Distraction and interruption in anaesthetic practice

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Editor’s key points

- This important study provides evidence of how distractions in anaesthesia practice can compromise patient safety.
- The authors observed 30 procedures and held interviews for qualitative data gathering.
- Of 424 distracting events, 92 (22%) were judged to have negative effect.
- This study provides insight into how anaesthetists can develop strategies to manage distractions.

Background. Distractions are a potential threat to patient safety. Previous research has focused on parts of the anaesthetic process but not on entire cases, and has focused on hazards rather than existing defences against error.

Methods. We observed anaesthetists at work in the operating theatre and quantified and classified the distracting events occurring. We also conducted semi-structured interviews with consultant anaesthetists to explore existing strategies for managing distractions.

Results. We observed 30 entire anaesthetics in a variety of surgical settings, with a total observation time of 31 h 2 min. We noted 424 distracting events. The average frequency of distracting events, per minute, was 0.23 overall, with 0.29 during induction, 0.33 during transfer into theatre, 0.15 during maintenance, and 0.5 during emergence. Ninety-two (22%) events were judged to have a negative effect, and 14 (3.3%) positive. Existing strategies for managing distractions included ignoring inappropriate intrusions or conversation; asking staff with non-urgent matters to return later at a quieter time; preparation and checking of drugs and equipment ahead of time; acting as an example to other staff in timing their own potentially distracting actions; and being aware of one’s own emotional and cognitive state.

Conclusions. Distractions are common in anaesthetic practice and managing them is a key professional skill which appears to be part of the tacit knowledge of anaesthesia. Anaesthetists should also bear in mind that the potential for distraction is mutual and reciprocal and their actions can also threaten safety by interrupting other theatre staff.

Keywords: anaesthetist, risks; complications; distractions; patient safety

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Distractions and interruptions are common in many healthcare settings. It is well recognized in other disciplines, such as aviation, that distraction increases the risk of error and within anaesthesia, distraction has been implicated in the development of critical incidents. In recent years, studies have been conducted to analyse how the theatre environment affects surgical performance. Later studies have examined the anaesthetist and the anaesthetic team, but these have focused on the induction of anaesthesia or split the process down to look at each phase separately, missing critical phases such as transfer between anaesthetic room and theatre. In contrast, we aimed to determine the frequency and nature of distracting events to the anaesthetist throughout the entire anaesthetic process and to analyse the possible consequences these might have on the patient. Further, Reason’s systemic model of accident causation not only describes hazardous acts and omissions but also postulates the presence of countervailing factors which act to mitigate or neutralize the hazards. This system property is termed resilience, and our secondary aim was to explore this by documenting the existing strategies already used by practising anaesthetists in dealing with distractions and interruptions. We proposed to do this by conducting and qualitatively analysing in-depth interviews with experienced anaesthetists.

Methods

Study design

Approval for the study was obtained from the local research ethics committee (North West 11 Research Ethics Committee—Preston; REC reference number 10/H1016/69). Written informed consent was given by each anaesthetist observed and interviewed; spoken consent was also obtained from the patient and theatre team. Data were collated and then anonymized before being shared with the rest of the research team.

Participants, setting, and sampling

Data were collected from real-time observations of patient care (a ‘case’ being defined as the time from when anaesthetist and patient entered the anaesthetic room until patient discharge to recovery). In most UK hospitals, there is an ante-room to the operating theatre where anaesthesia is induced.
This separate arrangement allows the operating theatre to be cleaned and prepared without disturbing the patient and anaesthetist as they prepare for the next operation. We aimed to observe a selection of cases so as to include both elective and emergency cases, a range of specialities, different theatres, and as many anaesthetists as possible. In our institution, anaesthetics are administered by one anaesthetist assisted by an operating department practitioner (ODP) or anaesthetic nurse. This team is often expanded with the addition of a trainee and the session would then be considered a teaching list. Observations focused solely on distractions encountered by the anaesthetist. As the observer became more experienced, the sampling was expanded to include teaching lists, although observations still focused on the primary (senior) anaesthetist. The study was conducted over a period of 6 months and only one case per operating session was observed so as to include as many different teams and theatres as possible. Detailed, in-depth structured interviews were then also performed with some of the participating consultants.

We decided to perform 15 interviews as this represents approximately two-thirds of the consultants in the study hospital. Each respondent was interviewed after he/she had been observed, at an interval varying from days to weeks.

Observations

The data were collected by G.C. (senior anaesthetic trainee). To make the observations more rigorous and reduce bias, she discussed her approach and any emerging issues with the senior researcher throughout the observation period, most intensively after the initial pilot testing of the data collection sheet. The observer positioned herself in the anaesthetic room so as not to disrupt usual anaesthetic practice but still able to clearly see any distractions and their effects on the anaesthetist. The observer then followed the anaesthetist and patient into theatre and positioned herself near the corner of the room where she had a clear view. Observations were deemed complete when care was handed over to recovery staff. Notes were recorded during the observation periods by hand on a structured and piloted data recording form. This form included basic details about the case, and allowed the recording of the time, source of the distraction/interuption, and a description of the event. The section for recording in the anaesthetic room was split into specific tasks (drawing up medications, insertion of airway device, etc.), whereas the maintenance component was not structured as the tasks during this period are less ordered and defined. For the purposes of definition, a distraction was taken to be something which would not normally be considered within the anaesthetist’s primary role of maintaining anaesthesia and appropriate physiological variables. A negative consequence was defined as one of the following: interruption preventing smooth induction of anaesthesia, deterioration in physiological variables, repeated attempts at a practical procedure, brief periods where the patient was unattended by the anaesthetist, delays in transfer, and malfunctioning equipment.

Whether a distraction caused a negative consequence or not was recognized to be subjective, but we decided that if a consequence was closely related in time to the distracting event, it could justifiably be associated with it.

Interviews

Many distractions can be easily observed and quantified, but there are many which can only be detected through asking questions of anaesthetists. In addition to providing such material, collecting data from two different angles allows the findings from one to be cross-checked and validated against the other (a process known as triangulation). We therefore conducted semi-structured interviews based on the questions set out in Figure 1. Interviews were recorded, transcribed, and later analysed. This allowed us to improve our understanding of what individual anaesthetists believe constitutes a distraction and also when and where distractions and interruptions take place. Further, we planned to gather anaesthetists’ views on the potential impact and consequences of these distractions on patient safety and well-being.

Data analysis

All observational fieldnotes were transcribed onto a computer spreadsheet (Microsoft Excel™) after data collection. All distractions were classified according to a categorization system adapted from the work of Savoldelli and colleagues. Distracting events were divided into three groups—potential distraction, distraction, or interruption—then further divided according to their origin, source, and consequences (Fig. 2 and Table 1). The frequency, although not the duration, of distracting events was noted.

For the interview data, we used an inductive approach to analysis, which was performed in several stages. Transcripts were read individually by members of the research team, then analysed to develop general categories and sub-themes to give a picture of what individual anaesthetists see as distractions and interruptions, where these are most common and/or threatening to patient safety, and what coping mechanisms they have developed to counteract their effects. The research team then met and, through comparing, contrasting and debating the topics which emerged from each individual’s own analytical process, agreed on the validity of each. Data from observations and interviews were collated to establish what existing strategies anaesthetists use for managing distractions.

Results

Observations

Thirty anaesthetics were observed from the arrival of anaesthetist and patient until discharge to recovery. Details of patients and anaesthetists are given in Table 2. In total, 28 different anaesthetists were observed. Twenty-six cases observed were with a single anaesthetist (consultant or
trainee) working with an ODP or anaesthetic nurse. A number were observed more than once; four cases had two anaesthetists each. Observations took place with eight different theatres and theatre teams.

We observed 1862 min (31 h 2 min) of anaesthetic time, of which 481 min (6 h 1 min) were spent in the anaesthetic room. The cases were representative of the workload at a district general hospital: seven cases were orthopaedics and trauma, seven gynaecology, seven general surgery, six head and neck, two urology, and one ophthalmology. Twenty-nine were general anaesthetics, in 20 of which the airway was secured with a laryngeal mask airway and nine with a tracheal tube; the remaining case was a spinal anaesthetic with i.v. sedation.

The distribution of distracting events is shown in Table 3. During the observation period, 424 distracting events occurred, amounting on average to one event every 4 min 23 s (0.23 min⁻¹). These occurred most frequently during emergence, with one distracting event on average every 1 min 59 s (0.5 min⁻¹). The frequencies at other phases of the anaesthetic were: induction 0.29 min⁻¹, transfer 0.33 min⁻¹, and intraoperatively 0.15 min⁻¹. Examples of common distractions are given in Table 4.

Most distracting events were associated with no consequences for the patient. Ninety-two (22%) were associated with negative patient consequences as defined under ‘Observations’ in the Methods section. These are listed in Table 5. Fourteen (3.3%) distracting events were associated with
positive consequences, where either the procedure or safety of the patient was facilitated by the distraction.

Distracting events were classified into three categories: potential distraction (112), distraction (223), and interruption (89), then further coded according to their source and origin. One hundred events were external in source; the remaining 324 were internal. Sources of distraction were: internal team members (162), workspace (91), external team members (53), equipment (46), noise (23), anaesthetist-initiated (14), patient (13), and communication (12). Interruptions were

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**Table 1** Definitions used in study (modified from Savoldelli and colleagues)\(^6\)

<table>
<thead>
<tr>
<th>Variables</th>
<th>Definitions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>Potential distraction: a stimulus that may prevent someone from concentrating</td>
</tr>
<tr>
<td></td>
<td>Distraction: a stimulus that results in an observable response but not cessation of activity</td>
</tr>
<tr>
<td></td>
<td>Interruption: a stimulus that briefly requires the attention of the anaesthetist</td>
</tr>
<tr>
<td>Source</td>
<td>Internal: distracting event directly related to patient management activities</td>
</tr>
<tr>
<td></td>
<td>External: distracting event not related to patient management activities</td>
</tr>
<tr>
<td>Table</td>
<td>If internal</td>
</tr>
<tr>
<td>Team member</td>
<td>any member of anaesthetic team while in the anaesthetic room or any member of the theatre team while in theatre</td>
</tr>
<tr>
<td>Patient</td>
<td>any patient-related factor that distracts the anaesthetist from another task</td>
</tr>
<tr>
<td>Workspace environment</td>
<td>any event related to the ergonomics of the anaesthetic room or operating theatre</td>
</tr>
<tr>
<td>Equipment</td>
<td>equipment or item failing, any alarm that goes off inappropriately</td>
</tr>
<tr>
<td>Noise</td>
<td>any non-essential conversations held or background noise</td>
</tr>
<tr>
<td>Phones, bleeps</td>
<td>to include mobiles and hospital communication equipment</td>
</tr>
<tr>
<td>Other</td>
<td>any other distracting event not included in other classifications</td>
</tr>
<tr>
<td>Patient consequences</td>
<td>No observable consequence: the distracting event had no observable impact on patient management</td>
</tr>
<tr>
<td>Negative consequences</td>
<td>the distracting event was associated with suboptimal patient management</td>
</tr>
<tr>
<td>Positive consequences</td>
<td>the distracting event improved or facilitated patient management</td>
</tr>
</tbody>
</table>

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**Table 2** Patient and anaesthetist characteristics

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient gender</td>
<td>12 male, 18 female</td>
</tr>
<tr>
<td>Patient age group</td>
<td>1 aged &lt; 5, 4 aged 6–18, 23 aged 19–70, 2 aged 80+</td>
</tr>
<tr>
<td>ASA grade I:II:III</td>
<td>15:12:3</td>
</tr>
<tr>
<td>Urgency of procedure</td>
<td>4 cases urgent, 26 elective</td>
</tr>
<tr>
<td>Anaesthetist gender</td>
<td>19 male, 15 female</td>
</tr>
<tr>
<td>Anaesthetist grade</td>
<td>1 basic trainee, 8 advanced trainees, 23 consultants, 2 staff grades</td>
</tr>
<tr>
<td>Number anaesthetists per case</td>
<td>26 solo anaesthetist, 4 teaching cases</td>
</tr>
</tbody>
</table>

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**Table 3** Frequency of distracting events during different phases of anaesthetic

<table>
<thead>
<tr>
<th>Phase of anaesthetic process</th>
<th>Number of distracting events</th>
</tr>
</thead>
<tbody>
<tr>
<td>In the anaesthetic room</td>
<td>138 (0.29 min(^{-1}))</td>
</tr>
<tr>
<td>Between leaving anaesthetic room and first skin incision</td>
<td>72 (0.33 min(^{-1}))</td>
</tr>
<tr>
<td>Intraoperatively</td>
<td>153 (0.15 min(^{-1}))</td>
</tr>
<tr>
<td>During emergence (before transfer to recovery)</td>
<td>61 (0.5 min(^{-1}))</td>
</tr>
<tr>
<td>Total</td>
<td>424 (0.23 min(^{-1}))</td>
</tr>
</tbody>
</table>

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**Table 4** Examples of common distractions in the anaesthetic room and operating theatre. *Noise such as background music or radio was only recorded once when it was switched on unless turned up or staff otherwise distracted by it again

<table>
<thead>
<tr>
<th>Source</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internal team member</td>
<td>Unrelated conversation with ODP, trainees, students; requests to complete paperwork; inappropriately timed WHO surgical safety checklist</td>
</tr>
<tr>
<td>Workspace</td>
<td>Difficulty moving around due to space limitations or equipment blocking the way; ODP needing to leave and fetch equipment stored elsewhere; anaesthetist needing to check details in theatre, trips to anaesthetic room to collect drugs, equipment, or monitor readings; use of theatre as a thoroughfare, equipment/furniture obstructing passage, insufficient staff for transfer</td>
</tr>
<tr>
<td>External team member</td>
<td>Surgeons, recovery staff, or other anaesthetists entering the anaesthetic room to ask questions or locate equipment</td>
</tr>
<tr>
<td>Equipment</td>
<td>Inappropriately set alarms; broken/temperamental equipment; lack of equipment</td>
</tr>
<tr>
<td>Noise*</td>
<td>Music, radio, noise outside door</td>
</tr>
<tr>
<td>Anaesthetist-initiated</td>
<td>Teaching trainees, students, paramedics, nurses</td>
</tr>
<tr>
<td>Patient</td>
<td>Conversation to reassure them, one patient problem distracting from another</td>
</tr>
<tr>
<td>Communication</td>
<td>Mobile phones, bleeps, pagers</td>
</tr>
</tbody>
</table>
Distractions and safety

of the greatest concern as 49 (55%) of these were associated with negative patient consequences (Table 5). Further, distracting events were not evenly distributed over time and often occurred together. Finally, the directions of the effect of individual events—some negative, others positive—combine and their overall net impact can be conceptualized as in the specific examples illustrated in Figures 3 and 4. For instance, in Figure 4, there is a potential benefit to the patient from working through the WHO checklist or fetching a stethoscope from the anaesthetic room, but both actions present a risk also.

Table 5 Negative patient impact associated with distracting events

<table>
<thead>
<tr>
<th>Negative consequence</th>
<th>Distraction</th>
<th>Interruption</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deterioration in physiological variables</td>
<td>8</td>
<td>9</td>
</tr>
<tr>
<td>Prevention of smooth induction of anaesthesia</td>
<td>7</td>
<td>3</td>
</tr>
<tr>
<td>Repeated attempts at procedures</td>
<td>6</td>
<td>1</td>
</tr>
<tr>
<td>Brief periods when the patient was unattended by anaesthetist</td>
<td>0</td>
<td>25</td>
</tr>
<tr>
<td>Delays in procedure (including transfer, reconnecting monitoring, and responding to other tasks)</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Malfunctioning equipment</td>
<td>11</td>
<td>1</td>
</tr>
</tbody>
</table>

People coming into the anaesthetic room for whatever reason, surgeons coming in and checking things or people sticking their head in, noises going on in theatre as well when they’re cleaning theatre. They’re probably the most frequent ones. (Interview M)

The distractions are almost always things from outside the natural or expected progress of the anaesthetic but that would also include chatting with your colleagues because it’s quite common. The ODPs in particular are very good at chatting to patients and sometimes that can extend to you which may or may not be distracting. . . . That can then once the patient is asleep be extended, that can be a distraction because you’re chatting to the ODP about football or something and you’d not be paying attention to the patient. (Interview D)

Spatial and temporal patterns in distraction

Distractions may occur at the wrong time, in the wrong place, or indeed both simultaneously. In terms of spatial patterns, respondents made it clear that the anaesthetic room is both the most sensitive area for the patient’s well-being, as far as the anaesthetist’s task is concerned, but also one of the areas where distractions are very likely to take place. Although observed distractions were most frequent during emergence from anaesthesia, respondents’ perceptions that they were most common in the anaesthetic room may reflect their view that other staff may not fully appreciate the nature of anaesthetic induction:

I think during induction is probably the most vital point and I think in the main [operating room] there aren’t very many distractions during [the case]. There’s nothing that leaps to mind except for inappropriate people coming and going and really not treating the anaesthetic room as a separate anaesthetic room but treating it as a thoroughfare which . . . can certainly interrupt at time of induction. (Interview I)

Likewise, distractions can represent a violation of temporal boundaries, in that they constitute tasks which may be necessary and appropriate, but performed at the wrong time. Thus, around the time of emergence from anaesthesia, the conflict between roles and priorities of different members of staff can become apparent on aspects of patient care that are relevant to their own professional duty, demonstrating disregard for, or at best ignorance of, the anaesthetic process and the risks associated with its different stages:

I don’t think people quite appreciate that emergence is as important as induction really and sometimes they’re just glad to have finished off their case. They’re crashing and banging and moving on and fail to realise. (Interview E)

Quite often the issue might be you’ve got the patient onto the trolley ready to go to recovery, the recovery nurse is there, the ODP’s there concentrating, but the theatre staff behind . . . basically as far as they’re concerned the job’s finished. They’re there moaning, yelling or talking about the next case. I do find that distracting because I think: ‘we haven’t actually finished this case yet’. (Interview O)

Finally, although observed distractions were frequent during the period between leaving the anaesthetic room and the start of surgery, this period received little comment from respondents.

Interviews

We conducted 15 semi-structured interviews, all with consultant anaesthetists. Two were conducted by K.A. (social psychologist), 11 by G.C., and one jointly. There was generally an underlying assumption that distractions and interruptions are an integral part of anaesthetic work and that experienced practitioners have evolved strategies for managing them:

I think distraction is potentially constant if you allow yourself to be [distracted]. If you take in all those things I’ve said, extraneous noise, conversations, radio, theatre things, equipment things, can you just do this, can you connect that, email, text, telephone, people coming in to ask your advice about something. I think unless you’ve got a very good filter I think it’s a potential white noise of distractions. (Interview M)

Main sources of distractions

In line with our observation data, there were some references to ergonomic or personal factors presenting an opportunity for distraction. Our interviewees saw these as infrequent and often coincidental, and made no strong case for their significance as major distractions or interruptions to patient care. Many of our interviewees indicated that it is other healthcare professionals, either involved with the care of the specific patient or other staff, that most often create a distraction or an interruption to the task at hand.
EMERGENCE

Workspace
- mopping, clearing up, emptying bins

Internal team member
- Unrelated chatter

Noise
- Music

Patient (fixation)
- Laryngospasm

Oxygen forgotten to be connected

Internal team member
- Notice error

Oxygen reconnected

NEGATIVE CONSEQUENCE
- Desaturation

POSITIVE CONSEQUENCE
- Sats improved

Example 1 (Case 19):
41-yr-old (ASA I) patient undergoing varicose vein surgery, airway maintained with an LMA, breathing spontaneously anaesthetized by a consultant anaesthetist who was also teaching a foundation doctor. Laryngospasm occurred during emergence and complex series of distractions may have contributed to an adverse event.

Fig 3 Cumulative effect of multiple distractions: first example.

REINTUBATION IN THEATRE

Equipment
- No stethoscope available

Internal team member
- Left room to find stethoscope

Noise
- Radio

Internal team member
- Turned down radio

Workspace
- Surgeon adjusted lights

Internal team member
- WHO checklist whilst patient hypoxic

Internal team member
- Notice error

Internal team member
- Total staff to be quiet

Equipment
- No airway equipment in theatre

NEGATIVE CONSEQUENCE
- WHO checklist ignored

Example 2 (Case 20):
7-yr-old (ASA I) patient was anaesthetized by RSI for an urgent pelvic washout by trainee anaesthetist with 5 years’ experience working alone. Reintubation was required, for endobronchial intubation, in theatre immediately before first skin incision. This occurred amidst many distractions.

Fig 4 Cumulative effect of multiple distractions: second example.
Discussion

This study has revealed that distracting events are frequent in anaesthetic practice. It is the first study we are aware of to observe the anaesthetic process in its entirety, following individual patients from before induction to arrival in the recovery room. Distractions were most numerous during emergence but also common in the time between leaving the anaesthetic room and the surgical incision. They most commonly arose from other members of staff in theatre, and can have negative consequences on patients.

Early studies of anaesthetic vigilance were aimed primarily at measuring workload and only latterly has research focused specifically on distracting events. Previous work on distractions in the operating theatre began with the surgeon as the focus of investigation, for instance, in the study by Healey and colleagues. The authors found an overall average rate of distraction to the members of the sterile operating team of 0.45 min⁻¹ (1 every 2 min 13 s). Within anaesthesia, Savoldelli and colleagues analysed videotape recordings of 37 general anaesthetic inductions for emergency surgery in a Swiss hospital. In line with their usual practice, two anaesthetic practitioners were present for each induction. The authors recorded an average rate of distracting events of 0.7 min⁻¹, and judged 21.5% of the 209 distracting events observed to have a negative impact, with 7.2% positive. Broom and colleagues studied 30 inductions, 30 episodes of anaesthesia maintenance, and 30 emergences, but focused mainly on noise in theatre and the number of members of staff present rather than attempting to quantify distraction.

Our study shares a number of features with the published work described. First is the difficulty classifying distractions and interruptions. This may be one factor contributing to the differing rates noted in different studies. (Another factor is of course the work context, as one might expect more distractions per unit time in emergency inductions, as studied by Savoldelli and colleagues, than during routine maintenance of elective operations. Further, Savoldelli and colleagues also counted distractions affecting the whole team rather than one particular member.) We chose to base our work on Savoldelli and colleagues as it was designed for use in anaesthesia rather than surgery. Second is whether all distracting events taking place have actually been observed. The anaesthetist’s workload—so-called ‘action density’—varies with different phases of the anaesthetic. Further, tasks are often performed simultaneously in sequence so that they overlap, for example, when the anaesthetic assistant begins to position the patient for surgery, while the anaesthetist is still trying to check adequate ventilation through the laryngeal mask airway. This means first that actions may be too dense for all activities to be seen and recorded (although we did not feel that this was the case) and secondly that such ways of working change the nature of what is being observed—a given action might count as a distraction when performed too early, but not when carried out at its appropriate time.

Coping strategies for distractions

Respondents volunteered two main strategies for coping with distractions, namely deliberately ignoring people attempting to distract them, and asking people with non-urgent or irrelevant queries to return later.

I think if I really feel that I am concentrating and I can’t deal with something I would tell somebody to just come back later. As I said before, I think sometimes I do ignore it if it’s not something that needs immediate attention. I just ignore it. (Interview C)

They [distractions] don’t occur too often because I don’t let them. If somebody’s coming in, tries to come in during what I would regard as my time in the anaesthetic room, unless I know they’re there for a specific purpose such as the surgeons wanting to position a patient, then I’ll tell them to leave, please, leave us in peace. So not too much of a problem. I think you have to be assertive enough to say, no, stay out until we’ve done our bit. (Interview J)

The choice between a more proactive and less assertive stance towards other members of staff whose presence/behaviour causes distraction seems to depend on the particular situation and anaesthetist’s temperament. While ignoring those who create distraction might be the easiest and least confrontational way to protect the patient under the anaesthetist’s care, asking people to leave is more direct, and serves the dual purpose of protecting the patient and establishing ‘ownership’ of patient care at that point.

We identified a third strategy implicit in respondent’s accounts, that of learning to manage one’s own attention. This is illustrated, for instance, by the extract from interview M, where the respondent refers to a ‘filter’ to deal with constant potential distraction, although this appears to operate mostly at a subconscious level. This attribute, in common with many of the non-technical skills of anaesthetic practice, does not seem to be formally taught but is clearly a key professional skill. The strategies for managing distractions identified through observations and interviews are summarized in Table 6.

<table>
<thead>
<tr>
<th>Table 6 Existing strategies for managing distractions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Organizational:</strong> preparing and checking drugs for in-theatre use in advance to save returning to anaesthetic room mid-operation; leaving mobile phones in locker or bag; avoid using anaesthetic room for induction; set appropriate alarm limits for patient to avoid unnecessary alarms</td>
</tr>
<tr>
<td><strong>Team-working:</strong> educating and acting as an example to other staff to create awareness of distractions in general and of most critical times for anaesthesia; cultural change in communication</td>
</tr>
<tr>
<td><strong>Personal:</strong> ignoring inappropriate conversations and activities, asking staff with non-urgent queries to return later, rapport with other staff, assertiveness, being aware of one’s own distractibility, managing one’s own emotions and behaviour, concentrating on the job in hand, anticipating problems</td>
</tr>
<tr>
<td><strong>Ergonomic:</strong> physical barriers (anaesthetic room doors), lock, peep hole, remove physical obstructions</td>
</tr>
<tr>
<td><strong>System:</strong> well-planned operating list, appropriate breaks, team brief</td>
</tr>
</tbody>
</table>
Third is the difficulty determining whether a given distraction has a positive or negative effect on the anaesthetist or the patient. As this has to be inferred from the anaesthetist’s behaviour and observed consequences for the patient, this is clearly subjective. We attempted to address this by defining in advance what would constitute a negative consequence. Using two observers might help improve the consistency and reliability of rating, but would involve more people in the operating theatre, which could itself be a distraction. Analysis of videotaped observations is possibly better again, in that recordings can be analysed and reanalysed as required by any number of raters. However, video raises more ethical problems and a fixed video camera might miss events out of its line of ‘sight’. A further alternative would be to investigate the effects of distraction in simulated conditions, as, for instance, in surgery.\textsuperscript{17–19} As this allows investigations to be conducted without the slightest risk of harm to patients, this is superficially attractive, but by isolating the technical task and standardizing the distraction, it is less realistic than the naturalistic observation we have used. Finally, the question of what does and does not constitute a distraction is relevant. This is partly bound up with the issue of consequence, for if a potentially distracting event seems to enhance safe practice, can it be regarded as a true distraction? Common psychological theory\textsuperscript{20} holds that there is an optimal level of arousal for a given task, and if distractions serve to increase attention at periods when there is less activity, then this can be expected to be beneficial. It is thus possible that some events we recorded as distractions might have been functioning to maintain alertness in periods of sparse activity. The benefits and disadvantages of music in the operating theatre have been noted previously\textsuperscript{21} and music at a suitable volume may serve to increase alertness—indeed, one of our respondents noted that staff tend to talk less if music is playing. Likewise some anaesthetists read or undertake non-clinical tasks during the maintenance phase of anaesthesia and this may help them stay alert.

We identified that events were more likely to be regarded as distracting if they violated a boundary, whether spatial, temporal, or professional. For instance, our interview data diverged from the observational material in that distractions were perceived to be much less of a problem during the period between leaving the anaesthetic room and skin incision than during induction, despite having a similar frequency of events. We suggest that this is because transfer is a kind of ‘no man’s land’, in contrast to the anaesthetic room, which is perceived by anaesthetists as their ‘territory’, and the operating theatre, which is very much a public space shared by all staff. Thus, it appears that it is the perception of distraction that is important, and its acceptability seems to depend on this. (It is also possible that the dissonance between what anaesthetists think is happening and what is actually taking place may contribute to a sense of infallibility which may affect safety.) However, transfer into theatre is a hazardous time and distractions in this period can prolong the time where the patient is disconnected from the breathing system and electronic monitoring.\textsuperscript{22} In terms of the anaesthetic room, arguments for and against its routine use for induction of anaesthesia have been made,\textsuperscript{23} but in truth, the room serves a variety of other functions. Especially relevant here are its use as a storage facility (meaning that staff may have to interrupt induction to retrieve equipment) or as a thoroughfare to theatre.

Events are also more likely to be regarded as distracting if they occur at an inappropriate time. Clearly, casual conversation might be acceptable when there are no immediate demands from patient care, but would be less fitting at busy times or when problems occur. Nevertheless, some communication events classified as distractions are essential as team members share vital information, for instance, or talk to and reassure patients before and during induction.\textsuperscript{24,25} Further, communication serves to promote what has been termed ‘distributed situation awareness’\textsuperscript{26} whereby a shared picture of events and their progression is built up by interactions between the anaesthetist, monitoring equipment, and other people in theatre.

It is clear that distractions are an integral part of anaesthetic practice, and dealing with them is a key professional skill. Alertness is among those qualities judged necessary for excellence in anaesthesia\textsuperscript{27,28} but this has to be learned as part of the ‘tacit’ informal knowledge of anaesthesia education;\textsuperscript{11} medical students distracted while performing a simulated surgical task did not realize that they were affected by distraction,\textsuperscript{17} suggesting that the ability to consciously manage one’s attention is learned later in training. Further, the ability to accomplish tasks, including two or more tasks simultaneously or in alternation, may depend not only on inherent task demands and the level of experience but also on methods of training and practice. The theory on the role of practice in task performance is reviewed and developed by Schneider and Detweiler\textsuperscript{29} who suggest that dual-task training has advantages over single-task training and this may be a promising approach in the future.

Nonetheless, we believe that simply making explicit what is often not acknowledged, as we have done here, will allow a more mindful approach to be taken to this skill in anaesthesia education. As in other clinical settings, much can be learned from the interplay between what is done from experience and what is objectively measured.\textsuperscript{30} Finally, although this study has focused on distractions from the perspective of the anaesthetist, clearly our activities and behaviour can potentially be distracting to others around us. (Indeed, one of the sources of distraction for the surgeon in a previous study was alarms from the anaesthetic machine.) We may allow ourselves to take part in activities distracting to others if we feel we are in control of the situation and have the spare cognitive capacity at that point, but we cannot expect others to consider us at crucial times in our work if we do not extend the same consideration to them. This is a matter of professional courtesy but also has an impact on patient safety in that it encourages a shared
team model of the tasks of different team members in relation to patient care.

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References
3 James RH. 1000 anaesthetic incidents: experience to date. Anaesthesia 2003; 58: 856–63
9 Smith AF. Reaching the parts that are hard to reach: expanding the scope of professional education in anaesthesia. Br J Anaesth 2007; 99: 453–6
22 Broom M, Slater J, Ure D. An observational study of practice during transfer of patients from anaesthetic room to operating theatre. Anaesthesia 2006; 61: 943–5
23 Meyer-Witting M, Wilkinson DJ. A safe haven or a dangerous place—should we keep the anaesthetic room? Anaesthesia 1992; 47: 1021–2
28 Smith AF. In search of excellence in anaesthesiology. Anaesthesia 2009; 110: 4–5