

# Anaesthesia News

July 2021

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## Research issue:

Anaesthesia, nerve blocks and artificial intelligence

The positives of the COVID-19 pandemic in a DGH: how research helped to keep patients safe

Implementation science: relevance to the NHS and global anaesthesia

Supporting equality, diversity and inclusion in academic anaesthesia, critical care and pain medicine



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(MIDAZOLAM)

5MG/ML ORAL SOLUTION

## Prescribing information

Please refer to full SmPC before prescribing.

**Product Name:** Miprosed 5mg/ml Oral Solution

**Composition:** Each ml of oral solution contains 5mg midazolam. For the full list of excipients see SmPC.

**Indications:** *Children aged 6 months to 14 years:* Sedation and anxiolysis prior to diagnostic, surgical, therapeutic or endoscopic procedures. Premedication before induction of general anaesthesia.

**Posology and method of administration:** Oral use. *Children (6 months to 14 years):* 0.25mg/kg to 0.5mg/kg administered 15-30 minutes before the intervention or the induction of anaesthesia. The dose should be adapted to the patient's weight and administered rounded to the nearest syringe graduation in millilitres. Maximum dose should not exceed 20mg. *Obese children:* Use actual body weight up to the maximum limit of 20mg. Miprosed may be mixed with and administered in apple juice and diluted blackcurrant cordial. General fasting guidelines should be respected before sedation with Miprosed

**Contraindications:** Hypersensitivity to midazolam or to any of the excipients; Severe hepatic impairment; Severe respiratory failure or acute respiratory depression; Myasthenia gravis; Sleep apnoea; Anatomical respiratory impairment or lung diseases.

**Warnings and precautions for use:** Administration only by experienced physicians in a setting fully equipped for the monitoring and support of respiratory and cardiovascular function and by persons specifically trained in the recognition and management of expected adverse events. Caution in patients with hepatic impairment, heart failure or chronic renal failure. Caution in patients in poor general health. Concomitant use of midazolam and opioids or benzodiazepines may result in sedation, respiratory depression, coma and death. Concomitant prescribing should be reserved for patients for whom alternative treatment options are not possible; if prescribed, patients should be followed closely for signs and symptoms of respiratory depression and sedation and be informed of these symptoms. Caution in patients with chronic respiratory insufficiency. Miprosed should not be used in children aged under 6 months. Debilitated patients are more prone to the central nervous system effects of benzodiazepines and lower doses may be required. Avoid in patients with a medical history of alcohol or drug abuse. Combined use of midazolam and alcohol and/or central nervous system depressants should be avoided. Midazolam may cause anterograde amnesia. Paradoxical reactions such as agitation, involuntary movements (including tonic/clonic movements and muscle tremor), hyperactivity, hostility, rage reaction, aggression, paroxysmal excitement have been reported. Should such reactions occur, the response to midazolam and all other drugs including local anaesthetics should be evaluated before proceeding. It is recommended that children receiving oral midazolam are discharged post-surgery accompanied by a parent or guardian.

**Interactions with other medicinal products:** Inhibitors and inducers of CYP3A4. Pharmacokinetic interactions with CYP3A4 inhibitors or inducers are more pronounced for oral as compared to oromucosal or parenteral midazolam. Careful monitoring of the clinical effects and vital signs is recommended during the use of midazolam with a CYP3A4 inhibitor even after a single dose. The effect of CYP3A4 inhibitors may be larger in infants. Rifampicin, St John's Wort, Fentanyl, Carbamazepine, Phenytoin, Diltiazem, Verapamil, Cimetidine, Ranitidine, Omeprazole, Xanthines, Aprepitant, Levodopa, Muscle relaxants, Nabilone, Grapefruit juice, Caffeine and incompatible with cranberry juice. Azole antifungals (*ketconazole, voriconazole, fluconazole, posaconazole, itraconazole*), Erythromycin, Clarithromycin, Propiverine, Fluvoxamine, Nefazodone, Glucocorticoids, Protease inhibitors, Efavirenz, Atorvastatin. Sedative/hypnotic medicinal products and CNS depressants, including opiate derivatives (used as analgesics, antitussives or substitutive treatments), antipsychotics, other benzodiazepines used as anxiolytics or hypnotics, barbiturates, propofol, ketamine, etomidate; sedative antidepressants, non-recent H1-antihistamines and centrally acting antihypertensive medicinal products. Alcohol (including alcohol-containing medicinal products); intake should be strongly avoided with midazolam. Midazolam decreases the minimum alveolar concentration (MAC) of inhalation anaesthetics.

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**Undesirable effects:** *Common:* Agitation, Somnolence, Paradoxical reactions. It has not been possible to estimate the frequency of adverse events from the available clinical studies reporting the use of oral midazolam as a premedicant before induction of anaesthesia. The adverse events that have been reported in these clinical studies in patients receiving oral midazolam include: nausea, vomiting, salivation, hypoxia, hypertension, tachycardia, agitation, vertigo, euphoria, excitation, restlessness and nocturnal enuresis. See SmPC for full list of side-effects.

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**Date of prescribing information:** 20/04/2021

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Sedation and anxiolysis before surgical or diagnostic procedures in children 6 months to 14 years.



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# SyriMed

# Welcome



Welcome to the July issue of *Anaesthesia News*, with a focus on research. We hope that as the weather warms up, you can enjoy reading about what we have learnt and how we might take things forward as a speciality in some glorious sunshine! I'm hoping that my bees will have arrived from Italy having been postponed due to bad weather in May!

Working in such a safe speciality it's easy to forget that research underpins all of the work that we do as anaesthetists. In this issue, Tamas Szakmany points out research positives from the pandemic, how we have to take others with us and keep an open mind to undertake research effectively. Ramani Moonsinghe highlights the significant challenges facing equality and diversity in academic anaesthesia, and how the NIAA plans to support inclusivity which we believe is essential for job satisfaction, creativity and innovation.

There is no point in knowing what we should be doing but not actually implementing it. This month's article on implementation science and its relevance to the NHS and global anaesthesia will clarify the terms and concepts we all need to put the research into practice. How we implement what we have learnt from COVID is more important than ever.

For those of you that love Black Mirror, there is an opportunity to read about advancements in the use of artificial intelligence for ultrasound-guided nerve block. With a large surgical backlog, increased interest in regional anaesthesia, and a shortage of trained anaesthetists, the increased use of artificial intelligence is an exciting development.

Not such an exciting development is the potential for criminal liability for anaesthetists in Northern Ireland who fail in their duty of candour. The deadline for commenting on this possible legislation is 2<sup>nd</sup> August 2021.

We hope that you enjoy reading about our heritage work, a book review and letters too!

**Tei Sheraton**

*Honorary Membership Secretary Association of Anaesthetists*

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**Association of Anaesthetists**  
21 Portland Place, London W1B 1PY  
Telephone: 020 7631 1650  
Website: [www.anaesthetists.org](http://www.anaesthetists.org)

**Anaesthesia News Editorial Committee**  
Editor: Mike Kinsella  
Tei Sheraton (Chair)  
Mathew Patteril, Chris Mowat,  
Seema Agarwal, Will Rattenberry  
(Trainee Committee), and Officers  
of the Association (ex officio)

Address for all correspondence,  
advertising or submissions:  
Editorial Assistant: Ruth Eastwood  
Email: [anaenews@anaesthetists.org](mailto:anaenews@anaesthetists.org)

Design: Chris Steer  
Digital Designer  
Telephone: 020 7631 8803  
Email: [chris@anaesthetists.org](mailto:chris@anaesthetists.org)

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# Anaesthesia, nerve blocks and artificial intelligence

“Show me where the nerves are, and I’ll block them...”  
(Consultant anaesthetist colleague)

The practical aspect of ultrasound-guided regional anaesthesia (UGRA) comprises two key clinical skills [1]:

- image interpretation, i.e. knowing what you’re looking at on ultrasound.
- viewing of needle insertion and injection, i.e. keeping the needle and relevant structures in view and watching the safe spread of local anaesthetic.

Ultrasound image interpretation, as for regional anaesthesia in general, requires a sound knowledge of anatomy. However, anatomical knowledge alone does not address the challenge of acquiring and interpreting ultrasound images to perform a peripheral nerve block safely and effectively. While improvements in ultrasound technology provide greater image resolution, developments in artificial intelligence (AI) may be employed to support the application of this technology to identify the salient sono-anatomy [2].

AI is ‘the ability of a computer programme to perform processes associated with human intelligence’ [3]. A subfield of AI called ‘computer vision’ has been the focus of particular attention with respect to medical image analysis. This uses many of the techniques outlined in Table 1 to enable computers to interpret the visual world. Of these, deep learning is especially useful as it can drive learning from large datasets; large databases of medical images are often readily available.

We have contributed to the development of a deep learning-based system called *ScanNav Anatomy Peripheral Nerve Block* (also known as *ScanNav Anatomy PNB*, formerly known as *AnatomyGuide*). This system uses deep learning to identify anatomical structures on B-mode ultrasound and apply a colour overlay to those structures in real time. This is achieved through the use of convolutional neural networks (CNNs; ConvNets) based on the U-Net architecture [4] (Figure 1). Data (greyscale ultrasound images subsampled to 160 x 160 pixels) that are entered pass through a series of computational (neural) layers, with each layer extracting specific feature information. In the initial ‘contracting’ path in Figure 1, each of the down-sampling layers on the left-hand side of the ‘U’ applies a series of convolutional filters to extract image features, and then halves the resolution for the next layer. The top layer (left) of the CNN looks for information at the level of

individual pixels in the input image and draws out the obvious, more generalisable features such as edges and lines. Lower layers, with lower resolution, then look for coarser features that span larger regions to pull out features at larger scale. At the lowest level in the network, the entire image is represented by a 10 x 10 grid of features. Through down-sampling, the model can understand better what is present in the image, but it loses information about where those features are. In the subsequent ‘expanding’ path on the right-hand side, up-sampling layers apply further convolutional filters and successively double the resolution until the image is once again at the input resolution. The up-sampling helps the network understand where the features are in the image. ‘Skip connections’ (arrows from left to right) carry across features from the input to the output, bypassing lower layers of the network. This helps the network to reuse information from higher layers, which would otherwise become too abstract to be used further, so that it can learn to generate fine-grained details for the output segmentation (in this case, recognition of a given anatomical structure and application of a colour overlay).

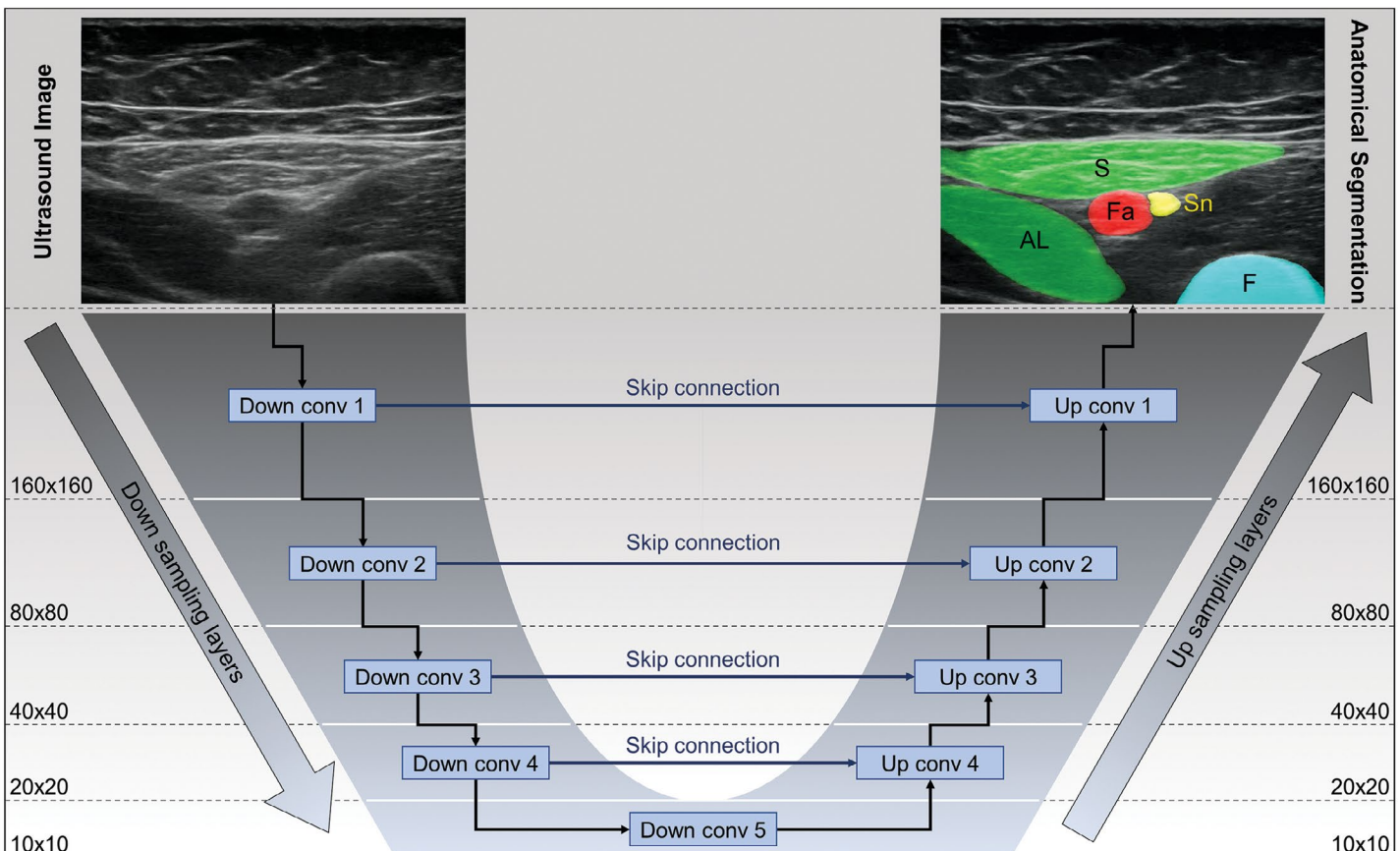
Each layer of the model helps to provide a specific feature map of the image. An analogy of this is “Imagine flying at night in an aeroplane over Los Angeles and taking a photo; the lights seen in your photo form a rough map of the features of the lit-up city. (. . .) Now imagine that you had a very special camera that could produce separate photos for house lights, building lights and car lights. This is something like what the visual cortex does: each important visual feature has its own separate neural map. (. . .) And (very roughly) like the visual cortex, each layer in a ConvNet consists of several grids of these units, with each grid forming an activation map for a specific visual feature” [5].

During development of *ScanNav Anatomy PNB*, a separate network was created for each anatomical region of interest (i.e. the area scanned for each block). Ultrasound videos for each area were allocated at random to training (90%) or testing (10%; internal validation). Training data for a region consists of pairs of images. In each pair, the first element was an unmodified still frame image taken from ultrasound videos of the region of interest. The second element was a manually segmented (mark-up/labelled) colour overlay corresponding to that view. As still frame image pairs were presented, the

Table 1. Commonly used terms in artificial intelligence

Machine learning	Enables computers to learn (improve performance with experience). This often involves training an algorithm (rule-based problem-solving instructions executed by the computer) by exposing it to 'training data'.
Supervised machine learning	Training data is labelled, typically by human experts. The system learns to make associations between the label and the underlying data.
Unsupervised machine learning	Training data is not labelled. Unsupervised systems learn underlying patterns and relationships by clustering data into groups that contain similar features.
Semi-supervised machine learning	A small amount of training data is labelled and a much larger amount is unlabelled. The model learns from a combination of these data.
Deep learning	A subfield of machine learning, deep learning uses networks which consist of multiple 'neural layers'. The layers are arranged in a hierarchical manner to extract progressively more characteristics from input data.
Artificial neuron	A mathematical function used in the field of artificial intelligence (the idea of a single functioning element was based upon the concept of a biological neuron)
Convolution	The mathematical function executed by the artificial neuron. The function is applied to data points within an array (a grayscale ultrasound image, or the subsequent display after processing in a down-/up-sampling layer of the convolution neural network). The output is relayed to artificial neurons in the next layer.
Neural layer	Connected computer processing units (artificial neurons) which each perform a specific function
Convolutional neural network	Multiple layers of artificial neurons. Each neuron receives one or more inputs and creates a single output which it relays to elements of the next layer. In a fully connected network, all neurons in one layer are connected to all neurons of the next layer.

Figure 1. A simplified overview of the convolutional neural network used in *ScanNav Anatomy Peripheral Nerve Block*  
 S - sartorius; AL - adductor longus; Fa - femoral artery; Sn - saphenous nerve; F - femur; conv - convolutional filter



network learned to make associations between the area of the colour overlay and the area on the underlying B-mode ultrasound image, and thus learned to recreate the desired output colour overlay when presented with an unlabelled input ultrasound image. The 10% of data reserved for testing was used to evaluate the network's performance after training. This is a supervised machine learning process, in that the learning is directed by human input at each stage. A typical training set consisted of 115,000 pairs of still frame images for each network; overall over 800,000 images were labelled and used. An example of the colour overlay produced can be seen at end of the U-Net CNN graphic in Figure 1.

The authors have recently published results of the initial system evaluation, in which three independent experts in UGRA assessed colour overlays produced for the test data [6]. The experts judged the AI-driven colour highlighting to be helpful for identifying anatomical structures in 1330/1334 (99.7%) cases, and for confirming the correct ultrasound view in 273/275 (99.3%) ultrasound scans. The device has been granted regulatory approval for clinical use in Europe and is currently being reviewed by the regulatory body in the USA. Furthermore, an objective and quantitative assessment of the system is underway to establish the exact level of performance in relation to humans, both experts and non-experts. This will help to identify its position in current practice, the potential for future development, and its role in supporting training. While such technology is not without limitations and inherent inaccuracies, automated medical image interpretation systems already exist that approach and even surpass human performance in medical image interpretation [7, 8].

There is more to UGRA than anatomical knowledge and ultrasound image interpretation, but AI is perhaps on the verge of showing you the nerves...

### Acknowledgements

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### James Bowness

Consultant Anaesthetist, Aneurin Bevan University Health Board  
DPhil Student, University of Oxford

### Alan JR Macfarlane

Consultant Anaesthetist, NHS Greater Glasgow & Clyde  
Honorary Professor, University of Glasgow

### Alison Noble

Technikos Professor of Biomedical Engineering, University of Oxford

### Helen Higham

Consultant Anaesthetist, Oxford University Hospitals NHS Foundation Trust  
Associate Professor, University of Oxford

### David Burkett-St Laurent

Consultant Anaesthetist  
Royal Cornwall Hospitals NHS Trust, Truro

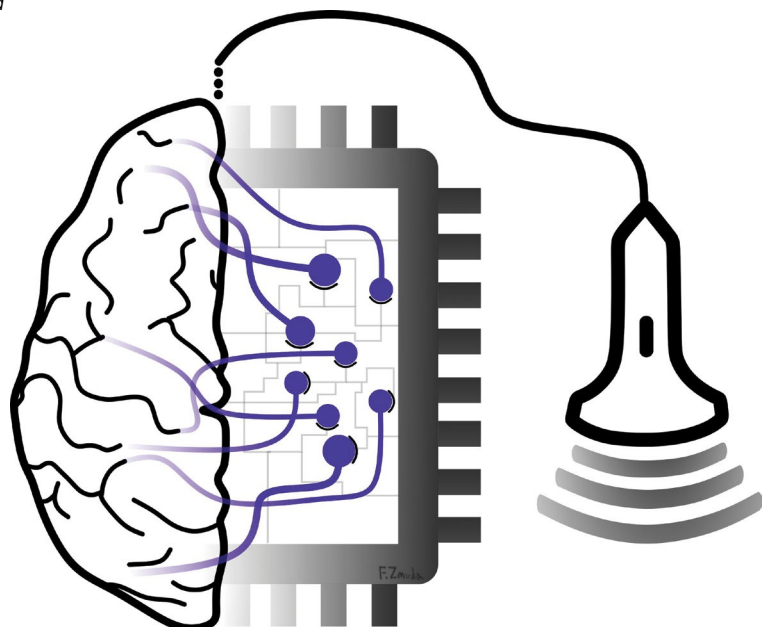
Twitter: @bowness\_james; @ajrmacfarlane; @AlisonNoble\_OU; @HelenEHigham

### Conflict of Interests

JB and DBSL are Clinical Advisors and AN is Senior Scientific Advisor to Intelligent Ultrasound Limited. AJRM has acted as an independent reviewer of Intelligent Ultrasound data submitted for regulatory approval (FDA and CE). DBSL is the Lead Clinician for ScanNav Anatomy PNB.

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# The positives of the COVID-19 pandemic in a DGH: how research helped to keep patients safe

The frantic activity between March and June 2020 is a blur in my mind. For many treatments we are right to think, with the benefit of 20:20 hindsight, “Why on earth did we do that?”

There are a few definite positives that we should take home from this period, and one of them is how the critical care and anaesthesia community approached research. In our hospitals, which were disproportionately affected by the first wave compared with other Welsh sites, we benefited from the firm commitment of ‘learning while doing’ [1]. As we reported earlier, we made significant organisational changes in the department to tackle the workload, including setting up urgent public health research studies in record time [2]. We agreed locally that we would only use disease modifying agents as part of a randomised clinical trial. This was a major commitment as we were bombarded by anecdotes, disparate data and ‘expert opinion’ on how we might best treat our patients, leading to huge uncertainty. The research team in Aneurin Bevan University Health Board gently nudged every colleague inside and outside critical care to actively engage with studies wherever feasible.

As the local principal investigator for the RECOVERY trial, and later for the REMAP-CAP trial, I had daily discussions about these moral and ethical dilemmas with our team. We managed to offer the opportunity to be part of a research study to every single patient who was admitted to our ICU, so they might contribute new knowledge for the next patient through the door. It was very gratifying when we read the results of the dexamethasone arm of RECOVERY, a treatment that I was sceptical about given less-than-favourable results in influenza pneumonia [3, 4]. While we celebrated the success,

it taught me an important lesson in trying to keep equipoise. We learnt a lot from our successes, and probably even more from our mistakes. During the start of the second wave, we have been actively recruiting patients on the wards and ICU to the convalescent plasma arms of RECOVERY and REMAP-CAP.

## Transfusion pathway

One clinical incident during the trial unearthed a significant gap in knowledge and practice in fresh frozen plasma administration. After requesting the convalescent plasma for a patient randomised into the trial, incompatible plasma was issued, delivered at the bedside and transfusion started. Thanks to the vigilance of the supervising nurse of the ICU pod, this was caught within minutes and didn’t result in an adverse reaction. We carefully traced back the steps and found multiple problems in the transfusion pathway, from known software glitches in the blood bank, through over-reliance of verbal handover of blood products from one practitioner to another, to transfusion practice issues at the bedside. Although the mistake occurred with a trial procedure, because of our corrective interventions we have made standard practice safer not just for ICU patients but in the whole hospital.





With the tremendous help of a truly multidisciplinary team, including medical students who decided to do their special study component modules with us during the height of the first wave, we were able to contribute not just to new treatment options but also more basic science. Our work highlighted that the so-called cytokine storm might be more of a gentle breeze, not very different to other causes of ARDS [5]. We continue to explore how could we use commonly available biomarkers, as well as more exploratory markers, to stratify patients who might benefit better from immunomodulation.

Whilst these months were a crazy, once-in-a-lifetime stressful period, I can't imagine myself being anywhere else than in the thick of it. We should retain the ability to keep an open mind even when our fundamental tenets of care are questioned.

**Tamas Szakmany**

Consultant, Critical Care Directorate  
Grange University Hospital, Llanyravon, Cwmbran

Twitter: @iamyourgasman

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# Implementation science: relevance to the NHS and global anaesthesia

Evidence-based practices developed through clinical research have the potential to enhance the quality of peri-operative care. However, it is often not known whether a negative or inconclusive impact of scale-up is because the intervention was ineffective, or just wasn't used. Only half of all evidence-based practices ever reach widespread clinical use, taking up to 17 years for changes to be widely adopted. This has been termed the 'research-to-reality' or 'implementation' gap. Reducing this gap will maximise the benefits of evidence-based practices and is the focus of implementation science, defined as 'The scientific study of methods to promote the systematic uptake of research findings and other evidence-based practices into routine practice, and, hence, to improve the quality and effectiveness of health services' [1]. Using a scientific approach to implementation can improve effectiveness from 15% to 83% and reduce the 'research to reality gap' from 17 to three years.

Quality improvement and implementation science share the goal of improving care quality, but there are important differences (Table 1). Quality improvement focuses on specific problems in a specific setting and may generate new evidence-based practices. In contrast, implementation science typically starts with an evidence-based practice that is under-utilised, seeks to understand why this is, and creates strategies for widespread sustainable uptake.

## Relevance to the NHS

There are several high-profile examples of implementation failures in the NHS: Matching Michigan, the Surgical Safety Checklist, and the Enhanced Peri-Operative Care for High-risk patients (EPOCH) trial. Matching Michigan was an NHS study aiming to 'match' Michigan in reducing central venous catheter (CVC)-associated infections. Work at Johns Hopkins University demonstrated reduced CVC infection rates using a bundle of infection prevention interventions. These interventions were then successfully applied at scale across the state of Michigan. In the NHS study, although CVC infections rates fell, few of the multiple implementation strategies used in Michigan were applied in the NHS. The 'negative' result was considered a failure of implementation, rather than failure of the intervention [3]. In 2010, around the same time as Matching Michigan, all UK hospitals were mandated to implement the Surgical Safety Checklist. Like Matching Michigan, the Surgical Safety Checklist

also faced significant challenges during implementation, especially integrating it into existing practices [4]. Despite being mandatory, wide variation in use was reported, being as low as 40% in some cases. Even today implementation challenges remain, and CQC inspections continue to identify considerable variation in checklist use.

A decade on, the EPOCH trial also failed to demonstrate success at a national level [5]. Subsequent analysis again acknowledged problems with implementation as the cause for the 'negative' result. It seems that while the NHS continues to design many good evidence-based practices, knowledge of how to apply them at scale is lacking.

## Relevance to global anaesthesia

Worldwide, five billion people lack access to safe affordable surgical care, with more deaths due to poor quality healthcare rather than lack of access. In Low- and Middle-Income Countries (LMICs) resources are limited, surgical quality and safety is often poor, and outcomes are significantly worse than in high income countries. Scale-up of evidence-based practices is therefore even more important. In 2019, the WHO declared that health systems must urgently focus on implementation science if the momentum of patient safety is to be maintained, especially in LMICs.

**Table 1: Similarities and differences between implementation science and quality improvement science [2].**

	Implementation science	Role and Hospital
Aim	Improve health care at the patient, provider, clinic, or system level	Improve health care at the patient, provider, clinic, or system level
Problem identification	Focus on getting latest effective research interventions into wide-scale, real-life practice	Focus on specific problem in current practice, usually in a specific setting
Methodology	Highly applied and multidisciplinary (clinical, psychology, social and organisation sciences)  Emphasis on theories, models and frameworks to explain, operationalise, and/or organise the mechanism of change, and constructs influencing the change	Highly applied and multidisciplinary (clinical, psychology, social and organisation sciences)  Emphasis on process maps, driver diagrams, and other tools often taken from other industries such as Toyota Lean, Six Sigma
Analytical tools	Evaluation theories and frameworks to explain the mechanism of change	Range of tools, examination of practice variations and performance benchmarks
Knowledge use and production	Knowledge aimed at improving practice by improving uptake of evidenced-based practices, often at scale.  Less familiar to clinicians	Knowledge aimed at improving practice locally, and may lead to generation of new evidenced-based practices  Familiar to clinicians as is recommended part of post-graduate surgical and anaesthesia training.

A huge number of evidence-based practices exist that would improve care in LMICs, but implementing these at scale is a monumental challenge. A recent analysis of Surgical Safety Checklist use in 94 countries reported a 75% rate of use overall, but < 30% in LMICs. Failure to scale up evidence-based practices around the world has been described as ‘a major failure in global health’, and a ‘form of waste that donors, researchers, clinicians, and ... communities in developing nations cannot afford’ [6].

## Conclusions

Anaesthetists have long been at the forefront of driving improvements in peri-operative care, especially at the individual and local level. We now need to raise our sights to the population level and learn how to apply evidence-based practices at scale. The current emphasis on clinical effectiveness over implementation risks leaving researchers wondering why interventions work in some contexts and not others, keeps potential solutions hidden in pockets but never reaching those in greatest need, and deprives many patients of high quality care. We must embrace this emerging discipline and understand its value for designing, planning and evaluating scale-up of evidence-based practices in the NHS and worldwide.

### Susanna Ritchie McLean

Consultant Paediatric Anaesthetist  
Birmingham Children’s Hospital

### Dina Hadi

Consultant Anaesthetist  
Whittington Health NHS Trust, London

### Michelle White

Consultant Paediatric Anaesthetist  
Great Ormond Street Hospital, London

Twitter: @Ritchiebiscuit; @mcwdoc

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# Supporting equality, diversity and inclusion in academic anaesthesia, critical care and pain medicine

In 2019/20, it was my privilege to chair a working group that aimed to support equality, diversity and inclusivity (EDI) in academic anaesthesia. We tried to understand whether there are systemic challenges that face people of different characteristics in reaching their full potential as an academic with an interest in anaesthesia, peri-operative medicine, pain or critical care. Our aim was to discuss and consider proposals that would be aimed at ensuring equality of opportunity, i.e. positive affirmation. We were also mindful to think broadly - outside defined protected characteristics - and consider specific issues that might apply to clinicians and scientists working in our academic field.



Academic medicine has been an occasionally uncomfortable environment for some people with protected characteristics. As for other walks of life, there is a broad base of inadvertent institutional prejudice, narrowing to a smaller but sharp point of individualised discrimination such as sexual harassment or bullying. Universities are now expected to provide an equitable environment for all staff and students. Initiatives range from the seemingly simple, for example not scheduling meetings outside the hours of 10 - 4 P.M. so as not to disadvantage those with parental responsibilities, to the more complex such as providing education for all staff on what is and is not acceptable behaviour in the workplace. They are also expected to measure staff and student experience in order to understand the effectiveness of interventions. Bullying, harassment and prejudice are not tolerated, and can carry serious consequences for individuals and the institution. In academic anaesthesia, other barriers to successfully achieving full diversity relate to our particular career characteristics: anaesthesia is a postgraduate specialty and our professional exams are completed later than many others, therefore many budding scientists start their academic career relatively late. Their progression may then be hampered by life events, for example financial, carer and family responsibilities, making the perceived uncertainty of an academic career feel like a risky option compared with a traditional clinical career.

Academic anaesthetists will compete with non-anaesthetists for all the things that are required to make a research career feasible and successful, namely research funding, research impact through publications and practice or policy change, and recognition. We must seize the potential to create opportunities for all groups within our community that will enable them to compete on an even playing field with everyone else. The

recommendations of our working group are directed at the NIAA partners and external stakeholders including funders, journals, hospitals and universities. Some aim simply to keep the equality, diversity and inclusivity agenda in people's minds; for example if one has to provide a gender breakdown of authorship on submission of a paper, might that make one think harder about why the research group is dominated by one gender and then seek to redress the gap? Some recommendations are aimed at ensuring that those who take time away from the bench or the bedside are not disadvantaged, for example providing specific funding or honorary awards for people who have had career breaks. And some aim to evaluate problems thought to be peculiar to anaesthesia training, for example it is a long-held belief that some rotations are more willing to release trainees for out-of-programme research experience than others: can we provide evidence for this belief, and if so can we change the paradigm? Finally, we acknowledge areas where we have no real understanding of potential or actual challenges, for example for LGBTQ+ colleagues or issues relating to social mobility, and ask the NIAA partners to commission research to plug this knowledge gap.

The report and recommendations can be found at <https://www.niaa.org.uk/niaa-equality-diversity-inclusivity-report>, and we look forward to updating you on progress over the next few months.

## **S. Ramani Moonesinghe**

*National Clinical Director for Critical and Perioperative Care  
NHSE England/NHS Improvement*

Twitter: @rmoonesinghe

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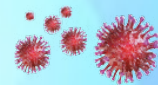
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# Duty of Candour in Northern Ireland - a cause for concern

For six years a statutory Duty of Candour has existed in England, requiring organisations to be open and honest with patients if things go wrong and they experience moderate harm or worse. This adds to the long-standing professional duty of candour that the GMC requires for all doctors. Organisations failing to meet their obligations can be prosecuted and fined, for instance £16,500 for one hospital trust in 2019 [1]. Scotland introduced a comparable statutory duty for organisations in 2018, and it is anticipated that similar relevant provisions in Wales will come into force in 2022.

The introduction of a statutory Duty of Candour in Northern Ireland has followed a different path to other UK jurisdictions and is currently subject to a consultation that closes on 2<sup>nd</sup> August 2021 [2]. Doctors in Northern Ireland should feel very concerned about the proposals, which recommend that individuals and organisations breaching the duty could be guilty of a criminal offence.

The background to the recommendation that a statutory Duty of Candour be introduced in Northern Ireland came from a judge-led public inquiry into five paediatric deaths from hyponatraemia that were related to saline 0.18% infusions. The deaths occurred between 1995 and 2003; the long-running inquiry, established in 2004, finally reported in 2018. In his report, Justice O'Hara found that there had been a "repeated lack of honesty and openness with the families" of the children who had died. His recommendation that there should be a statutory Duty of Candour in Northern Ireland was entirely understandable. Less explicable was the recommendation that breach of the statutory duty should be a criminal offence applying to individuals as well as organisations. If the proposals are fully adopted, Northern Ireland will be unique as the only UK country where the statutory duty applies to individuals as well as organisations, and where breach of the duty could attract criminal liability.

History has taught us that criminalising medical errors of judgement does not make patients safer. The classic example is the inadvertent intrathecal injection of vincristine [3]. For decades doctors were convicted for causing the death of their patients through gross negligence, yet deaths kept happening – jailing doctors made not one jot of difference. What stopped the deaths was the introduction of robust national policies coupled with the introduction of physical preventive measures. We now have a national policy for intravenous fluid therapy in children: its adoption and dissemination is what will prevent future deaths [4].

The statutory Duty of Candour in Northern Ireland is likely to be complicated and hard to understand for those expected to comply. There may be arbitrary, complex thresholds that apply to what constitutes a notifiable incident. Even if criminal sanctions are reserved for the most egregious breaches of the statutory duty, it is inevitable that more individuals will be subject to a criminal investigation than are actually prosecuted which will have a chilling effect on the profession and a negative impact on the morale of healthcare staff - at a time that they will be recovering from the stresses of the pandemic.

If you are a doctor in Northern Ireland and you are worried about what you have read, you have until 2<sup>nd</sup> August 2021 to make your voice heard in this consultation.

## Michael Devlin

*Head of professional standards and liaison, Medical Defence Union*

Twitter: @the\_mdu

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\*Nimmo AF, Absalom AR, Bagshaw O, et al. Guidelines for the safe practice of total intravenous anaesthesia (TIVA): joint guidelines from the Association of Anaesthetists and the Society for Intravenous Anaesthesia, 2018



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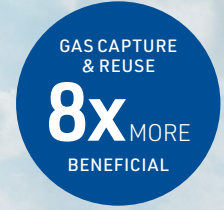


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# Contemporary collecting by the Association of Anaesthetists Heritage Department

It was acknowledged early on during the COVID-19 pandemic that, with the symptom mix, anaesthetists and intensivists would become involved rapidly in the care of many patients in addition to their usual case load. Preparations were made for redeployment of non-intensivist anaesthetists, and other health care professionals, to provide care in proliferating areas of the hospital environment where ventilatory support could be provided. It was felt that there was little formal experience of similar events, or training in management, even though global pandemics are regrettably not that infrequent; even verbatim reports from the medical profession involved in the early 20th Century pandemics might have been of value.

As the country went into lockdown, the Heritage Team began preparations for a contemporary collecting project to collect and document anaesthetists' and intensivists' role in the fight against COVID-19. Our ambition was to collect equipment and testimonies proactively related to anaesthesia and anaesthetists, intensivists and intensive care. Alongside anaesthetists' oral history interviews, we wanted to collect patients' voices to gain a new perspective on anaesthesia. On the 1<sup>st</sup> May 2020, the Board of Trustees approved the Contemporary Collecting policy and the team launched the project.

The Heritage Volunteers meet regularly with the Heritage Team, and at their virtual meeting in June 2020 the contemporary collecting plans were outlined. Dr Michael Ward immediately began collecting oral testimony from a cross section of anaesthetists who had become involved, in any capacity, in the global fight against this virulent virus.

## Box 1

Name	Age	Role and Hospital	Pandemic Role/Story
Dr Richard Birks	70	<ul style="list-style-type: none"> <li>Retired Anaesthetist</li> <li>Past President of the Association of Anaesthetists</li> </ul>	Contracted COVID-19
Dr Carl Waldmann	60	<ul style="list-style-type: none"> <li>Intensivist, Royal Berkshire NHS Foundation Trust</li> <li>Past Chair of the Intensive Care Society</li> </ul>	
Dr Tim Meek	50	<ul style="list-style-type: none"> <li>Consultant Anaesthetist, South Tees Hospitals NHS Foundation Trust</li> </ul>	Redeployed and contracted COVID-19
Dr John Shubhaker	30	<ul style="list-style-type: none"> <li>SAS Anaesthetist</li> </ul>	Training Team, Nightingale Hospital, London
Dr Alan McGlennan	50	<ul style="list-style-type: none"> <li>Consultant Anaesthetist</li> </ul>	Medical Director, Nightingale Hospital, London
Dr Jane Lim	30	<ul style="list-style-type: none"> <li>Anaesthetic Trainee, Royal Free London NHS Foundation Trust</li> </ul>	Deployed to a COVID-19 ward
Prof Andrew Farmery	60	<ul style="list-style-type: none"> <li>Academic and clinician</li> </ul>	Clinical leader of the OxVent ventilator project
Dr Alison Pittard	55	<ul style="list-style-type: none"> <li>Consultant Anaesthetist and Intensivist</li> <li>Dean of the Faculty of Intensive Care</li> </ul>	
Dr Natalie Mincher	38	<ul style="list-style-type: none"> <li>Consultant Anaesthetist, Royal Gwent Hospital, Newport, Wales</li> </ul>	Redeployed to COVID-19 ICU
Dr Shanath Ramachandran	27	<ul style="list-style-type: none"> <li>F2 Trainee, Leighton Hospital, Crewe</li> </ul>	Contracted COVID-19 and spent eight days on ICU intubated
Dr Nuala Lucas	-	<ul style="list-style-type: none"> <li>Lead Obstetric Anaesthetist, Northwick Park Hospital, London</li> <li>Past Honorary Secretary of the Obstetric Anaesthetists' Association</li> <li>Dean of the Faculty of Intensive Care</li> </ul>	MBE recipient for services to anaesthesia during COVID-19
Dr Fiona Roberts	31	<ul style="list-style-type: none"> <li>Final Year Trainee Anaesthetist, St Vincent's University Hospital, Dublin</li> </ul>	Irish perspective on COVID-19
Dr Sarah Ramsay	53	<ul style="list-style-type: none"> <li>Consultant Anaesthetist and Intensivist, QEH Glasgow</li> <li>Member of the Royal College of Anaesthetists, Scottish Board</li> </ul>	Scottish perspective on COVID-19
Dr Rory Dwyer	64	<ul style="list-style-type: none"> <li>Consultant Anaesthetist and Intensivist, Beaumont Hospital, Dublin</li> <li>Clinical Lead National Audit Office, Dublin</li> </ul>	Irish perspective on COVID-19

To date, 14 interviews have taken place with Michael as the interviewer, using the training acquired by the Oral History Project of the Greats of Anaesthesia (Box 1). It is hoped that beyond a record of the pandemic, these audio recordings could be used to give confidence and aid management in the event of future similar pandemics.

In terms of other collecting, we have been promised:

- UCL Ventura breathing aid developed by UCL engineers, UCLH clinicians and Mercedes-AMG High Performance Powertrains
- OxVent ventilator

We are awaiting confirmation from the Ventilator Challenge Consortium team about the ventilator they developed.

We have also acquired:

- Photographs by Jonathan Williamson, anaesthetist and photographer working in a London Hospital during the pandemic.
- Two written testimonies: an ST6 working at Evelina Children's Hospital at Guy's and St Thomas' during the pandemic; and an anaesthetist told to 'stand down' due to pregnancy, and how her return to work was supported.
- Breath artworks created during the Creating Breath: a mindful hour of art and breath workshop run for members working on the frontline.

These interviews and objects will be included in our Heritage collection, to be held in perpetuity. Their historical value is self-evident: they will help us tell the pandemic story, and anaesthetists' and intensivists' role on the frontline, now and in the future.

We hope to have a display of the collection in the museum in the near future, and the oral history recordings have been made available online at <https://anaesthetists.org/Home/Heritage-centre/Collection/COVID-19-Contemporary-Collecting>

Finally, a touch of humour to end: a COVID-19 skit by Dr Mincher who was interviewed for the oral history project:

*I thought the worst thing about working in a pandemic would be fear of catching the disease. Actually, I trust my PPE. What I'd never really thought about was how wearing it would be so different (Box 2). Thank goodness we've all got each other. My colleagues are the absolute business.*

**Caroline Hamson**

*Heritage Manager, Association of Anaesthetists*

**Michael Ward**

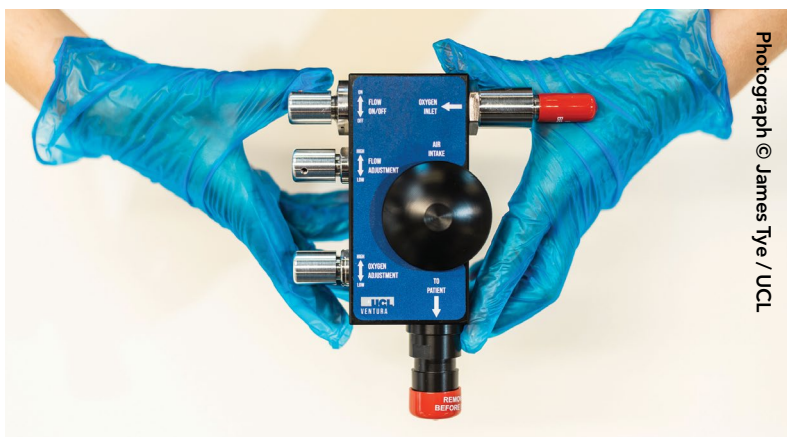
*Retired Consultant Anaesthetist and Heritage Volunteer*



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## Box 2

### Ten things about working in PPE that I had never thought about:

1. It hurts. It seems alright when you first put it on. An hour later the tips of your ears are necrotic and you can't adjust the mask straps.
2. Mouth like the Sahara. The masks make you mouth breathe. Then your mouth gets dry but obviously you can't have a sip of water.
3. You can't recognise your mates. You've been talking to someone for 20 minutes and then you realise who it is.
4. You've no idea what anyone is saying. Masks muffle the sounds and you can't see lips moving.  
"Big breasts!"  
"What?!"  
"I said BIG BREATHS!"
5. It's hot. Man it's hot some days. Add a lead gown for X-ray protection and you come out of there a stone lighter from sweating.
6. You can't wee. If you do 'doff', which takes a while, wee and 'don' again, you're aware you're wasting PPE. Not drinking enough for fear of needing a wee also compounds #2.
7. You can't 'pop' anywhere. You can't run and ask something because you can't leave or enter different areas. Communication becomes a nightmare. We should consider pigeons.
8. You've never got a pen. Pens go into red zones and don't come out. They are presumably eaten by the red zone pen monster.
9. You can't see. The visors are heavy and sag, and glare badly. Not being able to see wouldn't be so bad if you weren't also deaf (see #4).
10. It makes everything an effort. It's like moving around in a fake 'fat suit'. Or fancy dress when you ordered the full face outfit because it's all they had left and it's 4.55 on a Friday and you live to regret it deeply. After a 13 hour shift you're far more knackered than usual, despite having moved a total of about 1 km all day.

# WSM 2022 abstract submission

## Don't miss the deadline

Submit an abstract for poster presentation at WSM 2022 by the deadline of **11 August 2021**.

Submissions are invited in the following categories:

- Audit & quality improvement (QI)
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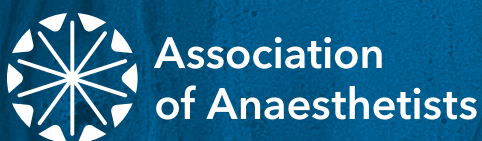
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For more information please visit:  
[www.anaesthetists.org/Home/Education-events/Winter-Scientific-Meeting-2022](http://www.anaesthetists.org/Home/Education-events/Winter-Scientific-Meeting-2022)



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The grant must not fund routine CPD activities which should be funded through normal study leave budgets, nor examination fees, exam preparation courses or college related fees.

For more details and to apply visit the website  
<http://anaesthetists.org/sas-grant>



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The closing date for applications is 30 September 2021 for consideration at the autumn meeting of the SAS Committee.

## SALG Patient Safety Conference abstract submission

### Abstract submission is now open

Trainees are welcomed to submit an abstract outlining a patient safety project that they have completed. We encourage submissions on the meeting theme of Airway Management particularly case reports and patient safety airway issues.

**Submission deadline 23:59 on 28 July 2021**

Submissions will be assessed and the presenting trainee author of the highest-scoring abstracts in the preliminary review will be invited to present their work during the SALG Patient Safety Conference on 26 November 2021.

For more information please visit:  
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# Journey through the body: a visual exploration

Eoin Kelleher. Mercier Press, Cork 2019. ISBN: 978 1 78117 708 2

Written and illustrated by a regular contributor to *Anaesthesia News*, this is an entertaining and immersive visual stroll through the workings of the human body, for young and old alike. The accompanying text is pitched very much at the level of an amateur anatomist, whoever or whatever that might be, but it is the illustrations that have clearly taken the artist time, effort and dedication. I suspect this was also where the fun was too. Kelleher's drawings take a stroll through the human body and its curious processes, whilst drawing on nudges of Pop Art and Picasso to create an oddly compelling experience. Where else will you see Dali, a smattering of Impressionism and the *Day of the Triffids* accompanying a brief outline of the autonomic nervous system? The text is quite frankly underwhelming, but would it be possible to make descriptions of laminar flow or the omentum anything else? However credit is due for the images that resemble an anatomical visual cryptic crossword, and Kelleher's interpretations are at times genuinely smile-inducing.

If it is prose you are after, then this is not the place. Instead the book by the Tulleken twins of BBC fame, *Secrets of the human body*, provide a well-written saunter through the human physique and its weird and wonderful processes. This is a pleasantly-paced narrative combining anecdote and science. I wasn't intending to finish it, but like a pack of half-eaten crisps, I enjoyed it sufficiently to polish it off.

A couple of steps up the humour ladder, and you will find Bill Bryson's latest offering *The body: a guide for occupants*. In his inimitable style, Bryson has you chuckling gently into your latte. This feels more of a holiday read, somewhere between a Haynes manual and a light-hearted Jilly Cooper; less of a belly-laugh kind of book than some of Bryson's expeditionary buffoonery, but more one to read and quietly annoy the person sitting near you with uselessly entertaining trivia (the average adult walking pace is  $130 \text{ cm}\cdot\text{s}^{-1}$ , since you asked).

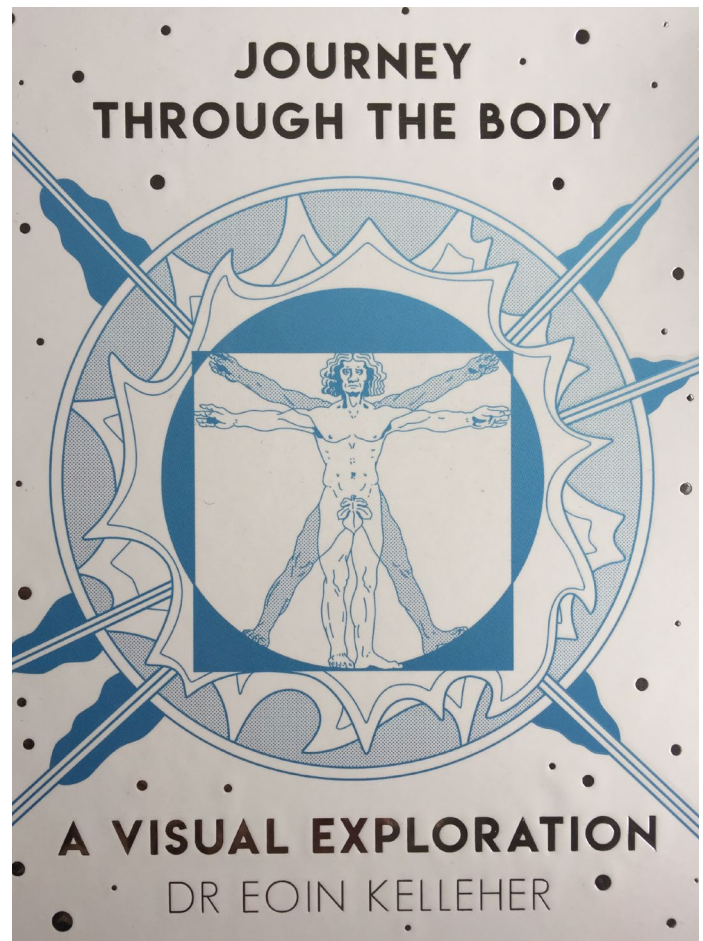
Back to Kelleher's *Journey through the body* - I paused to work out why I would buy this book. I kept on flicking to the back page to see if it was actually a colouring book (it's not). I think

my mum would find the text interesting, whereas my daughter might find the pictures a bit wacky and weird. However, if you are looking for a coffee table book for the anaesthetic office then *Journey through the body* might just be the one for you!

**Lawrie Kidd**

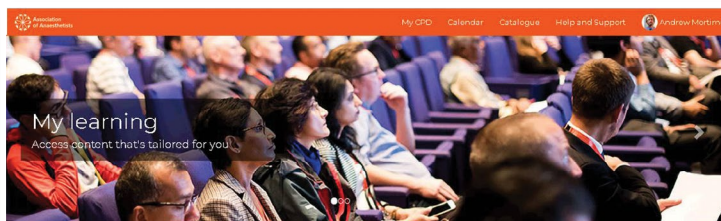
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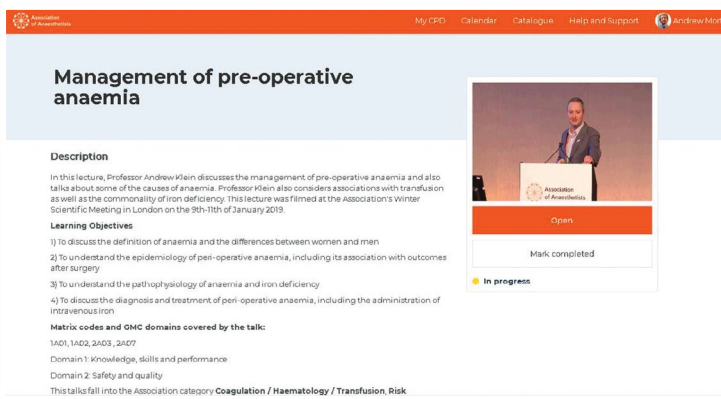




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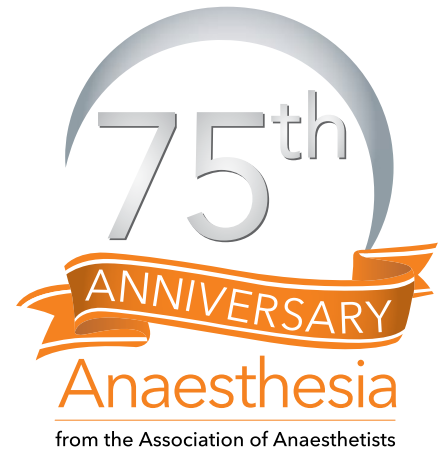
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# Speak up! Barriers to challenging erroneous decisions of seniors in anaesthesia



T. Beament and S.J. Mercer

## Summary

'Speaking up' or the ability to effectively challenge erroneous decisions is essential to preventing harm. This mixed-methods study in two parts explores the concept of 'barriers to challenging seniors' for anaesthetic trainees, and proposes a conceptual framework. Using a fully immersive simulation scenario with unanticipated airway difficulty, we investigated how junior anaesthetists (one to two years of training) challenged a scripted error. We also conducted focus groups with senior trainees (three to seven years of training) and undertook a 'thematic network analysis' of responses. Junior anaesthetic trainees challenged erroneous decisions effectively, but trainees with an additional year of experience challenged more quickly and effectively, combining 'crisp-advocacy-inquiry challenge' with 'non-verbal cues'. Focus group analysis conceptualised a 'barrier network' with three main themes: concerns around relationships; decision-making; and risk/cost-benefit. Emotional maturity is an important protective layer around decisions to challenge. Despite significant multifactorial barriers, systematic training in effective 'speaking up' could improve the confidence and ability of juniors to challenge erroneous decisions.

As anaesthetists, communication is at the heart of everything we do. We use a wide range of communication skills every day, communicating with our patients and members of multidisciplinary teams face to face (or mask to mask?), via email, and now increasingly via virtual means. By now, we are all aware of what can happen when communication goes awry. Beament and Mercer used a simulated scenario in which a 'confederate' consultant anaesthetist made an erroneous decision to assess how first or second year-core trainees approached the situation. They also held focus group sessions with more senior trainees for detailed exploration of barriers to speaking up (defined as communicating other team members' doubts, differing opinions, or potential problems about decisions or course of action in medical care). When I reflect on similar experiences in my own training, these themes come as no surprise - do we inadvertently put barriers up for our colleagues to speak up?

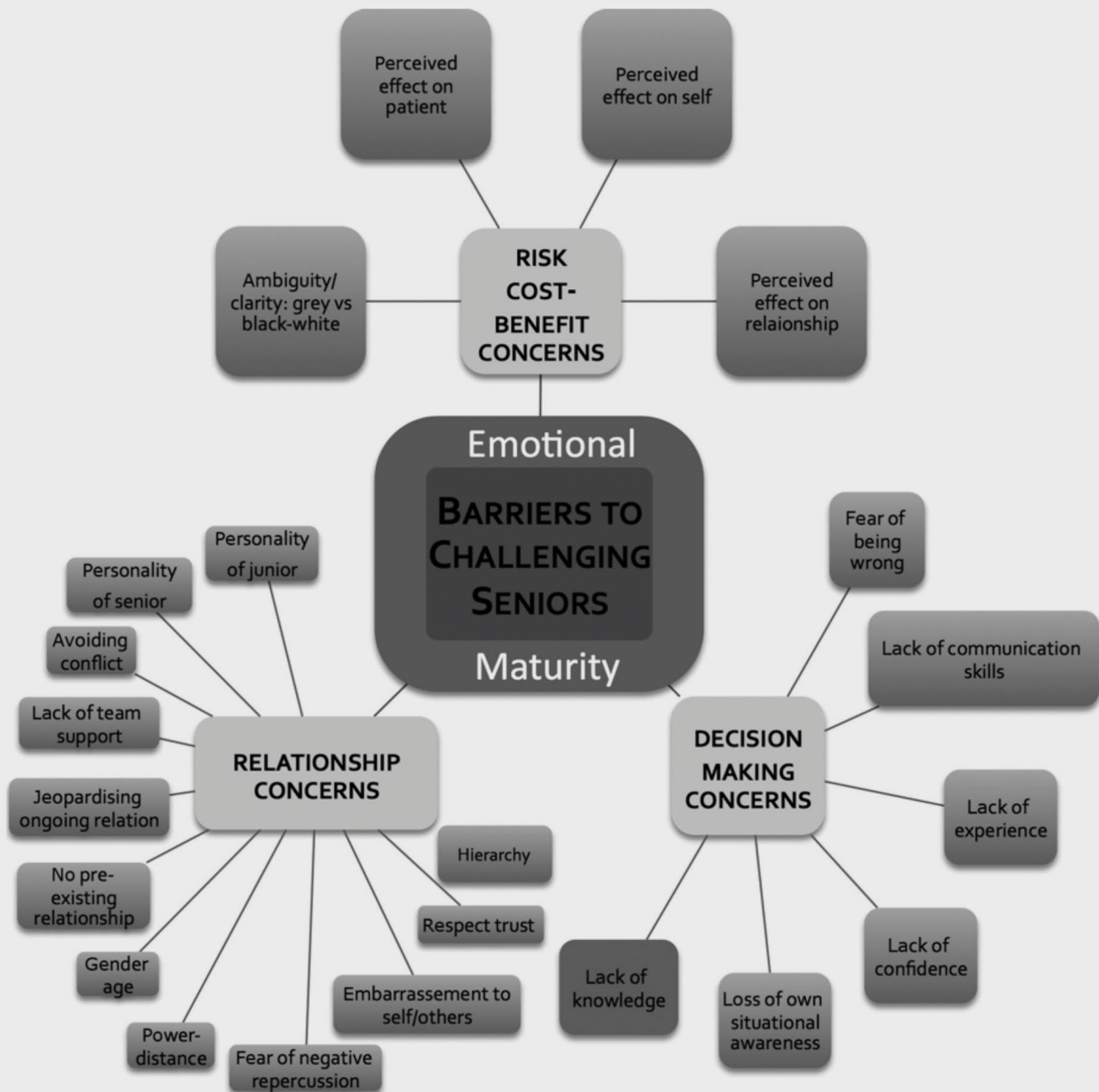
Being able to speak up is one of the duties set out by the GMC in 'Good medical practice' [1]. Beament and Mercer note that 'failure to challenge erroneous decisions contributes to patient morbidity and mortality'. There have been many high-profile examples of this, where a different outcome could have occurred if members of the team had spoken up or if they had been listened to when they did. The article's literature review notes 31 barrier themes that had previously been identified - it is surprising that anyone ever speaks up when there is so much on the line.

The thematic analysis of the focused discussions revealed 22 basic themes that were grouped into three second level themes ('relationship concerns', 'decision-making concerns' and 'risk/ cost-benefit concerns'), explaining the global theme of 'barriers to challenging erroneous decision in anaesthetic trainees' (Figure 1). Not all of these barriers exist in every situation, but there is value in being aware of them. Communication is a two-way street - if you are the more senior anaesthetist in such a dynamic, being aware of barriers and taking active steps to acknowledge and mitigate them is just as important as overcoming the barriers to speaking up. The article could not be clearer: *'Seniors must actively contribute to creating a culture where all team members are valued, decision-making is shared, and humiliation or bullying repercussions of conflict are no longer acceptable.'*

Speaking up does not come naturally to everyone. Thankfully, the authors make it clear that the verbal and non-verbal cues *'which seemed particularly powerful in gaining the confederate consultant's attention'* can be learned [2]. They describe the use of 'crisp-advocacy-inquiry challenge' as an effective means of communicating in this situation. In their discussion, they question whether *'learning such speaking up skills should be included in curricula to improve patient safety'*. I am sure that we will all have been on courses on airway management, but do we give enough priority to attending communication courses? Perhaps this is something to consider as we emerge into the post-pandemic era, when face-to-face events return.



Figure 1.



Rephrasing my first sentence, we might say that as humans, communication is at the heart of everything we do. Improving communication may not only benefit our clinical practice – it may benefit our non-clinical roles and personal life as well.

**Keith Hodgson**

Vice Chair, Trainee Committee of the Association of Anaesthetists  
ST7 in Anaesthesia, South East Scotland School of Anaesthesia

#### References

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2. Okuyama A, Wagner C, Bijnen B. Speaking up for patient safety by hospital-based health care professionals: a literature review. *BMC Health Services Research* 2014; **14**: 61.

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# Tales from way behind the front line 2

A retired anaesthetist in the vaccination clinic tells all

We treat our vaccines with due reverence around here. Pfizer is the demanding German supermodel of the coronavirus world, stored in arctic conditions, gently defrosted, inverted (SLOWLY) ten times, diluted with 1.8 ml (not 1.9) of saline, inverted again (SLOWLY) ten times, then transported to the drawer-upper on a velvet cushion by someone who walks as if they're balancing a book on their head. Astra-Zeneca is more of a cart-horse, the good old British job - toss it over, job's a good 'un.



Herewith a short, non-exhaustive list of "things that an anaesthetist wouldn't think twice about but which will send a pharmacist into terminal meltdown":

- Tapping a syringe gently to get the air bubbles to coalesce.
- Expelling air bubbles from the needle after removing the syringe from the vial.
- Having been previously ticked off for doing either of the above, leaving a single air bubble of estimated volume 0.001 ml in the syringe.
- Replacing the 23-gauge needle which dropped off the syringe onto the floor with a new sterile 23-gauge needle.
- Replacing the existing 23-gauge needle with a 21-gauge needle for the morbidly obese customer next in line.
- Drawing up a dose before the vaccinator is standing in front of you with their hand out and with a patient sitting at their station with sleeve already rolled up.
- Anything else which results in the dose sitting in the syringe for more than about 20 msec.

And, for the sake of balance, "a thing that drives anaesthetists nuts but which the pharmacist insists on":

- Resheathing EVERY NEEDLE after withdrawing it from the vial.

I'm glad I've got that off my chest.

Much excitement this week. We were sifting through the tail-enders of the over-70s, with long gaps and much shouting through face masks, when the boss came in and said: "Any contacts over 65? We're opening up to the next priority group".

A quick phone call, and Lady Jabber, usually quite a sedentary individual, was out of the blocks like Usain Bolt pursued by a rabid cheetah. Within 10 minutes of her departure, newly vaccinated, there was a long middle-England queue wearing thoughtfully-accessorised leisure gear, for all the world as if Waitrose had suddenly announced a BOGOF on quinoa.

The contrast between this crowd and the over-70s was extreme. The Queen Bee and I took to asking them how they'd heard about the extension of the programme so quickly. "It popped up on my WhatsApp bridge group", said one, while another said she'd been walking with her friend in the local country park when she got a text from her niece. Someone else had got an urgent email from the neighbourhood watch coordinator. Everyone was waving to their friends and being terribly jolly, and the comeback had gone in a flash from "I'd rather have the English one" to "Oh goody, it's the Pfizer. I really wanted that and Marjorie will be so jealous - she had to make do with the Oxford".

The Queen Bee and I sneaked off at 17:00 past a line extending into infinity, leaving the evening shift wondering what on earth was going on. As time goes by, we'll be moving from the middle-aged to the young, and then we expect the good times to be over. It'll be wall-to-wall fainters, multiple allergy sufferers and strident objectors to Astra-Zeneca on the grounds that fetal tissue was used to propagate the passive virus used to deliver the vaccine. Cynical? Moi?

## Jabber the Nut

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## Evelyn Baker Award

**An award recognising the 'unsung heroes' of anaesthetic departments.**

The Evelyn Baker Award was instigated by Dr Margaret Branthwaite in 1998, dedicated to the memory of one of her former patients at the Royal Brompton Hospital. The award recognises the 'unsung heroes' of anaesthetic departments, the often unspoken backbone of the department who is the 'go to' person for clinical or other advice. The award is given to individuals who set themselves apart from peers by demonstrating an exemplary track record in clinical excellence, teaching and training, and supporting colleagues.

To be eligible, a nominee:

- Must be a consultant or SAS doctor in anaesthesia, usually with more than ten years in post
- Must be in clinical practice at the time the nomination is submitted (but can have retired by the time the award is presented)
- Must be a current member of the Association
- Must NOT be in possession of a NATIONAL Clinical Excellence Award.

Nomination is by citation, which:

- Must be submitted by a current member of the Association
- Should include an indication that the nominee has broad support within their department
- May include additional comments from departmental and other colleagues.

The citation which should be of 1000 words or fewer, should explain how the nominee demonstrates outstanding competence that sets them apart from others, under the following headings:

- Clinical excellence (encompassing technical proficiency, consistently reliable clinical judgement and wisdom, and skill in communicating with patients, their relatives and colleagues)
- Teaching and training (encompassing the ability to train and enthuse trainee colleagues is seen as an integral part of communication skill, extending beyond formal teaching or academic presentation)
- Supporting colleagues and co-workers

The Evelyn Baker Award will be presented at WSM London in 2022.  
Details of previous winners and further information can be found on the website  
<https://anaesthetists.org/Home/About-us/Honours-awards/Evelyn-Baker-Medal-recipient>



The nomination and citation of up to 1000 words, should be sent to the  
Honorary Secretary at [honsecretary@anaesthetists.org](mailto:honsecretary@anaesthetists.org) by **17:00 on 6 August 2021**

July 2021

## Addressing priorities for surgical research in Africa: implementation of a multicentre cloud-based peri-operative registry in Ethiopia

Network for Peri-operative Critical care

A major and persistent patient safety issue in low- and middle income countries (LMICs) is limited access to reliable peri-operative information. Unfortunately, information technology solutions developed for higher income country settings are frequently poorly transferable and are often proprietary. In this article, the Network for Peri-operative Critical care collaborative describes the development and implementation of a peri-operative surgical registry across four hospitals in Ethiopia, including provision of real-time dashboards for clinical teams. Importantly, the registry was conceived, developed and applied by local service users to meet local needs. The authors outline implementation of the registry tool for 1748 individual surgical care episodes where descriptive dashboards were used to evaluate key performance indicators of quality and safety. These included compliance with the WHO Surgical Safety Checklist (92.1%) and the prevalence of anaesthetic-related adverse events (3.1%) and peri-operative mortality (0.9%).

In an accompanying editorial, Kluys and Biccard describe how peri-operative registries have been and could be applied in LMICs, particularly focusing on environmental and resource needs. They outline a formula for successful implementation of such initiatives that should include context sensitive data collection tools, together with a sustainable and robust data management cycle. The heavy lifting required to realise registry data collection systems should not be underestimated but, once the structures are in place, the benefits of standardised and auditable care may profoundly improve patient outcomes. Key to this, however, is equitable access so that those individuals collecting data can easily obtain clinically relevant information to inform their clinical practice.

## Oxytocin at elective caesarean delivery: a dose- finding study in women with obesity

Peska E, Balki M, Maxwell C, Ye XY, Downey K, Carvalho JCA

How low can you (safely) go? Obese women are more likely to suffer uterine atony after delivery compared with non-obese women, with conflicting reports of associated increased risk of post-partum haemorrhage. Here, the authors sought to determine the dose of oxytocin required to achieve adequate uterine tone in women with BMI  $\geq 40$  kg.m<sup>2</sup> during elective caesarean section. After exclusion of women with potential confounding risk factors for uterine atony, and using standardised neuraxial anaesthesia, the team conducted a double-blind dose finding study to determine effective dose. The primary outcome was uterine tone measured by the obstetrician 2 min after drug administration. The authors sought to standardise tone assessment with pre-determined definitions to reduce the risk of measurement subjectivity.

Thirty women were recruited with mean BMI 52 kg.m<sup>2</sup>. Using isotonic regression methods, the authors found that the ED<sub>90</sub>

of oxytocin was 0.75 IU (95%CI 0.5-0.93) to generate adequate uterine tone, approximately twice the dose required for women with BMI < 40 kg.m<sup>2</sup> found in a previous study.

The bolus doses investigated by the authors are well below UK (5 IU) and USA (10 IU) recommendations but align with recent consensus guidelines published in *Anaesthesia*, suggesting that an initial bolus of 1 IU followed by slow infusion may be preferable. This study provides reassurance, therefore, that a 1 IU initial bolus is sufficient for women after childbirth by elective caesarean section irrespective of BMI. By standardising oxytocin dosing in this manner, adequate uterine tone may be achieved whilst reducing the associated risk of drug-related acute cardiovascular adverse events commonly observed in this population.

# Particles

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Simpson JP, Wong DN, Verco L, Carter R, Dzidowski M, Chan PY

## Measurement of airborne particle exposure during simulated tracheal intubation using various proposed aerosol containment devices during the COVID-19 pandemic

*Anaesthesia* 2020; **75**: 1587-95.

### Introduction

The COVID-19 pandemic has highlighted the significance of aerosol-generating procedures and the subsequent increased risk of infection for frontline anaesthetic teams. Tracheal intubation can cause coughing, and has been viewed as a significant aerosol-generating procedure. Since the pandemic started several companies have produced aerosol containment devices, many of which have not been assessed for their safety or effectiveness [1]. International PPE guidelines do not currently recommend using any containment devices to minimise aerosol exposure.

The study authors aimed to examine the ability of some containment devices to reduce airborne particles during simulated tracheal intubation.

### Methodology

The study involved seven healthy volunteers > 18 years old in an ICU side room with the pressure equilibrated to the rest of the unit. Five containment devices were tested, as well as the standard condition with no containment device. The devices tested included: aerosol box; sealed box (no suction); sealed box (continuous suction); vertical drape; and horizontal drape.

A nebuliser containing 5 ml saline with gas flow 6 l.min<sup>-1</sup> was held beneath the simulated patient's mouth for 5 min, and the patient was asked to cough every 30 s throughout this period.

An airborne particle counter was positioned in front of the laryngoscopists' face, 75 cm above the simulated patient's head. Saline particle exposure was measured during the 5-min nebulisation period, and for a further 1 min after device removal.

### Results

The sealed aerosol containment device with continuous suction appeared to be the most effective, with particle counts being similar to baseline except for those of 5 µ size. The sealed box without suction resulted in a decrease in 2.5 µ particles at 300 and 360 s only.

The use of either vertical or horizontal drapes resulted in no difference in particle exposure, whereas the use of an aerosol box resulted in an increase in airborne particles. Using the aerosol box also demonstrated spikes in particles every 30 s, coinciding with the 'patient' coughing.

### Discussion

The finding that the aerosol box resulted in a considerable increase in airborne particles was unexpected. The authors theorised that the spikes in particle counts related to coughing were caused by escape through the arm holes, and they question the use of aerosol boxes in situations when coughing is likely such as tracheal extubation.

The authors note the effectiveness of using the sealed box with continuous suction at reducing airborne particle exposure. However, its design and degree of enclosure means that tracheal intubation cannot be performed practically.

A limitation of this study was the small sample size. The authors also highlight the need for further studies to examine the effects of such devices on airborne particle count elsewhere in the room.

### Conclusion

There is a need for large scale studies on the use of aerosol containment devices. Unless their effectiveness can be proven in such trials, they should not be used for tracheal intubation.

#### James Bennett

Senior Clinical Fellow

Queen Elizabeth Hospital, Gateshead

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# Your letters

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Please see instructions for authors on the Association's website [www.anaesthetists.org](http://www.anaesthetists.org)

Dear Editor

## "Glass of '88"

I wonder how many readers still have one of these CAMRA (Campaign for Real Ale) tankards (Figure 1), which were given out at a social function during the JAG conference in 1988. For younger readers, Junior Anaesthetists' Group was the previous name for the Trainee Committee (the meetings were very educational, in case any of my former seniors are reading this...).

It's a reflection of changing times - I don't believe the Association would care to be so closely associated with an alcohol-promoting organisation now, even one promoting fine craft ales. I think the first pint, and the tankard, were free, after which one paid for refills. I seem to remember it was a very good night!

I'm surprised mine has survived for so long - is it a valuable collectible yet? And are there any other Association memorabilia out there?

**Hilary Aitken**

*Retired Consultant Anaesthetist  
Kilmacolm, Scotland*



Figure 1

Dear Editor

## A mouthful of surprise!!

An 18-year old mentally challenged patient with delayed milestones was scheduled for an open inguinal hernia repair using general anaesthesia with a laryngeal mask. The airway appeared normal at the pre-operative evaluation but a thorough examination was not possible.

The patient happened to open his mouth just before induction to reveal an implant in the hard palate with four spikes (Figure 1). Because of the possibility of the laryngeal mask getting stuck on the implant or damaging it, we decided to intubate the trachea. Laryngoscopy proved to be difficult as a result of the palatal implant obstructing optimum placement and free movement of the laryngoscope, but intubation was successful.



Figure 1

On discussion with the patient's relatives postoperatively, they gave a history of palatal crib appliance insertion for tongue thrusting. A tongue thrusting habit is the primary etiological factor in the development of an anterior open bite. Management includes removal of the underlying aetiology, retraining exercises, and the use of mechanical restrictive orthodontic appliances such as the palatal crib or palatal spurs [1, 2]. The palatal crib induces a change in the resting position of the tongue, thus allowing normal tooth eruption and closure of an anterior open bite [1].

When full airway assessment is not possible before general anaesthesia, we need to be extra vigilant and flexible in our airway management in order to tackle surprises!

Consent from the patient's next-of-kin was obtained for publication.

**Harshal D Wagh**

*Consultant Anaesthetist  
Kokilaben Ambani Hospital, Mumbai, India*

**N. Keerthana**

*Assistant Professor in Anaesthesia  
Gandhi Medical College, India*

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# Your letters

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## Dear Editor

### Always lubricate your TOEs well!

We undertake approximately 2000 cardiac surgical cases every year at Barts Heart Centre, using transoesophageal echocardiography (TOE) in a large majority of these. Probe preparation involves application of a disposable sterile sheath, mouth guard and lubrication.

In a recent case, we were withdrawing the probe from the patient's stomach into the mid-oesophageal anchor position after acquisition of the standard images when we discovered that the whole sheath was transected at approximately 15-30 cm from the distal end. On examination it appeared that a lack of lubricant meant that rotation of the probe within the oesophagus led to excess friction between the oesophageal wall, probe and sheath, leading to the cover twisting tightly around the probe shaft and tearing.



As surgery continued we prepared to ask our gastroenterology team to retrieve the distal section with an endoscope, as there are reports of surgery being required after ingestion of foreign bodies [1, 2]. Fortunately the lack of lubricant meant that the distal section of the sheath adhered to the probe on withdrawal (Figure 1).

The moral of this case is the importance of liberal lubrication for safe performance of TOE.

#### Paul Balfour

*Anaesthetic Senior Clinical Fellow*

#### Nessa Dooley

*Consultant in Cardiothoracic Anaesthesia and Intensive Care  
St. Bartholomew's Hospital, London*

Twitter: @DrPJPB; @nessadooley

#### References

1. Bohsen F, Jensen VJ. [Recurrent intestinal ileus caused by condoms]. *Ugeskrift for Laeger* 1986; **148**: 516.
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## Dear Editor

### Desflurane dropped - reducing harm, contributing to a greener Anaesthetic Department

In October 2020 Northumbria NHS Foundation Trust Anaesthetic Department boldly went where few anaesthetic departments had gone before by making the decision to stop using desflurane. You might ask: why and how?

Desflurane is the most environmentally harmful inhalational agent, being > 2500 times more warming than CO<sub>2</sub>. An hour of anaesthesia warms the atmosphere by the equivalent of 30-60 kg CO<sub>2</sub>, similar to driving 200-400 km in a car; one bottle is the equivalent to burning 440 kg coal!

The greener agenda had been flagged by an enthusiastic consultant in the department. Highlighting the statistics, and addressing potential harm in terms of air pollution and global warming made significant impact. Presenting the facts in a visual way and educating colleagues on the meaning of 'carbon footprint' and sustainability was key. In a department where many embrace TIVA, only a couple were slow to get on board. 'We need it for case X', 'I've always used it', came the cries - but when halothane and enflurane disappeared, we were still able to anaesthetise.

The decision was made, desflurane disappeared, the blue gas was no more. Has our department folded? No. Have my colleagues complained? No. They've moved on, embraced the change and adapted; similarly to a pandemic, they just didn't realise they could!

Why should we continue to make unwise choices when alternatives are available that are less destructive to the environment. As healthcare professionals we need to set an example - we are looked upon by the public as 'doing the right thing'.

Our department took that bold step.....will yours ?

#### Elaine Winkley

*Consultant Anaesthetist  
Clinical Lead for Sustainability, Northumbria  
Healthcare NHS Trust, Newcastle  
Chair, Faculty of Sustainable Healthcare HEENE&NC*

Twitter: @ElaineW14626897

Congratulations to Paul Balfour for winning July's Letter of the Month prize.



Dear Editor

### Unidirectional block to passing guidewire through a central venous catheter

We planned central venous catheter insertion with a five-lumen 12Fr 16 cm Multicath5 HF UP (Vygon (UK) Ltd, Swindon, UK). The guidewire was passed through the needle into the internal jugular vein; however on feeding the catheter over the guidewire, absolute resistance to passage of the guidewire occurred at the hub of the catheter, which could not be overcome despite multiple attempts. A second catheter was obtained and threaded over the guidewire without any difficulty.

After the event we examined the original catheter. The guidewire passed through the catheter easily when this was attempted from the distal (connector) end, but again would not thread past the hub when attempted from the proximal (catheter-tip) end. The wire would also pass through all the other lumens in both directions. We presume that there was a material flap causing this one-way blockage. The incident was reported through our internal reporting system, to Vygon and to the MHRA.

It is good practice to check equipment before use, but the complexity of the check has to be balanced against the rarity of any problems that are identified. In order to detect this problem one would have to remove the guidewire from its holder and then reinsert after the check, which would bring its own challenges.

**Aiman Mian**  
Clinical Fellow

**Emily Wass**  
Foundation Year 1 Doctor

**John Wright**  
Clinical Teaching Fellow  
Great Western Hospital, Swindon

### A response from Vygon:

On 18<sup>th</sup> December 2020, the Vygon (UK) Ltd Technical Department was contacted by Great Western Hospital regarding an incident involving a Vygon 12Fr Multicath Highflow Up Quin lumen catheter.

Unfortunately, the device involved was not retained. This limited the investigation at our UK headquarters in Swindon and we were unable to speculate on a cause. The incident was discussed with our colleagues at the Vygon manufacturing facility in Aachen, Germany, and they confirmed that each catheter is tested with a guidewire via the distal end during production, along with being flow and leak tested.

We support the advice provided by Drs Mian, Wass and Wright of checking equipment before use, but encourage caution when guidewires are present as they can easily become kinked or damaged. An adverse incident report was submitted to the MHRA by Great Western Hospital following the incident. We support and encourage reporting incidents involving medical devices to the MHRA and we recommend clinicians contact the device manufacturer if they have any concerns or questions about a device.

**Kate O'Connell**  
Technical Manager, Vygon (UK) Ltd, Swindon



## Letter of the Month prize

It's your *Anaesthesia News*... and we'd love to encourage more of our readers to share their opinions and experiences. A Letter of the Month prize will be awarded to the best letter each month. The winner will receive a £50 voucher to use against the cost of one of the Association of Anaesthetists educational events.

To increase your chances of winning:

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The award will be made at the discretion of the Editor, and his/her opinion will be final. No cash alternative will be available. The voucher will remain valid for 12 months.

Send your letters to: The Editor, *Anaesthesia News* at [anaenews.editor@anaesthetists.org](mailto:anaenews.editor@anaesthetists.org)



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**Dr Sethina Watson**  
*Anaesthetic Registrar*



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Performance



John Snow Lecture  
**Dr Laura Duggan**  
Cardiothoracic  
Anaesthesiologist,  
Vancouver, Canada



Featherstone Oration  
**Prof Matthew Wilson**  
Senior Lecturer in  
Anaesthesia, Sheffield



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