

## Human Factors in Airway Management - The Four Plans at a Glance

	<u>Human factors potential causes for failure:</u>	<u>Human factors mitigation strategies:</u>
<b>A – Tracheal Intubation</b>	<ul style="list-style-type: none"> <li>Skill and familiarity gaps with videolaryngoscopy and airway equipment (<b>System design / culture</b>)</li> <li>Equipment variation and varying availability causing confusion at critical moments (<b>Workspace design</b>)</li> <li>Task fixation leading to repeated attempts beyond the recommended limit (&gt;3+1)</li> <li>Poor <b>situational awareness</b> of time, attempt number, and oxygenation</li> <li><b>Cultural barriers</b> to calling for help early</li> </ul>	<ul style="list-style-type: none"> <li>Review departmental induction processes; ensure all staff are familiar with local equipment</li> <li>Standardisation of equipment and availability</li> <li>Reinforce non-technical skills and team support - i.e. prompting to change something with each intubation attempt</li> <li>Education and coaching - Train teams in graded authority assertiveness tools to overcome hierarchy</li> </ul>
<b>B - Oxygenation via a SAD</b>	<ul style="list-style-type: none"> <li><b>Plan continuation bias</b> – e.g. Failure to wake the patient despite restored oxygenation via SAD</li> <li><b>Cognitive overload</b> during difficult airway events causing <b>loss of situational awareness</b></li> <li>Team members not prompting escalation or guideline adherence</li> <li><b>Hierarchy</b> limiting effective challenge or discussion</li> </ul>	<ul style="list-style-type: none"> <li>Ensure guideline familiarity across all members of the airway team</li> <li>Non-technical skills team support including expectation of prompting language by anaesthetic assistant</li> <li>Rehearse stressful failure events through in-situ or simulation training i.e. AirDrills or Interprofessional AirSim scenarios</li> <li>Use a graded assertiveness tool, such as <b>CUSS</b>, to support decision-making</li> </ul>
<b>C – Facemask Ventilation</b>	<ul style="list-style-type: none"> <li>Equipment configuration errors e.g., ventilator mode or gas outlet issues (<b>Workplace design</b>)</li> <li>Failure to recognise inadequate neuromuscular paralysis (<b>Cognitive overload</b>)</li> <li>Assistants unsure when to prompt corrective actions</li> <li>Suboptimal technique used (<b>Training issue</b>)</li> </ul>	<ul style="list-style-type: none"> <li>Procurement of user-centered equipment</li> <li>Use neuromuscular blockade monitoring routinely from the point of induction</li> <li>Non-technical skills team support with prompting</li> <li>Practise optimum or two-person technique with adjuncts during routine anaesthesia or educational workshops (e.g., AirBites Plan C)</li> <li>Interprofessional, team-based learning of DAS guidelines and airway management</li> </ul>
<b>D – Emergency Front-of-Neck Airway</b>	<ul style="list-style-type: none"> <li>Delayed decision to initiate eFONA due to cognitive biases (optimism, frequency, recency and confirmation bias)</li> <li>Lack of equipment standardisation and availability across clinical locations (<b>Design problem</b>)</li> <li>Unclear role allocation for assistants / team members during crisis (<b>Training / Bystander influence</b>)</li> <li>Unfamiliarity with equipment or preferred technique (<b>System problem with departmental induction / training</b>)</li> </ul>	<ul style="list-style-type: none"> <li>Use standard decision triggers to prepare for Plan D i.e., priming and transitioning techniques</li> <li>Graded assertiveness training of all team members to challenge and encourage cross checking behaviours</li> <li>Standardise eFONA equipment and technique across all anaesthetising locations</li> <li>Include the full multidisciplinary team in difficult and failed airway training, including leadership and followership</li> <li>Embed frequent, regular skills rehearsal to minimise risk of skill decay</li> <li>Consider use of ‘call-out checklists’</li> </ul>

*Failed intubation is frequently driven by human factors rather than purely technical failure. Addressing these factors is critical to improving airway safety and reducing preventable harm.*