of anaesthesia, is an acceptable day-case anaesthetic' and later that 'total i.v. anaesthesia with propofol was ..... associated with few clinical benefits in terms of speed or quality of recovery'.

The authors comment at length in their discussion on both nausea and vomiting and patient preference, but appear to give these important patient-related end-points little priority in contrast with the small financial saving ($13.1 per case) associated with a sevoflurane–sevoflurane technique. Surely an equally valid interpretation of these data might reject sevoflurane as a day-case anaesthetic in favour of total i.v. anaesthesia with propofol, which in this study offered superior quality of recovery and improved patient preference at a modest additional cost.

Perhaps we should also consider what patients themselves think about postoperative nausea and vomiting (PONV). When previous investigators have done so, they reported that patients were more worried about PONV than about pain,[2] would tolerate some additional pain to avoid PONV[3] and ranked it as 'least desirable outcome' from a surgery/anaesthesia episode.[4]

The guide to contributors to the *British Journal of Anaesthesia* requires that 'There should be clear declaration of any financial or commercial interest which any author may have in the material'. The paper acknowledges financial support from Abbott Laboratories, the manufacturer of sevoflurane. However, we are not told whether the authors have received any lecture fees or other research support from the same source. Readers might find this information useful when evaluating this report.

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Conflict of interest

Dr Sneyd has received research support from Abbott Laboratories, the manufacturer of sevoflurane, and lecture fees and research support from AstraZeneca, the manufacturer of propofol.

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Editor,—I thank Dr Sneyd for his interest in our article. All three anaesthetic techniques allowed rapid, smooth induction of anaesthesia, good intraoperative conditions and rapid recovery. By these criteria they were all acceptable. The incidences of nausea and vomiting were significantly higher in the sevoflurane induction and maintenance group only, and this is a cause for concern. Nevertheless, many cases were transient, occurring early in the recovery process, and not all required treatment. Although significantly more patients in this group would have chosen a different technique in the future, 90% still found their anaesthetic 'acceptable'. Furthermore, patients with PONV were no more likely to prefer an alternative future anaesthetic compared with those without these symptoms.

In criticizing our assertion that propofol anaesthesia was associated with few benefits, Dr Sneyd has taken our comments out of context. What we actually said was 'i.v. anaesthesia with propofol was more expensive than anaesthesia induced with propofol followed by sevoflurane (group 2), but was associated with few clinical benefits in terms of speed or quality of recovery'. This statement is true; in comparing the two groups, there were no significant differences in recovery times or incidence of nausea. We then went on to comment 'use of sevoflurane for induction and maintenance of anaesthesia (group 3) produced a further small reduction in costs ..... but was associated with a significant increase in postoperative nausea and vomiting, delay in ambulation (but not discharge) and reduction in patient satisfaction'.

Naturally, the patient's experiences and expectations are very important. However, this study made no allowances for various strategies which may reduce postoperative emesis, including omission of opioids from the volatile anaesthetic-based groups[1] and/or the use of prophylactic antiemetics. As for Dr Sneyd's alternative conclusion, while the additional cost of using propofol is indeed $13.1 per case ($12.2 from the propofol–sevoflurane group), the additional cost per case of PONV 'prevented' by propofol is $30.13 compared with sevoflurane induction and maintenance, and $85.40 compared with propofol–sevoflurane. These values are not quite so modest.

I am happy to disclose that I have previously received research funding from Abbott Laboratories (among others) and lecture fees from both Abbott and Astra-Zeneca. The original covering letter to the *British Journal of Anaesthesia* included the statement that 'some of the authors have received honoraria from Abbott for lecturing on an occasional basis'. It was therefore never our intention to conceal this information.

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1 Shakir AAK, Ramachandra V, Hasan MA. Day surgery postoperative nausea and vomiting at home related to peroperative fentanyl. *J One-day Surg* 1997; **6**(3): 10–11

Adverse effects of cannabis and cannabinoids

Editor,—This review article was timely.[1] It emphasized that in the young adult population we should be cognizant that 10–30% of 20–30-yr-olds may have used cannabis in the week before anaesthesia. Many obstetric patients do not admit to drug use, even on direct questioning (David Birnbach, personal communication 1999), and I am sure that this would apply to a request for an illegal drug history before anaesthesia. Should we therefore be screening all patients in this age group as the list of serious complications described in association with cannabis use would appear to present major anaesthetic risk? On the other hand, why have these central nervous depressant and cardiorespiratory stimulant effects not been manifest in multiple case reports in the anaesthetic literature? There are certainly case studies in association with cocaine abuse but not cannabis, yet cannabis is traceable for a longer period in body fluids.

Apart from normal clinical anaesthesia, where there has been no systematic investigation, the issue of studies of cannabis and cannabinoids should be considered. The majority of medical studies of cannabis as distinct from cannabinoids, have used non-naïve patients, thus the records of adverse effects are often in combination with an unknown quantity of cannabinoid material in tissues. The reluctance to use non-naïve subjects opens the question as to whether or not cannabis-naïve patients should enter, for example, long-term pain studies of tetrahydrocannabinol (THC)

or cannabis plant material. However, THC, the main psychoactive cannabinoids in cannabis, is licensed for use in the USA and has met the requirements of the regulatory authorities. If the adverse effects of cannabis are caused by cannabinoids other than THC, these need to be identified. The warnings in the data sheet for THC include caution in patients known to have a history of substance abuse, cardiac disorders, psychiatric history and those receiving sedatives. This pales into insignificance when the list of adverse effects from commonly used drugs, such as non-steroidal analgesics, is examined in the *British National Formulary.*

What is required are standardized preparations of cannabinoids available for medicinal use. Then the focus can be on the adverse effects of a known amount of medicinal product rather than the broader issue of substance abuse.

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1 Ashton CH. Adverse effects of cannabis and cannabinoids. *Br J Anaesth* 1999; **83**: 637–49

Editor,—Dr Holdcroft raises some interesting questions concerning the widespread use of cannabis in the young population. Why, she asks, have adverse effects of cannabis in anaesthetic practice been so rarely reported, and should patients in the 20–30-yr-old age group who require an anaesthetic be screened routinely for drug use?

Unfortunately, as stated in the review, there are no systematic studies of cannabis effects on anaesthesia. The theoretical potential for risks is based largely on animal data and isolated clinical reports. Until definitive studies are undertaken, we do not know if the actual risks are minimal or if they have simply been under-recognized. In the present state of knowledge, it is unlikely that routine screening for cannabis use would be very informative (except as a warning of possible but unknown complications) Because of the very slow elimination of cannabinoids and their metabolites (which are still detectable in urine up to 1 month after a single dose) and the considerable degree of pharmacokinetic and pharmacodynamic tolerance developed in chronic users, there is a poor relationship between cannabinoid concentrations in body fluids and central or systemic effects. Clearly, further research is needed. This would be difficult and should involve current cannabis users compared with non-users in the same age groups.

Dr Holdcroft also asks whether cannabis-naive patients should enter clinical studies for therapeutic actions of cannabinoids. Her assertion that the majority of medical studies have used non-naive patients is mistaken. In the UK, the synthetic cannabinoid nabilone has been used for many years as an antiemetic for cannabis-naive patients undergoing cancer chemotherapy. Dronabinol, synthetic Δ^9-tetrahydrocannabinol (THC) in sesame oil, has been used similarly in the USA. The therapeutic and adverse effects of these cannabinoids for this indication are well known. Nabilone and dronabinol can be prescribed legally for other indications and have been used in several clinical studies for pain relief in diverse conditions, including cancer pain and multiple sclerosis, mostly in cannabis-naive patients (references cited in the review). These cannabinoids may have a potential in palliative care[1] and there is nothing to prevent interested anaesthetists setting up their own studies.

The pharmacology of other cannabinoids (there are more than 60 in herbal cannabis) is little known but promising new synthetic cannabinoids are under development[2] and a Clinical Cannabinoid Group has been set up by the Department of Health to examine the clinical use of standardized cannabinoids preparations.[3] The medical use of raw cannabis is not recommended[3] because of the known toxicity of the many non-cannabinoid constituents (about 340) which are broadly similar to and carry the same risks as those of smoked or ingested tobacco.

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1 Ashton H. Cannabis in palliative care. *CME Bulletin Palliative Medicine* 1999; **1**: 73–7
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Pulmonary aspiration of gastric contents in obstetrics

Editor,—I was most interested in the review article by Engelhardt and Webster,[1] particularly the sections dealing with obstetric patients. While pointing out the steady decline in maternal deaths from pulmonary aspiration reported by the *Confidential Enquiries into Maternal Deaths in the UK* from the 1960s to the 1990s, they failed to specify concurrent relevant changes in anaesthetic practice. Over the past 11 yr, since the introduction of atraumatic pencil-point spinal needles, there has been a dramatic increase in the use of spinal anaesthesia in the UK, although this has not been well documented.[2] One wonders if we would have seen the decline in mortality associated with aspiration over the past decade were it not for the concurrent reduction in the number of general anaesthetics.

The values quoted from the recent Norwegian audit[3] are correct, but it should be mentioned that the authors declared there had been a trend for increased spinal and epidural anaesthesia for Caesarean section in that country. Furthermore, all obstetric patients who aspirated did so during airway problems under general anaesthesia and, although there were no deaths, admission to intensive care was necessary.

When commenting on the incidence of pulmonary aspiration in obstetrics, Engelhardt and Webster focused on studies from the first world. However, maternal mortality in the first world pales into insignificance compared with the staggering figures for the third world.[4] Since the review has been published in an international journal of anaesthesia, it will be read by anaesthetists practising in the third world and I would suggest they be cautious about eschewing recommendations for reducing gastric volume and acidity. General anaesthesia is still the norm in obstetrics in many third world countries and two recent studies from Zululand and Zimbabwe have highlighted deaths caused by failures in airway management in which aspiration probably contributed to fatality.[5 6] Preventive measures are particularly important in the third world because there may not be resources for adequate treatment if aspiration does occur.

One interesting South African study[7] not mentioned in the review found that combining ranitidine and sodium citrate produced higher mean pH values from 1 h onwards compared with orogastric tube aspiration or sodium citrate, or both. This suggests that ranitidine should be administered earlier rather than later if Caesarean section is pending. A further advantage of ranitidine is that it increases lower oesophageal sphincter tone.[8]

The reviewers are to be commended for drawing attention to