



Anaesthetic Non-Technical Skills for Anaesthetic Practitioners (ANTS-AP)



Structuring the observation, rating, and
feedback of non-technical skills used in
assisting the anaesthetist

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Introduction

The ANTS-AP system aims to provide a common language for Anaesthetic Practitioners assisting the Anaesthetist/Anaesthesiologist to discuss and develop their everyday practice. The focus of the ANTS-AP system is the non-technical skills used by Anaesthetic Practitioners. Non-technical skills are the social (communication and teamwork) and cognitive (situation awareness) skills practitioners need in addition to their technical skills to perform a task efficiently, effectively and safely.

Traditionally healthcare training has focused on learning facts, and gaining experience of clinical skills. In practice, trainee Anaesthetic Practitioners discover that new skills are required to allow the operating theatre list to flow smoothly. Failure to recognise the importance of, or learn this other body of skills is often a source of difficulty for trainees and their educators.

How does one improve teamwork, situation awareness or ensure adequate preparation of equipment and tasks? The ANTS-AP system can be used to objectively structure feedback in a standardised system, and should be used in a supportive, non-confrontational manner. It can also be used for self-reflection.

What this handbook contains

This handbook gives a practical guide to the ANTS-AP system. Part 1 gives some background to the development of the ANTS-AP system, and its potential use. Part 2 is the complete ANTS-AP system v1.0, including the non-technical skills taxonomy, behavioural markers, rating scale and rating form. Further rating forms can be downloaded from www.abdn.ac.uk/iprc/ants-ap

Part 1: Information for users

The anaesthetist is assisted by staff of various professional backgrounds in different countries, including nursing and paramedical disciplines. Examples from around the world include:

- Operating Department Practitioners and Anaesthetic Nurses in the United Kingdom
- Anaesthetic Technicians in Australia and New Zealand
- Anesthesia Technicians and Technologists and Anesthesia Support Personnel in the United States of America, and Canada.

Effective assistance for the anaesthetist is associated with fewer, and less severe, patient safety incidents [1]. Most commonly, patient safety incidents in the operating theatre are due to organisational factors or human error, rather than failures of knowledge, skill or equipment [2]. Traditionally training and teaching in healthcare has focused on the knowledge required for the job, and has failed to provide much guidance on the social, cognitive and personal skills required for safe and effective performance. These skills are known as non-technical skills. For example, one may be taught how to take a blood pressure—a technical skill. In response to a patient's condition becoming unstable, the understanding that one should take a blood pressure more often (situation awareness), alert the anaesthetist to this change (teamwork) and make sure any necessary fluids and drugs are available for resuscitation (task management) are non-technical skills. Traditionally these skills were often passed on in an apprenticeship fashion, if one was fortunate enough to have a good role model to copy whilst in training.

What is a behavioural rating system?

Behavioural rating systems are used to structure the observation and feedback for training, assessment and development of non-technical skills. They have been developed in anaesthesia, surgery and for scrub practitioners in theatre, and outside the operating theatre such as the emergency department, as well as in other industries such as aviation. They are occupation specific, and list the most commonly used non-technical skills with examples of good and poor behaviour, and a rating scale to aid structured observation and feedback. In order to be as usable as possible, only the most commonly utilised non-technical skills are included, but this does not exclude the possibility that other non-technical skills will be demonstrated.

What is the ANTS-AP system?

The ANTS-AP system was developed from a research project that conducted a series of task analyses to identify non-technical skills and to organise them into a hierarchical structure. First the operating theatre and psychology literatures were reviewed to see which skills had been examined [3]. Anaesthetic Nurses, Operating Department Practitioners, Consultant Anaesthetists and Anaesthetists-in-training were interviewed to identify which non-technical skills were used most often in practice [4]. In addition, critical incidents reported to the Australian Incident Monitoring System were reviewed to identify non-technical skills and behaviours [5]. The behaviours identified by the interview studies were arranged into themes by focus groups of Anaesthetic Nurses and Operating Department Practitioners to ensure that the skill set was relevant and the terminology was comprehensible. The themes identified were then organised into a skills structure by subject matter experts, before final development of the prototype ANTS-AP system by the researchers. The prototype ANTS-AP system was evaluated by Anaesthetic Nurses and Operating Department Practitioners to assess its reliability, validity and usability [6].

This behavioural rating system has been developed to provide a shared language for discussing the non-technical skills used most commonly when assisting the anaesthetist, and to allow staff assisting the anaesthetist to develop the skills required to become safe and effective practitioners. The ANTS-AP rating form has been designed to fit onto one page, to enable ease of use in the operating theatre.

The ANTS-AP behavioural rating system has three levels to its structure. There are three categories of skills which have a total of eight elements. Each element has examples of good or poor behaviours which might be observed. The examples are not exhaustive but show potential behaviours, and were identified in the interviews, the critical incident review, or suggested by the subject matter experts. See Table 1 for the categories and elements.

Using the ANTS-AP system.

The ANTS-AP system is for:

- use by experienced staff to assist in the professional development of trainee anaesthetic assistants
- use in peer review by experienced anaesthetic assistants
- use in self-reflection

The aim is to allow structured observation and feedback to improve performance, whether in the operating theatre or in a simulated setting. It is therefore a training aid and its use should not be allowed to divert attention from the care of the patient. Appropriate time, sensitivity and privacy should be available for the support and discussion generated by feedback.

Requirements for feedback:

- Background knowledge of human error, performance and non-technical skills
- Principles of using behavioural rating systems, and observational rating errors, (such as central tendency bias, halo/horns bias, leniency, severity, etc.)
- Ability to give constructive feedback

The ANTS-AP system should not be used for assessment unless the raters have been trained and calibrated.

Suggestions for practice:

- New observers should start using ratings at the element level, as there are suggested examples of good and poor behaviours for each element
- Use the notes (or video if in a simulated setting) to allow specific directed feedback in relation to specific observed behaviours
- Start looking at one element or category, and expand the elements and categories as expertise is gained
- The system reflects on the individual's performance over the observation period, there may be times when individuals vary their performance and an average will need to be decided
- There may be instances when certain elements are not relevant and these should be marked as 'not required' rather than being given a finite score
- Feedback is best given close to the event, such as the end of a list (or case, if there is time)
- Take time to become familiar with the ANTS-AP system

References

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2. Cooper JB, Newbower RS, Long CD, McPeck B. Preventable anesthesia mishaps: a study of human factors. *Anesthesiology* 1978; **49**: 399-406.
3. Rutherford JS, Flin R, Mitchell L. Non-Technical Skills of Anaesthetic Assistants in the peri-operative period: a literature review. *British Journal of Anaesthesia* 2012; **109**: 27-31.
4. Rutherford JS, Flin R, Mitchell L. Teamwork, communication and anaesthetic assistance in Scotland. *British Journal of Anaesthesia* 2012; **109**: 21-26.
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6. Rutherford J, Flin R, Hellaby M, Caldwell D. Testing the reliability, validity and usability of the prototype Anaesthetic Non-Technical Skills - Anaesthetic Practitioners (ANTS-AP) behaviour rating system. *Anaesthesia* 2015; **70** (Suppl2): 32.
7. Rutherford JS, Flin R, Irwin A, McFadyen A. Evaluation of the prototype Anaesthetic Non-Technical Skills for Anaesthetic Practitioners (ANTS-AP) system: a behavioural rating system to assess the non-technical skills used by staff assisting the anaesthetist. *Anaesthesia* 2015, In press.

Further reading:

Flin R, O'Connor P, Crichton M. *Safety at the Sharp End: A Guide to Non-Technical Skills*. 2008. Aldershot, Ashgate.

Further information can be found on the ANTS-AP website
www.abdn.ac.uk/iprc/ants-ap

Table 1. ANTS-AP categories and elements:

Category	Elements
Situation awareness	<i>Gathering information</i> <i>Recognising and understanding</i> <i>Anticipating</i>
Teamwork and communication	<i>Co-ordinating with the team</i> <i>Supporting colleagues</i> <i>Asserting</i>
Task management	<i>Planning and preparing</i> <i>Prioritising and problem solving</i>

Part 2: The ANTS-AP system (v1.0)

The ANTS-AP system v1.0

Situation awareness: Acquiring and maintaining an overall awareness of the relevant theatre environment (patient, team, time, procedure and equipment); understanding what this acquired information means; and considering what could happen next.

Gathering information

Actively seeking information in the operating theatre environment from the patient, equipment, colleagues and procedure, and verifying the data.

Positive behavioural markers:

- Remains with patient and increases level of observation at periods of risk, such as transfer to theatre or first surgical incision
- Chooses a location in operating theatre to allow observation of patient, procedure, monitor and colleagues
- Ensures appropriate monitoring is attached and functioning
- Asks colleague for information, such as the anaesthetist's adequacy of view at laryngoscopy
- Pays attention to patient observation without being distracted by other tasks or non-work related conversation
- Uses information from multiple sources, such as anaesthetic machine checking log, theatre briefing, WHO check or patient records

Negative behavioural markers:

- Does not ask colleagues for information which is not directly available
- Takes a position which does not allow view or hearing of patient and monitors
- Goes for break, or does stock taking, at a period of increased risk, and so, for example, being unable to assess response to surgical incision
- Is distracted by task-irrelevant events so not observing patient
- Fails to attach or make use of appropriate monitoring
- Fails to make use of clinical notes to identify hazards

Recognising and understanding

Interpreting the information collected to recognise what is going on, and identifying any discrepancies from what is expected.

Positive behavioural markers:

- Cross checks unexpected information, such as feeling for pulse and/or assessing pulse oximetry waveform after a low blood pressure reading
- Recognises changes in behaviour of colleagues, such as anaesthetist moving from sitting writing anaesthetic notes to examining the patient under the drapes
- Brings changes in patient's condition to the attention of the anaesthetist or colleagues, such as laryngeal mask airway dislodging
- Enquires about contingency plans with colleagues
- Shows understanding of patient factors, such as checking that the operating table is suitable for a morbidly obese patient

Negative behavioural markers:

- Silences alarms without investigation
- Does not seek clarification from colleagues when plan is not clear
- Fails to respond in a timely fashion when the conditions alter
- Reveals a lack of understanding of the situation by performing an inappropriate task, behaviour or asking an inappropriate question.

Anticipating

Projecting what may happen in the near future, and the impact of possible actions

Positive behavioural markers:

- Communicates the desired outcome of an intervention to colleagues
- Prepares appropriate equipment or drugs for developing situations, such as requesting colleague to fetch the difficult intubation trolley, or converting Group and Save sample to a Cross-match and setting up cell salvage in potential major haemorrhage
- Delivers equipment in the order in which it is required for a procedure

Negative behavioural markers:

- Responds to a problem after it has happened, when it could reasonably have been anticipated, such as not having vasopressors available for spinal anaesthesia
- Hands routine drugs or equipment to anaesthetist when it is clear that this is not appropriate, such as a laryngeal mask airway prepared for an aortic aneurysm repair

Teamwork and communication: Sharing information, knowledge, understanding and goals with colleagues to enable safe and efficient task completion.

Co-ordinating with team

Working collaboratively with the team to achieve goals by sharing information and ideas or performing tasks.

Positive behavioural markers:

- Verbally acknowledges requests from colleagues
- Shares information with team about plans and changes to plans, such as identifying patient with latex sensitivity, difficult airway, or malignant hyperpyrexia
- Confirms understanding or revised plan, such as taking part in safety briefing
- Suggests alternative equipment or plans, such as waking the patient up after a failed intubation
- Works with team to achieve goals, such as efficient scheduling
- Deals appropriately with interruptions

Negative behavioural markers:

- Does not include relevant colleagues in communication, such as communicating altered conditions to colleagues
- Speaks out to room rather than addressing specific colleagues
- Relies on non-verbal communication when a situation has become urgent or non-routine and plans are changing
- Fails to use the opportunity in a briefing to clarify activities
- Performs own tasks at inappropriate time, such as going to refill stock once anaesthetist has given intravenous induction so anaesthetist is left without assistance

Supporting colleagues

Providing physical, cognitive or emotional help to other members of the team.

Positive behavioural markers:

- Notices when colleagues are task saturated and offers assistance
- Requests assistance from colleagues when at risk of becoming task saturated
- Offers encouragement and/or reassurance
- Reminds anaesthetist if part of a task is accidentally omitted
- Asks rest of team to be quiet or to focus when a colleague is task saturated
- Notices when colleagues have not had a break, and offers to arrange relief cover
- Acts as sounding board for colleagues to consider options

Negative behavioural markers:

- Leaves colleagues to struggle on without offering assistance
- Distracts colleagues with conversation when they are trying to focus
- Leaves colleague, such as for coffee break, with challenging case despite knowing this is the sickest patient on the list
- Belittles colleagues whilst providing assistance

ANTS-AP system (v1.0)

Asserting

Using appropriate level of confidence to seek clarification or propose potential tasks/goals.

Positive behavioural markers:

- Speaks up assertively to colleagues, whatever their level of seniority, to identify potential problem; such as accidental preparation of penicillin-based antibiotic for penicillin allergic patient, or if a local anaesthetic block is about to be inserted on the wrong side
- Provides leadership when required, such as calling an emergency, and seeking senior support when guiding a trainee anaesthetist who has “frozen” during a critical incident
- Asks for clarification as to who is lead anaesthetist when there are two consultant anaesthetists present
- Explains rationale for a proposed course of action in resolving conflict
- Adjusts communication style to suit the situation
- Appeals to third party if needed to resolve conflict
- Uses professional judgement to support patient’s dignity and rights

Negative behavioural markers:

- Fails to speak up when challenging a colleague is appropriate
- Does not attempt to resolve conflict
- Fails to share experience/knowledge with colleagues
- Remains silent when concern should be expressed
- Speaks up so forcefully that colleagues feel intimidated

Task management: Organising the resources and activities required to achieve goals.

Planning and preparing

Organising requirements (and potential alternatives) so that tasks can be completed without unnecessary interruptions or delays.

Positive behavioural markers:

- Checks equipment, drugs and suction before case
- Knows what is required in 5, 15 or 50 minutes time
- Checks theatre list to identify what equipment is most likely to be required
- Has equipment and drugs available at appropriate time to maintain efficient and safe flow of tasks
- Utilises times of lower activity to prepare for remaining tasks
- Uses own initiative to prepare equipment for predictable tasks

Negative behavioural markers:

- Fails to have emergency drugs or equipment available such as suction, self-inflating bag, difficult airway equipment or defibrillator; or doesn't know where to find them
- Has not discussed backup plan with colleagues
- Hands colleague equipment in wrong order to perform task

Prioritising and problem solving

Scheduling tasks, issues and attention in accordance with their relative significance, and making judgements as to the appropriate course of action.

Positive behavioural markers:

- Recognises what is most critical and needs attention first when there are competing demands
- Identifies options and/or hazards, and communicates these to colleagues, such as going through the Difficult Airway Society algorithm or AAGBI anaphylaxis guideline

Negative behavioural markers:

- Performs tasks in apparently random order without regard to the needs of the patient or the team
- Persists in completing tasks which are not essential when the priority should be on life-saving procedure

Sample rating form ANTS-AP v1.0

Assessor
Name of observed

Date
Operation/anaesthetic

Hospital

Category	Category rating*	Element	Element rating*	Feedback on performance and debriefing notes
Situation awareness		Gathering information		
		Recognising and understanding		
		Anticipating		
Teamwork and communication		Co-ordinating with team		
		Supporting colleagues		
		Asserting		
Task management		Planning and preparing		
		Prioritising and problem solving		

* 1 Poor; 2 Marginal; 3 Acceptable; 4 Good; N/R Not required

- | | |
|--------------|--|
| 1 Poor | Performance was not acceptable and patient safety could potentially have been endangered, remedial action required |
| 2 Marginal | Performance indicated cause for concern, considerable improvement is needed |
| 3 Acceptable | Performance was of a satisfactory standard but could be improved |
| 4 Good | Performance was of a consistently high standard, enhancing patient safety; it could be used as a positive example for others |
| N/R | Not required; skill was not observed because it was not required in this case |