Nationales Referenzzentrum für Surveillance von nosokomialen Infektionen

Krankenhaus-Infektions-Surveillance-System

OP KISS

Surveillance of Postoperative Lower Respiratory Tract Infections

at the

Institute of Hygiene and Environmental Medicine
Charité - Universitätsmedizin Berlin

Internet: https://www.nrz-hygiene.de/

Protocol version: November 2020

Start of validity: January 2021

Translation: December 2024

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.

Contact address:

Nationales Referenzzentrum für Surveillance von nosokomialen Infektionen (Director: Prof. Dr. Christine Geffers)

at the

Institute of Hygiene and Environmental Medicine

Charité - Universitätsmedizin Berlin

Hindenburgdamm 27
12203 Berlin
Tel.: +49 30/450 577 612
Fax: +49 30/450 7 577 920

Email: nrz@charite.de
Homepage: https://www.nrz-hygiene.de/

Contents:

1 Introduction

In addition to ventilated patients, patients undergoing surgery are at particular risk of developing lower respiratory tract infections (LRTI). LRTI account for a substantial portion of the burden of healthcare-associated infections in surgical patients.

The development of nosocomial infections of the lower respiratory tract can be influenced by preventive measures such as mobilising patients as soon as possible after surgery, adequate pain management and consistent respiratory training to ensure ventilation of deep sections of the lungs.

2 General information

2.1 Prerequisites

A prerequisite for recording LRTI is participation in OP-KISS with at least one indicator procedure type. For each selected indicator procedure, recording of SSI in accordance with the OP-KISS protocol "Surveillance of Surgical Site Infections" is mandatory, whereas additional surveillance of LRTI is voluntary. LRTI surveillance in OP-KISS is possible since the year 2012.

2.2 Optional surveillance component for postoperative lower respiratory tract infections

Interested departments can register via webKess for the surveillance of LRTI as part of OP-KISS. Then, both SSI and LRTI can be documented for procedures under surveillance. Participants must specify for which procedures or for which periods LRTI surveillance in OP-KISS is performed.

2.3 Implementation of surveillance

All patients who undergo an operation that is part of a selected indicator procedure are included in the surveillance (provided inclusion criteria are fulfilled, see OP-KISS SSI protocol), and actively monitored for the occurrence of LRTI. Follow-up ends when the patient is discharged from the hospital or 30 days after the procedure.

The regular review of laboratory and radiological findings as well as patient files (at the ward) are important for identifying patients with healthcare-associated infections. The fewer microbiological samples or radiological results are available, the more attention must be paid to clinical symptoms. Close contact with the ward staff is particularly important in these situations. It is advisable to ask specifically whether there are signs or symptoms of a respiratory infection, such as abnormal auscultation findings, tachypnoea, dyspnoea, cough or purulent sputum, etc.

Otherwise, the same general framework applies as for SSI surveillance.

2.4 Documentation and feedback of data

The national reference centre for surveillance of nosocomial infections (Nationales Referenzzentrum für Surveillance von nosokomialen Infektionen, NRZ) provides KISS participants with an electronic system for recording surveillance data (https://webkess.charite.de/). webKess enables the documentation of the surveillance data recorded on site, and its transmission to the NRZ. Furthermore, each participant can perform department-related analyses through webKess independently at any time. To ensure that current data is available for reference data calculation, KISS participants are obliged to complete surveillance data for the previous year by 15 February of any year. Reference data are not yet available for LRTI surveillance in OP-KISS, as the number of participating departments and documented procedures is not yet sufficient. However, this will be routinely evaluated by the NRZ. As soon as a sufficient amount of valid data is available, publication of reference data for LRTI is intended.

If webKess is temporarily unavailable due to technical problems, the data collection form provided in this protocol can be used for documentation during this period, and can be subsequently entered into webKess.

3 Definitions for surveillance

Postoperative lower respiratory tract infections

The definition of postoperative LRTI is based on the KISS definitions (C1a, C1b, C1c, C1d, J1). For LRTI surveillance in OP-KISS, an additional case definition is offered (Cx). For details, see chapter 3.2 “Documentation”.

A post-operative LRTI is present if the infection occurs after an indicator procedure. The surveillance period for LRTI 30 days from the day of surgery. Surveillance ends prematurely if the patient is discharged from the hospital, if the patient undergoes reoperation in the surgical site of the previously performed indicator procedure, or if the patient dies.

LRTI that only become apparent after discharge or upon readmission of the patient are not recorded. Similarly, there is no surveillance of LRTI for outpatient procedures.

Lower respiratory tract infections at the time of surgery

If a patient already shows symptoms of an LRTI at the time of surgery (e.g. post-stenotic pneumonia in lung tumour operations), a postoperative LRTI can only be diagnosed if the prior infection was completely resolved and the patient had a sufficiently long symptom-free interval before the onset of the new LRTI.

Differentiation between lower respiratory tract infections and surgical site infections:

Infections such as an abscess or empyema in the lungs or thorax are not recorded as

LRTI. After operations in this area (e.g. LOBE), they are documented as SSI.

If a lung abscess or pleural empyema coincides with pneumonia at the time of diagnosis, this constellation is also categorised as an SSI and no LRTI is recorded, provided that the patient underwent an operation in this area of the body.

If both types of infection are diagnosed with a time gap and without a symptom-free interval in between, only the type of infection detected first is recorded.

3.1 Documentation

KISS participants enter data on healthcare-associated infections into a recording system provided by the NRZ (webKess). In the following, only data relevant for documenting LRTI in OP-KISS are addressed. Additional information on variables in OP-KISS can be found in the OP-KISS protocol "Surveillance of Surgical Site Infections".

KISS acronym: Enter the complete KISS acronym - consisting of hospital acronym **and** department acronym - which your department is registered with in webKess. (Only required on the data collection form, not required in the webKess input mask)

Procedure type: Enter the indicator procedure for which LRTI surveillance is performed. (Only required on the data collection form, not required in the webKess input mask)

Date of surgery: In the format DD/MM/YYYY

webKess ID: Identification number (webKess) of the procedure. (Only required on the data collection form, not required in the webKess input mask).

Date of infection: Date when the first clinical evidence of LRTI appeared or, date when specimen used to make or confirm diagnosis was collected, whichever comes first.

Type of infection: C1a, C1b, C1c, C1d, J1 according to KISS definitions and Cx (see below)

Cx – additional criteria: Supplementary case definition of the NRZ for the diagnosis of an LRTI. This definition should only be used if the KISS definitions for LRTI are not met, despite strong clinical suspicion of an LRTI (e.g. diagnosis by the attending physician). If the KISS criteria can be fulfilled, the corresponding type of infection (C1a, C1b, C1c, C1d or J1) must be documented.

Definition of Cx:
Chest X-ray shows new or progressive infiltrate,

consolidation, cavitation, or pneumatocele in infants < 1 year of age
and
physician starts antimicrobial therapy in response.

If this definition applies, please select why the KISS definitions could not be fulfilled:

- Second radiological examination missing
- Microbiology missing
- Symptoms missing
- Other

Time of diagnosis: Unlike for SSI, only postoperative LRTI detected during hospitalisation are recorded. Unlike for SSI, no post-discharge surveillance is performed for LRTI.

Mechanical ventilation: Enter "Yes" if mechanical ventilation was performed within 48 hours before the first symptoms of infection. There is no minimum duration for ventilation.

Ventilation during anaesthesia for the surgical procedure **is not** counted as mechanical ventilation in the context of of LRTI surveillance in OP-KISS. However, if mechanical ventilation is continued after surgery (outside of the operating theatre), it is counted as mechanical ventilation.

Invasive ventilation: Invasive ventilation (INV) is defined as mechanical positive pressure ventilation of a patient (controlled, assisted or in pressure support mode), with different pressure levels for inspiration and expiration, via endotracheal or tracheostomy tube.
Note on CPAP:
The sole application of continuous positive airway pressure (CPAP) **is NOT recorded as a form of ventilation**.

Non-invasive ventilation: Non-invasive ventilation (NIV) is defined as mechanical positive pressure ventilation of a patient (controlled, assisted or in pressure support mode), with different pressure levels for inspiration and expiration, via non-invasive means (nasal mask, face mask, full face mask or respiratory helmet) without the simultaneous presence of an endotracheal tube. Both continuous and discontinuous ventilation modes are included.
Note on CPAP:
The sole application of continuous positive airway pressure (CPAP) **is NOT recorded as a form of ventilation**.

If both non-invasive and invasive ventilation methods were used in the 48 hours prior to the first signs and symptoms, the respiratory infection is categorised as INV-associated.

Laboratory diagnosis: Only enter if the microorganism appears to be aetiologically relevant for the LRTI. Do not enter colonisations. If no aetiologically relevant microorganism was detected or no microbiological diagnostics were performed, please enter "Microorganism detected: No".

Note: Enterococci, coagulase-negative staphylococci (CNS) and corynebacteria are only very rarely aetiologically relevant microorganisms of LRTI and are usually considered colonisations.

Microorganism 1/2/3/4: Specification of up to four etiologically relevant microorganisms from the selection lists.

Specimen: Specify the specimen from which the microorganisms were identified (endotracheal aspirate, bronchoalveolar lavage (BAL), protected specimen brushing (PSB), blood, other).

Secondary BSI: A secondary bloodstream infection (BSI) 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 LRTI). Secondary BSI are only recorded if they represent a complication of a documented healthcare-associated infection.

Death: Mark if the patient died within the surveillance period (irrespective of the cause of death).

Comments: Free text for your own notes. Aspects that could be of importance for internal quality management (e.g. special risk factors, extraordinary circumstances) can be documented here. An evaluation of free text information by the NRZ is not planned.

4 Infection rates

4.1 The postoperative lower respiratory tract infection rate

The infection rates of postoperative LRTI are calculated separately for each indicator procedure type. Only LRTI detected during the primary postoperative inpatient stay are recorded.

The LRTI rate is calculated from the number of LRTI after a procedure of a certain type in a defined observation period, divided by the number of procedures of a certain type performed in the same observation period, multiplied by 100. Consequently, the rate indicates how many LRTI per 100 procedures of a type were recorded in the surveillance.

$$\text{Postoperative LRTI rate} = \frac{\text{Number of postoperative LRTI in patients with procedures of type } \textbf{'a'} \text{ in an observation period } \textbf{'t'}}{\text{Number of procedures of type } \textbf{'a'} \text{ in the observation period } \textbf{'t'}} \times 100$$

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

Example:

$$\text{Postoperative LRTI rate} = \frac{\text{Number of postoperative LRTI in patients with } \textbf{lobectomy} \text{ in an observation period } \textbf{'t'}}{\text{Number of } \textbf{lobectomies} \text{ performed in the observation period } \textbf{'t'}} \times 100$$

Addtionally, the proportion of ventilator-associated LRTI among all LRTI is stated as a percentage.

4.2 Comparison of own infection rates with other departments

The infection rates per selected indicator procedure are calculated as explained in chapter 4.1 for each participating surgical department.

For comparison with other departments participating in OP-KISS, the calculation of a pooled LRTI rate is intended, once sufficient LRTI data is available in the OP-KISS database. This rate is intended to be calculated per indicator procedure from the totality of all documented procedures with LRTI surveillance and all documented LRTI.

Once a sufficiently large database is available (see also remark in chapter 2.4), the following statistical distribution variables for the reference values will also be provided to facilitate interpretation of data:

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

5 Data collection form for postoperative lower respiratory tract infections

If an LRTI develops in a patient included in the surveillance, data on the infection must be recorded (see chapter 3). The form below provides an overview and can be used for internal recording. Use a separate data collection form for each LRTI. Data can only be transmitted electronically to the NRZ via webKess.

DATA COLLECTION FORM FOR POSTOPERATIVE LOWER RESPIRATORY TRACT INFECTIONS - OP-KISS -

PROCEDURE
KISS acronym:
Date of surgery:
Procedure type:
webKess ID:
POSTOPERATIVE LOWER RESPIRATORY TRACT INFECTION
Only infections detected during hospitalisation are recorded.
Date of infection (date of first symptoms)**:**
Type of infection (according to KISS definitions): ☐ Clinically defined pneumonia (C1a) ☐ Pneumonia with common bacterial or filamentous fungal pathogens and specific laboratory findings (C1b) ☐ Viral, legionella, and other bacterial pneumonias with definitive laboratory findings (C1c) ☐ Pneumonia with special pathogens in immunocompromised patients (C1d) ☐ Bronchitis, tracheobronchitis, bronchiolitis, tracheitis, without evidence of pneumonia (J1)
Supplementary case definition of the NRZ: ☐ Additional criterion for lower respiratory tract infection (Cx) **KISS definition is not fulfilled because:** ☐ Second radiological examination missing ☐ Microbiology missing ☐ Symptoms missing ☐ Other
Risk factors: Mechanical ventilation (within 48 hours before infection): ☐ No ventilation ☐ Non-invasive ventilation (NIV) ☐ Invasive ventilation via endotracheal or tracheostomy tube (INV)
Laboratory diagnosis: ☐ yes ☐ no **Microorganism** (max. 4)**:**
Specimen: ☐ Endotracheal aspirate ☐ BAL/PSB ☐ Blood ☐ Other
COMPLICATIONS
Secondary bloodstream infection 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.

Cx additional criterion for lower respiratory tract infection:

Supplementary case definition of the NRZ for the diagnosis of an LRTI. This definition should only be used if the KISS definitions for LRTI are not met, despite strong clinical suspicion of an LRTI (e.g. diagnosis by the attending physician). If the KISS criteria can be fulfilled, the corresponding type of infection (C1a, C1b, C1c, C1d or J1) must be documented

Definition Cx:
Chest X-ray shows new or progressive infiltrate, consolidation, cavitation, or pneumatocele in infants < 1 year of age

and

physician starts antimicrobial therapy in response.

If this definition applies, please select why the KISS definitions could not be fulfilled:

- Second radiological examination missing
- Microbiology missing
- Symptoms missing
- Other

6 Pathogens of postoperative lower respiratory tract infections

Up to four microorganisms can be documented for an infection. The microorganisms including 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.

7 Imprint

Nationales Referenzzentrum (NRZ) für Surveillance von nosokomialen Infektionen at the Institute of Hygiene and Environmental Medicine

Director: Prof. Dr. med. Christine Geffers,
Charité-Universitätsmedizin Berlin
corporate member of Freie Universität Berlin and Humboldt-Universität zu Berlin

Hindenburgdamm 27
12203 Berlin
Tel.: +49 30/450 577 612
Fax: +49 30/450 7 577 920
Email: nrz@charite.de

Cooperation partner:

Robert Koch Institute (RKI)
Department of Infectious Diseases,
Unit 14 Hospital Hygiene, Infection Prevention and Control

Nordufer 20
13353 Berlin
Tel.: +49 30/ 18754 2644

KISS contacts:

Contact addresses are listed on the NRZ homepage (https://www.nrz-hygiene.de/)

Protocol version November 2020 | Translation December 2024