

## Which Clinical Anesthesia Outcomes Are Important to Avoid? The Perspective of Patients

Alex Macario, MD, MBA\*, Matthew Weinger, MD†, Stacie Carney, BA‡, and Ann Kim, BA‡

\*Departments of Anesthesia and Health Research and Policy, Stanford University Medical Center, Stanford; †Department of Anesthesiology, University of California San Diego and the San Diego Veterans Affairs Healthcare System, San Diego; and ‡Stanford University, Stanford, California

Healthcare quality can be improved by eliciting patient preferences and customizing care to meet the needs of the patient. The goal of this study was to quantify patients' preferences for postoperative anesthesia outcomes. One hundred one patients in the preoperative clinic completed a written survey. Patients were asked to rank (order) 10 possible postoperative outcomes from their most undesirable to their least undesirable outcome. Each outcome was described in simple language. Patients were also asked to distribute \$100 among the 10 outcomes, proportionally more money being allocated to the more undesirable outcomes. The dollar allocations were used to determine the relative value of each outcome. Rankings and relative

value scores correlated closely ( $r^2 = 0.69$ ). Patients rated from most undesirable to least undesirable (in order): vomiting, gagging on the tracheal tube, incisional pain, nausea, recall without pain, residual weakness, shivering, sore throat, and somnolence ( $F$ -test  $< 0.01$ ). **Implications:** Although there is variability in how patients rated postoperative outcomes, avoiding nausea/vomiting, incisional pain, and gagging on the endotracheal tube was a high priority for most patients. Whether clinicians can improve the quality of anesthesia by designing anesthesia regimens that most closely meet each individual patient's preferences for clinical outcomes deserves further study. (Anesth Analg 1999;89:652-8)

In most industries, the quality of the product is assessed by the customer (1). Patients are customers of anesthesia service. Therefore, a logical step in perioperative healthcare is to determine what patients value, then tailor the anesthetic to meet each patient's requirements. Many anesthesiologists already seek such preferences by asking, for instance, whether the patient would rather be awake (i.e., regional anesthesia) or asleep (i.e., general anesthesia) for a surgical procedure. The quality of medical decisions, patient satisfaction, and clinical outcomes can be improved by eliciting such patient preferences (2-4).

The highest quality anesthetic (and related postoperative outcomes) for any patient may depend on a subjective assessment of his or her level of well being in different health states (expressed as preferences for those clinical anesthesia outcomes). For example, the

choice of an opiate to relieve postoperative pain may actually reduce the quality of the recovery period of a postoperative patient who considers nausea more objectionable than pain. In this patient, a less emetogenic, nonopioid analgesic may provide the patient's desired postoperative outcome. Knowing how patients prioritize clinical anesthesia outcomes will help anesthesiologists to customize care.

How patients rank the relative importance of avoiding low-morbidity, yet common anesthesia outcomes, such as nausea or shivering, is unknown. For example, it is unknown whether patients perceive a sore throat after anesthesia as less desirable than being somnolent after anesthesia, or whether patients consider avoiding postoperative nausea to be more important than pain relief.

Clinicians may use the term "outcome" to mean the results of patient care, such as an intermediate end point or adverse event. Donabedian (5) defined outcome more broadly as "a change in a patient's... health status that can be attributed to antecedent health care." This definition certainly applies to surgical outcomes that can affect the long-term health of a patient. However, in anesthesia for routine surgery, except in the case of an anesthetic disaster, anesthesiologists may seldom be able to influence more than patient comfort during the perioperative period.

Funded in part by a FAER/Hoechst Marion Roussel, Inc./Society for Ambulatory Anesthesia Clinical Research Starter Grant from the Foundation for Anesthesia Education and Research (to AM).

MW participated in this study as part of the Stanford Fellowship in the Management of Perioperative Services.

Accepted for publication April 21, 1999.

Address correspondence to Alex Macario, MD, MBA, Department of Anesthesia (H3580), Stanford University Medical Center, Stanford, CA 94305-5115, Address e-mail to amaca@leland.stanford.edu.

For purposes of this study, we used the phrase "clinical anesthesia outcome" to refer to adverse clinical events associated with anesthesia. Anesthesiologists are unable to predict which common, low-morbidity anesthesia outcomes are of highest importance to a particular surgical patient (6). Patient preferences for clinical outcomes are difficult to discern without informing patients about the expected outcomes of the procedure and asking them about their specific preferences in a structured manner (7). Davies and Ware (8) suggested that most patients have the knowledge base (more health information is being made available to patients) to make such judgments.

The goals of this study were to survey patients to: 1) rank order their preferences, from most to least important, for avoiding specific clinical anesthesia outcomes; and 2) quantify any variability in how surgical patients perceive common anesthesia side effects. Because there is no "gold standard" for asking patients about their subjective judgments of the value of avoiding acute conditions (e.g., nausea) that characterize emergence from anesthesia, we used two separate techniques (used by health economists)—priority ranking and relative value scales—to study patient preferences.

## Methods

The study took place at Stanford University Medical Center, a university- and community-affiliated university hospital, and was approved by the Stanford Human Subjects Committee.

A comprehensive list of clinical anesthesia outcomes was developed from a computerized literature search (MEDLINE) for 1986–1997 using the following term: "anesthetic outcome, complications." This yielded >100 published studies (a sample of these studies includes References 9–16) that were read by AM to generate a complete list of clinical anesthesia outcomes. This survey study did not include all possible outcomes, as that would have required giving patients an excessively long questionnaire. Rather, the complete list was reviewed, and nine items were selected (to represent a range of severity) for study. We then developed simple descriptions (25–45 words) of the clinical outcomes. The descriptions were reviewed and edited by four senior board-certified anesthesiologists in the anesthesia department for perceived validity and accuracy (see Table 1 for the actual language used to describe each of the outcomes). The descriptions reflected a constellation of symptoms with a focus on a particular outcome. A normal outcome, or side effect-free recovery, was included as 1 of the 10 outcomes studied.

The survey instrument was organized into three parts: 1) standard demographic items (age, sex, race,

income, education, marital status, work history, inpatient or outpatient surgery) and previous experience with side effects of anesthesia; 2) a rankings section; and 3) a relative value section (explained below). The order of the assessments was the same for all patients.

The questions and outcome descriptions were designed to flow from previous questions. Each question expressed one idea (i.e., no question contained "and"), and no question was phrased in a negative tense (i.e., "not" or "neither").

Patients were asked to rank (order) 10 possible post-operative outcomes from their most undesirable to their most desirable outcome. Patients were given the following written and verbal instructions:

We want to determine your preferences for each of the following possible outcomes of anesthesia care (i.e., which ones you think are better or worse than the others). Please carefully read each of the following descriptions of outcomes you could experience in the recovery room after your anesthesia and surgery. Assume that each situation described is equally likely. While it is impossible to know how long each condition will last, assume that each will last for an equal length of time. Rank each of these post-operative outcomes in relation to each other from 1 to 10 from the most undesirable (1) to the most desirable (10).

To determine the value of each outcome relative to the other outcomes, respondents were asked to assign 100 hypothetical "dollars" across the outcomes: more dollars were to be assigned to the less desirable outcomes.

Patients were given the following written and verbal instructions:

Distribute the \$100 according to your preferences such that the more money you spend on a condition, the less likely that it will occur. Thus, you should spend more money on outcomes you most want to avoid. Important: You must spend all of your \$100 (and no more than that).

The actual dollar allocations assigned to a particular outcome were used to determine the relative value of each outcome. If the patients assigned more than a total of \$100, the values for each outcome were standardized to 100.

A random number generator was used to select which patients would be asked to participate in this study. We aimed to obtain 100 completed surveys. A research assistant trained in preference assessments research methodology was available to answer any questions a patient had while completing the survey instrument. After the formal anesthesia evaluation and patient education sessions in the preoperative evaluation anesthesia clinic, patients completed and returned the survey anonymously to a mailbox. The preanesthetic visit and patient education process is standardized by the preoperative clinic. This standardization was not specifically confirmed for each patient who participated in this study. Per our usual

**Table 1.** Description of Postoperative Clinical Anesthesia Outcomes

Outcome	Description
Nausea	You are lying on your side, awake and aware of your surroundings in the recovery room. You are extremely queasy, as if you were seasick on a boat in rough seas. The least movement makes the nausea worse.
Recall without pain	You become aware of your surroundings in the recovery room and realize that you were awake during the surgery. You remember lying on the operating room table, unable to move or talk while the surgical procedure was underway.
Gag on endotracheal tube	You are lying on your back, alert and aware that you are in the recovery room. You have a breathing tube in your windpipe, which makes it more difficult to breathe and causes you to gag. It is impossible to speak.
Shivering	You are lying on your back, alert and aware that you are in the recovery room. Your entire body is shivering uncontrollably so that you are unable to hold a cup of water or speak clearly.
Vomiting	You are lying on your side, awake and aware of your surroundings in the recovery room. You feel waves of nausea and are throwing up. Your abdominal and chest muscles ache from vomiting.
Residual weakness	You are lying on your back, alert and aware that you are in the recovery room. You are so weak that you can not move any of your muscles. You can blink your eyes, but speaking is almost impossible and you feel short of breath.
Somnolence	You are in the recovery room and are drifting off to sleep even though you want to wake up and go home. You are unable, despite your best effort, to stay awake long enough to tell the nurse how you are feeling.
Sore throat	You are lying on your back, alert and aware that you are in the recovery room. Your throat is sore and your voice is hoarse, as if you had laryngitis.
Normal	You are lying on your back, alert and aware that you are in the recovery room. You have no pain or nausea, feel good, and are ready to go home.
Pain	You are lying on your back, awake and aware of your surroundings in the recovery room. Your surgical incision really hurts, as if a knife was stabbing you. Movement makes the pain worse, and no position seems to make it better.

practice, all patients provided consent for general anesthesia, even if a regional anesthetic was likely, in case general anesthesia was required.

Patients  $\geq 18$  yr gave their written informed consent before beginning to complete the survey. Patients were eligible for the study if they were scheduled to undergo surgery either in the outpatient surgery center or in the main tertiary hospital surgery suite. Patients unable to speak or read English or who had cognitive disabilities were excluded.

To gain insight into the internal validity of the instrument, we analyzed the association (i.e., correlation) between the relative value data and the ranking data for each outcome. One would expect that the relative value assignment (\$0–\$100) for an outcome to correspond with the ranking of that outcome (17). In other words, the less desirable the outcome by rank, the more dollars (\$0–\$100) that should be assigned to avoid the outcome. One would also expect that the normal (or side effect-free) outcome should be ranked 10 (highest) and would have the lowest relative value (fewest dollars) assigned.

Two-way analysis of variance of ranking and relative value data, followed by Newman-Keuls tests for multiple comparisons, was used to evaluate the statistical significance of the two outcomes (18). Correlation between the rank data and the importance scores were calculated by using Pearson's correlation coefficients.

Subgroup analyses were performed. For example, it was hypothesized that patients who have actually experienced a particular outcome would rate it differently than patients who have not. The Mann-Whitney *U*-test was used to determine whether the rank or relative value data were different for patients who had experienced a particular outcome compared with those who had not.

## Results

One hundred ninety-five surveys were distributed. One hundred thirty patients returned the survey. Twenty-nine of the surveys were returned but were incompletely completed and so were excluded from the data analysis. Thus, 101 patients completed the questionnaire (see Table 2 for demographic characteristics of patients). Clinical characteristics of the survey participants are summarized in Table 3. Sixty-two of the patients reported that they had previously experienced at least one of the outcomes studied.

In this patient population, vomiting was the least desirable outcome by both the ranking methodology and the relative value methodology (*F*-test  $< 0.01$ ) (Table 4). The relative value scores suggested, for instance, that relief of nausea was 56% (i.e., 11.82/7.60) more important than relief of shivering.

**Table 2.** Demographic Characteristics of the Survey Participants

Age (yr)	45 ± 16 (19-83)
Sex (male/female)	40/61
Marital status	
Single	26
Married	60
Widowed/divorced	14
Ethnicity	
Caucasian	81
African-American	4
Hispanic	3
Other	11
Years of schooling completed after kindergarten	
<12 (did not finish high school)	2
12	8
14	31
16	28
>16	32
Household income	
<\$50,000	32
>\$50,000	69

Values are mean ± SD (range) or number of patients.  
n = 101.

The results showed internal consistency. Ranking and relative value data were positively and significantly correlated ( $r^2 = 0.69, P < 0.0001$ ).

There was appreciable interindividual variability among patient preferences for different anesthesia outcomes (Table 5).

Previous experience with a certain anesthesia outcome was not related to a patient's ranking of outcomes. For example, patients who had experienced nausea ranked nausea similarly to those patients who had not had experienced nausea.

Patients studied were asked to list other outcomes that they had experienced after surgery and anesthesia. No single clinical outcome (e.g., dizziness, fainting, infection, urinary retention) was suggested by more than one respondent. All 101 respondents ranked the normal outcome after anesthesia as most desirable and allocated \$0 to it.

## Discussion

For clinicians, it is important to know how patients perceive clinical outcomes, then to design the anesthetic to minimize the incidence or severity of those anesthesia-related outcomes that a particular patient feels are most important to avoid. Clinicians may make anesthetic regimen decisions based partly on what they believe is important medically and partly on their perceptions of what an average, or typical, patient would want to have as an ideal outcome after

**Table 3.** Clinical Characteristics of the Survey Participants

Type of surgery planned	
Urologic	15
Cardiac	7
Neurosurgical	12
Otolaryngological	5
General	12
Orthopedic	37
Gynecological	7
Other	5
H/o previous surgery	77
D/C home day of surgery expected	38
Clinical outcome <sup>a</sup>	
Vomiting	32
Gagging on endotracheal tube	5
Pain	76
Nausea	60
Recall without pain	2
Shivering	46
Residual weakness	34
Sore throat	48
Somnolence	31

Values represent percentages of patients.  
n = 101.

H/o = history of, D/C = discharge.

<sup>a</sup> Experienced by 62 patients.

**Table 4.** Ranking and Relative Value of Anesthesia Outcomes

Outcome	Rank	Relative value <sup>a</sup>
Vomiting	2.56 ± 0.13	18.05 ± 1.09
Gagging on endotracheal tube	2.97 ± 0.15	17.86 ± 1.43
Pain	3.46 ± 0.2	16.96 ± 1.59
Nausea	4.02 ± 0.17	11.82 ± 0.87
Recall without pain	4.85 ± 0.26	13.82 ± 1.58
Residual weakness	5.34 ± 0.17	7.99 ± 0.8
Shivering	5.36 ± 0.20	7.60 ± 0.6
Sore throat	8.02 ± 0.11	3.04 ± 0.26
Somnolence	8.28 ± 0.11	2.69 ± 0.25
Normal	10.00	0

Values are mean ± SEM.

<sup>a</sup> This means that, for example, patients assigned \$18.05 of \$100 to avoid vomiting.

anesthesia. We used two separate preference assessment tools to determine how patients rank (from most severe to least severe) common, low-morbidity outcomes associated with anesthesia.

Patients rated vomiting as most undesirable, followed (in order) by gagging on the tracheal tube, incisional pain, nausea, recall without pain, residual weakness, shivering, sore throat, and somnolence. Because serious adverse outcomes from anesthesia are rare, improvements in the quality of anesthesia care may come from addressing these more common side effects. Given the variability in how patients responded, it is difficult to know *a priori* which clinical anesthesia outcomes are of highest concern for any given patient. Thus, it may be useful to actively engage patients (as part of the preoperative evaluation

**Table 5.** Percentage of Patients Who Gave an Anesthesia Outcome a Particular Rank

Outcome	Rankings							
	First	Second	Third	Fourth	Fifth	Sixth	Seventh	>Eighth
Vomiting	24 <sup>a</sup>	31	22	17	5	1	0	1
Gagging on endotracheal tube	22	18	24	20	13	3	1	0
Pain	21	17	17	12	14	11	9	0
Nausea	6	19	15	17	19	21	4	0
Recall without pain	20	6	6	10	10	18	14	17
Shivering	1	6	8	16	20	23	17	10
Residual weakness	7	5	10	8	15	19	26	11
Sore throat	0	0	0	1	1	3	14	81
Somnolence	0	0	0	1	2	3	15	79
Normal	0	0	0	0	0	0	0	100

<sup>a</sup> Of the patients, 24% ranked vomiting as their least desirable outcome.

and informed consent process) to identify, for example, their three most important clinical outcomes, then tailor the anesthetic to address these preferences.

Interestingly, we found no measurable differences in opinion about the relative severity of outcomes between patients who reported no personal experience with a particular outcome and those who had experienced the outcome during a previous anesthetic. This may support the validity of the descriptions used in the study. Further investigations are required to include other outcomes not evaluated in this study and to further understand whether patients who have had unpleasant outcomes after a previous anesthetic tend to rate that outcome as being most important to avoid during a subsequent anesthetic.

Our results showing the importance to patients of avoiding nausea are consistent with an earlier study.<sup>1</sup> In a study (20) of 800 patients focusing on patients' knowledge and attitudes about anesthesia, patients reported their highest level of concern for (in order) being able to wake up after surgery, postoperative pain, becoming paralyzed, having pain medications available, waking up in the middle of surgery, and postoperative nausea. We also showed that "failure to wake up" from an anesthetic (brain injury or dying during surgery) is a primary concern of patients. Although the rate of this adverse outcome is very low and further improvements in this end point may be difficult to obtain or measure, anesthesiologists should also address patient concerns surrounding rare but catastrophic events.

Patients who experience an adverse clinical anesthesia outcome may perceive different effects on their state of well-being. In other words, although two patients may both experience nausea, their perception of the impact of nausea on their quality of life (as measured by how patients rank outcomes relative to one another, as done in this study) may be quite different.

For example, Nease et al. (2) found that patients suffering from angina with similar functional limitations varied considerably in their tolerance of their symptoms. These authors recommended that medical management of angina should be based mainly on the preferences of the patient. Similarly, in a study of terminally ill patients, Danis et al. (4) recommended that the use of life-sustaining medical therapy should be guided primarily by patient preferences.

Some of the observed variability in how patients rank any particular outcome may be due to measurement error. However, the high correlation ( $r^2 = 0.69$ ) between the two ranking techniques may support the validity of the rank order of clinical outcomes we obtained. The current study was not powered to study whether demographic variables (e.g., age or sex) or timing (preoperatively or postoperatively) of the survey affected responses. We have also undertaken a larger study to measure whether the presence of preoperative symptoms (e.g., would a person experiencing preoperative pain as a result of the surgical diagnosis have a different priority about the postoperative outcome?) or the type of surgery (e.g., if one patient was to undergo a major cancer operation and another a minor diagnostic procedure) is correlated with importance of outcomes.

Monitoring the incidence over time of key clinical outcomes, such as those rated highly by patients in this study, may be a more useful measure of clinical quality than other quality measurement instruments, such as patient satisfaction scores. Patient satisfaction scales may not be "fine" enough to detect changes in the quality of clinical care by an anesthesia group. Patient satisfaction relies on a standard or expectation against which care is compared (21). Because this expectation of what the anesthesia experience will be can differ among patients, satisfaction may not be a reliable or valid way of detecting changes in care. In the setting of perceived risk (anesthesia), satisfaction ratings are dominated by a sense of relief (22).

<sup>1</sup> Orkin F. What do patients want [abstract]? *Anesth Analg* 1992; 74:S225.

This study focused on clinical anesthesia outcomes, rather than other aspects of care—such as the affect of care (how “nice” providers are to patients), the environment of care (how attractive the facility is), or the timeliness of care (whether the surgery started on time). In fact, these other aspects of care may be more noticeable and important to patients than the clinical outcomes about which physicians may be concerned. For example, one study suggested that friendliness of the operating room staff is the primary determinant of patient satisfaction with outpatient surgery (23). However, prioritizing the numerous nonclinical outcomes associated with anesthesia was beyond the scope of the present study.

Patient valuation of different outcomes is necessary for economic studies in anesthesia. Because anesthesia drugs and interventions almost always have side effects, clinicians and administrators must make tradeoffs among options with regard to desirable and undesirable properties. To optimize patient care, it is necessary to quantify how patients value these various outcomes. The relative value data (fraction of 100) suggest, for instance, that vomiting is almost 6 times (18.05/3.04) more undesirable than a sore throat or that relief of nausea is 56% (11.82/7.6) more important than relief of shivering. These data may help to complete economic analyses of anesthetic interventions that make tradeoffs among anesthesia outcomes.

As in most studies in healthcare, including clinical trials, the current patient sample depended on patients' willingness to participate. Respondents may have differed from the general population in an unpredictable number of attributes that could bias the data. The potential for selection bias was minimized by using a sampling strategy intended to represent a wide range of age, income, and surgical procedures. However, most patients who completed the survey were well educated. Some socioeconomic groups may not be able to complete accurately the ranking or relative value questions. We were unsuccessful in completing a follow-up study of the nonresponders to either improve the response rate or evaluate whether the responders are drawn from the same population as the nonresponders. This may have biased our results.

The expectations of patients also tend to have a cultural component. This study was performed in the United States, and all patients had medical insurance to pay for healthcare costs, which may have affected how the patients responded. In countries in which medical care is not available, tolerance for low-morbidity outcomes such as we studied may be assessed differently by patients fortunate enough to be treated.

It is unlikely that any one patient will have experienced (and be able to rank based on actual experience) all outcomes under study. In addition, the outcome

descriptions we used were chosen by investigators in consultation with other anesthesia providers. Wording from patients may yield more accurate data (24,25). Expressed patient preferences may be influenced by the way questions are phrased, and further studies are required to refine this methodology.

Patients undergoing surgery are fearful of experiencing adverse side effects from anesthesia. Asking patients explicitly to define their preferences can be part of the informed consent process. This is also consistent with patient autonomy, allowing patients to influence treatment decisions once the alternatives have been explained. On initiating this study, there was some concern that, by virtue of making postoperative adverse outcomes more explicit, patients would become more fearful or worried about their upcoming surgery. In fact, this happened in only a few patients and was managed by further conversation with the nurse educator or the physician. However, some patients did decline to participate in the study because of their concerns about making adverse outcomes more explicit. We have learned that the benefits of a better educated patient, along with knowledge about each patient's preferences for different outcomes, may outweigh the risks.

An important component of improving the quality of healthcare is that relevant patient information, including patient preferences and expectations, be incorporated into clinical care decisions. However, a review of the understanding of patients' attitudes toward anesthesia suggests that there is substantial variation in the quantity and nature of information given to patients preoperatively about their anesthetic care (26). In this study, we provided some indication of patients' relative preferences for anesthesia outcomes. Although there is substantial variability in patient preferences for postoperative outcomes, avoiding postoperative nausea/vomiting seems to be a high priority for most patients. Data obtained from physician and patient interaction on patient preferences may guide anesthesiologists to choose the anesthesia regimen that results in the highest value to each patient by best meeting his or her preferences. Whether clinicians can customize care based on elicited preferences, such as was done in this study, and improve the quality of anesthesia care deserves further study.

## References

1. Laffel G, Blumenthal D. The case for using industrial quality management science in health care organizations. *JAMA* 1989; 262:2869-73.
2. Nease R, Kneeland T, O'Connor G, et al. Variation in patient utilities for outcomes of the management of chronic stable angina: implications for clinical practice guidelines. *JAMA* 1995; 273:1185-90.

3. Schover L, Yetman R, Tuason L, et al. Partial mastectomy and breast reconstruction: a comparison of their effects on psychosocial adjustment, body image, and sexuality. *Cancer* 1995;75:54-64.
4. Danis M, Mutran E, Garret J, et al. A prospective study of the impact of patient preferences on life sustaining treatment and hospital cost. *Crit Care Med* 1996;24:1811-7.
5. Donabedian A. Evaluating the quality of medical care. *Millbank Mem Fund Q* 1966;44(Part 2):166-206.
6. Shafer A, Fish P, Gregg K, et al. Preoperative anxiety and fear: a comparison of assessments by patients and anesthesia and surgery residents. *Anesth Analg* 1996;83:1285-91.
7. Hornberger J, Habraken H, Bloch D. Minimum data needed on patient preferences for accurate, efficient medical decision making. *Med Care* 1995;33:297-310.
8. Davies A, Ware J. Involving consumers in quality of care assessment. *Health Affairs* 1988;15:33-9.
9. Chye EPY, Young IG, Osborne GA, et al. Outcomes after same-day oral surgery. *J Oral Maxillofac Surg* 1993;51:846-9.
10. King B. Patient satisfaction survey: day surgery unit. *Aust Clin Rev* 1989;9:127-9.
11. Burrow B. The patient's view of anaesthesia in an Australian teaching hospital. *Anaesth Intensive Care* 1982;10:20-4.
12. Philip B. Patients' assessment of ambulatory anesthesia and surgery. *J Clin Anesth* 1992;4:355-8.
13. Keep P, Jenkins J. From the other end of the needle: the patient's experience of routine anaesthesia. *Anaesthesia* 1978;33:830-2.
14. Osborne GA, Rudkin GE. Outcome after day-care surgery in a major teaching hospital. *Anaesth Intensive Care* 1993;21:822-7.
15. Moerman N, van Dam F, Oostino J. Recollections of general anaesthesia: a survey of anesthesiological practice. *Acta Anaesthesiol Scand* 1992;36:767-71.
16. Dodds CP, Harding MI, More D. Anaesthesia in an Australian private hospital: the consumer's view. *Anaesth Intensive Care* 1985;13:325-9.
17. Boyd N, Sutherland H, Heasman K, et al. Whose utilities for decision analysis? *Med Decis Making* 1990;10:1058-67.
18. Brown W, Hollander M. *Statistics: a biomedical introduction*. New York: J Wiley & Sons, 1977.
19. Deleted in proof.
20. Shevde K, Panagopoulos G. A survey of 800 patients' knowledge, attitudes, and concerns regarding anesthesia. *Anesth Analg* 1991;73:190-8.
21. Donabedian A. *The definition of quality and approaches to its measurement*. Ann Arbor, MI: Health Administration Press, 1980.
22. Fung D, Cohen M. Measuring patient satisfaction with anesthesia care: a review of current methodology. *Anesth Analg* 1998;87:1089-98.
23. Tarazi E, Philip B. Friendliness of OR staff is top determinant of patient satisfaction with outpatient surgery. *Am J Anesthesiol* 1998;4:154-7.
24. Llewellyn-Thomas H, Sutherland H, Tibshirani A, et al. Describing health states: methodologic issues in obtaining values for health states. *Med Care* 1984;22:543-52.
25. McNeil B, Pauker S, Sox H, Tversky A. On the elicitation of preferences for alternative therapies. *N Engl J Med* 1982;306:1259-62.
26. Klapf J, Roizen M. Current understanding of patient's attitudes toward and preparation for anesthesia: a review. *Anesth Analg* 1996;83:1314-21.