

## SCIENTIFIC REPORT

# “Near misses” in a cataract theatre: how do we improve understanding and documentation?

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**Aim:** Near miss event reporting is widely used in industry to highlight potentially unsafe areas or practice. The aim of this study was to see if a descriptive method of recording near misses was an appropriate method for use in an ophthalmic operating theatre and to quantify how many untoward events were recorded using this system.

**Methods:** The study was wholly conducted in a cataract theatre in the United Kingdom. The theatre nurse assigned to the patient in their journey through the operating theatre was asked to note any untoward events. As, at present, there is no consensus definition of near misses in ophthalmology the nurses recorded, in free text, any events that they considered to be a deviation from the normal routine in that theatre.

**Results:** Of the 500 cases randomly chosen, 96 “deviations from normal routine” were described in 93 patients—that is, 19% of cases. All forms distributed to the nurses were returned (100% response rate). The commonest abnormal events were intraoperative (69), with a lesser number being recorded preoperatively (27). When these events were further classified, it was thought that 25 could be classified as near misses. One true adverse event was recorded during the study.

**Conclusions:** The results suggest that experienced nursing staff in an ophthalmic theatre are a reliable source for collecting data regarding near misses. A consensus is now required to define near misses in ophthalmology and to devise a user friendly input system that can use these definitions to consistently record these potentially vital events.

It is increasingly recognised that within health systems patients can sometimes come to harm.<sup>1</sup> The prevalence of iatrogenic harm has been shown to be much higher than previously thought.<sup>2,3</sup> This has led, in recent years, to an increased interest in the study of patient safety within healthcare systems. Central to this study has been the development of definitions of harm or near harm that patients can and do suffer. Thus a “adverse healthcare event” is an event or omission during clinical care causing physical or psychological injury to a patient. A healthcare “near miss” is a situation in which an event or omission, or a sequence of errors or omissions, arising during clinical care fails to develop further (as a result of compensating action), thus preventing injury to a patient.<sup>1</sup>

In most hospitals, adverse incidents are reported using a central adverse incident reporting system. Few systems however encompass near misses. Near misses occur more frequently than actual adverse incidents and they provide a valuable opportunity for learning by quantitative analysis about the nature, frequency, and types of safety issues.<sup>2</sup> The importance of near misses is that they can indicate where flaws in systems lie. The weakness of them is that the lessons

they can offer are ignored because the patient has not come to harm.

In most hospitals, adverse events are reported through an established incident reporting system tailored to individual hospitals. However, near misses are not usually systematically recorded, unlike in industry.<sup>4–7</sup> Near misses outnumber adverse events in a relationship that was quantified over 60 years ago by Heinrich, who estimated that for every 300 near misses there would be 29 minor injuries and one major injury.<sup>1</sup>

If we are to utilise lessons from near misses, we need to know how often they occur and in what circumstances. Before this can be done near miss events need to be defined on the basis of their likelihood and consequences. In ophthalmology there is, as yet, no clear definition of near misses. It is therefore difficult to subject them to quantitative methods of analysis. Other specialties have indicated that the operating theatre is one of the commonest sites of errors and near misses—and the area with the greatest potential for serious harm from these.<sup>8</sup> We thought that cataract surgery represented a good model for analysing operating theatre errors—it is a common operation, complications can be sight threatening, and it has the highest indemnity claims in ophthalmology.<sup>9–11</sup>

The purpose of this study was thus to devise an acceptable method of recording near misses in a theatre dedicated to cataract surgery. Since near misses in ophthalmology have not been fully defined, we decided to use a descriptive method to record experienced theatre nurses’ perception of what they considered to be “deviations from the routine.”

## METHOD

The study was conducted at a single specialty ophthalmic hospital with a dedicated high volume cataract theatre. The theatre has an annual turnover of over 5000 patients.

The system employed in this theatre is that on the day of the operation the patient is assigned a named nurse called the “primary nurse.” The duties of the primary nurse are to accompany the patient throughout their time in theatre—they are also responsible for filling in the operative notes. Because they chaperone the patient throughout their visit to the cataract theatre but are not involved in the mechanics of the surgery, we thought them to be in the best position to record the events surrounding the operation. We thus asked the primary nurses to report any event during their patient’s visit to the theatre that they considered to be a “deviation from routine.”

All the nurses who participated in the study were trained ophthalmic nurses experienced in cataract surgery. They were not asked to categorise their comments into near misses or adverse events but simply to describe events that struck them as “deviations from routine” during surgery. The method of reporting was anonymous in that the nurses did not need to identify themselves or any other member of the team.

**Table 1** Reasons given for delay in starting the operation

Delay	Number
Late surgeon	2
Late anaesthetist	1
Autoclave delay	2
Trials phaco machine	2
Complicated procedure in previous patient	2
Preoperative refraction required	1
Delay in acquiring patient's notes	1 (NM)
No cause stated	1

NM, near miss.

**Table 2** Anaesthetic problems noted

Anaesthetic problems	Number
Painful peribulbar injection	1
Venous cannulation tissues	1
Difficult cannulation	2

A total of 500 cases in the year 2002 were randomly chosen. The selected patients' names, hospital identification numbers, and dates of operation were printed on A4 sheets and distributed to the primary nurses at the start of every list. The sheets were otherwise blank to allow free text.

## RESULTS

All 500 distributed sheets were returned (response rate 100%). Most response sheets had "uncomplicated," "nothing to report," or "nothing untoward" written on them. Ninety six sheets had responses that the nurses thought described deviations from the routine. Three patients had more than one deviation during their operation. No patients had more than two recorded. Therefore, in this study 93 (19%) patients had, what the primary nurse considered to be, a deviation from the normal routine during their visit.

Although these deviations were reported by the primary nurses in a descriptive manner, for ease of presentation and analysis we have categorised their responses into preoperative, intraoperative, and postoperative events. These are summarised below:

### (1) Preoperative "deviations from routine"

- Delay in starting operation, 12 (2.5%) cases (table 1)
- Anaesthetic problems, four (1%) cases (table 2)
- Miscellaneous, 11 (2%) cases (table 3).

### (2) Intraoperative "departures from routine"

- Extended surgery, four (1%) cases.
- (Analysis of the theatre logbook indicated they were all over 20 minutes. None involved any surgical complication.)
- Defective instruments, 20 (4%) cases (table 4)
  - Difficult operation, 14 (3%) cases (appendix, table A1)
  - Complications, 26 (5%) (appendix, table A2)
  - Miscellaneous, five (1%)

(One case incorrect intraocular lens brought by the floor nurse. Three cases of "contamination" of surgical field by the patient. One case of a patient with known allergy to cefuroxime was given the drug subconjunctivally.)

**Table 3** Other preoperative deviations recorded

Miscellaneous	Number
Biometry error	5 (NM)
Incorrect patients' notes	3 (NM)
Consent form not signed by patient	1
Checklist not signed by surgeon	1
5% povidone iodine not available	1 (NM)

NM, near miss.

**Table 4** Defective instrument events recorded

Defects	Number
Phaco machine failure	2 (NM)
Phaco probe blocked	10 (NM)
Irrigation aspiration canula blocked	1 (NM)
Defective forceps	5
Problem with microscope settings	1
Mark on intraocular lens	1 (NM)

NM, near miss.

### (3) Postoperative (from completion of surgery to discharge) "departures from routine."

No incident was documented in this study.

After categorising these deviations, we assessed which deviations we thought could be classified as near misses and which as true adverse events. This was inevitably a subjective interpretation. Although we have given standard definitions in our introduction there remains considerable debate surrounding these definitions (see [www.safetyandquality.org/definition/smlhome.htm](http://www.safetyandquality.org/definition/smlhome.htm) for further discussion of this). The results of our deliberations are documented in table 5. Near misses (which we defined as having the potential to cause harm if correcting action was not taken) are denoted by "NM" in the remaining tables. As far as true adverse events (that is, where the patient did come to temporary or permanent harm) are concerned, we thought there was only one of these—the patient who was known to have a cefuroxime allergy and was given the drug. The patient developed some itchiness and was observed until this abated—resulting in some delay to the patients discharge. This adverse event was reported via the standard hospital system.

## DISCUSSION

### General findings

This descriptive study found 96 occurrences in 93 patients (out of a total of 500), which the primary nurse thought deviated enough from the normal routine to record.

Although it was one of the commonest recorded events, "complications" or "difficult surgery" has been excluded from this analysis as we thought that these represented well recognised and unavoidable variations in surgical difficulty. For full details of these see the tables in the appendix. It is important to note that none of the near misses described resulted in a complication in this study.

Excluding the above, the commonest deviation was defective instruments—described in 20 cases. The most common problem was blocking of the phaco tip, followed by defective forceps and then failure of the phaco machine itself. The majority of deviations in this category we thought could be categorised as potential near misses.

A number of preoperative events could also be classified as near misses. These included biometry errors, incorrect patient notes (corrected before commencement), and iodine not available. "Delay in starting operation" cannot be called a near miss in itself but could contribute to creating an environment in which near misses/adverse events are more likely to occur.

**Table 5** Recorded deviations from routine, assessment of number of near misses within this and number of adverse events

	Number of deviations from routine	Number of near misses	Number of adverse events
<b>Preoperative</b>			
Delay in starting operation	12	0	0
Anaesthetic problems	4	0	0
Miscellaneous	11	9	0
Total	27	9	0
<b>Intraoperative</b>			
Extended surgery	4	0	0
Defective instruments	20	14	0
Difficult operation	14	0	0
Complications	26	0	0
Miscellaneous	5	2	1
Total	69	16	1
<b>Postoperative</b>	0	0	0
<b>Totals</b>	<b>96</b>	<b>25</b>	<b>1</b>

No postoperative complications were described in this study—this is the time the primary nurse helps the patient leave the theatre before preparing them for discharge and it is likely that they had too limited a time to record any untoward events. In our study this was therefore not a useful method of recording deviations.

Overall, we assessed that 25 of the “deviations” could be classified as near misses. Thus, 5% (25/500) of cases had a near miss. With one case classified as a true adverse event, we have calculated the Heinrich ratio from this study as 25:1.

**Usefulness of study method**

The aim of this study was to test if a simple, open ended method of recording untoward events in theatre would be feasible. Our response rate (100%) suggests that the method itself was efficient and that the personnel chosen (the primary nurse) was best placed to record these events.

The nurses thought that in 19% of operations, there were deviations from the routine that were worth reporting. These positive responses are interesting in that they provide us with information which probably would not have been documented elsewhere but could have a significant impact on the outcome of cases in any operating list. The figure does need to be treated with some caution as we did not assess any deviations that the nurses either missed or did not record. Indeed, it may be speculated that they are likely to under-record these events in the “heat of the moment.”

As described previously, there are, at present, no universally agreed definitions of near misses in ophthalmology. This study suggests that our method may be a useful first step in creating these definitions.

The advantages of this “blank canvas” recording method include the fact that the observer is not forced to choose from a predetermined range of choices making it more likely that a wider range of deviations are noted. For example “phaco probe blocked” is not something that would be reported in any adverse event system but it represents a situation where if the blockage is suddenly relieved the posterior capsule may be ruptured. It was shown in this study to be relatively common and is preventable.

The descriptive method is only really useful though as a starting point as it produces a large amount of data, not all of which may be relevant (for example, variations in surgical difficulty). For a near miss reporting system to be generalisable there needs to be a consensus from ophthalmologists, theatre nurses, and other theatre personnel. Our definitions of near misses in this study were subjective and future work

needs to use this consensus as a basis for devising a practical near miss recording system.

**CONCLUSION**

The aim of the medical profession is to provide safe, humane, and up to date care individualised to every patient. In order to provide our patients with a safer healthcare system, errors need to be documented, types of errors and trends and factors contributing to errors need to be identified. Near misses often appear insignificant but when analysed systematically can provide valuable information about “weak links” in a system. Our study suggests that experienced nursing staff in an ophthalmic theatre appear to be a reliable observers and the descriptive methods they used appeared acceptable.

The results of the study now need to be refined to produce a definition of important near misses in cataract theatres. Once these definitions and guidelines have been devised a user friendly but flexible input system needs to be developed. This will then allow us to analyse the frequency and patterns of near misses and in the long term increase patient safety in this commonest of operations.

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**APPENDIX**

**Table A1** Reasons given for “difficult” surgery

Difficulties recorded	Number
Bulging eye	2
Small eye	1
Small pupil	1
Iris prolapse	1
Hyphaema	2
Dense cataract	2
Subluxated lens preoperatively	1
Patient positioned upright because of orthopnoea	1
Patient moving at operation	3

**Table A2** Complications noted during surgery

Complication recorded	Number
Posterior capsule rupture	5
Zonule rupture	1
Anterior vitrectomy	2
Conversion to extracapsular technique	2
IOL damaged at folding	1
IOL damaged at insertion	11
Painful operation	4

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