

ORIGINAL ARTICLE

Clinical guidelines and enteral nutrition support: a survey of dietetic practice in the United Kingdom

D Judges¹, S Beverly¹, A Rio² and LM Goff³

¹Nutrition and Dietetics Department, London Metropolitan University, London, UK; ²Nutrition and Dietetics Department, Kings College Hospital, London, UK and ³Diabetes and Nutritional Sciences Division, King's College London, School of Medicine, London, UK

Background: Artificial nutrition support is used in treating hospital patients and has been shown to reduce hospital stays. The NICE (National Collaborating Centre for Acute Care) guidelines are the first national consensus guidelines for dietetic practice in artificial nutrition. The aim of the current survey was to explore the influence of local and national guidelines, and clinical experience on enteral tube feeding practices in a large cohort of UK dietitians.

Methods: A cross-sectional anonymous online survey of UK registered dietitians was performed.

Results: A total of 681 responses were received. In all, 85% deemed 'clinical experience' to be of greatest influence when initiating a tube feeding regimen; the influence of 'clinical experience' was significantly associated with the number of years in practice ($P = <0.001$). A total of 70% of respondents were aware of a department feeding protocol with 67% of protocols using a start rate of 24–49 ml/h; furthermore, 65% of respondents reported most commonly using a feeding start rate of 24–49 ml/h and 75% of them reported that their department had a protocol for preventing refeeding syndrome; 23% had mandatory implementation of NICE guidelines.

Conclusions: Enteral feeding practice varies among practitioners. Clinical experience and published clinical guidelines have a pivotal role when treating adult patients that require enteral tube feeding.

European Journal of Clinical Nutrition (2012) **66**, 130–135; doi:10.1038/ejcn.2011.153; published online 7 September 2011

Keywords: enteral; nutrition support; dietetic; refeeding syndrome

Introduction

Nutrition is a fundamental component of patient care, however, there is widespread evidence of malnutrition in hospitalised patients of all ages (British Association for Parenteral and Enteral Nutrition (BAPEN), 2007). In 1992, (The Kings Fund Centre, 1992) it was estimated that 30 000 patients per year require some form of artificial nutritional support (defined as the administration of oral nutrition supplements, enteral tube feeding or parenteral nutrition) after admission to hospital in the United Kingdom, however,

with nutrition in hospitals now appearing high on the healthcare agenda, it is suspected that this figure would now be much higher.

Enteral tube feeding is widely used in the United Kingdom to treat patients with a variety of medical conditions (Stroud *et al.*, 2003) and is usually provided as an adjuvant for other medical therapies (Delegge, 2008). Evidence to support the effectiveness of enteral tube feeding has grown significantly, and randomised controlled trials have shown that the initiation of enteral tube feeding can result in a reduction in hospital stays and medical complications in some populations (Lochs *et al.*, 2006a).

Enteral tube feeding is not without risk; the refeeding syndrome may occur as a result of the reintroduction of nutrition to severely malnourished or starved patients (Lochs *et al.*, 2006a). Too rapid initiation of feeding in these patients can result in hormonal and metabolic changes leading to fluid and electrolytes shifts (Kraft *et al.*, 2005) that can be fatal (Mehanna *et al.*, 2009). The actual incidence of the refeeding syndrome is unknown (Mehanna *et al.*, 2008); its management involves the recognition and assessment of

Correspondence: Dr LM Goff, Diabetes and Nutritional Sciences Division, King's College London, School of Medicine, Franklin-Wilkins Building, Stamford Street, London SE1 9NH, UK.

E-mail: louise.goff@kcl.ac.uk

Contributors: DJ and SB were involved in the study design, data collection and analysis, and drafting of the manuscript. AR was involved in the conception and study design, data interpretation and drafting of the manuscript. LG was involved in the conception and study design, data analysis and interpretation, drafting and revising of manuscript for final submission.

Received 30 September 2010; revised 27 July 2011; accepted 28 July 2011; published online 7 September 2011

patient risk, and the gradual introduction of nutrition support along with thiamine and electrolyte supplementation where necessary (NCCAC, 2006).

Clinical guidelines are now ubiquitous in clinical practice and have been shown to improve the quality of health care by promoting consistent standards of care and the use of interventions of proven benefit (Cluzeau *et al.*, 1999; Feder *et al.*, 1999). In the United Kingdom the National Institute for Health and Clinical Excellence (NICE) have developed a range of clinical guidelines that are based upon the best available clinical evidence (NCCAC, 2006). NICE guidelines are advisory but not mandatory and aim to provide evidence and information that healthcare professionals can use along with their skills and knowledge to make clinical decisions (Woolf *et al.*, 1999; NCCAC, 2006; Lochs *et al.*, 2006b).

There are a range of enteral tube feeding guidelines used in the United Kingdom including NICE (NCCAC, 2006), the European Society for Parenteral and Enteral Nutrition (Lochs *et al.*, 2006a) and the Parenteral and Enteral Nutrition Group (PENG) of the British Dietetic Association (McAtear *et al.*, 1999). The impact of the introduction of such guidelines on enteral tube feeding practices in the United Kingdom is not known.

The aim of the current survey was to explore the influence of NICE guidelines (NCCAC, 2006), local protocols and clinical experience on enteral tube feeding practices in a large cohort of UK dietitians. We hypothesise that NICE guidelines (NCCAC, 2006) will be an important determinant of clinical practice.

Materials and methods

A cross-sectional survey of UK-based registered dietitians was performed. The survey was approved and conducted in accordance with the ethical standards of the London Metropolitan University Research Ethics Committee. An opportunistic sample was recruited: 424 dietitians were invited to complete an online survey via email invitation. All NHS Trusts in the United Kingdom were contacted and email addresses of the dietetic managers and administrators were collected and used to recruit participants. An advertisement in the British Dietetic Association magazine 'Dietetics Today' was also placed, as well as a flyer mail-out to 478 dietetic departments in acute National Health Service hospitals in the United Kingdom and advertisements in the members-only British Dietetic Association discussion forums. The survey was conducted over a 7-week period between February and March 2009.

The survey was designed and accessed using an online survey tool 'SurveyMonkey' (Portland, OR, USA). No identifiable information was collected from the respondents to ensure anonymity. Only responses from registered dietitians were included in the analyses.

The survey was developed specifically for this project by dietitians with experience in nutrition support (see Supplementary Material). The survey consisted of 25 questions: 24 were closed questions with multiple choice or yes/no answer options and 1 was an open-ended question. When asked to rank how much something influenced them the following options were given: 'a lot of influence', 'some influence', 'a little influence' and 'no influence'.

The survey was divided into themed sections: (i) demographic information; (ii) enteral feeding practices; (iii) department and hospital guidelines; (iv) refeeding syndrome knowledge; (v) refeeding syndrome feeding practices and (vi) cases of refeeding syndrome. The survey took ~10 min to complete.

A small sample of dietitians ($n=15$) piloted the survey to check comprehension, structure and accessibility. Minor changes were made accordingly before the survey was distributed nationally.

All data are self-reported, no validation or cross-checking of data was undertaken.

Statistical analysis

Data analyses were performed using SPSS version 16.0 for Windows (SPSS Inc., Chicago, IL, USA). Partially completed responses were included in the analysis; data are shown as percentage of actual responses. Categorical data were analysed using descriptive frequencies and χ^2 -tests for independence. A value of $P<0.05$ was considered statistically significant. Answers from surveys partially completed were used in the descriptive analyses; only matched cases were used for χ^2 -tests for independence.

Results

Demographic details

A total of 678 online survey responses were received: 589 surveys were fully completed and 89 were partially completed. Responses were received from a broad range of clinical specialities and geographical locations (Table 1).

Enteral feeding practices

In all 70% of respondents reported they had a department protocol in place for starting a tube feed; 45% felt that the department protocol influenced them 'a lot' when starting a tube feeding regimen while 85% felt that clinical experience influenced them 'a lot' (Figure 1). There was a significant association between how long the respondent had been in clinical practice and how much clinical experience influenced them when initiating a tube feeding regimen ($P<0.001$): 63% of those that had been in clinical practice for 0–1 year felt that clinical experience influenced them 'a lot' compared with 92% of those that had been in clinical practice for more than 5 years.

Table 1 Demographic characteristics of survey respondents

Demographics	Number of respondents	%
Geographical location (n = 673)		
East of England	11	1.6
London	102	15.2
Midlands	105	15.6
North East	83	12.3
North West	86	12.8
Northern Ireland	16	2.4
Scotland	60	8.9
South East	101	15.0
South West	59	8.8
The Islands	3	0.4
Wales	34	5.1
Yorkshire and the Humber	13	1.9
Years in clinical practice (n = 678)		
0–1	89	13.1
2–3	91	13.4
3–4	92	13.6
> 5	201	29.6
> 10	205	30.2
Job band (n = 677)		
5	131	19.3
6	226	33.4
7	259	38.3
8a	45	6.6
8b	12	1.8
8c	3	0.4
8d	0	0.0
9	1	0.1
Speciality (n = 666)		
Nutrition support	157	23.6
Paediatrics/adolescents	71	10.7
General/mixed	52	7.8
Oncology	51	7.7
Gastroenterology	48	7.2
Neurology/stroke	48	7.2
Renal	41	6.2
Care of the elderly	34	5.1
Critical care	31	4.7
Surgical	28	4.2
Community	23	3.5
Other	82	12.3

Band 5 (newly qualified dietitian); Band 6 (specialist dietitian); Band 7 (advanced dietitian); Band 8–9 (dietitian principal; head of department; allied health professional consultant).

Specialities with <20 respondents were grouped as 'other' and include eating disorders, HIV, liver, cystic fibrosis and cardiology.

Respondents were only able to select one category as their speciality.

In all, 23% of the respondents reported that their department had mandatory implementation of NICE guidelines (NCCAC, 2006) whereas 43% did not, and the remaining 34% were unsure. A total of 48% of the respondents felt that NICE guidelines (NCCAC, 2006) influenced them 'a lot' when initiating a tube feeding regimen (Figure 1). In all, 66% of respondents that had mandatory implementation of NICE guidelines (NCCAC, 2006) felt that the guidelines influenced them 'a lot' compared with 38% of those that did not have mandatory

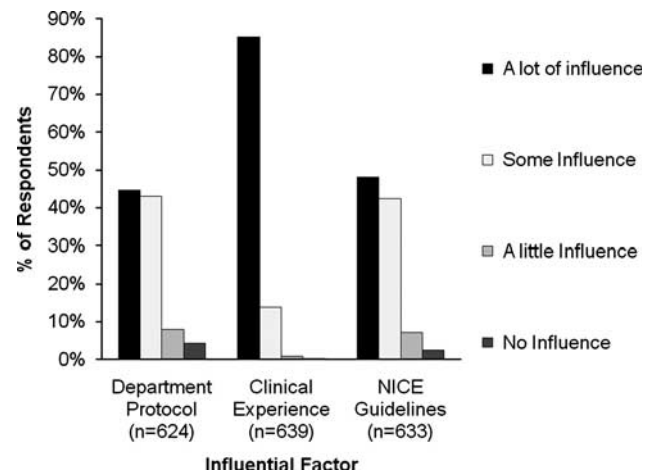


Figure 1 The influence of department protocol, clinical experience and NICE guidelines when initiating a tube feeding regimen. NICE guidelines: 'Nutrition support for adults. Oral nutrition support, enteral tube feeding and parenteral nutrition' NCCAC, 2006. Participants were asked to indicate the level of influence of 'department protocols', 'clinical experience' and 'NICE guidelines' when initiating a tube feeding regimen.

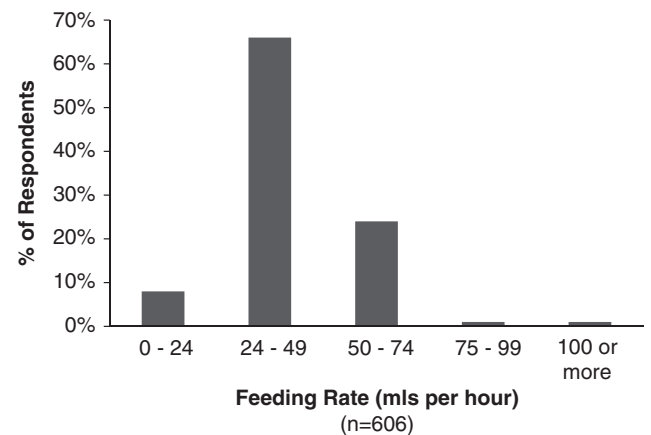


Figure 2 Reported starting enteral feed rates in newly referred tube fed patients. Respondents were asked to indicate the starting feed rate (ml/h) that they most commonly used in patients newly referred for tube feeding.

implementation of the guidelines. A significant association was found between how much NICE guidelines (NCCAC, 2006) influenced the respondent when initiating a tube feeding regimen and whether their hospital had mandatory implementation of the guidelines ($P < 0.001$). 'Other' influences upon tube feeding practice included local guidelines, patient preference and disease state, PENG guidelines, dietetic peers and multi-disciplinary colleagues.

In the most commonly reported protocol, the starting feed rate was 24–49 ml/h (67%), 3.5% of respondents were unsure of their department protocol starting feed rate. In 66% of respondents most common feeding start rate was 24–49 ml/h (Figure 2; responses from paediatrics were excluded from this

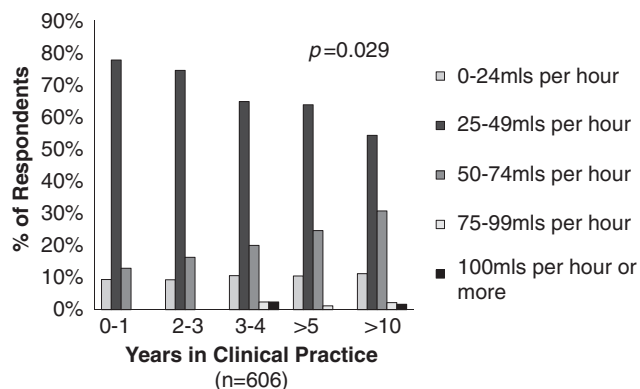


Figure 3 Respondents number of years in clinical practice and most commonly reported starting feed rate for newly referred tube fed patients. Length of time in clinical practice was surveyed as a categorical variable, respondents selected the category that most closely applied to how long they had been in clinical practice. The χ^2 -analysis was used to test for an association between the length of time in clinical practice and respondents' most commonly reported starting feed rate; a higher starting feed rate was associated with a longer time in clinical practice, $P=0.029$.

analysis ($n=71$) as feed starting rates would be expected to be significantly lower in this patient group compared with adult groups). A significant association between department protocol starting feed rate and the respondents most common starting feed rate in newly referred tube fed patients was indicated ($P<0.001$). A total of 77% ($n=61$) of respondents that had been in clinical practice for 0-1 years most commonly used a starting feed rate of 25-49 ml/h compared with 56% ($n=89$) of those that had been in clinical practice for more than 10 years (Figure 3). A significant association between number of years in clinical practice and most common starting feed rate in newly referred tube fed patients was found ($P=0.029$) with those with more clinical experience using a higher starting rate.

Refeeding syndrome

A total of 75% of respondents' departments had a protocol for preventing refeeding syndrome whereas 21% did not, and the remaining 4% were unsure. Of those respondents who worked in a department that did have a protocol for preventing refeeding syndrome ($n=502$), 79% had a single protocol, 12% had a multiple protocol and 10% were unsure whether there was a single or multiple protocols in place.

A total of 65% of respondents stated that they considered the risk of refeeding syndrome in all of their patients compared with 1% that never considered it and 2% that rarely considered it. In all, 32% of respondents considered refeeding syndrome in particular groups of patients, among those groups of patients cited were: alcoholic patients ($n=43$); those receiving treatment for cancer ($n=18$); patients with eating disorders/anorexia nervosa ($n=21$); and elderly patients ($n=14$).

In all, 50% of respondents felt that the amount of energy recommended by NICE (NCCAC, 2006) when treating patients at risk of the refeeding syndrome was 'about right'; 25% felt that the amount of energy was 'too cautious and should be more liberal'; 3% felt that the energy advised was 'too liberal and should be more cautious' and 21% had no opinion.

When respondents were asked to choose the two factors which influenced them the most when initiating an enteral feed in a patient at risk of the refeeding syndrome, the NICE guidelines (NCCAC, 2006; $n=404$) and the PENG guidelines post-2006 ($n=284$) were most influential.

Discussion

The data presented here represents the largest survey of UK dietetic practice, exploring the influence of local and national guidelines, and clinical experience on enteral feeding practice. Early studies on reported enteral tube feeding practices found large variations in feed composition, administration and techniques across the United Kingdom (Tredger *et al.*, 1981; Green *et al.*, 1987). Later studies found no improvement on this and also demonstrated large variations in enteral feeding techniques and standards of care across hospitals in the United Kingdom (Payne-James *et al.*, 1990, 1992, 1995). Since that time there has been development and publication of national consensus guidelines, and we have shown that these are influential in enteral feeding practices; 48% of respondents felt that NICE guidelines influenced them 'a lot' when initiating a tube feeding regimen. However, we found that with increasing clinical experience the influence of the practitioner's own clinical judgement became more important. Although this survey has recognised that local and national guidelines have an important influence on dietetic practice, we have shown that variation in enteral tube feeding still exists: feeding rates, and knowledge and perception of refeeding syndrome risk are variable. Although the present survey is the largest investigation of reported current enteral tube feeding and refeeding practices in the United Kingdom, we acknowledge that this population may not represent the entire UK dietetic workforce. Although every effort was made to recruit a wide range of participants, data bias must be considered: we are aware that larger departments may be overly represented in such a survey and that the topic of this survey may have been of greater interest to nutrition support specialists. Additionally, reported practice may differ from actual practice.

It has been postulated that the development of nutritional guidelines and standards of practice are essential in facilitating cost-effective nutrition care plans (Mueller and Shronts, 1997), ensuring that treatment is delivered appropriately reflecting the patients' needs (Adam, 2000) and limiting complications among patients receiving nutritional support (Pennington *et al.*, 1995). As a result, healthcare providers are

increasingly working on developing and implementing local policies to help ensure efficient and effective nutritional support is provided to patients (Main and Morrison, 1998). If standardised practice is to be achieved through the publication of, and adherence to, national guidelines then the issue of mandatory implementation needs to be considered. The current study found that only 23% of respondents reported that their hospital had mandatory implementation of the NICE guidelines on adult nutrition support (NCCAC, 2006), furthermore, dietitians working in departments with mandatory implementation were more likely to deem the guidelines highly influential in their practice than dietitians from departments without mandatory implementation.

A large systematic review that evaluated clinical guidelines found a significant change in practice in the direction recommended by the guidelines and subsequently concluded that the clear guidelines can improve clinical practice (Grimshaw *et al.*, 2004). However, it is widely recognised that the development and implementation of enteral nutrition guidelines is difficult (DeLegge, 2008) and can be insensitive to individual patient needs (Woolf *et al.*, 1999). It has been suggested that one of the factors limiting the use of clinical guidelines is that they restrict the professional's use of their own clinical judgement when treating a patient (Haycox *et al.*, 1999) and lead to 'cookbook medicine', that is merely following a formula for patient care (Hurwitz, 1999); however, the current study found the biggest influence when initiating a tube feeding regimen was clinical experience (70% of respondents). As expected there was a significant association between years in clinical practice and how much clinical experience influenced the respondent. It will be important to monitor the influence of guidelines and clinical experience in new graduates who are in the early stages of their clinical careers, these are professionals who have been educated and trained in an era of guidelines and standardised protocols, and it has yet to be seen whether as they gain clinical experience they will continue to be focused on guidelines or will become more influenced by their clinical experience. Interestingly, when looking at treating tube fed malnourished patients at risk of refeeding syndrome, the most influential factor was NICE guidelines (NCCAC, 2006) followed by the PENG guidelines post-2006 and clinical experience was deemed less influential; this may suggest that many dietitians rely on guidelines to inform their practice with 'non-routine' or high-risk cases but use their own clinical judgement when treating more routine cases. It is suggested that the optimal regimen to treat the refeeding syndrome is still to be determined, as randomised controlled trials of refeeding syndrome treatment are non-existent (Mehanna *et al.*, 2009). At present there are no internationally validated refeeding syndrome guidelines, this is demonstrated by the vast difference in treatment recommendations made by NICE (NCCAC, 2006) and WHO (World Health Organisation; WHO, 2004). NICE recommend initial energy provision of 5 kcal/kg per day for

patients at the highest risk of refeeding syndrome compared with the WHO (2004) WHO recommend 40 kcal/kg per day for the severely malnourished. Despite this lack of consensus between recommendations, the results of this study show that dietetic departments across the United Kingdom are actively implementing their own refeeding syndrome guidelines at local level with 75% of departments having a guideline in place.

The data presented demonstrate that national guidelines are important for informing practice by the development of local protocols, and that clinical judgement has a pivotal role when treating tube fed adult patients. The use of protocols and guidelines appears to be of more importance when treating specialised, high-risk cases, while clinical experience informs the majority of standard practice. Although not directly compared with previous surveys in this area, this new data may demonstrate that while enteral tube feeding practices in the United Kingdom remain variable, they may have increased in uniformity because of the development and introduction of national and local guidelines and protocols. Furthermore, if there is to be maximal uptake of consensus guidelines then mandatory implementation needs to be considered. Refeeding syndrome is recognised as an important risk in enteral feeding practice, however, there is much disagreement over whether the guidelines on nutritional management of refeeding syndrome are appropriate.

Conflict of interest

The authors declare no conflict of interest.

References

- Adam S (2000). Standardization of nutritional support: are protocols useful? *Intensive Crit Care Nurs* 16, 283–289.
- British Association for Parenteral and Enteral Nutrition (2007). Nutrition screening survey in the UK in 2007. (Accessed: 15 February 2009, at: http://www.bapen.org.uk/pdfs/nsw07_report.pdf).
- Cluzeau FA, Littlejohns P, Grimshaw JM, Feder G, Moran SE (1999). Development and application of a generic methodology to assess the quality of clinical guidelines. *Int J Qual Health Care* 11, 21–28.
- DeLegge MH (2008). Enteral feeding. *Curr Opin Gastroenterol* 24, 184–189.
- Feder G, Eccles M, Grol R, Griffiths C, Grimshaw J (1999). Clinical guidelines: using clinical guidelines. *Br Med J* 318, 728–730.
- Green C, Tredger J, Dickerson JWT (1987). Enteral feeding: a survey to investigate current practices and attitudes of dietitians. *Hum Nutr Appl Nutr* 41A, 360–363.
- Grimshaw JM, Thomas RE, MacLennan G, Fraser C, Ramsay CR, Vale L *et al.* (2004). Effectiveness and efficiency of guideline dissemination and implementation strategies. *Health Technol Assess* 8, 1–72.
- Haycox A, Bagust A, Walley T (1999). Clinical Guidelines—the hidden costs. *Br Med J* 318, 391–393.
- Hurwitz B (1999). Legal and political considerations of clinical practice guidelines. *Br Med J* 318, 661–664.
- Kraft MD, Btaiche IF, Sacks GS (2005). Review of the refeeding syndrome. *Nutr Clin Pract* 20, 625–633.

- Lochs H, Pichard C, Allison SP (2006b). Evidence supports nutritional support. *Clin Nutr* 25, 177–179.
- Lochs H, Valentini L, Schütz T, Allison SP, Howard P, Pichard C *et al.* (2006a). European Society for Clinical Nutrition and Metabolism (ESPEN) guidelines on adult enteral nutrition. *Clin Nutr* 25, 177–360.
- Main BJ, Morrison DL (1998). Development of a clinical pathway for enteral nutrition. *Nutr Clin Pract* 13, 20–24.
- McAtear CA, Arrowsmith H, McWhirter J, Payne-James J, Silk DBA, Stanford J, Teahon K (1999). Current perspectives of enteral Nutrition in adults. *A report by the working party of the British Association for Parenteral and Enteral Nutrition Group (BAPEN)*. BAPEN: Berkshire.
- Mehanna H, Moledina J, Travis J (2008). Refeeding syndrome: what it is, and how to prevent and treat it. *Br Med J* 336, 1495–1498.
- Mehanna H, Nankivell PC, Moledina J, Travis J (2009). Refeeding syndrome—awareness, prevention and management. *Head Neck Oncol* 1, 4.
- Mueller C, Shrouts EP (1997). Position of the American dietetic association: the role of registered dietitians in enteral and parenteral nutrition support. *J Am Diet Assoc* 97, 302–304.
- National Collaborating Centre for Acute Care (2006). *Nutrition Support for Adults Oral Nutrition Support, Enteral Tube Feeding and Parenteral Nutrition*. National Collaborating Centre for Acute Care: London.
- Payne-James JJ, De Gara CJ, Grimble GK, Bray MJ, Rana SK, Kapadia S *et al.* (1992). Artificial nutrition support in hospitals in the United Kingdom—1991: second national survey. *Clin Nutr* 11, 187–192.
- Payne-James JJ, De Gara CJ, Grimble GK, Rees R, Bray J, Rana S *et al.* (1990). Nutritional support in hospitals in the United Kingdom: national survey 1988. *Health Trends* 22, 9–13.
- Payne-James JJ, De Gara CJ, Grimble GK, Silk DBA (1995). Artificial nutrition support in hospitals in the United Kingdom—1994: third national survey. *Clin Nutr* 14, 329–335.
- Pennington CR, Powell-Tuck J, Shaffer J (1995). Review article: artificial nutrition support for improved patient care. *Aliment Pharmacol Ther* 9, 471–481.
- Stroud M, Duncan H, Nightingale J (2003). Guidelines for enteral feeding in adult hospital patients. *Gut* 52, vii1–vii12.
- The Kings Fund Centre (1992). *A Positive Approach to Nutrition as Treatment: Report of a Working Party (chaired by Professor J.E. Lenhard-Jones) on the Role of Enteral and Parenteral Feeding in Hospital and at Home*. Kings Fund Centre: London.
- Tredger J, Bazin C, Dickerson JWT (1981). Naso-gastric tube feeding. A survey to investigate current practices and attitudes of dietitians. *Int J Food Sci Nutr* 35, 118–122.
- Woolf SH, Grol R, Hutchinson A, Eccles M, Grimshaw J (1999). Clinical guidelines: potential benefits, limitations and harms of clinical guidelines. *Br Med J* 318, 527–530.
- World Health Organisation (2004). *Informal Consultation to Review Current Literature on Management of Severe Malnutrition in Hospitals*. World Health Organisation: Geneva.

Supplementary Information accompanies the paper on European Journal of Clinical Nutrition website (<http://www.nature.com/ejcn>)

Reproduced with permission of the copyright owner. Further reproduction prohibited without permission.