

13. Saudan P, Berney T, Leski M, Morel P, Bolle JF, Martin PY. Renal transplantation in the elderly: a long-term, single-centre experience. *Nephrol Dial Transplant* 2001; 16: 824–8.
14. Palomar R, Ruiz JC, Cotorruelo JG *et al.* Influencia de la edad del receptor en la evolución del trasplante renal. *Nefrología* 2001; 21: 386–91.
15. Valdés F, Pita S, Alonso A *et al.* The effect of donor gender on renal allograft survival and influence of donor age on post-transplant graft outcome and patient survival. *Transplant Proc* 1997; 29: 3371–2.
16. Ojo AO, Hanson JA, Meier-Kriesche HU, Okechukwu CN, Wolfe RA, Leichtman AB. Survival in recipients of marginal cadaveric donor kidneys compared with other recipients and wait-listed transplant candidates. *J Am Soc Nephrol* 2001; 12: 589–97.
17. Pessione F, Cohen S, Durand D *et al.* Multivariate analysis of donor risk factors for graft survival in kidney transplantation. *Transplantation* 2003; 75: 361–7.
18. Dew MA, Switzer GE, Goycoolea JM *et al.* Does transplantation produce quality of life benefits? A quantitative analysis of the literature. *Transplantation* 1997; 64: 1261–73.
19. Otero-Raviña F, Romero R, Rodríguez-Martínez M *et al.* Factores de riesgo para la desestimación de riñones en Galicia. ¿Es posible incrementar su utilización?. *Nefrología* 2005; 25 (in press; accepted 22 nov 2004).
20. Arend SM, Mallat MJ, Westendorp RJ, Van der Woude FJ, Vans Es LA. Patient survival after renal transplantation; more than 25 years follow-up. *Nephrol Dial Transplant* 1997; 12: 1672–9.

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## Improving care for patients with dysphagia

SALLY K. ROSENVINGE<sup>1</sup>, IAN D. STARKE<sup>2</sup>

<sup>1</sup>Guy's and St Thomas' NHS Trust, St Thomas' Hospital, Lambeth Palace Road, London SE1 7EH, UK

<sup>2</sup>University Hospital Lewisham, Lewisham High Street, London SE13 6LH, UK

Address correspondence to: S. K. Rosenvinge. Tel/Fax: (+44) 20 7188 2522. Email: sally.rosenvinge@gstt.nhs.uk

### Abstract

**Background:** early diagnosis and effective management of dysphagia reduce the incidence of pneumonia and improve quality of care and outcome. Dysphagic stroke patients rarely perceive that they have a swallowing problem, and thus carers have to take responsibility for following the safe swallow recommendations made by the Speech and Language Therapist (SLT). Published work and observations in our own Trust indicated that patients with dysphagia may be fed in a manner which places them at significant risk of aspiration, despite SLT advice for safe swallowing.

**Objective:** to determine compliance with swallowing recommendations in patients with dysphagia and to investigate the effectiveness of changes in practice in improving compliance.

**Design:** sequential observational study before and after targeted intervention.

**Setting:** an acute general and teaching hospital in an inner city area.

**Subjects:** all patients with dysphagia on the caseload of the speech and language therapy department at the time of the study.

**Methods:** observations were made on compliance with the recommendations of SLTs regarding consistency of fluids, dietary modifications, amount to be given at a single meal/drink, swallowing strategies, general safe swallow recommendations and whether supervision was required. A dysphagia link nurse programme was established, together with modification of an in-house training scheme, use of pre-thickened drinks and modification of swallowing advice sheets. The same observations were repeated after this intervention.

**Results:** thirty-one patients were observed before and 54 after the intervention. There was improvement in compliance with the recommendations on consistency of fluids (48–64%,  $P < 0.05$ ), amount given (35–69%,  $P < 0.05$ ), adherence to safe swallow guidelines (51–90%,  $P < 0.01$ ) and use of supervision (35–67%,  $P < 0.01$ ). There were no significant differences in compliance with dietary modifications or swallowing strategies. Improvement in compliance was demonstrated in medical and geriatric wards and the stroke unit, but not in the surgical wards. Compliance with 'nil by mouth' instructions was 100% throughout.

The work was done at University Hospital Lewisham, Lewisham High Street, London SE13 6LH, UK.

**Conclusions:** relatively simple and low-cost measures, including an educational programme tailored to the needs of individual disciplines, proved effective in improving the compliance with advice on swallowing in patients with dysphagia. It is suggested that this approach may produce widespread benefit to patients across the NHS.

**Keywords:** *dysphagia, speech and language therapy, dysphagia training, stroke, older people, cost-effectiveness, elderly*

## Introduction

Dysphagia (difficulty in swallowing) can result from a wide variety of medical conditions including acute or progressive neurological conditions, trauma, disease or surgery [1]. The condition affects 50–64% of hospitalised stroke patients [2–4], 68% of elderly care home residents [5] and up to 30% of the elderly acutely admitted to hospital [6]. Dysphagia has been identified as an independent predictor of mortality in stroke patients [4] and is an important risk factor for aspiration pneumonia and malnutrition [2, 4, 7–11]. Both aspiration pneumonia and dysphagia are associated with increased length of stay in hospital and thus are very costly to the healthcare system [4, 10–12].

Early diagnosis and effective management of dysphagia reduce the incidence of pneumonia, thus reducing costs and improving quality of care and outcome [10, 12, 13]. Speech and Language Therapists (SLTs) with experience in dysphagia are trained to identify and manage swallowing difficulties, using case history, clinical assessment and investigative techniques such as videofluoroscopy and fiberoptic endoscopy.

SLTs will advise on compensatory swallowing manoeuvres and/or diet or fluid modification. These techniques will minimise the risk of aspiration [1, 13, 14, 15] and have been shown to be associated with improvements in nutritional parameters [16]. In a review of studies investigating interventions to reduce aspiration pneumonia, the recommendation with the strongest evidence-base related to modification of food and drink [17].

Many patients with dysphagia have limited ability to follow the safe swallowing recommendations, for example due to cognitive impairment [17], and dysphagic stroke patients rarely perceive that they have a swallowing problem [18]. This means that the patients' carers have to take responsibility for following the recommendations made by the SLT. Non-compliance with recommendations is associated with adverse outcomes, high mortality rates and aspiration pneumonia as a cause of death [19]. Despite this, an audit of adherence to swallowing advice for inpatients with dysphagia revealed that 54% of patients demonstrated non-adherence [20].

In our own Trust, we had noted a high incidence of patients with dysphagia being fed in a manner which placed them at significant risk of aspiration, despite SLT advice for safe swallowing. We therefore decided to investigate the level of compliance with our recommendations throughout the hospital and to identify, where possible, the reasons for non-compliance. We proposed to develop ways to improve compliance and to re-measure the levels of compliance once we had implemented our programme.

## Methods

An observational audit was undertaken at University Hospital Lewisham on five consecutive days in May 2002 (audit 1) and was repeated on five consecutive days in September 2003 (audit 2).

We included all inpatients with dysphagia on the speech and language therapy caseload at the time of the audit. This included patients on the specialist stroke unit, medicine for the elderly wards, general medical wards and surgical wards and included both nil by mouth (NBM) patients and those receiving oral intake. The senior nurse for medicine was informed about the study. However, in order to prevent any change in behaviour of the nursing staff at the time of the study, ward managers were not contacted. Verbal consent was obtained from the patients.

Each ward was visited 16 times over each 5-day period, and patients were observed eating and drinking. Observations were made at all mealtimes and of drinks throughout the day. All patients with dysphagia have a clearly written 'Swallow Advice Sheet' placed behind their bed, which contains all the key recommendations made by the SLT looking after that patient. When recommendations are made, they are also documented in the medical notes, and the nursing staff responsible for the patients' care are informed.

Speech and language therapy recommendations fall into six categories:

- (i) Consistency of fluids
- (ii) Dietary modifications
- (iii) Amounts to be given at one meal/drink
- (iv) Swallowing strategies
- (v) General Safe Swallow recommendations (e.g. advice on alertness, posture, advice to stop the patient eating or drinking if showing signs of aspiration)
- (vi) The level of supervision required.

A checklist was designed on which the specific recommendations for each patient were documented under these six headings. This was marked according to whether the recommendation was adhered to. The reason for non-compliance was documented but was only documented as 'patient non-compliance' if that patient was deemed able to take responsibility for following the advice by the SLT who had made the recommendations. Both studies were implemented by a single SLT. If unsafe practice was noted, the SLT responsible for the care of the affected patient was informed.

Recommendations were only scored if the opportunity for that recommendation to be implemented occurred at the time of the visit. For example, if the recommendation was for the caregiver to stop feeding if the patient coughed, this behaviour could only be scored if the patient was witnessed coughing during feeding.

Percentage compliance scores were calculated for each recommendation on each ward. The reasons for non-compliance were recorded and analysed for each recommendation in the first audit. The levels of compliance were compared between the two audits, 95% confidence intervals (CI) were calculated and Chi-squared test statistic was used to analyse the significance of any differences demonstrated.

### Changes in practice

Within 2 months of the completion of audit 1, the following changes in practice had been instigated:

- (i) A 'Dysphagia Compliance Group' was formed. This included a consultant in medicine for the elderly, the heads of speech and language therapy, dietetics and catering departments and the senior nurses for elderly care and stroke. This group met quarterly and was responsible for overseeing measures to improve care for patients with dysphagia.
- (ii) A 'Dysphagia/Nutrition Link Nurse' programme was established, in which specific nurses in each ward received quarterly 2-h training sessions, run jointly by speech and language therapy and dietetics, to qualify to supervise the care of patients with dysphagia in their ward.
- (iii) The existing training scheme for qualified nursing staff in screening patients for swallowing problems was strengthened by the introduction of a three-tiered training package, targeting qualified nurses, health care assistants and catering staff. Each quarterly training session, run by the speech and language therapy department, lasted between 1 and 2 h and was booked through the training department of the hospital. Staff are expected to update their skills by attending a training session on a yearly basis.

- (iv) Pre-thickened drinks were made available in all wards as a direct result of the better level of compliance identified on the stroke ward, which was already providing these drinks.
- (v) The original white swallowing advice sheets for each patient were replaced by new, clearly written bright red swallow advice sheets placed behind the patient's bed.

### Results

A total of 31 patients were included in the first audit and 54 in the second audit (Table 1). The number of observations per patient varied because of discharges or deaths and because of the frequency with which a particular behaviour could be observed. There were no significant differences between the two audits in the distribution of patients between the different types of wards. For the patients receiving oral feeding, there was an increased percentage on the medical wards and a decreased percentage on the stroke unit in the second audit.

There were no examples of non-compliance for the patients who were NBM in either audit (100% adherence). Patients who were NBM were considered separately, and observations regarding this group are not included in the results below.

The overall level of compliance in audit 1 for all recommendations was 51.9% (95% CI 46.8–57.1). Taken across all wards, the overall compliance in audit 1 with dietary modification was good, but compliance with quantity of food or fluids and supervision was very poor (Table 2).

The stroke unit had significantly higher percentage compliance than the medical wards ( $P < 0.05$ ) and the medicine for the elderly wards ( $P < 0.05$ ) in audit 1 and higher than the medical wards in audit 2 ( $P < 0.05$ ).

There were significant differences between audit 1 and audit 2 in the level of compliance for consistency of fluids,

**Table 1.** The distribution of the patients in the studies between ward types and whether advice applied to oral intake or patients were nil by mouth

Ward type	Number of patients on oral diet		Number of patients nil by mouth		Total number (%) of patients	
	Audit 1	Audit 2	Audit 1	Audit 2	Audit 1	Audit 2
Stroke unit	9 (56)	14 (36)	2 (13)	5 (33)	11 (35)	19 (35)
Care of elderly	3 (19)	7 (18)	4 (27)	5 (33)	7 (23)	12 (22)
Medical	2 (12.5)	13 (33)	9 (60)	5 (33)	11 (35)	18 (33)
Surgical	2 (12.5)	5 (13)	0	0	2 (6)	5 (9)
Total patients	16	39	15	15	31	54

**Table 2.** Overall compliance for individual recommendations across all wards in both audits

Recommendation	<i>R</i> ( <i>n</i> )		% compliance (95% CI)		Mean difference (95% CI)	<i>P</i>
	Audit 1	Audit 2	Audit 1	Audit 2		
Consistency of fluids	74 (153)	50 (78)	48.4 (40.5–56.3)	64.1 (53.5–74.8)	16.0 (2.7–29.3)	<0.05
Diet modifications	47 (57)	48 (61)	82.5 (72.6–92.3)	78.7 (68.4–89.0)	–3.8 (–1.8 to –10.0)	Not significant
Amounts	12 (34)	11 (16)	35.3 (19.2–51.4)	68.8 (46.0–91.5)	33.5 (19.0–49.0)	<0.05
Strategies	6 (12)	5 (8)	50.0 (21.7–78.3)	62.5 (29.0–96.1)	12.5 (7.6–17.4)	Not significant
General safe swallow guidelines	37 (72)	44 (49)	51.4 (39.8–62.9)	89.8 (81.3–98.3)	38.4 (24.0–53.0)	<0.01
Supervision required	12 (34)	26 (39)	35.3 (19.2–51.4)	66.7 (51.9–81.5)	31.4 (9.0–53.0)	<0.01

*R*, number of compliant behaviours observed; *n*, total number of behaviours observed; CI, confidence interval.

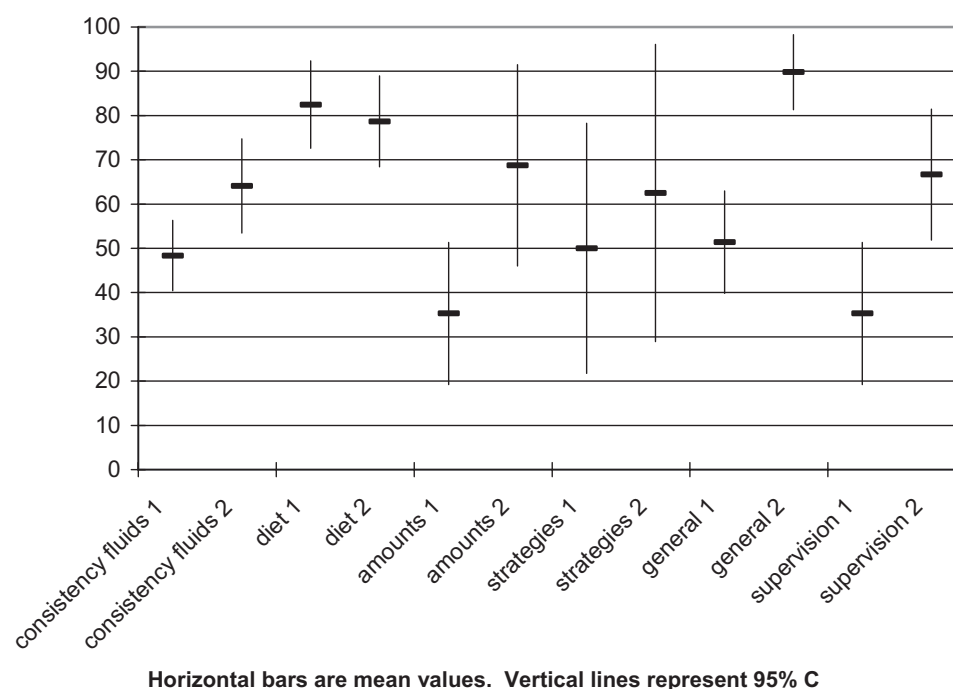


Figure 1. Levels of compliance with the different recommendations in audits 1 and 2.

Table 3. Overall compliance with all recommendations for each ward type in both audits

Ward type	<i>R</i> ( <i>n</i> )		% compliance (95% CI)		Mean difference (95% CI)	<i>P</i>
	Audit 1	Audit 2	Audit 1	Audit 2		
Stroke unit	135 (212)	106 (127)	63.7 (57.2–70.2)	83.5 (77.0–89.9)	19.8 (10.5–29.0)	<0.01
Medicine for the elderly	38 (87)	38 (52)	43.7 (33.34–54.1)	73.1 (61.0–85.1)	29.4 (14.0–45.0)	<0.01
Medical	10 (55)	28 (49)	18.2 (8.0–28.4)	57.1 (43.3–71.0)	39.0 (22.0–56.0)	<0.01
Surgical	5 (8)	12 (23)	62.5 (29.0–96.1)	52.2 (31.8–72.6)	–10.3 (–4.9 to –29.0)	Not significant
All wards	188 (362)	184 (251)	51.9 (46.8–57.1)	73.3 (67.8–78.8)	21.4 (14.0–29.0)	<0.01

*R*, number of compliant behaviours observed; *n*, total number of behaviours observed; CI, confidence interval.

amounts, general safe swallowing advice and supervision. There were no significant differences for recommendations regarding dietary modification or strategies (Table 2 and Figure 1).

There was a significant improvement in the overall levels of compliance across all wards between the two studies ( $P \leq 0.01$ ) and in the levels of compliance on the stroke ward ( $P \leq 0.01$ ), the medical wards ( $P \leq 0.01$ ) and the medicine for the elderly wards ( $P \leq 0.01$ ) individually (Table 3 and Figure 2). There was no significant difference in the levels of compliance on the surgical wards between the two studies.

The reasons for non-compliance with each recommendation in audit 1 are summarised in Table 4. More than one reason for non-compliance might be identified in one observation period. This accounts for the inconsistencies in the total number of observations in Tables 2 and 4. The reasons for non-compliance in audit 2 were not recorded.

## Discussion

A limitation of this study is the small number of patients included. However, it represents the complete speech and

language therapy caseload at the time of each audit. Several observations were made of each patient to increase the amount of data. We have therefore made the assumption that an accurate representation of patient care in hospital was gained from this small sample.

By conducting a blind study, it was possible to gain data that best represented normal behaviour on the wards. A similar study has been reported, but in that study, the carers knew they were being observed, which may have altered their behaviour [21].

In the present study, both audits demonstrated 100% compliance where there was a recommendation that patients be kept NBM. These patients will not be discussed further.

For those patients who were not NBM, the overall level of compliance with all speech and language therapy advice in the first audit was 52%, which is comparable to the results of a similar study where 46% of patients were compliant [20].

The most common reason for non-compliance with consistency recommendations for thickened fluids was that drinks were thickened inappropriately by the domestic (32%) or nursing (38%) staff. In 2002, the stroke unit was the only ward in which pre-thickened drinks were available, reducing the risk of inappropriate consistencies being

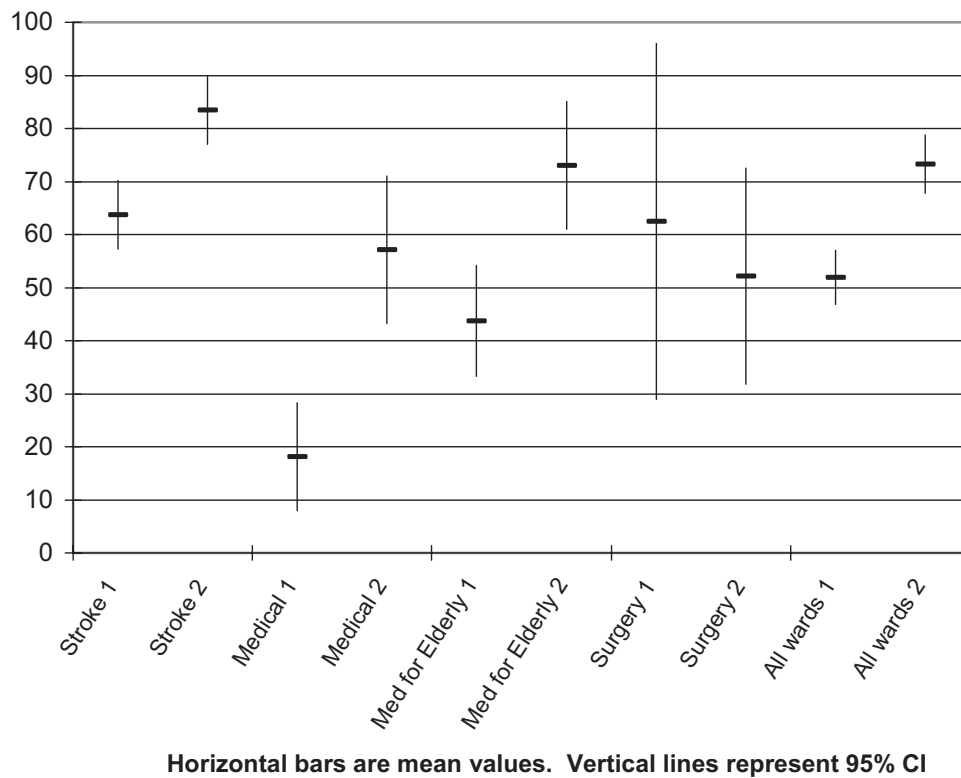


Figure 2. Levels of compliance across the different wards in audits 1 and 2.

Table 4. Reasons for non-compliance with recommendations in audit 1

Recommendation	Reason for non-compliance	Frequency (%)
Thickened fluids ( <i>n</i> = 76)	No thickener in drink	19 (25)
	Nursing staff thickening fluids to an inappropriate consistency	29 (38.2)
	Domestic staff thickening to inappropriate consistency	24 (31.6)
	Other	4 (5.26)
	Number of episodes where reason for non-compliance was not identified	3
Diet modification ( <i>n</i> = 11)	Inappropriate food from kitchen	7 (53.8)
	Unthickened gravy added to food	6 (46.2)
	Number of episodes where reason for non-compliance was not identified	0
	Patient non-compliant	7 (33.3)
Amounts ( <i>n</i> = 21)	No supervision of patient	3 (14.3)
	Patient fed more than specified	11 (52.4)
	Number of episodes where reason for non-compliance was not identified	1
	Patient non-compliant	6 (100)
Strategies ( <i>n</i> = 6)	Number of episodes where reason for non-compliance was not identified	0
	Patient continuing to eat/be fed when coughing	10 (27)
	No supervision	27 (73)
General advice ( <i>n</i> = 37)	Number of episodes where reason for non-compliance was not identified	0
	No supervision	24 (100)
	Supervision <i>n</i> = 24	

*n*, number of behaviours observed.

provided, and the staff were receiving more dysphagia-specific training than staff on other wards. The greater overall compliance on the stroke unit than on other wards highlights the benefits of dysphagic patients being managed on specialist units.

Common reasons for non-compliance related to a lack of knowledge or understanding amongst the staff involved. Fifty-two per cent of non-compliance with the recom-

mended quantities was due to the patient being fed more than specified, which may lead to silent aspiration from fatigue or a build-up of residue in the pharynx. Furthermore, 27% of non-compliance with the general safe swallowing advice was due to the patient continuing to eat/be fed when coughing.

Lack of supervision accounted for 73% of non-compliance with the general safe swallowing advice and 14% of non-

compliance with recommendations concerning amounts to be consumed in one meal/drink. For example, a patient might be coughing while eating, but this was not witnessed by staff. When it was specifically stated that a patient needed direct supervision during all meals/drinks, compliance was only 36%. Much higher levels of adherence with eating and drinking advice were achieved in a similar study (77%), in which each caregiver had been individually trained in dysphagia management prior to compliance being measured [21].

Following the initial audit, measures were introduced to increase knowledge and awareness of the management of dysphagia within the hospital.

In the second audit, there was evidence of a significant improvement in compliance across all wards and particularly on the medical wards, medicine for the elderly wards and the stroke unit. There was improvement in compliance with recommendations on consistency of fluids, amounts, general safe swallowing advice and supervision.

The provision of 'pre-thickened fluids' removed some of the potential for error in thickening drinks for patients to the wrong consistency and thus reduced the risks of aspiration for the patient. Others have shown that pre-thickened drinks improve hydration levels in patients with dysphagia [22], and this is a cost-effective measure to improve patient care. Changing the colour of the swallow advice sheets to make them more visible was another very low-cost, simple measure which instantly heightened awareness of SLT recommendations.

There was no significant difference in levels of compliance with diet modification advice between the two studies. In audit 1, inappropriate food being brought from the kitchen accounted for 54% of the non-compliance with this recommendation. Despite introducing training for catering and domestic staff, we were unable to address the meal options on the patients' menus until after the second audit. The menus have now been adjusted so that there are always suitable food options for patients with dysphagia.

The key to improvement in compliance lies within the level of training provided. Others have reported that the caregivers that showed the greatest adherence with SLT advice were those who had received extra training in dysphagia by SLTs [21]. Compliance with SLT recommendations requires involvement of staff in many areas. We ensured that we targeted as many staff as possible and acknowledged the high turnover of staff, which resulted in a need for ongoing training.

We were able to access a large number of staff involved in the care of patients with dysphagia, from the catering staff preparing meals to the health care assistants feeding the patients, by developing different levels of training appropriate to each professional group. The heads of each discipline were encouraged to facilitate their staff attending dysphagia training. The Dysphagia/Nutrition Link Nurse programme empowered individual nursing staff by giving them increased responsibility and in turn highlighted dysphagia as a significant concern. The establishment of specific training packages reduced the time demands on trainers by reducing the preparation required for individual sessions. The training programme was made as interactive and stimulating as possible, and certificates were provided to reward attendance.

There may have been other factors leading to the improvement in care in the 18 months between the two audits—for example, changes in personnel and new national initiatives to improve care for older people. However, without adequate training in this specialist area, it is unlikely that these factors alone would have been sufficient to produce the level of improvement demonstrated.

These changes in practice were straightforward and of relatively low cost and have led to demonstrably improved care for patients with dysphagia within our Trust: they could easily be introduced into other Trusts.

A future study investigating the possible link between compliance with SLT advice and health outcomes in patients would be beneficial and may serve to highlight further the importance of effective management of dysphagia.

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### Key points

- Effective management of dysphagia has been shown to reduce the incidence of pneumonia.
  - SLTs make recommendations designed to reduce the risk of aspiration in patients with dysphagia.
  - Two sequential audits were used to identify and subsequently evaluate measures to improve compliance with speech and language therapy recommendations in an acute care setting, including specific educational programmes for different disciplines.
  - Simple and low-cost measures resulted in significant improvements in care for patients with dysphagia within our Trust and could easily be introduced in other settings across the NHS.
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### Addendum

If unsafe feeding was observed during the study, the food/drink was removed from the patient at once and the SLT responsible for managing the affected patient was informed immediately. This SLT then took appropriate action, for example by informing the relevant nursing and medical teams and reiterating recommendations.

The audit was registered with the Clinical Governance and Audit Department in the Research and Development Unit of University Hospital Lewisham NHS Trust. Submission to the local research ethics committee was not required.

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### Conflicts of interest

The authors have no conflicts of interest to declare.

### References

1. Leslie P, Paul N, Carding PN, Wilson JA. Investigation and management of chronic dysphagia. *BMJ* 2003; 326: 433–6.

2. Mann G, Hankey GJ, Cameron D. Swallowing function after stroke. Prognosis and prognostic factors at 6 months. *Stroke* 1999; 30: 744–8.
3. Smithard DG, O'Neill PA, England RE *et al.* The natural history of dysphagia following a stroke. *Dysphagia* 1997; 12: 188–93.
4. Smithard DG, O'Neill PA, Park CL *et al.* Complications and outcome after acute stroke. Does dysphagia matter? *Stroke* 1996; 27: 1200–4.
5. Steele CM, Greenwood C, Ens I, Robertson C, Seidman-Carlson R. Mealtime difficulties in a home for the aged: not just dysphagia. *Dysphagia* 1997; 12: 43–50.
6. Lee A, Sitoh Y, Liell P, Phua S. Swallowing impairment and feeding dependency in the hospitalised elderly. *Chin J Ann Acad Med Singapore* 1999; 23: 1–6.
7. Perry L, Love CP. Screening for dysphagia and aspiration in acute stroke: a systematic review. *Dysphagia* 2001; 16: 7–18.
8. Langmore SE, Terpenning MS, Schork A *et al.* Predictors of aspiration pneumonia: how important is dysphagia? *Dysphagia* 1998; 13: 69–81.
9. Holas MA, De Pippo KL, Reding MJ. Aspiration and relative risk of medical complications following stroke. *Arch Neurol* 1994; 51: 1051.
10. Langmore SE, Kimberley A, Skarupski MPH, Park PS, Fries BE. Predictors of aspiration pneumonia in nursing home residents. *Dysphagia* 2002; 17: 298–307.
11. Finestone HM, Greene-Finestone LS, Wilson ES, Teasell RW. Prolonged length of stay and reduced functional improvement rate in malnourished stroke rehabilitation patients. *Arch Phys Med Rehabil* 1996; 77: 340–5.
12. Odderson IR, Keaton JC, McKenna BS. Swallow management in patients on an acute stroke pathway: quality is cost effective. *Arch Phys Med Rehabil* 1995; 76: 1130–3.
13. Rockville MD. Dysphagia diagnosis and treatment reduces pneumonia rates in stroke patients. *Doctor's Guide to the Internet* [online] 1999 [cited 30 March 1999]; pages available from URL: <http://www.docguide.com/dg.nsf>
14. Marks E, Rainbow D. Working with Dysphagia. Speechmark Publishing, 2001.
15. Smithard DG. Dysphagia assessment after acute stroke. *Hosp Update* 1995; Dec: 555–61.
16. Elmstahl S, Bulow M, Ekberg O, Peterson M, Tegner H. Treatment of dysphagia improves nutritional conditions in stroke patients. *Dysphagia* 1999; 14: 61–66.
17. Cook IJ, Kahrilas PJ. AGA technical review on management of oropharyngeal dysphagia. *Gastroenterology* 1999; 116: 455–78.
18. Parker C, Power M, Hamdy S, Bowen A, Tyrrell P, Thompson DG. Awareness of dysphagia by patients following stroke predicts swallowing performance. *Dysphagia* 2004; 19: 28–35.
19. Low J, Wyles C, Wilkinson T, Sainsbury R. The effect of compliance on clinical outcomes for patients with dysphagia on videofluoroscopy. *Dysphagia* 2001; 16: 123–7.
20. Free G. When what's happening is hard to swallow. *Speech and Language Therapy in Practice* 2000; Spring: 4–7.
21. Chadwick DD, Joliffe J, Goldbart J. Adherence to eating and drinking guidelines for adults with intellectual disabilities and dysphagia. *Am J Ment Retard* 2003; 103: 202–11.
22. Whelan K. Inadequate fluid intakes in dysphagic acute stroke. *Clin Nutr* 2001; 20: 423–8.

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