

ORIGINAL ARTICLE

Disclosing and reporting medical errors*Cross-sectional survey of Swiss anaesthesiologists*

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BACKGROUND There is limited research on anaesthesiologists' attitudes and experiences regarding medical error communication, particularly concerning disclosing errors to patients.

OBJECTIVE To characterise anaesthesiologists' attitudes and experiences regarding disclosing errors to patients and reporting errors within the hospital, and to examine factors influencing their willingness to disclose or report errors.

DESIGN Cross-sectional survey.

SETTING Switzerland's five university hospitals' departments of anaesthesia in 2012/2013.

PARTICIPANTS Two hundred and eighty-one clinically active anaesthesiologists.

MAIN OUTCOME MEASURES Anaesthesiologists' attitudes and experiences regarding medical error communication.

RESULTS The overall response rate of the survey was 52% (281/542). Respondents broadly endorsed disclosing harmful errors to patients (100% serious, 77% minor errors, 19% near misses), but also reported factors that might make them

less likely to actually disclose such errors. Only 12% of respondents had previously received training on how to disclose errors to patients, although 93% were interested in receiving training. Overall, 97% of respondents agreed that serious errors should be reported, but willingness to report minor errors (74%) and near misses (59%) was lower. Respondents were more likely to strongly agree that serious errors should be reported if they also thought that their hospital would implement systematic changes after errors were reported [(odds ratio, 2.097 (95% confidence interval, 1.16 to 3.81)]. Significant differences in attitudes between departments regarding error disclosure and reporting were noted.

CONCLUSION Willingness to disclose or report errors varied widely between hospitals. Thus, heads of department and hospital chiefs need to be aware of the importance of local culture when it comes to error communication. Error disclosure training and improving feedback on how error reports are being used to improve patient safety may also be important steps in increasing anaesthesiologists' communication of errors.

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Introduction

At the core of the patient safety movement is open communication about medical errors. With research highlighting how many errors have their roots in systematic failures,¹ it is seen as important that errors are reported so that opportunities for system improvements can be identified and addressed.² Disclosing errors to patients is also widely seen as an ethical,

professional and legal duty internationally.^{3–7} However, there remains a large 'gap' between expected communication practice and what is actually being done, with research indicating that errors are often not reported within hospitals or disclosed to patients.^{8,9} A number of barriers to open and honest communication about medical errors have been identified;

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however, the most pervasive barrier identified is professionals' legal fears.^{10,11}

In Switzerland, patient safety has received greater attention ever since the Swiss Patient Safety Foundation was founded in 2003. In 2010, the second national monitoring for clinical risk management in Swiss hospitals found that 65% of responding hospitals had a central coordination for clinical risk management (although many with only minimal personnel resources).¹² The University of Basel's Department of Anaesthesia set up one of the first critical incident reporting systems internationally in 1996,¹³ but progress on the implementation of reporting systems is mixed in Switzerland. For example, 71% of responding hospitals have a hospital-wide critical incident reporting system (14% had a non-anonymised system), but some of these also operate a different reporting system at the departmental level.¹² Whereas most systems are voluntary and anonymous, some hospitals mandate the reporting of certain errors, consequently 78% of responding hospitals saw a need for standardisation of critical incident reporting processes.¹² The Swiss Patient Safety Foundation has established a network of local incident reporting systems wherein reports are merged in a central database. Regarding the disclosure of errors to patients, the Swiss Patient Safety Foundation translated the Massachusetts Coalition for the Prevention of Medical Errors' "When Things Go Wrong" into German (*Wenn etwas schief geht*) in December 2006,⁴ which has been widely distributed and has helped bring awareness to this issue in Switzerland. However, adoption has been slow. A recent study found that only 46% of the responding Swiss hospitals currently have an error disclosure policy.¹⁴

Although anaesthesiology has long been considered as 'the leading medical specialty in addressing issues of patient safety',¹⁵ there has been limited research on anaesthesiologists' attitudes and experiences regarding medical error communication, particularly the disclosure of errors to patients.^{16–20} This study, therefore, aims to characterise anaesthesiologists' attitudes and experiences regarding disclosing errors to patient and reporting errors within the hospital, and to examine factors influencing their willingness to communicate errors. We expect that attitudes towards error communication are connected to hospital culture and policies, and hence we will compare differences in attitudes and experiences between departments.

Methods

The study was approved by Prof A. Perruchoud, Chairperson of the Ethics Committee of Basel, on 6 January 2012. Informed consent was implied by returning the survey.

Survey implementation

This anonymous survey was conducted between July 2012 and April 2013. Surveys were not sent to

departments at the same time because of logistical considerations. Participation was encouraged through repeated e-mail reminders via the Chiefs of Departments.

Survey contents

The survey was a modified version of a survey conducted in the North American setting,²¹ which was kindly provided by Thomas H. Gallagher from the University of Washington. The survey was translated into German and French and was pilot tested with a total of 11 medical doctors (five German speaking, six French speaking) to ensure clarity and item comprehension. Questions explored respondents' experiences and attitudes relating to medical errors, disclosing errors to patients and reporting errors within the hospital. Definitions for key terms (medical error, serious error, minor error, near miss) that have been well established in the literature were provided at the beginning of the questionnaire.^{21,22} Agreement was measured on a 4-point Likert scale (from 'strongly disagree' to 'strongly agree'). Demographic questions asked for respondents' age, sex, religion, level of training, position and the percentage of time they spent in direct patient contact. The survey took approximately 10 min to complete.

Statistical analysis

Descriptive statistics included medians, means and SDs for continuous variables and percentages for categorical variables. Questions that used 4-point Likert response scales were dichotomised at the midpoint (agree vs. disagree) because sample sizes for some cells were often too small to be analysed. However, the question 'serious errors should be disclosed to patients' was dichotomised at strongly agree vs. all others because we expected that disclosure of serious errors would be endorsed by virtually all anaesthesiologists based on previous research.^{21,22} To analyse characteristics of respondents, and attitudes and experiences regarding error communication, we used chi-squared tests for categorical data and *t* tests for continuously distributed data. To assess predictors of strong agreement that serious errors should be reported to the hospital or disclosed to patients, we used logistic regression models. For each predictor we set up two models. The first model contained the respective predictor and department as sole covariate, whereas the second model was in addition adjusted for the following covariates: sex, age, years in practice, religion and position. As the results based on both models were always comparable for each model, we only report those based on the first and more parsimonious model. Departments were always included in the model as they were considered an integral part of the study design. The reported odds ratios are conditional, that is, adjusted for the covariate(s) in the model. The test for significance of a predictive effect was based on the logarithm of the ratio between the likelihoods of the model containing the predictor and the covariate(s) and the model containing

only the covariate(s). All analyses were performed with a significance level α set to 0.05 and two-tailed tests, using SPSS v21 (IBM Corp., SPSS Statistics for Windows Version 21.0, Armonk NY, USA).

Results

Surveys were mailed to a total of 542 clinically active anaesthesiologists working in the departments of anaesthesia in Switzerland's five university hospitals: department A ($n = 77$), department B ($n = 145$), department C ($n = 115$), department D ($n = 85$) and department E ($n = 120$). Responses were obtained from 281 anaesthesiologists, a response rate of 52%.

Characteristics of respondents

Overall respondent characteristics are shown in Table 1 (see also Table, Supplemental Digital Content 1, <http://links.lww.com/EJA/A66>, which presents characteristics by department).

General experiences and attitudes regarding medical errors

Nearly all of the anaesthesiologists (98%) reported having been involved in an error (Table 2). Most anaesthesiologists (78%) agreed that medical errors are 'one of the most serious problems in healthcare.' Overall, 59% of anaesthesiologists thought that it was either somewhat likely or likely that they would receive a malpractice complaint within the next year. This result was strongly depended on the department (Supplemental Digital Content 2, <http://links.lww.com/EJA/A66>, which presents general error experiences and attitudes by department).

Disclosing errors to patients

Anaesthesiologists' agreement that errors should be disclosed to patients increased with the level of error harm

Table 1 Characteristics of the 281 respondents from the 542 surveyed: differences between departments

Characteristic	Total ($n = 281$)	Statistics
Response rate ^a	52%	$\chi^2(4) = 33.4, P < 0.001$
Age (years) ^b	38.4 (8.62)	$F(4, 274) = 3.49, P = 0.008$
Men/Women	158 / 123	$\chi^2(4) = 9.69, P = 0.046$
Years in practice ^c	11.7 (8.9), 9.0	$F(4, 274) = 5.07, P < 0.001$
Seniority ^d		$\chi^2(12) = 84.9, P < 0.001$
Chief	12 (4)	
Senior	100 (36)	
Chief resident	35 (13)	
Assistant	134 (48)	
% Time in direct patient contact ^d		$\chi^2(8) = 8.77, P = 0.36^e$
0	1 (<1)	
1–25	2 (1)	
26–50	20 (7)	
51–75	76 (27)	
76–100	182 (65)	

^aResponse rate is based on 281 respondents of 542 total possible. ^bData are mean (SD). ^cData are mean (SD), median. ^dDue to rounding, total percentages can exceed or fall below 100%. ^eGroups 1 to 3 were combined due to small cell sizes.

Table 2 Anaesthetists' previous involvement in an error and their attitudes regarding medical errors: differences between departments

Statement	Total $n = 281$ (%)	Statistics
Error involvement ^a		
Serious Error	116 (41)	$\chi^2(4) = 8.97, P = 0.062$
Minor Error	220 (78)	$\chi^2(4) = 3.00, P = 0.555$
Near Miss	240 (85)	$\chi^2(4) = 3.55, P = 0.471$
None ^b	5 (1.8)	
Medical errors are one of the most serious problems in healthcare	219 (78)	$\chi^2(4) = 3.91, P = 0.418$
Medical errors are usually caused by system failures ^{c,d}	160 (57)	$\chi^2(4) = 31.1, P < 0.001$
Likely to receive a malpractice complaint within the next year ^e	166 (59)	$\chi^2(4) = 24.1, P < 0.001$

^aData are given as the number and percentage of each group that responded 'yes' to the statement. ^bCell sizes too small to be analysed. ^cData are given as the number and percentage of each group that agrees with the statement. 'Agree' includes those who agree and those who strongly agree. ^dMissing data. Total of 279 responses. ^eData are given as the number and percentage of each group that reported it was somewhat likely or likely that they will receive a malpractice complaint within the next year.

(Table 3). However, agreement that serious errors and minor errors should be disclosed varied among departments. Anaesthesiologists thought that disclosing a serious error to a patient would be very difficult (63%), would damage a patient's trust in their competence (28%) and would make it less likely that a patient would sue them (71%), but all three percentages varied among departments. Whereas anaesthesiologists agreed that serious errors should be disclosed to patients, many reported that certain factors might make them less likely

Table 3 Disclosing errors to patients: differences between departments

Statement	Total $n = 281$ (%)	Statistics
Patients should be informed about:		
Serious Errors ^b	228 (81)	$\chi^2(4) = 24.3, P < 0.001$
Minor Errors ^c	215 (77)	$\chi^2(4) = 34.8, P < 0.001$
Near Misses ^c	53 (19)	$\chi^2(4) = 2.28, P = 0.684$
Disclosing a serious error would ^c :		
Be very difficult	175 (63)	$\chi^2(4) = 14.1, P = 0.007$
Damage patient's trust in my competence	79 (28)	$\chi^2(4) = 12.8, P = 0.012$
Make it less likely that a patient would sue me	197(71)	$\chi^2(4) = 17.1, P = 0.002$
Previous disclosure training ^d	33 (12)	$\chi^2(4) = 10.6, P = 0.031$
Interest in receiving disclosure training ^e		
Not at all interested	18 (6)	
Somewhat interested	144 (51)	
Very interested	118 (42)	

^aDue to missing data, total responses range from 281 to 277. Missing data for a department did not exceed two responses for any question. ^bData are given as the number and percentage of each group that strongly agrees with the statement. All respondents either agreed or strongly agreed with the statement. ^cData are given as the number and percentage of each group that agrees with the statement. 'Agree' includes those who agree and those who strongly agree. ^dData are given as the number and percentage of each group that responded 'yes' to the statement. ^eDue to rounding, total percentages can exceed or fall below 100%. Cell sizes were too small to be analysed.

to actually disclose (see Table, Supplemental Digital Content 3, <http://links.lww.com/EJA/A66>, which presents respondents' attitudes to error disclosure by department).

Of all the anaesthesiologists, only 34% reported having previously disclosed a serious error to a patient, whereas 75% reported having previously disclosed a minor error to a patient. Of those who had disclosed an error, most reported being satisfied with the patient conversation, that the conversation had no change or a positive impact on their relationship with the patient, and that they experienced relief afterwards. Only a minority of anaesthesiologists (12%) had received some training on how to disclose errors to patients. However, almost all (93%) respondents were either somewhat or very interested in receiving general training on how to disclose errors to patients, and 95% were either somewhat or very interested in receiving support from an expert on patient communication after a serious error (see Table, Supplemental Digital Content 4, <http://links.lww.com/EJA/A66>, which presents respondents' experiences with error disclosure by department).

Only two factors were found to independently predict strong agreement that serious errors should be disclosed to patients. First, anaesthesiologists who had been personally involved in a serious error were less likely to strongly agree. Second, anaesthesiologists who had experienced relief after disclosing their last serious error were more likely to strongly agree compared with those who had not experienced relief or who had never disclosed a serious error before (see Table, Supplemental Digital Content 5, <http://links.lww.com/EJA/A66>, which presents all factors tested).

Reporting errors within the hospital

Anaesthesiologists' agreement that they should report errors to their hospital increased with the error's harm (see Table 4). However, agreement that near misses and minor errors should be reported varied among departments. The majority of all anaesthesiologists (93%) knew that their hospital had an error-reporting system to improve patient safety. Of those who knew that there was an error-reporting system, most had reported an error, and most also agreed that system changes to improve patient safety occurred after errors were reported at their hospital. However, only 63% of all anaesthesiologists agreed that current systems for doctors to report errors are adequate. All these percentages varied among departments except for the reporting of serious errors (see Table, Supplemental Digital Content 6, <http://links.lww.com/EJA/A66>, which presents respondents' attitudes and experiences with error reporting by department).

Three factors were found to independently predict strong agreement that serious errors should be reported to the hospital: anaesthesiologists were more likely to strongly

Table 4 Reporting errors within the hospital: differences between departments

Statement	Total n = 281 (%) ^a	Statistics
Doctors should report to their hospital ^b		
Serious errors ^c	269 (97)	
Minor Errors	206 (74)	$\chi^2(4) = 40.7, P < 0.001$
Near Misses	163 (59)	$\chi^2(4) = 31.5, P < 0.001$
My hospital has an error-reporting system (Yes) ^{c,d}	258 (93)	
Errors personally reported ^e		
Serious Error	82 (32)	$\chi^2(4) = 6.00, P = 0.200$
Minor Error	147 (57)	$\chi^2(4) = 14.7, P = 0.005$
Near Misses	166 (65)	$\chi^2(4) = 33.2, P < 0.001$
None	45 (18)	$\chi^2(4) = 22.0, P < 0.001$
System changes occur in hospital after errors are reported ^{b,e}	189 (74)	$\chi^2(4) = 15.7, P = 0.002$
Current reporting systems are adequate ^b	173 (63)	$\chi^2(4) = 15.7, P = 0.003$

^a Due to missing data, total responses range from 281 to 276. Missing data for a department did not exceed two responses for any question. ^b Data are given as the number and percentage of each group that agrees with the statement. 'Agree' includes those who agree and those who strongly agree. ^c Cell sizes were too small to be analysed. ^d Data are given as the number and percentage of each group that responded 'yes' to the statement. ^e Data are given as the number and percentage of each group that responded 'yes' to the statement 'Does your hospital have an error-reporting system to improve patient safety?' Due to missing data, sample size was 257.

agree that serious errors should be reported if they also thought that near misses should be reported to improve patient safety, if they thought that their hospital implements systematic changes to improve patient safety after errors are reported and if they thought that current systems for reporting errors are adequate (see Table, Supplemental Digital Content 7, <http://links.lww.com/EJA/A66>, which presents all factors tested).

Discussion

This study resulted in a number of key findings. First, very few respondents had received any training on how to disclose errors despite great interest in such training. Second, respondents showed a low willingness to report minor errors and near misses. Third, our data suggest an important influence of local culture on the willingness to report and disclose errors. Fourth, legal fears may not be the most important barrier to error disclosure and reporting.

Respondents widely endorsed disclosing harmful errors to patients, and their willingness to disclose serious errors or minor errors is comparable with the findings of a previous study,²² the largest study yet conducted on error disclosure, involving physicians from multiple specialties in the United States and Canada.²² However, whereas all respondents agreed that they should disclose serious errors to patients, many reported that certain factors might make them less likely to actually disclose. Anaesthesiologists who had been personally involved in a serious error were less likely to strongly agree that serious errors should be disclosed to patients, despite

the majority of respondents who had previously disclosed a serious error reporting positive experiences. This is somewhat disquieting and may reflect the significant emotional impact that serious errors can have on physicians. Furthermore, a number of respondents disagreed that they should disclose minor errors to patients. There is an ethical responsibility to maintain honest communication with patients and their families even in cases of less harmful errors, and studies conducted internationally have indicated that patients are virtually unanimous in wanting all harmful errors disclosed.^{23,24} Disclosing an error is one of the most complex and difficult conversations that occur in healthcare, and provides some unique challenges to medical specialties such as anaesthesiology, given the limited contact with the patient, the absence of an ongoing professional relationship and the complex teams in which anaesthesiologists typically work.^{25,26} The complexity of these situations calls for a strategy of training and supporting clinicians in relation to this process. However, very few of the respondents in our study had received any education or training regarding disclosure of errors, although nearly all of the respondents were interested in receiving such education. Increasing anaesthesiologists' training (in medical school and during postgraduate training) to equip them with the skills to conduct these difficult discussions may be an important step in increasing error disclosure.

The vast majority of respondents were aware that their hospital had an error-reporting system and agreed that serious errors should be reported to their hospital to improve patient safety. However, compared with other international studies in other specialties, we found much lower agreement rates for reporting minor errors and near misses. For instance, a 2007 US study found that a majority of paediatricians agreed that they should report not only serious errors, but also minor errors (90%) and near misses (82%) to their hospital.²¹ Although there were significant differences between departments regarding this issue, this overall low willingness to report minor errors and near misses to the hospital is surprising, given the leadership Swiss anaesthesiologists have previously shown in relation to error reporting. The low willingness to report near misses is particularly concerning as there has been a growing emphasis in medicine, following the example of other high-risk industries, to report near misses as they occur more frequently and provide valuable lessons without harm to patients.²⁷ This low willingness may reflect a lack of confidence among Swiss anaesthesiologists that their hospitals will treat these reports in a reasonable way. Respondents may also find reporting systems cumbersome and time consuming, or think the incident is too trivial to report, or have received insufficient encouragement and feedback on the lessons learnt from reports.^{18,19,28} Indeed, respondents in this study were more likely to strongly agree that serious errors should be reported if they believed that the reports would

be used to improve patient safety. Anticipated ineffectiveness of reporting has been identified as a major barrier to error reporting.²⁸ In a recent Swiss study, the most important influence on the willingness to report was the transparency of the incident reporting system procedures to potential users; perceived effectiveness of reporting was a relevant antecedent at the individual level.²⁹

The risk of malpractice complaints is an issue that is well known among anaesthesiologists,³⁰ and over half of all respondents thought that it was likely that they would receive a malpractice complaint within the next year. International studies examining clinicians' views regarding error communication have consistently found legal fears to be one of the most pervasive barriers to open communication.^{10,17} However, our study found that respondents' attitudes about malpractice did not affect their willingness to report serious errors. Indeed, the majority of respondents thought that disclosing a serious error to a patient would make it less likely that the patient would complain about them. These findings support previous research that suggests that the legal environment may have a more limited impact on physicians' error communication attitudes and practices than often believed.²²

As suggested by Gallagher *et al.*²², the culture of medicine itself may be a more important barrier to error communication than the malpractice environment. Our results support this conclusion as we found significant differences in attitudes to error reporting across departments. Given that this study only included clinically active anaesthesiologists working in university hospitals, and that Switzerland is a reasonably small and dense country, these large differences are remarkable. Whereas differences between the French and German speaking parts of Switzerland are often expected, our data did not support such an opinion. Previous research has found that physician attitudes generally vary more by specialty than by country, pointing to the role of medical culture, particularly that of the physician's specialty in shaping these views.²² However, partly due to the sampling technique, these studies did not report on sub-group analysis such as department. In contrast, our study design allowed for the comparison of anaesthesia departments in all the university hospitals in one country, and our results suggest that the culture towards error reporting in individual departments differs significantly. As these differences are probably due to issues concerning leadership and the prevailing ethos in the broader organisation, heads of department and hospital chiefs need to be aware of how important local culture is in relation to error communication. However, further research is required to examine the reasons behind these departmental differences, and what action is required to address these.

This study has some limitations. With the response rate being only 52% a generalisation of the results to all

anaesthesiologists working in Switzerland's five university hospitals is not possible. However, as those who responded to our survey are, in general, likely to be more motivated and more interested in error reporting than the non-respondents, the low willingness to communicate minor errors and near misses should be taken seriously. Our study has the usual limitations of a self-reported questionnaire: we do not know how often anaesthesiologists actually reported errors to the hospital or to patients. Social desirability may have resulted in an over-reporting of error communication. However, this only reinforces the main result of our study that error communication clearly remains incomplete and problematic even among the more motivated and interested anaesthesiologists. There may be hospital-specific and country-specific differences in anaesthesiologists' attitudes that might limit the ability to generalise the results to anaesthesiologists in other countries. However, the significant differences in attitudes to error reporting found between departments suggest that these issues need to be dealt with regionally. Furthermore, the percentage of physicians who come from adjacent European countries is known to be considerable in Switzerland. Finally, although we used definitions for medical errors that have been well established in the literature, there can be wide disagreement in practice about whether a certain event constitutes an error.

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References

- Reason J. *Human Error*. Cambridge: Cambridge University Press; 1990.
- Australian Commission on Safety and Quality in Healthcare. Open disclosure standard: a national standard for open communication in public and private hospitals, following an adverse event in healthcare. Sydney: Australian Commission on Safety and Quality in Healthcare; 2008.
- National Patient Safety Agency. Being open: saying sorry when things go wrong. NHS: National Patient Safety Agency; 2009.
- Massachusetts Coalition for the Prevention of Medical Errors. When things go wrong: responding to adverse events. A consensus statement of the Harvard Hospitals. Massachusetts Coalition for the Prevention of Medical Errors; 2006.
- Canadian Patient Safety Institute. Canadian disclosure guidelines. Ottawa: Canadian Patient Safety Institute; 2008.
- Australian Commission on Safety and Quality in Healthcare. Open disclosure standard: a national standard for open communication in public and private hospitals, following an adverse event in healthcare. Sydney: ACSQHC; 2008.
- New Zealand Ministry of Health. Health and disability services standards NZS 8134. Wellington: Ministry of Health; 2008.
- Gallagher TH, Garbutt JM, Waterman AD, *et al.* Choosing your words carefully: how physicians would disclose harmful medical errors to patients. *Arch Intern Med* 2006; **166**:1585–1593.
- Classen DC, Resar R, Griffin F, *et al.* 'Global trigger tool' shows that adverse events in hospitals may be ten times greater than previously measured. *Health Aff* 2011; **30**:581–589.
- Iedema R, Allen S, Sorensen R, Gallagher TH. What prevents incident disclosure, and what can be done to promote it? *Jt Comm J Qual Patient Saf* 2011; **37**:409–417.
- Hartnell N, MacKinnon N, Sketris I, Fleming M. Identifying, understanding and overcoming barriers to medication error reporting in hospitals: a focus group study. *BMJ Qual Saf* 2012; **21**:361–368.
- Briner M. Second national monitoring for clinical risk management in the hospital. *Schweizerische Ärztezeitung* 2011; **92**:463–466.
- Staender S, Kaufmann M, Scheidegger D. Critical incident reporting. With a view on approaches in anaesthesiology. In: Vincent C, de Mol B, editors. *Safety in medicine*. Amsterdam, New York: Pergamon Elsevier Science; 2000.
- McLennan S, Engel S, Ruhe K, *et al.* Implementation status of error disclosure standards reported by Swiss hospitals. *Swiss Med Wkly* 2013; **143**:w13820.
- Gaba DM. Anaesthesiology as a model for patient safety in healthcare. *BMJ* 2000; **320**:785–788.
- White SM, Deacy N, Sudan S. Trainee anaesthetists' attitudes to error, safety and the law. *Eur J Anaesthesiol* 2009; **26**:463–468.
- Heard GC, Sanderson PM, Thomas RD. Barriers to adverse event and error reporting in anaesthesia. *Anesth Analg* 2012; **114**:604–614.
- Sanghera IS, Franklin BD, Dhillon S. The attitudes and beliefs of healthcare professionals on the causes and reporting of medication errors in a UK Intensive care unit. *Anaesthesia* 2007; **62**:53–61.
- Sharma S, Smith AF, Rooksby J, Gerry B. Involving users in the design of a system for sharing lessons from adverse incidents in anaesthesia. *Anaesthesia* 2006; **61**:350–354.
- Merchant RN, Gully PM. A survey of British Columbia anaesthesiologists on a provincial critical incident reporting program. *Can J Anaesth* 2005; **52**:680–684.
- Garbutt J, Brownstein DR, Klein EJ, *et al.* Reporting and disclosing medical errors: pediatricians' attitudes and behaviors. *Arch Pediatr Adolesc Med* 2007; **161**:179–185.
- Gallagher T, Waterman AD, Garbutt JM, *et al.* US and Canadian physicians' attitudes and experiences regarding disclosing errors to patients. *Arch Intern Med* 2006; **166**:1605–1611.
- Gallagher TH, Waterman AD, Ebers AG, *et al.* Patients' and physicians' attitudes regarding the disclosure of medical errors. *JAMA* 2003; **289**:1001–1007.
- Iedema R, Sorensen R, Manias E, *et al.* Patients' and family members' experience of open disclosure following adverse events. *Int J Qual Health Care* 2008; **20**:421–432.
- Souter KJ, Gallagher TH. The disclosure of unanticipated outcomes of care and medical errors: what does this mean for anaesthesiologists? *Anesth Analg* 2012; **114**:615–621.
- Manser T, Staender S. Aftermath of an adverse event: supporting healthcare professionals to meet patient expectations through open disclosure. *Acta Anaesthesiol Scand* 2005; **49**:728–734.
- Barach P, Small SD. Reporting and preventing medical mishaps: lessons from nonmedical near miss reporting systems. *BMJ* 2000; **320**:759–763.
- Evans SM, Berry JG, Smith BJ, *et al.* Attitudes and barriers to incident reporting: a collaborative hospital study. *Qual Saf Health Care* 2006; **15**:39–43.
- Pfeiffer Y, Briner M, Wehner T, Manser T. Motivational antecedents of incident reporting: evidence from a survey of nurses and physicians. *Swiss Med Wkly* 2013; **143**:w13881.
- Jena AB, Seabury S, Lakdawalla D, Chandra A. Malpractice risk according to physician specialty. *N Engl J Med* 2011; **365**:629–636.