# Scandinavian SSAI clinical practice guideline on pre-hospital airway management

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**Conflicts of interest**
LKJ, LR, MR, MS, VM and PKH are authors of systematic reviews or studies that provide supporting data to this guideline. PKH developed the concept of the lateral trauma position. He has gained no economic benefit from that work.

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**Background:** The Scandinavian society of anaesthesiology and intensive care medicine task force on pre-hospital airway management was asked to formulate recommendations following standards for trustworthy clinical practice guidelines.

**Methods:** The literature was systematically reviewed and the grading of recommendations assessment, development and evaluation (GRADE) system was applied to move from evidence to recommendations.

**Results:** We recommend that all emergency medical service (EMS) providers consider to: apply basic airway manoeuvres and airway adjuncts (good practice recommendation); turn unconscious non-trauma patients into the recovery position when advanced airway management is unavailable (good practice recommendation); turn unconscious trauma patients to the lateral trauma position while maintaining spinal alignment when advanced airway management is unavailable [strong recommendation, low quality of evidence (QoE)]. We suggest that intermediately trained providers use a supraglottic airway device (SAD) or basic airway manoeuvres on patients in cardiac arrest (weak recommendation, low QoE). We recommend that advanced trained providers consider using an SAD in selected indications or as a rescue device after failed endotracheal intubation (ETI) (good practice recommendation). We recommend that ETI should only be performed by advanced trained providers (strong recommendation, low QoE). We suggest that videolaryngoscopy is considered for ETI when direct laryngoscopy fails or is expected to be difficult (weak recommendation, low QoE). We suggest that advanced trained providers apply cricothyroidotomy in 'cannot intubate, cannot ventilate' situations (weak recommendation, low QoE).

**Conclusion:** This guideline for pre-hospital airway management includes a combination of techniques applied in a stepwise fashion appropriate to patient clinical status and provider training.

**Editorial comment: what this article tells us**
In this Scandinavian clinical practice guideline, recommendations for pre-hospital airway management are presented according to standards for trustworthy clinical practice guidelines.


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Lack of appropriate airway management is a main contributor to preventable death and disability in critically ill or injured patients.[1–5] Airway patency must be addressed immediately upon arrival of the pre-hospital emergency medical services (EMS). Proper airway management facilitates gas-exchange, while reducing complications such as aspiration of gastric content to a minimum. Airway management normally involves a combination of techniques such as patient positioning, manual airway opening, use of airway adjuncts, insertion of a supraglottic airway device (SAD), direct or indirect laryngoscopy followed by endotracheal intubation (ETI) with or without anaesthesia and lastly emergency cricothyroidotomy, as appropriate to provider level of training.[6–8]

Pre-hospital emergency care in Scandinavia is mainly provided by ground ambulance units staffed by emergency medical technicians, paramedics and nurses as well as on-call general practitioners and specialist response units or pre-hospital critical care teams (usually manned by anaesthesiologists and paramedics/pre-hospital nurses) using aircrafts and rapid response cars. The heterogeneity in environment, procedures, equipment, drug protocols and provider qualifications between these EMS systems may influence the level and quality of airway management.[9,10]

Following the efforts of the Scandinavian Society of Anaesthesiology and Intensive Care Medicine (SSAI) to improve emergency critical care, a guideline on pre-hospital airway management was published in 2008.[11] Since then many new devices have been introduced and new studies have identified areas for improvement relevant for pre-hospital airway management. In this updated clinical practice guideline, the grading of recommendations assessment, development and evaluation (GRADE) system has been combined with standards for clinical practice guidelines and best available evidence on selected topics to provide recommendations to improve pre-hospital airway management in critically ill or injured patients, in our Scandinavian context.[12,13] The SSAI plans guideline revision at least within 5 years.

## Methods

### Process

The SSAI Clinical Practice Committee appointed anaesthesiologists from Denmark, Finland, Iceland, Norway and Sweden with specific expert knowledge of pre-hospital airway management to form the guideline task force on pre-hospital airway management. Additionally, one methodologist contributed with evidence appraisal and synthesis throughout the entire project. The standards for clinical practice guidelines were consulted.[13,14]

The task force identified key clinical questions for basic airway manoeuvres, SADs, ETI including videolaryngoscopy and emergency cricothyroidotomy relevant to pre-hospital airway management. Topics related to pre-hospital airway management such as causes and recognition of airway obstruction, management of foreign body airway obstruction, the use of cricoid pressure, indications for different airway management strategies, pre-oxygenation, medications for rapid sequence induction (RSI) including reversal of muscle relaxants, the use of checklists, ventilation, extubation and training were not addressed in this guideline, but are covered elsewhere.[8,15–22] In the absence of task force representation by stakeholders such as paramedics and nurses, Scandinavian pre-hospital care practitioner organisations were invited to comment on the recommendations outlined by the guideline. The recommendations depend on the level of training of the EMS provider (basic, intermediate and advanced trained provider). The recommendations apply for both adult and paediatric patients, but the task force emphasises that equipment, drugs and technique need to be appropriately adapted for weight throughout.

The SSAI co-publishes its current clinical practice guidelines in MAGICapp (www.magicapp.org).

### GRADE

We applied an evidence-based approach to formulate clinical questions and assess quality of evidence. We used the GRADE system to move


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from evidence to recommendations.[12] Clinical questions were formulated using the PICO format, to identify the relevant patient population (P), intervention (I), comparator (C) and relevant patient-oriented outcomes (O) (c.f. Table 1 for clinical problems and PICO questions).

We systematically searched PubMed, Embase, Centre for Reviews and Dissemination, Cochrane Library and Epistemonikos for systematic reviews. The databases were searched using the terms 'airway*' and a search filter for systematic review. Minor differences in search strategies were implemented due to the unique search system of each database. Randomised controlled trials (RCTs) start as high-quality and observational studies as low quality in rating evidence quality.[23]

All searches were updated to 26 November 2015. Two reviewers independently screened the titles and abstracts of all records identified by the searches for inclusion and discrepancies in decisions were resolved through consensus or discussion with a third reviewer using Covidence (© Alfred Health, Melbourne, Australia). Identified guidelines were assessed for quality using the appraisal of guidelines for research and evaluation (AGREE) instrument and relevant references were abstracted from the bibliographies.[24] The target population was critically ill or injured patients of all ages in the pre-hospital setting. The outcomes of interest included mortality, morbidity, success rates and serious adverse events. In line with the principles of the GRADE methodology, we downgraded the quality of evidence for an intervention (i.e. our confidence in the effect estimates) for identified risks of bias (e.g. lack of blinding), inconsistency (e.g. unexplained heterogeneity), indirectness (e.g. in-hospital patient populations), imprecision (e.g. wide confidence interval around the effect estimate) or publication bias (e.g. if identified in the systematic review). Where results were considered too heterogeneous for meta-analysis the data is presented in the summary of finding (SoF) tables as range (min–max).[25] GRADE was not applied to obvious 'good practice recommendations' where it is sufficiently obvious that desirable effects outweigh undesirable effects.[23] The results from each PICO question are presented in a key recommendations and quality of evidence table where evidence is rated as one of four levels of quality (high, moderate, low and very low).

When moving from evidence to recommendations four factors were considered and integrated: benefits and harms, quality of evidence, values and preferences (of patients or their proxies), and cost considerations. In the absence of patient representation, the task force anticipated a patent airway as an obvious patient preference. When techniques were considered to have equal clinical effect, the least invasive and most cost-effective method was preferred. GRADE classifies recommendations as strong when virtually all informed patients would choose the recommended management strategy. Weak recommendations reflect a close call between benefits and harms, uncertainty regarding treatment effects, questionable cost-effectiveness, or variability in values and preferences in which case informed patients would likely choose different management strategies.[26] The task force agreed upon the recommendations in this guideline. Strong recommendations were given the wording 'we recommend', and weak recommendations 'we suggest'.

## Results

The recommendations and the rationale based on the PICOs are presented in Table 2 (Key recommendations and quality of evidence). Due to the paucity of randomised clinical trials, our recommendations are largely based on non-randomised trials and observational studies. An airway management flow chart is depicted in Fig. 1. We provide SoF tables in the online Appendices S1–S5 (additional files 1.3 through 4.1).

### Basic airway management

*Basic airway manoeuvres and the use of adjuncts*

*Recommendation.* We recommend that all EMS providers should apply basic airway manoeuvres and consider using adjuncts such as oropharyngeal (OPA) and nasopharyngeal (NPA) airways in cases with upper airway obstruction (Good practice recommendation).

*Rationale and knowledge base.* Basic airway manoeuvres remain the backbone of airway


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**Table 1** Clinical problems and PICO questions used to assess evidence relevant to this guideline statement.

| | PICO question | | | |
|---|---|---|---|---|
| Clinical question | Population (P)* | Intervention (I) | Comparator (C) | Outcomes (O) |
| Basic airway management | | | | |
| 1.1 Should basic airway manoeuvres incl. NPA/OPA be applied? | Critically ill/injured | Basic NPA/OPA | NIL interventions | Mortality<br>Morbidity |
| 1.2 In unconscious non-trauma patients, where advanced airway management is not immediately available, should the patient be turned into a lateral position? | Unconscious non-trauma patients | Recovery position | Supine position | Serious adverse events |
| 1.3 In unconscious trauma patients, where advanced airway management is not immediately available, should the patient be turned into a lateral position? | Unconscious trauma patients | Lateral position | | |
| Supraglottic airway device | | | | |
| 2.1 In OHCA should a SAD be used? | OHCA | SAD | ETI | Mortality |
| 2.2 Should a SAD be used as an alternative to ETI or as a rescue device in airway management? | Critically ill/injured | | | Morbidity<br>Serious adverse event |
| Endotracheal intubation | | | | |
| 3.1 What training level is necessary for ETI? | Critically ill/injured | ETI | Provider skill level | Mortality<br>Morbidity<br>Serious adverse event |
| 3.2 Should videolaryngoscopy be applied for ETI? | | Videolaryngoscopy | Direct laryngoscopy | Success rates<br>Serious adverse event |
| Emergency cricothyroidotomy | | | | |
| 4.1 In CICV situations what technique for emergency cricothyroidotomy should be applied? | Critically ill/injured | Surgical cricothyroidotomy | Non-surgical cricothyroidotomy | Mortality<br>Time expenditure |

Notes: *All patients are managed out of hospital; NPA, nasopharyngeal airway; OPA, oropharyngeal airway; RSI, rapid sequence induction; OHCA, out-of-hospital cardiac arrest; SAD, supraglottic airway device; ETI, endotracheal intubation; CICV, cannot intubate, cannot ventilate.

management and include jaw thrust, head tilt and chin lift.[8,27–32] We assume that these manoeuvres are combined with bag-valve-mask ventilation when appropriate (ventilation is not covered in this guideline). Although properly placed OPAs and NPAs do not protect the airway against aspiration of gastric content, they should be considered carefully applied as adjuncts to basic airway manoeuvres.[33] (Recommendation is based on 'good practice recommendations' and a recognised guideline.[8])

*Unconscious non-trauma patients and the use of the recovery position*

*Recommendation.* In unconscious patients, where there is no suspicion of trauma and where advanced airway management is not immediately available, we recommend that all EMS providers place the patient in the recovery position (Good practice recommendation).

*Rationale and knowledge base.* For non-trauma patients, the recovery position is recommended until a more secure airway can be obtained. (Recommendation is based on 'good practice recommendations' and recognised guidelines.[34–36])

*Unconscious trauma patients and the use of the lateral position*

*Recommendation.* In unconscious trauma patients, where advanced airway management is not immediately available, we recommend that all EMS providers turn the patient into a lateral position while maintaining spinal alignment (strong recommendation, low quality of evidence). When spinal precautions are warranted, chin lift or jaw


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**Table 2** Key recommendations and quality of evidence.

| Recommendation | Strength of recommendation | Quality of evidence reasons for downgrading | Benefits and harms | Comments |
|---|---|---|---|---|
| Basic airway management | | | | |
| 1.1 All EMS providers should apply basic airway manoeuvres and consider using adjuncts such as NPA and OPA in cases with upper airway obstruction | Good practice recommendation | | Harm of NPA and OPA are largely unknown. The assumed benefit outweighs the potential harm | There is a general paucity in the literature on this topic |
| 1.2 All EMS providers should turn unconscious non-trauma patients into the recovery position when advanced airway management is not available | Good practice recommendation | | Evidence for benefit, no evidence for harm | There is a general paucity in the literature on this topic |
| 1.3 All EMS providers should turn unconscious trauma patients to the lateral trauma position while maintaining spinal alignment when advanced airway management is not an option | Strong | Low due to observational studies | No evidence for harm in lateral positioning (including logroll) in patients with a spinal cord injury. The assumed benefit outweighs the potential harm | |
| Supraglottic airway device | | | | |
| 2.1 EMS providers with intermediate training should use an SAD or basic airway manoeuvres in OHCA | Weak | Low due to: Risk of bias and serious indirectness in observational studies | SADs do not provide a definitive airway | Careful use and close observation complemented by continuous waveform end-tidal $CO_2$ monitoring is warranted |
| 2.2 EMS providers with advanced training may choose to use an SAD in situations where it is appropriate, i.e. considered equally beneficial to ETI or as a rescue device after failed ETI | Good practice recommendation | | The assumed benefit outweighs the potential harm | A maximum of three attempts at SAD insertion is recommended |
| Endotracheal intubation | | | | |
| 3.1 ETI should be performed by EMS providers with advanced training. | Strong | Low due to: Risk of bias and serious indirectness in observational studies | Observational studies suggest that inadequate training increases the incidence of complications | The tracheal tube position should be verified with a combination of visual confirmation, auscultation and continuous waveform end-tidal $CO_2$ monitoring |
| 3.2 Videolaryngoscopy should be considered as an alternative method for intubation when direct laryngoscopy fails or is expected to be difficult in pre-hospital ETI | Weak | Low due to risk of bias and serious indirectness | There is an overall heterogeneity in design and uncertainty of transportability to pre-hospital environment | Providers should be appropriately trained and experienced in the procedure. Equipment should be tested for feasibility for pre-hospital use |





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**Table 2** (Continued)

| Recommendation | Strength of recommendation | Quality of evidence reasons for downgrading | Benefits and harms | Comments |
|---|---|---|---|---|
| Emergency cricothyroidotomy | | | | |
| 4.1 EMS providers with advanced training should perform cricothyroidotomy in CICV situations | Weak | Low due to: Risk of bias and indirectness. Literature inconclusive on preferred technique | | Several techniques can be applied to establish an emergency front-of-neck airway in the CICV situation, but limiting choice simplifies decision-making |

Notes: EMS, emergency medical services; NPA, nasopharyngeal airway; OPA, oropharyngeal airway; SAD, supraglottic airway device; ETI, endotracheal intubation; OHCA, out-of-hospital cardiac arrest; CICV, cannot intubate, cannot ventilate.

thrust in combination with manual in-line stabilisation should be used to reduce the risk for exacerbation of any spinal injuries.[37,38]

*Rationale and knowledge base.* The lateral position is favourable to the supine position in unconscious patients.[39] We have not identified any evidence for harm in lateral positioning (including log roll) in patients with a spinal cord injury.[40] This does not mean that no such evidence exists. But having to balance the risk of harm from a potentially devastating but relatively rare injury (unstable spine injury) with a more frequent and potential lethal injury (traumatic brain injury with obstructed airway), we prioritise the latter (Appendix S1: Additional file 1.3 for SoF).

## Supraglottic airway devices

*The use of SAD in out-of-hospital cardiac arrest*

*Recommendation.* We suggest that EMS providers with intermediate training use an SAD or basic airway manoeuvres in out-of-hospital cardiac arrest (OHCA) (weak recommendation, low quality of evidence).

*Rationale and knowledge base.* In OHCA, an SAD has for long been an alternative to ETI but effect on outcome is debated.[8,19,41–43] Few studies (no RCTs) compare results of resuscitation with different strategies for airway management. Most of these are post hoc analyses with high risk of bias favouring limited intervention, as advanced airway devices are not employed in patients that are successfully resuscitated quickly. SADs and ETI, however, confer the advantage of continuous compressions without pausing for ventilation (Appendix S2: Additional file 2.1 for SoF).

*The use of SAD as an alternative to ETI or as a rescue device in airway management*

*Recommendation.* We recommend that EMS providers with advanced training use an SAD when it is appropriate, i.e. when an SAD is considered equally beneficial to ETI or as a rescue


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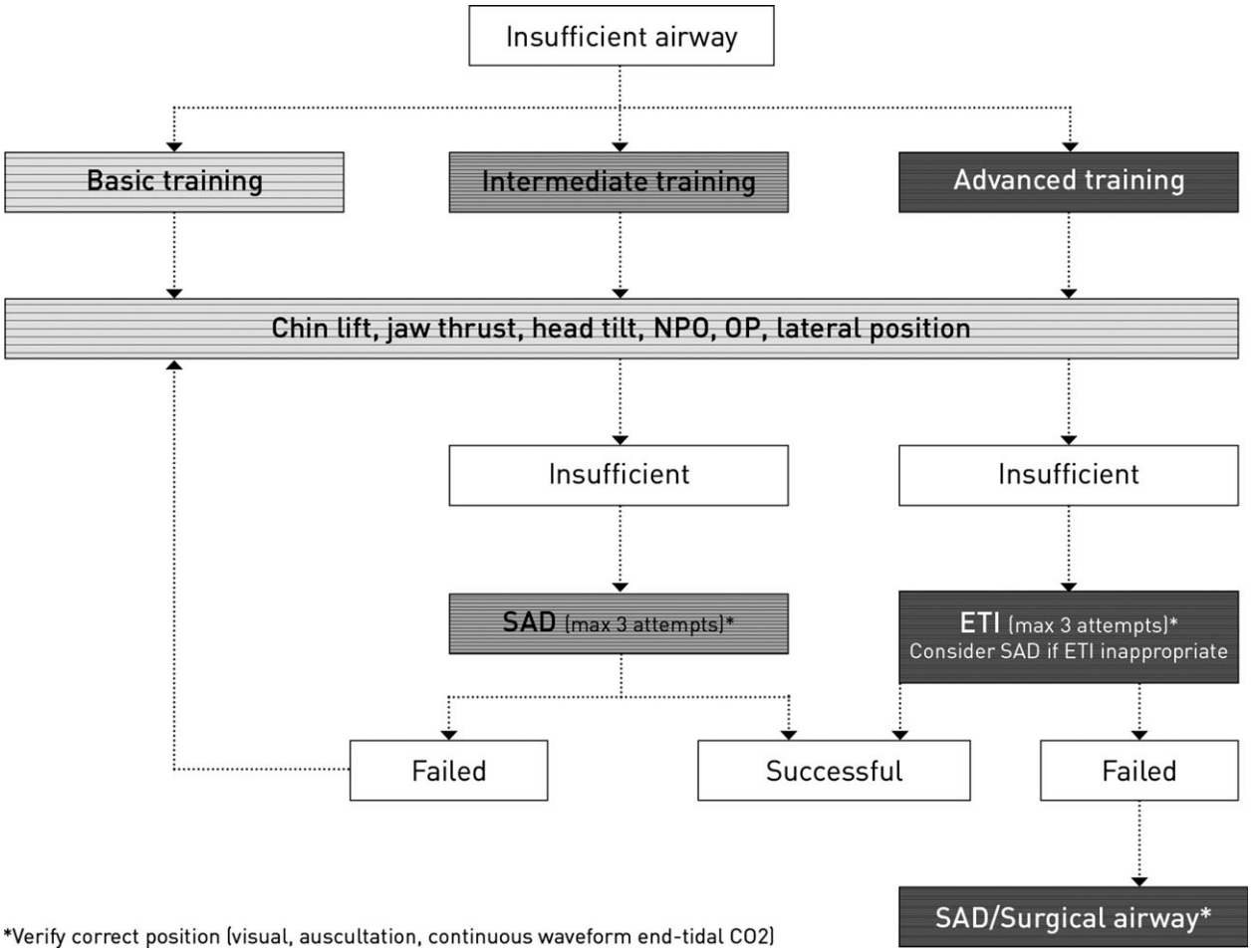


**Fig. 1.** Pre-hospital airway management flow chart according to provider training.

device after failed ETI (Good practice recommendation).

*Rationale and knowledge base.* For EMS providers with advanced training, an SAD may be used as a rescue device in cannot intubate situations or when ETI is considered inappropriate. An SAD can generally be inserted without interrupting chest compressions and efforts to treat reversible causes for cardiac arrest (e.g. pleural decompression of tension pneumothorax).[8,19] Recommendation is based on 'good practice recommendations' and recognised guidelines.[8,15]

*General considerations.* SADs do not completely protect the airway from gastric insufflation, regurgitation and aspiration so careful use and close observation complemented by continuous waveform end-tidal $CO_2$ monitoring is warranted. A maximum of three attempts at SAD insertion is recommended.[15] When clinical circumstances and provider competence allow, the SAD can be converted to a definitive tracheal tube reflecting the stepwise approach to airway management involving multiple techniques during a single resuscitation.[8] Several second-generation SAD models exist but evidence is inconclusive on the preferred model.[8,15,34,44–50] The task force does not recommend any specific second-generation model, but emphasises that EMS providers should be appropriately trained in inserting the specific device(s) in use by their service.


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## Endotracheal intubation and videolaryngoscopy

*Training level necessary for ETI*

*Recommendation.* We recommend that ETI should only be performed by EMS providers with advanced training (strong recommendation, low quality of evidence).

*Rationale and knowledge base.* The endotracheal tube is considered a definitive airway that prevents gastric insufflation and aspiration as well as allowing providers optimal ventilation control. However, prolonged laryngoscopy may shift the focus of care and delay other life-saving procedures. Inadequate training increases the incidence of complications, emphasising the necessity of advanced training.[51–53] The task force recommends that pre-hospital RSI should at least meet the same standards as in-hospital emergency RSI with regard to choice of e.g. drugs and pre-oxygenation strategies, cricoid pressure and comply with the SSAI clinical practice guideline on emergency anaesthesia.[21] To optimise the chance for first-pass success, the task force recommends that EMS providers consider strategies such as using a bougie, external laryngeal manipulation and optimised patient positioning.[15] The tracheal tube position should be verified through visual confirmation, auscultation and continuous waveform end-tidal $CO_2$ monitoring.[8,15,19]

The number of attempts at laryngoscopy is associated with increased incidence of haemodynamic and airway complications and a maximum of three attempts at laryngoscopy is recommended[15,16,54] (Appendix S3: Additional file 3.1 for SoF).

*Use of videolaryngoscopy*

*Recommendation.* We suggest that videolaryngoscopy be considered as an alternative method for ETI when direct laryngoscopy fails or is expected to be difficult (weak recommendation, low quality of evidence).

*Rationale and knowledge base.* Videolaryngoscopes use a miniature camera to indirectly visualise the airway anatomy. Numerous types of videolaryngoscopes exist but feasibility for pre-hospital use remains undecided for most models.[55–57] Videolaryngoscopy does not seem to increase risk for complications related to ETI when compared to direct laryngoscopy.[56]

We suggest that videolaryngoscopy be considered as an alternative method for ETI when direct laryngoscopy fails or is expected to be difficult. We recommend that the chosen device be tested for feasibility for pre-hospital use before implementation. There is heterogeneity in technical design and EMS providers should be appropriately trained in the procedure and with the special features of the pre-hospital setting (Appendix S4: Additional file 3.2 for SoF).

*Emergency cricothyroidotomy*

*Recommendation.* We suggest that EMS providers with advanced training perform cricothyroidotomy in 'cannot intubate, cannot ventilate' (CICV) situations (weak recommendation, low quality of evidence).

*Rationale and knowledge base.* Efficient management of a CICV situation requires early recognition and declaration of airway management failure and initiation of a well-rehearsed emergency cricothyroidotomy technique. Several techniques can be applied to establish an emergency front-of-neck airway in the CICV situation, but limiting choice simplifies decision-making. The traditional method of establishing a surgical airway involves an incision through the skin and the cricothyroid membrane into the tracheal lumen through which a tracheal tube is inserted. Many commercial kits are available intended for use in a CICV situation.[58,59] Some of these kits are based upon the Seldinger technique where the cricothyroid membrane is punctured with a needle, a guidewire introduced into the tracheal lumen through the needle and a specially designed tracheal tube inserted over the guidewire. Other kits rely on a cutting device that is used to create an opening in the cricothyroid


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membrane large enough to accommodate the tracheal tube that is a part of the kit. No technique has been shown to be superior.[58] However, many of the available kits consist of several items and require substantial training in order to be used in an efficient manner. If such training cannot be performed on a regular basis, we suggest that a scalpel cricothyroidotomy technique should be applied in CICV situations[8,15,58] (Appendix S5: Additional file 4.1 for SoF).

## Discussion

This guideline was developed through a systematic literature search and using the GRADE system to asses quality of evidence and direction and strength of recommendations in a systematic and transparent process.

The evidence-base for this review consists of both randomised interventional trials and observational studies. If we had restricted our recommendations to those that can be deduced from studies with a randomised design, there would be no guideline. In general, outcomes and provider competence were inconsistently reported and their diverse character made them difficult to accurately interpret. Numerous models of SADs, videolaryngoscopes and cricothyroidotomy kits were investigated as new designs are continually introduced and existing designs are modified. Commonly agreed model classification systems are lacking and we anticipated that level of evidence between models was skewed. Because of this heterogeneity, some sets of data are depicted with range (min–max) as a substitute for meta-analyses. We hope that this summary of evidence will outline the need for further trials with high-quality design and standardised reporting to answer pertinent questions and allow stronger recommendations for pre-hospital practice.[60,61] Suggested topics include provider competence necessary for safe ETI, type-specific studies on SADs, videolaryngoscopy and cricothyroidotomy kits, use of ultrasonography for tracheal tube placement confirmation, pharmacologically assisted SAD insertion and emergency cricothyroidotomy strategies in the pre-hospital setting.[62–64]

Pre-hospital critical care is undertaken by numerous EMS providers, many of which base their practice on established guidelines.[8,15–19] To reduce confusion, conflicting statements and facilitate adoption of these guidelines, we have chosen to align our recommendations with theirs on certain uncontroversial topics such as application of basic manoeuvres and the use of an SAD as a rescue device after failed ETI. This guideline includes several paradigmatic situations where we offer strong recommendations based on weak level of evidence.[65] In unconscious trauma patients and the use of the lateral position, we have found no evidence for harm, but recognise that a blocked airway may be life threatening. The task force also emphasises the necessity of advanced training to maintain patient safety during ETI. This guideline also presents good practice recommendations on the use of the recovery position in unconscious non-trauma patients, basic airway manoeuvres and adjuncts and the use of SAD as an alternative to ETI or as a rescue device in airway management. On these topics, the task force considered it sufficiently obvious that desirable effects outweighed any undesirable effects.[23]

We acknowledge that the field of airway management is vast and several topics of relevance have not been addressed. This includes ventilation strategies, indications for RSI, monitoring, training and the use of checklists. We think that the heterogeneity in airway devices and personnel competence emphasises the need for regular training, robust audit practice and clinical governance. The task force emphasises that these recommendations are not a substitute for good clinical judgement and may not be suitable in all circumstances (e.g. subgroups of patients may benefit from tailored strategies). EMS providers should regularly review current literature for continued relevance and consult separate guidelines for selected patient populations such as neonatal and obstetric patients.[66,67,68]

The task force recommends that type of airway strategy used should depend on the training of the EMS provider. The task force chose not to set standards for training or nominate certain procedures to professional categories as training within professions may vary. This leaves the responsibility with the individual medical director to determine the level of training required for basic, intermediate, and advanced airway management within their service. Furthermore, as the exposure to advanced procedures in the pre-


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hospital environment tends to be limited, we believe there is a need for maintenance of expertise with regular procedural exposure (in-hospital or simulation if needed), as well as monitoring of actual pre-hospital practice. In line with the previous version of these guidelines, the task force chose to construct a flow chart depicting the recommendations.[11]

In conclusion, we present systematically developed recommendations to assist EMS providers in pre-hospital airway management. The guideline includes a combination of techniques applied in a stepwise fashion appropriate to patient clinical status and provider competence. Heterogeneity in equipment models and paucity of high-quality pre-hospital studies emphasise the need for further trials. Improved study design and standardised reporting may improve patient safety and increase benefit for patients and society.

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## Supporting Information

Additional Supporting Information may be found in the online version of this article at the publisher's web-site:

**Appendix S1** Question: In unconscious trauma patients, should EMS providers use a lateral position?
**Appendix S2** Question: Should SADs be used for OHCA?
**Appendix S3** Question: What training level is necessary for pre-hospital ETI in critically ill or injured patients?
**Appendix S4** Question: Should EMS providers use a videolaryngoscopy for ETI in critically ill and injured patients?
**Appendix S5** Question: In cannot intubate, cannot ventilate situations what technique for emergency cricothyroidotomy should be applied?


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