Examining the Efficacy of Lipreading Classes in Scotland

An ALLIANCE Considerations Paper for Scottish Government

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Table of Contents

Executive Summary 3
Introduction 7
Hearing care as a public health priority 8
What is lipreading? 9
The rationale for lipreading classes 10
Scottish Lipreading Strategy Group 2012-2015 12
The status of lipreading provision in 2023 16
Examining the evidence for lipreading training 18
Alternative models of delivering lipreading 25
Considerations for future service planning 27
Appendix 1: SCTTL Course Information 2023-2024 30
Appendix 2: The limitations of hearing aids and the impact of stress, fatigue and listening effort on speech comprehension 32
Appendix 3: Range of rehabilitation classes at City Lit 36
About the ALLIANCE 37
Contact 37
References 38

Executive Summary

The aim of this review – carried out by the Health and Social Care Alliance Scotland's (the ALLIANCE) Scottish Sensory Hub on behalf of the Scottish Government – is to examine the efficacy of lipreading classes as an adult aural rehabilitation approach and highlight considerations for future service planning in Scotland.

Lipreading classes are a form of aural rehabilitation for adults living with deafness. The WHO states that healthcare systems should prioritise rehabilitation, and the Scottish Government aims to alleviate loneliness and isolation, which is particularly relevant for aural rehabilitation because unsupported deafness/poor access to inclusive communication is an established risk factor for both.

The main findings are that lipreading classes are beneficial in terms of improving feelings of well-being and increasing communication confidence. However, there is a lack of peer-reviewed evidence that a model of lipreading training exists which improves lipreading skills. With more targeted research, effective training paradigms may be discovered.

In addition, the structure of classes in Scotland resembles more of a social group or club than a programme of learning with specified outcomes which attendees can progress through. As such, there is no end point to classes and attendees may stay indefinitely, blocking opportunities for new learners. In this respect, lipreading classes differ to other classes such as education based lipreading courses, BSL and Cued Speech; learning from these models could inform an improved framework for aural rehabilitation and lipreading delivery.

The demand for group-based rehabilitation classes as well as the optimum time for people living with deafness to access these services, is not evident.

In terms of the lipreading training workforce, improvements are required to ensure workforce sustainability, professional identity and effective regulation in line with other rehabilitation services. A paradigm shift away

from lipreading classes to a system of sensory support which bridges health, social care and education could improve not only the lives of people living with deafness, but also the skills and development of those employed to deliver services, as part of an effective, sustainable and regulated sensory support industry.

The following considerations are proposed for future service planning:

1. More research to evidence lipreading as a teachable skill. Scottish Higher Education institutions have Audiology, Speech and Language and British Sign Language departments – they may be well placed to offer expertise and targeted research opportunities.
2. More research to understand the cost-effectiveness of lipreading classes/courses and sustainability of income streams for tutors/teachers. It is not clear if lipreading is part of aural rehabilitation as a health/social care pathway, or if it should reside in adult education similar to language learning – or if an alternative approach bridging the two is viable. There may also be overlap or opportunities to develop with BSL, deaf communication courses or other aspects of sensory care.
3. More research on when rehabilitation should be offered relative to receiving a deafness diagnosis. It is important to establish when rehabilitation interventions are most likely to be effective and meaningful for the person living with deafness. There is a need to understand the variance between the offer of rehabilitation being made, and the readiness of the person living with deafness to engage.
4. More research to understand attitudes towards and the demand for lipreading classes as part of, or instead of, other forms of rehabilitation or peer support. A mapping exercise of newly diagnosed people with hearing loss, as well as mapping peer support classes in Scotland, would help clarify what services currently exist with uptake/likely uptake figures.
5. More research to inform inclusive and effective rehabilitation services for people living with dual sensory loss and

deafblindness to optimise the brain's capacity for somatosensory processing.

6. More research to evaluate the cost-effectiveness of providing a one-to-one lipreading service for people living with deafness who feel discouraged from attending group learning (online or in-person), or those who experience sudden and catastrophic acquired profound hearing loss and need a range of intensive supports and inputs.
7. Development of a programme of lipreading with defined start/end points, i.e. beginner, intermediate and advanced classes, complete with learning outcomes and outcome measures, and established time-limited attendance to gain optimal and value-for-money benefit.
8. Creation of a sustainable workforce framework for lipreading tutors to ensure there are viable employment opportunities. Specific consideration may be given to registration and regulation by a governing body to promote a culture of best practice.
9. Development of a sustainable network of lipreading tutors across Scotland, to be in place before any referral pathways from Audiology or other health professions and organisations is implemented to ensure equitable access to lipreading classes. Established methods for obtaining consent for onward referral would be required here.
10. A pilot tested/test for change in a few selected areas of Scotland.
11. Development and provision of courses to include information on the human right to communication as well as the full range of assistive and augmentative tools available such as communication strategies, hearing aids, assistive listening devices (e.g. remote microphones, loop systems, FM systems, mobile technology and digital applications), Electronic Notetakers, speech to text software and knowledge of the limitations of technology.
12. Transitioning away from the historical lipreading approach in favour of designing an innovative and robust system of sensory care which bridges health, social care and education. This

might include a programme of learning delivered by tutors/teachers skilled beyond the current lipreading syllabus to provide sustainable return on investment and a more inclusive learning framework suitable across the spectrum of deafness.

Introduction

Adult aural rehabilitation can be defined as:

> *The reduction of hearing-loss-induced deficits of function, activity, participation, and quality of life through sensory management, instruction, perceptual training, and counselling*[1].

Rehabilitation is therefore associated with re-learning skills a person once had prior to the onset of deafness. This contrasts with *habilitation* for deaf children and young people where skills for communication and language acquisition are in the process of being learned.

The aim of this paper is to review the efficacy of lipreading classes as an adult aural rehabilitation approach and present considerations for future sensory service planning such as the 2025 refresh of the See Hear Strategy[2]. The Health and Social Care Alliance Scotland's (the ALLIANCE) Scottish Sensory Hub welcomes the opportunity to carry out this review on behalf of the Scottish Government. It was developed out of one of three 'Task and Finish' groups involving the Scottish Government's Sensory Loss and Augmentative and Alternative Communication Team.

Creating a sustainable framework for provision of adult lipreading classes in Scotland has been a long-standing aim for the Scottish Government[3]. In 2012, the Scottish Lipreading Strategy Group was formed to, '*improve access to lipreading classes for adults with hearing loss in Scotland, in recognition of the role that lipreading classes play in adult hearing rehabilitation and the limited availability of classes across the country*'[4]. While this three-year project generated recommendations for lipreading service development and identified areas for further research, a sustainable framework is yet to be realised and there continues to be a national shortage of lipreading tutors and classes.

Hearing care as a public health priority

The World Health Organisation (WHO) published the *Rehabilitation 2030 Initiative* in 2017 which categorised rehabilitation as a '*priority health strategy for the 21st century*'[5]. In addition, the recent World Report on Hearing[6] presents the case for hearing care[7] to be classed as a public health priority. This rationale was founded on a Global Burden of Disease study which found age-related hearing loss was the third highest caused of Years Lived with Disability (YLD) and the leading cause of YLD for people over the age of 70. By 2050, the number of people living with hearing loss is expected to rise by over 50% with age-related deafness the leading source[8]. In the UK, one in five adults are living with hearing loss[9]. Given the high prevalence of deafness in older adults, consideration needs to be given to co-existing age-related sight loss as well as the impact of cognitive ageing when designing person-centred aural rehabilitation[10].

The World Report on Hearing includes lipreading training as a specific rehabilitation consideration for hearing care provision, owing to its importance for speech comprehension.

> *This [lipreading] is an integral part of speech perception and, since it requires training, needs to be considered in hearing and speech rehabilitation strategies.*[11]

Given the WHO calls on each nation to prioritise hearing care, it is reasonable the Scottish Government would be keen to invest in rehabilitation approaches such as lipreading classes as part of a health, social care and well-being pathway for adults living with deafness. As the World Report on Hearing states lipreading 'requires training', this review examines the evidence supporting this assertion. In order to do so, it is necessary to define what lipreading is and describe the rationale underpinning current delivery of lipreading classes in Scotland.

What is lipreading?

Speech is composed of both auditory and visual components. Lipreading is the skill of using visual cues such as lip patterns and shapes to understand speech. This is particularly valuable when auditory (sound) stimuli are degraded or absent due to deafness and/or adverse listening environments. While the term 'lipreading' is commonly used in Scotland to refer to tuition-based classes, academic literature more recently favours the term 'speechreading' due to recognising that visual cues extend beyond the lip area to the face, head, eyes and even the upper body; body language and facial expressions all help provide contextual information when a listener is trying to decode another person's speech.[12]

Bernstein and co-authors[13] define lipreading as the recognition of speech using only visual cues, and speechreading as using both audio and visual cues. There are parallels with sign languages whereby visual cues such as facial, mouth and eye gestures form an integral part of the linguistic system[14].

Lipreading classes are primarily aimed at adults living with acquired deafness, however, all human beings without significant vision loss lipread to varying degrees, regardless of hearing acuity; speech is received more accurately and requires less listening effort/cognitive resources when it can be seen as well as heard. On analysis of the literature base, Campbell and Mohammed (2010) identified several factors which could predict effective lipreading skills, namely:

- Lipreading experience (through deafness or sustained exposure to adverse listening environments)
- Familiarity with the language
- Familiarity with the talker
- Strong verbal short term memory
- Clinically 'normal' visual acuity.

The authors state that people living with deafness, or those with experience of working long hours while communicating in noisy

conditions (e.g. industrial environments), have greater experience of lipreading and therefore a good level of lipreading skill acquired naturally through sustained exposure to degraded/absent speech sounds. Moreover, lipreading ability is likely person-specific; greater accuracy is achieved when watching a familiar communication partner due to being more attuned to their body language, accent and way of talking (i.e., mannerisms and dialect). Hence, it would be expected a person could lipread their main communication partners with greater ease than a stranger because the brain learns more effectively through exposure to a consistent stream of data input[15]

The rationale for lipreading classes

In Scotland, the pathway to becoming a lipreading tutor is through the Scottish Course to Train Tutors of Lipreading (SCTTL). Trainee tutors undertake the following modules:

- Theory of Lipreading
- Psychological Social and Emotional effects of Deafness
- Rehabilitation and Information Sharing
- Course Planning and Delivery
- Audiology Introduction

This course has been recently revised to also provide tutors with a recognised certificate in Deaf Awareness and Communication together with City and Guilds awards 6502 and 7300 for the teaching aspects. A further revision is the inclusion of the additional module, ‘Delivering online classes for lipreading’ to improve accessibility of lipreading classes for people living in remote and rural areas. More detailed information about the revised course is listed in Appendix 1.

As shall be discussed, while lipreading classes provide instruction on how to improve lipreading skills, the main benefits are likely derived from the fact that learning spans several areas of aural rehabilitation, as well as providing the opportunity for learners to connect with other people living with deafness and to gain peer-support.

It can be debated by advocates of lipreading tuition that lipreading classes fill a rehabilitation need which is beyond that of the NHS Audiology service. This viewpoint may stem from the belief that aural rehabilitation at the level of Audiology services is targeted primarily at hearing aid provision. It should be noted that Audiology services typically consult with people with hearing loss most intensively at the diagnostic/hearing aid fitting stage of their journey, but the real acquisition of skills and confidence as hearing aid wearers comes through learning, experience and time using the hearing aid(s).

Audiologists are trained in preparing people for this journey and will signpost to additional supports to address the practical and psychosocial challenges that individuals may face. However, it can be argued there is a gap in ongoing support for people with hearing loss 'beyond the clinic', particularly around communication-confidence and access to peers/positive role-models. Hearing aids are an important tool in supporting people with hearing loss, nevertheless, they are an 'aid to hearing' and have limitations, particularly in noisy environments.

If Audiologists are not providing sufficient information and sign-posting beyond issuing hearing aids, a primary focus on technology may be indicative of staffing and resource pressures on services striving to comply with referral to treatment targets, at the cost of providing aural rehabilitation within their scope of practice.

> *The PHIS [Public Health Institute of Scotland] Report (2003)…found that "Over-concentration on hearing aids as technical devices, at the expense of their rehabilitative context, has restricted the development of audiology services' wider role." In our view this is, with some exceptions, still the case because it has been exacerbated by the concentrated attention on waiting times.*[16]

One notable change in NHS departments is that Hearing Therapists (Audiologists specialising in psychosocial and emotional support) were once commonplace in Scotland, but these professionals are now rare[17]. Parallels can be made with other health professions who are NHS funded to provide rehabilitation. For example, rehabilitation programmes

are delivered by Physiotherapy and Occupational Therapy for amputees adjusting to life both physically and emotionally with a prosthetic.[18] However, broader rehabilitation for hearing loss does not appear to be valued similarly, in keeping with other health professions, despite the recognised impact deafness can have on health and well-being.

It is well evidenced that technological interventions in isolation are not sufficient to address the psychosocial and emotional effects of living with deafness, nor equip users with the necessary communication strategies to counter challenging listening environments[19]. The limitations of hearing aids and the impact of stress, listening effort, communication fatigue and cognitive load on speech detection and comprehension are explored in more detail in Appendix 2.

Scottish Lipreading Strategy Group 2012-2015

In Scotland, lipreading classes are classified as part of a *health* rehabilitation pathway. This contrasts with some other parts of the UK where lipreading sits within education or workplace pathways. In 2012, the Scottish Lipreading Strategy Group was formed, funded by the Scottish Government. The group comprised members from the following organisations:

- Action on Hearing Loss Scotland
- Association of Teachers of Lipreading to Adults (ATLA)
- Hearing Link
- NHS National Audiology Manager (until March 2014)
- Scottish Council on Deafness
- Scottish Course to Train Tutors of Lipreading (SCTTL)
- Scottish Government (Adult Social Care Division)

While the group was attended by the National Audiology Manager for the first two years of the project, the only qualified Audiologist member came from a Third Sector organisation; there was no-one working in Scottish Audiology Services amongst the group membership. This could be considered an omission as this stakeholder would likely be involved in any new referral pathways or signposting to help improve access to

lipreading classes. However, the National Audiology Manager held strategic responsibility for implementation of new pathways and for liaising with all Audiology Services in Scotland.

The work of the Scottish Lipreading Strategy Group culminated in the publication of two reports: ‘Lipreading Classes in Scotland - the way forward’[20] and ‘On Everybody’s Lips’[21]. This latter document reported on the findings of an in-depth literature review into the barriers and knowledge gaps related to provision of lipreading classes.

The specific aims of the group were:

1. *To understand Scotland’s current strategy and policy position and how this will affect long-term development of lipreading classes in Scotland.*
2. *To fund activities that were needed to support the beginning of this development.*
3. *To make recommendations to the Scottish Government on how to develop lipreading services for adults with hearing loss in Scotland so that anyone can get this support if they wish.*[22]

To meet these aims, Table 1 lists the group’s objectives with corresponding activities and outcomes.

Table 1: Objectives, Activities and Outcomes from the Scottish Lipreading Strategy Group

(Scottish Lipreading Strategy Group, 2015, p.6)

Objective	Activities and Outcomes
Up-to-date profile of tutors and classes.	SCTTL did a survey in 2013. There were 46 classes and 26 tutors available compared to 63 classes and 34 tutors when they did the same survey in 2006.
More trained lipreading tutors (no new tutors had been trained since 2007 and some tutors have retired, or left, in the meantime).	11 more tutors are now available to run lipreading classes. Five more are close to qualification. The number of tutors available

Objective	Activities and Outcomes
	now is back to the 2007 level (about 29 across Scotland). The course will run again in September 2015.
Look into how to get long-term funding for lipreading tutor training.	The course is being validated by the Scottish Qualifications Agency. The course committee is in discussions about linking the course to a Scottish university. See also ‘Recommendations’ section.
Find out what the current research evidence tells us about what affects people accessing lipreading classes.	There is very little research evidence. What there is suggests that people being ready to do something themselves about their hearing loss is important.
Find out how many lipreading classes are needed in Scotland.	At least 325 classes are needed (currently there are about 50).
Define a pathway through lipreading support.	We have defined a four stage pathway – taster sessions, lipreading classes, communication support group, self-help group.
Develop an aid to support people in deciding if lipreading classes are for them (shared decision-making).	A decision aid and a quiz were developed during the ‘On everybody’s lips’ project.
People thinking about trying lipreading classes in Scotland have access to the same information.	A set of resources about lipreading classes (written and video), and a list of classes, are now available on www.scotlipreading.org.uk
Look at the regulation of lipreading tutors in Scotland.	Recommendations have been made on this.

The group’s concluding recommendations were sub-divided into those for Scottish Government, SCTTL, the Scottish Lipreading Working Group and lipreading tutor employees, as listed in Table 2.

Table 2: Scottish Lipreading Strategy Group Recommendations

Scottish Government
• Set up and fund a ‘Scottish Lipreading Working Group’ over the next five years to continue and develop the work started by the strategy group to improve access to lipreading classes for adults with hearing loss in Scotland. • Support the development of the lipreading services pathway (taster sessions, classes, support group, self-help group). • Educate and support families of adults with hearing loss (and others in their support network) to maximise the benefit and impact of attending lipreading classes for adults with hearing loss.
Scottish Course to Train Tutors of Lipreading (SCTTL)
• Continue in its efforts to link the lipreading tutor training course into a university. • Be responsible for continuing training and updates for qualified lipreading tutors in Scotland. • Be the point of contact to check whether a tutor is trained.
Scottish Lipreading Working Group
• Oversee strategy group activities that are not yet finished. • Look into how SCTTL can be funded in the long-term and support it towards this goal. • Propose how lipreading classes can be integrated into statutory health and social care services. • Assess whether the lipreading class decision aid is useful. • Introduce and assess the usefulness of shared decision-making via lipreading ambassadors (volunteers). • Increase general public awareness of lipreading classes to ensure that adults with hearing loss know they exist when they decide that they want to try them. • Focus efforts to improve access to lipreading classes on all adult age-groups but, particularly, adults of working age (they are under-represented among lipreading class members in Scotland).

• Improve access to lipreading services in the remote and rural areas by trying out, and evaluating, new technology-based ways. • Consider how to improve access for people who are currently 'hard to reach' (such as those with dyslexia, those living in poverty, non-English speakers, ethnic minorities and young people with hearing loss). • Show the cost-effectiveness of lipreading classes as part of adult hearing rehabilitation. • Find out how often, and for how long, people should go to lipreading classes, allowing for differences in learning styles. • Explore whether going to lipreading classes as soon as someone realises they have a hearing loss reduces the need for hearing aids and/or increases motivation to use hearing aids effectively.
Lipreading tutor employers
• Only employ tutors who can show that they have been trained by SCTTL (or another of the recognised UK lipreading teacher courses – currently Manchester and London) and are members of the Association for Teachers of Lipreading to Adults (ATLA).

The status of lipreading provision in 2023

In the May 2020 edition of 'Hearing Matters', Action on Hearing Loss (now RNID) referenced the Scottish Lipreading Strategy Group stating:

> '*Although the sharp decline in lipreading tutors was reversed – when the Scottish Course to Train Tutors of Lipreading (SCTTL) trained 16 between 2013 and 2015 – as we go to press there are only 46 classes in the whole of Scotland, with availability varying from region to region. Urgent action needs to be taken to deliver the estimated 279 additional classes required to meet the needs of people with hearing loss in communities across Scotland.*'[23]

The report re-iterated the Scottish Government recommendations from Table 2 to fund a Scottish Lipreading Working Group, support a range of lipreading services to be available across the country and raise awareness of lipreading class benefits. The recommendations for the other stakeholders were not referred to in the 'Hearing Matters' report.

As of December 2022, only 17 out of 25 of Scotland's tutors were actively engaged in classes with rural areas in particular going without any provision[24]. One reason for the lack of classes is likely related to the absence of a sustainable workforce model; lipreading tutors are largely reliant on securing funding through local authorities or third sector organisations – the sustainability of classes therefore depends on specific funding agreements. This may explain the relatively small number of available tutors despite successful intake to the SCTTL over the years – the employment prospects are unpredictable.

Since the work of the Scottish Lipreading Strategy Group was concluded, the communication landscape in Scotland has shifted. As well as the introduction of the British Sign Language (Scotland) Act 2015[25], the global Covid-19 pandemic motivated a large-scale transition to online video conferencing platforms such as Zoom and Microsoft Teams, making remote learning more accessible and economical. Language Service Professionals (LSPs), including Interpreters and Electronic Notetakers, can also access these systems and there has been substantial improvements in captioning/subtitles (albeit more advancements are required).

The pandemic also highlighted the immense scale of loneliness and social isolation in the general population, prompting the recent publication, 'A Connected Scotland'[26] to help tackle these issues. Social pain or '*the painful experience of actual or potential psychological distance from other people or social groups*'[27] has been shown to initiate or exacerbate physical pain[28]. Conversely, improving social connection has been linked to management of physical pain and alleviating social pain[29]. Hence positive social relationships are protective and can be therapeutic[30].

It is well evidenced that deafness is a risk factor for both social isolation and loneliness and those with opportunities for social engagement may opt-out over fears of communication breakdown[31]

As Scotland moves ever closer towards mainstream adoption of the social model of disability — where communication is underpinned as a human right — people living with sensory loss *should* start to see more augmentative and assistive communication developments[32]. This includes greater public awareness of the links between deafness and cognitive decline as part of a dementia prevention strategy[33]. Hence it is important to consider innovative aural rehabilitation opportunities in the pandemic recovery and post-Covid era and review the efficacy of lipreading classes as a rehabilitation approach from new perspectives.

Examining the evidence for lipreading training

What then is the evidence that lipreading classes are an effective form of aural rehabilitation?

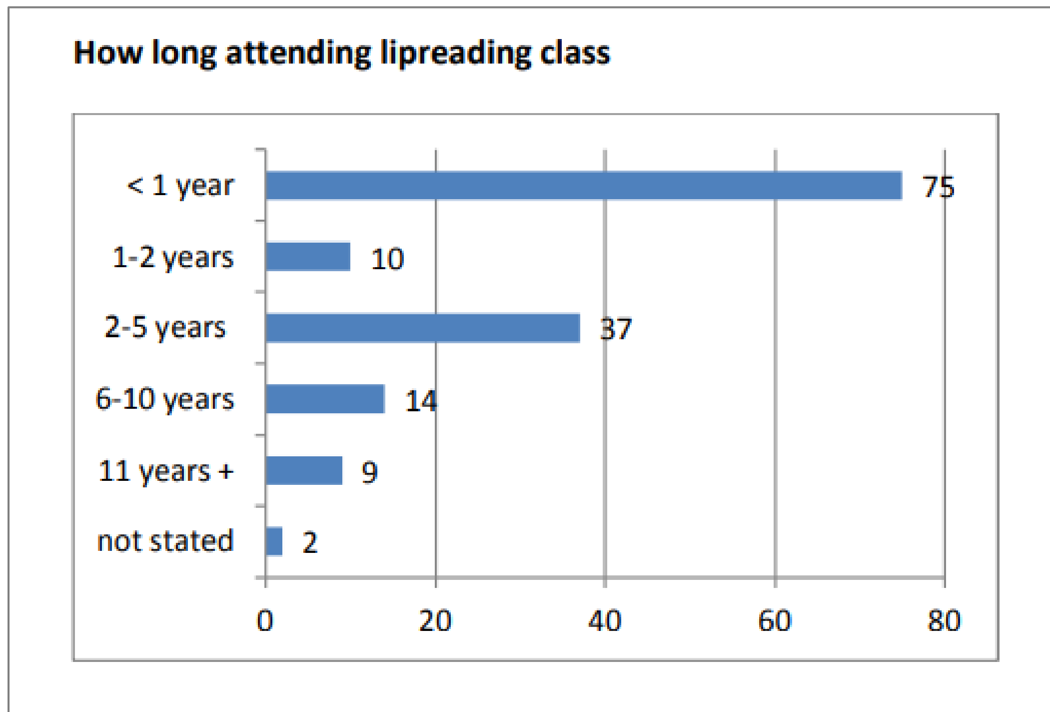
Improvement in lipreading skills

One area of curiosity is that previous attention to lipreading has focused on improving access to classes, but not on evidencing the effectiveness of lipreading training itself in terms of improvement in lipreading skills. Such evidence is relevant, not least because it intertwines with at least two recommendations identified as areas of further research from 'The Way Forward' report, namely:

1. Show the cost-effectiveness of lipreading classes as part of adult hearing rehabilitation.
2. Find out how often, and for how long, people should go to lipreading classes, allowing for differences in learning styles.

A concern from the 'On Everybody's Lips' report — which informed 'The Way Forward' — was the findings from a questionnaire completed by 174 out of 211 participants of lipreading classes in Scotland on length of attendance: 37 had been attending for between two to five years, 14 between six to ten years and nine selected 11 years or more, as shown in Figure 1.

Figure 1: Length of Attendance at Lipreading Class
(Taken from 'The Way Forward' report , 2014, p. 65)



The report stated:

> *Lipreading tutors vary in their opinion on the optimum length of time for people to attend lipreading classes, but the general consensus based on their experience is two years. There is no known research evidence on the optimal length of time people should attend lipreading classes for maximum benefit.*[34]

It is evident there are attendees of Scotland's lipreading classes who attend for significantly longer than two years[35]. Consequently, the lack of lipreading tutors and classes, or the lack of access, may be exacerbated by the absence of a defined improvement framework – this would need to be addressed as part of any new strategy or plan. Moreover, there does not appear to be any programme of learning whereby attendees progress through different levels such as beginner, intermediate or advanced classes, akin to British Sign Language or Cued Speech courses. As such, classes seem to take more of the form of a social group or club, rather than structured courses with a start and end date and specified learning outcomes. This may leave attendees with no

obvious exit strategy or self-management goal – however, they may give great satisfaction from a peer-support or (psycho)social perspective.

By enrolling on the SCTTL as part of a national lipreading plan or strategy, there are potentially two ethical considerations. As referred to previously, the first relates to the development of a sustainable workforce model before trainee tutors enrol to ensure there are sound employability prospects. The second is to confirm that training tutors to teach lipreading is in fact based on reliable research that training can lead to an improvement in this skill.

Notably, testing lipreading ability is not performed in any Scottish class, nor is testing featured in the SCTTL syllabus. Indeed, lipreading progress is commonly evaluated by self-assessment reports from attendees and from this there is a reliable evidence base demonstrating enhanced well-being and confidence to communicate[36]. Arguably this in itself is a good enough reason for running lipreading classes solely because attendees perceive they are helpful and have improved quality of life.

One argument against tests of lipreading is due to the artificial conditions in which the test would take place because there is poor correlation with 'real-world' ability[37]. Another is due to discouraging people living with deafness from attending as testing may cause additional stress or anxiety.

> *Lipreading classes do not typically involve exercises or tests to assess the progress of class members. This is because they provide a diverse range of information and support, and the emphasis on developing this one component is not necessarily the best measure of progress. Furthermore, the requirement to undertake an assessment may place unnecessary pressure on class members, some of whom will be attending as a means of adjusting to hearing loss.*[38]

Whether or not there is some form of lipreading assessment *during* classes, it would be expected that the theory underpinning lipreading

instruction is supported by data. That is, there exists research from an adequate sample of adult participants across a spectrum of age groups and levels of deafness which shows that applying the lipreading pedagogy, as taught to trainee tutors, returns a significant benefit. However, this data could not be located despite searching the lipreading/speechreading literature.

In examining the evidence for lipreading training it seems timely that a recent review of lipreading paradigms has been published in the American Journal of Audiology[39]. The authors report on outcomes of various forms of lipreading training from the 20th century to the present day, concluding that lipreading research was largely superseded by focusing rehabilitation research on hearing technologies instead. However, refreshing academic and clinical interest in lipreading training has the potential to uncover effective training paradigms.

> *There have been numerous attempts to achieve effective lipreading training paradigms. Those of the 20th century focused on how knowledge about the structure of language (e.g., phonemes, words, and sentences) might be deployed to obtain efficient and effective training. Relative to the present, there was limited knowledge about the roles of internal and external feedback in perceptual learning. There was also much less knowledge about how the training task may affect perceptual learning…More research is needed to expand the available paradigms for training and to extend our understanding of the specific conditions that engage perceptual learning with generalization.*[40]

This journal article is in keeping with the concern that it is unlikely the lipreading component of the SCTTL is founded on peer-reviewed research data. In addition, an earlier literature review on '*Speechreading for Information Gathering*' also cautioned against the use of lipreading training as a means of improving lipreading skills.

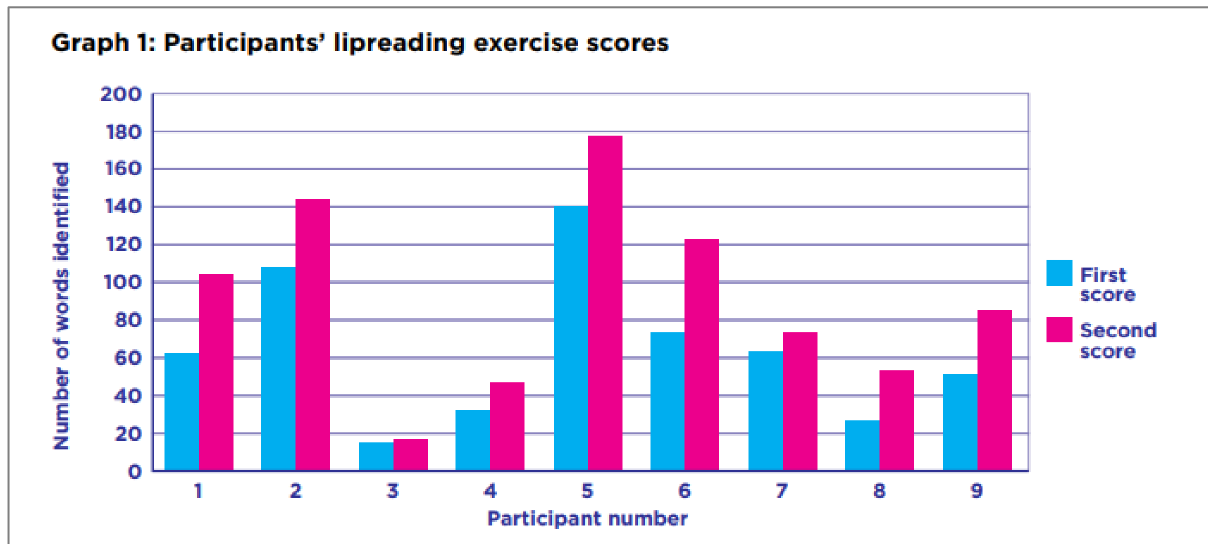
> *Lipreading training can help people develop confidence in this ability, and can offer useful tips and clues. It is not clear that any specific lipreading training regime makes a reliable difference to*

actual performance, and some training schemes can depress performance accuracy[41].

A study of lipreading training was reported by Degan and co-authors[42] who described improvement in lipreading ability for 34 staff working in an Intensive Care Unit in Italy. A 20-hour training programme was delivered by a speech therapist. Perhaps surprisingly, although all staff improved their speech score after completion of the training, when tested again after six months, most scores had reverted to baseline, meaning the improvement was not permanent. This was an important finding demonstrating that longitudinal studies may be key contributions to understanding the efficacy of lipreading training as an aural rehabilitation approach.

A rare example of lipreading improvement from a UK-based lipreading class was reported by Ringham[43] (2013). Different levels of improvement were derived from a class of nine adults aged from 37-56 years using the UCL CUNY Sentence Test, as shown in Figure 2. After 30 two-hour weekly sessions, one participant only increased their score by two words with the greatest improvement seeing an increase in 49 words. Given the small sample size, it is difficult to generalise results though it was notable that improvement was recorded. One observation is that the age range of participants was relatively young compared with the questionnaire respondents from the ‘On Everybody’s Lips’ report which represented 70% of Scotland’s lipreading attendees. Here the overwhelming majority were aged 66-85 years indicating further research should include this age group to increase the validity of lipreading classes in Scotland.

Figure 2: Lipreading test scores for nine adults (Ages 37 – 56 years) (Taken from Ringham, 2013, p.19)



Cross-modal plasticity

A factor not highlighted in the lipreading literature is that lipreading ability may be linked to a process called 'cross-modal plasticity' whereby areas of the auditory brain deprived of stimulation can be recruited by other senses such as vision and touch to enhance their resolution.

Glick and Sharma[44]investigated how the brain responds to loss of auditory input and the effects of clinical interventions such as hearing aids and cochlear implants used to stimulate the auditory pathways again. Age, duration of hearing loss and experience with amplification all affected the degree of cross-modal plasticity. The study showed that poorer use of amplification was associated with areas of the auditory cortex being reassigned to the cortex of other senses – a direct consequence of auditory deprivation.

> *Auditory deprivation, as in hearing loss or deafness, may result in cortical cross-modal plasticity, whereby the auditory cortex is recruited for visual or somatosensory processing*[45].

Studies show that cross-modal plasticity occurs for even mild levels of deafness; the greater the degree of deafness, the greater the area of sensory take-over. When there is more activity in the visual cortex to

compensate for auditory deprivation, there is greater capacity for non-auditory communication skills such as lipreading. That is, lipreading skills may improve as the degree of deafness increases without any formal lipreading instruction.

Merabet and co-authors[46] described an experiment concerning acquisition of Braille reading skills and visual deprivation. One group of sighted participants were exposed to the same intensive training as another group of sighted but blind-folded participants (i.e., all participants had clinically ‘normal’ vision). After five days, fMRI scan showed the latter group demonstrated cross-modal plasticity in the visual domain when performing the touch-based activity of braille reading and improved braille skills; this was not observed in the group who were learning braille by *both* sight and touch. Moreover, the blind-folded group also demonstrated a response in the visual cortex to auditory stimuli. By 24 hours post-blindfold removal, this brain reorganisation reversed returning to normal.

While not centred on hearing, this study demonstrated the rapid rate at which sensory take-over can occur when the brain is deprived of a sensory input, and also, the rate of brain adaption once restored. This research area is particularly relevant when considering rehabilitation for adults with dual sensory loss or deafblindness; knowing the brain is capable of increased somatosensory processing when deprived of auditory and visual information means optimising tactile forms of communication becomes paramount to leverage the full potential of the brain and promote social integration.

A possible criticism of the lipreading approach to aural rehabilitation is that by focusing on the visual aspects of speech to improve communication, it does not appear to meet the needs of people with dual sensory loss or deafblindness. This contrasts with tactile BSL and Cued Speech. With an ageing population experiencing age-related vision and hearing loss, it may be prudent to provide a system of learning adaptable to the spectrum of sensory needs when considering how to improve a person’s confidence to communicate, self-management skills and social connection.

Well-being improvement: lipreading provision and peer support

While there may not appear to be a solid evidence base for lipreading improvement from lipreading classes, there is evidence to support improvement in well-being.

> *Lipreading classes are enabling, empowering and contribute to self-management support of adult hearing loss. Class members derive significant benefits from classes, especially in terms of their impact on confidence re-building and social re-inclusion.*[47]

If the benefit of lipreading classes is largely due to peer support factors, performing a mapping exercise of peer support services across Scotland could be helpful to know what services already exist. An example of peer support is Hearing Link's 'LinkUps' - these are available both online and in-person in two Scottish locations for free and focus on the self-management and peer-support aspects of living with hearing loss[48].

Alternative models of delivering lipreading

The Scottish Lipreading Strategy Group was predicated on lipreading classes being positioned in a health pathway, albeit not delivered by healthcare staff. In some areas of England, free lipreading classes are available, but one of the main providers is City Lit, an adult education provider who run several different aural rehabilitation classes including 'Become more lipreadable' for families and staff communicating with people living with deafness/hearing loss. Current lipreading and hearing loss management classes alongside their associated costs are listed in Appendix 3.

Integral to the City Lit model is that — by being situated within Education — courses are accredited and led by teachers as opposed to tutors. In Scotland, providing tutors with teaching qualifications linked with a Further Education institution is currently being introduced, namely, City and Guild course awards in Education and Training[49]. This will help

improve the professional standing of lipreading and development of the lipreading tutor workforce.

An area of consideration which was identified in the Scottish Lipreading Strategy Group's recommendations concerned registration and regulation.

Speech and Language Therapists and Hearing Aid Dispensers register with the Health Care Professions Council (HCPC) and NHS Audiologists register with the Registration Council for Clinical Physiologists (RCCP), now known as the Academy of Healthcare Science (AHS). However, lipreading tutors do not currently have a regulatory body to monitor practice or to underpin their professional identity. It is important that, if lipreading *is* considered to be aural rehabilitation, then it is regulated to ensure adequate standards are maintained, particularly considering the recent requirement for a National Audiology Review[50]. It may be useful to consider models used by organisations such as Signature who are a fully regulated and registered UK charity delivering accredited deaf communication and language qualifications[51]. Such frameworks could inform improvements for aural rehabilitation and lipreading delivery.

In its current format, there does not appear to be a clear business case for delivering lipreading courses as part of a health pathway for aural rehabilitation. Equally, there is also not an obvious framework for lipreading to sit completely within Adult Education. However, there is scope for an innovative bridge between the two. One possibility might be a funded rehabilitative short course which sits within health (but not necessarily delivered by over-stretched Audiology services), and then an optional progression to a programme of adult learning (beginner/intermediate/advanced etc.) within education.

Further consideration could also be given to the skill set of tutors/teachers delivering these programmes to broaden employability and professional identity within a regulated and accredited system. For example, it could be envisaged these professionals had opportunities to upskill into related areas, including hearing aid care, counselling,

mentoring and/or British Sign Language tuition through a Scottish Credit and Qualifications Framework (SCQF) or similar.

Ongoing education and development of tutors could enhance the return on any government investment, bringing sustainable economic advantages within a sensory care industry, in addition to enhancing the health and well-being of people living with deafness. Although examining the efficacy of lipreading classes has highlighted areas of concern, this brings with it the opportunity to shift the existing paradigm to a more transformative system by considering the wider possibilities.

Considerations for future service planning

After reviewing the efficacy of lipreading classes as an approach to aural rehabilitation, the following considerations are proposed for future service planning:

1. More research to evidence lipreading as a teachable skill. Scottish Higher Education institutions have Audiology, Speech and Language and British Sign Language departments – they may be well placed to offer expertise and targeted research opportunities.
2. More research to understand the cost-effectiveness of lipreading classes/courses and sustainability of income streams for tutors/teachers. It is not clear if lipreading is part of aural rehabilitation as a health/social care pathway, or if it should reside in adult education similar to language learning – or if an alternative approach bridging the two is viable. There may also be overlap or opportunities to develop with BSL, deaf communication courses or other aspects of sensory care.
3. More research on when rehabilitation should be offered relative to receiving a deafness diagnosis. It is important to establish when rehabilitation interventions are most likely to be effective and meaningful for the person living with deafness. There is a need to understand the variance between the offer of rehabilitation being made, and the readiness of the person living with deafness to engage.

4. More research to understand attitudes towards and the demand for lipreading classes as part of, or instead of, other forms of rehabilitation or peer support. A mapping exercise of newly diagnosed people with hearing loss, as well as mapping peer support classes in Scotland, would help clarify what services currently exist with uptake/likely uptake figures.
5. More research to inform inclusive and effective rehabilitation services for people living with dual sensory loss and deafblindness to optimise the brain's capacity for somatosensory processing.
6. More research to evaluate the cost-effectiveness of providing a one-to-one lipreading service for people living with deafness who feel discouraged from attending group learning (online or in-person), or those who experience sudden and catastrophic acquired profound hearing loss and need a range of intensive supports and inputs.
7. Development of a programme of lipreading with defined start/end points, i.e. beginner, intermediate and advanced classes, complete with learning outcomes and outcome measures, and established time-limited attendance to gain optimal and value-for-money benefit.
8. Creation of a sustainable workforce framework for lipreading tutors to ensure there are viable employment opportunities. Specific consideration may be given to registration and regulation by a governing body to promote a culture of best practice.
9. Development of a sustainable network of lipreading tutors across Scotland, to be in place before any referral pathways from Audiology or other health professions and organisations is implemented to ensure equitable access to lipreading classes. Established methods for obtaining consent for onward referral would be required here.
10. A pilot tested/test for change in a few selected areas of Scotland.
11. Development and provision of courses to include information on the human right to communication as well as the full range of assistive and augmentative tools available such as

communication strategies, hearing aids, assistive listening devices (e.g. remote microphones, loop systems, FM systems, mobile technology and digital applications), Electronic Notetakers, speech to text software and knowledge of the limitations of technology.

12. Transitioning away from the historical lipreading approach in favour of designing an innovative and robust system of sensory care which bridges health, social care and education. This might include a programme of learning delivered by tutors/teachers skilled beyond the current lipreading syllabus to provide sustainable return on investment and a more inclusive learning framework suitable across the spectrum of deafness.

Appendix 1: SCTTL Course Information 2023-2024

Course Dates

19th-20th August 2023	City & Guilds 7300 'Introduction to Trainer Skills'
9th-10th September 2023	Block one
14th-15th October 2023	Block two
25th-26th November 2023	Block three
13-14th January 2024	Block four
2nd-3rd March 2024	Block five
20th-21st April 2024	Block six
18th-19th May 2024	Block seven
29th-30th June 2024	Block eight

Course Modules

- Psychological and Social Effects of Hearing Loss
- Theory of Lipreading
- Rehabilitation and Information Sharing
- Course Planning and Delivery
- Audiology
- Online and hybrid Teaching
- The course will also include: -
- City & Guilds 7300 'Introduction to Trainer Skills'
- The City & Guilds 6502 Level 3 Award in Education and Training
- The Signature Level 1 Award in Deaf Awareness and Communication

Course Fees

- The fees for this course will be £1,950.
- ATLA* can offer small discretionary bursaries (maximum £1,175) to students on approved training courses in order to boost the number of qualified teachers, especially in areas of the country where there are no or few classes currently. Funds are raised by ATLA members and supporters, and it is only through their generosity that these bursaries are available.
- For more information, please contact treasurer@atlalipreading.org.uk

- *Association of Teachers of Lipreading to Adults

Appendix 2: The limitations of hearing aids and the impact of stress, fatigue and listening effort on speech comprehension

Limitations of hearing aids

Human beings born without deafness are tuned for speech sounds – these are the building blocks of language acquisition for oral-auditory (speech-hearing) based communication. A key function of the auditory system is to use information from the environment to enable the brain to locate and tune into sounds of importance by filtering out competing noise[52]. As the accessibility of speech sounds becomes compromised, so too does the brain's ability to interpret speech. Consequently, conversation becomes increasingly difficult to follow, especially in background noise, requiring greater listening effort and attention to focus on sounds of interest[53]. One of the hallmarks of age-related and noise-induced hearing loss is the feeling of being able to hear, yet speech lacks 'clarity' or is perceived as 'mumbled'. This is consistent with degradation or loss of important high frequency consonant speech sounds[54].

The terms 'clarity' and 'mumbled' are referred to clinically as 'audibility' and 'intelligibility' respectively; understanding the difference is vital to appreciating the limitations of hearing aids for restoring the sense of hearing. A common societal myth is that hearing aids can 'fix' hearing loss and as such, user and non-user expectations from these devices are high. Audibility means making sounds loud enough for the brain to detect, while intelligibility refers to the ability of the brain to make sense of the sounds once detected[55]. Hearing aids may make sounds audible through amplification, but changes in the auditory pathway cause distortion meaning the brain is not activated in the same way it once was.

To understand deafness purely as a loss of volume significantly undermines the complexity of the human sense of hearing[56]. Moreover, the impact of reduced intelligibility is most significant when listening in

background noise[57]. As such, even with hearing aids, capitalising on any available visual cues provided through speechreading as well as optimising other communication strategies becomes essential to enable people living with deafness to follow conversation.

Stress, fatigue and listening effort

A key factor in following conversation accurately is the impact of stress on the physiology of the auditory system. Dr Stephen Porges' Polyvagal theory describes how emotional states can affect hearing and listening; when people don't feel safe, they are less able to detect higher frequency information where speech is concentrated because the nervous system shifts to detect danger.

> *The theory emphasizes the different neural circuits that support defensive behaviors (i.e., fight-flight and freeze) and social interactions…during defensive states, when the middle ear muscles are not contracted, acoustic stimuli are prioritized by intensity and during safe social engagement states, acoustic stimuli are prioritized by frequency. During safe states, hearing of the frequencies associated with conspecific vocalizations is selectively being amplified, while other frequencies are attenuated. During the defensive states, the loud low frequency sounds signaling a predator could be more easily detected and the soft higher frequencies of conspecific vocalizations are lost in background sounds…the identification and construction of safe contexts (e.g., burrows, nests, or houses) plays an important role in enabling the social engagement system to promote prosocial behavior.*[58]

Hence when feeling stressed or anxious, accessing the auditory part of speech may be particularly challenging, even if sounds are being amplified through hearing aids or other assistive technologies. Stress and uncertainty make speech more difficult to follow. For people living with deafness, anticipating parts of a conversation will be missed could produce an emotionally defensive state rather than a safe state,

compounding communication difficulties over and above the impact of any underlying hearing loss.

Additional factors in speech understanding are listening fatigue and cognitive load. Important here is the knowledge that hearing and listening are brain activities largely integrated with memory and executive function.

> *People with hearing loss must recruit more cognitive resources to extract meaning from the spoken message…understanding engages greater cognitive resources (such as working memory and attention). Successful comprehension requires increased effort and motivation. When demand exceeds capacity, the listener may have no choice but to withdraw from conversation. In challenging listening environments (e.g., high ambient noise), this will occur earlier and more often, and withdrawal may become a habitual response…In sum, for a given level of hearing loss, disability depends on environmental context. But it also depends on availability of cognitive resources and motivation to invest listening effort.*[59]

Given the limitations of hearing aids and the potential for the emotional impact of deafness to erode confidence in communicating, optimising the visual parts of speech as well as adopting augmentative communication strategies becomes vital, particularly where understanding information is crucial such as during clinical appointments or legal/quasi-judicial proceedings. For older adults, age-related hearing loss can accompany cognitive ageing meaning there is additional strain on the brain resources to engage in everyday activities.

Lipreading classes are therefore a proposed aural rehabilitation approach to providing support and learning for living well with deafness.

> *The combination of lipreading skills, communication coping strategies and information can bring back lost confidence and can be truly life changing to someone with a hearing loss.*[60]

Arguably, there is scope for a more transformative model.

Appendix 3: Range of rehabilitation classes at City Lit

(City Lit, 2023)

Class	Length of Class	Cost
Introduction to lipreading	7 sessions over 10 weeks	Full fee: £129 Senior fee: £84 Concession £65
Lipreading 1:1 Coaching	1 hour	£59
Assertiveness and hearing loss	1 day (10am-4pm)	Full fee: £69 Senior Fee: £45 Concession: £35
Become more lipreadable	1 day (10.30am-1.30pm)	£49

About the ALLIANCE

The Health and Social Care Alliance Scotland (the ALLIANCE) is the national third sector intermediary for a range of health and social care organisations. We have a growing membership of over 3,000 national and local third sector organisations, associates in the statutory and private sectors, disabled people, people living with long term conditions and unpaid carers. Many NHS Boards, Health and Social Care Partnerships, Medical Practices, Third Sector Interfaces, Libraries and Access Panels are also members.

The ALLIANCE is a strategic partner of the Scottish Government and has close working relationships, several of which are underpinned by Memorandum of Understanding, with many national NHS Boards, academic institutions and key organisations spanning health, social care, housing and digital technology.

Our vision is for a Scotland where people of all ages who are disabled or living with long term conditions, and unpaid carers, have a strong voice and enjoy their right to live well, as equal and active citizens, free from discrimination, with support and services that put them at the centre.

The ALLIANCE has three core aims; we seek to:

- Ensure people are at the centre, that their voices, expertise and rights drive policy and sit at the heart of design, delivery and improvement of support and services.
- Support transformational change, towards approaches that work with individual and community assets, helping people to stay well, supporting human rights, self management, co-production and independent living.
- Champion and support the third sector as a vital strategic and delivery partner and foster better cross-sector understanding and partnership.

Contact

Amy White, Senior Sensory Hub Officer (Deafness)
E: amy.white@alliance-scotland.org.uk

Lucy Mulvagh, Director of Policy, Research and Impact
E: lucy.mulvagh@alliance-scotland.org.uk

T: 0141 404 0231
W: http://www.alliance-scotland.org.uk/

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