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ORIGINAL RESEARCH ARTICLE

Strategies to reduce the risk of unrecognised oesophageal intubation: a survey of Difficult Airway Society members

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Abstract

Background: Despite multiple initiatives and consensus guidelines, preventable deaths from unrecognised oesophageal intubation continue worldwide. We aimed to establish what different organisations are doing to reduce the risk of unrecognised oesophageal intubation.

Methods: This was a cross-sectional survey of Difficult Airway Society (DAS) members using an internet-based survey platform. Members were invited to participate via e-mail over a period of 10 weeks (28 March to 07 June 2023). Results were reported according to the CROSS checklist.

Results: The response rate was 39% (819/2125). About 50% (402/799) of respondents were providing training to reduce the risk of unrecognised oesophageal intubation and 9% (69/799) were planning to. Most of the training (69%; 310/449) is multidisciplinary. However, almost one-third of respondents (31%; 246/799) were from departments that were not planning any training. Non-training-related strategies (including but not limited to increased use of videolaryngoscopy, increased use or improving the interpretability of waveform capnography) were implemented in 39% (297/765) of respondents' departments and planned in 8% (60/765). Nearly one-third (31%; 237/765) were not planning any non-training interventions to reduce risk. Of those who responded, 17% (130/765) were from departments not planning *any* strategies to reduce the risk of unrecognised oesophageal intubation. *Two-person verbal confirmation of capnography* was considered 'extremely' or 'very' helpful by 59% (411/702) of respondents.

Conclusions: Our study suggests that uptake of preventative strategies to reduce the risk of unrecognised oesophageal intubation remains inadequate. The authors suggest it is now time for the Royal College of Anaesthetists, DAS, and the General Medical Council to mandate strategies to reduce the risk of unrecognised oesophageal intubation.

Keywords: airway management; capnography; education; training; unrecognised oesophageal intubation; videolaryngoscopy

Unrecognised oesophageal intubation (UOI) is the unintended placement or migration of a tracheal tube into the oesophagus that is not promptly identified and addressed.[1] This can result in hypoxia, cardiac arrest, and irreversible brain injury or death.[2–5] It is a globally recurring theme reported from all areas where an airway might be managed.[6–14] UOI has been described in a multitude of settings: elective and emergency airway management scenarios, with both junior and experienced airway practitioners from different medical specialties, and in both perceived 'easy' and 'difficult' airways.[2,3,13,15]

Recently, several strategies to reduce the risk of oesophageal intubation have been advocated, including use of a videolaryngoscope, which has been shown to improve rates of easy tracheal intubation[16,17] and first-pass success[18,19] thereby

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reducing the possibility of oesophageal intubation. A recent Cochrane review[20] demonstrated a reduced incidence of oesophageal intubation when using a hyperangulated videolaryngoscope. Although avoidance of oesophageal intubation itself is beneficial to avoid rare complications (such as gastric and oesophageal perforation[21–23]), of utmost importance is the identification and management of oesophageal intubation when it does occur. This is done primarily through the use and correct interpretation of exhaled carbon dioxide (waveform capnography).[1,24] When identification of UOI does not occur, catastrophic consequences ensue from failure of adequate oxygenation.

Analysis of mortality and coronial reports from all over the world reveal that the anaesthetist involved often fails to recognise the warning signs that the tube has not been placed in the trachea. Several initiatives have been undertaken to address this problem, including the Global Capnography Project in Malawi[25] and others in the USA, Canada, Australia, and South Africa. This culminated in the publication of international guidelines from the Project for Universal Management of Airways (PUMA) to address the many institutional, individual, and procedural elements that contribute to this event.[1] In the UK, coroner Dr Sean Cummings released a Regulation 28: Report to Prevent Future Deaths in 2021[12] after the death of Mrs Glenda Logsdail in 2020. Mrs Logsdail was anaesthetised for an appendicectomy (in weekday working hours), but died from irreversible brain damage after a period of prolonged hypoxia and cardiac arrest following UOI. As a result of this, and other coronial reports, strategies have been introduced by (amongst others), the Royal College of Anaesthetists (RCoA), the Safe Anaesthesia Liaison Group (SALG), and the Difficult Airway Society (DAS), leading to a coordinated campaign to prevent the morbidity and mortality associated with UOI.

In 2022, our survey of UK-based RCoA-DAS Airway Leads[26] found that 45% of Airway Leads worked in departments undertaking training on UOI and 36% were in the process of introducing training. However, 19% of Airway Leads were from departments that were not planning any training on this topic. Furthermore, 40% of Airway Leads' departments had introduced non-training strategies to reduce the risk of UOI, and 24% had planned these; but a large minority (36%) of departments were not planning any non-training strategies. Given the importance of this issue and ongoing preventable deaths, we decided to expand the survey to the DAS membership to see whether these strategies had been implemented.

We aimed to establish the training and non-training methods that had been implemented to decrease the incidence of UOI, the perceived barriers preventing departments from introducing methods to reduce the incidence of UOI, and we sought respondents' opinions on two-person verbal confirmation of capnography. Finally, we also wanted to establish whether the prevalence of departmental strategies to reduce the risk of UOI varied according to the role of the respondent, their country of practice, or their main specialty area.

Methods

Study design

This was a cross-sectional survey of DAS members reported according to the Consensus-based checklist for Reporting of Survey Studies (CROSS) checklist.

Data collection methods

A questionnaire was initially devised to survey RCoA-DAS Airway Leads from March to July 2022.[26] This survey was then pre-tested by 10 DAS committee members to assess its relevance to the wider DAS membership: subsequently, one question was removed and the language modified to ensure ease of understanding.

The questions covered country of origin and profession, and whether the respondent undertakes tracheal intubation in their role. The outcome questions cover the training to reduce the risk of UOI that their department or organisation provides; whether their department has implemented non-training strategies to reduce the risk of UOI; if there are barriers to implementing these strategies; and their views on two-person verbal confirmation of capnography tracing. There was a final section asking whether discussion of Glenda Logsdail's case had occurred in their department, looking at engagement with initiatives from the RCoA, and the recent PUMA guidelines.[1] The full survey is available in Supplementary Appendix SA.

The majority of questions were optional, apart from where a response was required to dictate a follow-up question, explaining the variable denominator. Questions such as, 'Does your department or organisation provide specific training to reduce the risk of unrecognised oesophageal intubation?' were single-answer questions with responses limited to 'Yes', 'No – but we are planning to', 'No', and "Don't know". Questions about the format of initiatives to reduce risk were multiple-choice questions. The question asking for the respondent's opinion on two-person verbal confirmation of capnography required an answer on a 5-point Likert scale. There were also three questions with free text responses. The data were automatically anonymised.

Sample characteristics

The survey was only available in English and was distributed to all current DAS members with an e-mail address on the membership database who had agreed to receive surveys of practice. Members of the society who chose not to respond were treated as missing completely at random[27] as this was likely to be independent of their opinion. In addition, the survey was available on X (www.x.com) to allow airway managers who follow @dasairway and @dastrainees X account to participate.

Survey administration

An electronic version was created using an internet-based survey platform (www.surveymonkey.com). DAS members were invited to participate via e-mail, with three reminder e-mails, over a period of 10 weeks between 28 March 2023 and 7 June 2023. In addition, to compare results between DAS members and other anaesthetists who followed @dasairway and @dastrainees, the survey was also open to users of X between 1 and 7 June 2023.

Ethical considerations

Anonymous clinician surveys do not require ethical approval in the United Kingdom.

Statistical analysis

The data were analysed using descriptive statistics, with Excel and GraphPad Prism (https://www.graphpad.com/

features). χ^2 testing was used to compare the groups as appropriate; respondents who indicated that they did not know were excluded from the analysis of the relevant question. We considered $p<0.05$ to be statistically significant.

Results

Participants

The survey was sent to 2125 members, and 819 completed or partially completed responses were received (39%). Not all respondents completed all questions, but all responses are included in the analysis. Any subsequent results and discussion focus on DAS member data. However, 231 people responded to the X distributed survey and their results are summarised in Supplementary Appendix SB.

Descriptive data

The majority of respondents were physicians (89.2%; 725/812), of whom 641 were Consultant, Attending, Staff Specialist, or equivalent grade (including similarly experienced locally employed doctors). Most cited anaesthesia as their main area of practice (91.9%; 746/812), and the majority of respondents were from the UK (82.2%; 673/819) (Table 1).

Outcome data

Of those who responded, 17% (130/765) were from departments not implementing or planning to implement *any* strategy (whether training or non-training related) to reduce the risk of UOI.

Training strategies to reduce the risk of UOI

Almost one-third of respondents (30.8%; 246/799) work in departments that are not planning any training to reduce the risk of UOI. About 50.3% (402/799) of respondents work in departments providing training to reduce the risk of UOI, and 8.6% (69/799) are planning training. The majority of training is multidisciplinary (69%; 310/449). There was no difference in whether training was planned by departments between physician/non-physician respondents ($P=0.698$), UK- and non-UK-based respondents ($P=0.051$), or those who work in anaesthesia compared with those in other specialties ($P=0.615$) (Table 2). Training strategies to reduce the risk of UOI are shown in Fig 1a.

Non-training strategies to reduce the risk of UOI

Nearly one-third of respondents (31%; 237/765) were not planning any non-training strategies to reduce risk. Of those who responded, 38.8% (297/765) work in departments that have implemented other (i.e. non-training-based) strategies to reduce the risk of UOI, and 7.8% (60/765) are planning them. There was no difference in whether non-training strategies were planned by departments between physician and non-physician respondents ($P=0.809$), UK- and non-UK-based respondents ($P=0.134$), or those who work primarily in anaesthesia compared with those in other specialties ($P=0.736$) (Table 3). Non-training strategies to reduce the risk of UOI are shown in Fig 1b.

Table 1 Characteristics of the Difficult Airway Society members who completed the survey on unrecognised oesophageal intubation. *Includes Anaesthetic Doctor/Physician Anaesthetist, Anaesthesia Associate, Nurse Anaesthetist, Operating department practitioner, Anaesthetic Nurse, Anaesthetic Practitioner, Anaesthetic Technician.

Category	Respondents who completed the question N (% of all respondents)
Continent	
Africa	5 (0.6)
Antarctica	0 (0)
Asia	21 (2.6)
Australasia/Oceania	36 (4.4)
Europe	726 (88.6)
North America	25 (3.1)
South America	6 (0.7)
Total	819 (100)
Work location	
UK	673 (82.2)
Outside UK	146 (17.8)
Total	819 (100)
Profession	
Doctor	725 (89.2)
Operating department practitioner/Anaesthetic Nurse/equivalent	59 (7.3)
Anaesthesia Associate/Nurse Anaesthetist	12 (1.5)
Paramedic	11 (1.4)
Other (including Resuscitation Officer, Intensive Care Nurse)	5 (0.6)
Total	812 (100)
Grade	
Consultant, Attending, Staff Specialist or equivalent locally employed doctor	641 (78.9)
Foundation, intern, CT1-3, ST4-8, resident, registrar or equivalent locally employed doctor	84 (10.3)
Non-physician	87 (10.7)
Total	812 (100)
Main area of practice	
Anaesthesia*	746 (91.9)
Other specialties including Intensive Care, Emergency medicine, pre-hospital medicine	66 (8.1)
Total	812 (100)

Barriers to implementing new strategies to reduce the risk of UOI

No barriers to implementing new strategies to reduce the risk of UOI were reported by 41.6% (292/702). Other perceived barriers are detailed in Fig 2.

Opinion on two-person verbal confirmation of capnography

Overall, 32.3% (227/702) of respondents indicated that two-person verbal confirmation of capnography was 'extremely' helpful and 26.2% (184/702) indicated that it was 'very' helpful

Table 2 The use of training strategies to reduce the risk of unrecognised oesophageal intubation in respondents' departments. *Respondents who work in departments that have already implemented (column 1) and/or are planning to implement (column 2) training *compared* with those that are not planning any training (column 3) to reduce the risk of unrecognised oesophageal intubation. Respondents who do not know (column 4) what strategies their department are undertaking have been excluded from χ^2 testing. †Includes Anaesthetic Doctor/Physician Anaesthetist, Anaesthesia Associate, Nurse Anaesthetist, Operating department practitioner, Anaesthetic Nurse, Anaesthetic Practitioner, Anaesthetic Technician. ‡Includes Emergency Medicine, Intensive Care, Pre-hospital medicine, ENT.

Training/teaching/ education to reduce the risk of unrecognised oesophageal intubation	**1. Yes**	**2. No, but we are planning to**	**3. No**	**4. Do not know**	**Total**
All respondents	**N (% of total)** 402 (50.3)	**N (% of total)** 69 (8.6)	**N (% of total)** 246 (30.8)	**N (% of total)** 82 (10.3)	**N (% of total)** 799 (100)
Profession	***n* (% of profession)**	***n* (% of profession)**	***n* (% of profession)**	***n* (% of profession)**	***n* (% of total)**
Doctor	358 (50.2)	62 (8.7)	217 (30.4)	76 (10.7)	713 (100)
Operating department practitioner/ Anaesthetic Nurse/ equivalent	29 (49.2)	3 (5.1)	23 (39)	4 (6.8)	59 (100)
Anaesthesia Associate/ Nurse Anaesthetist	6 (50)	4 (33.3)	2 (16.6)	0 (0)	12 (100)
Paramedic	7 (70)	0 (0)	3 (30)	0 (0)	10 (100)
Other	2 (40)	0 (0)	1 (20)	2 (40)	5 (100)
Combined responses from non-physician respondents	*44 (51.2)*	*7 (8.1)*	*29 (33.7)*	*6 (7)*	*86 (100)*
Comparison of doctors and non-physicians, χ^2 test*		*N*=717 *P*=0.698			
Continent	***n* (% of continent)**	***n* (% of continent)**	***n* (% of continent)**	***n* (% of continent)**	***n* (% of continent)**
Africa	3 (60)	1 (20)	0 (0)	1 (20)	5 (100)
Asia	13 (61.9)	1 (4.8)	6 (28.6)	1 (4.8)	21 (100)
Australasia/Oceania	11 (31.4)	9 (25.7)	13 (37.1)	2 (5.7)	35 (100)
Europe	365 (51.6)	56 (7.9)	209 (29.5)	78 (11)	708 (100)
North America	6 (25)	1 (4.2)	17 (70.8)	0 (0)	24 (100)
South America	4 (66.7)	1 (16.7)	1 (16.7)	0 (0)	6 (100)
UK or non-UK	***n* (% of category)**	***n* (% of category)**	***n* (% of category)**	***n* (% of category)**	***n* (% of category)**
UK	339 (51.4)	53 (8)	190 (28.8)	78 (11.8)	660 (100)
Non-UK	63 (45.3)	16 (11.5)	56 (40.3)	4 (2.9)	139 (100)
Comparison of UK and non-UK respondents, χ^2 test*		*N*=717 *P*=0.051			
Main area of practice	***n* (% of area of practice)**	***n* (% of area of practice)**	***n* (% of area of practice)**	***n* (% of area of practice)**	***n* (% of area of practice)**
Anaesthesia†	367 (49.9)	67 (9.1)	224 (30.4)	78 (10.6)	736 (100)
Other specialties‡	35 (55.6)	2 (3.2)	22 (34.9)	4 (6.3)	63 (100)
Comparison of those respondents who primarily work in anaesthesia *vs* those who work in other specialties, χ^2*		*N*=717 *P*=0.615			

(Fig 3). Physicians were less likely to consider that two-person verbal confirmation of capnography is 'extremely'/'very'/'somewhat' helpful and more likely to consider it 'not so'/'not at all' helpful compared with non-physicians (*P*=0.006). Amongst the 629 physicians who responded to this question, senior doctors (Consultant, Attending, Staff Specialist, or equivalent locally employed doctors) were less likely to consider that two-person verbal confirmation of capnography is 'extremely'/'very'/'somewhat' helpful and more likely to consider that it is 'not so'/'not at all' helpful (*P*=0.015) compared with non-consultant doctors (Foundation, intern, CT1-3, ST4-8, resident, registrar, or equivalent locally employed doctors). Whether anaesthesia or a different specialty was the respondent's main area of practice (*P*=0.889) and whether they were UK-based (*P*=0.101) did not make a difference to their opinion on two-person verbal confirmation of capnography.

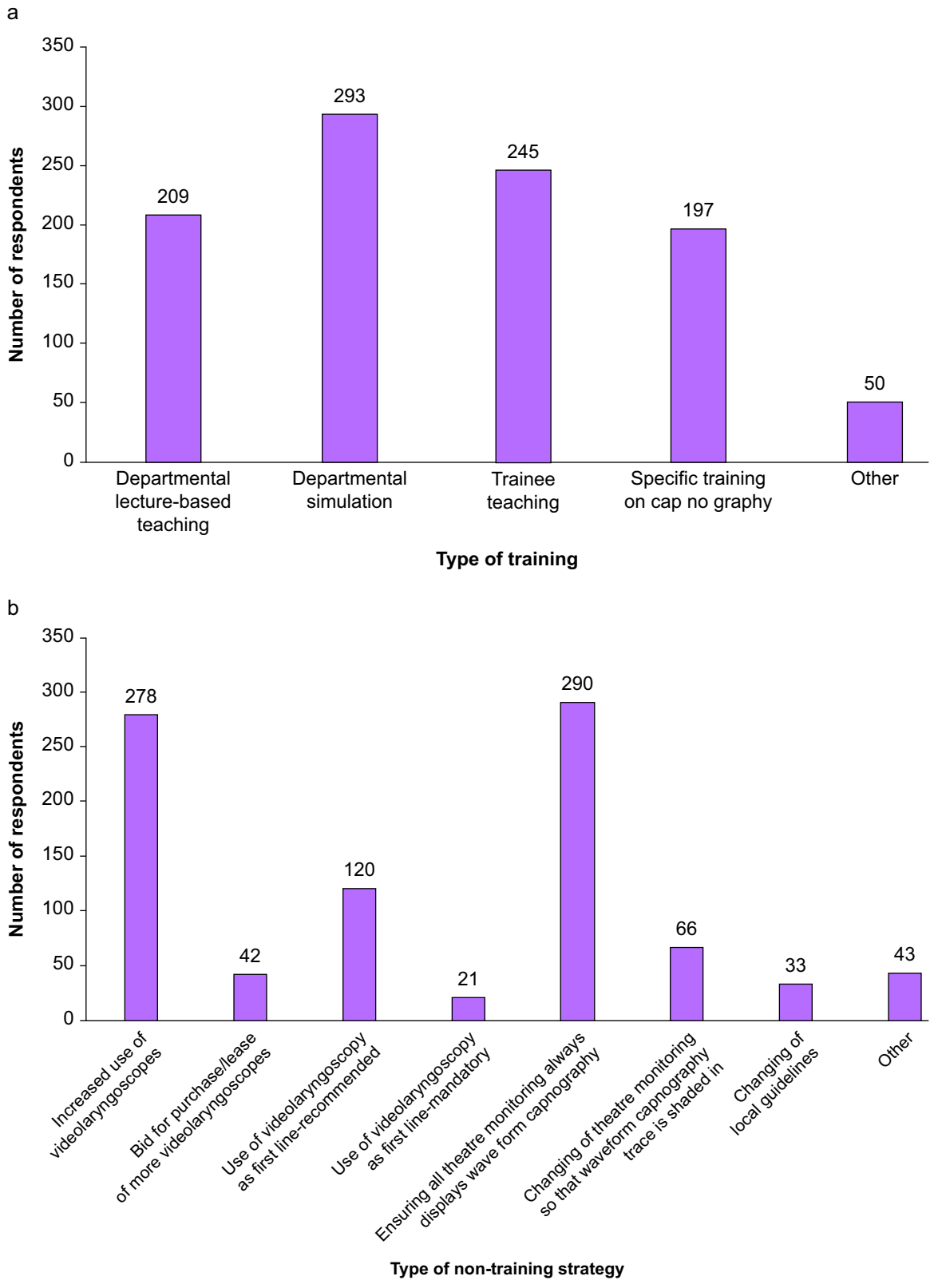
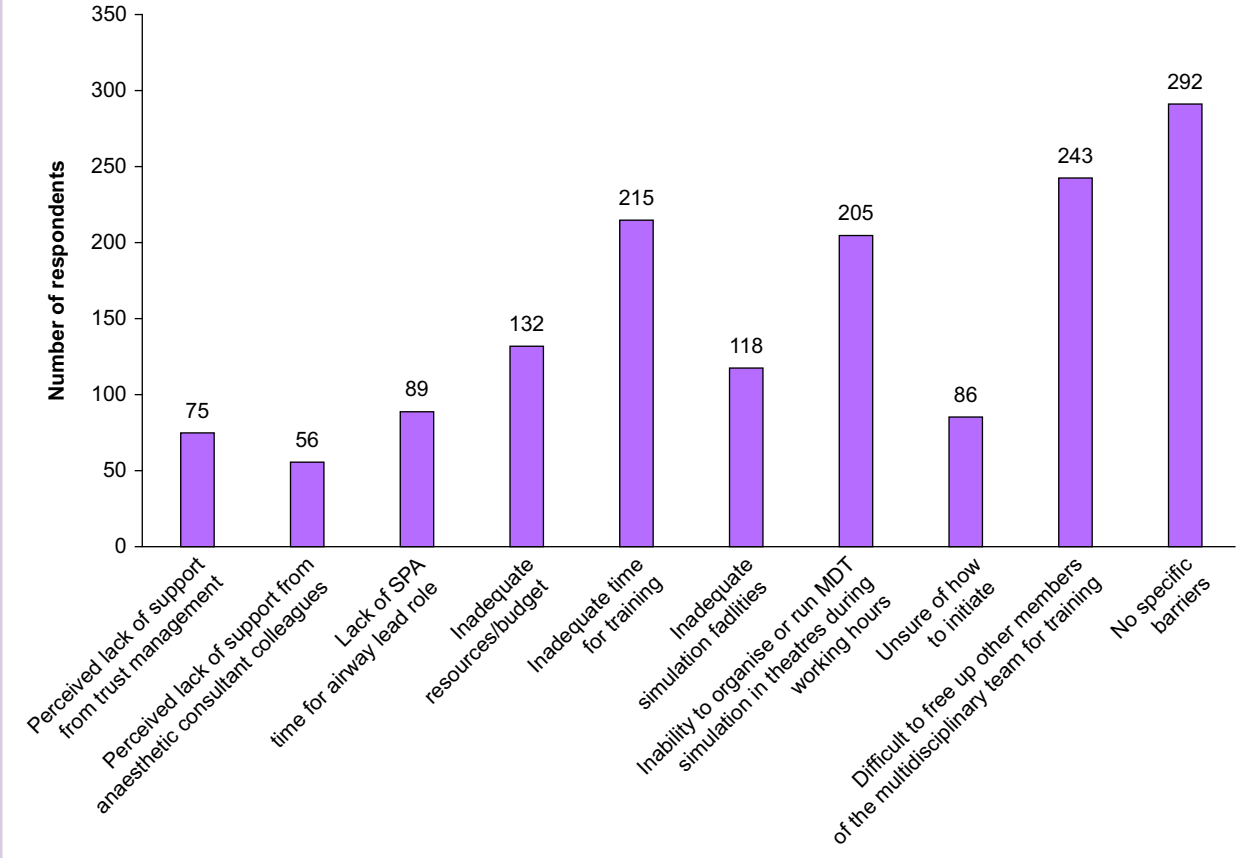


Figure 1. Training (n=446) (a) and non-training (n=350) (b) strategies implemented in respondents' departments to reduce the risk of unrecognised oesophageal intubation, total respondents 446.

Table 3 The use of non-training strategies to reduce the risk of unrecognised oesophageal intubation by respondents' departments. *Respondents who work in departments that have already implemented (column 1) and/or are planning to implement (2) non-training based strategies *compared* to those that are not planning any training (3) to reduce risk of unrecognised oesophageal intubation. Respondents who don't know (4) what strategies their department are undertaking have been excluded from Chi-squared testing. †Includes Anaesthetic Doctor/Physician Anaesthetist, Anaesthesia Associate, Nurse Anaesthetist, Operating department practitioner, Anaesthetic Nurse, Anaesthetic Practitioner, Anaesthetic Technician. ‡Includes Emergency Medicine, Intensive Care, Pre-hospital medicine, ENT.

Non-training strategies to reduce the risk of unrecognised oesophageal intubation	**1. Yes**	**2. No, but we are planning to**	**3. No**	**4. Do not know**	**Total**
All respondents	**N (% of total)** 297 (38.8)	**N (% of total)** 60 (7.8)	**N (% of total)** 237 (31)	**N (% of total)** 171 (22.4)	**N (% of total)** 765 (100)
Profession	**n (% of profession)**	**n (% of profession)**	**n (% of profession)**	**n (% of profession)**	**n (% of total)**
Doctor	260 (38.1)	54 (7.9)	210 (30.8)	158 (23.2)	682 (100)
Operating department practitioner/ Anaesthetic Nurse/equivalent	24 (42.9)	3 (5.4)	19 (33.9)	10 (17.9)	56 (100)
Anaesthesia Associate/Nurse Anaesthetist	4 (33.3)	3 (25)	4 (33.3)	1 (8.3)	12 (100)
Paramedic	5 (50)	0 (0)	4 (40)	1 (10)	10 (100)
Other	4 (80)	0 (0)	0 (0)	1 (20)	5 (100)
Combined responses from non-physician respondents	37 (44.6)	6 (7.2)	27 (32.5)	13 (15.7)	83 (100)
Comparison of doctors and non-physicians, χ^*		N=594 *P*=0.809			
Continent	**n (% of continent)**	**n (% of continent)**	**n (% of continent)**	**n (% of continent)**	**n (% of continent)**
Africa	3 (60)	2 (40)	0 (0)	0 (0)	5 (100)
Asia	8 (38.1)	5 (23.8)	6 (28.6)	2 (9.5)	21 (100)
Australasia/Oceania	8 (22.9)	4 (11.4)	20 (57.1)	3 (8.6)	35 (100)
Europe	266 (39.5)	46 (6.8)	197 (29.2)	165 (24.5)	674 (100)
North America	10 (41.7)	0 (0)	13 (54.2)	1 (4.2)	24 (100)
South America	2 (33.3)	3 (50)	1 (16.7)	0 (0)	6 (100)
UK or non-UK	**n (% of category)**	**n (% of category)**	**n (% of category)**	**n (% of category)**	**n (% of category)**
UK	248 (39.5)	40 (6.4)	179 (28.5)	161 (25.6)	628 (100)
Non-UK	49 (35.8)	20 (14.6)	58 (42.3)	10 (7.3)	137 (100)
Comparison of UK and non-UK respondents, χ^*		N=594 *P*=0.134			
Main area of practice	**n (% of area of practice)**	**n (% of area of practice)**	**n (% of area of practice)**	**n (% of area of practice)**	**n (% of area of practice)**
Anaesthesia†	267 (37.9)	57 (8.1)	217 (30.8)	163 (23.2)	704 (100)
Other specialties‡	30 (49.2)	3 (4.9)	20 (32.8)	8 (13.1)	61 (100)
Comparison of those respondents who primarily work in anaesthesia to those that work in other specialties, χ^*		N=594 p=0.736			



2Figure 2. Perceived barriers to implementation of strategies to reduce the risk of unrecognised oesophageal intubation. MDT, multidisciplinary team; SPA, supporting professional activity.

Of the 138 free text responses to the question 'What else could DAS do to promote or facilitate teaching and training around the subject of UOI?', suggestions to 'mandate'/'make training mandatory' arose 13 times, there were seven further suggestions to include UOI in national training standards or the curriculum, one suggestion to reinstate UOI as a *Never Event* and one suggestion to include capnography as part of the WHO checklist. Free text responses are summarised in Supplementary Appendix SC.

Discussion

This survey of DAS members found that 17% (130/765) of respondents reported that their department is not implementing *any* strategy (whether training or non-training) to reduce the risk of UOI. Moreover 31% report their department is not undertaking any training strategies (246/799), and 31% report their department is not implementing any non-training techniques (237/765). This suggests that a significant minority of departments and organisations are still not tackling this critical issue. The reasons for this may be explained by the barriers noted in the survey. The most frequently cited barriers were 'difficulty freeing up members of the multidisciplinary team for training' (34.6%) and 'inability to run MDT simulation during working hours' (29.2%). This implies that any strategies mandated to reduce risk must not be limited to physicians, but instead include all allied health professionals involved in airway management. Furthermore, 80% cited perceived lack of support from anaesthetic colleagues as a barrier to implementation of new strategies to reduce the risk of UOI. This is supported by some of the free text answers to this question, for example '*General reluctance and complacency*'.

A large minority (41.6%) cited no barriers to implementing new strategies to reduce the risk of UOI. Interestingly, of the 130 respondents who reported their department is not undertaking *any* strategy (training or non-training) to reduce the risk of UOI, 50 cited no specific barriers to implementing these strategies. Our survey was not designed to investigate why, despite no barriers, departments may still not be implementing strategies to reduce the risk of UOI. However, we speculate there may be psychological bias towards injury prevention at play, particularly optimism bias[28] (the incorrect belief that I am at lower risk of injury than others, making it less likely that I will take adequate safety precautions 'it will never happen to me'). At least seven respondents reported in the free text comments that UOI could not happen to a competent anaesthetist and that further training was therefore not warranted, for example, '*A few people have messed up. It should never have happened. It was due to incompetence. And now all of us need extra training?*', '*Not sure specific extra training is required. Further recent tragic events have been caused by incompetence*', '*What a spectacular waste of time. We are trained anaesthetists. Most of us know*

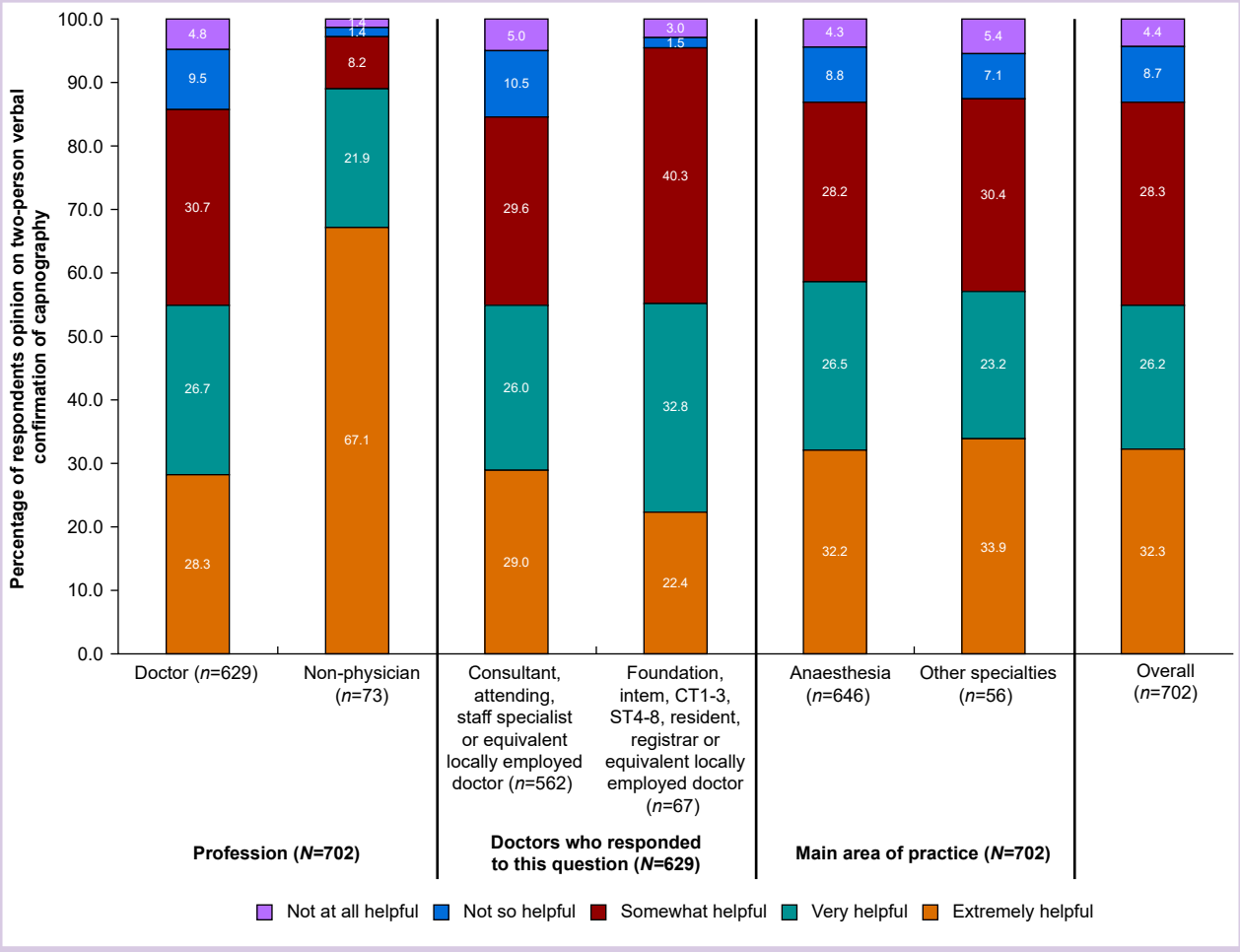


Figure 3. Percentage of respondents who consider two-person verbal confirmation of capnography helpful. Opinion separated by profession (all respondents), grade of doctor (physicians only), and main area of practice (all respondents).

that there are two holes. Sometimes it is easy, sometimes catastrophically difficult - a fact of which we are all shockingly aware'.

Amongst non-training strategies, the survey suggests that videolaryngoscope use has increased with 'increased videolaryngoscope use' commonly cited (278), along with 'use of videolaryngoscopy first line' (most often as the 'recommended' technique, but also mandatory in 21 respondents' departments). Forty-two respondents reported that their department had acquired more videolaryngoscopes. One strategy to avoid UOI is to improve first-pass success at tracheal intubation. Multiple studies have demonstrated increased rates of easy tracheal intubation[16 17] and higher rate of first-pass success[18,19] using videolaryngoscopy. A recent Cochrane review[20] demonstrated a reduced incidence of oesophageal intubation when using a hyperangulated videolaryngoscope; however, the assertion that this benefit does not extend to Macintosh and channelled-type devices has been challenged by the authors themselves.[29] Other studies have also demonstrated fewer oesophageal intubations associated with videolaryngoscopy,[30,31] including in paediatric patients.[32] Furthermore, the opportunity for the airway assistant to visualise tube placement should promote a team approach and may empower them to raise any concerns with the airway operator during intubation or subsequent waveform capnography confirmation. This is reliant on team dynamics and assistant training. Interprofessional education has recognised benefits, both on collaborative team behaviour and patient outcomes[33]; however, facilitation can be challenging,[34] with facilitators requiring specific training to ensure its effectiveness.[35] The challenge is not just to deliver training but to ensure that the training promotes effective team functioning, enabling team members to notice errors (in this case UOI) before the patient comes to harm. It is not enough for all members of the team to recognise that an absent capnograph trace may indicate oesophageal intubation, but they must be empowered to speak up, with simulation having a recognised role to play here not just for junior members of the team but also for senior staff.[36] The mantra that 'staff who work together must train together' must not just apply to maternity services.[37,38]

There is currently no published evidence (that we are aware of) that two-person verbal confirmation of capnography reduces the risk of UOI. There is mixed evidence for two-person checks and reduction of risk in other areas of healthcare (e.g. medication administration errors[39] and blood transfusion[40]). However, the two-person verbal confirmation

of capnography could empower the airway assistant to raise concerns if the capnography trace is not as expected after tracheal intubation. More than half of respondents indicated that the two-person verbal confirmation of capnography was 'extremely' or 'very' useful. Doctors (physicians), particularly senior doctors, were more likely to respond that it is not helpful. This may be because there is a misperception that UOI only occurs in cases where the airway operator is junior or less experienced. It may also represent reluctance to adopt a flattened hierarchy, which is also reflected in some of the free text comments. However, the benefit of a team approach to positively identifying the presence of an appropriate capnograph trace after intubation cannot be underestimated. Some comments reflected the view that expecting inexperienced assistants to have the confidence to challenge the airway operator was unrealistic. A recently published report[41] implemented training to improve capnography interpretation of theatre nursing staff and their confidence to challenge using graded assertiveness techniques. This type of educational project could easily be implemented elsewhere.

Our survey has limitations. Responses from airway society members may not reflect wider anaesthetic/other specialty views. Furthermore, DAS members may be more likely to lobby for new strategies to reduce the risk of UOI within their departments, and therefore report a higher prevalence of such strategies. As the survey was aimed primarily at UK and Ireland respondents, the survey was only available in English. Not all questions were mandatory which means some survey areas have incomplete data; however, this was intentionally designed to maximise the response rate. The use of X was an attempt to capture airway managers who are not DAS members; however, we recognise that they had to be interested enough to follow @DASairway or @DAStrainees. We cannot provide a denominator for this group, nor can we verify the validity of their responses (which is why we include them as an appendix). The strengths of this study include a large sample and higher than average response rate (39%) for a survey targeting healthcare professionals, which can be prone to sampling bias if the sample size is too small.[42]

Despite initiatives from the RCoA (including a dedicated webpage with educational tools, social media promotion, educational talks at multiple conferences and events, articles published in magazines, newsletters, and anaesthetic peer-reviewed journals),[43] the recent PUMA guidelines,[1] and a Regulation 28 report after the death of Mrs Glenda Logsdail,[12] tragic deaths from UOI continue. Our study supports the theory that the uptake of preventative strategies to reduce the risk of UOI could be improved. This is underlined by the ongoing occurrence of death after UOI since the Logsdail case.

One option would be for the mandating of departmental strategies to reduce the risk of UOI. Of the 138 free text responses to the question 'What else could DAS do to promote or facilitate teaching and training around the subject of UOI?', there were 25 suggestions mandating training in some respect, one suggestion to reinstate UOI as a Never Event, and two suggestions to include it as part of the WHO checklist. However, for this to be effective, professional and regulatory bodies would have to work together to deliver time, training, and recognition for the implementation of such a programme. A powerful step would be for a recommendation to provide multidisciplinary training around this topic to be included in the Guidelines for the Provision of Anaesthetic Services (GPAS) and Anaesthesia Clinical Services Accreditation (ACSA). However, the authors recognise that the deliverability of training must be considered, which may be difficult in a financially constrained system. We hope that our work will promote further discussion around this topic, not just amongst anaesthetists but also between all of those involved in an airway management team. Crucially, this will include input from all involved organisations, including medical Royal Colleges and organisations such as the College of ODPs and the Nursing and Midwifery Council (NMC). The comment stating, 'This should never have happened' is simplistic. It did happen, has happened so many times and, tragically, continues to happen.

Authors' contributions

Conceptualisation: all authors.
Methodology: all authors.
Formal analysis: MMM.
Data collection: all authors.
Data curation: MMM, AC.
Wrote original manuscript draft: MMM.
Reviewed and edited the manuscript: all authors.
Project administration: MMM.
Supervision: AC, BM, EOS, AFM.

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Declaration of interests

EOS is a member of PUMA which produced the consensus guidelines on preventing unrecognised oesophageal intubation. AM has received honoraria from Fisher and Paykel Healthcare (Optiflow) and is on the speakers bureau for Medtronic (McGrath Mac VL). He is an associate editor of the *EJA*. The other authors declare that they have no conflicts of interest.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.bjao.2025.100390.

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