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CLINICAL PRACTICE GUIDELINE

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The 2024 revision of the Norwegian standard for the safe practice of anaesthesia

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Abstract

The Norwegian standard for the safe practice of anaesthesia was first published in 1991, and revised in 1994, 1998, 2005, 2010 and 2016 respectively. The 1998 version was published in English for the first time in Acta Anaesthesiologica Scandinavica in 2002. It must be noted that this is a national standard, reflecting the specific opportunities and challenges in a Norwegian setting, which may be different from other countries in some respects. A feature of the Norwegian healthcare system is the availability, on a national basis, of specifically highly trained and qualified nurse anaesthetists. Another feature is the geography, with parts of the population living in remote areas. These may be served by small, local emergency hospitals. Emergency transport of patients to larger hospitals is not always achievable when weather conditions are rough. These features and challenges were considered important when designing a balanced and consensus-based national standard for the safe practice of

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anaesthesia, across Norwegian clinical settings. In this article, we present the 2024 revision of the document. This article presents a direct translation of the complete document from the Norwegian original.

KEYWORDS
anaesthesia, safe practice, standard

1 | INTRODUCTION

The Norwegian standard for the safe practice of anaesthesia (NSA) was developed by the Norwegian Association of Anaesthesiologists and the Norwegian Association of Nurse Anaesthetists in 1991. The consensus document is regularly revised to align with the relevant legislations, medical/technological development and clinical practice. The previous revision was in 2016.

1.1 | The document must be read and interpreted as a whole

NSA is laid down as normative guidelines for all anaesthesia providers, irrespective of geographical and organisational context.[1–3] The purpose is to ensure patient safety through safeguarding satisfactory anaesthetic practice in Norway.

Deviations from NSA must be justified and documented. In general, NSA must be followed also in anaesthesiological emergency work. However, this must never intervene with life-saving interventions.

If clinical practice systematically deviates from NSA, local risk and vulnerability analysis should be developed.

All anaesthetic practice must include a patient-centered focus. This means that the patient must be informed and involved in the decision-making process.

In situations where use of force is unavoidable in order to anaesthetize the patient, a formal legal process must be followed. Anaesthetic personnel should develop local routines for handling such situations.

2 | ORGANISATION AND WORK CONDITIONS

2.1 | Definitions

Anaesthetic practice, as encompassed within NSA, is understood as preoperative anaesthesiological assessment, general anaesthesia, regional anaesthesia, intravenous sedation using a titrated dose, postoperative handling and anaesthesic standby activity.

Anaesthesia personnel includes consultant anaesthetists, registrar anaesthetists and nurse anaesthetists.

1. A consultant anaesthetist is a physician with licensed specialisation in anaesthesiology.[4]
2. A registrar anaesthetist is a physician under specialisation in anaesthesiology.
3. A nurse anaesthetist is a registered nurse with a Master's degree or a post graduate education as nurse anaesthetist based on the Norwegian national curriculum or equivalent.[5,6]

Anaesthesia competence means an ability to independently keep one's role and function as anaesthesia personnel.

ASA refers to the assessment and communication system of a patient's pre-anaesthesia medical co-morbidities, from the American Society of Anesthesiologists.[7]

2.2 | Medical responsibility

Any entity that provides anaesthesia must have a consultant anaesthetist with overall medical, anaesthesiological responsibility. The responsible consultant anaesthetist must ensure that all anaesthesia is provided in-line with NSA, and sound professional practice.

In all anaesthetic practice, it must be clear which consultant anaesthetist has the clinical responsibility.

2.3 | Teamwork

Normally, an anaesthesia team consists of a registrar and/or consultant anaesthetist and a nurse anaesthetist. Additional resources may be added if necessary. The registrar and/or consultant anaesthetist may be responsible for several patients under anaesthesia at the same time, provided that this is consistent with sound professional practice. The anaesthesia team has a common responsibility for establishing clear agreements regarding the patient's perioperative pathway.

2.4 | Competence

Healthcare personnel administering sedatives and/or anaesthetics must be capable of observing, identifying and dealing with their effects, side-effects and potential complications. This includes establishing free airways, bag valve mask ventilation, cardiopulmonary resuscitation and use of relevant antidotes.

A quality system describing training needs, and documentation of anaesthetic personnels' skills at different levels of specialisation must

be present. This must be documented at an individual level for all participants.

Nurse anaesthetists are qualified to independently administer general anaesthesia for minor operations on otherwise healthy patients (ASA I and II), provided that a consultant or registrar anaesthetist can be called upon if needed and has confirmed that the patient is fit for anaesthesia. Nurse anaesthetists are qualified to work in a team with a consultant/registrar anaesthetist on anaesthesia for major operations and patients with more complex illnesses (ASA III and IV), as well as to monitor patients during regional anaesthesia, sedation, and general anaesthesia.

Anaesthesia competence requires regular practice, professional update, and annual skill-training. Maintenance of anaesthesia competence should be facilitated through, for example, team training, simulation or hospitation at other hospitals.

Anaesthesia competence is essential in the entity's contingency plans (in relation to pandemics/casualties).

2.5 | Organisation

The work must be organised in a way to be prepared for emergencies. As a main rule a consultant anaesthetist must be present at the hospital. If this is not achievable, guidelines based on local risk and vulnerability analysis describing when a consultant anaesthetist must be present, should be developed.

As a minimum, the requirements at hospitals with emergency functions are:

1. A nurse anaesthetist, a registrar or a consultant anaesthetist present at the hospital.
2. A registrar or consultant anaesthetist should be able to be present within 10 min.
3. A consultant anaesthetist on duty must be able to be present within 30 min if needed.

Hospitals providing obstetric services (maternity or gynaecology ward) must be capable of performing a caesarean section within 15 min if there are known risk factors before or during delivery.[8]

3 | INSPECTION AND USE OF MEDICAL EQUIPMENT

Routines must be in place for the inspection, use and maintenance of medical equipment. All medical equipment must be registered according to regulations, have an instruction manual in Norwegian, and a system for training and approving users that complies with the requirements of the Directorate for Civil Protection and Emergency Planning.[9] The anaesthesia unit and ventilator including the patient system must always be inspected before use. The user must sign off that the inspection has been completed and approved.

In procurement and obtaining tenders on medical equipment for anaesthesiological use, anaesthesia competent personnel must be involved.

4 | PREOPERATIVE EVALUATION AND INFORMATION

A medical evaluation must be carried out and conclude that anaesthetsia is needed and consistent with sound practice. Relevant information must be collected if needed. Before induction of anaesthesia, a registrar or consultant anaesthetist must declare that the patient is fit for anaesthesia and approve upon the planned method of anaesthesia.

Preoperative assessment, information and documentation should be conducted by a nurse anaesthetist, a registrar or a consultant anaesthetist. Timing of assessment, and whether the patient should be assessed physically or via the medical journal is decided based on the patients' condition, type of surgery and level of emergency.

The following must be checked and taken into consideration:

1. Planned intervention.
2. Planned type of anaesthesia.
3. Physical and phsychological functional level. Frailty should be assessed in patients ≥65 years of age.[10]
4. Medical information (including height and weight).
5. Current medication.
6. Allergies.
7. Coagulation status and previous history of bleeding.
8. Results of any supplementary examinations when needed (blood tests, ECG, radiological examinations and spirometry).
9. Results of any preoperative cardiac or pulmonary assessment.
10. Previous anaesthesia experience(s).
11. Airway assessment, intubation conditions, dentition and potential risk of aspiration.
12. Preoperative fasting.
13. Plan for postoperative care including level of observation, pain, and management of postoperative nausea and vomiting.
14. ASA-classification.

Information about and choice of premedication, anaesthesia method and planned postoperative care must, if possible, be co-decided with the patient.[11] The patient must be informed of any relevant risk factors. The information must be adjusted according to the situation and the patient's condition.

5 | MONITORING AND EQUIPMENT REQUIREMENTS IN ANAESTHESIA

The patient must be continuously monitored during and after anaesthesia. The monitoring must be adjusted to the patients' condition and

the nature of the intervention, but as a minimum include the following:[12–14]

In sedation:

1. Pulse oximeter.
2. Clinical assessment of level of consciousness, respiratoration and circulation.

Capnography or similar must be considered used in non-conscious sedation.[14,15]

Regional anaesthesia (central or peripheral) also includes:

1. ECG.
2. Blood pressure measurement.

In addition to the above, general anaesthesia monitoring includes:

1. Oxygen alarm in the ventilation system.
2. Capnography.
3. Disconnection alarm when using a ventilator.
4. Multigas analysis when using inhaled anaesthestics.
5. Neuromuscular monitoring when using non-depolarising muscle relaxants.

Temperature monitoring must be considered in all patients. In risk of a temperature abnormality, appropriate action must be taken. Monitoring of anaesthesia depth (e.g., BIS and EEG) must be individually considered.

The monitoring equipment must have adequate alarms. Variable audible pulse-tone should be considered.[13,16]

In every anaesthesia, the following must be easily accessible:

1. Equipment for bag valve mask ventilation (self-expanding ventilation bag, mask, oropharyngeal airway).
2. Equipment for establishing supraglottic airway.
3. Equipment for intubation (endotracheal tube, laryngoscope and stylet).
4. Equipment for handling difficult airways.
5. Equipment for establishing a surgical airway or other direct tracheal access.
6. Extra oxygen source.
7. Suction unit.
8. Appropriate emergency drugs.
9. Video laryngoscope.
10. Defibrillator.

An ultrasound device must be easily accessible where relevant.

Accessible equipment and an algoritm for difficult airway handling, and to facilitate training is an institutional responsibility. To be able the use of equipment and act according to the algoritm is the individual performer's responsibility.

6 | ANAESTHESIA PROVISION

6.1 | General

6.1.1 | Environmental considerations

Health services are obliged to make environmental considerations. In anaesthesia this involves increased attention in procurement, training, as well as raising awareness and practice related to the identification of areas where the consumption of single-use equipment, emissions and use of anaesthetic gases and various chemicals may be reduced.

6.2 | Staffing

A nurse anaesthetist or registrar/consultant anaesthetist must stay with the patient continuously from induction of anaesthesia until handover to the postoperative anaesthesia care unit (PACU) (an exception may be made for stable, peripheral regional anaesthesia). Additional anaesthetic personnel must be readily accessible, to provide assistance when needed. At induction of general anaesthesia, a minimum of two anaesthesia competent personnel must be present. At the emergence of anaesthesia, a second anaesthesia competent must be present or easily available in addition to the one responsible for administering the anaesthesia.

Anaesthestic staffing depends on the anaesthesiological procedure, type of surgery and the patients' condition.

If the preoperative assessment identified an increased risk of complications, the anaesthetic team's competence and skill level, must be adjusted accordingly. In high-risk patients, major surgery, and anaesthesia in remote locations the responsibility of the registrar or consultant anaesthetist should be limited to one patient at a time.

World Health Organizations' Surgical Safety Checklist (or similar), or an abbreviated checklist in emergency situations, must be used in all surgery.[17]

All units involving anaesthesia practice must have fasting guidelines for elective general and regional anaesthesia. Intravenous access is necessary in all general and regional anaesthesia, and when using large doses of local anaesthetics. If assessed by a consultant anaesthtist, this may be modified or amended (e.g., in bag valve mask anaesthesia or intramuscular ketamine).

Medications and syringes should be clearly marked with the name of the drug and its concentration. Generic names and concentrations in SI-units should ideally be used. Medications should be double-checked in accordance with the entity's guidelines. Two persons must check the infusion pump settings before induction of anaesthesia.

6.3 | Paediatric anaesthesia

The Healthcare personnel legislation mentions childrens' rights and defines children as persons under 18 years of age. NSA also applies to

children if no explicit exceptions are stated. Registrar/consultant anaesthetists and nurse anaesthetists providing paediatric anaesthesia must have specific knowledge about childrens' rights, age dependent development, anatomy, physiology and pharmacology.

Use of force at induction or other procedures should be avoided, by using parents/guardians, distraction, safe surroundings, or premedication. Nevertheless, small children may oppose treatment. Necessary medical treatment must not be omitted for that reason.

Painful procedures or postoperative pain should not be tolerated to any greater extent in children than in adults.

Age and size adjusted equipment must be available. Reception areas, wards, areas for induction and post-anaesthesia care should be furnished specifically for children and be separated from adult patients.

The categories of children specified below should be anaesthesised by a consultant anaesthetist and nurse anaesthetist with added education or extensive experience within paediatric anaesthesia, and who practice within this group on a regular basis:[18,19]

1. Children <1 year of age. These children are specifically exposed to destabilising events under anaesthesia, and the risk increases with lower gestational age. In some cases, it will be necessary with two consultant anaesthestists present.
2. ASA ≥3 or other conditions entailing treatment challenges.
3. Major or complex surgery.

These cases, and other elective paediatric anaesthesia entailing hospitalisation, should be conducted in hospitals with a paediatric ward and/or a paediatric surgical ward.

Children ≥1 and <3 years of age, ASA-classification 1–2, and children ASA ≥3 without organ failure, may for minor surgical procedures (e.g., inguinal hernia, adenotomy and tonsillectomy) be anaesthetised by a consultant anaesthetist and a nurse anaesthetist who practice anaesthesia in children on a regular basis. In such cases, two consultant anaesthetists should be present in the ward.

For older children ≥3 years of age, even for children ≥ ASA 3, an individual consideration must be made whether further education, experience or regular practice within paediatric anaesthesia is required.

All anaesthesia departments anesthetising children must have a subject manager and written guidelines for paediatric anaesthesia. These individuals should collaborate with a consultant anaesthetist employed at a hospital with a paediatric surgical ward. Everyone working with paediatric anaesthesia should receive regular professional updates.

Emergency situations may occur, where children must be temporarily stabilised and/or treated at an emergency hospital without elective paediatric anaesthesia. Such hospitals are specifically responsible for having updated procedures and competence. If the patients' condition is not immediately clarified after emergency treatment, transfer to a hospital with a paediatric ward and anaesthesiological peadiatric competence is required as soon as possible.

6.4 | Anaesthesia outside operating theatre departments

NSA also applies to anaesthesia provided outside the operating departments. Here, specific attention should be paid to the anaesthetic personnel's competence, experience, available equipment and access to assistance.

6.5 | Sedation

Conscious sedation is defined as 'controlled and reduced level of consciousness, with intact protective reflexes such as coughing. The patient maintains free airways and responds to verbal and physical stimulation'.[20]

Non-conscious sedation is defined as 'reduced level of consciousness with partly loss of protective reflexes. The patient may be unable to maintain free airways all the time. The patient may respond to verbal or physical stimulation'.[20] Non-conscious intravenous sedation with a titrated dose must be administered by anaesthestic personnel. One exception could be within palliative care.

The level of monitoring is considered based on the patients' condition and planned depth of sedation (see section: Monitoring and equipment requirements in anaesthesia). In palliative sedation, it may be acceptable to deviate from common standards regarding stand-by and monitoring.

A registrar/consultant anaesthetist must be easily available.

In all sedation, equipment for handling of complications must be readily available.

6.6 | Obstetric anaesthesia

Anaesthesiological handling of pregnant women requires specific attention. Departments that perform obstetric surgery must meet the staffing requirements set out in the section: Organisation and work conditions.

Hospitals handling pregnant women with anticipated complicated deliveries must have a consultant anaesthetist present and responsible for the obstetric anaesthesia.

Written procedures for dealing with complications from pregnancy, acute and elective Caesarean sections, analgesia, and delivery complications must be present.

6.7 | Anaesthetic work outside hospital

For emergencies outside hospital, it may be necessary to provide anaesthesia even if not all requirements in NSA are met. Such activities must be described in the institution's or service's procedures.

The responsible registrar or consultant anaesthetist must decide whether the expected health benefit to the patient justifies the acknowledged higher risk. The team must be trained in the use of medical equipment, the administration of anaesthesia and how to handle any complications. Anaesthetic personnel who have their primary employment outside hospital, must practice regularly within an intrahospital anaesthetic department.

6.8 | Anaesthetic work in intrahospital emergencies and intensive care units

Anaesthesiological procedures are essential when caring for critically ill patients acutely admitted to hospital, and when handling acute, critical illnesses in hospitalised patients. NSA is valid also in these situations. With regards to anaesthesia-related practice in intensive care units, other guidelines may also be applicable.[21]

7 | DOCUMENTATION

Every anaesthesia must be documented in an anaesthetic record, as a common responsibility of the anaesthesia team. Anaesthetic records must be assessed together with the patient's medical records.

There must be a system for transferring information from the anaesthetic records to the patient's main medical records.

Anaesthetic records must include:

1. Date and time.
2. Patient identification.
3. Preoperative diagnosis and ASA group.
4. Patients' height and weight.
5. Anaesthesia machine and current patient system.
6. Documentation of equipment/system check.
7. Airway assessment and equipment.
8. Dental status.
9. Monitoring equipment (e.g., $EtCO_2$, TOF, Temp and BIS) and other medical equipment connected to the patient (e.g., fluid heater, heating sheet and gastric tube).
10. Procedures (e.g., spinal, epidural, centralvenous/peripheral venous/arterial catheter).
11. SpO_2, blood pressure and heart rate must be documentet every 10 min, or more frequently if the patients' condition or the nature of surgery indicates such need.
12. Ventilator mode and setting (tidal volume, PEEP, respiratory rate, FiO_2 and peak pressure).
13. Patient positioning, as well as adjustments during anaesthesia.
14. Continuous dosage of drugs, fluid infusions and blood products.
15. Documentation of problems and how they were resolved.
16. Name and/or code for anaesthesia method.
17. Name and/or code for type of surgery/intervention.
18. Name of anaesthesia personnel in charge.
19. Post-operative prescriptions.

7.1 | Reporting of anaesthesia-related problems and complications

Severe anaesthesia-related problems and complications must, in addition to the documentation in the patients' main record, be registered in the national core journal in accordance with the entity's procedures. The patient must receive oral and written information about such events.

Adverse events must be reported according to the procedure of the entity.

The responsible registrar or consultant anaesthetist must ensure that any suspected allergic reactions are further investigated.

8 | MONITORING AFTER ANAESTHESIA

Wherever anaesthesia is provided, satisfactory conditions for transport and monitoring after anaesthesia must be in place.[22,23] Monitoring should take place in suitable locations.

The patients must be accompanied by anaesthetic personnel familiar with the anaesthetic course. Supplemental oxygen, a pulse oximeter and any other appropriate monitoring should always be considered. Necessary equipment and drugs for handling unforeseen complications during the transport must be brought along or be easily accessible.

The anaesthetic personnel must not leave the patient before the one taking over the responsibility for the patient, has received a report and is ready to take over relevant duties. Local procedures for content and structure of the report should be available.

The monitoring location must have necessary equipment and personnel with relevant competence to be able to monitor, diagnose and treat problems related to consciousness, respiration, circulation, pain and side-effects. Anaesthetic personnel must be available to provide immediate assistance if needed.

Monitoring must be documented throughout the course of anaesthesia. The responsible physician and nurse must clearly be documented in the patients' records or in the local procedures. The patient must be monitored until discharge from the PACU.

The monitoring PACU must have written, preferably standardised procedures for when the patient is ready for discharge. This includes criteria for:

1. Awareness.
2. Ventilation and oxygenation.
3. Circulation.
4. Pain.
5. Nausea.
6. Diurese/urinary bladder status.
7. Acceptable drain loss/haemorrhage.
8. State of sensoric/motoric spread after regional anaesthesia.
9. Prescriptions made for further course.

At discharge the one making this decision must be documented.

9 | SPECIFIC REQUIREMENTS FOR SAME DAY DISCHARGE

9.1 | Patient selection

Following issues must be considered:

1. Type and extent of surgery.
2. Anaesthesia method and risk of side effects.
3. Postoperative analgesia.
4. Patient consent to same day discharge.
5. Patient suitability regarding physical, psychological and social situation.
6. ASA 3 and 4 patients. These patients must be assessed by a registrar/consultant anaesthetist for feasibility with same day discharge.
7. Patients with severe obstructive sleep apnea syndrome. These patients must be individually assessed for feasibility with same day discharge.
8. Infants' gestational age. If this is <60 weeks, day surgery should normally not be applied.
9. Travel distance and logistics to accommodation after discharge.
10. Travel distance to nearest professional competent treatment, in relevance to competence in eventual complications related to specific surgery.

9.2 | Before surgery

The patient, and eventually relatives, must receive oral and written information about:

1. Limitations in activity that demands concentration and awareness.
2. Need for monitoring by an adult after discharge.
3. Main rule of having an adult present until the day after surgery.

9.3 | Discharge criteria

The patient must primarily return to his/her habitual condition and be respiratory and circulatory stable before discharge. Normalisation should be established regarding[24]:

1. Awareness.
2. Orientation.
3. Motorical skills, including balance.

Additionally:

1. The patient should have urinated. If not, he/she must be instructed to contact the hospital if eventual urination difficulties occur after discharge.
2. The patient should have drunk fluids.
3. The patient should not be nauseous or actively vomiting, or have pain levels that require injections of analgesics.
4. The patient should not have signs of complications.

As a main rule, the patient should be accompanied by an adult on the journey home, and not be alone until the day after surgery. This rule may be adjusted based on an individual assessment.

Before discharge, individual considerations must be made regarding whether the patient can receive additional help or support within an acceptable time frame if actual complications during transport or at place of residence occur.

A written plan for analgesia must be available if needed. In cases of opioid treatment after discharge, a written plan for duration, extent and need for follow-up should be available.

Patients must be given a 24 h number to call if they have any questions or need help after discharge.

AUTHOR CONTRIBUTIONS

All authors contributed in the planning and discussions leading to the complete Norwegian standard. ACLL translated the Norwegian version, and all authors revised the English version critically. All authors agreed on the final version.

CONFLICT OF INTEREST STATEMENT

The authors have no conflicts of interest to declare.

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