

Evidence briefing on nurse endoscopy

- York Hospitals NHS Foundation Trust is considering setting up a nurse led service to deliver elective diagnostic endoscopy.
- Endoscopy by nurses is becoming increasingly common and is approved, subject to appropriate training and management, by the relevant professional organisations.
- The available evidence suggests that appropriately trained nurses can perform diagnostic endoscopy safely and with similar outcomes to doctors.
- The largest study undertaken in the UK found that nurses can undertake diagnostic endoscopy safely and effectively, but that doctors were more likely to be cost-effective, although there was uncertainty underlying the cost-effectiveness analysis.
- Any loss of cost-effectiveness resulting from a transfer of elective endoscopy from doctors to nurses needs to be balanced against possible gains from using the doctors more effectively elsewhere and from potential better co-ordination of elective endoscopy services.
- The likely impact of released time is difficult to assess, particularly as it will be split between several specialties.
- Implementation of an elective nurse led endoscopy service will take time and require a substantial investment in training and supervision.
- Given these uncertainties, it will be important to plan carefully for implementation of any change to services and monitor costs and clinical outcomes during and after the change.

This evidence briefing has been produced for the York Teaching Hospital NHS Foundation Trust by the Centre for Reviews and Dissemination (CRD). Full details of methods are available on request (paul.wilson@york.ac.uk or duncan.chambers@york.ac.uk)

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Background

Gastrointestinal endoscopy at York Hospitals NHS Foundation Trust is currently performed mainly by doctors (gastroenterologists and surgeons), although one nurse endoscopist is performing upper GI endoscopy. Endoscopy by nurses is becoming increasingly common and is approved, subject to appropriate training and management, by the British Society of Gastroenterology and the American Society for Gastrointestinal Endoscopy.^{1, 2} However, the Healthcare Commission reported in 2007 that 85% of acute hospital trusts employed nurse endoscopists but they were allocated only 13% of programmed sessions.³

An option under discussion at the Trust is to set up a nurse endoscopy service (with a medical lead) to deliver elective endoscopy. Such a service could potentially reduce expenditure on endoscopy services and improve use of resources by releasing doctors' time.

The aim of this evidence briefing is to support decision-making by summarising and appraising relevant research evidence in the context of the situation at York Hospitals.

Its main focus is evidence comparing endoscopy performed by nurses (and nurse endoscopy services generally) with endoscopy performed by doctors (and doctor-provided endoscopy services).

Methods

This briefing is based primarily on existing sources of synthesised and quality-assessed evidence, primarily systematic reviews and economic evaluations. We initially searched for relevant research evidence in the following sources:

- DARE (Database of Abstracts of Reviews of Effects) for quality-assessed systematic reviews
- Cochrane Database of Systematic Reviews (CDSR)
- NHS EED for quality-assessed economic evaluations
- Health Technology Assessment (HTA) database

Our initial search did not locate any systematic reviews but it did locate some potentially relevant economic evaluations and two randomised trials. To reduce the risk of bias by only including those studies found on NHS EED and HTA, we asked an information specialist to conduct a broader search. The following sources were searched for any relevant systematic reviews, randomised trials, guidelines, health technology assessments or economic evaluations published in English between 1991 and 2011:

- NICE guidelines
- MEDLINE
- CINAHL
- DARE administrative database
- National Guidelines Clearing House
- Cochrane Central Register of Controlled Trials
- Controlled Clinical Trials

After removal of duplicates, this search located 15 potentially relevant records. In addition to critical appraisal and interpretation of the research evidence, we have attempted to assess implications for health equity and ease of implementation of changes to services.

Evidence base for effectiveness

Systematic reviews

We found one potentially relevant systematic scoping* review.⁴ The review addressed a broader research question than this evidence briefing as it included randomised and non-randomised studies of nurses' involvement in gastroenterology and endoscopy.

The review included three randomised trials comparing nurses with doctors or medical trainees (residents) for flexible sigmoidoscopy (two US trials) and upper endoscopy (undertaken in the UK). These trials were also located by our additional searches. All three evaluated primarily outcomes related to performance and accuracy of the procedure and found no significant differences between doctors and nurses.

A further 14 non-randomised studies evaluated nurses' performance in upper endoscopy (two studies), endoscopic ultrasound (one study), flexible sigmoidoscopy (seven studies), capsule endoscopy (two studies) and percutaneous endoscopic gastrostomy placement (two studies). Overall, the authors concluded that nurses were able to perform all these procedures safely and accurately.

This review had some limitations. Only a limited search for published studies was undertaken, the quality of included studies was not assessed and the synthesis of studies was mainly a description of individual studies within broad categories. Having independently assessed the randomised evidence, the authors' conclusion that nurses can adequately perform a range of diagnostic endoscopic procedures appears reasonable.

The American Society for Gastrointestinal Endoscopy guideline on endoscopy by non-physicians¹ cited a similar range of evidence and reached similar conclusions, although this was based on a more limited search of the literature and the inclusion criteria were unclear.

The MINuET trial

Funded by the HTA programme, the MINuET (Multi-Institution Nurse Endoscopy Trial) trial was published too late to be included in Verschuur et al.'s systematic review. MINuET is reported in three publications.⁵⁻⁷

Unlike the studies included in Verschuur et al.'s systematic scoping review, this trial focused on patient outcomes. The objective was to compare endoscopy (diagnostic upper GI endoscopy or flexible sigmoidoscopy) carried out by nurses and the resulting sequence of events with endoscopy carried out by doctors and its sequelae. The trial was performed in 23 hospitals in the UK and was a pragmatic trial with endoscopy being performed according to the standard protocols of the participating hospitals. Outcomes were evaluated 1 day, 1 month and 1 year after the procedure. The primary outcome was the score on a gastrointestinal symptom rating questionnaire 1 year after endoscopy.

Of 4964 potentially eligible patients, 4128 were randomised and 1888 were recruited into the trial. They were treated by 67 doctors and 30 nurses. There were no statistically significant differences between groups in outcomes except that patients were more satisfied with nurses at 1 day after endoscopy. Nurses were significantly more thorough than doctors in examining the stomach and oesophagus. Quality of life scores were slightly higher in the doctor group and while the difference

* Scoping reviews attempt to determine the size and nature of the evidence base for a topic area but without performing a full synthesis and critical appraisal of the literature.

was not statistically significant, this was important for the economic evaluation of the trial as discussed below. The authors' main conclusion was that diagnostic endoscopy can be undertaken safely and effectively by nurses.

This trial was funded and designed to provide evidence to support decision-making in the NHS. The participants and procedures reflect those of a range of NHS hospitals at the time of the trial (2002-03). Hence the findings are likely to be generalisable to York Hospitals. The trial was well conducted and the authors' conclusions are likely to be reliable.

Other evidence

The HTA database contains a record for a randomised trial of nurse endoscopy of the colon⁸ but we have been unable to locate a full report of this trial in English.

Evidence base for cost-effectiveness

We found two potentially relevant economic evaluations on the NHS EED database. The most important of these was associated with the MINuET trial.

The MINuET economic evaluation

This well conducted economic evaluation^{5,7} was based on the MINuET trial with a 1-year time horizon and was conducted from the perspective of the NHS.

A generic health-related quality of life questionnaire (EQ-5D) was used to measure patients' health status in each group. These data were used to estimate health gain in terms of quality-adjusted life years (QALYs) from baseline to 1 year after endoscopy. Data on resource use (for example, NHS staff and time, inpatient stays, outpatient appointments, GP visits, prescribed drugs, travel to and from appointments and any private medical care) were collected throughout the trial and costs were estimated from various official sources.

Patients with endoscopy performed by doctors gained 0.015 QALYs more than those in the nurse endoscopy group (0.712 vs. 0.695 mean change in QALY at 1 year) at an increased cost of about £56 per patient at 1 year (£739 vs. £683). This resulted in an estimated incremental cost-effectiveness ratio of £3660 per QALY for endoscopy by doctors compared with endoscopy by nurses. The greater health gain from endoscopy by doctors compared with endoscopy by nurses was attributed to a higher number of additional tests and investigations in the nurse group.

Whilst recognising that there was considerable uncertainty underlying both the costs and QALY estimates, the authors concluded that endoscopies carried out by doctors although slightly more expensive, were more likely to be cost-effective than those carried out by nurses.

Other economic evidence

Another economic evaluation in the NHS EED database looked at screening for colorectal cancer with flexible sigmoidoscopy by non-physicians.⁹ Cost and effectiveness data were obtained from a non-randomised study included in the systematic scoping review by Verschuur et al.⁴ The study involved three non-physicians, only one of whom was a nurse. The total cost per examination was \$283 for physicians and \$186 for non-physicians. This study was less rigorous than the MINuET economic evaluation and conducted in a US rather than a UK hospital setting, but it provides evidence that endoscopies by other health professionals tend to be less expensive than endoscopies by doctors.

Implications for York Hospitals NHS Trust

The available evidence suggests that appropriately trained nurses can perform diagnostic endoscopy safely and with similar outcomes to doctors.

The use of nurse endoscopists is supported by relevant professional bodies and one nurse endoscopist is already working at the York Trust. Based on this evidence, it seems unlikely that an increase in the number of elective diagnostic endoscopies undertaken by specialist nurses would have any adverse impact on patient outcomes.

The economic evidence from the MINuET study suggested that endoscopy by doctors was more likely to be cost-effective than endoscopy by nurses, though there was considerable uncertainty surrounding the findings.^{5, 7}

There are a number of potential limiting factors that need to be borne in mind when applying these findings to the York context. Changes in practice have occurred since the time of the trial (decreased use of flexible sigmoidoscopy and increased use of colonoscopy⁶) and there has been an increase in the numbers and experience of nurse endoscopists. In addition, the MINuET authors acknowledged that 'the choice of skill mix in endoscopy might be driven by factors other than cost-effectiveness, such as affordability, staff shortages and access to health care'.⁵

As such, any loss of cost-effectiveness resulting from a transfer of elective endoscopy from doctors to nurses needs to be balanced against possible gains from using the doctors more effectively elsewhere. The influence of any of these factors on any decisions relating to service provision was outside the scope of the MINuET study.

Implementation

The proposed development of an expanded nurse endoscopy service would require some time and resources to implement and the Trust will need to consider whether the longer term benefits of the service will outweigh the costs of implementation. Issues to consider include:

- The need to develop appropriate referral criteria (patient selection for endoscopy by doctors vs. nurses is not considered in this briefing)
- The time required to recruit and/or train nurse endoscopists
- Whether increased use of nurse endoscopists will free doctors' time for use elsewhere and whether the benefits of this additional free resource can be realised in practice
- The degree of support or buy-in from clinical staff for the proposed service redesign
- The knock-on effects of the service redesign on other departments and services within the Trust

In their full report (Chapter 7), the MINuET researchers considered the workforce implications of nurse endoscopy.⁷ Using data from the Hospital Episode Statistics and their trial, they estimated that a notional 'median' hospital in England carries out 2488 upper GI endoscopies and 515 flexible sigmoidoscopies in a year, equivalent to 788 and 223 hours of patient contact time, respectively. Allowing time for nurse endoscopists to undertake other duties and covering holidays etc., they estimated that two full time equivalent nurse endoscopists would be required to cover all elective endoscopies in this notional hospital.

We have requested local episode data from York and upon receipt we will be able to make a more informed estimate of likely impact.

The MINuET researchers noted that performance of all elective endoscopy by nurses was likely to release a substantial amount of doctors' time but it was difficult to assess the likely impact of this released time, particularly as it was split between several specialties. They suggested that the benefits of nurse endoscopy could include better co-ordination of elective endoscopy services and more appropriate use of staff skills as well as release of doctors' time. A 'substantial investment of time and resources'⁷ would be required for training and supervision of nurse endoscopists; the authors estimated that about a year of supervision would be required for each nurse endoscopist before any savings of doctors' time would be achieved.

Given these uncertainties, it will be important to plan carefully for implementation of any change to services and monitor costs and clinical outcomes during and after any change.

Health equity

None of the evidence sources considered implications of nurse-delivered vs. doctor-delivered endoscopy for health equity. If development of a nurse-delivered service improves access to endoscopy overall, this could result in a reduction in inequity. York Hospitals NHS Foundation Trust should consider the effect of any changes in access to services (e.g. referral criteria) and where services are provided on health equity.

References

1. American Society for Gastrointestinal Endoscopy. Endoscopy by non-physicians. *Gastrointestinal Endoscopy* 2009;69:767-70.
2. British Society of Gastroenterology. *Non-medical endoscopists*. London: British Society of Gastroenterology; 2005.
3. Healthcare Commission. *Taking a closer look: endoscopy services in acute trusts*. London: Healthcare Commission; 2007.
4. Verschuur EML, Kuipers EJ, Siersema PD. Nurses working in GI and endoscopic practice: a review. *Gastrointestinal Endoscopy* 2007;65:469-79.
5. Richardson G, Bloor K, Williams J, Russell I, Durai D, Cheung WY, et al. Cost effectiveness of nurse delivered endoscopy: findings from randomised multi-institution nurse endoscopy trial (MINuET). *BMJ* 2009;338:b270.
6. Williams J, Russell I, Durai D, Cheung WY, Farrin A, Bloor K, et al. Effectiveness of nurse delivered endoscopy: findings from randomised multi-institution nurse endoscopy trial (MINuET). *BMJ* 2009;338:b231.
7. Williams J, Russell I, Durai D, Cheung WY, Farrin A, Bloor K, et al. What are the clinical outcome and cost-effectiveness of endoscopy undertaken by nurses when compared with doctors? A Multi-Institution Nurse Endoscopy Trial (MINuET). *Health Technology Assessment* 2006;10 (40):1-195.
8. The Netherlands Organisation for Health Research and Development (ZonMw). *Nurse-endoscopy of the colon; a randomized trial on accuracy, patient experiences and costs* (Project record). In: The Netherlands Organisation for Health Research and Development (ZonMw); 2006.
9. Wallace MB, Kemp JA, Meyer F, Horton K, Reffel A, Christiansen CL, et al. Screening for colorectal cancer with flexible sigmoidoscopy by nonphysician endoscopists. *American Journal of Medicine* 1999;107:214-8.