IQoro and DYSPHAGIA – COST BENEFITS of IMPROVED PATIENT OUTCOMES

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Purpose of document

Many NHS managers and clinicians are seeking ways to fund IQoro deployment in their institutions. There is often a need to present a business case at department or institutional level to fundholders and procurement departments. This document presents the cost benefit data and rationale to support such applications. It is more focussed on the cost and savings arguments for IQoro' use, than on improved patient outcomes which are well documented elsewhere.
It is focussed mostly on the case for treating the conditions related to dysphagia than to those associated with GERD, the latter are addressed in a parallel paper.

Introduction

IQoro is a NICE-recognised treatment for patients with dysphagia caused by a range of aetiologies: especially where neurological injury has occurred. It is referenced by brand name in the relevant NHS care pathway guidelines for treating dysphagia [1].

It is also an effective treatment for patients with reflux-based diseases – usually as a result of Hiatus hernia [2 - 5] and is referenced by brand name in the relevant NHS care pathway guidelines for treating GERD in both adults and children [6, 7]. This document does not focus primarily on this patient group.

IQoro's adoption has increased over the past 5 years with approx. 100,000 people in Europe using it at the time of writing. The majority of these IQoro devices have been self-purchased by individuals to treat GERD and similar conditions, with a smaller proportion purchased by healthcare institutions, often for dysphagia-related conditions.

IQoro can be prescribed by hospital consultants for patients under their care via the use of hospital prescriptions. IQoro devices procured in this way are issued by hospital pharmacies and funded from the hospital prescription budget.

In the NHS, dysphagia is most commonly diagnosed, assessed and treated by SLTs. This document supports an SLT service that is seeking funding from budget holders in order to be able to use IQoro to improve patient and organisation outcomes, in their care setting.

Over recent years new data and SLT experience enables us to be able to present evidence of the suitability of IQoro for use in the NHS in the acute, rehab and community settings. Specific data on patient outcome improvements and associated cost reductions in NHS settings can also be shown.

IQoro: treatment of both dysphagia and reflux-based conditions

This document is one of two produced simultaneously by the manufacturers of IQoro: this one focussing on the treatment of dysphagia, and the other on reflux-based diseases. Many patients may have difficulties in both condition areas, in which case both documents should be considered as being relevant. Both conditions are caused by muscular and / or neurological dysfunction [8]. IQoro addresses the underlying causes with the same device and training regime.

The two conditions are the subject of different NICE pathway guidelines [1,6, 7] – all of which reference IQoro as appropriate treatments - but are often treated by different departments and professionals within the care system.

What IQoro is and what it treats

IQoro is a simple handheld neuromuscular training device. It can be self-administered by the patient in three daily training sessions of 30 seconds each when they are self-treating a condition [9]. In the case of dysphagia treatment, it is more normally used by, or under the direction of, an SLT.

Treatment with IQoro successfully addresses many of the legacy conditions of stroke, brain injury or neurological diseases. These include dysphagia, drooling, facial weakness, speech weakness, postural control, hiatal hernia, reflux, and more. IQoro is shown in scientific studies [10 - 13] to be equally effective in treating patients whether at the onset of their condition or for those that have experienced their symptoms for many years. Costs of caring for these long-term patients incur huge present and recurring costs.

It is not the purpose of this document to explain in detail how IQoro works [14], but in essence it stimulates the sensory nerves present in the oral cavity to activate a sensory motor reflex arc in the brainstem that causes the efferent motor nerves to exercise the 148 muscles in the swallowing chain. This holistic effect accounts for the wide range of symptoms addressed including Hiatal hernia and postural control where the muscles affected are beyond the reach of the physical, mechanical effect of the device.

Suitability of IQoro for use in NHS and clinical settings

At the current time, IQoro has been purchased for deployment in more than 30 NHS services in varying numbers: a range of roughly a minimum of 5 in one SLT service to a maximum of 100 in the largest. In all but a few cases, the primary focus of these deployments is to treat patients with dysphagia, sometimes with reflux symptoms too.

A recent service evaluation conducted in the Royal Devon and Exeter NHS Foundation Trust [15 -16] which was funded by the South West Academic Health Science Network looked at IQoro deployment in three Speech and Language care settings: acute, rehab and community. The conclusion shown in the poster for this study says,

- *"Dysphagia can have long-term impacts on QoL, health and represent increased costs. Effective treatment options are needed to reduce the impact of dysphagia in all these areas.*
- *IQoro therapy can be successfully introduced to a SLT service within an NHS setting.*
- *IQoro therapy can have a positive impact on function and QoL in relation to eating and drinking in patients with chronic dysphagia."*

Cost saving opportunities

1. Quantifiable savings in the IQoro treatment of Dysphagia

1.1 Percutaneous Endoscopic Gastrostomy (PEG)

Patients unable to eat or drink orally: "Nil by Mouth" (NBM) or gain sufficient intake orally, may be fed via PEG. This form of enteral feeding allows patients to bypass the difficulties in swallowing solids, and the risks of drinking liquids.

PEG costs

In the NHS,

- a PEG insertion costs £1,124 [17] (*HRG code FE12A. Endoscopic insertion of gastrostomy tube, 19 years and over*).
- the cost of enteral tube feeding in the home setting is about £95 per week [18] or £380 per month.
- the cost to the NHS of a PEG removal is £260 [19]
- in the event of a PEG insertion for a patient under 19 years of age the cost is higher: £2,561[17] (*HRG code FE12B. Endoscopic insertion of gastrostomy tube, 18 years and under*).

PEG incidence

The incidence of PEG insertions is estimated by NICE [18] as:

> "*While 20% of patients after a stroke may need enteral tube feeding during the acute phase, 8% will need long-term enteral tube feeding for more than 6 months. The cost of enteral tube feeding in the home setting is about £95 per week.*

The Stroke Association reports 1,300,000 stroke survivors in the UK [20]. If 8% of this number are long-term PEG users, then this is the total addressable population in this savings category – 104,000.

1.1.1 Avoided PEG insertions

Strategic importance of avoiding PEG insertions

Avoiding PEG insertions is a current, pressing NHS imperative. Under the current pandemic conditions, the British Society of Gastroenterology [21] says that,

> "*Following conversations with key stakeholders and opinion leaders involved in Endoscopy, there is agreement that there is an urgent need to plan for endoscopy activity over the coming weeks and months."*

The referenced article categorises PEG insertions as "*Emergency / essential procedures*". IQoro treatment can obviate the need for such operations where oral swallowing competence can be recovered instead, freeing up theatre resources for the many other procedures in this category.

Avoiding PEG insertions with IQoro

Where IQoro training can be commenced in a timely manner, PEG insertions that were otherwise planned can be avoided. In such cases, the savings to the NHS are not only the ongoing PEG maintenance costs but the avoided insertion operation costs too.

a) After a recent service evaluation conducted with the support of the South West Academic Science Network (SW AHSN) [15, 16] the clinicians that performed the evaluation had access to five extra IQoro devices over and above those required for the evaluation. These were deployed to five patients of whom two were scheduled for PEG insertion operations; after IQoro training both these operations were cancelled.

b) The SLT team in the stroke rehab unit at the Torbay and South Devon NHS Foundation Trust has supported five patients who had self-purchased IQoro devices that were all scheduled for PEG insertion operations. In all five cases the operations were cancelled and the patients returned to '*normal, or almost normal'* eating and drinking.

Patient cost and savings data

The next table shows the potential cost savings per-patient through avoiding PEG insertions, and the following table shows what total savings might be realised.

All figs in £

	1 month	1 year	2 years	5 years
PEG insertion costs	1,124	1,124	1,124	1,124
PEG maintenance costs	380	4,560	9,120	22,800
potential saving	**1,504**	**5,684**	**10,244**	**23,924**

Table 1. Avoided PEG insertions: cost savings per-patient

The success rates of 100% and 100% shown in a) and b) above are the only known percentages for likely success outcomes. In practice, outcomes will be lower than this and we use 75% as the assumption for success rate for the purposes of this calculation: new data may indicate a different rate.

All amounts in £

assumed IQoro success rate in PEG avoidance			**cost reduction per-patient**			**cost reduction per 100 patients treated**			**IQoro costs**	**cost saving per 100 patients treated**		
outcome range	assume	success / 100 patients	year 1	2 years	5 years	year 1	2 years	5 years	year 1	year 1	2 years	5 years
a) 100% b) 100%	**75%**	**75**	**5,684**	**10,244**	**23,924**	**426,300**	**768,300**	**1,794,300**	**12,100**	**414,200**	**756,200**	**1,782,200**

Table 2. Avoided PEG insertions: cost savings per-100 patients

1.1.2 PEG removals

Where patients using PEG feed have been treated with IQoro by SLTs, the swallow has improved such that the PEG could be safely removed. Such cases are instanced by:

a. A peer reviewed, prospective, cohort pre- and post-study [11] included five patients who were PEG fed. After 13 weeks' training with IQoro all five had their PEGs removed and returned to normal food and drink diets.

b. In the SW AHSN evaluation of IQoro treatment in an NHS setting (See 4 below) ten patients were entirely PEG ('Nil by Mouth' or NBM) fed at baseline, and four of these had their PEGs removed twelve weeks or less into an IQoro treatment programme.

	total	NBM
recruited	25	
dropped out	4	
baseline	21	10
end-of-treatment	21	6
ceased mod diets		4
success %age		40%

Table 3. SW AHSN evaluation. PEG reversals

c. A very recent customer survey conducted by the manufacturer of IQoro of all people using the device for more than one month, showed that of all IQoro users who had been PEG fed, 31% had them removed after IQoro training, and that a further 6% had started some oral feeding (N=35). It is not known whether these individuals had the support of an SLT and whether these outcomes could have been further improved with professional support. Note that respondents included people who had only been training for as little as one month where PEG reversal would be unlikely.

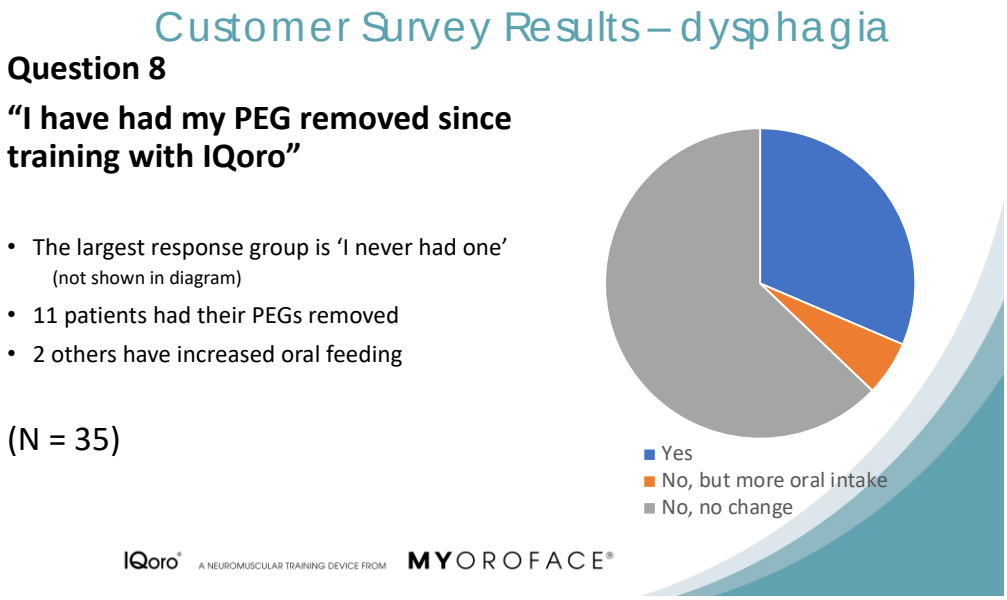

Fig 1. IQoro Customer Survey June 2021. PEG reversal

The following table shows the potential cost savings per-patient through reversing PEG insertions, and the next table shows what total savings might be realised.

All amounts in £

	per month	per year	2 years	5 years
PEG maintenance costs	380	4,560	9,120	22,800
PEG removal cost (est.)	(260)	(260)	(260)	(260)
potential saving	**120**	**4,300**	**8,860**	**22,540**

Table 4. Reversed PEG insertions: cost savings per-patient

Using the success rates of 100%, 40%, and 31% shown in a), b) and c) above as the range of likely outcomes, and choosing 50% as the assumption for success rate, we have:

All amounts in £

assumed IQoro success rat in PEG reversals			cost reduction per-patient			cost reduction per 100 patients treated			cost of IQoro devices	cost saving per 100 patients treated		
outcome range	assume	success / 100 patients	year 1	2 years	5 years	year 1	2 years	5 years	year 1	year 1	2 years	5 years
a) 100% b) 40% c) 31%	**50%**	**50**	**4,300**	**8,860**	**22,540**	**215,000**	**443,000**	**1,127,000**	**12,100**	**202,900**	**430,900**	**1,114,900**

Table 5. Reversed PEG insertions: cost savings per 100 patients.

1.2 Reduced need for drink thickeners

Patients with swallowing difficulties are at risk of 'aspiration' in which liquids enter the lungs instead of being swallowed correctly down the esophagus. This causes immediate distress and can lead to pneumonia if an infection develops; a 2017 study [22] found "*Infections accounted for 17.3% of hospital readmissions after stroke*". Patients are prescribed drink thickeners that make fluids more viscous and thus easier to be swallowed safely; the annual cost to the NHS of drink thickeners is £20,755,499.88 [23].

The degree to which drinks are thickened is described by the International Dysphagia Diet Standardisation Initiative [24] scale which defines five levels of thickened liquids from level 0 '*Thin'* to level 4 '*Extremely thick'*.

Three sources are used here to estimate IQoro success rate in reducing the need for drink thickeners.

a) The SW AHSN evaluation of IQoro treatment in an NHS setting reports that,

   "This evaluation found that there were clear changes to the consistencies of food and drink that people were able to manage before and after using IQoro. This was shown through the FAM and the IDDSI recommendations that participants were on. The FAM score indicates that on average participants moved from modified diet and fluids to normal diet and fluids with compensatory strategies.

   The IDDSI levels gave detail on the amount of change, participants typically moved from a minced and moist diet (IDDSI level 5) and level 2 thickened drinks to normal diet (IDDSI level 7) and drinks (IDSSI Level 0)."

	total	mod. fluids
recruited	25	
dropped out	4	
baseline	21	11
end-of-treatment	21	5
ceased mod diets		6
success %age		55%

Table 6. SWAHSN evaluation. Patient recruiting and outcomes

b) In a recent survey of all IQoro users that had started training in the previous 1 – 15 months the following responses were received.

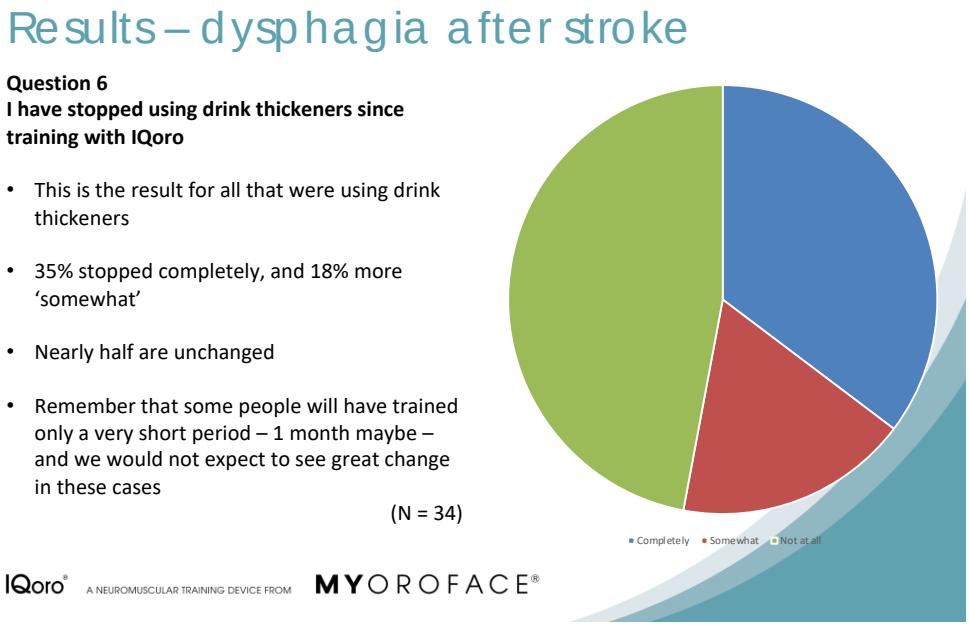

Fig 2. IQoro Customer Survey June 2021. Ceasing drink thickeners

Per-patient cost and savings data

The Clinical Commissioning Groups for East and North Hertfordshire and Herts Valley identified a preferred drink thickener [25]: 'Resource ThickenUp Clear'.
IDDSI Level 2 requires '*at minimum*' 5 x 127g tubs [25] per-patient per month, and Level 0 requires none. The product is priced to the NHS at £8.46 per tub [26]. Based on this, the saving per-patient, when moving from level 2 to level 0 (as in the SWAHSN evaluation quoted) is £8.46 x 5 per month, i.e., £42.30, or £507.60 p.a.

The following table shows the potential cost savings per-patient through reducing the use of drink thickeners, and the next table shows what total savings might be realised.

All amounts in £

	year 1	2 years	5 years
annual thickener cost	508	1,015	2,538
potential saving	**508**	**1,015**	**2,538**

Table 7. Avoided thickeners: cost savings per patient

Using the success rates of 55%, 35% shown in a), b) above as the range of likely outcomes, and choosing 55% as the assumption for success rate, we have:

All amounts in £

assumed IQoro success rate in avoiding drink thickeners			cost reduction per-patient			cost reduction per 100 patients treated			cost of IQoro devices	cost saving per 100 patients treated		
outcome range	assume	Success / 100 patients	year 1	2 years	5 years	year 1	2 years	5 years	year 1	year 1	2 years	5 years
a) 55% b) 35%	**55%**	**55**	**508**	**1,015**	**2,538**	**27,918**	**55,836**	**139,590**	**12,100**	**15,818**	**55,836**	**139,590**

Table 8. Avoided thickeners: cost savings per 100 patients.

1.3 Reduced hospital bed days

Patients with oropharyngeal dysphagia have a longer stay in hospital than those without. In 2001-2 in England and Wales there were 23 000 people with a primary diagnosis of dysphagia [27] resulting in 76 000 hospital bed days. The difference in stay-length leads to an extra 40.36% [27] in NHS costs or 2.99 days per-patient which could be reduced if dysphagia were not present. It is estimated that an 'excess bed day' costs the NHS between £2 089 and £2 532 per week [28].

Per-patient cost and savings data

The following table shows the potential cost savings per-patient through reducing the length of hospitalisation, and the next table shows what total savings might be realised.

All amounts in £

	per patient
avoided bed days	2.99 days
cost per bed week	2,089
cost per bed day	298
cost of extra days	892
potential savings	**892**

Table 9. Saved bed days: cost savings per patient

We have no solid data on IQoro efficacy in reducing the number of bed days, each institution may make its own estimate here. We believe that discharge of dysphagic patients is most often delayed when a PEG is fitted, and the requirements of the post-discharge environment

thus become more complex: whether in finding a suitable residential placement, or in supporting family in a domestic setting.

Using this assumption, we feel that outcome success is likely to mirror the frequency of success in avoiding PEG insertions (see "1.1.1 Avoided PEG insertions" above). Hence, we use 75% in the following calculation whilst expecting that institutions will be able to provide better data soon.

All amounts £

assumed IQoro success rate in reduced hospital bed days			cost reduction per-patient	cost reduction per 100 patients treated	cost of IQoro devices	cost saving per 100 patients treated
outcome range	assume	success / 100 patients	year 1	year 1	year 1	year 1
not known	**75%**	**75**	**892**	**66,923**	**12,100**	**54,823**

Table 10. Saved bed days: cost savings per 100 patients

In terms of bed days saved, using the above assumptions, 100 deployed IQoro devices would achieve a saving of 2.99 days each for 75 patients: a total of 224 bed days.

2. Unquantifiable savings in the IQoro treatment of Dysphagia

In addition to the cost savings that we have attempted to quantify above there are other, very real, costs that can be avoided. It is currently beyond our scope to try to quantify these accurately.

2.1 Readmission due to aspiration-induced pneumonia

The relationship of dysphagia and aspiration-induced pneumonia is well appreciated within the NHS with many admissions occurring as a result, often repeat admissions too. A study [22] estimates this at 17.4% in NHS institutions. It is clear that patients who can swallow safely are at reduced risk of readmission for this reason.

2.2 Patients' quality of life

Eating and drinking is a basic function of human life and for those with a normal swallowing function this is usually a source of pleasure and the focus of many social occasions. Social isolation and depression are common effects experienced by patients with dysphagia. Many IQoro users cite the ability to regain and normalise this aspect of their lives as being the most important.

2.3 Moving patients to specialist rehabilitation as soon as possible

Supporting nasogastric tube feeding is often not possible in many rehabilitation units outside of the hospital environment, including specialist rehab units that are not based on a hospital site. PEG insertions can allow safe transfer of patients with continued severe dysphagia. Resolving swallowing difficulties with IQoro achieves the same result without the disadvantages of a PEG insertion. (see comments on this subject in the SW AHSN report below).

2.4 Reduced need for nursing home placements

Some families cannot cope with supporting a PEG feed in the home environment, even with support. Nursing home care is often the consequence of this. Removing the need for PEG feeding may enable people to return home, reducing the cost of care to self-funding individuals, social care and CHC budgets.

2.5 Reduction in modified meal costs

The results of the SWAHSN evaluation quantify the reductions that can be made in providing specially modified solid foodstuffs. The financial benefits of this are real, but it is impossible to attribute quantum to where they may accrue. The savings may be enjoyed by the hospital, a residential care home, the individual, or social care services.

A recent survey of all IQoro users who have self-purchased in the last 1 – 15 months supports this trend.

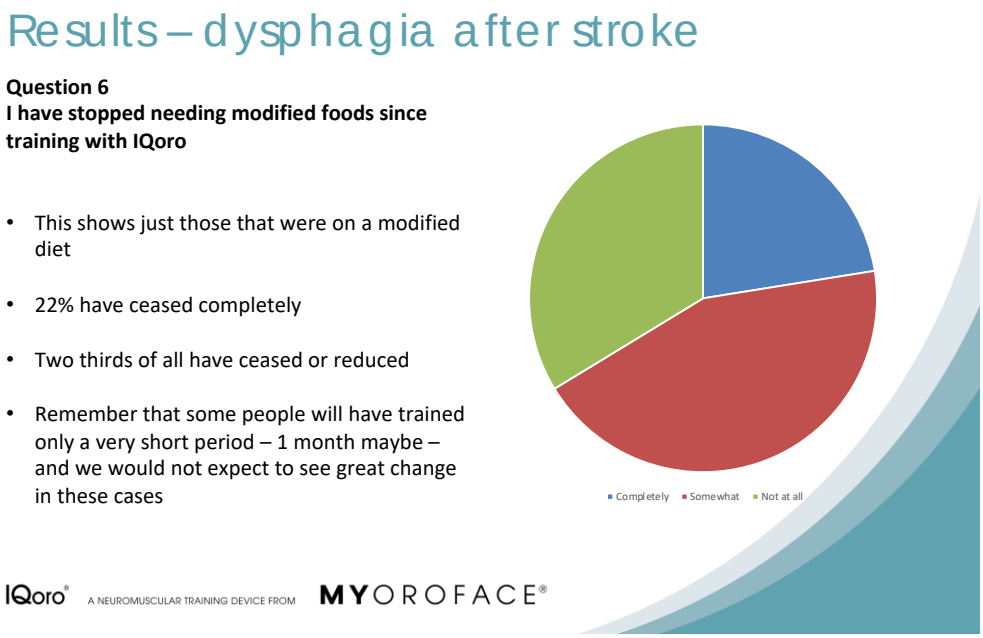

Fig 3. IQoro Customer Survey June 2021. Reducing modified diets

2.6 Reduced difficulty taking medication

Dysphagia or swallowing problems can hinder administration of solid medications. A survey [29] conducted in 2005 reported that 60% of patients presenting to community pharmacists experienced problems swallowing tablets or capsules. Non-adherence to prescription regimes undermines outcomes and increases the burden on health services.

3. Conclusion

Use of IQoro in NHS institutions continues to grow as better patient outcomes and reduced costs are being achieved, but overall take up is a small percentage of the cases where clinicians would like to use IQoro. The most frequent reason for this is the lack of an existing budget for such a device, this document supports the financial benefits of IQoro deployment in SLT departments.

NHS clinicians are routinely provided with support in adopting and deploying IQoro on a free-of-charge basis, including demonstration devices, feasibility / assessment kits and training sessions. A clinical team provides help with queries from professionals about patient cases, suitability and usage.
Similarly, the company provides comprehensive customer support services via web, chat, telephone and email to individuals as required.

4. The SW AHSN Service evaluation

New NHS Service Evaluation
A service evaluation conducted over the last year at an NHS Trust has now been completed and the results written up prior to publication. The entire report is awaiting peer-review and publication, parts of the abstract are reproduced below.

Method
Patients with chronic dysphagia were recruited from acute and community settings and completed a 12-week programme using IQoro. Clinical and well-being measures were taken pre- and post-training. Feedback was gained from the Speech and Language Therapists delivering this programme.

Results:
25 patients were recruited into the evaluation, 21 completed the programme. There were significant improvements in self-reported quality of life scores, including the overall scores and burden of dysphagia and mental health subscales. There was significant improvement in functional measures of dysphagia, including the consistencies of food and drink that patients' could safely manage. There was also significant improvement in the facial movement and symmetry of the lower half of the face.

Feedback from SLTs indicated that IQoro improved the range of therapy options available and many planned to use it again. Qualitative feedback suggested that use of IQoro may change SLTs clinical thinking, including in relation to intervention or compensation for dysphagia.

> The report authors added the following helpful information. *Our Trust had the following correspondence from a Consultant Gastroenterologist in the Trust when we enquired about use of PEGs after stroke. It is a compelling argument for finding easy-to-introduce, evidence-based dysphagia therapies (such as IQoro) to avoid PEG in the first place on patient safety grounds, let alone costs:*
>
> > *"I too have worked in units where PEGs are placed earlier – often within the first few weeks of an acute CVE. I have to say, this is poor practice. Truth be told, often the motivation behind early PEGs is to facilitate discharge and to meet the requirements of the accepting unit. This is neither evidence based or patient-centred.*
> >
> > *This appears to stem from a partial understanding of how dangerous PEGS are. Yes, they are technically reasonably straightforward and are reversible but, what is not commonly appreciated, is that they are the highest risk procedure of all endoscopic interventions. There is a very high risk of mortality and morbidity associated with them.*

They are potentially very dangerous tubes – therefore, the default position should always be NOT to place one. In other words, the indication to place them should be compelling. Placing them just because they can be removed if not needed would be irresponsible practice which would bring harm to more patients than would be acceptable.

If it is possible that a PEG will not be needed within a number of weeks – they should not be placed

For this reason, with CVEs which may have excellent SLT rehab potential within a short period of time it advised that a PEG is NOT placed within the first 5-6 weeks. This can cause friction between us and rehab centres/stroke teams

Consultant Gastroenterologist & Physician,
Enteral Nutrition Lead

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		Year	2021
Ref.	**2**	*Item*	Reflux is caused by Hiatal hernia
		Source	InTechOpen
		Author	Hägg M., Franzén T
		URL	*https://www.intechopen.com/online-first/75980*
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		Year	2015
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		Source	Acta Oto-Laryngologica 138(11):1-5 DOI: 10.1080/00016489.2018.1503715
		Author	Franzén T., Tibbling L., Hägg M.
		URL	*https://www.researchgate.net/publication/330300453_Oral_neuromuscular_training_relieves_hernia-related_dysphagia_and_GERD_symptoms_as_effectively_in_obese_as_in_non-obese_patients*
		Year	43466
Ref.	**6**	*Item*	Managing gastro-oesophageal reflux disease in adults
		Source	NICE
		Author	
		URL	*https://pathways.nice.org.uk/pathways/dyspepsia-and-gastro-oesophageal-reflux-disease/managing-gastro-oesophageal-reflux-disease-in-adults*
		Year	2021

Ref.	**7**	*Item*	Managing gastro-oesophageal reflux disease in children and young adults
		Source	NICE
		Author	
		URL	*https://pathways.nice.org.uk/pathways/dyspepsia-and-gastro-oesophageal-reflux-disease/managing-gastro-oesophageal-reflux-and-reflux-disease-in-children-and-young-people#content=view-node%3Anodes-treatment*
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Ref.	**13**	*Item*	Effect of oral IQoro® and palatal plate training in post-stroke, four-quadrant facial dysfunction and dysphagia: A comparison study.
		Source	Acta Otolaryngol. 2015 Sep;135(9):962-8
		Author	Hägg MK., Tibbling LI

		URL	*https://pubmed.ncbi.nlm.nih.gov/25947252/*
		Year	2015
Ref.	**14**	*Item*	How does IQoro work?
		Source	Myoroface AB
		Author	
		URL	*https://www.iqoro.com/what-is-iqoro/why-iqoro-works/*
		Year	2016
Ref.	**15**	*Item*	R,D&E evaluation - abstract
		Source	SWAHSN
		Author	
		URL	
		Year	2021
Ref.	**16**	*Item*	R, D & E evaluation - poster
		Source	SWAHSN
		Author	
		URL	
		Year	2021
Ref.	**17**	*Item*	Cost of PEG insertions
		Source	NHS England and NHS Improvement
		Author	
		URL	*https://www.england.nhs.uk/national-cost-collection/*
		Year	2019-2020
Ref.	**18**	*Item*	PEG maintenance costs
		Source	NICE
		Author	
		URL	*https://www.nice.org.uk/advice/mib175/chapter/The-technology#costs*
		Year	2019
Ref.	**19**	*Item*	Cost of PEG removals
		Source	NHS Annex A. The national tariff workbook
		Author	
		URL	*https://www.england.nhs.uk/publication/national-tariff-payment-system-documents-annexes-and-supporting-documents/*
		Year	22nd July 2021
Ref.	**20**	*Item*	Prevalence of stroke in the UK
		Source	The Stroke Association
		Author	

		URL	*https://www.stroke.org.uk*
		Year	
Ref.	**21**	*Item*	Strategic importance of avoiding PEG insertions
		Source	The British Society of Gastroenterology
		Author	
		URL	*https://www.bsg.org.uk/covid-19-advice/endoscopy-activity-and-covid-19-bsg-and-jag-guidance*
		Year	March 3rd 2021
Ref.	**22**	*Item*	Readmissions due to pneumonia
		Source	NIH
		Author	
		URL	*https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5477341/*
		Year	2017
Ref.	**23**	*Item*	English Prescription Cost Analysis Data
		Source	NHSBSA
		Author	Section code 1907
		URL	*https://www.nhsbsa.nhs.uk/statistical-collections/prescription-cost-analysis-england/prescription-cost-analysis-england-2019*
		Year	2019
Ref.	**24**	*Item*	The International Dysphagia Diet Standardisation Initiative
		Source	IDDSI
		Author	
		URL	*https://iddsi.org/framework*
		Year	2019
Ref.	**25**	*Item*	Healthcare professional guide: Thickeners and thickening ONS
		Source	NHS. Herts Valleys Clinical Commissioning Group
		Author	Smith, Alison
		URL	*https://hertsvalleysccg.nhs.uk/application/files/8615/4963/1344/Thickeners_prescribing_guidance_HMMC_022019.pdf*
		Year	
Ref.	**26**	*Item*	Cost for Resource ThickenUp
		Source	NHS Hereford CCG & Wye Valley NHS Trust
		Author	
		URL	*https://www.herefordshireccg.nhs.uk/your-services/medicines-optimisation/prescribing-guidelines/nutrition/thickening-agents-for-patients-with-swallowing-difficulties/1883-resource-thickenup-clear-guidance-may-18/file*
		Year	2018
Ref.	**27**	*Item*	Impact of oropharyngeal dysphagia on healthcare cost and length of stay in hospital: a systematic review

		Source	NIH
		Author	
		URL	*https://pubmed.ncbi.nlm.nih.gov/30068326/*
		Year	2nd Aug 2018
Ref.	**28**	*Item*	Cost of 'excess bed days'
		Source	NHS Reference costs 2015-2016
		Author	Department of Health and Social Care
		URL	*https://www.gov.uk/government/publications/nhs-reference-costs-2015-to-2016*
		Year	2015-16
Ref.	**29**	*Item*	Dysphagia and solid medications
		Source	www.gerimed.co.uk
		Author	Greener, Mark
		URL	*https://www.gmjournal.co.uk/dealing-with-dysphagia*
		Year	2008