M. Bauer[1,3] · T.C. Auhuber[2] · R. Kraus[4] · J. Rüggeberg[2] · K. Wardemann[3] · P. Müller[5] · C. Taube[1] · M. Diemer[2,3] · M. Schuster[1]

The German Perioperative Procedural Time Glossary

A joint recommendation by the BDA, BDC, VOPM, VOPMÖ, ÖGARI and SFOPM

2020 Edition*

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1 Berufsverband Deutscher Anästhesisten e.V. (BDA), Nürnberg, Deutschland
2 Berufsverband Deutscher Chirurgen e.V. (BDC), Berlin, Deutschland
3 Verband für OP-Management e.V. (VOPM), Hannover, Deutschland
4 Verband für OP-Management Österreich e.V. (VOPMÖ), Baden, Österreich
5 Schweizerische Fachgesellschaft für OP-Management (SFOPM), Luzern, Schweiz

Summary

Successful OR management will be based on an efficiency-oriented organisation of processes surrounding medical procedures, together with a robust reporting system for the OR. Both these conditions require the use of key performance indicators.

A first uniform definition of procedural times and key performance indicators in relation to OR processes was agreed upon and published by the Professional Association of German Anaesthesiologists (BDA), the Professional Association of German Surgeons (BDC) and the Association of OR management (VOPM) in 2008 [1].

The update published in 2016 [2] and this publication from 2020 represent evolutionary steps in the development of the glossary, taking into account the increasing complexity and requirements of contemporary OR management. In doing so, the glossary was fundamentally revised with updated definitions based on the current state of knowledge and supplemented with additional relevant content.

This new 2020 edition includes significant changes and additions such as

- an updated definition of certain procedural times, especially in relation to **Anaesthesia Ready** and **Turnover Time OR-Staff** (incl. A6, A7, O2, K7, K15a),
- more precise definitions of metrics relating to capacity (incl. S2 and K18) with the addition of a definition of **Core Resource Time** (K18a),
- a revision of the **surgical priority classification**,
- a new section on classification of caesarean section based on urgency with regard to OR management in accordance with the **C-section classification** in the June 2020 S3-Guidelines on Caesarean Section published by the German-language Societies of Obstetrics and Gynaecology, and
- a newly introduced conceptual differentiation of terms central to OR management, specifically **procedure, operation, session and case**.

The aim of this continuous evolution is to provide valid universal definitions of perioperative performance metrics suited to the current state of OR operation; the intent is that these be used by those involved in OR processes – focusing on OR managers but also on hospital executives – as guidance in the selection, use, interpretation and reporting of suitable OR performance metrics. Furthermore, they represent the foundation of robust benchmarking which cannot otherwise, without precise and universal definitions of procedural times and key performance indicators, provide valid results. This updated 2020 edition of the glossary is the first to be adopted by the respective German, Swiss and Austrian bodies and has as such attained validity across the whole German-speaking geographical region. Amongst other things, this achievement provides for process analyses across borders and healthcare systems.

* This consented recommendation supersedes the previous versions of the glossary, which was last updated and published in 2016. The authors would like to extend their gratitude to Priv.-Doz. Dr. T. Klöss for the final review of this paper.

This updated recommendation is a fundamental revision of previous versions. We expressly recognise the contributions of earlier authors towards the evolution of the recommendations. The following authors were involved in the development of previous versions: J. Ansorg, A. Schleppers, K. Bomplitz, E. Tsekos and R. Hanss (2008), and R.M. Wäschle and H.J. Meyer (2016).

Competing interests

The authors declare no competing interests.

Keywords

Operating Room – Management – Hospital – Health Care Economics and Organisation

Introduction

The cost pressure in hospitals and day-surgery centres continues to mandate an efficient provision of medical services.

With regard to surgical cases, the main cost driver is the intraoperative use of resources – a fact which bestows a key role on operating room (theatre; OR) management. As a consequence, efforts to install OR managers with budgetary responsibility and an appropriate leadership role have become more common. The aim is to ensure cost efficiency in this cost-intensive area, especially taking into account the fact that the institution of central OR management can lead to positive performance development and a consequent relevant increase in revenue [3].

The remit of the OR manager is to ensure efficiency-oriented organisation of processes surrounding medical procedures and to establish a valid, timely, intelligible and reproducible reporting system.

This requires that the OR manager have access to robust key performance indicators which, insofar as that data is directly process-associated, must be collected on the basis of clearly defined procedural times. In addition, that data is required for internal cost and revenue calculations for the OR on the basis of cost objective accounting [4].

In Germany, a first uniform definition of procedural times and key performance indicators in relation to OR processes was agreed upon and published by the Professional Association of German Anaesthesiologists (BDA), the Professional Association of German Surgeons (BDC) and the Association of OR management (VOPM) in 2008 [1]. This current 2020 edition is the second update following the first in 2016 [2].

Preamble

Within centres, all those involved should agree upon a written consensus with regard to the process steps listed hereafter. Amongst other things, the consensus should define the following:

- what each step of the process entails,
- who is responsible for each step of the process,
- which qualifications the person executing those steps must hold and which formal preconditions they must fulfil,
- precisely how each step of the process should be executed,
- how and by whom each step of the process should be documented, and
- which steps are to be taken if deviations from the standard occur.

The procedural steps and times named hereafter map out the perioperative process for the patient, surgeon, anaesthesiologist, nursing and cleaning staff as well as logistics as precisely as possible. Everyday practice, however, shows significant differences in the way perioperative processes are implemented throughout different hospitals and ambulatory surgery centres. It is not the intention that this glossary should impose or propagate a certain process, but instead that it should provide for uniform and consistent definitions and syntax which can be used to describe OR processes in each and every unit.

To fulfil the aim of being suited to precisely depicting the large number of different process variants, sub-processes but also research questions with regard to OR management, the glossary contains a good deal more procedural times and key performance indicators than will routinely be documented in most hospitals. The procedural times are split into three categories, namely pertaining to patient logistics (P), anaesthesia (A) and operation (O).

With regard to quality assurance and economic validation of OR processes, documentation of specific procedural times and key performance indicators comes highly recommended. Those procedural times and key performance indicators are marked with "▶" for Germany; "‡" for Austria; "*" for Switzerland. It is not the intention, however, that use of unmarked times and indicators should in any way be restricted by this approach.

When calculating staff time on the basis of the procedural times and intervals set out here, the fact that on the whole only those processes directly related to patients are exhaustively specified in the glossary should be taken into account. There are numerous further tasks and time requirements directly related to the OR which are not listed. These include time requirements for OR planning, quality assurance, documentation, supervision and training, but also for logistics and preparations between surgical procedures or when switching locations. Furthermore, costs related to prescribed hygiene measures, training requirements with regard to radiation protection, fire protection, regulations pertaining to use of medical devices or hazardous substances, instrument reprocessing and so on cannot directly be attributed to individual surgical procedures. It may be necessary to declare these costs within the framework of a general overhead per department.

Defining terminology: procedure, operation, session and case

Problems delimiting the terms procedure, surgical measure, intervention, operation, surgery, session and case are often encountered when they are used in a perioperative context. The following hierarchical definitions enable consistent use of the terms to their full potential and are used in the glossary.

- **Procedure** (synonyms: **surgical measure, intervention**)
  A procedure is a medical measure which can generally be encoded with an OPS code.
- **Operation**
  An operation consists of one or more procedures which are characterised by common incision-to-closure times. Operations performed by interdisciplinary teams are combined operations.
- **Session**
  A session consists of one of more **operations** which are characterised by a common **Room Occupied**

Time (K17a) but differing Incision-to-Closure times (K8). When only one operation is performed, operation and session are superimposed. When more than one operation is performed within a session, these can be simultaneous or parallel. In accordance with German ambulatory billing system EBM, a simultaneous operation is one which takes place within the same session as the initial operation, but for which the diagnosis and route of surgical access differ from those of the initial operation. When operations are performed by different departments within a session, these may be classified as parallel or sequential operations, as appropriate.

- **Case**
  A OR case consists of one or (in the case of multisession surgery) more individual sessions.

Appendix: times / indicators

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Conclusion

Made available on the basis of consensus between the respective bodies in Germany, Switzerland and Austria, and with that across the whole German-speaking geographical region, this 2020 version of the glossary of procedural times and key performance indicators provides definitions of the respective times and indicators adapted to the current state of OR management. In addition to a revised classification of surgical priority, the glossary also features a new section on classification of caesarean section and compiles a fundamental distinction of the terms procedure, operation, session and case. As a Professional Association of OR management (VOPM) recommendation for OR managers, it aims to provide instructions for selecting, using and interpreting suitable performance indicators. Furthermore, the glossary aims to be the foundation of both reporting and benchmarking of OR processes. The evolution of the glossary makes comparisons of OR management possible across borders and healthcare systems.

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Correspondence address

Prof. Dr. Dr. Martin Bauer, MPH

Kliniken für Anästhesiologie, Intensivmedizin, Notfallmedizin und Schmerztherapie
Klinikum Mitte, Standorte Nordstadt und Siloah
Klinikum Region Hannover
Stadionbrücke 4
30459 Hannover, Germany

Tel.: 0551 927-3400

E-Mail: martin.bauer@krh.eu

ORCID-ID: 0000-0003-4118-2720

Procedural times *

Patient logistics

P1 ▸ **Patient Sent For**
Def.: point in time at which the patient is sent for.
Com.: the type of upstream unit from which the patient is dispatched should be documented (regular ward, OR holding area, day-surgery waiting area).

P2 ▸ ‡ **Patient Arrival at OR suite**
Def.: arrival of the patient at the operating suite, e.g. OR transfer room, PACU or holding area.
Com.: P1 and P2 may be identical, e.g. if the patient enters the OR autonomously or was waiting in the OR waiting area.

P3 ▸ **Start Transfer In**
Def.: the patient is transferred from the ward bed or gurney to the OR table.
Com.: this procedural time is relevant to the key performance indicator Anaesthesia Time (K14).

P4 **End Transfer In**
Def.: following transfer, the patient is on the OR table.
Com.: at this point in time a check of the patient's identity and accompanying documents should have been completed.

P4a ▸ **Arrival at Anaesthesia Induction Unit**
Def.: arrival of the patient at the location where anaesthesia will be induced.
Com.: that place may vary from hospital to hospital and from OR to OR (central induction area, induction room, OR).

P5 ▸ ‡ * **Patient In OR**
Def.: the patient is on the OR table, in the OR.
Com.: this parameter constitutes part of the **Column Time** (K17) and **Room Occupied Time** (K17a). As both document actual physical occupancy of the OR, and the place of induction may vary across hospitals, this parameter should always be documented.

P6 **Registration with Post-Anaesthesia Care Unit (PACU)**
Def.: scheduling of capacity for postoperative care.

P7 ▸ ‡ * **Patient Out of OR**
Def.: patient is transfered out of the OR.
Com.: this parameter constitutes part of the **Column Time** (K17), which – in that it documents actual physical occupancy of the OR – should be documented.

P8 **Transfer to Bed**
Def.: the patient is transferred from the OR table to a bed or gurney (only valid when the PACU is located **within** the operating suite).

P8b ‡ **Transfer Out**
Def.: the patient leaves the operating suite.
Com.: only valid when the PACU is located **outside** the operating suite.

P8c ▸ **Start PACU**
Def.: arrival of the patient on the unit providing postoperative care.
Com.: insofar as postoperative care is rendered in a recovery room/PACU this parameter constitutes part of the **Anaesthesia Time** (K14) and **Recovery Room Time** (K33). Documentation is required routinely.
As patient-safety considerations usually require the patient to be handed over, P8c should typically be earlier or at the same time as **End Presence Anaesthesiologist** (A12).

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* In order to preserve the taxonomy, previous designations for times and key performance indicators have been retained. Newly introduced parameters are distinguishable by a trailing letter (e.g. P4a), whilst deleted parameters result in missing designations.

P8d **Cleared for Discharge from PACU**
Def.: further monitoring in the PACU is unnecessary. The physician responsible has cleared the patient to be discharged from the PACU.

P8e ▶ ‡ **End PACU**
Def.: the patient is picked up or transferred from the PACU by personnel providing in-hospital transport.
Com.: insofar as postoperative care is rendered in a recovery room/PACU this parameter constitutes part of the **Recovery Room Time** (K33) which in turn constitutes part of **Anaesthesia Time** (K14) via the setup time.

P9 **Start OR Cleaning**
Def.: start of cleaning and disinfecting measures as per cleaning schedule.

P10 ▶ **End OR Cleaning**
Def.: end of cleaning and disinfecting measures as per cleaning schedule. The OR is available for the next case (e.g. surface drying times have been observed).
Com.: for parallel work sequences, this parameter marks the end of the minimum patient-related room occupied time.

OR logistics

S1 ▶ ‡ **Start OR Hours of Operation (syn.: OR Opening Time)**
Def.: 15 minutes prior to the first incision-time target (O8) in accordance with predefined hospital-specific internal arrangements.
Com.: this parameter represents a pragmatic definition which permits consistent registration of OR capacity. As such, the hours of operation are based on processes rather than on staffing considerations.

S2 ▶ ‡ **End OR Hours of Operation (syn.: OR Closing Time)**
Def.: 20 minutes after the final closure-time target (O10) in accordance with predefined hospital-specific internal arrangements.
Com.: patient-centric surgical measures related to the intervention (applying a dressing, plaster cast; O11) and initial decommissioning of the OR are brought to a close within the above timeframe.
Unlike in previous versions, the OR hours of operation are no longer defined by the End of Surgical Measures (O11) but rather by the Closure Time (O10) for the last scheduled case. This is due to the fact that it is still common for only incision and closure times to be reliably documented, whilst at the same time it appears important to document any deviation from target values.
This parameter represents a pragmatic definition which permits consistent registration of OR Capacity (K18). As such, the hours of operation are based on processes rather than on staffing considerations.

Anaesthesia

A1 **Start Preparations by Anaesthesia Nursing Staff**
Def.: anaesthesia Nursing Staff commence necessary preparations for anaesthesia.
Com.: with regard to the first anaesthesia of the day, it is important to observe sufficient time for technical preparations such as testing the anaesthetic apparatus.

A2 **End Preparations by Anaesthesia Nursing Staff**
Def.: end of all necessary preparations for anaesthesia.
Com.: A2 should lie prior to the arrival of the patient at the location where anaesthesia will be performed.
Preparing the anaesthesia workplace is typically not a continuous process but is instead interrupted and performed as numerous individual steps (with potential long intervals in-between). As such it is not validly possible to determine staff time from parameters A1 and A2.

A4 * **Start Presence Anaesthesia Nursing Staff**
Def.: point in time at which anaesthesia nursing staff commits to the patient.
Com.: for medico-legal reasons the point in time from which on the patient is in the continuous care of anaesthesia nursing staff should be documented.

A5 **Start Presence Anaesthesiologist**
Def.: point in time at which the anaesthesiologist commits to the patient.
Com.: this parameter constitutes part of the interval Presence Anaesthesiologist (K12).
For medico-legal reasons and to enable calculation of the simultaneity factor for dual presence in accordance with the InEK handbook for calculation, it may be sensible to enable documentation of presence of additional anaesthesiologists participating outside of a purely supervisory role. Reference: [5].

A6 ▶ ‡ * **Start Anaesthesia**
Def.: point in time of injection of the first anaesthetic or, for regional anaesthesia, skin puncture.
Com.: this parameter constitutes part of the key performance indicator Net Anaesthesia Time (K13).
Start Anaesthesia must be later than **Patient Available** (P2). Prior measures in other areas of the hospital (emergency room, intensive care etc.) must be documented separately.
Consensus has been reached that in addition to the above definition, measures performed on the awake patient directly preoperatively and required for anaesthesia (e.g. insertion of an arterial line) satisfy the definition of **Start Anaesthesia** (A6).

A7 ▶ ‡ * **Anaesthesia Ready**
Def.: the anaesthesiologist declares the patient ready for surgical interventions; these may include positioning of extremities, body hair removal, removal of a plaster cast, cleansing of contaminated wounds prior to entering the OR etc. These measures may be performed in parallel to final anaesthesiologic interventions such as insertion of additional peripheral venous catheters, a gastric tube or suturing a central line. **Anaesthesia Ready** cannot be declared until the patient is located in a place where surgical preparations can take place, e.g. an induction room.
Com.: this parameter constitutes part of the key performance indicator Perioperative Time (K10). Documentation is required routinely.

A8 **End Induction of Anaesthesia**
Def.: point in time at which all measures pertaining to induction of anaesthesia are completed.
Com.: equating this parameter with **Start Patient Preparations by OR nursing staff** (O3a) is not helpful, as delays between A8 and O3a then go undetected. That said, the two parameters may be identical in some cases.

A9 ▶ ‡ * **End Anaesthesia**
Def.: end of patient care provided by the anaesthesiologist in the OR or emergence area. For patients cared for solely with regional anaesthesia this parameter is identical to End Follow-up Surgical Measures (O11). For patients who remain ventilated, **End Anaesthesia** is the point in time at which the patient is handed over to the unit taking over care of the patient.
Com.: this parameter constitutes part of the key performance indicator Net Anaesthesia Time (K13).

A10 **End Presence Anaesthesia Nursing Staff**
Def.: end of commitment by anaesthesia nursing staff to the patient.

A12 ▶ * **End Presence Anaesthesiologist**
Def.: following handover of the patient to medical or nursing staff in the PACU (recovery room, IMC, ICU).
Com.: when handing over a ventilated patient, this parameter can be identical to **End Anaesthesia** (A9).
This parameter constitutes part of the intervals **Presence Anaesthesiologist** (K12) and **Anaesthesia Time** (K14) and should be documented routinely.

A13 **Anaesthesiologist Ready**
Def.: following A12 and any necessary transit through the operating suite, the anaesthesiologist is ready to commit to the next patient.
Com.: equating this parameter with End Presence Anaesthesiologist (A12) is not helpful when dealing with decentralised structures.

A14 **End Follow-up by Anaesthesia Nursing Staff**
Def.: all measures to be performed following anaesthesia have been completed.

Operation

O1 **Start Preparations by OR nursing staff**
Def.: start of non-patient-centric preparations by OR nursing staff.
Com.: with regard to the first case of the day it is important to observe sufficient time for preparing the OR.

O2 ▶ **End Preparations by OR nursing staff**
Def.: end of non-patient-centric preparations by OR nursing staff in the respective OR.

O3a ▶ * **Start Patient Preparations by OR nursing staff**
Def.: start of patient-centric preparations pertaining to surgery by OR nursing staff (e.g. positioning the patient, skin disinfection, draping etc.).

O3b ▶ **End Patient Preparations by OR nursing staff**
Def.: end of those patient-centric preparations performed exclusively by OR nursing staff.

O4a ▶ * **Start Measures by Surgeon**
Def.: start of measures performed by a physician affiliated with the department performing the operation, e.g. patient positioning by the surgeon, skin disinfection by the surgeon, application of a Mayfield clamp, insertion of navigation pins, preoperative X-ray, preoperative manipulation under anaesthesia, rigid bronchoscopy prior to thoracoscopic lung surgery, closed reduction of a fracture or dislocation. Synonyms: Start Surgical Measures, Start Operation.

O7a **Preoperative Team Time-out**
Def.: the OR team performs a preoperative interdisciplinary interprofessional check using a checklist as a quality assurance measure related to the surgical intervention ("sign in").
Com.: Whilst the point in time for performing the preoperative check can be defined internally, it must be performed prior to **Incision** (O8). Other or additional team time-outs (e.g. "sign out") are not affected.

O8 ▶ ‡ * **Incision**
Def.: incision of the skin after the surgeon has approached the OR table.
Com.: this parameter constitutes part of the **Incision-to-Closure Time**; as such documentation is essential.
For procedures which do not involve incising the skin (e.g. isolated closed reduction) the time of incision is equated to **Start Measures by Surgeon** (O4a). For interventional procedures (e.g. cardiovascular diagnostics, neuroradiologic coiling) incision time is the point in time at which percutaneous vascular access is gained. For isolated patient transport (e.g. of an ICU patient to CT) and other cases not involving an incision (e.g. patient care rendered in the ER) no incision or closure times should be documented. Instead **Start Anaesthesia** (A6) and **End Anaesthesia** (A9) or **Start Presence Anaesthesiologist** (A5) and **End Presence Anaesthesiologist** (A12) must be documented. For simultaneous or parallel operations **Incision** should be documented more than once.

O9a **Start Console Time**
Def.: for robot-assisted surgery, the point in time at which the surgeon commences patient-related work at the computer console.
Com.: together with O9b this parameter constitutes the **Console Time** (K8a) and is useful for recording the duration of robot-assisted surgery.

O9b **End Console Time**
Def.: for robot-assisted surgery, the point in time at which the surgeon ends patient-related work at the computer console.
Com.: together with O9a this parameter constitutes the **Console Time** (K8a) and is useful for recording the duration of robot-assisted surgery.

O10 ▶ ‡ * **Closure**
Def.: end of the final surgical suture.
Com.: this parameter constitutes part of the I**ncision-to-Closure Time** (K8); its routine documentation is essential. For operations without an incision and for interventions (e.g. cardiovascular diagnostics, neuroradiologic coiling) closure is equated to the end of all operative manipulations.
For simultaneous or parallel procedures **Closure** should be documented more than once.

O11 ▶ ‡ * **End Follow-up Surgical Measures**
Def.: end of patient-centric measures related to surgery (surgical site dressing, plaster cast).
Com.: this parameter constitutes part of the key performance indicator **Perioperative Time** (K10).
Synonyms: End Surgical Measures, End Surgery.

O12 **End Follow-up OR nursing staff**
Def.: end of all measures required following surgery, incl. tray logistics and any documentation directly pertaining to the case.

Key Performance Indicators

K1 **Transfer Time**
Def.: **Patient Sent For** (P1) to **Patient Available** (P2).
Com.: suitable key performance indicator for evaluating patient flow to the operating suite in the context of process analyses.

K1a **OR transfer Room Time**
Def.: **Patient Arrival at OR suite** (P2) (or when using an upstream holding area: P1) to **Arrival at Anaesthesia Induction** (P4a). Reference: [6].

K2 ▶ ‡ * **Anaesthesia Induction Time**
Def.: **Start Anaesthesia** (A6) to **Anaesthesia Ready** (A7).
Com.: this parameter also constitutes part of the key performance indicator **Anaesthesia Lead-in** (K4).
Overlapping induction is not unusual in modern anaesthesia. This may lead to discontinuous induction of anaesthesia (i.e. a peridural catheter may be placed earlier on, with later induction of general anaesthesia). In consequence, K2 may not reflect the actual time required for induction. Ideally, the time required for each sub-process would be added up by documenting K2 each time. This, however, is typically not possible with currently available operation management information system (OIS). References: [7,8].

K3 ▶ ‡ * **Anaesthesia Emergence Time**
Def.: **End Follow-up Surgical Measures** (O11) to **End Anaesthesia** (A9).
Com.: this parameter constitutes part of the key performance indicator **Anaesthesia Lead-out** (K5). Where A9 takes place before O11, a value of 0 should be documented for K3 as negative values influence mean values without actually representing time saved.

K4 * **Anaesthesia Lead-in**
Def.: **Start Presence Anaesthesiologist** (A5) to **Anaesthesia Ready** (A7).
Com.: this parameter also constitutes part of the key performance indicator Anaesthesia Controlled Time (K6).

K5 * **Anaesthesia Lead-out**
Def.: **End Follow-up Surgical Measures** (O11) to **End Presence Anaesthesiologist** (A12).
Com.: this parameter also constitutes part of the key performance indicator **Anaesthesia Controlled Time** (K6).

K6 **Anaesthesia Controlled Time**
Def.: **Anaesthesia Lead-in** (K4) + **Anaesthesia Lead-out** (K5).
Com.: this parameter is influenced by anaesthesia and infrastructure but is free from processes related to surgery. References: [9–12].

K7 ▶ ‡ * **Surgical Lead-in**
Def.: **Anaesthesia Ready** (A7) to **Incision** (O8). If **Patient In OR** (P5) is later than A7, then P5 to O8 should be used.
Com.: this parameter also constitutes part of the key performance indicator Perioperative Time (K10). For use in process analyses this parameter can be subdivided into **K7a** and **K7b** (see below).

K7a **Surgical Lead-in OR nursing staff**
Def.: **Anaesthesia Ready** (A7) to **End Patient Preparations by OR nursing staff** (O3b). If **Patient In OR** (P5) is later than A7, and for cases without anaesthesia use **Patient In OR** (P5) to **End Patient Preparations by OR nursing staff** (O3b).

K7b ▶ **Surgical Lead-in Surgeon**
Def.: **End Patient Preparations by OR nursing staff** (O3b) to **Incision** (O8).

K8 ▶ ‡ * **Incision-to-Closure Time**
Def.: **Incision** (O8) to **Closure** (O10).
Com.: routine documentation is required together with the main OPS code.
This parameter constitutes part of the key performance indicator **Perioperative Time** (K10). When multiple operations are performed within one setting, multiple Incision-to-Closure Times must be documented.
Reference: [13].

K8a **Console Time**
Def.: **Start Console Time** (O9a) to **End Console Time** (O9b).
Com.: this parameter is used to document the duration of robot-assisted surgery.

K9 ▶ ‡ * **Surgical Lead-out**
Def.: **Closure** (O10) to **End Follow-up Surgical Measures** (O11).
Com.: this parameter is also a component of key performance indicator **Perioperative Time** (K10).

K10 ▶ ‡ * **Perioperative Time**
Def.: **Anaesthesia Ready** (A7) to **End Follow-up Surgical Measures** (O11), and for cases without anaesthesia **Patient In OR** (P5) to **End Follow-up Surgical Measures** (O11).
Com.: this parameter is dependent on anaesthesiologic procedures, the availability of staff, and infrastructure (overlapping processes, central induction area, etc…). Correct calculation of K10 requires that in the case of overlapping induction A7 is not set prior to P10. References: [9,11,12].

K11 **Presence Anaesthesia Nursing Staff**
Def.: **Start Presence Anaesthesia Nursing Staff** (A4) to **End Presence Anaesthesia Nursing Staff** (A10).

K12 **Presence Anaesthesiologist**
Def.: **Start Presence Anaesthesiologist** (A5) to **End Presence Anaesthesiologist** (A12).

K13 ▶ ‡ **Net Anaesthesia Time**
Def.: **Start Anaesthesia** (A6) to **End Anaesthesia** (A9).
Com.: this parameter can be used for calculating internal service charges based on anaesthesia minutes.
References: [14–19].

K14 ▶ **Anaesthesia Time**
Def.: **Start Transfer In** (P3) to **End Presence Anaesthesiologist** (A12) + setup time*.
Com.: according to the InEK handbook for calculation this parameter is the definitive figure to be used in calculating the case-related allocation of costs for anaesthesia.
* The InEK handbook for calculation defines the setup time for preparing and postprocessing of anaesthesia as comprising the following measures, each of which bind staff:
- pre-anaesthesia evaluation and gaining informed consent
- donning scrubs and hand hygiene
- postoperative patient care in the recovery room (P8e–P8c)
- postoperative visit by the anaesthesiologist
- documentation

In practice, reporting of this controversial parameter by those hospitals reporting data to InEK is generally based on internal calculations of the setup time, as electronic records of the time spent on the above factors are not widely available. References: [15,20].

K14b * **Anaesthesia Care Time**
Def.: **Start Presence Anaesthesia Nursing Staff** (A4) to **End Presence Anaesthesia Nursing Staff** (A10) and/or **Anaesthesiologist** (A12).
Com.: The **Anaesthesia Care Time** is equivalent to the anaesthesia performance period in accordance with REKOLE® by HPlus and provides the basis for internal and external costing of anaesthesia in Switzerland.

K15a ▶ **Turnover Time OR nursing staff**

Def.: **End Follow-up Surgical Measures** (O11) of the previous session to **End Preparations by OR nursing staff** (O2) of the following session.

Com.: Surgical break.
For use in process analyses only turnovers pertaining to consecutive sessions (without planned or unplanned breaks at the end of the previous and/or start of the following session) may be considered.

K15b ▶ ‡ * **Turnover Time Anaesthesia**

Def.: **End Follow-up Surgical Measures** (O11) of the previous case to **Anaesthesia Ready** (A7) of the following case.

Com.: Synonym: Perioperative Turnover Time.
This parameter is dependent on anaesthesia and infrastructure but is free from the influence of procedural components under the operative control of OR staff and/or surgeons – it is therefore a useful adjunct to **K15a or K16.** For use in process analyses only turnovers pertaining to consecutive sessions (without planned or unplanned breaks at the end of the previous and/or start of the following session) may be considered. Where A7 takes place before O11, a value of 0 should be documented for K15b as negative values influence mean values without actually representing time saved.
This parameter does not validly permit inference of avoidable waiting times. References: [8,21,22].

K16 ▶ ‡ * **Closure-to-Incision Time**

Def.: **Closure** (O10) of the previous session to **Incision** (O8) of the following session.

Com.: the value of this parameter is influenced by the surgeon, anaesthesia, OR nursing staff, infrastructure and patient, material, cleaning and OR logistics and as such describes the entirety of all turnover processes. This parameter does not validly permit inference of avoidable waiting times. References: [8,11,12,21].

K17 ‡ * **Column Time**

Def.: **Patient In OR** (P5) to **Patient Out of OR** (P7).

Com.: this parameter represents actual physical occupancy of the OR.

K17a ▶ **Room Occupied Time**

Def.: **Patient In OR** (P5) to **End OR Cleaning** (P10).

Com.: this parameter describes the minimum extent of patient-related blocking of the OR that occurs under parallel working processes. At a minimum, routine documentation during Core Resource Time is recommended.

K18 ▶ ‡ **OR Capacity (synonym: Block Time)**

Def.: OR Capacity = S2–S1.

Com.: this term describes the planned hours of operation of an OR in minutes enveloped within the Core Resource Time. As such, OR hours of operation are defined as the interval from 15 minutes prior to the first incision-time target to 20 minutes after the final closure-time target in accordance with structural data.
Defined this way, the OR capacity is detached from the working hours of the participating departments and refers to the maximum possible utilisation of the OR within the core resource time. Including the 15-minute interval prior to the first intended incision and the 20-minute interval following the final intended closure time was a pragmatic agreement aimed at depicting the required minimum patient-related preparations and follow-up within the context of the OR capacity. Individual departments and cases will undercut or exceed these intervals.

K 18a ▶ ‡ **Core Operating Time**

Def.: Core Operating Time describes the interval from the earliest **Start OR Hours of Operation** (S1) to the latest **End OR Hours of Operation** (S2) for a particular department.

Com.: Core Operating Time provides the envelope within which a specific department can situate its OR Capacity (K18).

K20 **OR Utilisation Incision-to-Closure Time (%)**

Def.: **Incision-to-Closure Time** within **OR Capacity** (K8 in K18, cumulated by OR area and observation period)/**OR capacity** (K18, cumulated by OR area and observation period).

Com.: this parameter should be interpreted within the context of the type of surgical department and the average length of surgery. It does not provide any indication of the profitability of utilised OR time. References: [21–23].

K21 **Underutilisation (%)**

Def.: S2 – (O10 + 20 minutes) last operation (cumulated by OR area and observation period)/**OR Capacity** (K18, cumulated by OR area and observation period).

Com.: this parameter shows up unused OR capacity at the end of the OR schedule and is elementary for detecting additional usable OR capacity.
This parameter provides details on how many OR hours of operation could, at least theoretically, be recruited following the final closure if planning and processes were optimised. Premature closure of the OR and later reopening can cause the parameter to take on a false low value. References: [24,25].

K22 **Overutilisation (%)**

Def.: **Incision-to-Closure Time** (K8) outside **OR Capacity** cumulated by OR area and observation period)/**OR Capacity** (K18, cumulated by OR area and observation period).

Com.: this parameter shows the extent of overutilisation of OR capacity. Only those **Incision-to-Closure Times** outside **OR Capacity** which are related to elective surgery with an incision within the OR hours of operation are included. For obvious reasons, this parameter is heavily dependent on the type and length of surgery or the department, and on the length of **OR Capacity** per OR. References: [24,25].

K23 **OR Efficiency**

Def.: K21 + x * K22.

Com.: this parameter, which is commonly used in the U.S.A., is targeted towards avoiding overutilisation and instead recruiting underutilised OR capacity through process optimisation. Overutilisation and underutilisation are combined within the parameter, whereby a coefficient x is defined to describe the relationship of the two utilisation factors to one another. U.S. literature typically describe a coefficient of 1.75, as overutilisation is assumed to have negative effects on staff satisfaction. References: [24–27].

K24 ▶ ‡ **Incidence of Emergencies**

Def.: percentage of emergencies per priority, including both "number of emergencies per priority as a percentage of the total number of sessions" and "sum of all OR minutes dedicated to emergencies per priority as a percentage of the total number of minutes for all sessions".

K25 ▶ **Ratio Cancelled Sessions**

Def.: percentage of cancelled sessions in relation to the total number of planned elective sessions.
Proportion of sessions which were included in the finalised OR schedule as published the previous day, but which were ultimately not performed the following day. It would appear expedient to document the reasons for cancellation. Reference: [28].

K26 **Integration of Emergencies**

Def.: percentage of emergencies per priority within the planned OR hours of operation in relation to the total number of planned sessions.

K27 **Planning Precision Incision-to-Closure-Times**

Def.: $\text{Incision-to-Closure}_{\text{ACTUAL}}$/$\text{Incision-to-Closure}_{\text{PLAN}}$.

Com.: both overestimation and underestimation are equally unfavourable, so that the average of the absolute values for deviation should be used. Planning can be optimised using historic data.
Visualisation using an xy-plot can help detect systematic planning errors. This parameter can also be calculated for other process parameters, such as K10: **Perioperative Time,** K12: **Presence Anaesthesiologist,** K13: **Net Anaesthesia Time,** etc. References: [21,29,30].

K28a ‡ **Deviation Patient Available**

Def.: Deviation of Patient Available (P2) of the first scheduled operation in an OR from the plan, in minutes.

Com.: visualisation using a distribution graph would seem reasonable.
Training time-discipline and adjusting processes can lead to a reduction in delays occurring in the morning. References: [31–34].

K28b ▶ ‡ **Deviation Anaesthesia Ready**

Def.: Deviation of **Anaesthesia Ready** (A7) of the first scheduled operation in an OR from the plan, in minutes.

Com.: visualisation using a distribution graph would seem reasonable.
Training time-discipline and adjusting processes can lead to a reduction in delays occurring in the morning. References: [31–33,35].

K28c ▶ ‡ **Deviation Incision**
Def.: Deviation of **Incision** (O8) of the first scheduled operation in an OR from the plan, in minutes.
Com.: visualisation using a distribution graph would seem reasonable.
Training time-discipline and adjusting processes can lead to a reduction in delays occurring in the morning.
References: [31–33,36].

K29 **Waiting time Anaesthesia Controlled Time**
Def.: Waiting time within Anaesthesia Controlled Time (K6, cumulated by OR area and observation period).
Com.: in the context of detailed analyses, this parameter can be broken down into the two incorporated parameters **Anaesthesia Lead-in** (K4) and **Anaesthesia Lead-out** (K5). It is recommended that the causes of delays be documented together with this parameter. References: [21,22,37].

K30 **Waiting time Perioperative Time**
Def.: Waiting time within **Perioperative Time** (K10, cumulated by OR area and observation period).
Com.: in the context of detailed analyses, this parameter can be broken down into the three incorporated parameters **Surgical Lead-in** (K7), **Incision-to-Closure Time** (K8) and **Surgical Lead-out** (K9).
It is recommended that the causes of delays be documented together with this parameter. References: [21,22].

K31 **Waiting time Logistics**
Def.: Waiting time outside the scope of key performance indicators **Waiting time Anaesthesia Controlled Time** (K29) and **Waiting time Perioperative Time** (K30).
Com.: It is recommended that the causes of delays be documented together with this parameter. References: [21,22].

K32 **Waiting time Patient Pickup from OR Area**
Def.: **Patient Out of OR** (P7) to **Transfer to Bed/Transfer Out** (P8/P8b).

K33 ▶ **Recovery Room/PACU Time**
Def.: **Start PACU** (P8c, insofar as care is rendered in a recovery room) to **End PACU** (P8e, insofar as care was rendered in a recovery room).
Com.: this parameter is a component of **Anaesthesia Time** (K14, part of the setup time); routine documentation is recommended.

K34 **Waiting time Patient Pickup from Recovery Room**
Def.: **Cleared for Discharge from PACU** (P8d) to **End PACU** (P8e).
Com.: this parameter shows positive correlation with the number of beds required in the recovery room.
Reference: [38].

▶ ‡ Surgical Priority Classification

N0 **Highest priority**
Recommendation for OR management: immediate surgery, performed – if required – in the current location of the patient (e.g. ER, ICU, delivery room).

N1 **Very high priority**
Recommendation for OR management: surgery to be performed in the next available suitable OR, irrespective of department.

N2 **Surgery to commence ≤ 6 hours following request**
Recommendation for OR management: surgery to be performed in the next available OR affiliated with the department responsible for the patient.
Com.: if possible, delay until patient fasted; lack of fasting does not justify postponement, however (e.g. initial trauma surgery).

N3 **Surgery to commence following list of scheduled elective operations**
Recommendation for OR management: integration into out-of-hours schedule.

N4 **Urgent surgery within 24 hours**
Recommendation for OR management: integration into the OR schedule for the following day even if planning has already been concluded; preserve the first scheduled case.
Com.: N4 is relevant e.g. with regard to quality assurance measurements for hip fractures etc.

N5 **Elective surgery**

▶ ‡ Caesarean Section Classification

The potential maternal and foetal risk involved in obstetrics justifies defining a bespoke caesarean section classification in addition to the aforementioned surgical priority classification. That risk requires that special considerations including procedural requirements be taken into account. This caesarean section classification implements the classification in the current S3-Guidelines on Caesarean Section published by the German-language Societies of Obstetrics and Gynaecology, whilst using the terminology and process logic of OR management.

Cat 1 **Emergency caesarean section for immediate threat to life of mother or foetus**
Com.: **Recommendation for OR management:** C-section to begin without any delay; standard preparations for surgery are forgone.

Cat 2 **Emergent caesarean section for maternal or foetal distress without an immediate threat to life**
Com.: **Recommendation for OR management:** C-section to be performed as soon as possible, whilst undertaking usual preparations for surgery.

Cat 3 **Prompt caesarean section without maternal or foetal distress**
Com.: **Recommendation for OR management:** unplanned C-section which can be performed following coordination of required resources and undertaking usual preparations for surgery.

Cat 4 **Elective caesarean section**
Com.: **Recommendation for OR management:** planned C-section, scheduled for surgery on the day prior to surgery at the latest.