



# **Resource Manual for Commissioning and Planning Services for SLCN**

Professor Pam Enderby  
Dr Caroline Pickstone  
Dr Alex John  
Kate Fryer  
Anna Cantrell  
Diana Papaioannou

**Acknowledgements**

The RCSLT and the Project Team would like to thank all those who assisted in drafting this guidance. We have received valuable advice from many reviewers from within the speech and language therapy profession who have given up their time generously. Experts on particular topic areas from related professions have also been consulted and assisted with detail. Service Commissioners and senior managers have commented on drafts showing patience and fortitude!

We would particularly like to thank the many who contributed to the focus groups which helped to shape this document.

## Resource Manual for Commissioning and Planning Services for SLCN

### CONTEXT

The aim of this section is to set out the context for this resource. This work forms part of a range of tools which can support leaders with service planning and delivery, in line with both government and local priorities.

#### **It is essential for service providers to demonstrate quality and productivity and to:**

- show value for money
- be able to provide a strong financial argument for the need to invest in services for people with speech, language, communication and swallowing needs
- demonstrate improvements in outcomes for individuals, families and society

Value for money is not about being the cheapest option but about delivering the most return (impact, best outcomes) for a given investment over time.

The key drivers for change to services include:

1. The broad context, which can be divided according to the following factors:
  - **P**olitical and **L**egislative factors
  - **E**conomic factors
  - **S**ocial factors
  - **T**echnological factors
2. The near or local context, including:
  - Localised policies
  - Addressing local needs
  - Service provision
  - Workforce
  - The evidence base

### **THE BROAD CONTEXT (MACRO-ENVIRONMENTAL ANALYSIS): FACTORS FROM THE WIDER WORLD**

The Macro-environmental analysis commonly takes the form of a PEST analysis:

**P**olitical and legislative factors

**E**conomic factors

**S**ocial factors

**T**echnological factors

#### *Political and legislative drivers*

Devolution has resulted in changes to the powers of the different institutions across the UK.

The government in power at Westminster maintains responsibility for policy and legislation in relation to key areas including: tax, benefits, foreign affairs, international development,

trade and defence for the four countries of the UK. Government in Westminster is also responsible for health, social care and education in England, but these areas are devolved for Northern Ireland, Scotland and Wales.

As a result of devolution, each country of the UK may have different parties in power, with the possibility of increasing powers in the future. The impact of this is the diversification of policy and direction of travel.

### *Legislative drivers*

The main areas of UK-wide legislation that are relevant include the following themes:

- Human Rights
- Disability Discrimination
- Equality

Though there is different local interpretation, these far-reaching legal instruments define the rights and responsibilities of people and those commissioning and providing services for them.

Public protection has also been strengthened through the introduction of registration of professionals, for example, through the Health Professions Council.

There is separate legislation relating to health, education and social services in each of the devolved administrations in England, Northern Ireland, Scotland and Wales.

### *Economic*

The current challenging economic backdrop will have a significant impact on the financing of public services, with local planners and commissioners prioritising services which are value for money, evidence based and releasing cash through innovation.

### *Social*

In order to plan and deliver services, it is essential to identify the demographic factors relevant to speech and language therapy (SLT) and the challenges that these bring.

- The population is aging: people are living longer.
- The birth rate is falling: most families are having fewer children
- The infant mortality rate is also falling, with more children surviving premature birth or health problems or injury in infancy.
- The urban population is growing.
- The proportion of the population in employment is falling.
- The proportion of the population with English as an additional language is increasing, particularly in urban areas.

## THE NEAR OR LOCAL CONTEXT

### *Localised policies*

Central to the new reforms is the emphasis on local decision-making within a national framework. Across the four countries of the UK there are requirements to provide services to accord with local need and influence. In England there is a particular focus on increasing the range of potential providers (plurality of provision) with commissioners having a role to stimulate the market.

For each country, arrangements have been established to assess whether commissioners are achieving better health outcomes for the local population. Part of this process will be an assessment of how well commissioners are performing against specified competencies/indicators/targets. For example, in Northern Ireland these targets are based upon high-level outcomes linked to local strategies.

With the devolution of power to local levels, there is a focus on developing more robust accountability. There is an emphasis on joint working to support integrated commissioning, service planning and provision across health, social care and education.

There are different approaches to this development with different structures and commissioning and performance management arrangements being established across the UK. The dominant theme in strengthening accountability is “putting service users at the centre” with respect to:

- Access and self-referral
- User voice at strategic to operational to individual case management
- Population/local engagement
- Information and advice for users, parents/ carers
- Patient Rights
- Self management of conditions

Some localities will be commissioning or planning speech and language therapy services as a single service whilst others will be commissioning integrated services, cutting across traditional boundaries, with health services integrated with education or social services. In many areas, this has already happened for children's services.

It is recognised that, often, no single agency can deliver best outcomes for their service users by working in isolation. Joint commissioning is advocated wherever the meeting the needs of individuals requires contributions from a number of agencies.

Similarly, some service planners or commissioners will be organising services around disease groups, such as services for persons who have survived a stroke. In either case, it will be important for speech and language therapy managers to liaise with other services to ensure that SLT provision is incorporated in their service plans.

Special arrangements are in place for commissioning services for unusual, low incidence or costly interventions. Speech and language therapy managers should identify the specialist commissioning procedures that may be required for individuals requiring

particular interventions such as costly augmentative communication aids, protracted or intensive interventions.

### *Addressing local needs*

In general terms, the UK is experiencing a number of long-term demographic changes (some of which are identified above).

There is significant local variation within these general trends. It is important to understand what these changes and variations imply in relation to the provision of local SLT services. Other local factors to be taken into consideration include: employment, cost of living, housing, transport and, particularly, levels of deprivation.

There are information resources available online from which planners, commissioners and providers can find out more about local and regional demographic factors. Some of these can be found signposted on the RCSLT website [www.rcslt.org](http://www.rcslt.org).

Local public health teams will also be able to sign-post local services to relevant data and information for their area.

There will also be learning from data collected by services. The RCSLT has developed an online tool called Q-SET, the Quality Self- Evaluation Tool to help you collate local SLT service derived information <http://www.rcslt.org/resources/qset>. Q-SET should be used alongside national and local data to support service planning and evaluation of service delivery.

Through completing Q-SET, provider services can:

- use the resource every 9-12 months to review progress in meeting action plans and to demonstrate service enhancement
- compare their service with other similar service types e.g. urban, rural, acute, community, adult, paediatric, education, 3rd sector
- demonstrate that their service meets the needs of the service users
- identify areas of strength and generate action plans relating to areas of development.
- submit the results as part of the evidence for a clinical audit
- retain ownership of the monitoring and development of services ensuring that strong professional standards are maintained in the context of multi-agency teams

Service providers completing Q-SET will support commissioners to:

- reduce the 'postcode lottery' of service availability and quality
- have high quality information that is relevant and accessible
- have an overview of developments, trends and initiatives within the service
- have accurate and timely statistics to support performance management and monitoring
- collect data to contribute to the debates on benchmarking. Where benchmarks do not yet exist Q-SET will enable Commissioners to contribute to this in the future
- collect examples of good practice to inform other pieces of work and the development of services as a whole.

Locally derived information will help SLT services to illustrate:

- the numbers of patients/clients seen
- sources of referral
- amount of resource used in providing a service to the client e.g. number of sessions and skill mix
- nature and severity of the disorder, disability, psychosocial impact at the onset of intervention
- nature and severity of the disorder, disability, psychosocial impact at the completion of intervention.
- level of satisfaction with the service.

### *Service provision*

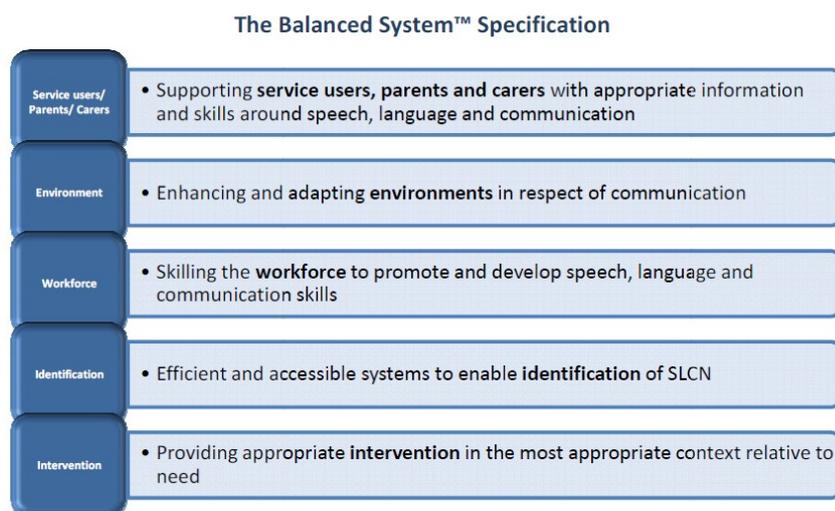
Speech and language therapists have a role in delivering specialist and targeted support to clients, carers and their families. Speech and language therapists can also reduce long-term demands on services by addressing immediate needs that arise from circumstance rather than underlying impairment. Providing training for the wider workforce is integral to the speech and language therapists core role, as outcomes for people with speech, language and communication needs SLCN are improved when the whole workforce is able to contribute appropriately to care pathways.

SLTs also work with the wider workforce contributing to the public health agenda, promoting health and well-being in respect of communication and swallowing. There is little awareness outside the profession of the role of speech and language therapists in preventing the development of speech and language impairments and the further impact and consequences of different speech, language and communication disorders upon health, education, social integration and employment.

The challenges of meeting the speech, language and communication needs (SLCN) of a given population are best understood through a social (participative) model. Key elements of a total service specification will start with:

- identifying the needs of the service user, parent or carer for support and information
- identifying/assessing and diagnosing specific SLCN and providing appropriate intervention.
- considering needs of service users within the environments they encounter
- training the wider workforce that interfaces with them to maximise opportunities for positive outcomes.

The balanced system (diagram 1) below illustrates the wider context for how SLTs contribute to this range of activities. The needs of service users should be considered in service specifications. The role of SLTs in supporting the active participation of service users in service planning, adapting the environment and enskilling the workforce is as relevant as the SLT role in identification and intervention.



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### *Workforce*

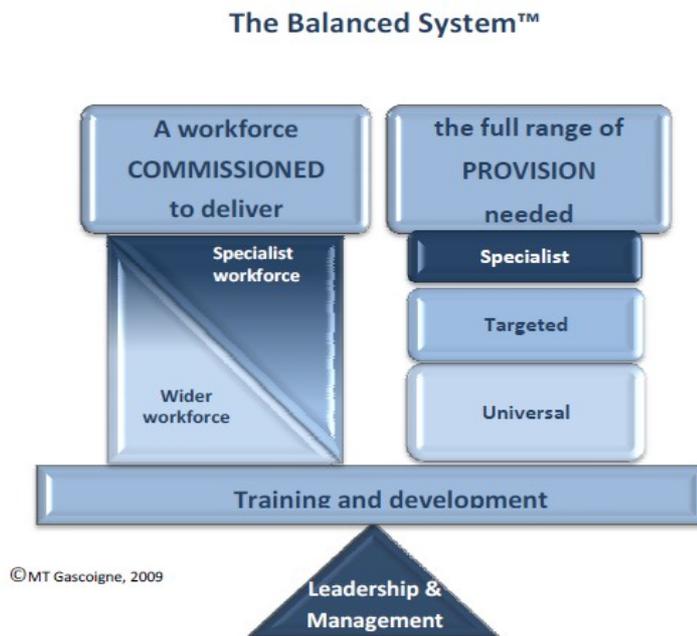
Careful planning of services, including joint commissioning, will help to shape the workforce and inform the skill mix required to deliver high quality services, improve outcomes and support value for money. Because the commissioning and planning of services relies on the evidence base for a given type of SLCN or model of practice, it is essential that clinical and managerial expertise from speech and language therapists is available to support innovation and quality of service design.

Speech and Language Therapists, as part of the wider workforce, may be employed by a range of organisations, including the third sector, social care and education or be working as private practitioners.

Equal Access to services is of importance to local decision makers. Local demographic profiling will inform workforce requirements. For example, bilingual staff and support workers are required in most areas to meet the needs of diverse communities. The appropriate skill mix should enable services to be family-centred and be culturally and linguistically appropriate and responsive. It may be necessary to consider increasing home delivered services or providing services in unusual locations.

The RCSLT also acknowledges the important role that Assistants and Support Workers have in the delivery of effective speech and language therapy services. Assistants and Support Workers are integral members of both speech and language therapy and multi-disciplinary teams, engaged in a wide range of clinical settings with diverse client groups, duties and responsibilities. [http://www.rcslt.org/aboutslts/rcslt\\_statement\\_v3.pdf](http://www.rcslt.org/aboutslts/rcslt_statement_v3.pdf)

In order to support more effective use of skill mix, SLT services also need to provide education and training of the wider workforce and not be focussed solely on direct patient / client care. For all services, this is critical to secure the appropriate balance of cost-effective universal, targeted and specialist services.



## PRACTICAL CONSIDERATIONS

Many people involved in strategic planning, commissioning or reviewing services will not be familiar with speech and language therapy, its objectives, the needs of clients requiring speech and language therapy, the principles driving the profession, or the evidence base and the following points may support people.

- Where possible, draw on the evidence base.
- Communicate clearly and succinctly.
- Avoid using acronyms and provide a glossary of terms.
- Do not assume knowledge of local arrangements or the requirement to interface with other agencies
- Set your service in the context of local priorities.

The RCSLT's Communicating Quality 3 (CQ3) provides clear guidance on care pathways, clinical standards and issues related to quality assurance. This information should be used in submissions to support commissioning quality services.

The following guiding principles have been adopted and apply to all client groups. Services are to:

- be family centred and culturally and linguistically appropriate and responsive
- be comprehensive, coordinated and team based
- work with and communicate effectively with other services meeting the needs of the client
- be evidence based
- ensure equal access
- involve the family and carers
- include training and education of co-workers
- ensure practitioners continuing professional development and appropriate support.

Evidence of the impact of the service will be important to commissioners and providers. Providers will need to demonstrate the impact of their service, particularly when services are being reviewed. Determining the objectives of the service will support the process of outcome measurement. SLT services will need to provide information on outcomes achieved and levels of client satisfaction. Some of this information can be gathered through use of the RCSLT's Q-SET tool, as detailed above.

Managers of speech and language therapy services will need to equip themselves to engage effectively and positively with those who are commissioning or monitoring services. They will need to:

- identify who is commissioning or responsible for overseeing different services. For example, health commissioners may be working with commissioners for education/head teachers. It is important to identify who is taking the lead for each aspect of the service delivery in the locality.
- establish good working relationships and effective communication with those commissioners and planners for their area of responsibility.
- be aware of local priorities and commissioning plans and strategies.
- have a good understanding of the commissioning/planning/monitoring framework for the locality
- be equipped with local data, knowledge and evidence to the tendering process
- be clear of the unique contribution of the service to improving health, employment, education and social outcomes
- be able to clarify and demonstrate local working partnerships and collaborations
- provide data describing the service provided, (numbers and types of patients, numbers of attendances, health and social outcomes etc).

The RCSLT has developed a range of resources to support its members with Continuing Professional Development. CPD is a regulatory requirement for all SLTs and this requires all HPC Registrants to demonstrate how the CPD they have undertaken has sought to enhance service delivery and to be of benefit to service users. The RCSLT has endorsed this requirement through its own CPD standards. <http://www.rcslt.org/cpd/resources>

## THE EVIDENCE BASE

The commissioning and planning of services must be informed by the evidence base of effective practices.

This Resource Manual SLCN is based on a synthesis of existing published research. The threshold for inclusion in the syntheses has favoured the most scientifically robust research methodologies which have often reflected medical (impairment) rather than social (participative) models of care.

In the section summaries, emerging practices that have not been included in the evidence synthesis, are referred to and should be considered alongside the syntheses. This tension between empirical evidence resulting from robust research, which by definition is retrospective, and the needs to encourage innovation and service re-design to support improvements in outcomes for people with speech, language, communication and swallowing difficulties is natural and unavoidable. Emerging practice will not have the same evidence base and therefore less empirically stringent measures of evidence need to be taken into account for these areas including professional consensus and measures of service user, parent or carer experience. However, because of the value of some emerging innovative practice, they have been included in this resource.

An overview of the methodologies employed in identifying practices that are included in this resource accompanies this document.

### *Using these resources*

Speech and language therapy managers can assist commissioners by understanding their agenda and the objectives that they are to be assessed on.

The Royal College of Speech and Language Therapists is providing these resources to assist speech and language therapists in gathering the core data required to support service tendering agreements, service planning, monitoring arrangements and/or where services require specification.

Each part of these resources is focused on a specific area.

The resources provide:

- *The Contextual Synthesis*. This includes definitions, information on the incidence and prevalence of the disorder, key contribution of speech and language therapists, consideration of the implications and broader consequences of the disorder.
- *The Synthesis of Key Literature*. This summarises the evidence of the impact of speech and language therapy.

Each section within these resources gives succinct information to inform the factual content for any service planning activity. These include:

- Key points
- Topic –What is [the condition]?
- How many people have [the condition]?

- What causes [the condition]?
- How does this condition affect individuals?
- What are the aims/objectives of speech and Language therapy interventions for [this condition]?
- What is the management for people with [this condition]?
- What is the evidence for Speech and language therapy interventions in [this condition]?
- Studies
- Assessment methods
- Speech and language therapy interventions
- Summary
- References

This information will need to be put into context, using local information.

### **Other guidance and resource materials**

It is recognised that service managers may wish to amplify or clarify, an aspect of their service by providing reference to other national or local research of relevance.

The RCSLT has a range of resources which can be used to further support and inform the commissioning, planning and provision of services for people with speech, language, communication and swallowing needs. These can be found on the RCSLT website: [www.rcslt.org](http://www.rcslt.org)

**The RCSLT is grateful to the experts from within the SLT community who contributed to the evidence published in this document.**

## METHODOLOGY FOR SYNTHESIS OF LITERATURE

### *Introduction*

The focus of the interventional synthesis within these briefings is to provide a synopsis on the effectiveness of speech and language therapy interventions for each specific condition.

The interventional syntheses are produced by reviewers within the Information Resources Section (within the Health Economic and Decision Science Section) at the School of Health and Related Research (SchARR). Information specialists/reviewers for this bulletin were Diana Papaioannou and Anna Cantrell.

### *Methodology*

The interventional syntheses are not intended to be a full systematic review within each topic area. However, they draw upon systematic review techniques to ensure that the syntheses are developed according to systematic, explicit and transparent methods. The intention of the syntheses is to consolidate twenty articles which represent some of the best research for each topic area.

### *Literature searching*

Systematic literature searches were undertaken to identify a range of evidence for each interventional synthesis. The interventional syntheses do not attempt to consolidate all research within a particular topic area; rather they aim to present a careful selection of the most current research within that field. Therefore, the approach adopted for the literature search aims to be comprehensive reflecting this systematic and explicit approach.

Firstly, search terms were selected within the project team drawing on the expertise of four speech language professionals. This involved listing all possible synonyms describing the condition or population (for e.g. children/infant, stuttering/stammering) and combining those with terms to describe speech and language therapy. Terms were used in both free text and thesaurus searching. The following databases were used:

- ASSIA
- CINAHL
- The Cochrane Library (which includes the Cochrane Database of Systematic Reviews, Cochrane Central Register of Controlled trials, Database of Abstracts of Reviews of Effects, Health Technology Assessment Database and NHS Economic Evaluations Database).
- Linguistics and Language Behaviour Abstracts
- MEDLINE
- PsycInfo

All references retrieved from the literature searches were entered onto a Reference Manager Version 11 database using appropriate keywords.

### *Selecting and obtaining relevant articles*

Articles for inclusion were selected to illustrate the range of good quality evidence within each topic area. An initial screening of articles was undertaken by the Information specialists/reviewers who adopted the following principles:

- Articles must be empirical research evaluating the effectiveness of a particular speech and language therapy intervention
- Only articles published in English language are included.
- In general, only the most current (1998-present) literature is included. However, exceptions were made to this if a particular article was felt to be important to include.
- Where possible higher level evidence was included (systematic reviews, randomised controlled trials). However, this research did not always exist in every topic area.
- Efforts were also made to seek out literature that provided a range of perspectives on interventions for each topic area, i.e. both quantitative and qualitative research.

Following initial screening, the remaining articles were examined by two members of the team; each having considerable speech and language therapy knowledge and experience. Approximately, twenty articles were selected by the two reviewers with disagreements being resolved by a third reviewer.

### *Assessing the quality of relevant articles*

Formal quality assessment of the articles was not undertaken. Instead, quality assessment involved using checklists as a guide to give an indication of the overall quality of studies and highlight the main good and bad aspects of each study. For each interventional synthesis, the included study designs are listed and the problems with each study design noted. General observations on study quality are made and common errors within the studies, where appropriate, are specifically noted. The checklists used are one for quantitative and one for qualitative studies from the Alberta Heritage Foundation for Medical Research.<sup>1</sup> Additionally, when an identifiable study design was used, the appropriate Critical Appraisal Skills Programme (CASP) checklist was selected.<sup>2</sup>

### *Syntheses of the twenty articles*

Each article was read in turn by one of the Information Specialists/reviewers. The key points were summarised including the objective of the study, the participants' characteristics, the methodology, the intervention, results and limitations. From this, articles were grouped into themes according to the factor being investigated (for e.g., length of intervention, personnel carrying out intervention, family involvement in treatment, nature of disorder). Results were summarised and drawn together within each particular theme and a summary paragraph provided at the end.

These syntheses first went out for review by selected individuals, identified by the research team, with particular expertise in the delivery or management of services to the

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<sup>1</sup> LM Kmet, RC Lee, LS Cook (2004) Standard Quality Assessment Criteria for Evaluating Primary Research Papers from a Variety of Fields. Accessed at <http://www.ihe.ca/documents/hta/HTA-FR13.pdf> (Accessed on 25<sup>th</sup> September 2008, now no longer available)

<sup>2</sup> Critical Appraisal Skills Programme (2007) Appraisal Tools. Accessed at <http://www.phru.nhs.uk/Pages/PHD/resources.htm> on 9<sup>th</sup> January 2009.

specific client group. Comments were included in the second draft, which was then dispatched to those selected by the Royal College Speech and Language Therapists who were invited to attend a focus group day. These therapists gave detailed consideration to their specialist area and contributed to the more general discussion of one further area. Issues to be captured in the key points were also identified within the focus groups. These comments contributed to the third draft of the syntheses, which again went out to reviewers. In some cases, further work was required in order to modify the wording and reflect discussion.

#### **Checklist for service managers involved in commissioning services**

Have you presented incidence and prevalence figures and local demographic trends for the conditions in your area?

Have you provided information on local access and use of services in the context of the number expected and highlighted your approaches to inequalities?

Have you consulted systematically with users to inform development of this commissioning proposal?

Does your proposal fit/link with local cross agency priorities?

Have you outlined the range of services provided including training?

Have you made clear how this fits with future planning for your service over the next 3-5 years?

Have you stated the assumptions which underpin your thinking in the plan and for future developments?

Have you offered predictions about the likely impact of investment in the proposal?

Have you made clear where the risks are and what contingency plans you have put in place?

**Professor Pam Enderby**  
**Dr Caroline Pickstone**  
**Dr Alex John**  
**Kate Fryer**  
**Anna Cantrell**  
**Diana Papaioannou**



# **RCSLT RESOURCE MANUAL FOR COMMISSIONING AND PLANNING SERVICES FOR SLCN**

## **HEAD AND NECK CANCER**

## Head and Neck Synthesis

### 1. Key Points on Head and Neck Synthesis

1. Speech and Language Therapists (SLTs) are an integral part of a multi-disciplinary team working with patients with Head and Neck cancer.
2. SLTs have expertise in assessing, diagnosing and managing disorders of communication, speech, voice and swallowing.
3. SLTs develop and support the communication skills of both the patient and communicative partners.
4. SLTs have a unique and positive role to play in alaryngeal voice restoration post laryngectomy.
5. SLTs have the lead responsibility for the decision making process of selection of prosthesis, care and management in Surgical Voice Restoration service (SVR) post laryngectomy.
6. SLTs contribute to better health outcomes through their unique role in assessing, diagnosing and managing patients who have an oropharyngeal dysphagia at both pre and post treatment stages.
7. Early SLT intervention for swallowing problems associated with head and neck cancer requires a thorough assessment that may include both videofluoroscopy and/or FEES (fibreoptic endoscopic evaluation of swallowing using videoflexible nasendoscopy).
8. The long-term risk and /or presence of transient, intermittent or persistent dysphagia puts patients at risk of the complications that are associated with dysphagia and require a specialist SLT to monitor and review the patient's progress over time.
9. Pathways of care for persons with speech, voice or swallowing disorders associated with head and neck cancer need to take account of the changing needs and focus interventions as the condition alters or declines.
10. SLTs contribute to palliative and 'End of Life' care, maximising and facilitating communication and managing dysphagia throughout the end stages, promoting quality of life.

### 2. What is Head and Neck cancer?

Cancer refers to those many diseases where abnormal cells divide without control and invade tissues. The different cancers are named by the site of occurrence. In Head and Neck Cancer, the main areas affected include the oral cavity, salivary glands, nasopharynx, pharynx, larynx, oesophagus, thyroid, nose/sinuses, skin in ears, skin around eyes.

### 3. How many people have Head or Neck cancer?

Prevalence for Head and Neck cancer is reported by the different locations of the disease in the head or neck. Head and neck squamous cell carcinoma (HNSCC) is the most common cause with an incidence of 500,000 new cases a year in Europe (Ferlay et al 2004). NICE 2004 reported 90% of oral cancers are squamous cell carcinomas involving the lining of the mouth, tongue and floor of the mouth. Specific cancers have different rates, for example, nasopharyngeal carcinomas have a reported incidence of 2% (Kufe et al 2003). Boyle & Ferlay (2004) reported the incidence in Europe in 2004 to be higher in men than in women 76.6/21 per thousand in oral and pharyngeal cancer; 33.6/10.1 in oesophageal cancer and 42/4.1 in laryngeal cancer. Oral cancer forms 3% of all malignancies in UK, of these 6% of people are over 45 yrs with the majority of people over 50 years (Warnakulasuriya 2010). Oral cancer is strongly related to social and economic deprivation (Cancer Research UK 2007). High levels of smoking and/or alcohol intake have been identified as primary causes of oral, pharyngeal and laryngeal cancer

(Cancer Research UK 2010, NICE 2004) the risks of which can be reduced by not smoking or drinking and by adopting a healthy lifestyle with a diet rich in fruit and vegetables (NICE 2004, Wunsch 2004, Maier & Tisch 1997). While most cancers occur in the older age group, there is a higher incidence of cancer of the tongue in young Scottish males (Macfarlane 1987). The Cancer Research UK statistics for oral cancer are shown in Table 1.

Table 1: Number of new cases of oral cancer by type UK for 2007 (Cancer UK – Incidence 2007)

Site	Males	Females	Persons	M:F ratio
Lip	220	113	333	1.9:1
Tongue	1008	590	1598	1.7:1
Mouth	954	620	1574	1.5:1
Oropharynx	799	264	1063	3:1
Piriform sinus	267	59	326	4.5:1
Hypopharynx	109	62	171	1.8:1
Other & ill-defined	183	77	260	2.4:1
<b>Oral cancer</b>	<b>3,540</b>	<b>1,785</b>	<b>5,325</b>	<b>2:1</b>

Laryngeal cancer forms some 1% of all cancers. In 2007, the UK had 2,205 people diagnosed with laryngeal cancer. The risk of developing laryngeal cancer is 1:181 for men and 1:849 for women. Laryngeal cancer is rare in young people (>40 years) with the incidence rising over 50 years of age (73% are 60+) and peaking for people aged 70-74 years (Cancer Research UK 2007).

Table 2: Number of new cases and rates of laryngeal cancer in UK for 2007 (Cancer Research UK 2007)

	England	Wales	Scotland	N. Ireland	UK
Cases					
Males	1,436	104	246	58	<b>1,844</b>
Females	278	18	51	14	<b>361</b>
<b>Persons</b>	<b>1,714</b>	<b>122</b>	<b>297</b>	<b>72</b>	<b>2,205</b>
Crude rate per 100,000 (UK) population					
Males	5.7	7.2	9.9	6.7	<b>6.2</b>
Females	1.1	1.2	1.9	1.6	<b>1.2</b>
<b>Persons</b>	<b>3.4</b>	<b>4.1</b>	<b>5.8</b>	<b>4.1</b>	<b>3.6</b>
Age-standardised rate (European) per 100,000 population					
Males	4.9	5.5	8.4	6.7	<b>5.3</b>
Females	0.8	0.9	1.5	1.5	<b>0.9</b>
<b>Persons</b>	<b>2.7</b>	<b>3.1</b>	<b>4.7</b>	<b>3.9</b>	<b>3.0</b>

Carding et al (2001) reported an incidence of 1500 laryngectomies per annum with a prevalence of 22,000 people in the UK who had undergone a laryngectomy for a cancer of the larynx.

Survival rate is linked to site, type and size of tumour and survival is adversely affected by co-morbidities and poor nutrition (Mehanna, West et al 2010).

#### 4. What causes Head and Neck cancer?

There are different risk factors and causes that contribute to a person developing a head and neck cancer. Some people inherit a high-risk mutation in a particular gene which causes cancer. Around 1% of all cancers are caused by these high-risk mutations that usually affect tumour suppressor genes (Cancer Research UK accessed 2010). Some suggested causes of different types of head and neck cancer are shown in table 3.

Table 3: Causes and risk factors for developing head and neck cancer

Type of Cancer	Cause	Comment
Oropharyngeal Cancer	Smoking & drinking (NICE 2004) Human papillomavirus (HPV) (Monk et al 2001, Attner 2010) Poor dental and oral hygiene (Medline Plus 2010)	
Laryngeal Cancer	<ul style="list-style-type: none"> <li>• Smoking tobacco</li> <li>• High alcohol consumption</li> <li>• Environmental (Wunsch 2004, Maier &amp; Tisch 1997)</li> <li>• Genetic</li> </ul>	Familial or genetic polymorphisms Asbestos Strong inorganic acids Cement dust Free crystalline silica

While smoking and drinking are related to a higher incidence of cancer, studies show that head and neck cancer occurs in 20% of people who do not smoke or drink (Ferlay et al. 2004). The cause may be related to an infectious aetiology such as an immune-suppression from post-transplant drug therapy, HIV, HPV or Fanconi's anaemia (Gillespie et al. 2009). The rise in the incidence of oropharyngeal squamous cell carcinoma has been linked to an increase in the number of people with human papillomavirus (HPV) (Mehanna et al 2010).

The National Cancer Institute (2010) has identified a number of risk factors for cancers of the head and neck which are summarised in their factsheet as being:

- **Oral cavity.** Sun exposure (lip); possibly human papillomavirus (HPV) infection.
- **Salivary glands.** Radiation to the head and neck. This exposure can come from diagnostic x-rays or from radiation therapy for noncancerous conditions or cancer.
- **Paranasal sinuses and nasal cavity.** Certain industrial exposures, such as wood or nickel dust inhalation. Tobacco and alcohol use may play less of a role in this type of cancer.
- **Nasopharynx.** Asian, particularly Chinese, ancestry; Epstein-Barr virus infection; occupational exposure to wood dust; and consumption of certain preservatives or salted foods.
- **Oropharynx.** Poor oral hygiene; HPV infection and the use of mouthwash that has a high alcohol content are possible, but not proven, risk factors.
- **Hypopharynx.** Plummer-Vinson (also called Paterson-Kelly) syndrome, a rare disorder that results from iron and other nutritional deficiencies. This syndrome is characterized by severe anaemia and leads to difficulty swallowing due to webs of tissue that grow across the upper part of the oesophagus.
- **Larynx.** Exposure to airborne particles of asbestos, especially in the workplace.

#### 5. How do Head and Neck cancers affect people?

The presence of head and neck cancer causes a diverse range of communication and swallowing problems. Interventions can have varying impact from hoarseness to a total glossectomy with laryngectomy (Radford et al 2004). Treatments for cancers involve destroying the cancer cells through a combination of surgical interventions, chemotherapy and radiation therapy with survival associated with long term dysphagia (Roe et al 2010, Van der Molen 2010). The aims of treatment tend to focus on maintaining structures and organs but the effect of the different treatment can have a serious effect on structure and functioning (DAHNO 2008, Radford et al. 2004). Before treatment the individual may have few symptoms or some discomfort and they are usually able to speak, eat and swallow safely. Following prolonged multimodality treatments there are many physiological and structural changes that affect the individual's ability to communicate, to speak, to use their voice, to eat and/or swallow, smell, breath, to carry out social interactions and fulfil work capabilities.

The loss of the ability to communicate and swallow has a major psychological impact on the individual and their concept of self. Loss of communication can be a shock and cause upset to both the individual and their family and a period of grief (denial, anger, bargaining, and frustration) may be experienced. The individual may experience feelings of isolation with the loss of personal relationships, loss of work, economic security, home and independence (Fox & Rau 2001). Of these factors, the loss of work is a major component of decline in and individual's quality of life (QOL) and depression can follow. The impact of such losses can be ameliorated with appropriate pre-treatment counselling, ensuring that the individual has a real understanding of what will happen to them and a real commitment to work on rehabilitation strategies (Logemann 1997).

There is significant mortality associated with head and neck cancers. DAHNO (2008) reported a 5 year survival rate of 50% for cases of cancer of the larynx. The best prognosis is associated with early detection while a poor survival prognosis is associated with late detection with a markedly reduced survival rate along with the age of onset, lifestyle factors and co-morbidities.

**Oral (mouth) surgery/ glossectomy/pharyngeal surgery and chemoradiation**

The structure and function of the mouth, tongue and pharynx is altered by surgery and /or chemoradiation therapy (CRT) (Weber et al 2010). The latter being a combination of chemotherapy and radiation that is carried out for the preservation of organs. However, preserving the organs does not necessarily preserve the function (Van der Molen et al. 2009) and some of the main difficulties that arise from the treatments are related to problems in speaking and swallowing. Frowen & Perry (2006) reported a number of adverse outcomes after radiotherapy for head and neck cancer that included lack of motility and mobility in the pharynx, epiglottis, fibrosis of pharyngeal and laryngeal musculature and poor closure of the laryngeal vestibule. Dysphagia may result as a consequence of this treatment (Carroll et al 2007, Logemann et al, DAHNO 2008).

Table 4: Types of speech problems post surgery and chemoradiation therapy

Area of Surgery/ Chemoradiation	Possible Symptoms
Oral (mouth) surgery/ glossectomy	Loss of anatomical structures and/or cranial nerve function affect the ability to use articulators. Air from the lungs passes the vocal folds which vibrate to provide an audible sound that the articulators transform into intelligible speech. Treatment for the cancer may affect the movement and co-ordination of muscles such as jaw, palate or tongue affecting the ability to produce speech sounds for intelligible speech.
Pharyngeal (throat) surgery	Altered resonance affecting voice quality.
Chemoradiation therapy (CRT)	Reduced function in the jaw and a feeling of stiffness and the reduced ability to open the mouth as wide as before treatment (trismus). Reduced function in the tongue. Loss of or reduced function in the salivary glands affects mucosal surfaces in the mouth and throat causing dryness which affects speech/voice production.

Swallowing problems are associated with increased risk of aspiration, chest infections and pneumonia. SLTs have a unique role in assessing, diagnosing and managing patients who have symptoms associated with oropharyngeal dysphagia. The involvement of SLTs in the assessment and

management of those with dysphagia continues throughout the treatment process, (pre-treatment, during and post-treatment). SLTs monitor swallowing throughout because dysphagia has serious repercussions for the person; including choking, dehydration, malnutrition, aspiration pneumonia, asphyxiation, chronic pain, adverse socio emotional effects and death (Frowen & Perry 2006).

Table 5: Types of swallowing problems post surgery and radiation treatment

Area of Surgery/ Chemoradiation	Possible Symptoms
Oral (mouth) surgery/ glossectomy	Loss of overall control of food, including chewing and swallowing which can impact on managing oral intake safely. May have delayed/absent initiation of the swallowing reflex.
Pharyngeal (throat) surgery	Problems in transit of food and liquid from the mouth to the oesophagus may result in aspiration of food into the lungs.
Laryngectomy (voice box) surgery	May have restricted diet owing to loss of normal swallow process and slower propulsion of food and liquid from the mouth to the oesophagus as a result of surgery/oncological therapies creating a narrow, immobile pharynx
Chemoradiation therapy (CRT)	Oral & pharyngeal soreness with reduced saliva, dry mouth, limitation in functional movement of structures affecting chewing, transition of food from mouth to throat. Pharyngeal/oesophageal pain may restrict eating ability. Aspiration can result from fibrosis, muscle atrophy, fixation of the hyolaryngeal complex, and reduced glottic closure. Changes in function and sensitivity of oropharynx causing decreased tongue base contact with the posterior pharyngeal wall, reduced laryngeal elevation, increased oropharyngeal transit time and increased pharyngeal residue with increased risk of aspiration/penetration resulting in dysphagia

### Laryngeal surgery

In laryngeal cancer, surgery focuses on the elimination of the cancer while aiming to preserve neighbouring organs and structures. Laryngectomy procedures may include the total or partial removal of the larynx and will affect the individual's ability to produce voice. When there is total removal of the vocal cords with the creation of a stoma to breathe, the individual can no longer speak in their normal way. Extensive laryngeal cancers may necessitate the complete removal of tongue musculature and the whole larynx which will have a greater impact on the person than a glossectomy or laryngectomy alone.

As with all cancers, people who have had previous unsuccessful cancer treatments, can have feelings of depression that can occur prior to the radical surgery and this impacts on post-surgery recovery and acceptance of augmentative and alternative communication (Fox & Rau 2001).

Table 6: Laryngectomy and partial laryngectomy procedures

Surgery	Procedure
total laryngectomy	complete removal of the larynx
cordectomy	removal of a vocal cord
frontolateral laryngectomy	removal of the anterior of both vocal cords and part of the affected cord
anterior frontal laryngectomy	removal of front of both vocal cords
hemi-laryngectomy	removal of one side of the larynx
subtotal laryngectomy	part removal of the larynx, sufficient to allow a hoarse voice production

**6. What are the aims and objectives of Speech and Language Therapy for individuals with Head and Neck cancer?**

The document 'National Cancer Action Team Head and Neck Pathways' (NCAT 2009) describes the role of the SLT with this client group. The role of the SLT is to work as part of the MDT to provide assessment, treatment, information and advice, psychological support and contribute to the individual's quality of life. The scope of involvement is specified in the NCAT at:

[http://www.cancer.nhs.uk/rehabilitation/documents/pathways/symptom\\_pathways/NCAT\\_Rehab\\_SyS\\_Communication.pdf](http://www.cancer.nhs.uk/rehabilitation/documents/pathways/symptom_pathways/NCAT_Rehab_SyS_Communication.pdf) (2009). The type SLT involvement within the MDT intervention is stated for seven different stages in the care pathway, these are described as:-

- Pre Diagnosis
- Diagnosis & Care Planning
- Treatment
- Post Treatment
- Monitoring & Survivorship
- Palliative Care
- End of Life

The SLT at each of these stages aims to contribute to the assessment, treatment, maximising and maintenance of abilities relating to:-

- Speech, Voice Swallowing & Communication
- Cognitive & Psychological Factors
- Information provision
- Support
- Nutrition
- Referral
- Liaison

NICE (2004 pg 66) also stressed the importance of team working in the MDT. NICE emphasised the roles of SLT, dietician, clinical nurse specialist and palliative care specialist in the assessment and management of care especially for those individuals with difficult to control symptoms. (NICE 2004 pg 45, 68)

The nature of the SLT work requires SLTs to have specialist training. This training allows the SLT to assess and advise on communication skills, safe swallow and the selection, use and maintenance of prosthesis. SLTs make a unique contribution to the MDT through completing technical assessments that include the 100 mL water swallow test (WST), endoscopy, videofluoroscopy and selection and fitting of prosthesis for SVR (Patterson 2009, Carding et al 2008, RCSLT 2008, RCSLT 1999). SLTs can work in different teams according to the needs of the individual. For example, SLTs may work with intensive care nurses to help to reduce the risk of aspiration in patients, engender safe swallow and facilitate communication. The SLT can advise on and can fit speaking valves to both aid communication and reduce the risk of aspiration in those with a long term tracheostomy or intubation (Baumgartner 2008).

The specific aims of intervention vary with the location of the cancer and the nature and extent of treatment and the SLTs will work with an individual and their family as required. This period may be life-long for the individual from their referral to death and the SLT will remain involved in the palliative care of the individual.

The SLT aims to complete a full assessment of communication, including an assessment of body structure/ function and use of communication. Specifically, on impairment, SLTs assess the oro-facial and laryngeal motor function, language abilities (both receptive and expressive), sensory abilities (both auditory and visual), speech fluency, voice, cognition including insight and awareness, and para-linguistic abilities (NACT 2009).

Table 7: SLT aims in communication using World Health Organisation ICF

ICF	Aim
Impairment	Assessment of oro-facial/laryngeal structure and motor function
	Assessment of receptive and expressive language

	Assessment of articulation
	Assessment of sound production in sequential speech
	Assessment of speech fluency
	Provide pre-treatment exercises
	Increase or maximise oro-facial/laryngeal motor function
	Provide appropriate exercises to maximise articulation and sequential sound production
	Provide appropriate therapy for receptive & expressive language
Activity	Minimise communication disability by ensuring maximum use of current abilities.
	Maximise compensatory strategies and provide access to assistive and augmentative communication (AAC).
	Provide strategies to compensate for immediate communication issues.
	Educate patient, communication partners, appropriate health and social care professionals on patient specific communication difficulties.
Participation	Enable participation according to individual's circumstances and preferences.
	Develop social skills and confidence, promote independence and decision making.
	Reduce isolation and increase social integration.
	Facilitate contacts with other patients as appropriate
Well-being	Reduce distress related to condition
	Address psychological issues
	Provide basic psychological support and refer on where appropriate
	Provide appropriate support to reduce anxiety
	Refer to appropriate agencies where psychological problems need specialist input
	Develop coping strategies
	Maximise individual's sense of well being and quality of life.

### Communication disorders

It is part of the SLTs aim to provide continuity of care for individuals and their families throughout the care pathway (NCAT 2009, Ryan 2003). Part of assessment includes SLTs working closely with otolaryngologists to decide on the best treatment for each individual (Samlan 2002). Results of a pre-surgery assessment are shared with the MDT who, with the patient and family, decide on the planned treatment. The SLT's role includes explaining to the individual and their family how the proposed treatment i.e. surgery or oncological management can affect their ability to communicate and swallow. Pre-operative information and counseling are an essential part of the care offered by SLTs (Iversen-Thoburn 2000, McColl et al. 2006, RCSLT 2009, ASHA 2004). SLTs can shape expectations and introduce individuals to other patients and make referrals to appropriate support groups (NCAT 2009).

The SLT completes post surgery assessments and has the expertise to distinguish voice, articulation and resonance quality. This assessment informs the treatment plan aiming to achieve optimal communication effectiveness despite, for example, the absence of a functional structure as in a tongue or a larynx (Furia et al 2001, Hurran et al 2009). Intervention for laryngectomy will aim to achieve 'best' voice either through use of artificial larynx, SVR or oesophageal voice. In the case of total laryngectomy, this will most likely include Prosthetic Surgical Voice Restoration (SVR) and management of Tracheo-Oesophageal Puncture Prostheses (TOPP) and Stoma, which is not required in partial laryngectomy (Evans et al 2009). Intervention in glossectomy aims to help the individual achieve intelligible speech through articulatory adaptations and compensatory movements (Furia et al 2001).

Surgical voice Restoration (SVR) can have an 80% success rate in restoring functional voice (Stafford 2003). SVR is a procedure that involves re-connecting pulmonary airflow to a vibratory source to allow production of pseudo-voice (RCSLT 2009, Carding et al. 2001). Whilst SLTs work closely with the surgeon, the SLT influences the selection of appropriate prosthesis, and takes the lead on the management of SVR procedures (NICE, 2004, RCSLT 2009). In selecting prostheses, SLTs take care to document each procedure undertaken, the equipment used and why. SLTs aim to provide appropriate voice prosthesis management in line with RCSLT policy, as set out in the literature and the RCSLT SVR policy statement (Evans et al 2009, RCSLT 2008, 2009, RCSLT 2005). Intensive speech training post insertion of prosthesis is vital and has been used to good effect (Benazzo et al 2001).

Only specialist SLTs can undertake these procedures. Access to Postgraduate education/Clinical Professional Development and clinical training and experience as set out in the RCSLT Position Paper (RCSLT 2009 pg 11) is essential. SLTs aim to address the impact of loss of the individual's own voice (Carding et al 2001, Hurran et al 2009). The SLT assessment, intervention and support provided aims to

optimise voice and to address the psychological impact of laryngectomy and its affect on self image, and ability to communicate in different environments. SLTs often need to provide close monitoring, support and education post-operatively to promote best outcomes (Bunting 2004). Long term use of voice prosthesis can present complications such as obstruction, leakage or granulation. Usually, this can be resolved by replacement of the prosthesis. A study by Mäkitie et al (2003) found good or average tracheoesophageal speech for 78% of patients fitted with a Provox prosthesis.

Table 8: SLT aims in head and neck communication rehabilitation

ICF	Aim
Impairment	Assessment of voice, may include videofluoroscopy X-ray and endoscopy
	Improve laryngeal function
	Alter vocal fold adduction
	Alter respiratory patterns
	Modify pitch
	Reduce supraglottic activity
	Alter resonance
	Adjust articulatory tension
	Develop optimum voice
	Develop alternative phonation e.g. Tracheoesophageal speech.
	Instigate the whole programme for surgical voice restoration (SVR)
	Prepare the voice prosthesis for fitting, including selection of appropriate prosthesis and the preparation of the patient
	Fit the voice prosthesis
	Provide a oro-motor range of motion & strengthening exercises
Activity	Advise on use of voice
	Advise on strategies to sustain voice
	Maximise vocal effectiveness
	Use of pseudo-voice
	Develop technique in valve use
	Educate on the use of voice in different setting/environments
	Troubleshoot the management of voice prosthesis management in liaison with the MDT
	Teach patient, family, carers, nursing staff as appropriate about care & maintenance of prosthesis
	Develop ability to communicate in different environments
Participation	Establish vocal skills necessary to meet occupational and social needs
	Develop ability to socialise without harming voice
	Develop ability to cope in different social settings
	Develop self-esteem as a communicator
	Help the patient reduce social limitations experienced
Well-being	Reduce distress related to the voice problem
	Address psychological causes of voice problems
	Address the psychological effect of the voice problem and support the patient regarding the psychological impact of laryngectomy and its affect on self image
	Refer to appropriate agencies where psychological problems need specialist input

### Swallowing Problems

SLT intervention aims to improve swallowing function through advice on muscle exercises, compensatory strategies, maximising a safe swallow, advising on a safe diet and swallow techniques. SLTs aim to address problems with restricted oral movements, chewing and controlling food and liquid in the mouth and during the swallow (Patterson 2009, SCAN March 2006).

Pre Diagnosis, SLT assessment may include observational and instrumental evaluation, (fibre-optic endoscopic evaluation (FEES) and videofluoroscopy). These assessments will inform diagnosis (Denk et al 1997). SLTs will contribute to the MDT decision regarding the SLT role in care planning and decisions on treatment for swallowing.

*Pre-treatment*, SLT can provide intervention by providing swallowing advice and exercises with the aim of maintaining swallow function during treatment and improving swallow post-treatment (Kulbersh et al 2006, Carroll et al 2007).

*During Treatment*, SLTs aim to inform and educate patients and their carers as it is essential in ensuring compliance with the safety recommendations.

*Post-treatment*: SLTs will undertake objective assessment of swallowing (Langendijk et al. 2009) and monitor swallow function using observation, tests and instrumental assessments as necessary when there is a risk of aspiration. Videofluoroscopy assessment can be a valuable monitoring tool, particularly when silent aspiration is suspected (Graner et al 2003, Hiss & Postma 2003) while fibre-optic endoscopic evaluation (FEES) can be used to visualise the altered anatomy and pharyngeal phase of the swallow. These investigations allow the SLT to determine the management of the appropriate eating/feeding regimes. Interventions target the reduction of swallowing disorders through a number of techniques which may include altered postures, manoeuvres, modifications, motion and muscle strengthening exercises (Pauloski 2008, Logemann 1994, Logemann 2005).

*Monitoring & Survivorship*: The SLT will continue to monitor changes in swallow function from the first visit to final discharge or the death of the patient. The type of intervention and intensity of support needed will vary over time. It is recognised that late effects of treatment may lead to the deterioration of swallowing and oromuscular function. It is therefore essential that there are mechanisms in place for re-referral to SLT.

Table 9: SLT aims in swallowing rehabilitation in patients with head and neck cancer

ICF	Aim
Impairment	Assessment of swallow
	Provide pre-treatment exercises
	Videofluoroscopy assessment of swallow process
	Fibre-optic Endoscopy evaluation of swallow process
	Increase or maximise oro-facial/laryngeal motor function
	Re-establish maximum swallow function
	Establish safe transition to complete or partial oral feeding
	Aid achieving and maintenance of oral feeding in palliative stage.
	Modify the physiology of the swallow mechanism during swallowing
	Ensure correct posture for swallow
Activity	Assess current feeding pattern
	Educate patient on safe swallow techniques
	Management of secretions
	Advise on positioning and correct posture
	Advise on pacing and presentation of food and drink
	Consider and recommend foods based on dietary preferences
	Advise on adequate nutrition and altered food constituencies. Work with other members of the MDT to optimise nutrition and hydration
	Advise on bolus size
	Advise on use of special utensils
	Participate in MDT discussion on non oral feeding appropriateness
	Advise on PEG feeding
Advise on coping strategies	
Participation	Contribute to support that maintenance of quality of life
	Develop and support ability to participate in social meal times
	Develop ability to cope in different social settings and to eat in different locations
	Promote self-esteem
Well-being	Reduce distress related to the swallowing problem
	Address psychological causes of swallowing problems
	Address psychological effect of swallowing problem
	Refer to appropriate agencies when psychological problems need specialist input

*End of Life/ Palliative Care*: SLTs have a role in palliative care in contributing to the control of symptoms and in helping to minimize the impact on quality of life related to both swallowing and communication difficulties (Roe et al. 2009, Eckman & Roe 2005). SLTs provide clinical advice that allows flexible goal setting and alteration of interventions to best suit the needs and choices of the patient/family and which are responsive to changes in the patient's medical status, cognitive ability and prognosis (Santiago-Palma & Payne, 2001). At times the patient or family may choose interventions that do not follow the

SLTs recommendations and the reasons for this will be clearly documented. Nevertheless, the SLT will continue to give appropriate advice and support that is appropriate and responsive to the patient/families' preferences and needs (Roe et al. 2009, NICE 2004).

**7. What is the management for individuals with Head and Neck cancer?**

As a core member of the multidisciplinary team, SLTs play a key role in contributing to the diagnosis of an individual's speech, voice, fluency and swallowing abilities. SLTs will provide the level of care specified in the NCAT care pathways (NCAT 2009) and recommended in the RCSLT position papers (RCSLT 2009). The main areas of management are outlined in table 10 which highlights the different stages of intervention. Intervention can be individual or group based. The SLT works closely with other professionals within the team, in the community and with relevant support groups. NICE (pg 114 NICE 2004) have recommended that specialist SLTs should be available to work with those patients whose 'primary treatment disrupts the ability to speak, eat or swallow'. In order to meet this need, NICE recognised that sufficient specialist SLT posts would need to be funded within each Cancer Network (NICE 2004).

Table 10: SLT services for Head & Neck Cancer Patients: Information for Health Professionals (SCAN Speech and Language Therapy Sub Group March 2006)

<i>Pre Medical Treatment</i>	<i>During Medical Treatment (Chemo/irradiation therapy)</i>	<i>Post Medical Treatment</i>
<p><b>Speech Impairment</b></p> <ol style="list-style-type: none"> <li>1. Assess patient.</li> <li>2. Provide advice on how medical/surgical treatment may affect speech.</li> <li>3. Provide communication therapy if required.</li> </ol>	<ol style="list-style-type: none"> <li>1. Monitor communication.</li> <li>2. Provide appropriate range of motion exercises to maximise oral function.</li> <li>3. Provide communication therapy or augmentative communication as required.</li> </ol>	<ol style="list-style-type: none"> <li>1. Provide appropriate exercises to maximise oral function.</li> <li>2. Maximise functional use of oral communication.</li> <li>3. Provide communication therapy as required.</li> </ol>
<p><b>Voice Disorder</b></p> <ol style="list-style-type: none"> <li>1. Screen all patients presenting with laryngeal tumours, offering individualised information and support.</li> <li>2. Ensure vocal tract hygiene.</li> <li>3. Advise on factors which will damage voice.</li> <li>4. Provide appropriate range of motion exercises to maximise oral function</li> </ol>	<ol style="list-style-type: none"> <li>1. Offer advice aiming to promote good vocal care/habits and reduce anxiety.</li> </ol>	<ol style="list-style-type: none"> <li>1. Review.</li> <li>2. Provide voice treatment if required.</li> <li>3. Provide information / advice / support.</li> </ol>
<p><b>Laryngectomy</b></p> <ol style="list-style-type: none"> <li>1. Assessment.</li> <li>2. Advice / support to patient and family on impact of surgery on communication and swallow.</li> <li>3. Arrange for patient and family to meet another laryngectomy patient.</li> <li>4. Provide written information.</li> <li>5. Inform patient of support Groups.</li> </ol>	<ol style="list-style-type: none"> <li>1. Monitor changes in communication and swallow function.</li> </ol>	<ol style="list-style-type: none"> <li>1. Reassess communication and maximise non oral communication.</li> <li>2. Assess swallow function.</li> <li>3. Provide voice restoration / communication therapy (may include a communication aid).</li> <li>4. Provide support to patient and family.</li> <li>5. Provide ongoing specialist advice on communication and swallow function.</li> </ol>
<p><b>Dysphagia</b></p> <ol style="list-style-type: none"> <li>1. Screen patients who have a tumour in a site that is known to cause swallowing problems.</li> <li>2. Provide advice.</li> </ol>	<ol style="list-style-type: none"> <li>1. Screen patients who have a tumour in a site that is known to cause swallowing problems.</li> <li>2. Provide advice.</li> <li>3. Manage swallow problems</li> </ol>	<ol style="list-style-type: none"> <li>1. Re-establish maximum swallow function.</li> <li>2. Establish safe transition to complete or partial oral feeding.</li> <li>3. If palliative care necessary –</li> </ol>

<b>Pre Medical Treatment</b>	<b>During Medical Treatment (Chemo/irradiation therapy)</b>	<b>Post Medical Treatment</b>
3. Manage swallow problems appropriately. 4. Provide the patient with a checklist of potential swallow problems, empower the patient to contact the SLT department once swallow problems occur. Provide contact details.	appropriately. 4. Provide the patient with a checklist of potential swallow problems, empower the patient to contact the SLT department once swallow problems occur. Provide contact details.	aid the patient to achieve / maintain safest options for oral feeding if that is their wish.

In addition to speech /voice assessment and therapy, SLTs undertake the management of voice prostheses. This management includes appropriate selection of individual patients for SVR, working as an integral member of the Head and Neck Cancer Multi-disciplinary Team (RCSLT 2009, ASHA 2004). They will assess voice and swallowing function post-surgical and non-surgical treatment, provide comprehensive SVR assessment of voice quality and swallowing and interpret abnormal findings. Following assessment, SLTs will plan the appropriate intervention. This includes selection of the appropriate prosthesis; provide appropriate interventions; make onward referrals/second opinions (ENT, other specialist SLTs) and provide on-going evaluation for the use of voice prosthesis (Evans et al 2009). Voice prosthesis can provide effective communication for many individuals (Mäkitie et al 2003).

Table 11: Approaches to producing voice and communication post surgery

<b>Laryngectomy Voice</b>	<b>Direct technique</b>
Artificial larynx	Artificial larynx - battery operated hand held device that vibrates air in the oral cavity when held to the neck. Can be used with an oral adapter.
Surgical Voice Restoration	Voice restoration by fitting valve prosthesis (e.g. Blom-Singer, Provox etc.) through a puncture hole between the trachea and oesophagus. Voice is enabled by occluding the stoma either manually or with a hands free valve fitting
Oesophageal Voice	Oesophageal voice - air from the mouth is transferred into the upper oesophagus where the released air causes the pharyngo-oesophageal segment to vibrate producing a low-pitched voice.
Silent Mouthing/ Writing/ Gesture	Silent communication, articulation of words, use of writing and gesture, alphabet charts, word charts, low & high tech speech aids.

The SLT will work as part of the local support team which incorporates the following members (National Cancer Peer Review-National Cancer Action Team 2010).

- Speech and Language Therapist;
- Clinical Nurse Specialist;
- Dietician;
- Nurse responsible for the management of stomas (tracheostomies and gastrostomies), nasogastric tubes and tracheo-oesophageal valves;
- Dental Hygienist;
- Nominated member of the MDT responsible for the psychological support of head and neck cancer patients;
- Physiotherapist;
- Occupational Therapist;
- Restorative dentist
- Social worker.

If the specialist SLT transfers care to the community SLT, the specialist SLT remains available for 'expert advice' and professional guidance such as managing prosthesis or valves (NICE 2004 pg 94).

SLTs are actively involved in research to identify which forms of treatment are most effective. This has involved assessing SLT intervention and outcomes, for example, the value of pre-treatment education and exercises (van der Molen et al 2010, Logemann 2005). SLTs contribute to research evaluating which treatments are effective in eradicating the cancer whilst preserving structure and function of

organs and providing the best communication and swallowing results, as seen in studies by Feng et al 2010, Van der Molen and reported by Roe et al 2010.

### **Augmentative and Alternative Communication**

Augmentative and Alternative Communication (AAC) refers to any system of communication that is used to supplement or replace speech, to help people with oral communication impairments to communicate. SLTs can recommend pseudo-voice appliances as appropriate.

'Low tech' aids can be used, for example, drawing or writing or 'High tech' aids such as computerised voice output communication aids. Individuals with communication or swallowing problems following surgery or chemoradiation interventions in the absence of other speech/language problems have an intact linguistic system. This means they can participate in AAC assessment to select a system that best suits their needs (Fox & Rau 2001). The objectives of introducing AAC include maximising communicative function in the areas of life that are seen as a priority by the individual and their family for example a voice amplifier may be required in certain environments. These needs will be continually reviewed according to changing needs. Factors in recommending an AAC include identifying participation and communication needs, assessing the capabilities and external constraints present in order to determine appropriate options and strategies for evaluating the success of interventions (Beukelman & Mirenda 1998).

To ensure appropriate access to the range of resources available, for those individuals who may benefit from communication aids. The SLT may refer the person to an AAC specialist or team, who are skilled in assessment, planning, intervention and review in this area. It may be necessary to provide counselling during the AAC assessment to support the individual and their family and to enable them to cope with the loss of speech, voice and fluency while they discover which form of AAC is suitable and how best to meet both current and future needs (Fox & Rau 2001). The role of the SLT is to investigate funding for the AAC as deemed appropriate or to refer the individual onto specialist an AAC service for assessment and recommendation of assistive devices as appropriate (NCPNRCAT 2010).

### **Bilingualism**

Individuals who are bilingual and have a communication and swallowing problems associated with head and neck cancer may need help to access services. An interpreter may be required to conduct the SLT assessment to ensure it is both accurate and reliable and to facilitate understanding of therapy and implementation of treatment strategies. There are time and cost implications when working with interpreters/co-workers for example, in taking a case history, completing a full assessment in all languages spoken by the individual and their family. Timings of services need to be culturally sensitive, for example, not offering appointment times which coincide with religious observations (Communicating Quality 3, 2003).

### **Training**

SLTs require extended training to work in this specialist field. Time and funding needs to be in place to ensure SLTs working in the area of Head and Neck Cancer are provided with the supervision and post-graduate training needed to contribute fully in this specialist area.

## **8. What is the evidence for SLT interventions?**

### **Details of studies**

Nineteen studies were included in the assessment of speech and language (SL) therapy interventions for head and neck cancer. All studies were published in English. Eight studies were undertaken in the USA, three in Brazil, two in Australia and one in Italy, Austria, Sweden, United Kingdom, Korea and the Netherlands respectively. The earliest study was published in 1992 and the most recent in 2010. Sample sizes, not including review studies, ranged from six to 110 study participants. All of the studies included adult populations.

Overall the studies included a broad range of head and neck cancers and specific details were given in most papers. Eleven studies included participants requiring SLT interventions following surgery, two

studies included participants receiving radiation and/or chemotherapy and seven studies included participants requiring SL interventions from various treatment groups.

### **Study quality**

Study designs included two randomised controlled trials (RCTs), one non-randomised comparative study, seven uncontrolled observational cohort studies, one case control study, three case series, one survey, two systematic reviews and two non-systematic reviews.

Overall the quality of studies was limited. Five of the sixteen studies were retrospective. Of the studies which can be considered to be of higher quality, the two RCTs were restricted to small sample sizes and the two systematic reviews, whilst rigorous in terms of methodology, were not able to identify any good quality studies for inclusion. Overall sample sizes were small. The three largest studies had sample sizes of 110, 103 and 95 respectively. These included a survey with a 45% response rate, a comparative study which did not have equal distribution of participants between study arms and a retrospective study.

### **Speech and language therapy interventions**

The effectiveness of SLT interventions was assessed in fifteen of the nineteen included studies.

Details of the four remaining studies are given for information but are not considered in more depth in this briefing. These include two non-systematic reviews (Perry 2006, Logemann, 2006) the latter of which discusses issues relating to the design of trials in dysphagia. A further study assesses the prognostic factors following surgery that should be considered in swallowing rehabilitation (Denk 1997). The remaining study specifies that its aim is not to assess specific SLT interventions, but to pilot prospective multi-centre evaluation methods (Radford, 2003).

The fifteen studies considered in the remainder of this briefing fall into three main groupings. Five studies assessed prostheses, six studies assessed interventions relating to dysphagia, and four studies considered speech and voice rehabilitation.

### **Prostheses**

Five studies assessed the effectiveness of voice prostheses (Benazzo 2001, Carvalho-Teles 2006, Carvalho-Teles 2008, Mäkitie 2003, Sidell 2010) with one focussing on the surgical procedure used to fit the prosthesis (Sidell 2010).

Three of the studies were prospective small, uncontrolled studies with sample size ranging from six to thirty-six participants. (Benazzo 2001, Carvalho-Teles 2006, Carvalho-Teles 2008) The remaining two studies were retrospective case series. (Mäkitie 2003, Sidell 2010)

In a small prospective cohort study Benazzo and colleagues (2001) assessed the effectiveness of the Provox 2 voice prosthesis with intensive speech training (7-8 sessions) in six subjects. All study participants had advanced cancer of the hypopharynx and cervical oesophagus and had undergone total circumferential pharyngolaryngectomy and reconstruction with a jejunum flap. Speech was analysed using computerized and spectrographic analysis and assessed qualitatively in terms of intelligibility, pleasantness and acceptability. Speech intelligibility was assessed as satisfactory in all six participants with some difficulty of comprehension in three participants. There were no post-operative complications following insertion of the prosthesis and none of the prostheses had to be replaced during the 8-14 month follow-up.

The Provox voice prosthesis was also assessed in a ten year retrospective chart review of 95 patients who had undergone laryngectomy for laryngeal or hypopharyngeal malignant disease (Mäkitie 2003). Voice quality had been assessed subjectively as good, average or poor by a physician or SLT at each follow-up visit. Speech was rated as good in 53 (56%) and average in 21 (22%) of the 95 patients; 21 patients (22%) had poor voice or were aphonic. There were 218 prosthesis replacements over the 10 years. The authors noted that during the course of the 10 year period two different types of Provox prosthesis had been used and that policies relating to prosthesis replacement decisions had changed.

Two prospective cohort studies by Carvalho-Teles and colleagues assessed prostheses in two different populations. The first assessed the speech of 23 participants with prosthetic palatal obturators following resection of the maxillae due to tumours in the palatomaxillary region (Carvalho-Teles, 2006). Speech was assessed by SLTs on a six point scale according to a number of parameters. Nineteen of 23 (82.6%) participants had significantly improved speech intelligibility and 16 (69.9%) had reduced hypernasality. Participant characteristics including extent of surgery, radiotherapy, xerostomia and the amount of speech therapy received were important considerations in assessing the effectiveness of the prosthesis.

The second study (Carvalho-Teles, 2008) assessed the effectiveness of palatal augmentation prostheses in 36 participants who had undergone glossectomy. Speech both with and without prosthesis was assessed in terms of spontaneous speech intelligibility and acoustic spectrography of vowel sounds. Randomized, blinded assessment was undertaken by expert listeners. Statistically significant improvement was seen in speech intelligibility and in the formants of vowels. The authors acknowledged limitations of the study including sample size, heterogeneity in terms of surgery type and use of prosthesis and the use of expert listeners for the outcome assessment.

A retrospective chart review of 31 cases compared two approaches to tracheoesophageal puncture (TEP) undertaken as part of the procedure for fitting tracheoesophageal prostheses (Sidell, 2010). Eighteen patients received TEP as an operating room (OR) procedure and 13 patients underwent office based TEP. The traditional OR procedure requires two stages; the puncture followed by visit to an SLT several days later to have a prosthesis sized and fitted. The office-based procedure allows both stages to be carried out at the same visit. Successful tracheoesophageal speech was reported as being achieved all participants. Prosthesis sizing and stability of fit was better achieved in the office-based TEP with participants requiring fewer post-operative visits to the SLT. The authors recommend a prospective controlled study be undertaken to confirm their results acknowledging that the timing of post-operative visits was not controlled and may have been affected by a variety of factors.

### **Dysphagia**

Six studies assessed interventions for dysphagia resulting from treatments for head and neck cancers. Interventions included pre-treatment swallowing exercises (Carroll 2007, Kulbersh 2006), the chin tuck procedure during swallowing evaluation for patients with aspiration (Lewin 2000), electrical stimulation therapy in addition to SLT (Ryu, 2008) and diagnostic procedures (Logemann 1992). A systematic review considered evidence on a number of interventions (McCabe 2009).

In addition to the systematic review (McCabe 2009), study designs included one randomised case control study (Ryu, 2008), two non-randomised comparative studies (Kulbersh 2006, Logemann, 1992), one observational cohort study (Lewin 2001) and one retrospective case control study (Carroll 2008).

One non-randomised comparative study (Kulbersh 2006) and one retrospective case control study (Carroll 2008) assessed pre-treatment swallowing exercises in participants who had received chemotherapy and/or radiotherapy.

In the Kulbersh study (2006) 37 participants receiving treatment for newly diagnosed hypopharyngeal, laryngeal or oropharyngeal primary tumours were given either swallowing therapy two weeks before radiotherapy or chemotherapy (25 patients) or swallowing therapy following their cancer treatment (12 patients). The M.D. Anderson Dysphagia Inventory (MDADI) was administered at follow up (average of 14 months post-treatment) to assess dysphagia-specific quality of life (QoL). The QoL of the pre-treatment group was statistically significantly higher in 3 of 4 QoL domains. The authors acknowledge the limitations of the study, including the delayed effect on results of radiotherapy, and recommend that their observations be evaluated in randomised studies.

The study by Carroll (2008) assessed the effectiveness of pre-treatment exercises on post treatment swallowing function in 18 participants with advanced squamous cell carcinoma of the oropharynx, hypopharynx or larynx. Nine patients received pre-treatment training and nine received post treatment training only. The main assessment was undertaken at 3 months post treatment using standard videofluoroscopy examinations (VFS). Significant benefits in terms of swallowing function, epiglottis

inversion and posterior tongue base position were observed in the pre-treatment group. The authors acknowledge the limitations of the study, including the short follow up interval. They report that a prospective randomized trial has begun. It is assumed that this study has not yet been published as further searching for this briefing did not identify a corresponding study report.

An RCT by Ryu (2009) assessed the effects, in terms of swallowing function, of neuromuscular electrical stimulation (NMES) in addition to conventional swallowing rehabilitation in 26 patients with dysphagia following treatment for head and neck cancer. Patients were randomised to receive NMES and conventional rehabilitation or sham stimulation and conventional rehabilitation. Effectiveness was assessed using four dysphagia outcome measures. Statistically significant differences, in favour of the intervention group, were seen in one of the four measures (Functional Dysphagia Scale (FDS)). Improvements in remaining outcomes were not significant. The authors discuss the strengths and weaknesses of the study. The latter include incomplete follow up with authors recommending longer follow up be undertaken.

The study by Logemann (1992) assessed bedside evaluation procedure versus videofluoroscopy (modified barium swallow) in the evaluation of 103 patients who had received partial laryngectomy. The study aimed to assess the impact of diagnostic procedure on speech rehabilitation outcomes including first post-operative oral intake, removal of nasogastric tube, achievement of pre-operative diet and achievement of normal swallow. Twenty-one subjects received the bedside procedure and 83 received videofluoroscopy. The mean time to achieve all outcomes was lower in the videofluoroscopy arm. Subjects in the videofluoroscopy had more swallowing related complications. At three month follow up there was significantly better transit times and swallowing efficiencies in the videofluoroscopy arm and a higher incidence of undetected aspiration in the bedside group. The participants were not randomised and were not distributed equally between the arms of the study. The authors report a high level of heterogeneity between study arms.

The study by Lewin (2001) assessed the use of the chin tuck procedure during barium swallow in 26 patients with possible aspiration with the aim of undertaking a full evaluation of the gastric conduit. All patients had undergone oesophagectomy. Twenty-one patients were assessed as having aspiration. The chin tuck procedure was reported as alleviating all episodes in aspiration in 17 of 21 patients. The authors recommend that the chin tuck manoeuvre should be attempted to protect the airways of patients following oesophagectomy who aspirate during evaluation of the gastric conduit.

The systematic review by McCabe (2009) identified and assessed evidence from six studies on dysphagia behavioural interventions including side lying, chin tuck, head rotation, effortful swallow, Mendelsohn, supraglottic swallow and super-supraglottic swallow. Effectiveness was assessed in terms of swallowing physiology, functional swallowing outcomes, pulmonary health. The methodological quality of included studies was assessed with quality marker scores ranging from 1 to 4 out of 7 possible markers. Evidence was minimal or not available for assessment of the chin tuck procedure and the supraglottic and super-supraglottic swallow manoeuvres. The effortful swallow manoeuvre should be recommended after observation of its effectiveness under fluoroscopic or endoscopic evaluation. The Mendelsohn manoeuvre appears to be the treatment approach that produces the best result in returning patients to oral feeding. The authors conclude that there is limited available evidence, and that evidence has methodological weaknesses. They recommend that interventions should be assessed within specific cancer subpopulations.

### **Speech and voice therapy**

Four studies assessed the effectiveness of speech and voice therapy. Study populations included participants who had undergone glossectomy (Furia, 2001), laryngectomy patients using different alaryngeal speech methods (Iverson-Thoburn, 2000), patients with early glottic carcinoma who had undergone radiotherapy or endoscopic laser therapy and patients who had undergone laryngectomy (Xi 2009).

Study designs included one systematic review (Xi, 2009), an RCT (van Gogh, 2005), a survey (Iverson-Thoburn, 2000), and an uncontrolled observational cohort study (Furia, 2001).

Furia (2001) evaluated speech intelligibility before and after speech therapy in 27 patients who had undergone total, subtotal or partial glossectomy. A therapeutic speech programme, lasting 3-6 months, aimed to activate articulatory adaptations, compensations and maximization of the remaining structures. Speech was assessed before and after therapy by trained listeners. Significant improvement in speech intelligibility was reported for patients with total and subtotal glossectomy. Improvements in patients with partial glossectomy were not significant. The authors commented on the limitation of the study in terms of size and heterogeneity in the sample population. The reduction of speech rate, temporal modifications and auditory feedback were reported as being important elements of the speech therapy programme.

A questionnaire survey investigated alaryngeal speech methods in people who had previously (over the last 20 years plus) undergone total laryngectomy (Iverson-Thoburn, 2000). One hundred and ten respondents of 245 surveyed described which speech method was used (oesophageal speakers, artificial larynges speakers or prosthetic speakers). The survey also elicited information on speech and device training and length of time taken to reach speech proficiency. The survey suggested that over time there had been an increase in the use of prosthetic speech methods. More speech therapy training was reported as being required for oesophageal speech (mean 24 sessions) compared to electrolarynx (mean 9 sessions) or prosthetic-assisted methods (mean 2.7 sessions). The authors acknowledged the possible bias implied in the 45% response rate and recommended a larger study be undertaken.

An RCT by van Gogh (2005) assessed the effectiveness of voice therapy in 23 patients who had received treatment for early glottic carcinoma. Twelve patients were randomised to receive voice therapy and eleven patients did not receive voice therapy during the study period. Voice therapy was tailored to meet the requirements of individual patients but comprised in the main voice and breathing exercises and voice hygiene with specific voice exercises taking up more than 50% of therapy time. Speech was assessed using a number of objective measures and subjectively by patients using the self-reported Voice Handicap Index (VHI). Significant improvement in patients receiving voice therapy, in both subjective and objective measures, was reported post therapy compared with pre-therapy. Significant difference in VHI, in favour of the experimental group, was seen post-therapy between the experimental group and the control group. Between group results for objective measures were mixed with significant differences in favour of the intervention group reported for some measures. The authors reported that 60% of patients who met the inclusion criteria for the study chose not to participate.

A systematic review by Xi (2009) and summarised by Xue (2010) considered the effectiveness of voice rehabilitation in patients who had undergone laryngectomy. Twenty-two studies were included in the review. All studied populations who had undergone laryngectomy and who had received a voice rehabilitation programme. None of the studies appeared to be comparative. Oesophageal speech, electrolarynx and TEP were the most common forms of voice rehabilitation. In terms of speech therapy, the electrolarynx was reported as being the easiest method to learn, requiring little training. Oesophageal speech required the most training. TEP was the most common form of rehabilitation and, overall, appeared to be the most successful in terms of initial and long-term success rate, quality of life and satisfaction although prosthesis replacement was seen as a complication. The need for high quality comparative studies is highlighted.

## **Conclusion**

Most of the included studies are not of high quality in terms of study type and study quality. These limitations, particularly in terms of sample size and heterogeneity within study populations are acknowledged by the authors and their implications discussed in almost all of the studies. Research in this field is notoriously difficult and related to the difficulty in identifying homogenous groups given the heterogeneity of the cancer types and sites and broad range of treatments (surgical and medical). However, beneficial effects are reported in most studies. In addition the place of the SLT as an integral and established member of the multi-disciplinary care team is clearly represented in the studies and the different types of interventions assessed reflect the scope of the role of the SLT in the care of patients with head and neck cancer.

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Table 12: Studies list

Study	Country	Study design	Subjects	Intervention
Benazzo et al. 2001	Italy	Observational study	6 subjects (male (M), 47-64 yrs) with cancer of the hypopharynx and cervical oesophagus having undergone surgery	Provox 2 type voice prosthesis and intensive speech therapy of 7-8 sessions
Carroll et al. 2008	USA	Non-randomised retrospective case-control study	18 subjects (12 M 6 F, mean age approx 60 yrs) with advanced squamous cell carcinoma of the oropharynx, hypopharynx, and larynx having undergone combined chemotherapy and radiation treatment.	Pre-treatment compared to post treatment swallowing exercises
de Carvalho-Teles et al. 2006	Brazil	Observational study	23 subjects (6 M; 17 female(F), 18-83 yrs) having undergone resection of the maxillae	Stable maxillary obturator prosthesis
de Carvalho-Teles et al. 2008	Brazil	Observational study	36 subjects (33 M, 3 F, 30-80 yrs) having undergone glossectomy	Palatal augmentation prosthesis
Denk et al. 1997	Austria	Retrospective case series	32 subjects (24 M 8 F, 37-79 yrs) with prolonged postsurgical aspiration following radical resection of malignant tumours	Swallowing rehabilitation
Furia 2001	Brazil	Observational study	27 subjects (24 M, 3 F, 34-77 yrs) having undergone glossectomy	Speech therapy
Iversen-Thoburn and Hayden 2000	USA	Survey	110 subjects (45% response rate) (85 M, 15 F mean age approx 70 yrs) having undergone laryngectomy.	Speech therapy

Study	Country	Study design	Subjects	Intervention
Kulbersh et al. 2006	USA	Prospective non-randomised comparative study and cross-sectional QoL analysis.	37 subjects (28 M, 6 F, mean age approx 55 yrs) with hypopharyngeal, laryngeal, or oropharyngeal primary tumours and undergoing radiation and/or chemoradiation.	Pre-treatment swallowing exercises
Lewin et al. 2001	USA	Observational study	26 subjects (23 M, 3 F, 52-82 yrs) with aspiration following oesophagectomy	Chin tuck manoeuvre
Logemann et al. 1992	USA	Non-randomized comparative study	103 subjects (? M/F, mean age approx 60 yrs) having undergone partial laryngectomy and receiving swallowing rehabilitation	Bedside examination compared to videofluoroscopy (modified barium swallow)
Logemann 2006	USA	Non-systematic review	Discussion of issues relating to trial design in clinical trials in populations with dysphagia	
Makitie 2003	Sweden	Retrospective case series	95 patients (88 M 7 F, mean 63.5 yrs) having undergone total laryngectomy or laryngopharyngectomy.	Provox voice prosthesis
McCabe et al. 2009	USA	Systematic review	Dysphagia literature from 1985-2008.  60 subjects (47 M, 31 F, 40-70 yrs) with structurally induced dysphagia across 6 studies  31 with head and neck cancer and 29 with oesophageal cancer.	Seven swallowing behavioural interventions
Perry and Frowen 2006	Australia	Non-systematic review	Review of issues relating to speech and swallowing dysfunction following treatment for head and neck cancer.	
Radford et al. 2004	UK	Longitudinal pilot study	Pilot study of quality of life (QoL) and therapy outcome measures (TOM) in patients with speech and swallowing impairments following treatment for head and neck cancer.	
Ryu et al. 2009	Korea	Prospective, double blinded, randomized case control study	26 subjects (25 M, 1 F, mean age approx 63 yrs) with dysphagia having undergone treatment for head and neck cancer	Neuromuscular electrical stimulation (NMES) in combination with swallowing training compared to sham NMES and training
Sidell 2010	USA	Retrospective case series	31 subjects (24 M, 7 F, 44-79 yrs) having undergone secondary tracheoesophageal puncture (TEP) for postlaryngectomy speech	Office-based tracheoesophageal puncture (TEP) compared to operating room-based TEP.

Study	Country	Study design	Subjects	Intervention
van Gogh et al. 2006	Netherlands	Randomised controlled study	23 subjects (23 M, age range 40-80 yrs) having received treatment for early glottic carcinoma.	Voice therapy
Xi et al 2009 (summarised by Xue, 2010)	Australia	Summary of systematic review	22 included studies of patient populations having undergone laryngectomy	Voice rehabilitation

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