**Title page**

**Title:** Disclosing and Reporting Medical Errors: Cross-sectional survey of Swiss Anaesthesiologists

**Running Title:** Disclosing and Reporting Medical Errors

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**Abstract**

**Background:** There is limited research on anaesthesiologists' attitudes and experiences regarding medical errors 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 5 university hospitals' departments of anaesthesia in 2012/2013.

**Participants:** 281 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 widely endorsed disclosing harmful errors to patients (100% serious, 77% minor errors, 19% near misses), but reported factors that might make them less likely to actually disclose. 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 implements systematic changes after errors were reported (OR, 2.097 [95% CI, 1.16-3.81]). Significant differences in attitudes between departments regarding error disclosure and reporting.

**Conclusion:** Willingness to disclose or report errors varied strongly between hospitals. Heads of department and hospital chiefs thus need to be aware of how important local culture seems to be when it comes to error communication. Increasing 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.

**Keywords:** Medical Errors, Truth Disclosure, Patient Safety, Switzerland

**Introduction**

At the core of the patient safety movement is the 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, 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 personal resources).[12] It was also found that while 71% of responding hospitals have a hospital-wide critical incident reporting system (14% had a non-anonymized system), 78% saw a need for standardization of critical incident reporting processes.[12] Indeed, while the University of Basel's Department of Anaesthesia set up one of the first critical incident reporting systems internationally in 1996,[13] implementation progress of reporting systems is mixed in Switzerland. For example, some hospitals operate many reporting systems at the department level, while other have one hospital-wide system in place, most systems are voluntary and anonymous but some hospitals mandate the reporting of certain errors. The Swiss Patient Safety Foundation has established a network of local incident reporting systems where 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, adaption 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 errors 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 due to logistic considerations and availability of departments. Surveys were mailed to a total of 542 clinically active anaesthesiologists working in Switzerland's five university hospitals' departments of anaesthesia: department A (n=77), department B (n=145), department C (n=115), department D (n=85) and department E (n=120). Participation was encouraged through repeated email 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 patients contact. The survey took approximately 10 minutes to complete.

### *Statistical Analysis*

Descriptive statistics included medians, means and standard deviations for continuous variables and percentages for categorical variables. Questions that used 4-point Likert response scales were dichotomized 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 dichotomized 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. Since 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 integrated part of the study design. Odds ratios reported are conditional, i.e. 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 alpha set to 0.05 and two-tailed tests, using SPSS v21.

## Results

*Characteristics of Respondents*

Overall respondent characteristics are present in **Table 1** (see also Table, Supplemental Digital Content 1, which presents characteristics by department).

*General Experiences and Attitudes Regarding Medical Errors*

Nearly all of the anaesthesiologists reported having been involved in an error (98%) (see **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 somewhat likely or likely that they would receive a malpractice complaint within the next year, however, this also strongly depended on the department (see Table, Supplemental Digital Content 2, 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 error's harm (see **Table 3)**. However, agreement that serious errors and minor errors should be disclosed strongly 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. While anaesthesiologists agreed that serious errors should be disclosed to patients, many reported certain factors might make them less likely to actually disclose (see Table, Supplemental Digital Content 3, which presents respondents' attitudes to error disclosure by department).

Of all the anaesthesiologists, only a third (34%) reported having previously disclosed a serious error to a patient, while 75% reported having previously disclosed a minor error to a patient. Of those who had disclosed an error, most reported being satisfied with the conversation, that the conversation had no change or a positive impact on their relationship with the patient, and that they experienced relief after. A minority of anaesthesiologists (12%) had received any 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%) either somewhat or very interested in receiving support from an expert on patient communication after a serious error (see Table, Supplemental

Digital Content 4, 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 to those who had not experienced relief or who had never disclosed a serious error before (see Table, Supplemental Digital Content 5, 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 strongly varied among departments. The majority of all anaesthesiologists (93%) knew that their hospital has 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 occur after errors are reported at their hospital. However, only 63% of all anaesthesiologists agreed that current systems for doctors to report errors are adequate. All these percentages strongly varied among departments except for the reporting of serious errors (see Table, Supplemental Digital Content 6, 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 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, which presents all factors tested).

**Discussion**

This study has resulted in a number of key findings. First, very few respondents had received any disclosure training despite great interest in such training. Second, respondent showed a low willingness to report minor errors and near misses. Third, our data points towards an important influence of local culture on the willingness to report and disclose errors, and that 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 and minor errors is comparable to the findings of the largest study conducted to date on error disclosure involving physicians from multiple specialties in the United States and Canada.[22] However, while all respondents agreed that they should disclose serious errors to patients, many reported certain factors might make them less likely to actually disclose. Anaesthesiologists who had been personally involved in a serious error were also 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 concerning and may reflect the significant emotional impact that serious errors can have on physicians. Furthermore, a number of respondents disagreed that they should disclosure 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, 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 has an error reporting system and agreed that serious errors should be reported to their hospital to improve patient safety.

However, compared to other international studies in other specialities, we found much lower agreement rates for reporting minor errors and near misses. For instance, a 2007 U.S. 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] While 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 the 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, think the incident is too trivial, and be receiving 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 reports are being used to improve patient safety. Anticipated ineffectiveness of reporting has been identified as 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 disclosure or 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]

Instead, the culture of medicine itself may be a more important barrier to error communication than the malpractice environment as has been suggested by Gallagher in 2006.[22] Our results

support this conclusion as we found significant differences in attitudes between departments regarding error communication. 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. While differences between the French and German speaking parts of Switzerland are often expected, this was not confirmed (data not shown as locations have been anonymised). Previous research has found that physician attitudes generally vary more by specialty than by country, which points to the role of medical culture, particularly that of the physicians' specialty, in shaping these views.[22] However, partly due to their sampling technique, these studies did not report on subgroup analysis such as department. In contrast, our study's design has allowed for the comparison of all university hospitals' anaesthesia departments in one country, and our findings suggest that individual department/hospital culture towards error communication differs strongly. As these differences are likely 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 seems to be when it comes to error communication. However, further research is required to examine the reasons behind these department/hospital differences and the action needs to address these.

This study has some limitations. With the response rate being less than 60% (281/542; 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 likely to be generally more motivated and more interested in error communication 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 communicated errors with 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 remains clearly 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 found between departments regarding error communication suggests 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, while 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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**3. Conflicts of interest:** Daniel H. Scheidegger was head of one of the participating departments during the study. The authors have no other competing interests to declare.

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**Tables**

**Table 1. Characteristics of the Respondents**

| **Characteristic** | **Total** | **Statistics** [a] |
|---|---|---|
| | **N=281 (%)** | |
| Response rate [b] | 52% | $\chi^2(4)=33.4$, p<.001 |
| Age [c] | 38.4 (8.62) | F(4, 274) = 3.49, p=.008 |
| Sex | | $\chi^2(4)=9.69$, p=.046 |
| Male | 158 (56) | |
| Female | 123 (44) | |
| Years in practice [d] | 11.7 (8.89), 9.0 | F(4,274)=5.07, p<.001 |
| Position [e] | | $\chi^2(12)=84.9$, p<.001 |
| Chief | 12 (4) | |
| Senior | 100 (36) | |
| Chief Resident | 35 (13) | |
| Assistant | 134 (48) | |
| %Time in direct patient contact [e f] | | $\chi^2(8)=8.77$, p=.36 |
| 0 | 1 (<1) | |
| 1-25 | 2 (1) | |
| 26-50 | 20 (7) | |
| 51-75 | 76 (27) | |
| 76-100 | 182 (65) | |

[a] Statistics report the differences between the five departments.

[b] Response rate is based on 281 respondents of 542 total possible.

[c] Data is given as mean (SD).

[d] Data is given as mean (SD), and median.

[e] Due to rounding, total percentages can exceed or fall below 100%.

[f] For the test, groups 1–3 were combined due to small cell sizes.

**Table 2. General Experience and Attitudes Regarding Medical Errors**

| Statement | Total | Statistics [a] |
|---|---|---|
| | **N=281 (%)** | |
| Error involvement: [b] | | |
| Serious Error | 116 (41) | $\chi^2(4)=8.97$, p=.062 |
| Minor Error | 220 (78) | $\chi^2(4)=3.00$, p=.555 |
| Near Miss | 240 (85) | $\chi^2(4)=3.55$, p=.471 |
| None [c] | 5 (1.8) | |
| Medical errors are a serious problem | 219 (78) | $\chi^2(4)=3.91$, p=.418 |
| Medical errors are usually caused by system failures [d e] | 160 (57) | $\chi^2(4)=31.1$, p<.001 |
| Likely to receive a malpractice complaint within the next year [f] | 166 (59) | $\chi^2(4)=24.1$, p<.001 |

[a] Statistics report the differences between the five departments.

[b] Data are given as proportion of each group that responded "yes" to the statement.

[c] Cell sizes too small to be analysed

[d] Data are given as proportion of each group that agrees with the statement. "Agree" includes those who agree plus those who strongly agree. [e]

[f] Data are given as proportion of each group that it was somewhat likely or likely that they will receive a malpractice complaint within the next year.

**Table 3. Disclosing Errors Disclosure to Patients**

| Statement | Total | Statistics [a] |
|---|---|---|
| | **N=281 (%)** [b] | |
| Patients should be informed about: | | |
| Serious Errors [c] | 228 (81) | $\chi^2(4)=24.3$, p<.001 |
| Minor Errors [d] | 215(77) | $\chi^2(4)=34.8$, p<.001 |
| Near Misses [d] | 53 (19) | $\chi^2(4)=2.28$, p=.684 |
| Disclosing a serious error | | |

| | | |
|---|---|---|
| would: [d] | | |
| Be very difficult | 175(63) | $\chi^2(4)=14.1$, p=.007 |
| Damage patient's trust in my competence | 79 (28) | $\chi^2(4)=12.8$, p=.012 |
| Make it less likely that a patient would sue me | 197(71) | $\chi^2(4)=17.1$, p=.002 |
| Previous disclosure training [e] | 33 (12) | $\chi^2(4)=10.6$ p=.031 |

| | |
|---|---|
| Interest in receiving disclosure training [f] | |
| Not at all interested | 18 (6) |
| Somewhat interested | 144(51) |
| Very interested | 118(42) |

[a] Statistics report the differences between the five departments.

[b] Due to missing data, total responses range from 281 to 277. Missing data for a department did not exceed 2 responses for any question.

[c] Data are given as proportion of each group that strongly agrees with the statement. 100% of respondents either agreed or strongly agreed with the statement.

[d] Data are given as proportion of each group that agrees with the statement. "Agree" includes those who agree plus those who strongly agree.

[e] Data are given as proportion of each group that responded "yes" to the statement.

[f] Due to rounding, total percentages can exceed or fall below 100%. Cell sizes were too small to be analysed.

**Table 4. Reporting Errors within the Hospital**

| **Statement** | **Total** | **Statistics** [a] |
|---|---|---|
| | **N=281 (%)** [b] | |
| Doctors should report to their hospital: [c] | | |
| Serious errors [d] | 269 (97) | |
| Minor Errors | 206 (74) | $\chi^2(4)=40.7$, $p<.001$ |
| Near Misses | 163 (59) | $\chi^2(4)=31.5$, $p<.001$ |
| My hospital has an error reporting system (Yes) [d e] | 258 (93) | |
| Errors personally reported [f] | | |
| Serious Error | 82 (32) | $\chi^2(4)=6.00$, $p=.200$ |
| Minor Error | 147 (57) | $\chi^2(4)=14.7$, $p=.005$ |
| Near Misses | 166 (65) | $\chi^2(4)=33.2$, $p<.001$ |
| None | 45 (18) | $\chi^2(4)=22.0$, $p<.001$ |
| System changes occur in hospital after errors are reported [c f] | 189 (74) | $\chi^2(4)=15.7$, $p=.002$ |
| Current reporting systems are adequate. [c] | 173 (63) | $\chi^2(4)=15.7$, $p=.003$ |

[a] Statistics report the differences between the five departments.

[b] Due to missing data, total responses range from 281 to 276. Missing data for a department did not exceed 2 responses for any question.

[c] Data are given as proportion of each group that agrees with the statement. "Agree" includes those who agree plus those who strongly agree.

[d]Cell sizes were too small to be analysed.[e] Data are given as proportion of each group that responded "yes" to the statement.[f] Data are given as proportion 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.

**List of Supplemental Digital Content**

Supplemental Digital Content 1.docx

Supplemental Digital Content 2.docx

Supplemental Digital Content 3.docx

Supplemental Digital Content 4.docx

Supplemental Digital Content 5.docx

Supplemental Digital Content 6.docx

Supplemental Digital Content 7.docx