



Inspire

VORTEX APPROACH TRAINING PROGRAM
module 2

Human Factors in Airway Management
(Interactive Discussion)

60 mins

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OVERVIEW

Module Name:

Module 2: Human Factors in Airway Management

SESSION TITLE:

Session 2.0: Human Factors in Airway Management

Format

Interactive Discussion

AIMS

- To establish participants' understanding of what human factors are and their potential impact on performance during airway management
- To encourage participants to consider strategies to address human factors related impairment of performance and understand the role of the Vortex Approach in facilitating these.

Duration

60 minutes

Type of learners

Medical/nursing/paramedical/technician staff whose clinical responsibilities include advanced airway management.

Number of Participants

6-20 participants

Number of staff

1 Instructor (if available a 2nd instructor is useful, esp with large groups - but not essential. If 2 instructors are used ideally one's background should be in being an airway operator and the other in being an airway assistant).

Summary of components

1. Introduction (5 mins)
2. 'Elaine Bromiley Case' Video (12 mins)
3. Debrief of 'Elaine Bromiley Case' video (25 mins)
4. 'What If' Video (8 mins)
5. Debrief of 'What If' video (8 mins)
6. Wrap Up (2 mins)





Learning objectives

By the end of the session the participants will be able to:

- Define 'human factors'
- Discuss the role of human factors in contributing to loss of situational awareness, fixation and impaired decision making during airway management
- Discuss why even highly trained & technically skilled clinicians remain vulnerable to making human factors related errors.
- Outline strategies to overcome the potential negative impact of human factors related issues on performance.
- Describe the role of the Vortex Approach in facilitating these strategies.

Evaluation technique

Feedback form at end of session

Anticipated challenges

- Avoiding participant fixation on technical issues that may have impacted on management (e.g. failure to preoxygenate)
- Engaging clinicians who do are reluctant to accept their own vulnerability to human factors related impairment of performance.
- Encouraging non-anaesthetic clinicians to recognise the relevance of the human factors issues depicted despite the anaesthetic context.

Preparatory Material

Instructors: should be familiar with the following

- ['The Elaine Bromiley Case'](#) and ['What If'](#) videos
- ['Just a Routine Operation'](#) video
- ['Independent Review of the Elaine Bromiley Case'](#) document
- Instructors should have completed module 1 of the Inspire program.

Participants:

- Should have completed Module 1 of the Inspire Program

SET

Equipment

- Chairs for participants & instructors
- Laptop & video cables
- 'Elaine Bromiley Case' & "What If" videos
- Data projector & Screen
- Speakers & audio cables
- Whiteboard & markers
- Lesson Plan



FOUNDATION (5 MINS)

Welcome

Introduction of instructors/participants: names & backgrounds (as required)

Outline aims of session

- Explain what is meant by human factors.
- Discuss the impact of human factors on performance during airway management.
- Consider strategies to address human factors related impairment of performance.
- Explore the role of the Vortex Approach in facilitating these.

ESTABLISH RELEVANCE

- All clinicians, no matter how well trained or technically skilled remain vulnerable to human factors related errors.
- Though video depicts an anaesthetic context the issues illustrated are generalisable beyond anaesthesia and even beyond airway management.

establish groundrules

- Outline structure of session (as above)
- Encourage interactivity/discussion/debate with other participants and instructors.
- Stress anonymity of what is discussed: clinical examples shared with group should not allow either patients or clinicians to be identified.
- Stress confidentiality of what is discussed: while sharing of the principles learned in session with others should be encouraged, specific statements by participants about their own thoughts/experiences/anxieties, etc must remain confidential.

Establish entry level:

- Ask participants their understanding of the term 'human factors'.
- Offer the following definition of 'human factors': ***the scientific discipline concerned with understanding and optimising interactions among humans and other elements of a system.*** 'Ergonomics' is a synonymous term used in some parts of the world. Human factors/ergonomics involves evaluating the impact of behavioural (teamwork, tasks, roles), environmental (equipment, workspace), organisational (culture, procedures), situational (stress, fatigue) and individual factors on human performance & wellbeing. Rather than representing human involvement as a 'weak link' and focusing on the responsibility of individuals to merely 'try harder' to avoid error, human factors acknowledges the potential strengths of the human contribution to patient safety and attempts to facilitate this by harmonising the interaction between all these areas to meet the needs, abilities & limitations of people. (Adapted from [International Ergonomics Association](#) and [Australian Health Human Factors Group](#) websites).



BODY (52 MINS)

Introduce 'the elaine bromiley case' video:

- Explain that first video is a real time reconstruction in which timing of various interventions, vital signs, etc exactly matches the known timeline of the case.
- Emphasise that clinicians involved were considered to be well respected & competent.
- Encourage participants to focus on human factors rather than technical issues.
- Highlight that first question asked after video will be 'What issues contributed to this outcome?' and encourage participants to consider this while watching.

Play 'The Elaine bromiley case' video:

- Stop video at 10' 40": "*We need the fiberoptic scope*" (If desired and time available, the remainder of the video can be played but is not essential).
- Briefly summarise the subsequent events: no need to show video after 10'40" unless desired.
 - Attempts at fiberoptic intubation unsuccessful
 - Further attempts at laryngoscopy, including by the ENT surgeon, unsuccessful
 - Intubating LMA inserted 20 mins post induction establishes ETCO₂ trace and restores SpO₂ to 90% (i.e. Green Zone) but subsequent unsuccessful attempts to intubate via the ILMA result in further periods of profound hypoxia.
 - Option of performing CICO Rescue never raised.
 - Event continued to play out for total of 55mins post-induction
 - Patient eventually transferred to ICU but did not wake.
 - Imaging showed profound cerebral hypoxic damage.
 - Life support withdrawn 13 days later and patient died.
- Remind participants to focus on the human factors rather than technical aspects of the case (some participants may fixate on absence of preoxygenation).
- Explain that the purpose of the discussion is not to focus on how this situation could have been prevented (though this is clearly important) but what issues impeded optimal management once it did occur and how to overcome these.

Debrief of 'the Elaine Bromiley case' video:

Divide discussion into 3 phases:

1. **What issues contributed to this outcome?** This phase focuses on the specific events of the Bromiley case and should be kept as brief as possible.
 - Make a list of issues raised on whiteboard but avoid exploring these issues any further at this stage.
 - Encourage participants to illustrate these issues by linking them to specific events in the video where possible.



2. Why do these types of issues occur? This phase moves the focus away from the specific events of the Bromley case to the broader context of participants' own practice. In doing so this phase encourages participants to recognise that these are not things that just happen to 'other people' and explores their vulnerability to these issues.

- Ask participants why they think the above types of issues occur (both in the context of the video and in clinical practice in general).
- Discuss the stress performance curve
- Enquire as to whether these issues or the factors contributing to them have arisen in their own practice and encourage participants to share examples.

3. How can we prevent these issues occurring in our practice? This phase of discussion aims to encourage participants to consider strategies they can implement to protect them from these issues. This is the most important phase, the preceding phases being only to provide the insight to allow these strategies identified.

- Encourage participants to commit to specific actions they could undertake to maximise the opportunities for the session to influence their own clinical practice
- If participants make vague statements like 'communicate better' enquire specifically HOW they will achieve that in a way that addresses the reasons cited for that issue in phase 2.
- Where appropriate link these strategies back to elements of the Vortex Approach and other strategies demonstrated in the 'What If' video.

The following table provides examples of some issues that might be raised and how the Vortex Approach can be linked to strategies to address them.

PHASE 1 (WHAT)		PHASE 2 (WHY)	PHASE 3 (HOW)
Issue	Example	Reason	Strategy
Help called late		Delayed recognition of crisis. Task overload	Defined triggers for escalation (e.g. CICO Status)
No clear leader		Culture/self consciousness Assumed to be primary anaesthetist Cognitive overload	Defining key questions for help to ask: 'Who is coordinating?' Help can assume responsibility for ensuring a coordinator explicitly identified and declared. Team training
Impaired situational awareness	Failure to recognise onset of crisis Failure to recognise 'Best Effort' at some lifelines not achieved (e.g. SGA with paralysis, stop remifentanyl) Failure to recognise CICO Failure to recognise/exploit opportunities of Green Zone*.	Insidious onset, assumption that next intervention would work. No structured approach to optimisations No pause to stop & think in Green Zone Nursing staff not empowered to speak up	Defined criteria/actions for priming (e.g. CICO Status) Cognitive aids: Vortex, CICO Status, Green Zone tool. Structured approach to optimisations Critical language: 'CICO Status to...', 'In the Green Zone', 'Best Effort at...' Team training Graded assertiveness



PHASE 1 (WHAT)		PHASE 2 (WHY)	PHASE 3 (HOW)
Issue	Example	Reason	Strategy
Task fixation	Repeated interventions that had already failed. Failed to initiate CICO Rescue	Distorted time perception. Cognitive overload Absence of structured approach	Nominated person (or automated verbal prompt on SpO2 monitor) to declare time since 'critical desaturation'. Structured approach to optimisations Defined criteria/actions for escalation (e.g. CICO Status to get help early and initiate priming). Defining key questions for help to ask: 'Have you completed a Best Effort at any lifeline?'
Failed to use help effectively	ENT surgeon holding pillow Help rapidly drawn into fixation error of primary team	No coordinator No structured approach to using help	Define key questions for help to ask: 'Who is coordinating?', 'Have you ever been in the Green Zone?', 'Have you completed a Best Effort at any lifeline?' Team training
Inadequate handover to help.	No declaration of what options/optimisations attempted and what remained.	Absence of structured approach No terms for Best Effort, Green Zone, CICO Rescue, etc.	Structured approach Define key questions for help to ask Team training Critical language Priming Cognitive aids: Vortex, CICO Status
Lack of assertiveness	Nursing staff recognise need for CICO Rescue but do not speak up	Nursing staff not empowered to speak up	Graded assertiveness Critical language Team training Cognitive aids: Vortex, CICO Status
No shared mental model of situation/plan			Cognitive aids: Vortex, CICO Status, Green Zone tool. Team training Critical language

* Not depicted in shortened version of video but should be raised by instructor

Play 'WHAT IF' video:

- Explain that this video is not intended to represent ideal management but is to illustrate the potential impact of some of the issues that have already been discussed (again some participants may fixate on the persistent absence of preoxygenation. Preoxygenation has been deliberately omitted in the 'What If' video so that the interventions depicted are occurring under the same time pressure and cognitive stress as in the original video, allowing their benefits to be better appreciated).
- Explain that while the video depicts a potential impact on the events during an airway crisis it is obviously not known whether the strategies depicted would have changed the outcome in the actual situation of the Elaine Bromiley case.
- Highlight that this video uses an earlier version of the Vortex Approach with slightly different terminology (e.g 'optimal attempt' vs 'Best Effort', ESA Status vs CICO status).



Debrief 'WHAT IF' video:

- Invite participants to discuss the factors that they think influenced the outcome and whether there are any other interventions they would suggest.
 - Explore participants perceptions of the feasibility/barriers to implementing these sorts of strategies in their clinical practice.
 - Link the discussion of clinical implementation of these strategies back to the material covered in the Inspire training program for the Vortex Approach.
 - Encourage participants to make any comments on the material covered in Module 1 and facilitate an interactive group discussion of any issues raised to address any concerns/misconceptions with the material.
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CLOSE (5 MINS)

Invite & Answer questions

Summarise Main points covered

- Human performance under stress can become severely impaired, even in highly competent & experienced expert clinicians.
- The vulnerability of individuals to the impact of stress will vary but given sufficient stress *everyone* is susceptible to these effects.
- The degree to which performance is compromised once an individual becomes cognitively overwhelmed is probably much greater than most people realise.

Reinforce need to practice skill in own time to maintain/improve

- Emphasise that recognition of these vulnerabilities under stress is not sufficient to overcome them. Strategies to address them must be actively implemented and rehearsed.

Direct towards learning resources

- 'The Elaine Bromiley Case' and 'What If' videos are both available for participants to rewatch at VortexApproach.org along with a variety of resources directed at implementing the strategies depicted.

