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Anaesthetists' non-technical skills

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Key points

- Deficiences in anaesthetists' non-technical skills can contribute to medical error and adverse events.
- The ANTS tool is a skills taxonomy and behavioural rating system.
- ANTS is used for training, workplace assessment, self-reflection, simulator debriefing, and incident analysis.
- Anaesthetists require basic training in NTS and specialist ANTS training in order to use the tool effectively.

Summary. This review presents the background to the development of the anaesthetists' non-technical skills (ANTS) taxonomy and behaviour rating tool, which is the first non-technical skills framework specifically designed for anaesthetists. We share the experience of the anaesthetists who designed ANTS in relation to applying it in a department of anaesthesia, using it in a simulation centre, and the process of introducing it to the profession on a national basis. We also consider how ANTS is being applied in relation to training and research in other countries and finally, we discuss emerging issues in relation to the introduction of a non-technical skills approach in anaesthesia.

Keywords: clinical competence; decision-making; educational measurement/methods; interprofessional relations; task performance and analysis

Non-technical skills

The term 'non-technical skills' is used by a number of professions but was first applied to safety by the European civil aviation regulator in relation to airline pilots' behaviour on the flight deck. Non-technical skills can be defined as 'the cognitive, social, and personal resource skills that complement technical skills, and contribute to safe and efficient task performance'.[1] In essence, they enhance workers' technical skills, and typically include situation awareness, decision-making, team work, leadership, and the management of stress and fatigue. Deficiencies in non-technical skills can increase the chance of error, which in turn can increase the chance of an adverse event. Good non-technical skills (e.g. vigilance, anticipation, clear communication, team coordination) can reduce the likelihood of error and consequently of accidents. To identify non-technical skills for a given job or task, various forms of task analysis can be used: analysis of incidents, and studies of behaviour during routine tasks or emergencies, can reveal which workplace behaviours are associated with adverse outcomes or their avoidance. The resulting evidence base informs the content of non-technical skills taxonomies. In European aviation, pilots are trained and individually assessed on non-technical skills that are protective for flight safety.[2] Similarly, in other high-risk work settings, for example, nuclear power plants, assuring competence in non-technical skills is a key component of licensing and revalidation.[3]

In contrast, little attention had traditionally been paid to the behavioural components of safe medical practice. Anaesthesiologists in the USA were among the first to adapt the aviation Crew Resource Management (non-technical) skills approach for anaesthetic training. For example, Gaba and colleagues devised an Anaesthetic Crisis Resource Management course as part of their simulation centre training programme.[4] Within a few years, anaesthetists in other countries began to establish high-fidelity simulation centres and the first Scottish simulation facility was established in 1997, directed by Maran and Glavin. They recognized that for training and evaluation, they needed to have methods of measuring not only the anaesthetists' technical performance but also their non-technical skills, such as decision-making or team work.

Development of the ANTS system

In 1999, Flin and Glavin obtained funding from the Scottish Council for Postgraduate Medical and Dental Education, later subsumed into NHS Education Scotland, to develop a taxonomy of non-technical skills, which could be rated from behavioural observations of individual anaesthetists working in an operating theatre. A team of anaesthetists and psychologists was assembled to design an anaesthetists' non-technical skills (ANTS) system using methods of task analysis similar to those for the NOTECHS system for pilots.[5] The skill set for ANTS content was derived from a series of task analyses based on a literature review, observations, interviews, surveys, and incident analysis[6–8] and the rating tool was formulated to meet a set of design criteria, such as suitability for practical use in theatre or a simulation setting. For detailed reports and the resulting papers, see the ANTS website (www.abdn.ac.uk/iprc/ants).

The ANTS skills framework (Fig. 1) has four categories: Situation awareness, Decision-making, Task management, and Teamworking with component elements and examples of good and poor behaviour for each element. Managing stress and coping with fatigue are not explicit categories, as they can be difficult to detect unless when extreme; moreover, they influence other behaviours that can be rated. Leadership is incorporated into the Teamworking category, as there are times where the anaesthetist may lead the theatre team.

In addition to the ANTS framework, a behaviour rating scale was designed which is printed on a single page for ease of use. It has a set of 4-point rating scales for rating observed behaviours in relation to the elements and categories and space also to write brief comments (Fig. 2). It should be noted that the descriptors for the points on the rating scale emphasize not only performance levels, but also their relevance for patient safety. The ANTS ratings are made where anaesthesia is being delivered, normally in the theatre or anaesthetic room setting (or in simulator facilities). The tool is designed to be used by experienced anaesthetists to rate the non-technical skills of another anaesthetist who has achieved basic technical competence.

An evaluation of the ANTS behaviour rating method was undertaken with 50 consultant anaesthetists who were given 4 h of training on the system and then rated the non-technical skills of consultant anaesthetists in eight videotaped scenarios. The levels of rater accuracy were acceptable and inter-rater reliability approached an acceptable level.[9] Given that the raters had no previous experience of behaviour rating and minimal training in the ANTS system, it was concluded that these findings were sufficient to move on to usability trials. The first measures of usability and acceptability from consultants and trainees were promising[10] and so the system was released in 2004 and made available free of charge to anaesthetists for non-commercial use.

The subsequent sections describe consultant anaesthetists' experiences of introducing ANTS into an anaesthetic department and to a clinical simulation centre.

Using ANTS in a Department of Anaesthesia

We now present an example of introducing ANTS into one department of anaesthesia in a Scottish hospital. Following the publication of the ANTS system, a sizeable minority of consultant training staff in one large teaching hospital anaesthetic department underwent ANTS training similar to that provided in the pilot cascade training approach (described later in this article) of the Royal College of Anaesthetists (RCA). It proved difficult for staff in this department, as it did for those who took part in the RCA pilot, to routinely use ANTS to discuss and assess the use of non-technical skills in their daily practice. All trainees from this department attend the Scottish Clinical Simulation Centre at various times during their training and learn about human factors issues as part of this experience. However, the education team felt that for this learning to transfer to the work place, it was important for there to be regular discussion of the best use of non-technical skills throughout the training period and for trainees to be given feedback on their performance of non-technical skills. There was strong support and a willingness for further initiatives which would help

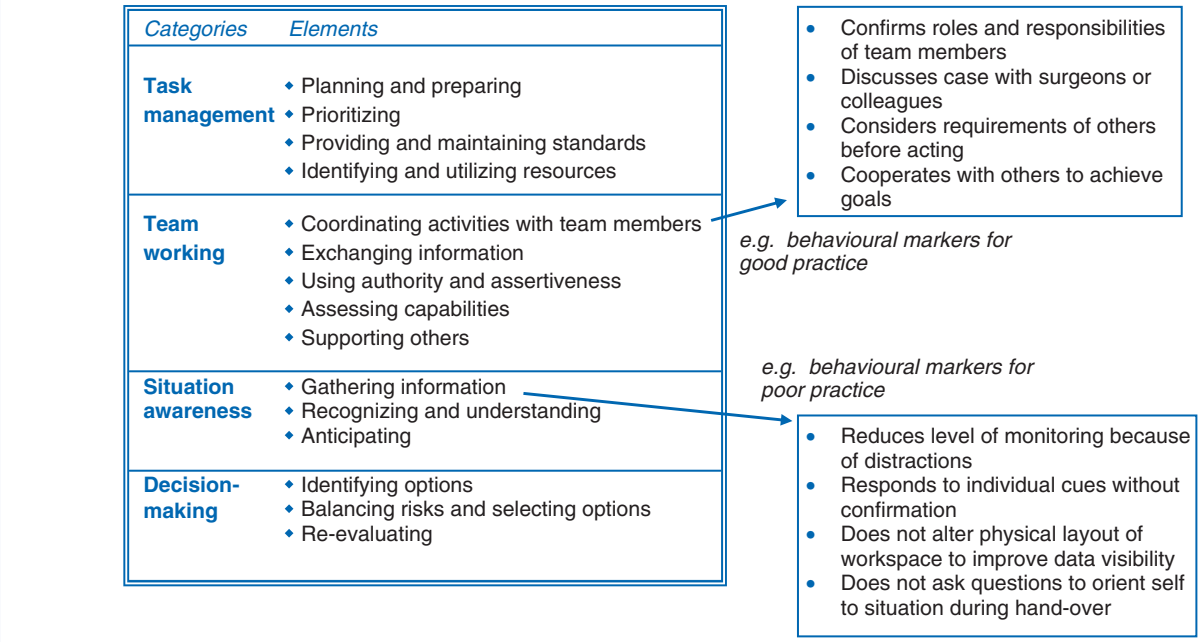

Fig 1 The ANTS system—prototype.