Nationales Referenzzentrum
für Surveillance von
nosokomialen Infektionen

Krankenhaus-Infektions-
Surveillance-System

OP KISS

Surveillance of Surgical Site Infections

at the

Institute of Hygiene and Environmental Medicine
Charité - Universitätsmedizin Berlin

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Note on translation

This document provides an English translation of the German version of the protocol on the surveillance of surgical site infections in OP-KISS. Only minor content-related changes were made to increase clarity for international readers. Certain terms were adapted to align with the terminology of the US Centers for Disease Control and Prevention and the European Centre for Disease Prevention and Control. Where applicable, administrative information was updated. The translation was aided by DeepL Pro, 2024.

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1 Introduction

Surgical site infections (SSI) are one of the most common types of healthcare-associated infections and represent a challenge for all surgical specialities. SSI negatively impact patients and surgical departments, and have therefore always been the subject of particular attention from caregivers and patients.

To ensure comparability of infection rates of different surgical departments, data from distinct types of surgery must be analysed separately. OP-KISS focuses on a number of indicator procedures that are frequently performed, or where SSI are particularly relevant. Departments participating in OP-KISS select one or more indicator procedures from a catalogue that includes over 30 operation types from almost all surgical specialities. Indicator procedures are defined by their procedure classification codes (OPS codes (*Operationen- und Prozedurenschlüssel*)).

In order to determine the number of SSI, each patient who has undergone a selected indicator procedure is followed up postoperatively for the occurrence of SSI. Standardised diagnosis is achieved by applying the KISS definitions (formerly CDC definitions) for SSI (current version of the KISS definitions at https://www.nrz-hygiene.de/kiss/kiss-definitionen). SSI are categorised by depth of infection into superficial incisional, deep incisional and organ/space SSI. The SSI rate per type of surgery is calculated from the number of SSI that occurred after all operations of a given indicator procedure.

Risk stratification is used to account for differences in patient populations at different surgical departments, and to determine the individual risk of a patient based on selected known risk factors. The internationally used NNIS risk index is applied, which considers the duration of surgery, the patient's ASA classification score and the contamination class of the surgical wound. The classification into different risk categories is based on the number of risk variables present for a procedure. SSI rates are calculated individually for each risk category; if neighbouring risk categories do not differ significantly from each other, they may be combined. For some procedure types, such as cholecystectomy, a distinction is also made between open and laparoscopic operations.

To facilitate interpretation, the national reference centre (Nationales Referenzzentrum, NRZ) calculates the SSI standardised infection ratio (SIR) for each participating department, per selected indicator procedure. This number expresses the ratio of SSI that actually occurred to the number of SSI that were expected based on the risk profile of the patients in the department (see 4.6.4).

OP-KISS reference data are updated and published once a year (https://www.nrz-hygiene.de/KISS-Modul/referenzdaten/KISS/OP).

2 Objectives of the surveillance protocol

The primary purpose of this surveillance* protocol is to provide the necessary definitions and specifications for surgical departments participating in OP-KISS, and thereby standardise data collection and analysis.

In addition, other interested institutions can also collect and analyse data according to the definitions and specifications provided. For these institutions, the available OP-KISS reference data may also represent a resource for orientation.

This surveillance protocol is based on specifications and definitions of the US National Healthcare Safety Network (NHSN, formerly NNIS) and the Centers for Disease Control and Prevention (CDC).[1-4] Experiences gained by the Institute of Hygiene at the Freie Universität Berlin and the Institute of Environmental Medicine and Hospital Hygiene at the Albert-Ludwigs-Universität Freiburg in the context of the NIDEP studies, were incorporated as well. Finally, experiences made within the KISS network since 1997 were also considered.[5] A German-language overview of OP-KISS was published in the journal "*Chirurg*" in 2002.[6]

This surveillance protocol is intended for interested infection control physicians and nurses, as well as clinicians who plan to perform surveillance using the KISS method. Any feedback to improve clarity and comprehensiveness is welcome.

The list of OP-KISS indicator procedures is updated more regularly than this protocol. The current version is published on the NRZ website (https://www.nrz-hygiene.de/KISS-Modul/KISS/Indikator-OP).

This surveillance protocol pertains to the surveillance of SSI. There is a separate protocol for the optional surveillance of postoperative lower respiratory tract infections (https://www.nrz-hygiene.de/KISS-Modul/protokolle/KISS/OP).

* Surveillance in this context refers to the continuous and systematic collection, analysis and interpretation of healthcare data, that are required for medical quality assurance. This includes the reporting of data to relevant stakeholders.

3 Requirements for the participation of surgical departments in OP-KISS and obligations of the KISS organisers

Participating surgical departments must fulfil the following requirements:

- Part of a hospital
- Approval of participation by the department's medical director
- Acceptance of the specifications of the OP-KISS protocol and the KISS definitions for the diagnosis of SSI, and explanation of these definitions to the physicians in the department
- Participation in the NRZ introductory course of at least one representative of the department tasked with performing surveillance, before registration for the module
- Acceptance of the web-based data entry system webKess, and provision of the necessary hardware and system requirements
- Regular entry of surveillance data into webKess
- Consent of the responsible management (medical director) to the publication of anonymised reference data
- Participation of a representative of the department in regular NRZ events (KISS Network Exchange Meeting) at least every two years
- Willingness to carry out internal quality assurance measures in respose to surveillance data
- Willingness to participate in validation efforts to sustain the quality of reported data (e.g. case vignettes on healthcare-associated infections)

The organisers of KISS are committed

- to advise and support the participating institutions in the implementation of surveillance,
- to handle the data of individual institutions with strict confidentiality,
- to make standardised and stratified reference data available to participating institutions on an annual basis,
- to provide assistance in using surveillance results for quality management purposes.

4 Methods for the surveillance of surgical site infections

The methods proposed by KISS are primarily aimed at supporting internal quality assurance measures. Continuous intensive contact with frontline staff (treating physicians and nurses) is therefore of great importance.

Another important strategy to identify patients with SSI, is the regular review of microbiological and laboratory results, as well as the review of patient records at the ward. The fewer microbiological samples are available, the more attention must be paid to clinical symptoms. Regular attendance at medical rounds or wound dressing rounds, and close contact with ward staff are suitable strategies for this.

4.1 Indicator procedures

OP-KISS focuses on specific, so-called indicator procedures, which are defined via the OPS procedure codes. For hip endoprosthesis (indicator procedure HPRO), the diagnosis code (ICD-10) must also be considered. Explanations and examples of indicator procedures can be found in chapter 7.

The participating surgical departments decide on one or more indicator procedures. It is important that the indicator procedure is performed frequently enough, so that surveillance results can be interpreted properly and trends over time can be assessed. If the selected indicator procedure is performed too rarely, individual SSI have a disproportionate impact on SSI rates, and it is not possible to distinguish whether an observed increased rate is random or actually significant.

Patients must be hospitalised for at least one night to be included. Outpatient procedures are not included.

4.2 Risk stratification

The risk of SSI depends on procedure-related (e.g. type of surgery, wound class, duration) and patient-related factors (e.g. general condition, underlying diseases such as diabetes, etc.).

SSI rates are stratified according to the NNIS risk index in order to account for differences in patient composition between the individual participating departments.[7] The variables required for the calculation of the risk index must therefore be recorded for each procedure (not only in the case of an SSI).

In addition to the NNIS risk index, a distinction is made for some procedures, as to whether the operation was planned (**elective**) or performed urgently (**emergency**)**.** This information is collected for the indicator procedures COLO (colon surgery) and SECC (caesarean section).

4.3 Implementation of surveillance

- The data is recorded and analysed at the level of the surgical department (usually corresponding to one medical director, one medical/nursing team). A hospital may have several surgical departments (e.g. trauma surgery, general surgery, obstetrics).
- All patients who have undergone an operation in the participating surgical department which meets the criteria of the selected OP-KISS indicator procedure, are followed up for the occurrence of SSI. The diagnosis of an SSI for surveillance purposes is made

on the basis of the KISS definitions for SSI (current version of the KISS definitions at https://www.nrz-hygiene.de/kiss/kiss-definitionen). Surveillance must also be carried out if the operated patients are not on a surgical ward (e.g. transfer to an internal medicine ward or intensive care unit).
To facilitate this, patients are entered into an operation list (i.e. list of procedures included into surveillance) by the surgical department with all necessary details (see section 5.2 Operation list).

- It is recommended that surveillance is carried out by infection prevention and control professionals.
- Based on the operation list, it is advisable to
  - take part in (dressing) rounds at the ward
  - review microbiological findings
  - ask treating staff specifically, whether there are signs of infection
  - consult the medical records if there are signs of an infection
- Active surveillance must be carried out for all patients on the operating list. Waiting for infections to be reported by ward staff/physicians is usually not reliable.
  Patients who have had an indicator procedure but for whom no surveillance of SSI could be carried out (e.g. due to the absence of the surveillance person), must not be reported to the NRZ and not included in the operation list.

4.4 Duration of follow-up in operated patients

- According to the KISS definitions, an infection occurring at the incision or surgical site is recorded as an SSI if it occurred within 30 days (or 90 days) postoperatively.

  The following surveillance periods apply:

  – A1: 30 days
  – A2: 30 days or 90 days (depending on indicator procedure)
  – A3: 30 days or 90 days (depending on indicator procedure)

  Each indicator procedure is assigned a defined surveillance period of 30 or 90 days (see chapter 7 “OP-KISS indicator procedure types” and attachments of the indicator procedures at https://www.nrz-hygiene.de/KISS-Modul/KISS/Indikator-OP).

- If another operation is performed in the same surgical site during the surveillance period (=reoperation), the surveillance (for the first procedure) is terminated.

  Example *1*:

  - 1 January: Dual-head prosthesis (HPRO_F indicator procedure)
  - 14 January: Subfascial haematoma evacuation
  - 10 February: Deep incisional surgical site infection

  for OP-KISS:

  - HPRO_F on 1 January with surveillance end date 14 January (due to revision surgery)
  - The SSI from 10 February is not recorded (because it cannot be clearly assigned to the surgery on 1 January or the revision on 14 January)

Example *2*:

- 1 January: Right aorto-femoral bypass (indicator procedure GC_EXT)
- 12 January: Revision, intraoperative diagnosis of a surgical site infection
- 20 January: Recurrent surgical site infection

for OP-KISS:

- GC_EXT on 1 January with surveillance end date 12 January (surveillance ends with a reoperation in the same surgical site)
- The infection detected on 12 January is recorded and documented in webKess as an SSI on 1 January
- The revision surgery on 12 January does not count as a KISS indicator procedure, even if it had a procedure code that would qualify it as such, as this operation was performed within 30 or 90 days of the previous operation in the same site.
This also means that the new infection on 20 January is not recorded, as only SSI after indicator procedures are recorded

- Patients who have undergone surgery are monitored closely at least until they are discharged from hospital. A high proportion of SSI occur after discharge ("post-discharge"), so continuing surveillance after hospital discharge is recommended ("post-discharge surveillance"). There is currently no simple and valid method for organising and thus systematising post-discharge surveillance of SSI, which is why post-discharge surveillance is not mandatory in OP-KISS.

Example 3*:*

- 1 April: Inguinal hernia surgery
- 3 April: Discharged with non-irritated wound
- 8 April: Clinical signs of a superficial SSI, the patient presents as an outpatient at the hospital. The attending physician at the outpatient clinic diagnoses a superficial incisional SSI according to KISS definitions. Anamnestic onset of symptoms on 6 April. This information is passed on to the KISS surveillance team and the infection is recorded for OP-KISS: Date of infection 6 April, SSI occurred after hospital discharge

4.5 End of surveillance

The end of surveillance marks the end of the period for which a patient is followed up during the postoperative course. Usually, this is equivalent to the so-called "surveillance limit date", which is calculated from the date of the surgery and the duration of the maximum surveillance period of the respective indicator procedure (30 or 90 days postoperatively). The surveillance limit date is calculated automatically by webKess. It is only necessary to specify the surveillance end date if surveillance was ended before the surveillance limit date.

There are two possible reasons for this:

- Repeated surgical intervention in the surgical site (=reoperation)
- Death of the patient

In these cases, participants enter the surveillance end date (date of reoperation or date of death) into webKess.

4.5.1 Reoperation

Reoperations are surgical procedures in the surgical site of the previously performed

indicator procedure. They are usually performed in the operating theatre. Minor procedures, such as simple punctures of haematomas/seromas, are not considered reoperations. Surveillance is not terminated by such minor interventions.

4.6 Calculation of SSI rates

4.6.1 SSI rate (total)

The **surgical site infection** rate (SSI rate) is the quotient of the number of SSI in the observation period in patients that underwent a given indicator procedure and the number of given procedures, multiplied by 100.

$$\text{SSI rate} = \frac{\text{Number of SSI in patients with a procedure of type } \textbf{'t'} \text{ during the observation period}}{\text{Number of procedures of type } \textbf{'t'} \text{ performed during the observation period}} \times 100$$

Procedure of "type t" represents any indicator procedure selected by the department.

Example:

$$\text{SSI rate} = \frac{\text{Number of SSI in patients with cholecystectomy during the observation period}}{\text{Number of cholecystectomies performed during the observation period}} \times 100$$

4.6.2 Stratified surgical site infection rates by risk category

OP-KISS stratifies the SSI rates according to the internationally used risk index of the American NNIS system.[7, 8]

One risk point is awarded for each procedure, if:

- the surgery took longer than 75% of procedures of the same type (this value is calculated annually by the NRZ)
- the wound class is 3 (contaminated) or 4 (dirty/infected)
- the patient's ASA score is 3 or higher

The risk category of the procedure corresponds to the number of applicable risk points (risk category = 0, 1, 2 or 3).

The stratified SSI rates are calculated using the following formula.

$$\text{Stratified SSI rate} = \frac{\text{Number of SSI after procedures of type } \textbf{'t'} \text{ with risk category } \textbf{'r'}}{\text{Number of procedures of type } \textbf{'t'} \text{ with risk category } \textbf{'r'}} \times 100$$

Example:

Within one year, 400 hip endoprosthesis indicator procedures were performed in a clinic. For 200 procedures no risk points were recorded, after 10 of these procedures an SSI occurred. For 100 procedures one risk point was recorded, after 10 of these procedures an SSI developed. There

were 70 procedures with two risk points, in this group 7 SSI occurred. All three risk factors were present in 30 procedures, after which 5 SSI developed.

Risk category	No. of procedures in risk category	No. of SSI	SSI rate
0	200	10	10/200 x 100 = 5,0
1	100	10	10/100 x 100 = 10,0
2	70	7	7/70 x 100 = 10,0
3	30	5	5/30 x 100 = 16,7
Total	400	32	32/400 x 100 = 8,0

4.6.3 In-house surgical site infection rate

The in-house SSI rate for an individual department is calculated exclusively based on SSI occurring during the primary postoperative inpatient stay. As with the overall SSI rate, it is also calculated stratified by risk category (see 4.6.2).

$$\text{In-house SSI rate} = \frac{\text{Number of } \textbf{in-house SSI} \text{ for patients with a procedure of type } \textbf{'t'} \text{ during the observation period}}{\text{Number of procedures of type } \textbf{'t'} \text{ performed during the observation period}} \times 100$$

Procedure of "type t" represents any indicator procedure selected by the department.

4.6.4 Standardised surgical site infection ratio (SIR)

If reference data are available for the indicator procedure, the standardised surgical site infection ratio (SIR) can be calculated:

$$\text{Standardised surgical site infection ratio (SIR)} = \frac{\text{Number of observed in-house SSI}}{\text{Number of expected in-house SSI}}$$

The expected number of SSI is the sum of the expected number of SSI of the individual risk groups.

$$\text{Number of in-house SSI expected in the risk group} = \frac{\text{Known in-house SSI rate (reference value)}}{100} \times \text{Number of procedures in the risk group}$$

As the proportion of SSI detected by after hospital discharge can vary significantly from department to department, the standardised surgical site infection ratio (SIR) is calculated exclusively on the basis of in-house SSI (individual data of department and reference data), i.e. SSI diagnosed during the primary postoperative inpatient stay. In addition, the SIR considers the distribution of patients according to their risk category. The SIR

represents a risk-adjusted ratio of a department's own SSI rates to those of the reference data, and can thus be used to determine whether a department has particularly many of few SSI.

The SIR has a value of 1 if the observed number of SSI matches the expected number. SIR values of greater than 1 indicate that more SSI occurred than expected, values of less than 1 mean that fewer SSI occurred than expected.

Example for calculating the standardised surgical site infection ratio (SIR):

Let's assume the following fictitious stratified in-house SSI rates after hip endoprosthesis for fracture in the OP-KISS reference data:

0 risk points: 1,0
1 risk point: 3,0
2 or 3 risk points: 5,0

Risk category	No. of procedures in risk category	No. of SSI (observed)	(Of which) No. of in-house SSI (observed)	In-house SSI rate (observed)	In-house SSI rate (reference data)	Number of in-house SSI (expected)
0	200	2	1	0,5	1,0	1,0/100 x 200 = 2,0
1	100	8	7	7,0	3,0	3,0/100 x 100 = 3,0
2	70	7	7	10,0	5,0	5,0/100 x (70+30)= 5,0
3	30	3	1	3,3	5,0	
Total	400	20	16	4,0	-	10,0

This means that 6 more SSI occurred (16 instead of 10) than would have been expected based on the risk category composition of the patient population**.**

Standardised surgical site infection ratio (SIR) = 16 (observed SSI) divided by 10 (expected SSI) = 1.6.

There were 1.6 times as many SSI as would have been expected based on the reference data and the risk category composition of the patient population.

4.6.5 Comparison of own infection rates with reference data

The SSI rates displayed in chapters 4.6.1 to 4.6.3 are calculated for each participating surgical department.

The following statistical distribution variables for the reference values are provided in KISS to facilitate interpretation of data:

- 25% quantile (the SSI rate is below this value in 25% of departments)
- Median (50% of departments have an SSI rate above this value, 50% of departments have an SSI rate below this value)
- 75% quantile (the SSI rate is below this value in 75% of the departments)
- The pooled SSI rate is calculated from the number of all procedures and all SSI of an indicator procedure type.

In addition to the reference data, OP-KISS graphs and funnel plots are offered as features

in webKess. They illustrate the relation of a department's infection rates in relation to other participating departments, and can be used for an extended assessment of (elevated or otherwise unusual) infection rates.

4.6.6 Descriptive overview of individual risk factors

For each participating department, the distribution of the risk factors considered in the risk adjustment (duration of surgery, wound class, ASA score) is displayed per indicator procedure type:

The following parameters are calculated:

- Surgery duration: average surgery duration in minutes
- Wound class: Percentage of operations per wound class (1 - 4).
- ASA score: Percentage of operations performed on patients with the respective score (1-5).

To compare one's own data with that of other departments, the duration of surgery (arithmetic mean; 25% quantile, median, 75% quantile) of all departments participating in the respective indicator procedure is determined. For wound class and ASA score, the distribution within the different classes (see above) of a department is compared to the reference data distribution.

The descriptive overview serves as an additional illustration of the distribution of the considered risk factors in a department. The influence of risk factors on SSI rates is already included in the risk adjustment by risk category and in the SIR (see 4.2).

5 Documentation

5.1 Electronic recording of surveillance data

The NRZ provides KISS participants with an electronic system for recording surveillance data. The web portal webKess has been used for this purpose since the year 2005 (https://webkess.charite.de/).

webKess is intended for the documentation of locally recorded surveillance data and the transmission of data to the NRZ. Furthermore, each participant can perform department-related analyses through webKess independently at any time.

To ensure that current data are available for reference data calculation, KISS participants are obliged to complete their surveillance data for the previous year by 15 February of any year.

If webKess is temporarily unavailable due to technical problems, the data collection form contained in this protocol can be used for documentation during this period. This data must then be subsequently entered into webKess. The input masks and mandatory fields in webKess differ depending on the type of indicator procedure. KISS participants can enter free text for internal notes into the fields provided for comments. An evaluation of free text information by the NRZ is not planned.

5.2 Operation list

A list of patients and operations to be included in OP-KISS should be compiled by the operating department. This list should be maintained regularly (e.g. daily) so that it can serve as a basis for the infection control staff for targeted monitoring of patients included in the surveillance.

If possible, the documentation systems already available in the hospital should be used. Most of the information required for OP-KISS is already available in the hospital information system, but ASA and wound class are often missing. This can usually be added to the surgery documentation software, e.g. by manual entry from the surgeon, making this information available for quality assurance (KISS and possibly other quality assurance systems).

The following inclusion criteria apply:

- The main procedure (OPS code) must match one of the specified codes for the indicator procedure; in exceptional cases, secondary procedures (e.g. for COBY_L and COBY_T) or the diagnosis (e.g. for HPRO_A and HPRO_F) may be important.
- Only procedures with primary wound closure are included (otherwise no wound assessment with the KISS definitions is possible).
- Procedures are not included if the patient has had a previous operation in the same surgical site within 30 or 90 days prior to the procedure at hand (depending on the surveillance period of the respective indicator procedure type). This applies regardless of whether the first operation was an OP-KISS indicator procedure or not. For example, a hip replacement 70 days after intramedullary nailing of a femoral neck fracture is not included. A cholecystectomy 21 days after a laparotomy is also not included.

- The patient must be alive at the time of the procedure (e.g. a post-mortem nephrectomy for subsequent transplantation is not included).

Further information and examples on including procedures in the OP-KISS surveillance can be found in chapter "7.1 General information on indicator procedures".

The following data must be recorded for every included procedure:

Procedure type	According to the OP-KISS indicator procedure list (https://www.nrz-hygiene.de/KISS-Modul/KISS/Indikator-OP)
Date of surgery	In the format DD/MM/YYYY
Surveillance limit date	This is calculated automatically by the system and indicates the last day of the maximum surveillance period of 30 or 90 days (depending on the indicator procedure).
Surveillance end (date) (=end of surveillance during the postoperative course)	If surveillance is ended before the surveillance limit date due to reoperation or death, enter the date when surveillance ended (i.e. day of reoperation or death).
Surveillance end (reason)	Specify why surveillance was ended before the surveillance limit date: – Reoperation – Death
Discharge date	Date of hospital discharge (optional)
Year of birth	Enter four digits
Gender	Female or male
Duration of surgery	Incision-to-suture time (= interval between skin incision and skin closure) in minutes
Wound class Please note the information specific to the indicator procedure in the procedure list on the NRZ website: https://www.nrz-hygiene.de/KISS-Modul/KISS/Indikator-OP	**1 = Clean:** Uninfected surgical site in which no inflammation is encountered, and neither the respiratory, alimentary or urogenital tract are entered. Surgical wounds following blunt, non-penetrating trauma are included if the above criteria are met. *- Examples: elective thyroid, heart, joint surgery* **2 = Clean-Contaminated:** A surgical site in which the respiratory, alimentary or urogenital tract are entered under controlled conditions and without unusual contamination. *- Examples: digestive tract surgery, provided there is no*

	evidence of infection or break of aseptic technique **3 = Contaminated:** Open, fresh, accidental wounds. In addition procedures with major breaks of aseptic technique or gross spillage from the gastrointestinal tract leakage, and procedures with acute non-purulent inflammation **4 = Dirty or infected:** Old traumatic wounds with devitalised tissue and procedures with existing infection or perforated viscera. This definition suggests that organisms causing postoperative infection were present in the operative field before the operation.
ASA classification	Enter the ASA score as determined by the anaesthetist. Assignment according to the classification of the American Society of Anaesthesiologists:[9] 1 = Normal, healthy patient 2 = Patient with mild systemic disease 3 = Patient with severe systemic disease 4 = Patient with severe systemic disease that is a constant threat to life 5 = Moribund patient, who is not expected to survive without the operation
Endoscopy	YES ► The operation was performed entirely endoscopically NO ► The operation was performed using open surgery or a combination of both, or there was a switch from endoscopic to open surgery
Implant	Only for selected procedures: YES► An implant is inserted during an operation: An implant is a foreign body of non-human origin that is permanently implanted in a patient during an operation and is not routinely manipulated for diagnostic or therapeutic purposes (e.g. hip prostheses, vascular prostheses, screws, wire, artificial abdominal mesh, porcine or synthetic heart valves). Human donor organs (transplants) (e.g. heart, kidney liver) are not considered implants. NO ► No implant as defined above is inserted during the procedure. UNKNOWN ► No information on the use of implants.
Urgency	Information only collected for COLO and SECC procedures: ELECTIVE = The procedure is initiated and performed as

	planned EMERGENCY = Surgery must be performed immediately or within a defined, short period of time (24 hours) UNKNOWN = Information cannot be provided
Revision surgery	Information only collected for SPONDY procedures: Revision surgeries are follow-up, replacement or corrective operations after an initial operation, the primary operation. The revision procedure therefore takes place in the same surgical site as the primary procedure.
Number of segments	Information only collected for SPONDY procedures: Number of spinal segments that were included in the operation.

5.3 Documentation of surgical site infections

If an SSI occurs in a patient included in the surveillance, the data listed in the table below must be collected. These can initially be entered in the data collection form provided in this protocol. For electronic transmission to the NRZ, infection data are added to the datasets of the corresponding operation.

Only postoperatively occurring infections (=surgical site infections) are recorded. Infections already present at the time of the procedure are not recorded. Based on the KISS definitions, a surgical site infection is defined as follows:

- An infection after an operation that affects the incision or any part of the anatomy (e.g. organs and spaces) opened or manipulated during the operation, is referred to as a surgical site infection (A1, A2 or A3), if the infection occurs within 30 or 90 days following the operation. If an infection of the surgical site was present at the time of surgery, a new surgical site infection can be diagnosed in an area of the surgical site or incision not previously affected by infection, or at the earliest 14 days after surgery and resolution of the previous infection.
- Surgical site infections can be detected during the inpatient hospitalisation, after discharge or in an outpatient setting
  (see also: https://www.nrz-hygiene.de/kiss/kiss-definitionen)

Date of infection	Date when the first clinical evidence of SSI appeared or, date when specimen used to make or confirm diagnosis was collected, whichever comes first
Type of infection	According to the KISS definitions (https://www.nrz-hygiene.de/kiss/kiss-definitionen): A1 - Superficial incisional SSI A2 - Deep incisional SSI A3 – Organ/Space SSI

Time of diagnosis	Fill in the appropriate box: • During the hospitalisation • After discharge • On readmission
Microorganism	Specify whether an aetiologically relevant microorganism was detected (selection: YES/NO). Do not enter colonisations.
Microorganism 1/2/3/4	Specify up to four aetiologically relevant microorganisms.

Complications during the surveillance period

Secondary bloodstream infection	Selection: YES or NO A secondary bloodstream infection is a laboratory-confirmed bloodstream infection that is attributable to an infection at another body site. In the case of secondary bloodstream infection for KISS, the microorganism detected and its antibiogram must match the primary infection (in this case SSI).
Death	Specify if the patient died within the surveillance period (irrespective of the cause of death).

Note: Only complications that occur during the surveillance period are recorded. If surveillance ends prematurely due to a reoperation, the following applies: if a secondary bloodstream infection was already present as a complication of the SSI at the time of the reoperation, it is recorded. If a secondary bloodstream infection occurs after reoperation, it is not recorded as a complication. Death after reoperation is also not recorded as a complication.

Infections present at the time of surgery

If an infection of the surgical site was present at the time of surgery of the indicator procedure, the procedure is recorded for OP-KISS using the usual inclusion criteria, and assigned a wound class of 4 (dirty or infected). A new SSI can be diagnosed according to the definition stated above:

- in an area of the surgical site or incision not previously affected by infection,

  or

- at the earliest 14 days after surgery and resolution of the previous infection.

  Example:

  A patient presents at the surgical emergency department with pain in the right lower abdomen and marked abdominal tension. A perforated appendicitis with surrounding peritonitis was found intraoperatively. Intravenous antibiotics are started and the wound is primarily closed in the operating room. Five days postoperatively, a painful reddening of the incision site develops and the attending physician removes two

stitches.

To be recorded:

- Indicator procedure APPE with wound class 4
- Surgical site infection (A1) on the 5th postoperative day

Multiple infections

- If a less deep SSI (e.g. A1) is initially diagnosed and the infection progresses further (e.g. becomes an A3), only the deeper SSI (here A3) is recorded. The infection date remains unchanged (see definition of infection date in the table above). If surveillance ends due to a reoperation, the following applies: an SSI that was present at the time of the reoperation is documented. If the SSI further progresses after reoperation, this is no longer considered.
- If two SSI of different depths occur independent of one another (e.g. an abscess in the Douglas space = A3, and an infection at the superficial incision = A1), both infections are recorded. The infection dates for distinct SSI can differ.

DATA COLLECTION FORM FOR SURGICAL SITE INFECTIONS
- OP-KISS -

PROCEDURE
Date of surgery:
Procedure type:
SURGICAL SITE INFECTION
Date of infection:
Type of infection (according to KISS definitions): ☐ SUPERFICIAL (A1) ☐ DEEP (A2) ☐ ORGAN/SPACE (A3) Time of diagnosis: ☐ During hospitalisation ☐ After discharge ☐ On readmission
Causative microorganisms (max. 4): 1. 2. 3. 4.

COMPLICATIONS

Secondary BSI within the surveillance period: ☐ yes ☐ no

Microorganism in blood culture:

Death within the surveillance period: ☐ yes ☐ no

COMMENTS (internal, not considered by the NRZ)

This form can be used for internal recording. Data can only be transmitted electronically to the national reference centre (Nationales Referenzzentrum, NRZ) via webKess.

6 Pathogens of surgical site infections

Up to four microorganisms can be documented for an infection. The microorganisms and special characteristics (e.g. resistance) can be selected from a list in webKess. Microorganisms that have been detected by cultural or non-cultural methods and that are considered to be aetiologically relevant (causative) for the infection should be documented. A reoperation ends the surveillance, but microbiological results of specimens taken during reoperation (e.g. intraoperative swab) are still considered.

Example 1:

An SSI (A2) occurs in a patient on day 4. Initially, no microorganism is detected. On day 5, the wound is revised due to the SSI. As this is a reoperation, surveillance is terminated. However, a wound swab was taken intraoperatively. The result of the intraoperative wound swab is available on day 7: *Staphylococcus aureus*.

-> *S. aureus* is recorded as the microorganism for the deep incisional SSI (A2).

Example 2:

An SSI (A2) occurs in a patient on day 4. Initially, no microorganism is detected. On day 5, the wound is revised due to the SSI. As this is a reoperation, surveillance is terminated. However, a wound swab was taken intraoperatively. The result of the intraoperative wound swab is available on day 7: no growth. A new wound swab is taken on day 7, which yields growth of *Staphylococcus aureus*.

-> The microorganism is not recorded.

7 OP-KISS indicator procedure types

Status: January 2021

The current catalogue of OP-KISS indicator procedures with a detailed description of the procedures as well as additional information (examples of SSI and wound class for the respective indicator procedures) can be found here:

https://www.nrz-hygiene.de/KISS-Modul/KISS/Indikator-OP

Abbreviation	Name	Surveillance duration	Speciality
APPE	Appendectomy	30 days	General surgery
APPE-KI	Appendectomy - Paediatric surgery	30 days	Paediatric surgery
ART	Arthroscopic procedures on the knee joint	30 days	Traumatology/ Orthopaedics
CARD	Heart surgery	90 days	Cardiac surgery
CHOL	Cholecystectomy	30 days	General surgery
COBY_L	Coronary artery bypass grafting with harvesting of autologous vessels from the extremities	90 days	Cardiac surgery
COBY_T	Coronary artery bypass grafting without harvesting autologous vessels from the extremities	90 days	
COLO	Colon surgery	30 days	General surgery
FPF_O	Open reduction of fracture of the proximal femur	90 days	Traumatology/ Orthopaedics
FPF_G	Closed reduction of fracture of the proximal femur	90 days	
GC_ABD	Abdominal aorta surgery	90 days	Vascular surgery
GC_CAR	Carotid bifurcation reconstruction	30 days	
GC_EXT	Arterial reconstruction - lower extremity	90 days	
HALLUX	Correction of a hallux malposition/deformity	30 days	Traumatology/ Orthopaedics
HERN	Inguinal hernia surgery	90 days	General surgery
HPRO_A	Hip endoprosthesis for osteoarthritis	90 days	Traumatology/ Orthopaedics
HPRO_F	Hip endoprosthesis for fracture	90 days	
HPRO_R	Hip endoprosthesis revision surgery	90 days	Traumatology/ Orthopaedics
HYST_A	Abdominal hysterectomy	30 days	Gynaecology/ Obstetrics
HYST_V	Vaginal hysterectomy	30 days	
KPRO	Knee endoprosthesis	90 days	Traumatology/ Orthopaedics
KPRO_R	Knee endoprosthesis revision procedures	90 days	
CRANE	Craniotomy	90 days	Neurosurgery
LOBE	Lobectomy of the lung	30 days	Thoracic surgery

LUMB	Lumbar disc surgery	30 days	Neurosurgery/ Orthopaedics
MAST	Breast surgery	90 days	Gynaecology/ Obstetrics
NECK	Removal of the cervical lymph nodes (neck dissection)	30 days	ENT
NEPH	Nephrectomy	30 days	Urology
OSG	Upper ankle joint surgery	90 days	Traumatology/ Orthopaedics
PARO	Parotidectomy	30 days	ENT
PRST	Prostatectomy	30 days	Urology
REKT	Rectum surgery	30 days	General surgery
SECC	Caesarean section	30 days	Gynaecology/ Obstetrics
SPONDY	Spinal fusion surgery	90 days	Neurosurgery/ Orthopaedics
STRIP	Venous stripping	30 days	Vascular surgery
STRUM	Thyroid surgery	30 days	General surgery

7.1 General information on indicator procedures

(1) Definition of the indicator procedure type

All listed procedure codes for a given indicator procedure can qualify an operation as such. If an indicator procedure has been selected (e.g. NEPH), **all operations with one of the specified codes** as the main proceduremust be recorded (e.g. 5-552.0/5-552.3 - Excision and destruction of (diseased) kidney tissue, 5-553 - partial resection of the kidney, 5-554 - nephrectomy)
Recording must not be limited to individual procedure codes! Otherwise, the comparability across participating departments is reduced.

(2) Main procedure

An operation can have several procedure codes, a main procedure and possibly several secondary procedures. The surgeon determines the main procedure for every operation. Only operations for which the main/leading procedure corresponds to an OP-KISS indicator procedure are considered for surveillance in OP-KISS. For some indicator procedures (e.g. COBY), the presence of a secondary procedure can also be important.

(3) Revision surgeries

Revision or second surgeries in the same surgical site within 30 (or 90) days after an operation are not counted as indicator operations.
Normally, revisions receive different procedure codes than the initial operation. For some types of operations, revision surgery can receive the same code as the initial procedure (e.g. for COLO, GC). These revisions must not be counted again for the operation list if the previous procedure was performed less than 30 or 90 days ago. A procedure performed in an area with prior surgery, is considered for surveillance in OP-KISS, if it is performed no earlier than 31 days after the previous procedure, and is assigned a code that qualifies it as an indicator procedure. For indicator procedures with a surveillance period of 90 days, the cut-off is 91 days.
If surgery is performed in the same surgical site after an indicator procedure, surveillance for the indicator procedure ends on the day of the reoperation (see 4.3 Implementation of surveillance, 4.4 Duration of follow-up in operated patients, 4.5 End of surveillance).

(4) Bilateral procedures

For bilateral procedures (e.g., procedures on both knees), the operation on each side is counted individually and recorded in webKess with the corresponding duration of surgery (incision-to-suture time). If the duration is not documented individually for each side, two operations are still recorded in webKess, and the overall duration of surgery is divided by two.

(5) Multiple surgeries

In the case of extensive surgeries, several procedures that could qualify as an indicator procedure might be performed (e.g. extensive abdominal surgery on the colon with removal of the gall bladder and appendix). For OP-KISS, only the procedure that was coded as the main procedure counts (see (2) Main procedure).

(6) Information on the lists of OPS codes for indicator procedures

The list of OPS codes for an indicator procedure always contains as many characters of the procedure code as are necessary to uniquely identify the indicator procedure.

Where the last characters of the procedure code are not specified or addressed, all codes matching the displayed characters are included.
Example: The specification 5-820 includes the codes 5-820.02, 5-820.20 and 5-820.4, but does not include 5-821.

The placeholder _ stands for any character at this position in the code.
Example: The specification 5-811._h includes the codes 5-811.0h, 5-811.9h and 5-811.ah, but does not include 5-811.x (because the character "h" does not follow in the 6th position).

7.2 Examples of the attribution of indicator procedures

In a surgical department, the indicator procedure types APPE, COBY and HERN are under surveillance. The following operations were performed:

No.	Year of birth/ gender	Description of the surgery	Main procedure	Secondary procedures	Endoscopy
1	1924, m	Incisional hernia	5-536	none	N
2	1933, m	Triple coronary artery-venous bypass	5-361.27	none	N
3	1932, w	Double coronary artery **bypass**, removal of a radial artery as a graft	5-361.13	Removal of the radial artery	N
4	1940, m	Double coronary bypass with A. mammaria	5-361.13	none	N
5	1960, w	Exploratory laparatomy, appendectomy	5-541.0	5-470	N

The following indicator procedures can be recorded:

1) No indicator procedure (OP-KISS procedure type HERN only includes inguinal hernias)

2) Indicator procedure "COBY_L"

3) Indicator procedure "COBY_L" (secondary procedure: removal of the *radial artery*)

4) Indicator procedure "COBY_T" (same main procedure as operation no. 3, but different indicator procedure attribution, as no graft was harvested from the extremities)

5) No indicator procedure, as appendectomy (5-470) is not stated as the main procedure

In addition to an appropriate OPS code, the following must apply to all included procedures:

- Primary wound closure was performed (otherwise no wound assessment using the KISS definitions is possible)
- The patient did not have an operation in the same surgical site within the last 30 or 90 days.

8 References

1 Emori TG, Culver DH, Horan TC, Jarvis WR, White JW, Olson DR, et al. National nosocomial infections surveillance system (NNIS): description of surveillance methods. *Am J Infect Control* 1991;19:19-35

2. nosocomial infection rates for interhospital comparison: limitations and possible solutions. A Report from the National Nosocomial Infections Surveillance (NNIS) System. *Infect Control Hosp Epidemiol* 1991;12:609-621

3 National Nosocomial Infections Surveillance (NNIS) System Report, Data Summary from January 1992-June 2001, issued August 2001 *Am J Infect Control* 2001;29:404-421

4 Horan TC, Emori TG. Definitions of key terms used in the NNIS System. *Am J Infect Control* 1997;25:112-116

5 Gastmeier P, Geffers C, Sohr D, Dettenkofer M, Daschner F and Ruden H. Five years working with the German nosocomial infection surveillance system (Krankenhaus Infektions Surveillance System). *Am J Infect Control* 2003;31:316-321

6 Steinbrecher E, Sohr D, Hansen S, Nassauer A, Daschner F, Rüden H, et al. Surveillance of postoperative wound infections - reference data from the Hospital Infection Surveillance System (KISS). *Chirurg* 2002;73:76-82

7 Culver DH, Horan TC, Gaynes RP, Martone WJ, Jarvis WR, Emori TG, et al. Surgical wound infection rates by wound class, operative procedure, and patient risk index. National Nosocomial Infections Surveillance System. *Am J Med* 1991;91:152S-157S

8 Mangram AJ, Horan TC, Pearson ML, Silver LC and Jarvis WR. Guideline for prevention of surgical site infection, 1999. Hospital Infection Control Practices Advisory Committee. *Infect Control Hosp Epidemiol* 1999;20:250-278

9 Owens WD, Felts JA and Spitznagel EL, Jr. ASA physical status classifications: a study of consistency of ratings. *Anesthesiology* 1978;49:239-243

9 Imprint

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