



VITAL ANAESTHESIA SIMULATION TRAINING

FACILITATOR HANDBOOK



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VERSION 1.0 - 2018

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VAST has been developed with the support of



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Dr Adam Mossenson
Founder and Managing Director - VAST

Disclaimer

The authors of this manual have endeavoured to provide accurate and up-to-date information. This manual may contain errors. Ultimate clinical responsibility rests with the individual practitioner, not the authors. Health care providers must use their clinical judgement, check local guidelines and be aware that treatment modalities may vary across and within countries.

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Foreword

Simulation is a unique and powerful way of learning.

In anesthesia, we must be capable of effectively managing routine everyday tasks as well as complex crisis situations. We are required to simultaneously execute psychomotor skills such as airway management, cognitive skills such as clinical decision making and social skills such as leadership and communication.

Putting all this together when it matters can't be learned in a text book, or a lecture, or even in a really interactive tutorial. There comes a point when you have to learn by doing. But then comes the challenge: how can you learn by doing for an event with a one in ten thousand incidence? Or when you're practising unsupervised in the middle of the night? How can you stand back and let your learner take charge and learn through mistakes when a mother's life is on the line? For this reason, simulation has been described as an "ethical imperative". An effective learning space that is safe for both patient and learner. It is arguably still more an imperative in low- and middle-income countries where the anesthesia human resource crisis leaves the majority of the world's population without access to safe anesthesia care.

It's easy to get caught up in the tech, but simulation is a technique, not a technology. It's increasingly understood that the same learning outcomes can be achieved with very low-cost resources as with high-end tech. It's more important to have a simulation model that is aligned with the learning objective, well constructed scenarios, organized facilitators and a thoughtful reflective debriefing for learning afterwards. The VAST Course is an "off the shelf" solution that provides the scenarios and the organization. It provides everything you need to start a simulation program with minimal cost. It builds on established content for low- and middle-income countries such as the SAFE, Primary Trauma Care and Essential Pain Medicine courses. Its focus is aligned with the Bellwether surgical procedures which must be offered safely in even rural district hospitals.

Like any form of teaching, simulation-based education is a learned skill that must be honed over many hours of practise and feedback. The companion VAST Facilitator Course provides essential tools to facilitate a debrief and empowers faculty to take the first steps along a career as a simulation educator. VAST and its Facilitator Course are a wonderful resource for those who want to bring simulation to where there is currently no simulation training. It can be the start of a kind of learning uniquely positioned to impact patient outcomes without risking patient harm.

Dr Dylan Bould
Associate Professor of Anesthesiology, University of Ottawa
Chair of CASIEF

Preface

This handbook has been developed as a companion for trainee-facilitators who are participating in the VAST Facilitator Course. Components of the handbook will be referred to throughout the Facilitator Course. In addition, the handbook includes a summary of VAST rationale, its ethos and educational principles. A detailed exploration of Anaesthetists' Non-technical Skills (ANTS) is also provided.

The Facilitator Course is designed as an entry into simulation facilitation. Simulation facilitation and debriefing are complex skills, requiring dedicated practice over time. Through the Facilitator Course and ongoing mentorship, you will be equipped with a robust 'toolkit' to begin the journey towards delivering high quality simulation and debriefing.

VAST Facilitator Course timetable

Timetable for day 1 and 2	
0800-0815	Registration
0815-1000	Sessions
1000-1030	Morning tea
1030-1100	Sessions
1200-1245	Lunch
1245-1345	Sessions
1400-1430	Afternoon tea
1430-1545	Sessions
1545-1600	End of day evaluation

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Abbreviations

Adv. – Advanced stage
BP – Blood pressure
DAS – Difficult Airway Society
ECG – Electrocardiogram
EPM – Essential Pain Management
ETT – Endo-tracheal tube
Ex – Examination
FC – Facilitator Course
Fund. – Fundamental stage
G_P_ – Gestation_Parity_
HR – Heart rate
Hx – History
IM – Intra-muscular
Int. – Intermediate stage
IU – International units
IV – Intra-venous
LMA – Laryngeal mask airway
MET – Metabolic equivalent
mls – Millilitres
Mx – Management
PMHx – Past medical history
PR – Rectally
PTC – Primary Trauma Care
RBC – Red blood cell
RR – Respiratory rate
RSI – Rapid sequence intubation
SAD – Supraglottic airway device
SAFE – Safer Anaesthesia From Education
SaO₂ – Oxygen saturation
SBAR – Situation, Background, Assessment, Recommendations
WHO SSC – World Health Organization Surgical Safety Checklist
– Fracture

VAST rationale

There are a number of valuable educational programs that focus on anaesthesia and trauma care in resource-limited settings. The VAST Course draws upon several of these established courses for key material.

The VAST Course has been designed de-novo to focus on the core components of safe anaesthesia delivery in the district hospital in resource-limited settings. This focus is reflected in the selected caseload, available resources and clinical actions to be performed. Simulation is the main learning technique in the VAST Course. This allows application of both non-technical skills and essential clinical principles in replicated clinical environments. The intention is to create vivid experiential learning in a safe and supportive atmosphere.

Although the prime focus is on anaesthesia, the VAST Course is designed as an inter-professional program, accommodating participants from nursing, surgery and medicine. There are relevant roles and opportunities to engage interprofessional learners throughout the Course. Scenarios also have inbuilt scalability, with facilitators being able to adapt scenario complexity to the needs of diverse learners.

An additional purpose of VAST is to build capacity for simulation-based medical education in low-resource settings. Following the VAST Course, a two-day facilitator course is offered. The Facilitator Course provides an introduction to simulation education, including the design, conduct and debriefing of simulation scenarios. Facilitator course graduates will help deliver future VAST Courses to consolidate new skills. This model promotes local ownership and sustainability. We hope that skills learned in the facilitator course will be transferable to teaching in other courses that rely on simulation (for example - SAFE Courses) as well as more broadly applicable to education of health professionals.

The authors of the VAST Course have sought approval to draw upon the following courses:

- SAFE – Safer Anaesthesia From Education (obstetrics and paediatrics)
(<https://www.aagbi.org/international/safer-anaesthesia-from-education>)
- PTC – Primary Trauma Care
(<https://www.primarytraumacare.org>)
- EPM – Essential Pain Management
(<http://fpm.anzca.edu.au/fellows/essential-pain-management>)
- Helping Babies Breathe
(<https://www.aap.org/en-us/advocacy-and-policy/aap-health-initiatives/helping-babies-survive/Pages/default.aspx>)

Through reinforcing consistent clinical frameworks and capacity building of a local facilitator network, VAST complements these existing programs. Facilitators and participants are also encouraged to attend these courses to broaden their understanding of the clinical themes raised in the VAST Course and to improve their skills for safe anaesthesia delivery.

Teaching principles

The following are core aspects of the course aimed to optimise participants' learning:

Design based on principles of adult learning:

- The VAST Course recognises that the adult learners participating in the course:
 - o Are motivated and well-intentioned clinicians attending for professional development
 - o Require varied and interactive teaching methods to maintain their interest
 - o May need the complexity of the simulation scenarios to be tailored to their individual needs to find an optimal balance between challenge and stress
- Specific elements that promote conditions for learner success include:
 - o Provision and completion of preparation material prior to the course
 - o Avoiding surprises and promotion of a supportive learning environment
 - o Utilising structure in sessions, with clear learning objectives
 - o Promoting development of understanding versus delivery of overwhelming factual information
 - o Provision of constructive feedback

Simulation-based education:

The course employs a graded exposure to simulation-based training through:

- Introductory discussions
- Demonstration scenarios by facilitators
- Transition from specific task orientated scenarios to more complex patient interactions
- Continuity of patients in scenarios and discussions at various stages of their clinical care

Safety:

- Physical:
 - o It is essential that participants are aware that **any procedures** that need to be performed **should not be done on human actors**
 - o Procedures should either be described or performed on dedicated equipment
 - o Ensure participants take the usual precautions with sharps they would in the real world
- Professional:
 - o For meaningful debriefing, there needs to be open forum for discussion
 - o **Maintaining strict confidentiality** regarding performance during the course is essential to safeguarding the trust of participants
- Psychological:
 - o Simulation training may be challenging and stressful for some participants
 - o Be vigilant for signs of stress in participants; discuss with the program co-ordinator and ensure time for group or individual debriefing, if required

Timing:

- There is always opportunity to explore topics in more detail
 - o Note - learning stops when participants are fatigued
- Adequate time for meal breaks will help to maintain learner engagement
- **Staying on time is crucial to course success**
- Pay close attention to the timetable and allocate a timekeeper amongst the facilitators
- The timekeeper should provide a 5-minute warning before a session is due to end

Educational methodology

General principles behind VAST Course:

- Participants are supported through the learning process
- Key concepts and frameworks are introduced prior to application in simulation
- Repetition and common themes are utilised to re-inforce learning
- Complexity of scenarios and expected actions are introduced progressively, recognising that many participants may be unfamiliar with this type of training
- Facilitators demonstrate all aspects of simulation prior to participant involvement
- The course is arranged thematically and can be delivered en-bloc or sequentially

Preparation of participants prior to the course:

- Simulation is not the most effective tool for 'teaching' clinical information
- Participants should be familiar with technical information, frameworks and algorithms prior to their expected application in simulation
- Participants should be 'primed' with the preparatory materials before the course
- Key resources will also be linked through our website <https://vastcourse.org>

Design principles underpinning the scenarios:

- All scenarios are designed with clear learning objectives
- Scenarios are not intended to 'test' participants, but to be an avenue to explore behaviours and thinking that are aligned with the learning objectives
- Participants should be guided through the scenarios as required with inbuilt prompts
- Allow participants time in the scenarios to complete required actions
 - o Utilise prompts only as needed if participants are not completing the transition trigger
- Scenarios can be tailored in complexity to meet the learning needs of participants
- Debriefing should be a structured process, directly focusing on the learning objectives for each scenario

The role of debriefing:

- Most learning from simulation occurs in the debrief
- Debriefing allows for participant reflection, an essential component of the learning process
- The facilitator provides a bridge between a participant experiencing an event and that event being translated into a meaningful learning
- Debriefing should aim to:
 - o Include all participants and observers
 - o Be structured in a way to promote a conversation that is led by the participants but steered by the facilitator towards the learning objectives
 - o Be based on observations, enquiry and clarification
 - o Explore thinking rather than being judgemental
 - o Encourage reflection on how the experience may impact future practice

Materials for a VAST Course

The equipment required to conduct a VAST Course is detailed in a VAST equipment list:

- This can be found online at <https://vastcourse.org> or in the VAST Course manual

In addition to the equipment for simulation, the following details the VAST resources:

Print resources:

- VAST Course Manual - assists facilitators in conducting the VAST Course
- VAST Participant Handbook - given to VAST Course participants
- VAST Facilitator Course Manual - assists facilitators in conducting the Facilitator Course
- VAST Facilitator Handbook - given to trainee facilitators in the Facilitator Course
- Posters (*VAST Handover, History and Examination, Non-technical skills and WHO SSC*)

Presentations:

- All presentations are stored electronically on the VAST Dropbox™ folder
 - o PowerPoint presentations all have associated facilitator notes
 - o Copies of the presentations and facilitator notes are in the course manuals

Supplementary materials:

- Simulation resources folder, containing:
 - o Materials required for simulation scenarios:
 - Coded briefing notes for participants
 - Coded patient documentation
 - Coded photos of pathology or imaging
 - o VAST equipment inventory
 - o VAST documentation inventory
 - o VAST Course USB with the PowerPoint presentations
- VAST ID clips:
 - o One available for each Course participant
 - o It includes the VAST pre-anaesthesia check and crisis management card
- Participant registration template:
 - o Allows for participant allocation to groups and session to be lead participant
- VAST Course Timetable - facilitator allocation:
 - o Allows for facilitator allocation to sessions
- Evaluation forms
- Certificates:
 - o VAST Course
 - o VAST Facilitator Course

Simulation room setup:

- Equipment:
 - o Setup boxes 1, 2 and 3 following the instructions in the equipment list
 - o Place a small table near the stretcher for equipment boxes and iPad
 - o Arrange a second small table for surgical equipment
- Hang posters in the simulation room (*VAST Handover, History and Examination, Non-technical skills and WHO SSC*)

Using SimMon

Description:

- SimMon is a simple, remote-controlled patient monitor that can be used for simulation

Requirements:

- Any pair of iOS devices with iOS 9.0 or later
- Preferably at least one iPad to act as the patient monitor
- Devices can pair over Bluetooth
- WiFi is not required

Advice on use:

- Open the app on both devices
- On the device being used as a remote-control go to settings, turn on SpO₂ sound, show MAP, respiration rate, End-tidal CO₂, blood pressure, timer
- Go back to main menu and select use a remote control and pair with the other device
- Once in the pairing mode, individual monitors can be turned on by tapping over the faint grey numerical values
- Once a monitor is on, the desired vital sign can be adjusted by double tapping on the value and entering in the new variable
- To turn on a waveform, tap on the small grey QRS symbol, and select normal
- **Note** – for pulse oximetry, it is required to also tap on the heart rate to adjust the pulse frequency
- To start the timer to help keep track of the duration of the scenario, tap on the faint grey numbers under the timer at the bottom of the screen
- Remember to keep devices charged when not in use

Downloading and troubleshooting:

- The app is available from apple App store
<https://itunes.apple.com/au/app/simmon/id364731597?mt=8>
- The developer's website is the best source of information for frequently asked questions and to make contact for trouble shooting
<http://castleandersen.dk/apps/simmon/>

Technological difficulties:

- Occasionally technology fails during simulation
- If SimMon malfunctions during a scenario:
 - o Continue to conduct the scenario
 - o Provide the relevant vital signs and clinical observations to the participants
 - o If participants have noticed or it has affected the delivery of the scenario, apologise for the problem during the reactions phase of the debrief

Example scenario

2.3 – SCENARIO

- C-section under spinal anaesthesia

Learning objectives

Identify the need for left uterine displacement during C-section under spinal anaesthesia

Recognise and treat post-spinal hypotension

Consider the differential diagnosis and management for persistent hypotension post-spinal

Scenario summary

Grace is a 21-year-old G1P0 who is in the operating theatre and has just been given spinal anaesthesia for urgent C-section. She has been in labour for 18hrs, is 5cm dilated with poor progression, signs of foetal distress and the surgeons are concerned regarding cephalopelvic disproportion. The co-facilitator is an anaesthesia provider, wanting to take a quick break. The scenario starts with handover between two anaesthesia providers. Routine care post-spinal anaesthesia is required. Optional progression of the scenario to Int. *hypotension and nausea* or Adv. *persistent hypotension* stages requires management of post spinal hypotension and consideration of the differential diagnosis for persistent hypotension respectively.

SCENARIO SETUP

Location	Operating theatre
Layout	Patient on stretcher, surgical instruments on a small table
Patient	
Type	Human actor, wearing a patient gown
Details	Grace, 21-year-old female
Position	Sitting up, immediately post insertion of spinal
Equipment on	Pulse oximeter, 16G IV line with fluids, BP cuff, ECG leads
Additional	Patient gown, rolled blankets for gravid uterus
Other	
Standard VAST equipment	See VAST Course manual for standard equipment list
Extra equipment	Wedge / sheets for left lateral tilt Surgical equipment on tray for C-section - gowns, drape Antibiotic syringe out on equipment table
Monitors	2 x iPads with SimMon
Documentation	Observation chart, pre-anaesthesia, consent and intra-operative charts
Cut out briefing notes	Anaesthesia provider (co-facilitator) Simulated patient Scrub nurse Circulating nurse Surgeon and medical student

2.3 – BRIEFING INSTRUCTIONS

Overview of roles	
<i>Lead participant</i>	Anaesthesia provider
<i>Present at start</i>	Anaesthesia provider (co-facilitator) Simulated patient Scrub nurse Circulating nurse Surgeon and medical student
<i>Additional</i>	The co-facilitator will 'leave' the scenario after handover: - Cue the co-facilitator to re-enter if called for by the lead participant or at any stage to help with crisis management following their 'break'

Prepare the scenario
<p>Isolate the lead participant outside the simulation room</p> <p>Prepare the other participants in the simulation room:</p> <ul style="list-style-type: none">- Allocate roles and briefing cards- Allow time for reading and asking questions- Arrange participants in the scenario according to their roles <p>Provide briefings:</p> <ul style="list-style-type: none">- In the simulation room for 'other participants'- For the lead participant after the scenario is prepared and other participants briefed

Briefing in the simulation room
<p>This is Grace, a 21-year-old female who is the operating theatre</p> <p>She is having an urgent C-section for failure to progress</p> <p>The spinal anaesthetic has just been placed</p>

Briefing for the lead participant
<p>You are an <u>anaesthesia provider</u></p> <p>You are going into the operating theatre to give a quick coffee break to one of your colleagues who has been working solidly all morning</p>

How to start the scenario
Cue the lead participant to enter the operating theatre to give the colleague a break

2.3 – COPY OF BRIEFING CARDS

2.3– Anaesthesia provider (co-facilitator)

You are an anaesthesia provider and are in desperate need for a coffee break. You have just placed the spinal anaesthetic and the Grace's legs are starting to feel numb. As the lead participant enters, lay Grace down flat, handover with SBAR and then leave the scenario:

S situation:

- This is Grace, a 21-year-old female, G1P0 having an emergency C-section for failure to progress with signs of foetal distress

B background:

- Grace has no allergies, takes no regular medications, has no significant past medical history
- I have just placed the spinal (2.2mls 0.5% heavy bupivacaine)
- **I have just given the antibiotics**

A assessment:

- Grace has told me her legs are numb, so I think the spinal is working well

R recommendation:

- All her documentation is here, the nurses have my number if you need me, I just desperately need to take a quick break

Extra notes:

- Wait to be cued by the facilitator before returning to the scenario

2.3 – Simulated patient

Your name is Grace. You are a 21-year-old female, G1P0 and about to have an urgent C-section:

- You have been in labour for 18hrs with failure to progress and signs of foetal distress
- You are otherwise well, have no past medical history, take no medications and have no allergies
- The spinal anaesthetic has just been placed and your legs are feeling numb

Follow this instruction **only if cued by the facilitator:**

- **One tap on your foot** – complain of having nausea and wanting to vomit
- **Two taps on your foot** – complain of feeling terrible. You now have difficulty talking and breathing, are feeling anxious and your heart is racing

2.3 – Scrub nurse

Act realistically in this role

Follow this instruction **only if cued by the facilitator:**

- **If tapped on the shoulder** – tell anaesthesia the patient has a rash on her abdomen

2.3 – Circulating nurse

Act realistically in this role

Follow this instruction **only if cued by the facilitator:**

- **If tapped on the shoulder** – comment to the anaesthesia provider, “When my sister was pregnant, she was so much more comfortable on her side...will she be ok on her back?”

2.3 – Surgeon and medical student

You should be talking near the surgical equipment:

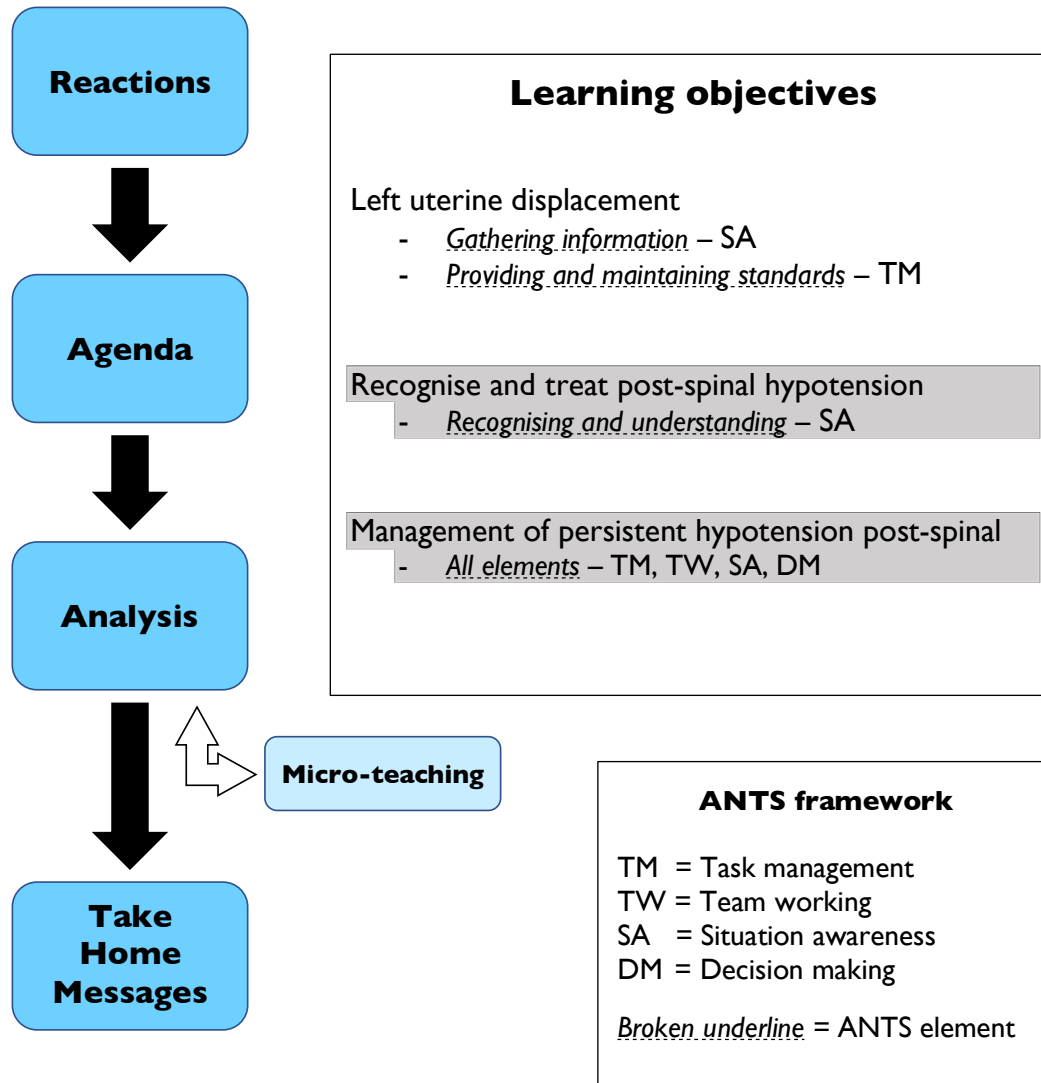
- After the patient is lying down, ask if it is ok to prep and drape
- Start the surgery and deliver the baby if time allows. The operation is going routinely

Give this information **only if asked** - there is a widespread rash over the patient's abdomen

2.3 – SCENARIO SEQUENCE (10 minutes)

Stages	Parameters	Actions	Transition triggers	Additional notes
Fund.	<u>Initial vitals:</u> A. Alert B. RR 20, SaO ₂ 99% C. HR 90, BP 100/56 <u>2nd set of vitals:</u> A. Alert B. RR 24, SaO ₂ 98% C. HR 98, BP 90/48	Receive handover Lay patient down Position with L uterine displacement Scan monitoring and confirm readings Confirm – IV and running fluids, vasopressor available, antibiotics given Communicate with surgical team Prepare oxytocin for delivery	Uterine displacement or lateral tilt <u>Prompts:</u> 1. 2 nd set of vitals 2. One tap circulating nurse – “when my sister was pregnant, she was so much more comfortable on her side...will she be ok on her back?”	<u>Post-spinal hypotension possible causes:</u> - Drug induced vasodilation / neuraxial blockade - Aorto-caval compression - High spinal - Haemorrhage or hypovolaemia - Anaphylaxis - Vasovagal - Drug overdose or toxicity - Amniotic embolism
Option – If time allows, progress to intermediate stage – <i>hypotension and nausea</i> or progress to end				
Int.	A. Alert – nauseated ++ B. RR 25, SaO ₂ 97% C. HR 115, BP 82/41	Reassure patient Confirm sufficient uterine displacement Treat hypotension: - Fluid bolus, vasopressor Recycle BP and reassess vital signs	Recognise and treat hypotension <u>Prompts:</u> 1. Change in vital signs 2. One tap patient’s foot – triggers nausea	<u>Anaphylaxis grades:</u> Grade I – Mild (<i>mucocutaneous signs only</i>) Grade II – Moderate (<i>multi-organ manifestations</i>) Grade III – Life-threatening (<i>severe hypotension or high airway pressure</i>) Grade IV – Cardiac arrest
Option – If time allows, progress to advanced stage – <i>persistent hypotension</i> or progress to end				
Adv.	Patient looks awful, sweaty A. Hoarse voice Difficulty talking B. RR 30, SaO₂ 86% Difficulty breathing Diffuse wheeze C. HR 135, BP 70/32 D. Responds to voice Extremely anxious E. Widespread rash	Recognise the crisis, call for help, allocate tasks Support A / B / C: - Assess airway - Give O ₂ , consider salbutamol - Fluid bolus, vasopressor, adrenaline Consider the differential diagnosis: - Check block height - Assess amount bleeding with surgeons - Assess for signs of anaphylaxis: ○ Diagnose and treat anaphylaxis Communicate with the team: - Expedite the surgery - Plan for ongoing management of the patient	Consider the differential diagnosis for hypotension <u>Prompts:</u> 1. Two taps patient’s foot – triggers breathing difficulty 2. One tap scrub nurse – comments on the widespread rash 3. Cue original anaesthesia provider to return from break and ask what is happening	<u>Adrenaline (epinephrine) dosing in anaphylaxis:</u> - Initial dose: ○ Grade II – 20mcg IV or 500mcg IM ○ Grade III – 100mcg IV or 500mcg IM ○ Grade IV – 1mg IV - Consider IM if no IV access or no monitoring - Repeat adrenaline after 1-2 minutes if needed - Increase dose if no clinical improvement - Prepare an adrenaline infusion, titrate to effect Anaphylaxis guideline – www.anzaag.com
End	A. Alert B. RR 22, SaO ₂ 96% C. HR 90, BP 110/56	End the scenario when expected actions performed or 10 minutes has elapsed		

2.3 – DEBRIEFING (25 minutes)



Place Post-it® note here

Debriefing principles

The VAST Course encourages a structured approach to the debriefing conversation:

A model for debriefing*

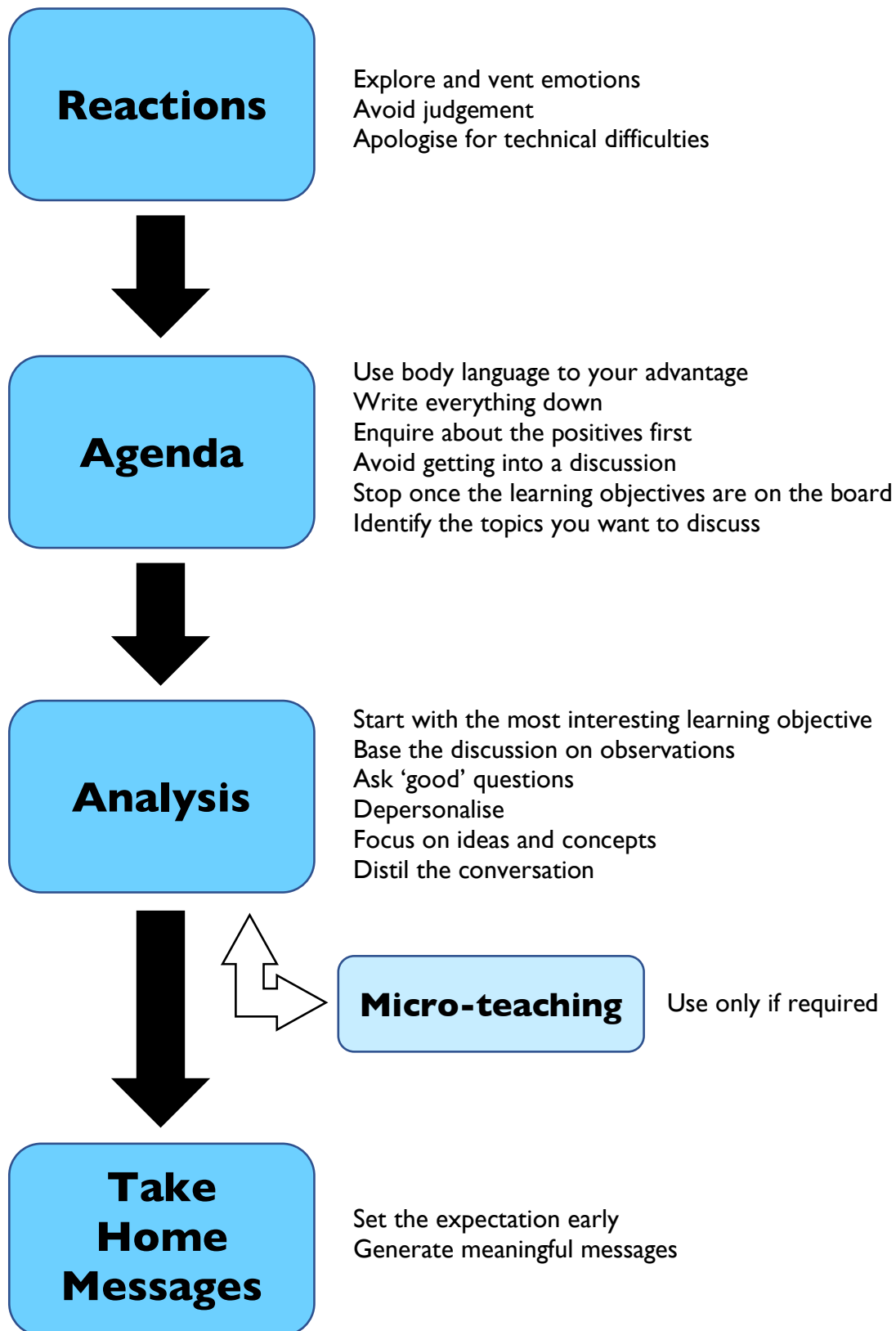
Stage	Principles
Reactions (1- 2 mins)	Occurs immediately after the scenario Gauges the participants' emotional response to the scenario Allows for venting of emotion and transition into analysis
Agenda (3-5 mins)	Is driven by the participants' observations of the scenario: - A list is created of what went well and what was challenging From this list, the debriefer selects topics that are the most important and reflect the learning objectives - This list of topics forms the basis of the analysis stage - The topics selected directly correlate with the pre-determined learning objectives The goal is that all of the scenario learning objectives are discussed
Analysis (15-20 mins)	Start with the most interesting or important learning objective Ask questions based on enquiry, observations and clarification Aim to explore the thinking and the mindset of the participants 'Micro-teaching' may be required as a small aspect of the debrief to clarify important clinical information The conversation should be led by participants and steered towards reflection on practice change
Take home messages (THM) (1-2mins)	Encourage participants to express what they have learnt from the case Write these down - THM should be generated by the participants

*Adapted from the Scottish Centre for Simulation debriefing framework – <https://scschf.org>

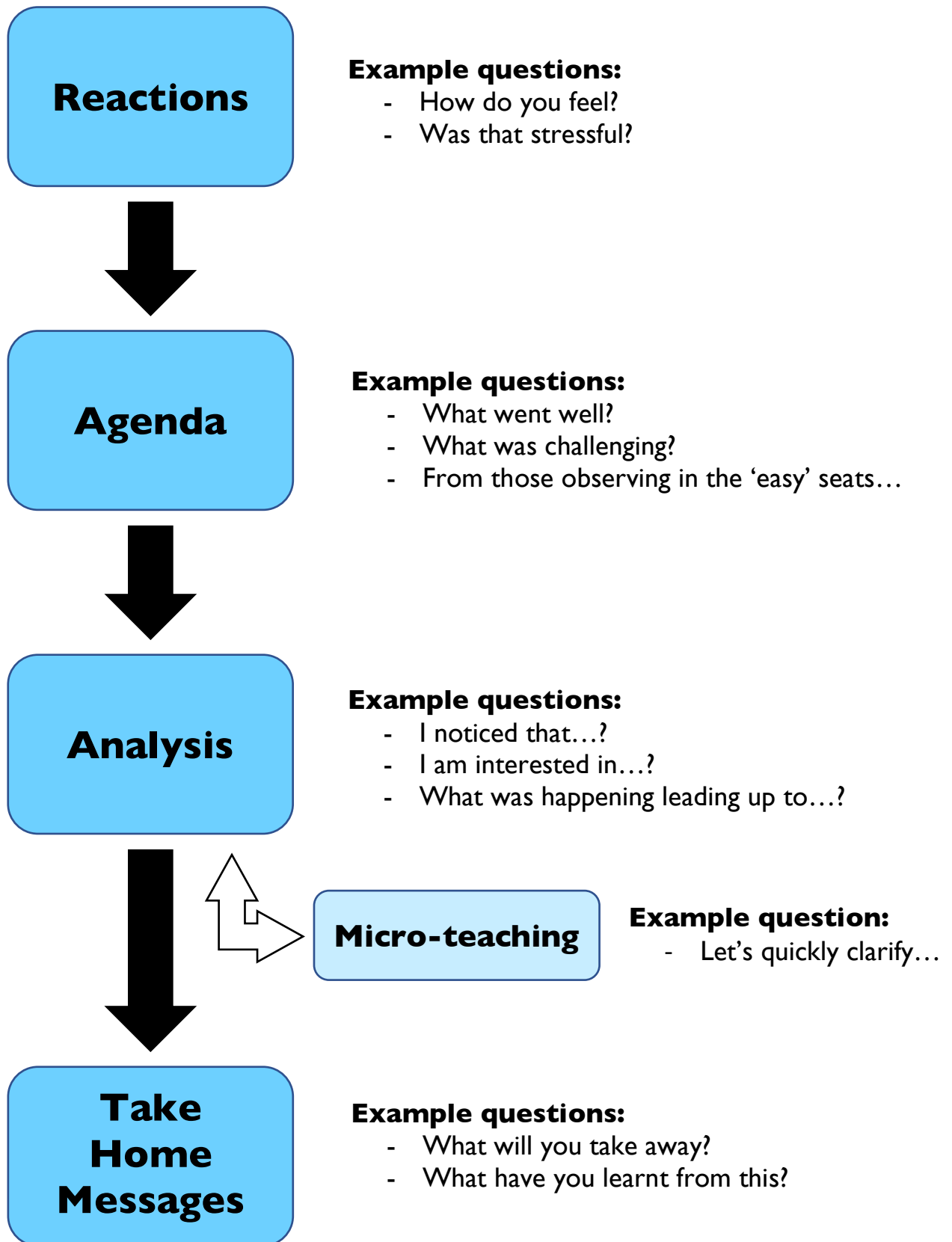
What supports good debriefing?

- Establishing trust and a safe learning environment
- Choosing a location away from the simulation area and free from distractions
- Apologising for technical difficulties before starting the debriefing (*only do this if the problems have been noticed by the participants*)
- Outlining the debriefing process so participants know what to expect
- Being genuine, accepting participants' opinions and having empathy to their point of view
- Avoiding lecturing, debriefing is not a process of 'teaching' participants, although simple corrective teaching may be necessary (microteaching)
- Being conscious of the questions you are asking
 - o Use open ended questions, pauses and silence to encourage participants to essentially debrief themselves
 - o Avoid questions that imply judgement or questions where you want the participant to guess what you are thinking
- Providing closure, resources for further exploration of the topic and thanking participants

TOP TIPS FOR DEBRIEFING



EXAMPLE QUESTIONS



*Adapted from the Scottish Centre for Simulation debriefing framework – <https://scschf.org>

Non-technical skills

Anaesthetists' non-technical skills have been discussed in detail in the VAST Course. In preparation for facilitation and debriefing, a more detailed understanding of the ANTS System is required. The following table will be utilised during the Facilitator Course. The Framework for Observing and Rating Anaesthetists' non-technical skills is also included below.

Category / Elements	Observations
Task management <ul style="list-style-type: none"> • Planning and preparing • Prioritising • Providing and maintaining standards • Identifying and utilising resources 	
Team working <ul style="list-style-type: none"> • Coordinating activities with the team • Exchanging information • Using authority and assertiveness • Assessing capabilities • Supporting others 	
Situation awareness <ul style="list-style-type: none"> • Gathering information • Recognising and understanding • Anticipating 	
Decision making <ul style="list-style-type: none"> • Identifying options • Balancing risks and selecting options • Re-evaluating 	



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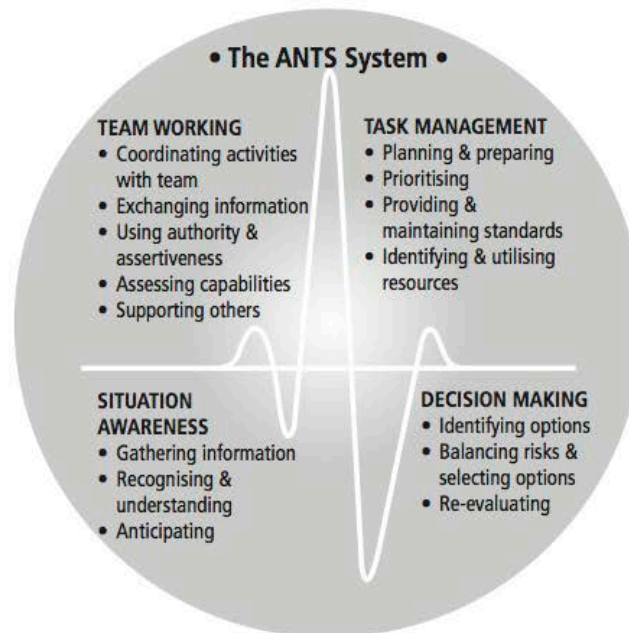


Framework for Observing and Rating Anaesthetists' Non-Technical Skills



This is the electronic access version of the handbook. To order a hardcopy, please send a cheque for £5.00 made payable to the 'University of Aberdeen', and forward it together with your name and address details to: Rhona Flin, Industrial Psychology Research Centre, School of Psychology, University of Aberdeen, Aberdeen, AB24 2UB.

Anaesthetists' Non-Technical Skills (ANTS) System Handbook v1.0



Acknowledgement

The ANTS System is being developed and evaluated in a collaborative project between the University of Aberdeen Industrial Psychology Research Centre and the Scottish Clinical Simulation Centre. The first phase of the study (1999-2003) was funded by NHS Education for Scotland. We particularly wish to acknowledge the significant contribution made by Georgina Fletcher to the design of this system.

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Introduction

Background

The training programme in Anaesthesia has been developed to help trainees acquire the necessary knowledge, skills and values that will enable them to meet the challenges of consultant practice. The most recent major development in the UK has been the introduction of the competency based training scheme, which recommends that progress through and completion of training be based on competence. This in turn places the emphasis on teaching and assessment in the workplace, and is encouraging greater emphasis on those components necessary to provide effective management of patients. The competency based approach can be thought of in terms of not only acquiring the individual components but being able to integrate them effectively in providing solutions to clinical challenges. Another important development in medical education has been the increasing recognition of the importance of reflection in the training of professionals. In a time of reduced working hours and exposure to fewer clinical challenges, it is important that clinicians, both in training and career grades, make the most of their clinical experience. Feedback on strengths and weakness and self-reflection are more likely to be effective when there is a terminology or vocabulary that permits analysis of performance. The tool described in this booklet addresses the area of non-technical skills. It provides both a framework and common terminology that allows anaesthetists to communicate effectively with each other in this area of practice, helping trainees (and others) develop abilities in both the real workplace or simulated work environment.

This handbook provides a condensed guide to the Anaesthetists' Non-Technical Skills System and includes suggestions on how the system can be used. Part 1: Information for Users is written in the form of answers to frequently asked questions. These have been based on research for the ANTS project and literature on the use of behavioural marker systems to support non-technical skills training. Part 2: System Details provides the full contents of the ANTS System, the rating scale, and the rating form. Further information and rating forms can be found at the ANTS website: www.abdn.ac.uk/iprc/ANTS

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Part 1 Information for users

What are Non-Technical Skills?

As in other industrial domains, accidents and incidents in anaesthesia are usually caused by a combination of organisational and operational factors. Investigations into adverse events or 'human errors' have shown that as many as 80% of them are the result of human factors breakdowns such as poor communication, inadequate monitoring, failures to cross-check drugs and equipment, rather than lack of technical knowledge or equipment problems. Research observing medical teams in operating theatres has also highlighted difficulties arising from loss of situation awareness and poor team interactions*.

Reducing the likelihood of such problems requires anaesthetists to have an additional set of skills, known as non-technical skills, that are used integrally with medical knowledge and clinical techniques. These non-technical skills can be defined as behaviours in the operating theatre environment not directly related to the use of medical expertise, drugs or equipment. They encompass both interpersonal skills e.g. communication, team working, leadership, and cognitive skills e.g. situation awareness, decision making. Such skills are not new in anaesthesia, good anaesthetists have always demonstrated these competencies. In the past, these skills have not been explicitly addressed through any formal education and trainees have had to acquire them along the way. However, with an increased focus on reducing adverse events and the introduction of competency based training and simulators, this is now changing.

To achieve successful non-technical skills training, it is first necessary to identify the requisite skills for the job in the given operational environment and culture. It is also important to be able to assess these skills, to provide feedback about performance and to allow training to be evaluated. To structure the training and assessment of pilots' non-technical skills, the aviation industry uses behavioural marker systems. Behavioural marker systems are empirically derived taxonomies of the principal non-technical skills required for the job, with an observation-based rating system for assessing their component behaviours*. Their explicit nature and the reliance on assessment of observable behaviour by trained instructors means behavioural marker systems can provide a structured tool for making reliable assessments. At a more basic level, they also provide a common language for discussing non-technical skills. Such systems can play an important role in supporting non-technical skills training in anaesthesia, in both simulator and on-the-job training.

It is important to remember that non-technical skills should not be considered in isolation to other aspects of anaesthetic competence. The purpose of examining these skills is to support the development of overall good practice. Successful task performance depends on the effective integration of both technical and non-technical skills for any given situation.

* For more information see the reports and journal articles on the ANTS website

What is the ANTS System?

The Anaesthetists' Non-Technical Skills (ANTS) System is a behavioural marker system developed by industrial psychologists and anaesthetists during a four year collaborative research project in Scotland. Used integrally with medical knowledge and clinical skills, non-technical skills should help to support safe and effective performance in everyday tasks and emergency situations. ANTS describes the main observable non-technical skills associated with good anaesthetic practice. The purpose of the system is to provide the anaesthetic community with a framework for describing non-technical skills and a tool to guide their assessment in an explicit and transparent manner. In short, the ANTS System supplies consultants and trainees with a language for discussing the 'behavioural aspects' of performance. It can be used for assessing an individual's behaviour, to provide input for the training process and for structuring feedback on skills development. Until a fuller understanding of the in-theatre validity and reliability of the ANTS System has been achieved, it is not recommended for formal summative assessment.

The ANTS System comprises a three level hierarchy. At the highest level are four skill categories and beneath these are fifteen skill elements (see table below). Each element has a definition and some examples of good and poor behaviours that could be associated with it. These are the behavioural markers, as they help to indicate the presence or absence of the skill elements. They have been derived from real examples given by consultant anaesthetists during interviews describing their experiences on a variety of cases. The ANTS System is not intended to provide a totally exhaustive list of all non-technical skills used by anaesthetists. It is limited to the principal skills that can actually be identified through observable behaviour.

ANTS System v1.0: Categories and Elements

Category	Elements
Task Management	<ul style="list-style-type: none"> • Planning and preparing • Prioritising • Providing and maintaining standards
Team Working	<ul style="list-style-type: none"> • Identifying and utilising resources • Co-ordinating activities with team members • Exchanging information • Using authority and assertiveness • Assessing capabilities
Situation Awareness	<ul style="list-style-type: none"> • Supporting others • Gathering information • Recognising and understanding
Decision Making	<ul style="list-style-type: none"> • Anticipating • Identifying options • Balancing risks and selecting options • Re-evaluating

The full ANTS System is shown in this guide. More information on how to use it follows.

This advice is based on feedback from consultant anaesthetists who trialled the ANTS System with trainees in the operating theatre.

How should I implement the ANTS System?

User selection and training

- In order to use the ANTS System effectively, training is required. This should include:
 - background knowledge on human performance, error management and non-technical skills, so constructive, directive feedback can be given to trainees;
 - principles of using psychometric tools for rating performance;
 - the contents of the ANTS System and how they relate to everyday activities;
 - practice in observing non-technical skills and making ratings with the ANTS System.
- If the ANTS System is to be used for assessment, trainers should undergo calibration to ensure that they can provide standardised judgements.
- Recurrent training and calibration programmes should be developed.
- It is recommended that a small group of consultants is selected in each department to become ANTS trainers/assessors.

Trainee selection and training

- Trainees should receive training on human performance and error management to support development of their non-technical skills. In future, this may begin at medical school and then be further developed throughout postgraduate training
- Trainees should receive their own copy of this ANTS System Handbook for reference.
- The ANTS System should be used appropriately for the level of experience of the trainee:
 - with junior trainees, the focus of training is on developing basic anaesthetic expertise; the ANTS System can be used for general discussion of non-technical skills and their importance to clinical practice;
 - for more senior trainees, the ANTS System can be used to rate skills and provide feedback during increasingly challenging cases;
 - towards completion of training, it can also be used to help senior trainees learn how to assess ANTS in others.
- Consultants should explain to trainees why it is important to provide feedback on non-technical skills during training, highlighting that the ANTS System has been designed to aid the development of professional skills.

How should the ANTS System be used?

Ratings can be made at both the element and category levels. The recommended method is first to observe performance, making notes of any specific behaviours or omissions. Any assessment should be based **only** on behaviours observed directly. Using these observations, the rating can then be carried out, first at element level, then at the more general category level. A four point scale is used to describe the level of performance demonstrated (with an option to record skills that were not observed) – see page 14. A copy of the rating form is shown on page 15. Before using the ANTS System for teaching and assessment in training, it is important that you have received training on the system. This should consist of practice in observation and rating, receiving feedback on your scores, and discussion of appropriate use of the system.

Time scheduling

- Formative assessment using the ANTS System requires feedback to be given to trainees.
- Trainers/assessors will require to have time available for feedback sessions.
- Trainees who are taking part in a non-technical skills review should be given time out of their in-service commitment to attend a feedback discussion.

General recommendations

- It may take some time for users to become familiar with the language and structure of the ANTS System; training should help facilitate this process.
- As with other in-theatre training, teaching and assessment should not interfere with clinical care; if circumstances in theatre dictate, concurrent use of ANTS should be abandoned.
- Formative assessment and feedback on ANTS should occur routinely in both clinical and simulator environments.

Suggested functions

- To assess/review trainees' non-technical skills on a periodic basis to identify strengths and weaknesses and support skills development
 - use in a case or list where the trainee can manage the patient(s), as taking the lead, with consultant observing and providing assistance as requested/required, this can be as second anaesthetist or just stepping in if a problem occurs.
- To guide general discussion of ANTS and their role in case management
 - consultant and trainee work together more as a team and discuss with case/list issues being considered from a non-technical perspective e.g. role of situation awareness – what is it for, how is it to be developed and maintained, how can it be lost or why good team working is so important?;
 - this more informal use is appropriate with new users, junior trainees when numerical ratings are premature, and senior trainees in more complex cases.
- As a framework for self-reflection both by trainees and other grades
 - questions could be asked about the categories and elements either following or in advance of a case, e.g. what resources would be needed for a vascular emergency case, what are the situation awareness requirements in this case?
- As above but during simulator-based training
 - videos of scenarios could be reviewed by the trainees with their instructors for more focussed feedback sessions.

Practical issues

- Use ANTS System in a variety of different cases as appropriate for the list type, health of patient, trainee level and consultant load.
- New users are recommended to work at the element level, as ratings can be more directly related to observed behaviours.
- If using the ANTS System for skills assessment, make brief notes about observations on the form during the case if possible e.g. of things seen, not seen, key events. Following the case/list make ratings based on these observations.
- Consultants and trainees should have a feedback and discussion session after the case or list being reviewed
 - use element level observations/ratings to give specific feedback on skills.
 - use category level to describe more general performance.
- Use whole ANTS System during training and assessment but focus on areas relating to weakness or of particular importance for type of case, e.g. co-ordinating with team in shared airway work.
- Make notes of specific circumstances of the case and trainee's experience, tasks, etc. (e.g. if very complex case, trainee new to grade, been on-call all night).

Part 2 The ANTS System

Task Management: Skills for organising resources and required activities to achieve goals, be they individual case plans or longer term scheduling issues. It has four skill elements: planning and preparing; prioritising; providing and maintaining standards; identifying and utilising resources.

Planning and preparing – developing in advance primary and contingency strategies for managing tasks, reviewing these and updating them if required to ensure goals will be met; making necessary arrangements to ensure plans can be achieved.

Behavioural markers for good practice

- communicates plan for case to relevant staff
- reviews case plan in light of changes
- makes post-operative arrangements for patient
- lays out drugs and equipment needed before starting case

Behavioural markers for poor practice

- does not adapt plan in light of new information
- does not ask for drugs or equipment until the last minute
- does not have emergency/alternative drugs available suitable for patient
- fails to prepare post-op management plan

Prioritising – scheduling tasks, activities, issues, information channels, etc., according to importance (e.g. due to time, seriousness, plans); being able to identify key issues and allocate attention to them accordingly, and avoiding being distracted by less important or irrelevant matters.

Behavioural markers for good practice

- discusses priority issues in case
- negotiates sequence of cases on list with surgeon
- conveys order of actions in critical situations

Behavioural markers for poor practice

- becomes distracted by teaching trainees
- fails to allocate attention to critical areas
- fails to adapt list to changing clinical conditions

Providing and maintaining standards – supporting safety and quality by adhering to accepted principles of anaesthesia; following, where possible, codes of good practice, treatment protocols or guidelines, and mental checklists.

Behavioural markers for good practice

- follows published protocols and guidelines
- cross-checks drug labels
- checks machine at beginning of each session
- maintains accurate anaesthetic records

Behavioural markers for poor practice

- does not check blood with patient and notes
- breaches guidelines such as minimum monitoring standards
- fails to confirm patient identity and consent details
- does not adhere to emergency protocols or guidelines

Task Management: continued

Identifying and utilising resources – establishing the necessary, and available, requirements for task completion (e.g. people, expertise, equipment, time) and using them to accomplish goals with minimum disruption, stress, work overload or underload (mental and physical) on individuals and the whole team.

Behavioural markers for good practice

- identifies resources that are available
- allocates tasks to appropriate member(s) of the team
- ensures time is free for busy/critical periods
- requests additional resources if needed

Behavioural markers for poor practice

- fails to utilise available resources
- overloads team members with tasks
- does not recognise when task load is unworkable
- does not request necessary resources in advance

Team Working: Skills for working in a group context, in any role, to ensure effective joint task completion and team member satisfaction; the focus is particularly on the team rather than the task. It has five skill elements: co-ordinating activities with team members; exchanging information; using authority and assertiveness; assessing capabilities; supporting others.

Co-ordinating activities with team members – working together with others to carry out tasks, for both physical and cognitive activities; understanding the roles and responsibilities of different team members, and ensuring that a collaborative approach is employed.

Behavioural markers for good practice

- confirms roles and responsibilities of team members
- discusses case with surgeons or colleagues
- considers requirements of others before acting
- co-operates with others to achieve goals

Behavioural markers for poor practice

- does not co-ordinate with surgeon(s) and other groups
- relies too much on familiarity of team for getting things done – makes assumptions, takes things for granted
- intervenes without informing/ involving others
- does not involve team in tasks

Exchanging information – giving and receiving the knowledge and data necessary for team co-ordination and task completion.

Behavioural markers for good practice

- gives situation updates/reports key events
- confirms shared understanding
- communicates case plans and other relevant information to appropriate people
- maintains clear case documentation

Behavioural markers for poor practice

- does not inform team of plan or subsequent alterations
- gives inadequate handover briefing
- does not include relevant people in communications
- fails to express concerns in a clear and precise manner

Using authority and assertiveness – leading the team and/or the task (as required), accepting a non-leading role when appropriate; adopting a suitably forceful manner to make a point, and adapting this for the team and/or situation.

Behavioural markers for good practice

- makes requirements known with necessary level of assertiveness
- takes over task leadership as required
- gives clear orders to team members
- states case and provides justification

Behavioural markers for poor practice

- does not challenge senior colleagues or consultants
- does not allow others to put forward their case
- fails to attempt to resolve conflicts
- does not advocate position when required

Team Working: continued

Assessing capabilities – judging different team members' skills, and their ability to deal with a situation; being alert to factors that may limit these and their capacity to perform effectively (e.g. level of expertise, experience, stress, fatigue).

Behavioural markers for good practice

- calls for assistance when it is needed
- asks new team member about their experience
- notices that a team member does not perform a task to the expected standard
- adapts level of monitoring to expertise of other team members
- observes that a member of the team has returned from sick leave and enquires about their general health

Behavioural markers for poor practice

- does not ask if trainee/assistant can cope with task
- allows team to accept case beyond its level of expertise
- does not pay attention to the performance of other members of the team, e.g. scrub nurse
- joins established team without ascertaining their capabilities
- fails to respond to obvious cues of fatigue – person yawning, not remembering simple instructions, etc.

Supporting others – providing physical, cognitive or emotional help to other members of the team.

Behavioural markers for good practice

- acknowledges concerns of others
- provides reassurance/encouragement
- debriefs and thanks staff after a difficult case
- anticipates when colleagues will need equipment/information

Behavioural markers for poor practice

- asks for information at difficult/high workload time for someone else
- does not offer assistance to team members
- fails to recognise needs of others requiring task reallocation
- uses a dismissive tone in response to requests from others

Situation Awareness: Skills for developing and maintaining an overall awareness of the work setting based on observing all relevant aspects of the theatre environment (patient, team, time, displays, equipment); understanding what they mean, and thinking ahead about what could happen next. It has three skill elements: gathering information; recognising and understanding; anticipating.

Gathering information – actively and specifically collecting data about the situation by continuously observing the whole environment and monitoring all available data sources and cues and verifying data to confirm their reliability (i.e. that they are not artefactual).

Behavioural markers for good practice

- obtains and documents patient information pre-operatively
- conducts frequent scan of the environment
- collects information from team to identify problem
- watches surgical procedure, verifying status when required
- cross-checks information to increase reliability

Behavioural markers for poor practice

- reduces level of monitoring because of distractions
- responds to individual cues without confirmation
- does not alter physical layout of workspace to improve data visibility
- does not ask questions to orient self to situation during hand-over

Recognising and understanding – interpreting information collected from the environment (with respect to existing knowledge) to identify the match or mis-match between the situation and the expected state, and to update one's current mental picture.

Behavioural markers for good practice

- increases frequency of monitoring in response to patient condition
- informs others of seriousness of situation
- describes pattern of cues and their meaning to other team members

Behavioural markers for poor practice

- does not respond to changes in patient state
- carries out inappropriate course of action
- silences alarms without investigation

Anticipating – asking 'what if' questions and thinking ahead about potential outcomes and consequences of actions, intervention, non-intervention, etc.; running projections of current situation to predict what might happen in the near future.

Behavioural markers for good practice

- keeps ahead of the situation by giving fluids/drugs
- reviews the effects of an intervention
- sets and communicates intervention thresholds
- takes action to avoid or mitigate potential problems

Behavioural markers for poor practice

- does not consider potential problems associated with case
- fails to increase level of monitoring in keeping with patient condition
- is caught unaware by surgical actions
- does not foresee undesirable drug interactions

Decision Making: Skills for reaching a judgement to select a course of action or make a diagnosis about a situation, in both normal conditions and in time-pressured crisis situations. It has three skill elements: identifying options; balancing risks and selecting options; re-evaluating.

Identifying options – generating alternative possibilities or courses of action to be considered in making a decision or solving a problem.

Behavioural markers for good practice

- generates options for decisions
- discusses various anaesthetic techniques with patient
- asks other anaesthetists for suggestions on a difficult case

Behavioural markers for poor practice

- even though time is available jumps straight to one option without considering alternatives
- fails to ask other team members for options, when appropriate
- ignores suggestions from other team members

Balancing risks and selecting options – assessing hazards to weigh up the threats or benefits of a situation, considering the advantages and disadvantages of different courses of action; choosing a solution or course of action based on these processes.

Behavioural markers for good practice

- considers risks of different treatment options
- weighs up factors with respect to patient's condition
- assesses time criticality associated with possible options
- implements chosen option

Behavioural markers for poor practice

- does not find out about the risks associated with an unfamiliar condition/drug
- does not preview courses of action with relevant people to assess their suitability
- fails to review possible options with the team

Re-evaluating – continually reviewing the suitability of the options identified, assessed and selected; and re-assessing the situation following implementation of a given action.

Behavioural markers for good practice

- re-assesses patient after treatment or intervention
- reviews situation, if decision was to wait and see
- continues to list options as patient's condition evolves

Behavioural markers for poor practice

- fails to allow adequate time for intervention to take effect
- fails to include other team members in re-evaluation.
- is unwilling to revise course of action in light of new information

Rating Anaesthetists' Non-Technical Skills

The scale below can be used for rating non-technical skills based on observed behaviour. If it is not relevant for a particular element to be demonstrated in a situation, the 'not observed' rating should be used.

ANTS System Rating Options

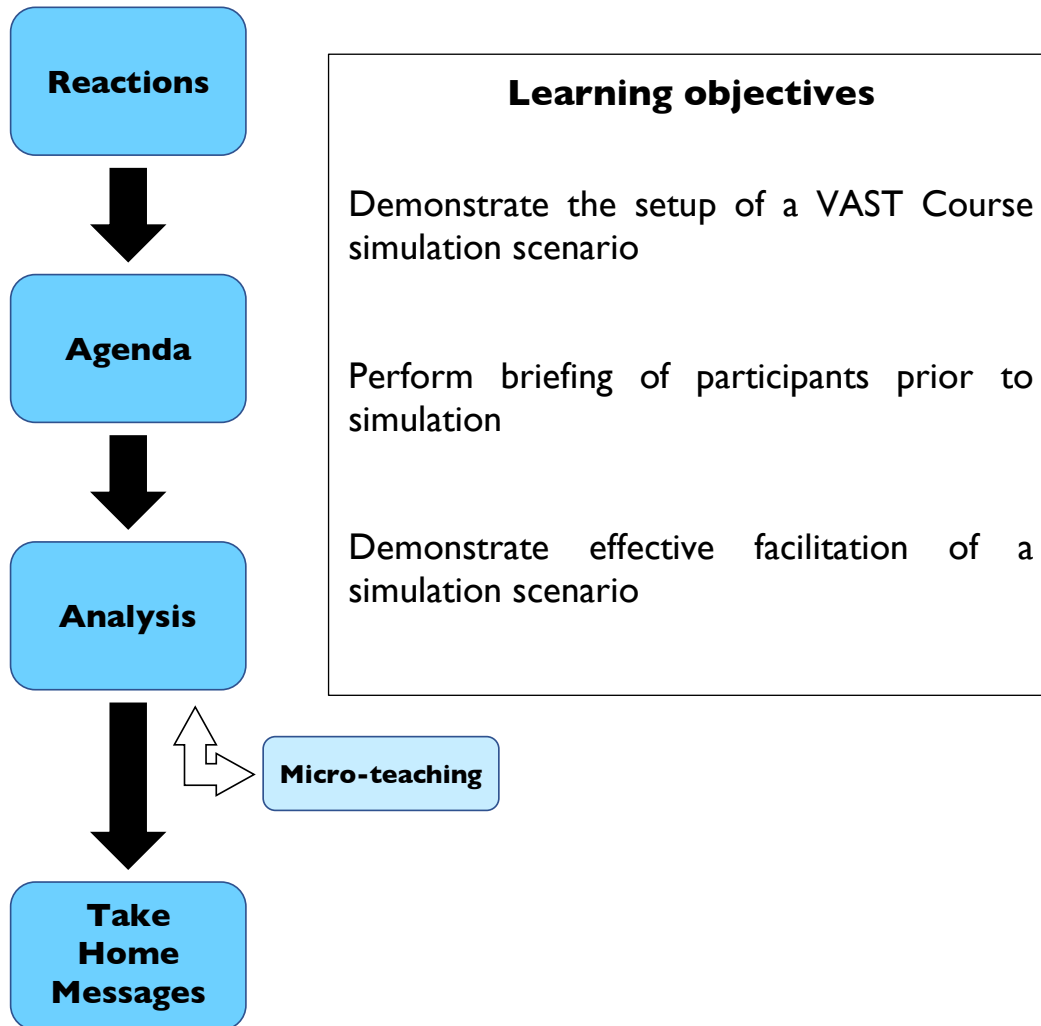
Rating Label	Description
4 – Good	Performance was of a consistently high standard, enhancing patient safety; it could be used as a positive example for others
3 – Acceptable	Performance was of a satisfactory standard but could be improved
2 – Marginal	Performance indicated cause for concern, considerable improvement is needed
1 – Poor	Performance endangered or potentially endangered patient safety, serious remediation is required
N – Not observed	Skill could not be observed in this situation

Category	Element	*Rating	Observation on Performance	Category rating and debriefing notes
Task Management	Planning & preparing			
	Prioritising			
	Providing & maintaining standards			
	Identifying & utilising resources			
Team Working	Co-ordinating activities with team			
	Exchanging information			
	Using authority & assertiveness			
	Assessing capabilities			
	Supporting others			
Situation Awareness	Gathering information			
	Recognising & understanding			
	Anticipating			
Decision Making	Identifying options			
	Balancing risks & selecting options			
	Re-evaluating			

15

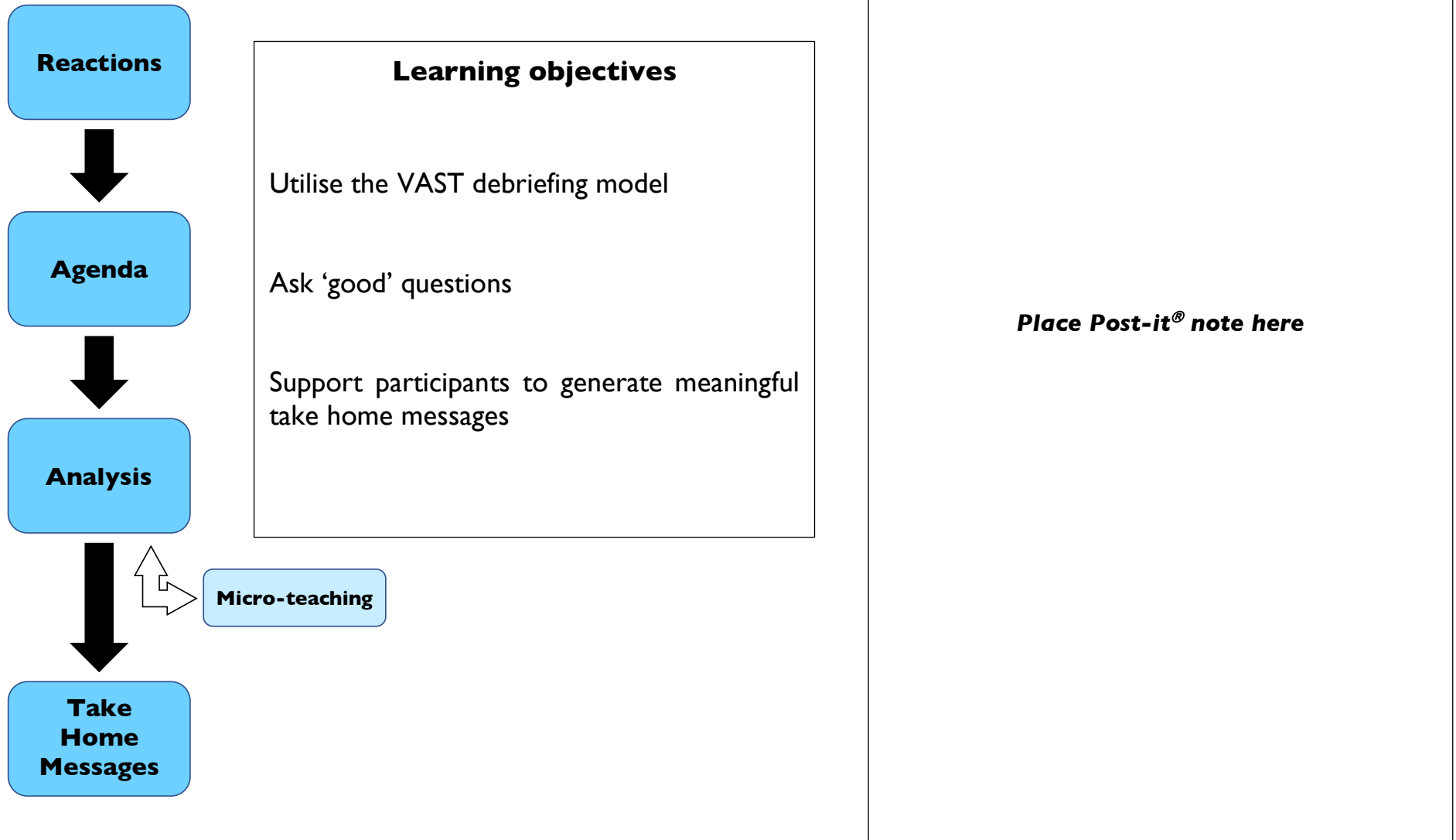
* **4** Good; **3** Acceptable; **2** Marginal; **1** Poor; **N** Not Observed

Meta-debrief A



Place Post-it® note here

Meta-debrief B



Session delivery advice

Session	Delivery advice
Registration	<p>Participants should sign in and be given name tags, VAST Course handbook, USB and VAST flipcard:</p> <ul style="list-style-type: none"> - Use participants' name tag to allocate simulation groups and indicate which scenario/s they will be the lead participant
Discussion	<p>Not all of the VAST Course is simulation scenarios. There are several interactive presentations throughout the Course</p> <p>Discussion sessions serve several functions:</p> <ul style="list-style-type: none"> - Establish ground rules and promote a safe learning environment - Familiarise participants to the principles of simulation - Introduce core clinical frameworks used during the course - Focus on specific aspects of anaesthesia practice <p>Tips on delivery of a discussion session:</p> <ul style="list-style-type: none"> - Arrange participants so they can see the slides - Stand close to the laptop, avoid blocking the projector - Speak slowly, clearly and with adequate volume - <u>Prepare</u>; review the material and delivery instructions prior - Avoid directly reading from the slides. Engage the participants - Allow time for questions and close with the key messages
Demo	<p>The aim is to familiarise participants with the simulation environment, the equipment, scenario briefing, safety information and to provide an example of how a scenario will run:</p> <ul style="list-style-type: none"> - Facilitators run and participate in the scenario as a demonstration
Skill station	<p>There are several skills stations during the VAST Course. The following 4 staged approach is advised when teaching these skills:</p> <p>Use 4 stages when teaching a skill:</p> <ol style="list-style-type: none"> 1. Demonstrate in real time 2. Slowly demonstrate whilst describing each step 3. Get a participant to narrate the skill whilst you demonstrate 4. Ask each participant to demonstrate the skill and describe it
Scenario	<p>Deliver in groups as per the registration roster:</p> <ul style="list-style-type: none"> - Each scenario template provides a complete framework for the setup, briefing of participants, running of the scenario and debriefing
Evaluation	<p>Evaluation forms should be completed at the end of each day</p>
Reflection	<p>Occurs as a combined group at the start of each day:</p> <ul style="list-style-type: none"> - It is an informal opportunity to reflect learning from the previous day - Note the key learning points on a large piece of paper - Post these learning points adjacent to participants' course objectives

Session overview

Day 1	Day 2	Day 3
Introduction to simulation	Obstetric case based discussion	Paediatric case based discussion
Facilitator led scenario*	Obstetric pre-op assessment*	Paediatric pre-op assessment*
Clinical frameworks	C-section under spinal anaesthesia*	Paediatric laryngospasm*
Non-technical skills	General anaesthesia for C-section*	Trauma primary survey+
Emergency surgery pre-op assessment*	Intra-partum haemorrhage*	Trauma – paediatric*
Pre-anaesthesia preparation*	Post-partum haemorrhage*	Trauma – adult*
Unanticipated difficult intubation*	Post-operative sepsis*	Trauma – adult re-assessment*
Rapid sequence induction+	Morning handover in recovery*	No easy answers
Pain case based discussion		Commitment to change
Neonatal resuscitation+		

* Simulation scenario

+ Skill station

Notes

[illegible]

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[illegible]

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[illegible]

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[illegible]

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