Time to retire
‘No trace wrong place’

Tim Cook

Airways Lead meeting

RCoA 28 March 2025

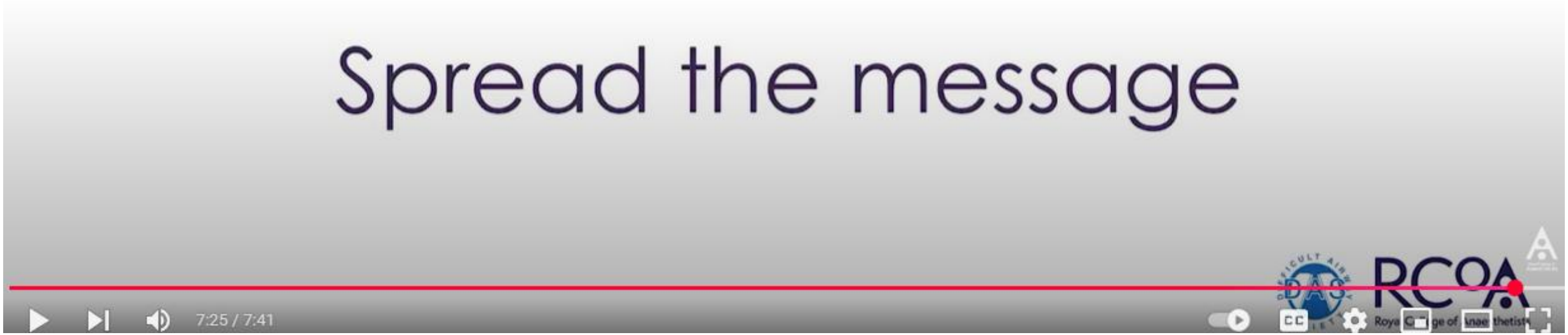
Conflicts

Author of the
No trace wrong place campaign

Author of the
PUMA guidelines

Capnography

NO TRACE = WRONG PLACE



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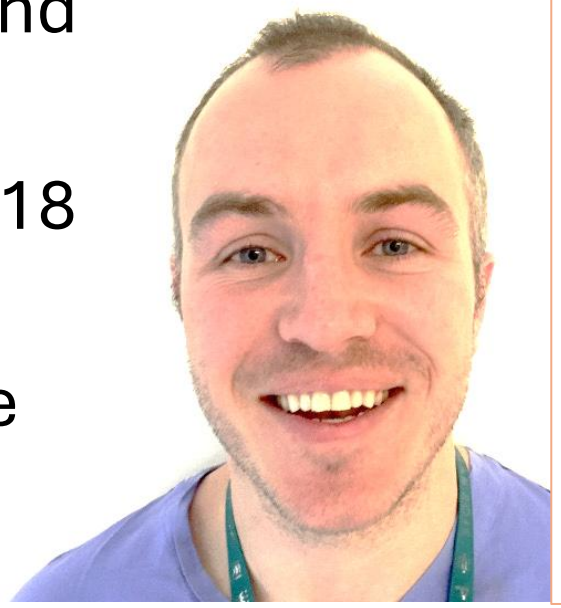
History

In the wake of coroner's reports on death of Sharon Grierson & Peter Saint

Term coined in this room by Lewys Richmond

RCoA video 2018

Still on website



RCoA Royal College of Anaesthetists

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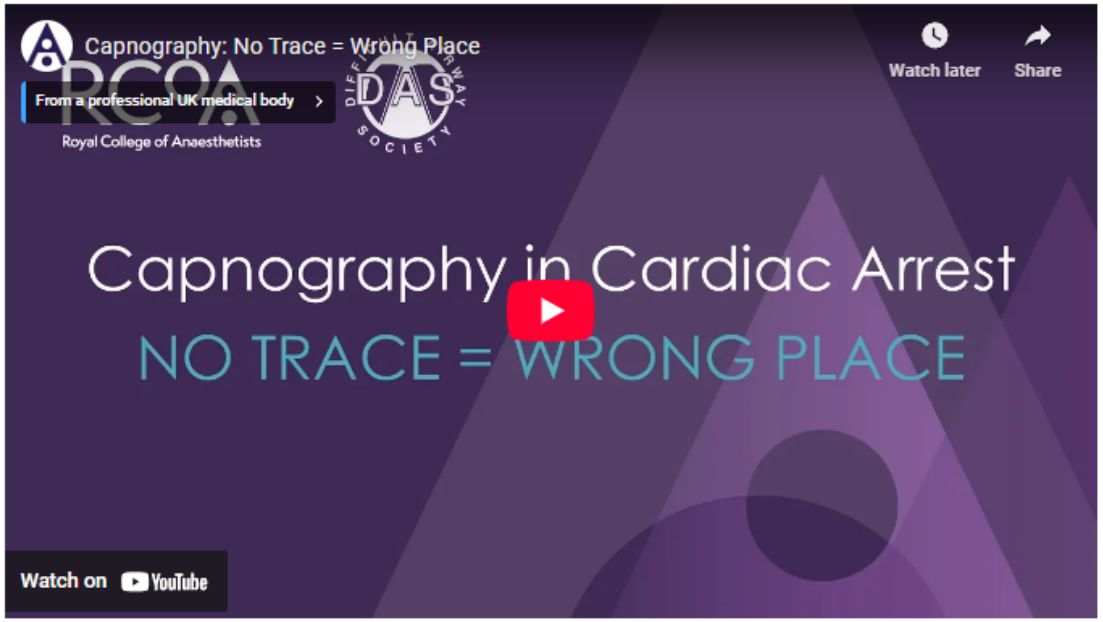
Home > Safety, standards and quality > Guidance and resources

Capnography: No Trace = Wrong Place

The Royal College of Anaesthetists (RCoA) and the Difficult Airway Society (DAS) have collaborated to create the video resource Capnography: No Trace = Wrong Place.

Presented by Professor Tim Cook, the video shares the important message that during cardiac arrest, if a capnography trace is completely flat, oesophogeal intubation should be assumed until proven otherwise.



Royal College of Anaesthetists

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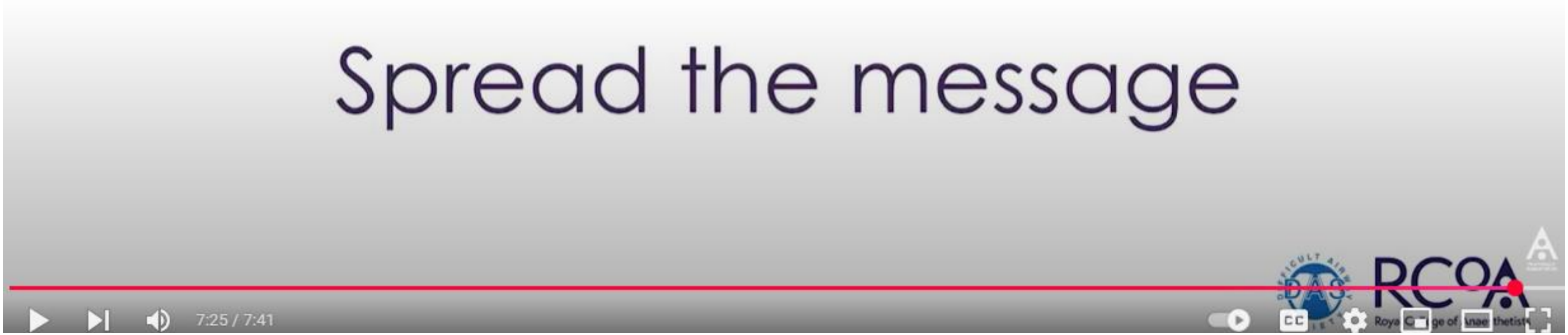
Capnography

NO TRACE = WRONG PLACE



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Nuance

Royal College of Anaesthetists

DIFFICULT AIRWAY SOCIETY

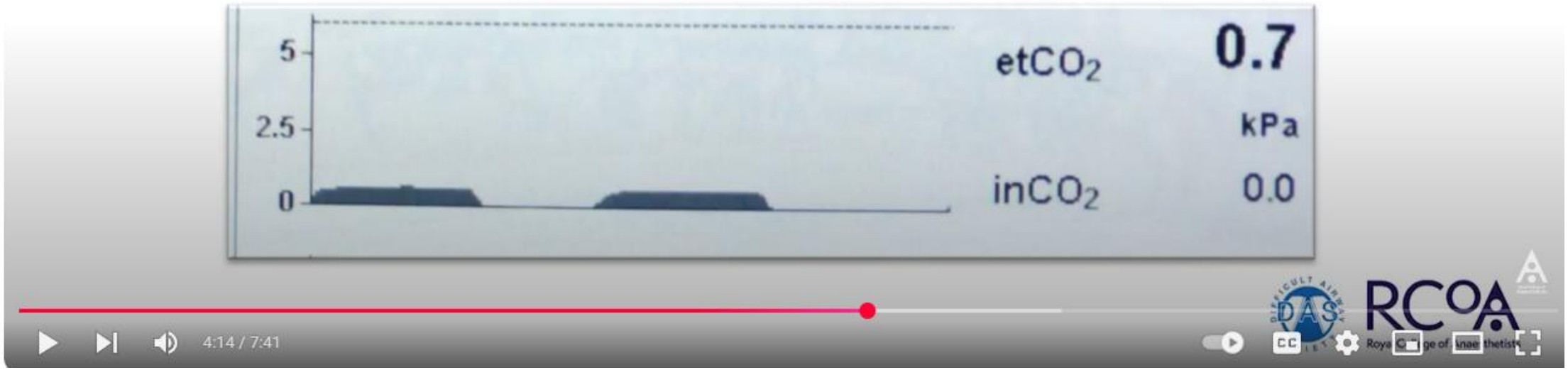
Capnography in Cardiac Arrest

NO TRACE = WRONG PLACE

(2018)

Capnogram during cardiac arrest is an attenuated trace IT IS NOT A FLAT TRACE

This is 5 mins after CPR was stopped



Royal College of Anaesthetists

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This is during CPR

Royal College of Anaesthetists

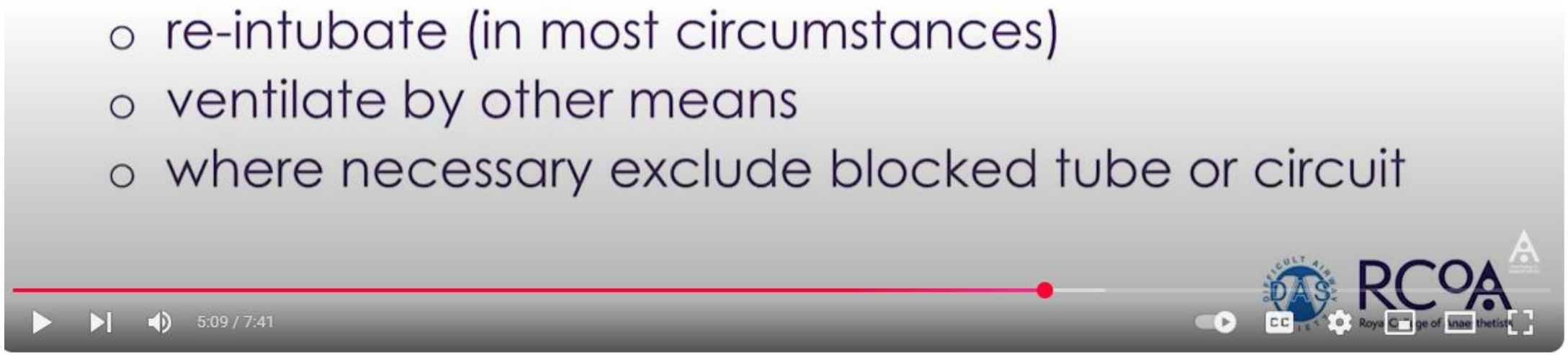
Centre for Research and Improvement

Actions

Assume oesophageal intubation until **PROVEN** otherwise

Remove tracheal tube and

- re-intubate (in most circumstances)
- ventilate by other means
- where necessary exclude blocked tube or circuit



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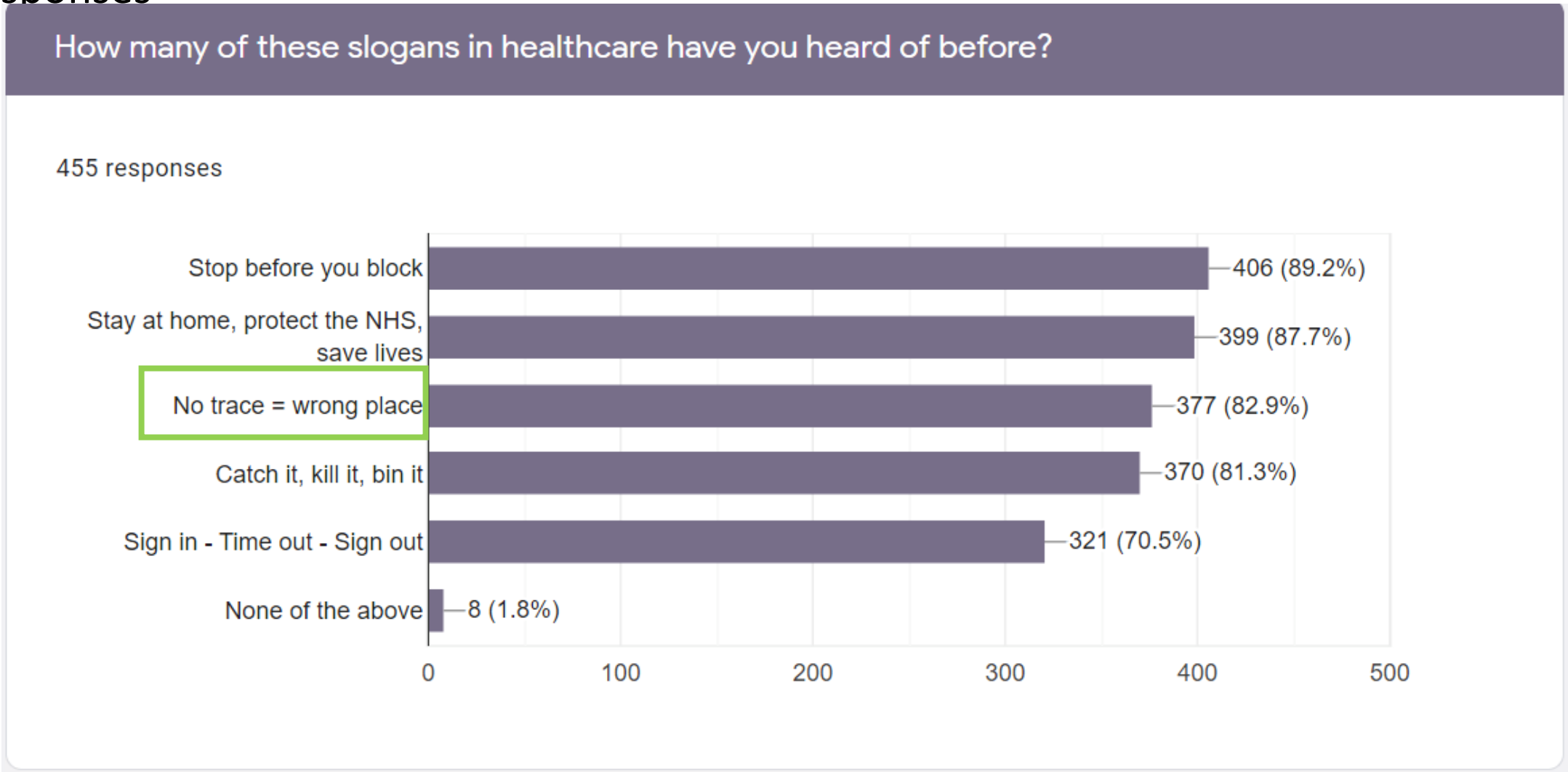
RCoA survey 2022 455 Social media 455 responses



Since 2018 - updated science

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Centre for Research and Improvement

Don’t use clinical signs to exclude oesophageal intubation

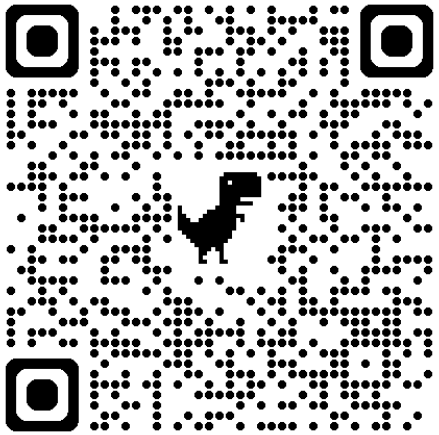
Anaesthesia
Peri-operative medicine, critical care and pain

Association of Anaesthetists

First published: 16 June 2023 | https://doi.org/10.1111/anae.16059

Clinical tests for confirming tracheal intubation or excluding oesophageal intubation: a diagnostic test accuracy systematic review and meta-analysis

J. Hansel ✉, J. A. Law, N. Chrimes, A. Higgs, T. M. Cook



Clinical tests for confirming tracheal intubation or excluding oesophageal intubation: a diagnostic test accuracy systematic review and meta-analysis

J. Hansel ✉, J. A. Law, N. Chrimes, A. Higgs, T. M. Cook

Misting: occurs with 70% of tubes in oesophagus

Auscultation: +ve in 14 -18% when tube in oesophagus
(RCT conditions)

Chest rise: insufficient data
(but clinically frequently rises with tube in oesophagus)

Clinical tests for confirming tracheal intubation or excluding oesophageal intubation: a diagnostic test accuracy systematic review and meta-analysis

Tests to exclude events that invariably lead to severe damage or death must have a negligible false positive rate.

Misting or auscultation have **too high a false positive rate** to reliably exclude oesophageal intubation and there is **insufficient evidence to support the use of 'hang-up' or chest rise.**

The oesophageal detector device may be considered where other more reliable means are not available.

Waveform capnography remains the reference standard for confirmation of tracheal intubation.

Anaesthesia
Peri-operative medicine, critical care and pain
Association of Anaesthetists

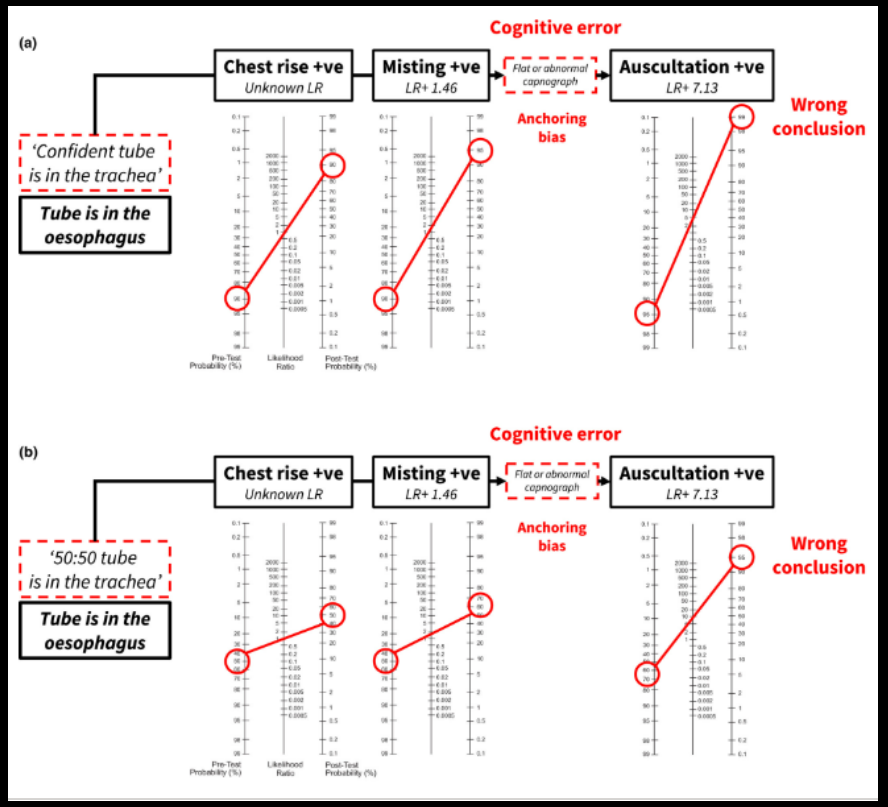
Unrecognised oesophageal intubation: a sequential Bayesian exploration of clinical signs

J. Hansel ✉, A. Higgs, T. M. Cook

First published: 22 September 2023 | https://doi.org/10.1111/anae.16134

The dangerous fallacy

"I've got chest rise and misting …..
….now I'll look at the capnograph"



(a)

Cognitive error

Chest rise +ve
Unknown LR

Misting +ve
LR+ 1.46

Flat or abnormal capnograph

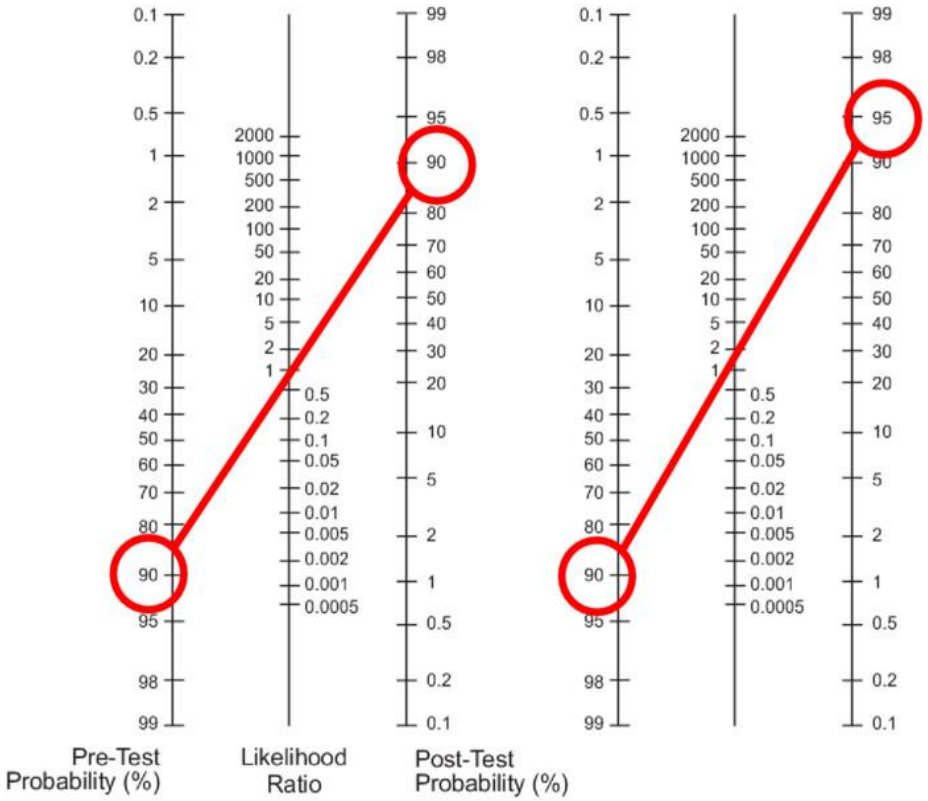
Auscultation +ve
LR+ 7.13

Anchoring bias

Wrong conclusion

'Confident tube is in the trachea'

Tube is in the oesophagus



p)

Cognitive error

Chest rise +ve
Unknown LR

Misting +ve
LR+ 1.46

Flat or abnormal capnograph

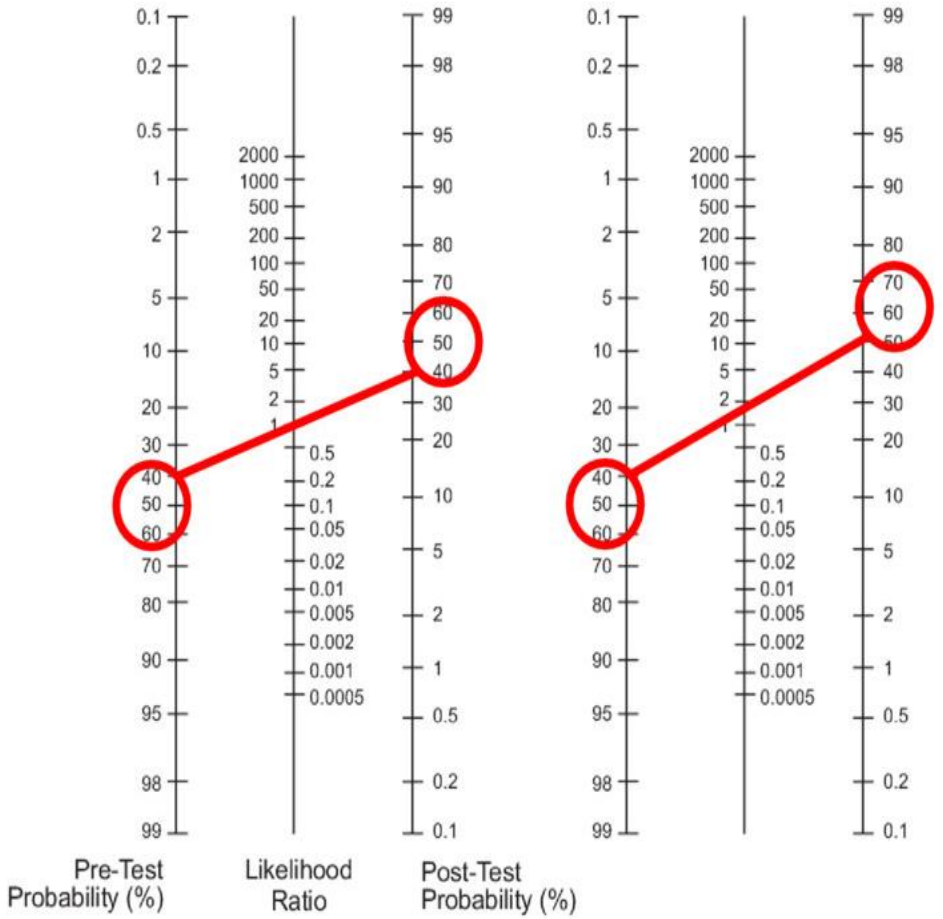
Auscultation +ve
LR+ 7.13

'50:50 tube is in the trachea'

Tube is in the oesophagus

Anchoring bias

Wrong conclusion



Do use a VL (always)

Cochrane Database of Systematic Reviews | Review - Intervention

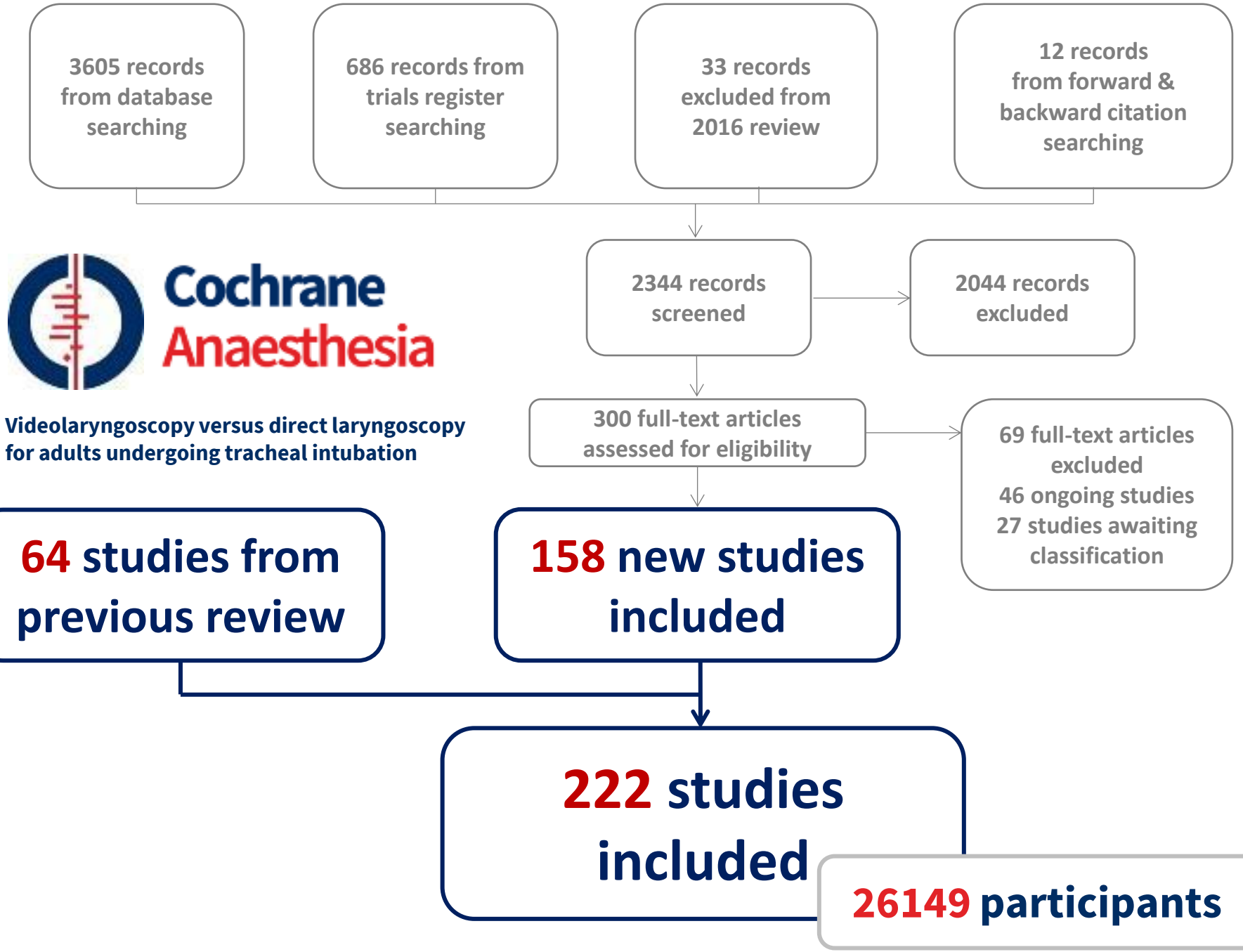
New search | Conclusions changed

Videolaryngoscopy versus direct laryngoscopy for adults undergoing tracheal intubation

Jan Hansel, Andrew M Rogers, Sharon R Lewis, Tim M Cook, Andrew F Smith Authors' declarations of interest

Version published: 04 April 2022 Version history

https://doi.org/10.1002/14651858.CD011136.pub3



Cochrane Anaesthesia

Videolaryngoscopy versus direct laryngoscopy for adults undergoing tracheal intubation

Population
Adults > 16 years

Intervention
Rigid indirect videolaryngoscopy

Comparison
Direct laryngoscopy – Macintosh blade only

Outcomes - Critical
Failed intubation
Hypoxia
Successful first attempt
Oesophageal intubation

Outcomes - Important
Dental trauma
Number of attempts
Patient-reported sore throat
Time for tracheal intubation
IDS score
POGO
Cormack-Lehane grade
Mortality

Anaesthesia 2022 doi:10.1111/anae.15818

Science Letter

Videolaryngoscopy, oesophageal intubation and uncertainty: lessons from Cochrane

A. M. Rogers
Royal United Hospitals Bath NHS Foundation Trust, Bath, UK
Email: andrewmark.rogers@nhs.net

J. Hansel
University of Manchester, Manchester, UK

T. M. Cook
Royal United Hospitals Bath NHS Foundation Trust, Bath, UK

Cochrane Library

40 studies reported oesophageal intubation

29 in theatre

11 non-theatre

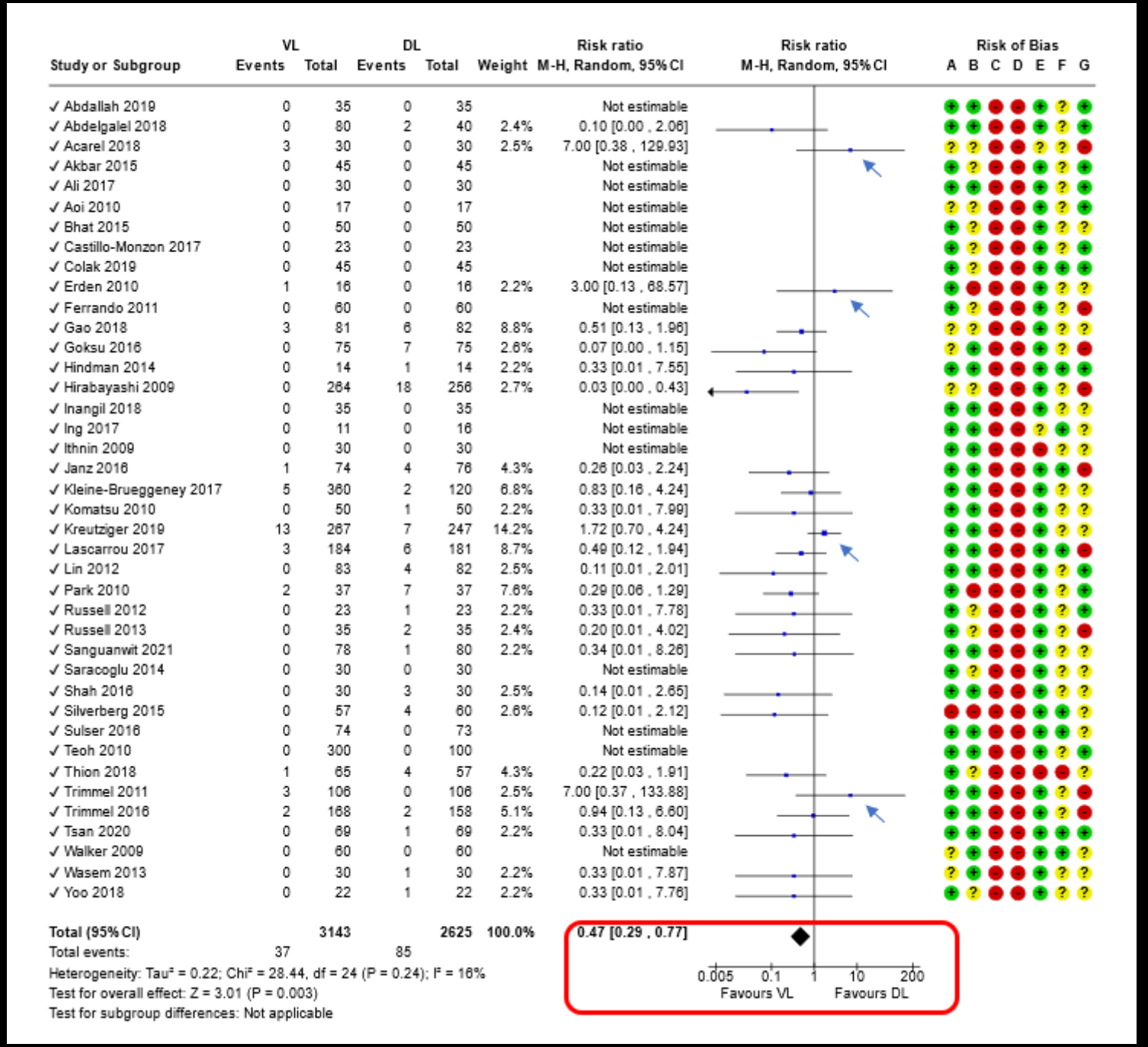
Definition?

Early vs late detection

https://associationofanaesthetists-publications.onlinelibrary.wiley.com/doi/epdf/10.1111/anae.15818

All VL combined

- Relatively rare
- Incidence approx 1% for VL vs 3% with DL
- Excluding non-theatre studies: 0.6% vs 3.2%
- Consistent with rates reported in other studies[1,2]



1. Pedersen TH, Ueltschi F, Hornshaw T, et al. Optimisation of airway management strategies: a prospective before-and-after study on events related to airway management. British Journal of Anaesthesia 2021; 127: 798-806.
2. Huitink JM, Lie PP, Heideman I, et al. A prospective, cohort evaluation of major and minor airway management complications during routine anaesthetic care at an academic medical centre. Anaesthesia 2017; 72: 42-8.

Oesophageal intubation in RCTs

DL	3%
VL	1%

Unrecognised oesophageal intubation
An ongoing issue?

Glenda Logsdail

Healthy mother of two

Married

Radiographer

August 2020

Acute appendicitis

Low risk surgery

Emma Currell
2020
reported 2023

https://www.bbc.co.uk/news/uk-england-beds-bucks-herts-64789531

Hatfield woman died after breathing tube put in food pipe

2 days ago

Emma Currell had a six-year-old child and lived with kidney disease

James Schimmin
Feb 2021

Four anaesthetists arrested
Charged with manslaughter

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Manx medics in court accused of manslaughter after patient death

16 February

James Joseph Shimmin died on 4 February at Noble's Hospital

https://www.bbc.co.uk/news/world-europe-isle-of-man-60403776

Joseph Parker

Unrecognised oesophageal intubation

https://uk.news.yahoo.com/gifted-student-joseph-parker-died-111646898.html

GloucestershireLive

Gifted student Joseph Parker died following adverse reaction to medication

On February 17, 2022, Joseph's mother discovered him unresponsive, prompting an emergency response by paramedics and he was transferred, conscious, to Southmead Hospital. Despite efforts by emergency services, Joseph's condition deteriorated rapidly and led to a cardiac arrest.

Subsequent investigations revealed critical errors in the initial medical interventions, including the misplacement of a tracheal tube into the oesophagus instead of the trachea, leading to severe oxygen deprivation and non-reversible brain damage.

The inquest will scrutinise the events leading up to Joseph's passing, focusing on the adequacy of his care, the response of healthcare providers, and any systemic factors contributing to Joseph's death. The coroner may garner insights with the aim to prevent similar occurrences in the future, ensuring safer drills in the provision of emergency care during intubation.

UOI – not reported as such

https://uk.news.yahoo.com/gifted-student-joseph-parker-died-111646898.html

Joseph Parker

Unrecognised oesophageal intubation

- not reported as such
- inquest May 2024
- no PFD report

https://uk.news.yahoo.com/gifted-student-joseph-parker-died-111646898.html

PUMA

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Preventing unrecognised oesophageal intubation: a consensus guideline from the Project for Universal Management of Airways and international airway societies*

N. Chrimes,[1] A. Higgs,[2] C. A. Hagberg,[3] P. A. Baker,[4,5] R. M. Cooper,[6] R. Greif,[7,8] G. Kovacs,[9] J. A. Law,[10] S. D. Marshall,[11,12] S. N. Myatra,[13] E. P. O'Sullivan,[14] W. H. Rosenblatt,[15] C. H. Ross,[16,17] J. C. Sakles,[18] M. Sorbello[19] and T. M. Cook[20,21]

PUMA

Preventing unrecognised oesophageal intubation

CONSENSUS GUIDELINE

Endorsed

Supported

- AIRWAY INTERVENTIONS & MANAGEMENT IN EMERGENCIES (AIME)
- AIRWAY MANAGEMENT ACADEMY
- AMERICAN SOCIETY OF ANESTHESIOLGISTS (ASA)
- ANZCA, ASA & NZSA TRIPARTITE AIRWAY MANAGEMENT SPECIAL INTEREST GROUP (AIRWAY SIG)
- ASSOCIATION OF ANAESTHETISTS
- AUSTRALASIAN COLLEGE OF EMERGENCY MEDICINE (ACEM)
- AUSTRALASIAN COLLEGE OF PARAMEDICINE (ACP)
- CANADIAN ASSOCIATION OF EMERGENCY PHYSICIANS (CAEP)
- CANADIAN ANESTHESIOLOGISTS' SOCIETY (CAS)
- COLLEGE OF OPERATING DEPARTMENT PRACTITIONERS
- DEUTSCHE GESELLSCHAFT FÜR ANÄSTHESIOLOGIE & INTENSIVMEDIZIN (DGAI)
- ENTRENAMIENTO EN VÍA AÉREA LATINOAMÉRICA (EVALA)
- EUROPEAN RESUSCITATION COUNCIL (ERC)
- FONDATION LATINE DES VOIES AÉRIENNES (FLAVA)
- FORMACIÓN INTERNACIONAL EN DOCENCIA E INVESTIGACIÓN EN VIA AÉREA (FIDIVA)
- INTENSIVE CARE SOCIETY (ICS)
- NEW ZEALAND ANAESTHETIC TECHNICIANS SOCIETY (NZATS)
- NEW ZEALAND SOCIETY OF ANAESTHETISTS (NZSA)
- ÖSTERREICHISCHE GESELLSCHAFT FÜR ANÄSTHESIOLOGIE, REANIMATION UND INTENSIVMEDIZIN (ÖGARI)
- POLISH SOCIETY OF ANAESTHESIOLOGY& INTENSIVE THERAPY
- ROYAL COLLEGE OF ANAESTHESTISTS
- SAFER CARE VICTORIA
- SLOVENSKO ZDRUŽENJE ZA ANESTEZIOLOGIJO IN INTENZIVNO MEDICINO (SZAIM)
- WESTERN AUSTRALIAN AIRWAY GROUP (WAAG)
- THE VORTEX APPROACH TO AIRWAY MANAGEMENT

PUMA

Preventing unrecognised oesophageal intubation

CONSENSUS GUIDELINE

Endorsed

- Difficult Airway Society
- Society for Airway Management
- EAMS
- AIDAA
- CAFG – Canadian Airway Focus Group
- Safe Airway Society
- IAMS – International Airway Management Society

RCoA – Royal College of Anaesthetists

Supported

- AIRWAY INTERVENTIONS & MANAGEMENT IN EMERGENCIES (AIME)
- AIRWAY MANAGEMENT ACADEMY
- AMERICAN SOCIETY OF ANESTHESIOLGISTS (ASA)
- ANZCA, ASA & NZSA TRIPARTITE AIRWAY MANAGEMENT SPECIAL INTEREST GROUP (AIRWAY SIG)
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- SAFER CARE VICTORIA
- SLOVENSKO ZDRUŽENJE ZA ANESTEZIOLOGIJO IN INTENZIVNO MEDICINO (SZAIM)
- WESTERN AUSTRALIAN AIRWAY GROUP (WAAG)
- THE VORTEX APPROACH TO AIRWAY MANAGEMENT

Principles

It happens to anyone

Safety first

If in doubt, take it out - go to a ‘place of safety’

Be prepared to be wrong

Work as a team

Key recommendations

1. Exhaled carbon dioxide monitoring and pulse oximetry should be available and used for all episodes of airway management.
2. Routine use of a videolaryngoscope is recommended whenever feasible.
3. At each attempt at laryngoscopy, the airway operator is encouraged to verbalise the view obtained.
4. The airway operator and assistant should each verbalise whether `sustained exhaled carbon dioxide´ and adequate oxygen saturation are present.
5. Inability to detect sustained exhaled carbon dioxide requires oesophageal intubation to be actively excluded.
6. The default response to the failure to satisfy the criteria for sustained exhaled carbon dioxide should be to remove the tube and attempt ventilation using a facemask or supraglottic airway.
7. If immediate tube removal is not undertaken, actively exclude oesophageal intubation: repeat laryngoscopy, flexible bronchoscopy, ultrasound and use of an oesophageal detector device are valid techniques.
8. Clinical examination should not be used to exclude oesophageal intubation.
9. Tube removal should be undertaken if any of the following are true:
    - Oesophageal placement cannot be excluded
    - Sustained exhaled carbon dioxide cannot be restored
    - Oxygen saturation deteriorates at any point before restoring sustained exhaled carbon dioxide
10. Actions should be taken to standardise and improve the distinctiveness of variables on monitor displays.
11. Interprofessional education programmes addressing the technical and team aspects of task performance should be undertaken to implement these guidelines.

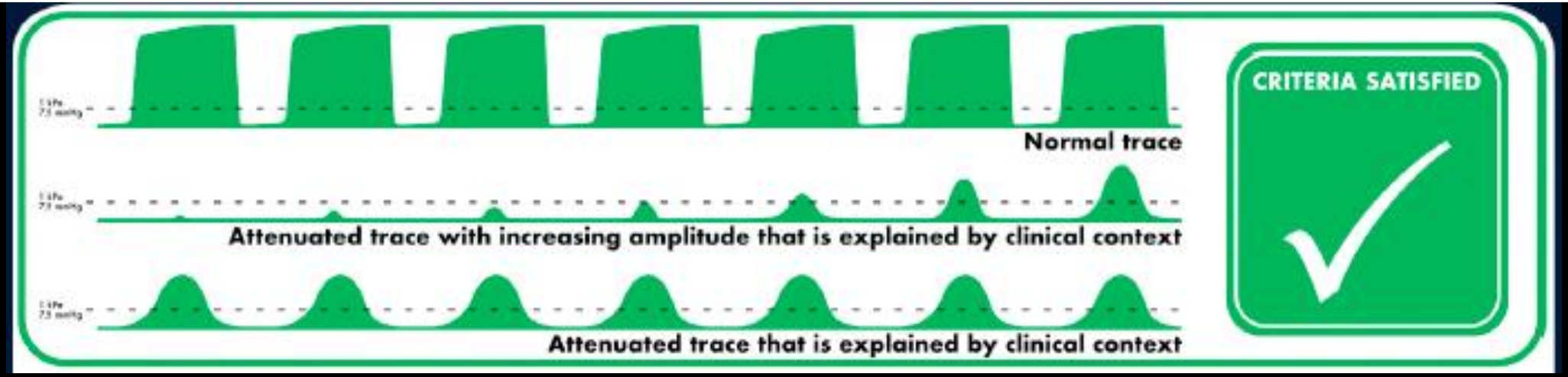
It is all about sustained exhaled capnography

-Level rises during exhalation & falls during inspiration

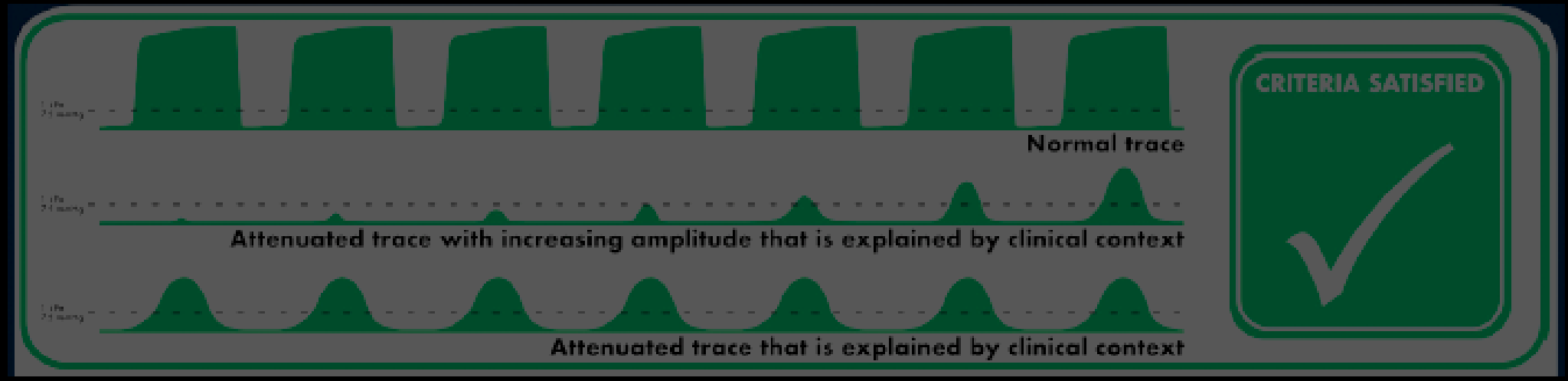
-Consistent or increasing amplitude over 7 breaths

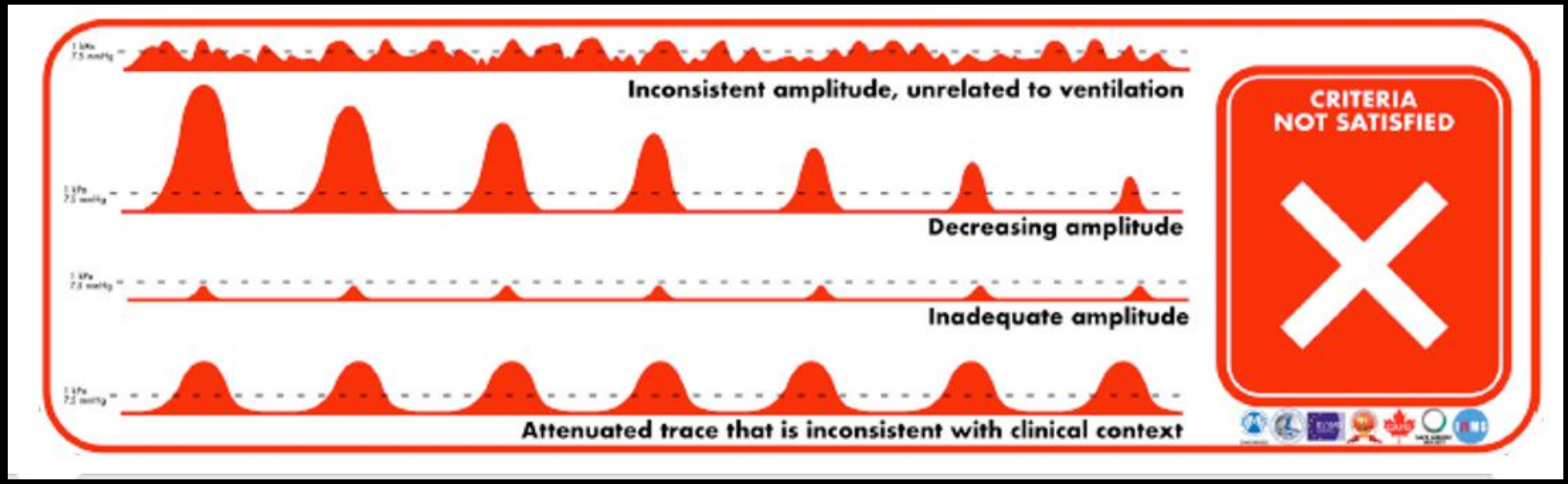
-Peak amplitude > 1kPa (7.5 mmHg) above baseline

-Reading is clinically appropriate



It is all about sustained exhaled carbon dioxide





Problems – NTWP is not sufficient

Many UOI do have ‘a trace’

Inquest finds death of 19-month-old girl at Port Macquarie Base Hospital preventable

ABC Mid North Coast / By Keely Johnson

Posted 8h ago, updated 4h ago

Problems – confusion
‘no trace = not always the wrong place’

CORRESPONDENCE

No trace, not always the wrong place

George Harvey* and Urvi Sanganee

Department of Anaesthesia and Critical Care, West Hertfordshire Teaching Hospitals NHS Trust, Watford, UK

*Corresponding author. E-mail: george.harvey1@nhs.net

BJA 2025: 134; 248-249

Royal College of Anaesthetists

Centre for Research and Improvement

Problems – confusion
‘have a trace = right place’

Anaesthesia Reports 2024, 12, e12313 doi:10.1002/anr3.12313

Case Report

Right trace wrong place: a normal capnography trace despite the tip of the tracheal tube existing outside the airway

A. Karmakar[1] **M. J. Khan,**[1] **N. A. H. Shallik,**[1,2,3,4] **A. H. M. N. Moustafa,**[5] **Y. M. R. A. Toble**[1] and **G. F. Strandvik**[2,3,6]

1 Department of Anesthesiology, ICU and Perioperative Medicine, 5 Department of Diagnostic Radiology and Medical Imaging, 6 Department of Trauma Intensive Care Unit, Hamad Medical Corporation, Doha, Qatar
2 Department of Clinical Anesthesiology, Weill Cornell Medicine – Qatar, Doha, Qatar
3 Department of Clinical Anesthesiology, College of Medicine, Qatar University, Doha, Qatar
4 Anesthesia and Surgical Critical Care Department, Tanta University, Tanta, Egypt

DAS Difficult Airway Society | RCoA Royal College of Anaesthetists | CR&I Centre for Research and Improvement

Time to retire

Anaesthesia Reports

Association of Anaesthetists

Correspondence

Excluding oesophageal intubation versus confirming tracheal intubation

N. Chrimes ✉, A. Higgs

First published: 11 December 2024 | https://doi.org/10.1002/anr3.12341

1 Department of Anaesthesia, Monash Medical Centre, Melbourne, Australia

2 Department of Anaesthesia and Intensive Care, Warrington Teaching Hospitals NHS Foundation Trust, Cheshire, UK

DAS Difficult Airway Society | RCoA Royal College of Anaesthetists | CR&I Centre for Research and Improvement

Time to retire NTWP

Time to replace ‘No trace, wrong place’ with ‘Sustained exhaled carbon dioxide’. Comment on *Br J Anaesth* 2025; 134: 248–9

Tim M. Cook[1,2,*], Andy Higgs[3] and Nicholas Chrimes[4]

BJA

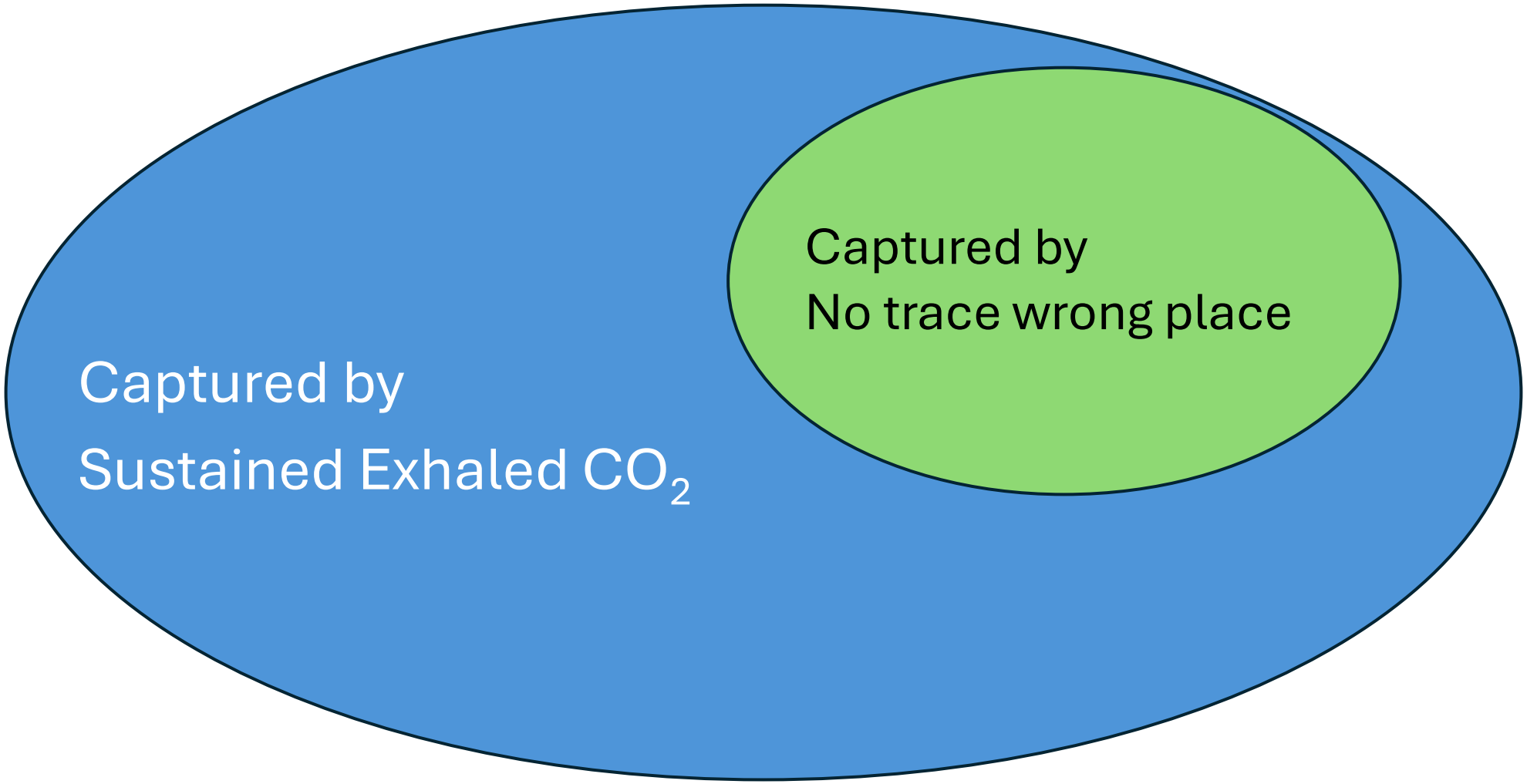
British Journal of Anaesthesia, 134 (4): 1218–1220 (2025)

https://www.bjanaesthesia.org/article/S0007-0912(24)00782-7/abstract

Royal College of Anaesthetists

Centre for Research and Improvement

Unrecognised oesophageal intubations in the academic and grey literature



Royal College of Anaesthetists

Patient safety: unrecognised oesophageal intubation

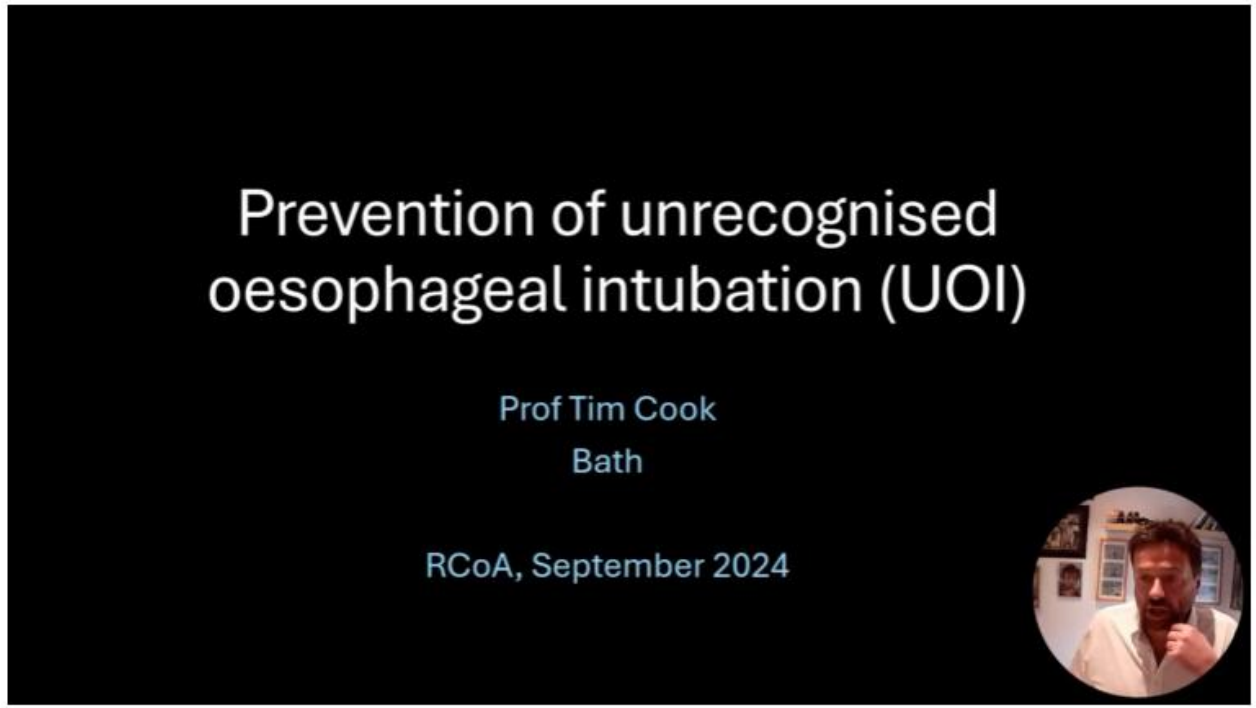
Patient safety lies at the heart of healthcare. It is one of the most significant concerns across the NHS and independent sector and is a key priority for the College. A key factor to driving forward patient safety is maximising the things that go right and minimising the things that go wrong. Learning from mistakes by addressing systemic factors in order to prevent future harm is essential to improving patient safety.

https://www.rcoa.ac.uk/safety-standards-quality/patient-safety/prevention-future-deaths

Unrecognised oesophageal intubation

The College has received a coroners report where an oesophageal intubation took place and was not recognised in time to save the life of the patient. Unrecognised oesophageal intubation is preventable through adherence to published recommendations on the monitoring of exhaled carbon dioxide (capnography) and its correct interpretation. The College endorses the Preventing unrecognised oesophageal intubation consensus guidelines produced by the Project for Universal Management of Airways.

For the latest advice on preventing unrecognised oesophageal intubation, please watch the talk below by Prof Tim Cook from the Anaesthesia Updates event in September 2024:



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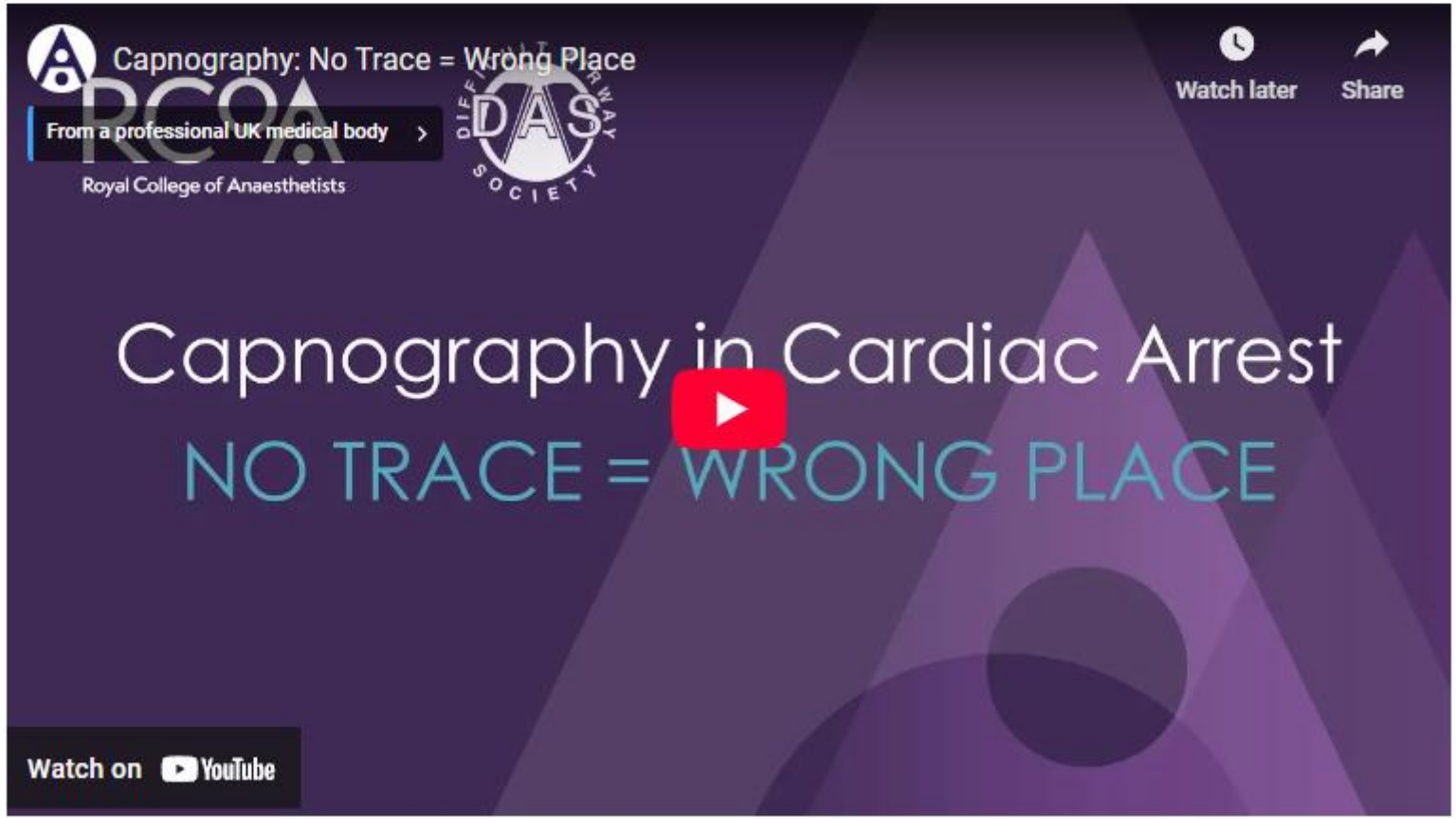
For the latest advice on preventing unrecognised oesophageal intubation, please watch the talk below by Prof Tim Cook from the Anaesthesia Updates event in September 2024:

No trace = wrong place

We previously launched the popular No Trace = Wrong Place campaign to highlight the correct use of capnography to prevent undetected oesophageal intubation.

All clinicians involved in airway management should watch the College and DAS video on capnography. We ask that they always remember 'No Trace = Wrong Place' and actively seek to exclude oesophageal intubation when a flat capnograph trace is encountered.

This short video is only seven minutes long - perfect to watch on your coffee break:



Joseph Parker

Unrecognised oesophageal intubation

No PFD letter… initially

https://uk.news.yahoo.com/gifted-student-joseph-parker-died-111646898.html

Courts and Tribunals Judiciary

About the judiciary Courts & Tribunals

July 31, 2024

Joseph Parker: Prevention of Future Deaths Report

Hospital Death (Clinical Procedures and medical management) related deaths

THIS REPORT IS BEING SENT TO:

Royal College of Anaesthetists (RCOA)
Faculty of Intensive Care Medicine (FICM)
Royal College of Emergency Medicine (RCEM)
NHS England

Difficult Airway Society

RCOA Royal College of Anaesthetists

CR&I Centre for Research and Improvement

5 **CORONER'S CONCERNS**

During the course of the inquest the evidence revealed matters giving rise to concern. In my opinion there is a risk that future deaths will occur unless action is taken. In the circumstances it is my statutory duty to report to you.

The **MATTERS OF CONCERN** are as follows:

Both [REDACTED] and [REDACTED] who were involved with this case have written to me supporting that a PFD report should be written in this case.

(1) I have been told that capnography is the only reliable test, the gold standard, to confirm that a tracheal tube is in the right place, that no other test should override it.

(2) That the more recent PUMA (Project for Universal Management of Airways) guidelines states, the detection of sustained exhaled carbon dioxide using waveform capnography is the mainstay for excluding oesophageal placement of an intended tracheal tube. The PUMA guidance deserves the widest possible endorsement and dissemination which has not happened yet.

(3) Unrecognised oesophageal intubation was a "Never Event" by NHS England but is no longer.

(4) There have already been a number of Prevention of Futures Deaths Reports written by Coroner's in relation to this concern but to date, I am told there have been no changes.

Association of Anaesthetists

RCOA Royal College of Anaesthetists

The Faculty of Intensive Care Medicine

11th September 2024

Dear Ms Voisin,

Re: Regulation 28: Report to Prevent Future Deaths in the matter of Mr Joseph Parker

https://www.judiciary.uk/wp-content/uploads/2024/07/2024-0389-Response-from-Association-of-Anaesthetists-RCOA-and-Faculty-of-Intensive-Care-Medicine-Joint-Respons.pdf

DAS Difficult Airway Society

RCOA Royal College of Anaesthetists

CR&I Centre for Research and Improvement

Association of Anaesthetists

RCOA Royal College of Anaesthetists

The Faculty of Intensive Care Medicine

Your report highlights that "capnography is the only reliable test, the gold standard, to confirm that a tracheal tube is in the right place and that no other test should override it." We agree entirely and this is made clear in the Association of Anaesthetist's "Standards of monitoring during anaesthesia and recovery"[1]. The message has been emphasised in our previous communications to members on the topic[2] and will continue to be at the heart of future communications. Our previous campaigns, in 2018 and again in 2021/22, have emphasised the "no trace = wrong place" message[3]. The Project for Universal Management of Airways (PUMA) consensus guidelines for the prevention of unrecognised oesophageal intubation's[4], emphasise "sustained exhaled carbon dioxide" as the test to exclude potential oesophageal intubation. This reflects the fact that in some cases of oesophageal intubation the capnograph trace has not been flat, but instead attenuated and abnormal. Our organisations are all supportive of the PUMA guidelines and plan to disseminate the key messages to our members through our safety communications and events. SALG publishes regular Patient Safety Updates, which are distributed to all members of the Association of Anaesthetists and Royal College of Anaesthetists. FICM publishes regular Safety Bulletins, which are distributed to all their members.

https://www.judiciary.uk/wp-content/uploads/2024/07/2024-0389-Response-from-Association-of-Anaesthetists-RCOA-and-Faculty-of-Intensive-Care-Medicine-Joint-Respons.pdf

Difficult Airway Society DAS

RCOA Royal College of Anaesthetists

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Association of Anaesthetists

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No trace: wrong place

Pros

Catchy

Cons

Catchiness engenders complacency

Imprecise

Insufficient

Confused

Abused

Sustained exhaled carbon dioxide

Pros

Part of an international consensus

Defined

Precise

Sufficient

Cons

A bit of a mouthful

Solution

Retire NTWP

Replace with **Sustained exhaled carbon dioxide**