDs smaller organizations may struggle to maintain them appropriately.

The survey found that audiologists are not involved in maintaining any ALDs within Christchurch community for the places surveyed. This is a similar result found by Currie et al. (2006), where only 4.92% of community organizations in HFM, Canada, consulted an audiologist about use, benefits and maintenance of ALDs. The question is asked whether audiologists are the best people for maintaining ALDs within community organizations. Currie et al. (2006) found that consultation by an audiologist is not needed for their successful use and maintenance within the HFM community, Canada. In large listening areas, Bakke et al. (2004) recommends that they be maintained by the installers, who also set standards in their performance. The survey in Christchurch found that many organizations within the community have their ALDs maintained by their installers.

There was a high proportion of community organization representatives who said that they were unsure if their ALDs were maintained. This indicates that the community organization representative who took the survey did not actually have knowledge about their own ALDs within their premises. A number of community organization surveyed said that their ALDs don't need maintaining, which is of some concern, and indicates there is a need for installers to check ALDs more regularly.

When community organizations were asked the question whether or not their ALDs were in working order or in need of repair, 3 out of the 55 in total surveyed said that their ALD was in need of repair. This result suggests that most ALDs throughout the community are in working order or that they are not sure as discussed previously.

When community organizations were asked the question "who uses their ALDs", several comments were made. Many organization representatives felt that PA systems were used by everyone but interestingly, some felt that their induction loop system were also. However, the loop system is designed for those that are wearing hearing aids with telecoils only. Unexpectedly, there was a large proportion of community organizations surveyed that were unsure who used their ALDs, this also suggests that the organization representatives have little knowledge of their ALDs. These critical points suggest that there is a need throughout the Christchurch community for organizations that carry ALDs to be educated about their appropriate use. This job could be carried out by an ALD installer or an audiologist. This would create awareness within community organizations about the purpose of ALDs and in doing so would help the hearing impaired.

Many community organizations surveyed in Christchurch said that the PA and loop systems are used by the hearing impaired. Very few respondents said that their

ALDs were rarely used or not at all, which is an encouraging result, however for those that said that their ALDs were rarely used, it would have been good to know the reasons why this is the case. It could just be that they have few hearing impaired in their congregation.

During the survey community organization representatives were asked “how many enquires they get a month about their ALDs?” Places of worship had the most enquires. This could be due to this organization type having a higher number of elderly patrons than other community organization types. There was a high number of representatives that did not respond or did not know the answer to this question. It is likely that a high number of hearing impaired people visit supermarkets and banks. When the researcher phoned banks and supermarkets, they were only found to be contactable through their head office. The head offices for these two organization types had customer representatives that knew very little about ALDs within their local branches, therefore giving the survey result that they did not know how many enquires they get per month. However, there is a sizable hearing impaired population within the community, and it is assumed that they would have made enquires. It could be that many hearing impaired people are not using their community organizations’ ALDs, because they are unaware that they exist within their community and that they could be using them. It could be that they are relying just on hearing aid technology to help communicate in community organizations listening environments. This would suggest that the hearing impaired have little knowledge about ALDs in the Christchurch community and of their benefits they provide in difficult listening situations. They need to be educated about the benefits

ALDs provide in speech perception. Perhaps doing another survey within the community targeting the hearing impaired would give more specific information about ALD usage.

Community organizations of Christchurch were asked why they provide ALDs for the public. Generally, many community organizations commented that they provide them for the hearing impaired community. Community organizations provide ALDs to improve overall sound quality within the listening environment. Two respondents explained that their ALDs were installed with the building and these respondents were probably referring to the New Zealand Building Act, 1991. Some commented that ALDs were installed so that all the audience can enjoy the listening experience. This comment suggests that these particular respondents were meaning that the whole audience would benefit and felt that they did not want the hearing impaired to miss out on any information. One comment from a community organization representative said that ALDs give awareness to the hearing impaired community. This comment indicates the importance of providing ALDs for the hearing impaired so that they are informed about community matters. ALDs not only help the hearing impaired and normal hearing individuals, but speakers also. A comment was made that ALDs make it easier for the speaker to communicate with the audience, as not all speakers have “big voices and are unable to project it to the whole audience”. One respondent suggested that ALDs are convenient, suggesting they make the general audience happier than if they were without ALDs. A happier patron is one that is more likely to return back to a particular community organization. One community organization representative commented that their members requested that ALDs be installed within the organization premises. Acting up upon a member’s request, this organization subsequently then installed an ALD. This

highlights the importance of feedback between patrons and community organizations. It underscores out the importance of having a cross range of community organization representatives as members (included those with disabilities) and giving them the chance to voice their concerns about the day to day running within their organization.

Community organization representatives were asked what sort of feedback they got from their hearing impaired patrons regarding the use of ALDs within their organization. A high proportion of community organizations were told by their patrons that their ALDs had worked well (38%), which is an encouraging result. There were unfortunately a higher proportion of community organizations that had not been given any feedback from their patrons (43%). It could be that these community representatives had no knowledge about ALDs usage within their own organization.

The survey suggests there is limited opportunity for the hearing impaired to give feedback about ALDs to their community organization. If the hearing impaired are unable to give back feedback to their community organization then how can positive changes in ALD use occur? It is recommended that the hearing impaired give feedback to community organizations about ALD usage through a suggestion box or directly to the organization itself. Feedback and suggestions should be discussed in the organizations agenda meetings and then implemented within the community organization. Feedback will create more transparency in communication between the hearing impaired and community organizations thus improving their quality of life.

The survey found a number of hearing impaired had made complaints after using ALDs within the Christchurch community. Two of these complaints relate to the use of the induction loop system where the hearing impaired had to move around the listening

environment to find the listeners sweet spot. According to Davidson and Noe (1996) the telecoil within the hearing aid picks up the shaped and amplified signal and factors such as the strength of the signal and the orientation of the telecoil to the electromagnetic signal determine how well the signal is picked up. BTEs have typically stronger telecoils and more precisely positioned than ITE's and ITC's hearing aids (Davidson and Noe 1996). Noe and Davidson (1997) found that audiologists need to take care when counseling their patients about using standard ITEs with ALDs, as the telecoils within these aids may not be strong enough to inductively pick up an ALD signal and the patient may have better results removing their ITE aids and using a FM, loop and infrared system with a headset. With recent developments in hearing aids, it is now possible to have them programmed so the telecoil matches the microphone response (Davidson, Noe, Mishler, 1996). In general, the hearing impaired with compatibility issues should visit their audiologist to get their telecoil programmed within the hearing aids, to improve the overall sound quality (Bakke, Levitt, Ross, Erickson. 1999).

4.1 Patrons feedback and complaints while using ALDs

Two patrons described that the signals they were hearing with the induction loop and the PA system were too loud. The complaint relating to the induction loop system could be easily addressed by an audiologist by adjusting the telecoil response. Likewise the loud signal using the PA system could be modified by advising the patron to move further away from the speakers. Alternatively the patron could also try turning down the volume on their hearing aids, if they have a volume control or get their audiologist to

tune their hearing aids so that they turn loud sounds down automatically.

Three community organizations representatives had complaints from their patrons that the sound was too quiet with a PA system. A PA system is normally set up for the general audience and if that audience has mainly normal hearing individuals, then it may not be loud enough for those with hearing loss. These individuals with trouble in these listening situations could try using a personal ALD which would improve speech perception in these environments.

One community organization got feedback from one of their patrons that while using the loop system, that the sound was too quiet. Some people with hearing loss using loop systems, can have problems in large areas where sounds are often not loud enough, especially women's voices can be very quiet (Vaughn et al. 1988). Noe, et al. (1997) found ITE hearing aids with standard telecoils were found to be inadequate. The individual in this listening situation should go to their audiologist and get their hearing aids checked or they may need to upgrade to a hearing aid that has a stronger telecoil, for example, a BTE.

There were three complaints from patrons with no description of details whatsoever. It could be that these particular patrons were unsure how to describe the problem to the community organization or that the community organization representative had forgotten the exact nature of the complaint.

4.2 Audiologists and ALD use

Audiologists fit hearing aids and personal ALD systems and make recommendations to their patients about their use. Audiologists also program and order hearing aids that are compatible with large area and individual ALDs. The results from the survey indicate that audiologists might be supporting the hearing impaired in their use of ALD systems in the Christchurch community; however, to what extent is unknown. Once again doing a survey of the hearing impaired experiences with ALDs and audiologists would be beneficial. For individual hearing needs Holmes & Saxon (2000) recommend that audiologist make recommendations for and dispense the appropriate ALD. Bakke et al. (2004), found disturbing comments from patients including “why didn’t my audiologist recommend a hearing aid with a telecoil”? “No one showed me how to use the telecoil and I thought it was for the phone only” (Bakke et al. 2004). Frustration is felt by the audiologist who has no time to develop expertise in this area. However, Southhall, Gagné, Leroux. (2006) suggests the problem is a larger one, and that there is a lack of overall knowledge from health professionals that these technologies exist and many need to be updated about their existence. They suggest that a lack of awareness and accessibility are the main barriers to lack of use of ALDs, which could be addressed by health professionals (Southhall et al. 2006). Following preliminary discussions with health professionals in the Christchurch community, the researcher agrees with Southhall et al. (2006) that there is generally a lack of awareness and accessibility of ALDs throughout.

The survey found there was a lack of communication between audiologists and ALD installers regarding the hearing impaired needs and it is argued that to promote more effective use and benefit of ALDs within communities, better communication needs to occur between these two groups. The spin off will be an improved quality of life for the hearing impaired.

Limitations were found while carrying out the study. It was found that the person surveyed was not necessarily the expert in their knowledge about the ALDs they provide within their community organization. It was hoped that when the survey was sent with an appendix asking the person who manages the ALDs within the organization to fill out the survey; the ALD expert would fill it out, however they were often unavailable to do so. The impression received from the researcher while carrying out the survey and contacting some community organizations is that often there was no expert within the organization. Often the administrator within the community organization filled out the survey and because of a lack of understanding of ALDs within their organization many surveys were not filled out. Not all the questions were appropriate for the determining ALD usage within the Christchurch community, for example, there was a question about hygiene measures undertaken in servicing the ALDs after each performance, targeting community organizations that offered headsets for their patrons but it was found that only one organization used headphones. When getting feedback about ALD usage within the community, good information was attained from community organizations, however in many instances it would have been better directing the questions directly to the hearing impaired themselves. When asking community organizations whether or not their ALDs were in working order or in need of repair, we would have received a more accurate

feedback asking the hearing impaired who patronise that particular community organization. However, this would be a separate study that should be considered in the future. As Currie et al (2006) reported, there contact was made with a community organization on separate occasions, contradictory responses were occasionally given. For example, a community organization representative would indicate they have one ALD but on a later discussion they would suggest they have a second one. The data gathered in the present study will be a good representation of the type of ALDs on site, accessibility of, maintenance and frequency of use within communities in Christchurch. However, a wider representative sample of communities around New Zealand, for example, comparing urban versus rural communities for ALD type, usage and maintenance would be beneficial. It would have been more beneficial asking a broader range of ALD organizations, for example including hospitals and courts.

4.3 CONCLUSIONS AND RECOMMENDATIONS

Within Christchurch there are an estimated 45,000 people with a hearing loss and they have the right to access to information and communication. Clinical experience and research has shown that ALDs can improve speech perception in certain listening environments more than the use of hearing aids alone. ALDs provide awareness of community matters within the hearing impaired population. Previous studies had indicated that once the hearing impaired has been educated about ALDs they tend to use them appropriately. However, literature suggests very little is known about the use and maintenance of ALDs within communities. The present study is a survey of ALD type,

usage and maintenance in the Christchurch community. The study was undertaken with a view towards improving the quality of life for the hearing impaired not just in Christchurch but in all communities in New Zealand.

The main objectives of the present study were to; (1) determine the types of ALDs used in Christchurch community organizations; (2) assess how accessible they are to the public and, (3) to learn whether or not they are appropriately maintained and whether there is a need for audiological support in order to make possible their appropriate use. The study provided an insight into ALD type, usage and maintenance in the Christchurch community. A list of community organizations that provide ALDs to the public of Christchurch was also made available to the Christchurch community (**Appendix 3**). It is hoped that the list will create awareness within Christchurch of the benefits of ALDs. This will improve the day to day listening experiences of the hearing impaired.

The survey found that current ALD technology within the Christchurch community is not necessarily compatible with the needs of the hearing impaired. The most commonly used ALD type in the Christchurch community is the PA system, which by itself does not meet the speech perception needs of the hearing impaired. Most ALDs are in working order; however, Christchurch community organizations need to be educated about their use and maintenance, which will create more awareness about their benefits. The survey found that Christchurch's community organizations do not advertise widely enough that they offer ALDs which might possibly account for the lack of awareness among the hearing impaired about their existence. Moreover, this lack of awareness of ALDs throughout the community also extends to health professionals, who need to be informing the hearing impaired that they exist and have speech perception

benefits. The study also indicates that currently health professionals and ALD installers need to communicate more about ALD types, use and maintenance, in order to better serve the needs of the hearing impaired.

Future research should be directed at understanding why Christchurch community organizations provide fewer ALDs to their patrons, and whether current hearing aid technology is compatible with the induction loop system. It would be useful to do a survey on end uses of ALDs; to ask them the type of hearing aids that they are using, and whether or not their audiologist helped set them up with ALDs. It is essential that communities find out how well the hearing impaired cope in such places with respect to their listening needs and also find ways of getting more ALDs into various organizations, for example, in supermarkets and banks. Research needs to determine which ALDs are best for each listening situation and have that information made available to ALD installers and audiologists. This will provide a tool that ALD installers, audiologists and the hearing impaired can use to ensure more effective use of ALDs within their communities.

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To Whom It May Concern:

My Name is Simon Begg and I am a researcher from the University of Canterbury, Department of Communication and Disorders. I am doing a research project and the purpose of the project is to find out what devices are available in your organization for your deaf or hard of hearing patrons. These devices could be PA systems, Loop systems, FM systems etc

If you participate in this project, it would be greatly appreciated if you could fill out attached survey and consent form and send them back in the pre paid envelope. The outcome of this research will help us compile a list of community organizations within Christchurch that offer the hearing impaired assistive hearing technology. You will also help us understand if you need any help in setting up, maintaining, and calibrating Assistive Device technology in your organization. Thank-you very much for taking part in this survey and for giving the hearing impaired a better quality of life.

Yours truly,

Simon Begg, BSc, MEnEd

Maud Candidate

Department of Communication Disorders

University of Canterbury

**Survey of Use of Assistive Listening Devices in Community Organisations of
Christchurch**

Name of Organization _____

Contact phone number for use of the public _____

Type of Assistive Listening Device on site

1. Do you have Assistive listening devices (ALDs) in place at your organization?
2. If yes, which type(s)
 - a) Hardwire system _____
 - b) Audio loop (or loop system)
 - c) Infrared system _____
 - d) FM system _____
 - e) Soundfield amplification system _____
 - f) Real-time/closed captioning _____
 - g) Rear window captioning system _____
 - h) PA system _____
 - i) Alerting systems (ie strobe light phone/alarm) _____
 - j) Sign language interpreter available on request _____
 - k) TTY
 - l) Phones and volume control _____

m) Preferential seating_____

n) Other_____

Their Accessibility

3. In which rooms are the ALDs located in your premises?

4. What percentage of seats within your organization has an ALD?

Less than 1%_____ 1%_____ 1-2% _____ 2-5% _____ 5-10%_____ 10-30%
_____ 30-50% _____ 50-75% _____ 75-100%_____

5. Do the ALDs need to be requested in advance? If so then how much notice is needed to be able to use them?

6. Do you charge extra for the public to use your assistive listening device? If so how much?

Advertisement of:

7. How do you advertise to the public that you have assistive listening devices?

Signs posted within your organization _____ Website _____ Newspaper _____

Television _____ Radio _____ Word of Mouth _____ Other (please explain)

Maintenance of:

8. How does your organization maintain these devices?

9. Are they periodically tested?

10. Do you have someone who is trained to help your customers to choose an appropriate ALD? -

11. Do you have someone who is trained to help instruct your customers how to use their ALD?

12. Do you have any hygiene measures for servicing the ALDs after performance?
(spraying of ear cushions using anti-septic solution etc?)

Frequency of Use

13. Who uses the ALDs? _____

14. How many enquires do you get in a month about the use of your ALDs?

30+ _____ 20-30 _____ 10-20 _____ 5-10 _____ 2-5 _____ 1 _____ Other _____

15. How long have you been using ALDs?

10 years + _____ 5-10 years _____ 2-5 years _____ 1-2 years _____ Less

1 year _____ other _____

16. What sort of feedback do you get with from users of your ALDs?

17. Why did your organization get ALDs to use for the public?

18. Do you give consent for your organizations name to be published as offering this service in the community in a handout that could be easily accessed by the people of Christchurch? Yes _____ No _____

**Re: Survey of Use of Assistive Listening Devices in Community Organisations of
Christchurch**

Dear community organization.....

Thank-you for taking part in the survey of Use of Assistive Listening Devices in
Community Organizations in Christchurch. The researcher is going to collate the
information obtained from the survey and incorporate it into a community handout that
can be used by the hearing impaired.

Confirmation of consent (to be completed by community organisation)

On behalf of the community organization, I have confirmed that the organization's name
be included in a community handout that gives information to the hearing impaired about
Assistive Listening Devices within the Christchurch Community.

Signed:..... Date ..

.....

Name (PRINT) Job title

.....

Yours truly,

Simon Begg (researcher)

Assistive Listening Devices in the Christchurch Community

Table of Contents

Community Organization	Page Number
Places of Worship	1
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Community Halls	3
Conference Facilities	3

Organisation	Phone number	Address	ALD type
Christian Science Church and Reading Room	3662544	66 Carlton Mill Rd,	Pa, loop
Anglican Parish of	3136148	353 High st, Rangiora	Pa, loop

Rangiora			
Baha'ifaith	3394244	PO Box 13253 Chch	Pa
Revival Fellowship	3880415	23 Nivin st Avondale	Pa
Quakers Religious			
Society Of friends	3858358	72 Cresswell Ave	Pa, loop
Burnside Christ The			
King	3582611	90 Greers Rd	Pa, loop
Shirley Methodist			
Church	3853473	25 Latimer Sq	Pa, loop
St Peters Catholic			
Branch	9819481	9 Fisher Ave Smfld	Pa, loop, Phones and volume control
Our Lady of Fatima			
Mairehau	3853459	380 Innes Rd StAb	Pa, Sound field amplification system
St Joseph's Parish			
Papanui	3529275	133 Main North Rd	Pa, loop
Catholic church			
Leeston	3252770	Lincoln Gerald St Licn	Pa, fixed and mobile mic
Anglican Cathedral			
the square	3660046	PO Box 855	Pa, loop
Waipara New Life			
Church	3146851	c/-25 Mackenzies Rd Waipr	Pa
St Pauls Lutheran			
Churh			
Burwood/Marshland	3830166	130 Burwood Rds Burd Manse	Pa, loop
St Albans Catholic			
Church	3558055	58 Somme St	Pa
Wairakei Road Bible			
Chapel	3599247	392 Wairakei Rd Burns	Pa, loop

Destiny Church				
Christchurch	3541017	PO Box 5477 Papanui		Pa
Cinemas				
Movieland Hornby				
Mall	3492365	Hornby Mall Hornby		loop loop, projected captions using DTS Disks in sync with film
Hoyts Cinemas	3666367	392 Moorhouse Ave		
Community Halls				
Shirley Community				
Centre	3851417	Cnr Shirley & Slater St		Pa
Freeville School				
Community Hall	3889666	11 Sandy Ave NthNB		Pa
Mt Pleasant				
Community Centre	3843495	McCormacks Bay Rd MtPlt		Pa
Cashmere Masonic				
Centre	3327244	Clive Chandler, 4 Patritt Place, Casmere Lodge		Pa with portable microphone
Caledonian Society				
Hall	3661607	Fraser 6 Prudhoe Lane Papanui 8052		pa
Conference Facilities and Services				
V-base for convention centre, Main halls, Meeting rooms, Town hall Auditorium, Theatre,	3668899	95 Kilmore St www.vbase.co.nz		Pa, loop, preferential seating

Limes room

Blue Skies

Conference and traing

centre 3278007 12 Williams St Kaiapoi gary@blueskies.org.nz Pa

Chatterley Manor B

& B 3296658 433 Old Tapu Rd chch enquiries@lady chatterley Phones and volume control