



TECHNICAL DOCUMENT

Surveillance of surgical site infections in European hospitals – HAISSI protocol

Protocol version 1.02

ECDC TECHNICAL DOCUMENT

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Abbreviations

ASA	American Society of Anesthesiology
CABG	Coronary artery bypass grafting
CBGB	Coronary artery bypass grafting with both chest and donor site incisions
CBGC	Coronary artery bypass grafting with chest incision only
CHOL	Cholecystectomy
COLO	Colon surgery
CSEC	Caesarean section
ECDC	European Centre for Disease Prevention and Control
EC	European Commission
EU	European Union
GP	General practitioner
HAI	Healthcare-associated infections
HAI-Net	European network for the surveillance of healthcare-associated infections
HELICS	Hospitals in Europe Link for Infection Control through Surveillance
HPRO	Hip prosthesis
IC	Infection control
ICU	Intensive care unit
IPSE	Improving Patient Safety in Europe
KPRO	Knee prosthesis
LAM	Laminectomy
LOS	Length of stay
MS	Member States
NHSN	National Healthcare Safety Network (formerly NNIS)
SSI	Surgical site infections
TESSy	The European Surveillance System

Introduction and objectives

The European Council Recommendation of 9 June 2009 on patient safety, including the prevention and control of healthcare-associated infections (HAI) (2009/C 151/01), recommends 'performing the surveillance of the incidence of targeted infection types', 'using surveillance methods and indicators as recommended by ECDC and case definitions as agreed upon at Community level in accordance with the provisions of Decision No 2119/98/EC' [1,2].

In 2000–2002, harmonised methods for the surveillance of two targeted infection types, surgical site infections (SSI) and healthcare-associated infections in intensive care units (ICU), have been developed by the network HELICS (Hospitals in Europe Link for Infection Control through Surveillance), funded by the European Commission's Directorate-General for Health and Consumers (DG SANCO), and progressively implemented in Member States by HELICS and later as part of the Improving Patient Safety in Europe (IPSE) project. In July 2008, the coordination of the European surveillance of healthcare-associated infections was transferred from the IPSE network to the European Centre for Disease Prevention and Control (ECDC) in accordance with ECDC's mandate. ECDC continued HAI surveillance as in HELICS in 2008 and 2009, while changes to the protocols were agreed during the annual meetings of the HAI surveillance network in Stockholm in June 2009 and June 2010. The current protocol describes the methods for the surveillance of surgical site infections as they were implemented in The European Surveillance System (TESSy) for communicable diseases covered under Decision No 2119/98/EC, in 2010.

Surgical site infections (SSI) are an important target for the surveillance of healthcare-associated infections and an official priority for surveillance in several European countries. Surgical site infections are among the most common healthcare-associated infections, associated with longer postoperative hospital stay, additional surgical procedures or stay at intensive care unit, and often higher mortality. All patients undergoing surgery are at risk for complications, including SSI.

The main objective of the European protocol for the surveillance of SSI is to ensure standardisation of definitions, data collection and reporting procedures for hospitals participating in the national/regional surveillance of surgical site infections across Europe, in order to contribute to the EU surveillance of healthcare-associated infections and to improve the quality of care in a multicenter setting.

The specific objectives of the surveillance activities are:

At the level of the hospital:

- To lower the incidence of SSI by encouraging the owners of the problem (primarily the surgical staff) to:
 - comply with existing guidelines and 'good surgical practice';
 - correct or improve specific practices; and
 - develop, implement and evaluate new preventive practices.
- Participation to the European network will also produce gains at local level from international comparisons that may provide insights that would not be revealed by surveillance limited at the regional or national level.

At the level of regional or national network coordination:

- To provide the units with the necessary reference data to make comparisons of risk-adjusted rates between units/hospitals:
 - to follow-up epidemiological trends in time;
 - to identify and follow-up risk factors of SSI; and
 - to improve the quality of data collection.

At the European level

- To monitor and describe the epidemiology of SSI in the EU in view of responding to the objectives of Decision 2119/98/EC of the European Parliament and of the European Council [2].
- To follow-up the incidence and the geographical spread of SSI for a selection of surgical procedures.
- To identify regions or countries at higher need of EU support with regard to surveillance and control of healthcare-associated infections.
- To ensure communication of relevant data on healthcare-associated infections to the European Commission as a complement to the data transmitted by the national health authorities.
- To facilitate the communication and the exchange of experience between national/regional networks for the surveillance of healthcare-associated infections.
- To stimulate the creation of national/regional coordination centres for the surveillance of SSI where these centres/networks do not exist.
- To provide methodological and technical support to the national/regional coordination centres.
- To improve surveillance methodology, data validation and utilisation.
- To validate risk factors of SSI at the EU level.
- To explore the correlation between structure and process indicators and the incidence of surgical site infections throughout Europe in order to generate hypotheses and new insights in healthcare-associated infection control.

1 From IPSE/HELICS-SSI to HAI-Net SSI: summary of major changes

The first version of this document was produced in October 2003 as protocol *Surveillance of Surgical Site Infections* (HELICS/IPSE protocol 9.1, 2004). Changes to the protocol have been applied, either based on agreements made during the annual meetings of the European network for the surveillance of healthcare-associated infections (HAI-Net) in June 2009 and June 2010, or because they were necessary for the integration of the HAI surveillance data into The European Surveillance System (TESSy) of ECDC.

1. A hospital/unit-based 'light' version of the SSI surveillance protocol is now available. Denominator data are collected per hospital and operation type, optionally per hospital-unit and operation type. Data on risk factors such as the American Society of Anesthesiology (ASA) score, wound contamination class, are not collected. However, the light version does allow calculating the main indicators for SSI surveillance as in the standard (patient-based) version.
2. HAI-Net SSI standard and light protocol datasets both contain four levels: hospital-unit, one record per operation (standard) or aggregated denominator per operation category (light), an infection level and a microorganism-antimicrobial resistance (bug-drug) level. Countries can submit data to ECDC as separate CSV files or as a single XML file.
3. An additional HAISSICOVERAGE dataset/file was introduced to collect the total numbers of operations carried out at the national level per year, for the calculation of the surveillance coverage of the operative categories included in the surveillance.
4. A variable collecting information on the method of post-discharge surveillance was introduced at the hospital (optionally unit) level, both in standard and light version.
5. Antimicrobial resistance markers were changed to those of the protocol for the European Point Prevalence Survey of healthcare-associated infections and antimicrobial use in acute care hospitals. Some microorganisms were corrected or added (_NA=result is not yet available or missing; ENCFAI instead of ENCFAC for *Enterococcus faecium*; CANKRU=*Candida krusei*).

Version 1.02

Version 1.01 was posted on the HAI-Net extranet in May 2011. The following changes have been made to v1.01:

Section 6.2. Clarification regarding the variables 'date of hospital discharge' (DateOfHospitalDischarge) and 'date of last follow-up post-discharge' (DateOfLastFollowup) were made.

Section 6.3. A value unknown (UNK=unknown) is now allowed for the variable 'Date of infection' (DateOfOnset) referring to the date of infection onset (if not known give an estimate of the best of your knowledge).

Section 7.2. In the Light protocol denominator data, the variable 'number of operations' (NumOperations) has become mandatory (changed from Warning to Error if missing).

Section 7.3. A value unknown (UNK=unknown) is now allowed for the variable 'Date of infection' (DateOfOnset) referring to the date of infection onset (if not known give an estimate of the best of your knowledge).

Section 7.3. The two variables 'Date of operation' (DateOfOperation) and 'Date of discharge from hospital' (DateOfDischarge) have been added (omitted from v1.01).

2 Unit-based (light) versus patient-based (standard) surveillance of surgical site infections

As for the protocol for the surveillance of ICU-acquired infections, a unit-based version has now been added for the surveillance of surgical site infections, as agreed at the Annual Meeting of June 2010. While the 'standard' patient-based protocol allows risk adjustment of SSI rates through the use of the basic NNIS (now NHSN, National Healthcare Safety Network) risk index for inter-hospital comparisons [3,4,5], the unit-based or 'light' protocol, provides a less-labour intensive solution, producing partially the same indicators as the patient-based version for follow-up of trends and the same possibilities for adjustment of differences in post-discharge surveillance, as well as descriptive results about infections and antimicrobial resistance, but with no possibility for risk-adjusted comparisons.

Case definitions and included patients are the same for both versions, but while in the patient-based protocol risk factors are collected for each patient (infected or not), in the light protocol denominator data are aggregated at the hospital (and optionally surgical unit) level.

3 Definitions [6,7]

3.1 Case definitions of surgical site infections

The same case definitions are used as in previous protocol, e.g. *HELICS Surveillance of Surgical Site Infections – Version 9.1*, September 2004.

3.1.1 Superficial incisional

Infection occurs within 30 days after the operation and involves only skin and subcutaneous tissue of the incision and at least one of the following:

- purulent drainage with or without laboratory confirmation, from the superficial incision;
- organisms isolated from an aseptically obtained culture of fluid or tissue from the superficial incision;
- at least one of the following signs or symptoms of infection: pain or tenderness, localised swelling, redness, or heat and superficial incision is deliberately opened by surgeon, unless incision is culture-negative;
- diagnosis of superficial incisional SSI made by a surgeon or attending physician.

3.1.2 Deep incisional

Infection occurs within 30 days after the operation if no implant is left in place or within one year if implant is in place and the infection appears to be related to the operation and infection involves deep soft tissue (e.g. fascia, muscle) of the incision and at least one of the following:

- purulent drainage from the deep incision but not from the organ/space component of the surgical site;
- a deep incision spontaneously dehisces or is deliberately opened by a surgeon when the patient has at least one of the following signs or symptoms: fever ($> 38^{\circ}\text{C}$), localised pain or tenderness, unless incision is culture-negative;
- an abscess or other evidence of infection involving the deep incision is found on direct examination, during reoperation, or by histopathologic or radiologic examination;
- diagnosis of deep incisional SSI made by a surgeon or attending physician.

3.1.3 Organ/space

Infection occurs within 30 days after the operation if no implant is left in place or within one year if implant is in place and the infection appears to be related to the operation and infection involves any part of the anatomy (e.g. organs and spaces) other than the incision that was opened or manipulated during an operation and at least one of the following:

- purulent drainage from a drain that is placed through a stab wound into the organ/space;
- organisms isolated from an aseptically obtained culture of fluid or tissue in the organ/space;
- an abscess or other evidence of infection involving the organ/space that is found on direct examination, during reoperation, or by histopathologic or radiologic examination;
- diagnosis of organ/space SSI made by a surgeon or attending physician.

3.2 Other key definitions

3.2.1 Basic SSI risk index

The basic SSI risk index is the index used in National Healthcare Safety Network (NHSN) and assigns surgical patients into categories based on the presence of three major risk factors [3,4,5,6,7,8,9]:

- operation lasting more than the duration cut point hours, where the duration cut point is the approximate 75th percentile of the duration of surgery in minutes for the operative procedure, rounded to the nearest whole number of hours;
- contaminated (class 3) or dirty/infected (class 4) wound class;
- ASA classification of 3, 4, or 5.

The patient's SSI risk category is the number of these factors present at the time of the operation.

Calculation of basic SSI risk index

Calculation	Score =0, if:	Score=1, if:
Wound contamination class	W1, W2	W3, W4
ASA classification	A1, A2	A3, A4, A5
Duration of operation T (see table in chapter 3.2.4)	$\leq T$	$> T$
Basic SSI risk index =	Sum of scores	

3.2.2 Wound contamination class

Wound contamination class as described by Altmeier *et al.* [8].

Wound contamination classification

Wound contamination class	Description
W1	A clean wound is an uninfected operative wound in which no inflammation is encountered and the respiratory, alimentary, genital or uninfected urinary tracts are not entered. In addition, clean wounds are primarily closed and, if necessary, drained with closed drainage. Operative incisional wounds that follow non-penetrating trauma should be included in this category.
W2	Clean-contaminated wounds are operative wounds in which the respiratory, alimentary, genital or uninfected urinary tracts are entered under controlled condition and without unusual contamination. Specifically operations involving the biliary tract, appendix, vagina and oropharynx are included in this category provided no evidence of infection or major break in technique is encountered.
W3	Contaminated wounds include open, fresh, accidental wounds. In addition operations with major breaks in sterile technique or gross spillage from the gastrointestinal tract, and incisions in which acute, nonpurulent inflammation is encountered are included in this category.
W4	Dirty or infected wounds include old traumatic wounds with retained devitalised tissue and those that involve existing clinical infection or perforated viscera. This definition suggests that the organisms causing postoperative infection were present in the operative field before the operation.

3.2.3 The ASA physical status classification (ASA score)

Physical status classification developed by the American Society of Anesthesiology (ASA) [9].

ASA physical status classification

ASA score	Description
A1	Normally healthy patient
A2	Patient with mild systemic disease
A3	Patient with severe systemic disease that is not incapacitating
A4	Patient with an incapacitating systemic disease that is a constant threat to life
A5	Moribund patient who is not expected to survive for 24 hours with or without operation

3.2.4 Duration of operation

The table below shows the 75th percentile cut-off values for the selected NHSN procedures. In case of a reintervention within 72h after the primary procedure, the duration of the reintervention needs to be added to the duration of the primary procedure.

Cut-off values for duration of operative procedure categories

Category	Description	75th percentile cut-off value, in hours
CABG	Coronary artery bypass graft, unspecified	5
CBGB	Coronary artery bypass graft with both chest and donor site incisions: chest procedure to perform direct revascularisation of the heart; includes obtaining suitable vein from donor site for grafting	5
CBGC	Coronary artery bypass graft with chest incision only: chest procedure to perform direct vascularisation of the heart using, for example, the internal mammary artery.	4
CHOL	Cholecystectomy: removal of gallbladder; includes procedures performed using the laparoscope	2
COLO	Colon surgery: incision, resection or anastomosis of the large bowel; includes large-to-small and small-to-large bowel anastomosis	3
CSEC	Caesarean section	1
HPRO	Arthroplasty of hip	2
KPRO	Arthroplasty of knee	2
LAM	Laminectomy: exploration or decompression of spinal cord through excision or incision into vertebral structures.	2

3.3 Definitions of other variables and codes used for surveillance of surgical site infections

Country code: ISO codes (International Organization for Standardization ISO 3166-1-alpha-2-c0de elements): AT = Austria, BE = Belgium, BG = Bulgaria, CY = Cyprus, CZ = Czech Republic, DE = Germany, DK = Denmark, EE = Estonia, ES = Spain, FI = Finland, FR = France, GB = Great Britain, GR = Greece, HU = Hungary, IE = Ireland, IT = Italy, IS = Iceland, LI = Liechtenstein, LV = Latvia, LT = Lithuania, LU = Luxembourg, MT = Malta, NL = Netherlands, NO = Norway, PL = Poland, PT = Portugal, RO = Romania, SK = Slovakia, SI = Slovenia, SE = Sweden.

Network code: Unique identifier for each network – Member State (MS) selected and generated. Code can be omitted, if the hospital identifiers are unique within the reporting country, but should be combined with HospitalId if same codes are used across different subnetworks that are reported through by single DataSource (e.g. data from five regional CCLIN networks reported as one database by France).

Subject: HAISSI

Hospital ID: The code provided by national institution, which is responsible for national surveillance.

Hospital Size: Total number of beds in the hospital or rounded to the closest 100 beds.

Hospital Type: PRIM = Primary level, SEC = Secondary level, TERT = Tertiary level, SPEC = Specialist/Other, UNK = Unknown

- Primary:
 - often referred to as 'district hospital' or 'first-level referral';
 - often corresponds to a general hospital without teaching function;
 - few specialities (mainly internal medicine, obstetrics-gynaecology, paediatrics, general surgery or only general practice);
 - limited laboratory services are available for general, but not for specialised pathological analysis.
- Secondary:
 - often referred to as 'provincial hospital';
 - often corresponds to general hospital with teaching function;
 - highly differentiated hospital by function with five to 10 clinical specialities, such as haematology, oncology, nephrology, ICU;
 - takes some referrals from other (primary) hospitals.
- Tertiary:
 - often referred to as 'central', 'regional' or 'tertiary-level' hospital;
 - often corresponds to University hospital;
 - highly specialised staff and technical equipment (ICU, haematology, transplantation, cardio-thoracic surgery, neurosurgery);
 - clinical services are highly differentiated by function;
 - specialised imaging units;
 - provides regional services and regularly takes referrals from other (primary and secondary) hospitals.
- Specialised hospital:
 - single clinical specialty, possibly with sub-specialties;
 - highly specialised staff and technical equipment;
 - e.g. paediatric hospital, infectious diseases hospital.

Post-discharge Surveillance Method:

- READM = Detection at readmission (=passive post-discharge surveillance): patient is readmitted with surgical site infection, often because of the SSI.
- REPSURG = Reporting on surgeon's initiative: surgeon actively reports post-discharge infections detected at outpatient clinic or private clinic follow-up to the hospital surveillance staff, e.g. using standardised forms, web-based system, e-mail or telephone.
- REPGP = Reporting on GP's initiative: general practitioner (GP) reports post-discharge infections detected at follow-up consultation to the hospital surveillance staff, e.g. using standardised forms, web-based system, e-mail or telephone.
- REPPAT = Reporting on patient's initiative: e.g. form send to hospital surveillance staff.
- ICSURG = Obtained by IC staff from surgeon: the hospital surveillance staff – usually infection control (IC) staff – obtains information from surgeon using telephone, additional questionnaire, visit to surgeon or patient chart review.
- ICGP = Obtained by IC staff from GP: hospital surveillance staff obtains information from general practitioner using telephone, additional questionnaire or visit.

- ICPAT = Obtained by IC staff from patient: hospital surveillance staff obtains information from patient using telephone or additional questionnaire.
- NONE = No post-discharge surveillance done.
- UNK = Unknown, no data about post-discharge surveillance method available.

Unit ID: Unique identifier for each surgical unit – MS selected and generated.

Surgical Unit Specialty: CA = General/abdominal surgery, CC = Cardiovascular surgery, CM = Mixed surgical/medical, CN = Neurosurgery, CO = Orthopaedic surgery, TR = Traumatology, GY = Gynaecology, OTH = Other surgical specialty, UNK = Unknown

Post-discharge method: READM = Detection at readmission, REPSURG = Reporting on surgeon's initiative, REPGP = Reporting on GP's initiative, REPPAT = Reporting on patient's initiative, ICSURG = Obtained by IC staff from surgeon, ICGP = Obtained by IC staff from GP, ICPAT = Obtained by IC staff from patient, NONE = No post-discharge surveillance done, UNK = Unknown.

Operation ID: Unique identifier for each operation – Hospital selected and generated.

Hospital Location: Region as NUTS-1 code where hospital is located: see Annex 1.

Age at date of operation in years: Age corresponds to the age of the patient at date of operation.

Gender: The gender of the patient who undergoes the operation: M = Male, F = Female, O = Transsexual, UNK = Unknown.

Outcome from hospital: Patient status at hospital discharge or at end of follow-up in hospital.

Date of operation: Date operation under surveillance was carried out (YYYY-MM-DD).

Date of hospital admission: Date patient was admitted to hospital in order to undergo the operation under surveillance (YYYY-MM-DD).

Date of discharge: Date the patient was discharged from hospital where they underwent the operation under surveillance or date of in-hospital death or date of last follow-up in hospital. This date is used to calculate the number of post-operative in-hospital patient days.

Date of last follow-up post-discharge: Date last information on the patient was obtained after discharge from hospital, for example from surgeon (out-patient department or private practice) or general practitioner. This date is used to calculate the total amount of follow-up days (in-hospital and post-discharge) (YYYY-MM-DD).

Operation code:

CBGB = coronary artery bypass grafting with both chest and donor site incisions

CBGC = coronary artery bypass grafting with chest incision only

CABG = coronary artery bypass grafting, not specified

COLO = colon surgery

CHOL = cholecystectomy

CSEC = caesarean section

HPRO = hip prosthesis

KPRO = knee prosthesis

LAM = laminectomy

Operation ICD-9-CM code: (see Annex 2)

Endoscopic procedure: Yes = only if the entire operation was performed using an endoscopic/laparoscopic approach.

Wound contamination class: The wound contamination class as described:

W1= Clean

W2 = Clean-contaminated

W3 = Contaminated

W4 = Dirty or infected

UNK = Unknown

Duration of operation in minutes: Duration of operation (in minutes) from skin incision to skin closure. In case of reintervention within 72h after the primary procedure, the duration of the reintervention is added to the duration of the primary procedure.

Urgent operation: Planning time of the operation. 'Yes' means urgent operation that was not planned at least 24 hours in advance. 'No' means elective operation that was planned at least 24 hours in advance.

Y =Yes (urgent)

N = No (elective)

UNK = Unknown

ASA classification: Physical status classification developed by the American Society of Anesthesiology at operation time.

A1 = Normally healthy patient

A2 = Patient with mild systemic disease

A3 = Patient with severe systemic disease that is not incapacitating

A4 = Patient with an incapacitating systemic disease that is a constant threat to life

A5 = Moribund patient who is not expected to survive for 24 hours with or without operation

UNK = Unknown

Antibiotic prophylaxis: Perioperative systemic administration of antimicrobial agent(s) at or within two hours prior to primary skin incision with the aim of preventing sepsis in the operative site.

Y = Yes (patient received surgical antibiotic prophylaxis)

N = No (patient did not receive surgical antibiotic prophylaxis)

UNK = Unknown

Surgical Site Infection: Presence of a surgical site infection for this operation (see section 3.1). For CBGB only chest wound infections are to be reported.

Date of Infection: Date when the first clinical evidence of SSI appeared or the date the specimen used to make or confirm the diagnosis was collected, whichever comes first (YYYY-MM-DD).

Type of Infection: Type of infection (see section 3.1).

S = Superficial incisional

D = Deep incisional

O = Organ/space

UNK = Unknown

Isolate result: Microorganism or reason why not available (see Annex 3 for the microorganism code list).

Antibiotic code and resistance data: Codes 0, 1, 2 or 9 must be filled out according to microorganism resistance. More details in Annex 5.

4 Indicators to be produced at the European level on the occurrence and characteristics of surgical site infections

For each procedure under surveillance and for each level of the NHSN risk index, the EU database will produce the rates of surgical site infections (superficial, deep, organ-space, total), as a percentage of the number of interventions and as an incidence density (number of SSI with onset before hospital discharge per 1 000 patient days in the hospital).

4.1 Cumulative incidence of SSI by category

The first indicator (% SSI) gives the most complete picture for a given operative procedure, but is highly dependent on the intensity of post-discharge surveillance, which varies considerably between hospitals and between countries.

$$\text{Cumulative incidence (by category)} = \frac{\text{all first SSI* in that category} \times 100}{\text{all operations in that category}}$$

*SSI are included, if {DateOfOnset}–{DateOfOperation}+1 ≤31 or ≤366 days for HPRO and KPRO.

4.2 Cumulative incidence of SSI excluding post-discharge diagnosed SSI

The second indicator only considers infections detected in the hospital (post-discharge diagnosed SSI are excluded). It corrects differences between in post-discharge surveillance between hospitals and countries, but provides an incomplete epidemiological picture and is not adjusted for differences in length of post-operative stay.

$$\text{Cumulative incidence excluding post-discharge (by category)} = \frac{\text{all first in-hospital SSI in that category} \times 100}{\text{all operations with known discharge date in that category}}$$

*SSI are included, if {DateOfOnset}–{DateOfOperation}+1 ≤31 or ≤366 days for HPRO and KPRO.

Step 1. Delete/exclude all operations (with or without SSI) where DateOfHospitalDischarge is unknown.

Step 2. Exclude from numerator (not from denominator!) all SSI where DateOfOnset > DateOfHospitalDischarge (= consider these records as having NO SurgicalSiteInfection).

Step 3. Apply 30d/1year rule on (in-hospital) SSI.

4.3 In-hospital SSI incidence density

The third indicator (number of in-hospital SSI/1 000 patient days in the hospital) only considers infections detected in the hospital and therefore it does not reflect the complete epidemiological picture, e.g. in procedures with short post-operative hospital stay. However, it is independent of post-discharge surveillance and corrects for differences in post-operative hospital stay, and therefore this indicator may be more reliable for inter-hospital or inter-network comparisons.

$$\text{Incidence density in-hospital SSI (by category)} = \frac{\text{all in-hospital SSI in that category} \times 1000}{\text{in-hospital postoperative patient days with known discharge date in that category}}$$

*DateOfOnset–DateOfOperation+1 ≤31 or ≤366 days for HPRO and KPRO.

Step 1. Delete/exclude all operations (with or without SSI) where DateOfHospitalDischarge is unknown.

Step 2. Calculate in-hospital postoperative patient days as Sum of (DateOfHospitalDischarge–DateOfOperation+1).

Step 3. Apply 30d/1year rule on (in-hospital) SSI.

5 Data collection

5.1 Population under surveillance

All data from participating hospitals (or specific wards within a hospital) that perform procedures included in the European protocol are eligible for inclusion. A minimum period of three months of collection of data on surgical site infections in the participating hospitals is recommended for both standard and light protocols.

5.2 Type of surgery under surveillance

In order to obtain sufficient numbers of records allowing statistically valid conclusions, the diversity of operations to be recorded is limited and focuses on relatively frequently registered procedures that are likely to be interpreted similarly in different settings.

The following table offers a selection of operations from which the participating centres may chose. At a later stage this list can be modified at the demand of participants (also see Annex 2 for ICD-9-CM code list). All ICD-9-CM codes are available on the website <http://www.findacode.com/home.php>.

Selected type of surgical procedures for surveillance

NHSN category	Description	ICD-9-CM* Codes included in the category
COLO	Colon surgery Incision, resection or anastomosis of the large bowel; includes large-to-small and small-to-large bowel anastomosis Laparoscopic excision of large intestine Enterotomy Intestinal anastomosis Abdominoperineal resection of rectum Transsacral rectosigmoidectomy	17.3–17.39, 45.00–45.03, 45.15, 45.26, 45.31–45.34, 45.4, 45.41, 45.49, 45.50–45.52, 45.61– 45.63, 45.7–45.95, 46.0, 46.03, 46.04, 46.1–46.14, 46.20–46.24, 46.31, 46.39, 46.4, 46.41, 46.43, 45.5, 46.51, 46.52, 46.7–46.76, 46.9–46.94, 48.25, 48.35, 48.40, 48.42, 48.43, 48.49, 48.5–48.59, 48.6–48.69, 48.74
CHOL	Cholecystectomy Removal of gallbladder, includes procedures performed using the laparoscope	51.0, 51.03, 51.04, 51.13, 51.2–51.24
HPRO	Arthroplasty of hip	00.70–00.73, 81.51–81.53
KPRO	Arthroplasty of knee	00.80–00.84, 81.54–81.55
LAM	Laminectomy Exploration or decompression of spinal cord through excision or incision into vertebral structures	03.0–03.09, 80.50, 80.51, 80.53, 80.54, 80.59, 84.60–84.69, 84.80–84.85
CSEC	Caesarean section	74.0–74.2, 74.4, 74.9–74.99
CABG	Coronary artery bypass, unspecified	36.1–36.2
CBGB	Coronary artery bypass grafting with both chest and donor site incisions Chest procedure to perform direct revascularisation of the heart; includes obtaining suitable vein from donor site for grafting	36.10–36.14, 36.19
CBGC	Coronary artery bypass grafting with chest incision only Chest procedure to perform direct vascularisation of the heart using, for example, the internal mammary artery	36.15–36.17, 36.2

*ICD-9-CM Procedure Codes ver. 2001

5.3 Levels of data requirement

In ECDC's TESSy system, variables are classified according to three levels of requirement:

- **Required true (error):** data will be rejected if this variable is missing (previously called mandatory (**M**))
- **Required true (warning):** variables are required for the correct interpretation of the results and/or for routine analysis, a warning will be produced if this variable is missing (previously called required (**R**))
- **Required false:** no error if data is missing, previously called optional (**O**), data used for additional analysis

5.4 Hierarchy of datasets

The set of variables for **HAI-Net-SSI reporting** (*RecordType* 'HAISSI') consists of eight technical variables and 43 epidemiological variables. Technical variables are only relevant at the surveillance network coordination.

HAI-Net-SSI standard protocol dataset contains four levels:

1. The first level 'HAISSI' includes data referring to the hospital/unit that are repeated in all records reporting the operation data, infection data and microorganisms and resistance data.
2. Second level 'HAISSI\$OP' includes variables about patient, operation and risk factors.
3. Third level 'HAISSI\$OP\$INF' includes variables about surgical site infections.
4. Fourth level 'HAISSI\$OP\$INF\$RES' includes variables about pathogens and their resistance.

HAI-Net-SSI light protocol dataset contains four levels:

1. The first level 'HAISSILIGHT' includes data referring to the hospital/unit that are repeated in all records reporting the operation data, infection data and microorganisms and resistance data.
2. Second level 'HAISSILIGHT\$OPCAT' includes variables about operations.
3. Third level 'HAISSILIGHT\$OPCAT\$INF' includes variables about surgical site infections and operations.
4. Fourth level 'HAISSILIGHT\$OPCAT\$INF\$RES' includes variables about pathogens and their resistance.

HAISSICOVERAGE contains variables about different types of operation and their national denominators.

5.5 Technical variables

Variable name (Transport label)	Description	Value list	Required
Record ID (RecordId)	Unique identifier for the hospital (and, optionally, the surgical unit) within each Network. Recommended format: [Network ID]-[HospitalId]-[UnitId]-[DateUsedForStatistics]		True (Error)
Record type (RecordType)	Structure and format of the data (case based reporting and aggregate reporting).		True (Error)
Record type version (RecordTypeVersion)	There may be more than one version of a record type. This element indicates which version the sender uses when generating the message. Required when no metadata set is provided at upload		False
Subject (Subject)	Disease to report		True (Error)
Data source (DataSource)	The data source (surveillance system) that the record originates from	[List of data sources]	True (Error)
Reporting country (ReportingCountry)	The country reporting the record	[List of countries]	True (Error)
Date used for statistics (DateUsedForStatistics)	Year covered	YYYY	True (Error)
Status (Status)	Status of reporting NEW/UPDATE or DELETE (deactivate). Default if left out: NEW/UPDATE. If set to DELETE, the record with the given recordId will be deleted from the TESSy database (or better stated, invalidated). If set to NEW/UPDATE or left empty, the record is newly entered into the database	NEW/UPDATE DELETE	No
Network ID (NetworkId)	Unique identifier for each network – MS selected and generated. Can be omitted if the hospital identifiers are unique within the reporting country		No

6 Standard protocol

6.1 Hospital and unit data (first level)

The first level (RecordType 'HAISSI') includes data referring to the hospital/unit that are valid for all related records about operation data, infection data and microorganisms and resistance data.

Information at this level should be collected once a year and are used for stratification of reference data.

Variable name (Transport label)	Description	Value list	Required
Hospital ID (HospitalId)	Unique identifier for each hospital – MS selected and generated, should remain identical in different surveillance periods/years		True (Error)
Hospital size (HospitalSize)	Number of beds in the hospital or rounded down to the closest 100 beds	min: 0, max: 9999, UNK	True (Warning)
Hospital type (HospitalType)	Type of hospital (see section 3.3)	PRIM = Primary level (district hospital or first-level referral) SEC = Secondary level (provincial hospital) TERT = Tertiary level (regional or tertiary-level hospital) SPEC = Specialist/Other UNK = Unknown	No
Region where hospital is located. (HospitalLocation)	Region as NUTS-1 code where hospital is located	See annex 1: NUTS-1 codes	No
Unit ID (UnitId)	Unique identifier for each surgical unit – MS selected and generated		No
Unit specialty (UnitSpecialty)	Specialty of unit	CA = General/abdominal surgery CC = Cardiovascular surgery CM = Mixed surgical/medical CN = Neurosurgery CO = Orthopaedic surgery TR = Traumatology GY = Gynaecology OTH = Other surgical specialty UNK = Unknown	No
Method used for post-discharge surveillance (PostDischargeMethod)	Method used for post-discharge surveillance of surgical site infections (see section 3.3)	READM = Detection at readmission REPSURG = Reporting on surgeon's initiative REPGP = Reporting on GP's initiative REPPAT = Reporting on patient's initiative ICSURG = Obtained by IC staff from surgeon ICGP = Obtained by IC staff from GP ICPAT = Obtained by IC staff from patient NONE = No post-discharge surveillance done UNK = Unknown	No

6.2 Patient, operation and risk factors data (second level)

The second level (RecordType 'HAISSI\$OP') includes variables about patient, operation and risk factors.

Variable name (Transport label)	Description	Value list	Required
Patient information			
Age (Age)	Age corresponds to the age of the patient at date of operation	Num (0–120), UNK	True (Warning)
Gender (Gender)	Common variable. In SSI: the gender of the patient who undergoes the operation. Transsexual should be coded as O = Other	M = Male F = Female O = Other UNK = Unknown	True (Warning)
Outcome from hospital (OutcomeHospital)	Patient status at hospital discharge or at end of follow-up in hospital	A = Alive D = Dead in hospital UNK = Unknown	True (Warning)
Operation information			
Operation ID (OperationId)	Unique identifier for each operation – Hospital selected and generated		True (Error)
Patient counter (PatientCounter)	Numeric code for each patient, unique within hospital. Anonymous code assigned by hospital to specify patient		No
Date of operation (DateOfOperation)	Date operation under surveillance was carried out	Date (YYYY-MM-DD)	True (Error)
Date of hospital admission (DateOfHospitalAdmission)	Date patient was admitted to hospital in order to undergo the operation under surveillance	Date (YYYY-MM-DD), UNK	True (Warning)
Date of hospital discharge (DateOfHospitalDischarge)	Date the patient was discharged from hospital where they underwent the operation under surveillance or date of in-hospital death or date of last follow-up <u>in hospital</u> if discharge date is unknown. This date is used to calculate the number of post-operative in-hospital patient days	Date (YYYY-MM-DD), UNK	True (Warning)
Date of last follow-up post-discharge (DateOfLastFollowup)	Date last information on the patient was obtained <u>after</u> discharge from hospital, for example from surgeon (out-patient department or private practice) or general practitioner. This date is used to calculate the total amount of follow-up days (in-hospital and post-discharge)	Date (YYYY-MM-DD), UNK, NA	False
Operation code (OPCode)	NHSN (National Healthcare Safety Network) code of the primary operative procedure under surveillance according to SSI surveillance protocol	CBGB = coronary artery bypass grafting with both chest and donor site incisions CBGC = coronary artery bypass grafting with chest incision only CABG = coronary artery bypass grafting, not specified COLO = colon surgery CHOL = cholecystectomy CSEC = caesarean section HPRO = hip prosthesis KPRO = knee prosthesis LAM = laminectomy	True (Error)
ICD-9-CM code (ICD9CMCode)	ICD-9-CM code of the primary operative procedure under surveillance according to SSI surveillance protocol. Use 4-digit code or 3-digit code if 4-digit code not available	See Annex 2	False
Endoscopic procedure (EndoscopicProc)	Enter 'Yes' only if the entire operation was performed using an endoscopic/laparoscopic approach	Y = Yes N = No UNK = Unknown	True (Warning)
Wound contamination class (WoundClass)	The wound contamination class as described in the surveillance protocol	W1 = Clean W2 = Clean-contaminated W3 = Contaminated W4 = Dirty or infected UNK = Unknown	True (Warning)

Variable name (Transport label)	Description	Value list	Required
Duration of operation (OperationDur)	Duration of operation (in minutes) from skin incision to skin closure. In case of reintervention within 72h after the primary procedure, the duration of the reintervention is added to the duration of the primary procedure	Num (0–998), UNK	True (Warning)
Urgent operation (UrgentOperation)	Planning time of the operation. 'Yes' means urgent operation that was not planned at least 24 hours in advance. 'No' means elective operation that was planned at least 24 hours in advance	Y = Yes (Urgent) N = No (Elective) UNK = Unknown	True (Warning)
ASA classification (ASAClassification)	Physical status classification developed by the American Society of Anesthesiology at operation time	A1 = Normally healthy patient A2 = Patient with mild systemic disease A3 = Patient with severe systemic disease that is not incapacitating A4 = Patient with an incapacitating systemic disease that is a constant threat to life A5 = Moribund patient who is not expected to survive for 24 hours with or without operation UNK = Unknown	True (Warning)
Patient received surgical prophylaxis (Prophylaxis)	Perioperative systemic administration of antimicrobial agent(s) at or within two hours prior to primary skin incision with the aim of preventing sepsis in the operative site. In case of caesarean section, after clamping of umbilical cord	Y = Yes N = No UNK = Unknown	False
Surgical site infection (SurgicalSiteInfection)	Presence of a surgical site infection for this operation. For CBGB, only chest wound infections are to be reported	Y = Yes N = No	True (Error)

6.3 Infection data (third level)

The third level (RecordType 'HAISSI\$OP\$INF') includes variables about type of infections and date of onset.

Variable name (Transport label)	Description	Value list	Required
Date of infection onset (DateOfOnset)	Date when the first clinical evidence of SSI appeared or the date the specimen used to make or confirm the diagnosis was collected, whichever comes first	Date (YYYY-MM-DD), UNK	True (Error)
Type of infection (SSIType)	Type of infection	S = Superficial incisional D = Deep incisional O = Organ/space UNK = unknown	True (Error)

6.4 Microorganisms and antimicrobial resistance data (fourth level)

The fourth level (RecordType 'HAISSI\$OP\$INF\$RES') includes variables about isolated microorganisms and antimicrobial resistance. Please see Annex 5 for AMR markers adjusted to the European PPS protocol.

Variable name (Transport label)	Description	Value list	Required
Isolate result (ResultIsolate)	Microorganism or reason why not available	See Annex 3	True (Error)
Antibiotic code (Antibiotic)	Antibiotic code tested for susceptibility	See Annex 6	True (Warning)
SIR (SIR)	Final interpretation result of all different susceptibility tests performed	S = Susceptible I = Intermediate R = Resistant UNK = Unknown NA = Not applicable	True (Warning)

7 Light protocol

7.1 Hospital and unit data (first level)

The first level in the light protocol (RecordType 'HAISSILIGHT') includes the same data as in the standard protocol.

Variable name (Transport label)	Description	Value list	Required
Hospital ID (HospitalId)	Unique identifier for each hospital – MS selected and generated, should remain identical in different surveillance periods/years		True (Error)
Hospital size (HospitalSize)	Number of beds in the hospital or rounded down to the closest 100 beds	min: 0, max: 9999, UNK	True (Warning)
Hospital type (HospitalType)	Type of hospital	PRIM = Primary level (district hospital or first-level referral) SEC = Secondary level (provincial hospital) TERT = Tertiary level (regional or tertiary-level hospital) SPEC = Specialist/Other UNK = Unknown	No
Region where hospital is located (HospitalLocation)	Region as NUTS-1 code where hospital is located	See annex 1: NUTS-1 codes	No
Unit ID (UnitId)	Unique identifier for each surgical unit – MS selected and generated		No
Unit specialty (UnitSpecialty)	Specialty of unit	CA = General/abdominal surgery CC = Cardiovascular surgery CM = Mixed surgical/medical CN = Neurosurgery CO = Orthopaedic surgery TR = Traumatology GY = Gynaecology OTH = Other surgical specialty UNK = Unknown	No
Method used for post-discharge surveillance (PostDischargeMethod)	Method used for post-discharge surveillance of surgical site infections (see section 3.3)	READM = Detection at readmission REPSURG = Reporting on surgeon's initiative REPGP = Reporting on GP's initiative REPPAT = Reporting on patient's initiative ICSURG = Obtained by IC staff from surgeon ICGP = Obtained by IC staff from GP ICPAT = Obtained by IC staff from patient NONE = No post-discharge surveillance done UNK = Unknown	No

7.2 Aggregated operation category denominator data (second level)

The second level (RecordType 'HAISSILIGHT\$OPCAT') includes denominator data and variables about operation category.

Variable name (Transport label)	Description	Value list	Required
Unit information			
Start date of the time period covered by this denominator entry (PeriodStart)	Start date of the time period covered by this denominator entry	Date (YYYY-MM-DD)	True (Error)
End date of the time period covered by this denominator entry (PeriodEnd)	End date of the time period covered by this denominator entry	Date (YYYY-MM-DD)	True (Error)
Operation code (OPCode)	NHSN (National Healthcare Safety Network) code of the primary operative procedure under surveillance according to SSI surveillance protocol	CBGB = coronary artery bypass grafting with both chest and donor site incisions CBGC = coronary artery bypass grafting with chest incision only CABG = coronary artery bypass grafting, not specified COLO = colon surgery CHOL = cholecystectomy CSEC = caesarean section HPRO = hip prosthesis KPRO = knee prosthesis LAM = laminectomy	True (Error)
ICD-9-CM code (ICD9CMCode)	ICD-9-CM code of the primary operative procedure under surveillance according to SSI surveillance protocol. Use 4-digit code or 3-digit code if 4-digit code not available	See Annex 2	False
Number of operations (NumOperations)	Number of operations for this operation code and ICD-9 code (if given)		True (Error)
Number of operations with known discharge date (NumOperationsDisDate)	Number of operations for this operation code and ICD-9 code (if given) with known discharge date		True (Warning)
Number of post-operation hospital patient days (NumPatDaysHosp)	Number of post-operation hospital patient days. Definition: the sum of patient days in the hospital following the operation (discharge date – operation date + 1) according to operation code and ICD-9 (if given)		True (Warning)

Surveillance period started: Start date of the time period covered by this denominator entry.

Surveillance period ended: End date of the time period covered by this denominator entry.

Number of operations: Number of surgical procedures in the category of operations during the survey period.

Number of postoperative patient days: Number of post-operation hospital patient days. Definition: the sum of patient days in the hospital following the operation (discharge date – operation date + 1) according to operation code and ICD-9 (if given).

7.3 Infection data (third level)

The third level (RecordType 'HAISSILIGHT\$OPCAT\$INF') includes variables about surgical site infections, adding some basic patient/operation variables in comparison to the infection data in the standard protocol.

Variable name (Transport label)	Description	Value list	Required
Patient information			
Age (Age)	Age corresponds to the age of the patient at date of operation	Num (0–120), UNK	True (Warning)
Gender (Gender)	Common variable. In SSI: the gender of the patient who undergoes the operation! Transsexual should be coded as O = Other	M = Male F = Female O = Other UNK = Unknown	True (Warning)
Outcome from hospital (OutcomeHospital)	Patient status at hospital discharge or at end of follow-up in hospital	A = Alive D = Dead in hospital UNK = Unknown	True (Warning)
Infection information			
Operation ID (OperationId)	Unique identifier for each operation – Hospital selected and generated		True (Error)
Date of infection (DateOfOnset)	Date of infection onset. If not known, give an estimate to the best of your knowledge	Date (YYYY-MM-DD), UNK	True (Error)
Type of infection (SSIType)	Type of infection	S = Superficial incisional D = Deep incisional O = Organ/space UNK = Unknown	True (Error)
Date of operation (DateOfOperation)	Date operation under surveillance was carried out	Date (YYYY-MM-DD)	True (Warning)
Date of discharge from hospital (DateOfDischarge)	Date the patient was discharged from hospital where they underwent the operation under surveillance or date of in-hospital death or date of last follow-up <u>in hospital</u> if discharge date is unknown	Date (YYYY-MM-DD)	True (Warning)

7.4 Microorganisms and antimicrobial resistance data (fourth level)

The fourth level (RecordType 'HAISSILIGHT\$OPCAT\$INF\$RES') includes the same variables as standard protocol about microorganisms and antimicrobial resistance (AMR). Please see Annex 5 for AMR markers adjusted to the European PPS protocol.

Variable name (Transport label)	Description	Value list	Required
Isolate result (ResultIsolate)	Microorganism or reason why not available	See Annex 3	True (Error)
Antibiotic code (Antibiotic)	Antibiotic code tested for susceptibility	See Annex 6	True (Warning)
SIR (SIR)	Final interpretation result of all different susceptibility tests performed	S = Susceptible I = Intermediate R = Resistant UNK = Unknown NA = Not applicable	True (Warning)

8 HAISSICOVERAGE dataset

The HAISSICOVERAGE dataset/file was introduced to collect the total numbers of operations carried out at the national level per year (for the reported surveillance year). These data should only be reported for surgical procedures included in the national/regional surveillance and will be used for the calculation of the surveillance coverage of the operative categories included in the surveillance.

Variable name (Transport label)	Description	Value list	Required
Number of operations for coronary artery bypass grafting (NoOfOperationsCABG)	Total number of operations for coronary artery bypass grafting for the complete network or the Member State if only one network for the year		True (Warning)
Number of operations for colon surgery (NoOfOperationsCOLO)	Total number of operations for colon surgery for the complete network or the Member State if only one network for the year		True (Warning)
Number of operations for cholecystectomy (NoOfOperationsCHOL)	Total number of operations for cholecystectomy for the complete network or the Member State if only one network for the year		True (Warning)
Number of operations for caesarean section (NoOfOperationsCSEC)	Total number of operations for caesarean section for the complete network or the Member State if only one network for the year		True (Warning)
Number of operations for hip prosthesis (NoOfOperationsHPRO)	Total number of operations for hip prosthesis for the complete network or the Member State if only one network for the year		True (Warning)
Number of operations for knee prosthesis (NoOfOperationsKPRO)	Total number of operations for knee prosthesis for the complete network or the Member State if only one network for the year		True (Warning)
Number of operations for laminectomy (NoOfOperationsLAM)	Total number of operations for laminectomy for the complete network or the Member State if only one network for the year		True (Warning)

9 Confidentiality

9.1 Patient confidentiality

It will not be possible to identify individual patients in the European database on SSI by coding patient information only at the hospital level or at the level of the official networks in the countries. However, for validation purposes, the hospitals should be able to trace back patients based on the anonymous unique operative procedure ID.

9.2 Hospital and unit confidentiality

Individual hospitals will not be identifiable in the European database on SSI by coding hospital information at the hospital level or at the level of the official networks in the countries. When presenting the results of the European SSI surveillance, it has to be secured that no individual hospital can be recognised.

9.3 Publication policy

The data will be published in ECDC's Annual Epidemiological Reports and in a disease-specific report on HAI surveillance, in interactive tables on the internet and in scientific publications. Official networks in the countries have to provide written consent with any publication before publication. In any publication reference will be made to the official networks in the countries, including their acronym and contact information, if desired by the networks.

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Annex 1: NUTS-1 codes (hospital location)

Source: <http://epp.eurostat.ec.europa.eu/portal/page/portal/eurostat/home/>

Level	Code	NUTS-Code
1	250	NUTS LEVEL 1
2	275	BE BELGIQUE-BELGIË
3	280	BE1 RÉGION DE BRUXELLES-CAPITALE / BRUSSELS HOOFDSTEDELIJK GEWEST
3	290	BE2 VLAAMS GEWEST
3	300	BE3 RÉGION WALLONNE
3	310	BEZ EXTRA-REGIO
2	315	BG БЪЛГАРИЯ / BULGARIA
3	320	BG3 СЕВЕРНА И ЮГОИЗТОЧНА БЪЛГАРИЯ / SEVERNA I IZTOCHNA BULGARIA
3	330	BG4 ЮГОЗАПАДНА И ЮЖНА ЦЕНТРАЛНА БЪЛГАРИЯ / YUGOZAPADNA I YUZHNA TSENTRALNA BULGARIA
3	340	BGZ EXTRA-REGIO
2	345	CZ ČESKÁ REPUBLIKA
3	350	CZ0 ČESKÁ REPUBLIKA
3	360	CZZ EXTRA-REGIO
2	365	DK DANMARK
3	370	DK0 DANMARK
3	380	DKZ EXTRA-REGIO
2	385	DE DEUTSCHLAND
3	390	DE1 BADEN-WÜRTTEMBERG
3	400	DE2 BAYERN
3	410	DE3 BERLIN
3	420	DE4 BRANDENBURG
3	430	DE5 BREMEN
3	440	DE6 HAMBURG
3	450	DE7 HESSEN
3	460	DE8 MECKLENBURG-VORPOMMERN
3	470	DE9 NIEDERSACHSEN
3	480	DEA NORDRHEIN-WESTFALEN
3	490	DEB RHEINLAND-PFALZ
3	500	DEC SAARLAND
3	510	DED SACHSEN
3	520	DEE SACHSEN-ANHALT
3	530	DEF SCHLESWIG-HOLSTEIN
3	540	DEG THÜRINGEN
3	550	DEZ EXTRA-REGIO
2	555	EE EESTI
3	560	EE0 EESTI
3	570	EEZ EXTRA-REGIO
2	575	IE IRELAND
3	580	IE0 IRELAND
3	590	IEZ EXTRA-REGIO
2	595	GR ΕΛΛΑΔΑ / ELLADA
3	600	GR1 ΒΟΡΕΙΑ ΕΛΛΑΔΑ / VOREIA ELLADA
3	610	GR2 ΚΕΝΤΡΙΚΗ ΕΛΛΑΔΑ / KENTRIKI ELLADA
3	620	GR3 ΑΤΤΙΚΗ / ATTIKI
3	630	GR4 ΝΗΣΙΑ ΑΙΓΑΙΟΥ, ΚΡΗΤΗ / NISIA AIGAIΟΥ, KRITI
3	640	GRZ EXTRA-REGIO
2	645	ES ESPAÑA
3	650	ES1 NOROESTE
3	660	ES2 NORESTE
3	670	ES3 COMUNIDAD DE MADRID
3	680	ES4 CENTRO (E)
3	690	ES5 ESTE
3	700	ES6 SUR
3	710	ES7 CANARIAS
3	720	ESZ EXTRA-REGIO
2	725	FR FRANCE

3	730	FR1	ÎLE DE FRANCE
3	740	FR2	BASSIN PARISIEN
3	750	FR3	NORD - PAS-DE-CALAIS
3	760	FR4	EST
3	770	FR5	OUEST
3	780	FR6	SUD-OUEST
3	790	FR7	CENTRE-EST
3	800	FR8	MÉDITERRANÉE
3	810	FR9	DÉPARTEMENTS D'OUTRE-MER
3	820	FRZ	EXTRA-REGIO
2	825	IT	ITALIA
3	830	ITC	NORD-OVEST
3	840	ITD	NORD-EST
3	850	ITE	CENTRO (I)
3	860	ITF	SUD
3	870	ITG	ISOLE
3	880	ITZ	EXTRA-REGIO
2	885	CY	ΚΥΠΡΟΣ / KIBRIS
3	890	CY0	ΚΥΠΡΟΣ / KIBRIS
3	900	CYZ	EXTRA-REGIO
2	905	LV	LATVIJA
3	910	LV0	LATVIJA
3	920	LVZ	EXTRA-REGIO
2	925	LT	LIETUVA
3	930	LT0	LIETUVA
3	940	LTZ	EXTRA-REGIO
2	945	LU	LUXEMBOURG (GRAND-DUCHÉ)
3	950	LU0	LUXEMBOURG (GRAND-DUCHÉ)
3	960	LUZ	EXTRA-REGIO
2	965	HU	MAGYARORSZÁG
3	970	HU1	KÖZÉP-MAGYARORSZÁG
3	980	HU2	DUNÁNTÚL
3	990	HU3	ALFÖLD ÉS ÉSZAK
3	1000	HUZ	EXTRA-REGIO
2	1005	MT	MALTA
3	1010	MT0	MALTA
3	1020	MTZ	EXTRA-REGIO
2	1025	NL	NEDERLAND
3	1030	NL1	NOORD-NEDERLAND
3	1040	NL2	OOST-NEDERLAND
3	1050	NL3	WEST-NEDERLAND
3	1060	NL4	ZUID-NEDERLAND
3	1070	NLZ	EXTRA-REGIO
2	1075	AT	ÖSTERREICH
3	1080	AT1	ÖSTÖSTERREICH
3	1090	AT2	SÜDÖSTERREICH
3	1100	AT3	WESTÖSTERREICH
3	1110	ATZ	EXTRA-REGIO
2	1115	PL	POLSKA
3	1120	PL1	REGION CENTRALNY
3	1130	PL2	REGION POŁUDNIOWY
3	1140	PL3	REGION WSCHODNI
3	1150	PL4	REGION PÓŁNOCNO-ZACHODNI
3	1160	PL5	REGION POŁUDNIOWO-ZACHODNI
3	1170	PL6	REGION PÓŁNOCNY
3	1180	PLZ	EXTRA-REGIO
2	1185	PT	PORTUGAL
3	1190	PT1	CONTINENTE
3	1200	PT2	Região Autónoma dos AÇORES
3	1210	PT3	Região Autónoma da MADEIRA
3	1220	PTZ	EXTRA-REGIO
2	1225	RO	ROMÂNIA
3	1230	RO1	Macroregiunea unu
3	1240	RO2	Macroregiunea doi

3	1250	RO3	Macroregiunea trei
3	1260	RO4	Macroregiunea patru
3	1270	ROZ	EXTRA-REGIO
2	1275	SI	SLOVENIJA
3	1280	SI0	SLOVENIJA
3	1290	SIZ	EXTRA-REGIO
2	1295	SK	SLOVENSKÁ REPUBLIKA
3	1300	SK0	SLOVENSKÁ REPUBLIKA
3	1310	SKZ	EXTRA-REGIO
2	1315	FI	SUOMI / FINLAND
3	1320	FI1	MANNER-SUOMI
3	1330	FI2	ÅLAND
3	1340	FIZ	EXTRA-REGIO
2	1345	SE	SVERIGE
3	1350	SE1	Östra Sverige
3	1360	SE2	Södra Sverige
3	1370	SE3	Norra Sverige
3	1380	SEZ	EXTRA-REGIO
2	1385	UK	UNITED KINGDOM
3	1390	UKC	NORTH EAST (ENGLAND)
3	1400	UKD	NORTH WEST (ENGLAND)
3	1410	UKE	YORKSHIRE AND THE HUMBER
3	1420	UKF	EAST MIDLANDS (ENGLAND)
3	1430	UKG	WEST MIDLANDS (ENGLAND)
3	1440	UKH	EAST OF ENGLAND
3	1450	UKI	LONDON
3	1460	UKJ	SOUTH EAST (ENGLAND)
3	1470	UKK	SOUTH WEST (ENGLAND)
3	1480	UKL	WALES
3	1490	UKM	SCOTLAND
3	1500	UKN	NORTHERN IRELAND
3	1510	UKZ	EXTRA-REGIO

Annex 2: ICD-9-CM code list of surgical procedures

ICD-9-CM code list of surgical procedures for EU surveillance	Other allowed operation codes included in NHSN
COLO 45.0 = Enterotomy 45.00 = Incision of intestine, not otherwise specified 45.03 = Incision of large intestine <u>45.4 = Local excision or destruction of lesion or tissue of large intestine</u> 45.41 = Excision of lesion or tissue of large intestine 45.49 = Other destruction of lesion of large intestine 45.5 = Isolation of intestinal segment 45.50 = Isolation of intestinal segment, not otherwise specified 45.52 = Isolation of segment of large intestine <u>45.7 = Partial excision of large intestine</u> 45.71 = Multiple segmental resection of large intestine 45.72 = Cecectomy 45.73 = Right hemicolectomy 45.74 = Resection of transverse colon 45.75 = Left hemicolectomy 45.76 = Sigmoidectomy 45.79 = Other partial excision of large intestine 45.8 = Total intra-abdominal colectomy 45.9 = Intestinal anastomosis 45.90 = Intestinal anastomosis, not otherwise specified 45.92 = Anastomosis of small intestine to rectal stump 45.93 = Other small-to-large intestinal anastomosis 45.94 = Large-to-large intestinal anastomosis 45.95 = Anastomosis to anus <u>46.0 = Exteriorisation of intestine</u> 46.03 = Exteriorisation of large intestine 46.04 = Resection of exteriorised segment of large intestine <u>46.1 = Colostomy</u> 46.10 = Colostomy, not otherwise specified 46.11 = Temporary colostomy 46.13 = Permanent colostomy 46.14 = Delayed opening of colostomy <u>46.4 = Revision of intestinal stoma</u> 46.43 = Other revision of stoma of large intestine <u>46.5 = Closure of intestinal stoma</u> 46.52 = Closure of stoma of large intestine <u>46.7 = Other repair of intestine</u> 46.75 = Suture of laceration of large intestine 46.76 = Closure of fistula of large intestine <u>46.9 = Other operations on intestines</u> 46.91 = Myotomy of sigmoid colon 46.92 = Myotomy of other parts of colon 46.94 = Revision of anastomosis of large intestine <u>48.5 = Abdominoperineal resection of rectum (till 2008-10-10)</u> <u>48.6 = Other resection of rectum</u> 48.61 = Transsacral rectosigmoidectomy 48.62 = Anterior resection of rectum with synchronous colostomy 48.63 = Other anterior resection of rectum 48.64 = Posterior resection of rectum 48.65 = Duhamel resection of rectum 48.69 = Other resection of rectum	COLO <u>17.3 = Laparoscopic partial excision of large intestine:</u> 17.31 = Laparoscopic multiple segmental resection of large intestine 17.32 = Laparoscopic cecectomy 17.33 = Laparoscopic right hemicolectomy 17.34 = Laparoscopic resection transverse colon 17.35 = Laparoscopic left hemicolectomy 17.36 = Laparoscopic sigmoidectomy 17.39 = Laparoscopic partial excision of large intestine 45.26 = Open biopsy of large intestine 45.81 = Laparoscopic total intra-abdominal colectomy 45.82 = Open total intra-abdominal colectomy 45.83 = Other and unspecified total intra-abdominal colectomy SB 45.01 = Incision of duodenum 45.02 = Other incision of small intestine 45.15 = Open biopsy of small intestine 45.31 = Other local excision of lesion of duodenum 45.32 = Other destruction of lesion of duodenum 45.33 = Local excision of lesion or tissue of small intestine, except duodenum 45.34 = Other destruction of lesion of small intestine, except duodenum 45.51 = Isolation of segment of small intestine 45.61 = Multiple segmental resection of small intestine 45.62 = Other partial resection of small intestine 45.63 = Total removal of small intestine 45.91 = Small-to-small intestinal anastomosis 46.01 = Exteriorisation of small intestine 46.02 = Resection of exteriorised segment of small intestine 46.20 = Ileostomy, not otherwise specified 46.21 = temporary ileostomy 46.22 = Continent ileostomy 46.23 = Other permanent ileostomy 46.24 = Delayed opening of ileostomy 46.31 = Delayed opening of other ileostomy 46.39 = Other enterostomy 46.41 = Revision of stoma of small intestine 46.51 = Closure of stoma of small intestine 46.71 = Suture of laceration of duodenum 46.72 = Closure of fistula of duodenum 46.73 = Suture of laceration of small intestine, except duodenum 46.74 = Closure of fistula of small intestine, except duodenum 46.93 = Revision of anastomosis of small intestine REC 48.25 = Open biopsy of rectum 48.35 = Local excision of rectal lesion or tissue 48.40 = Pull-through resection of rectum, not otherwise specified 48.42 = Laparoscopic pull-through resection of rectum 48.43 = Open pull-through resection of rectum 48.49 = Other pull-through resection of rectum 48.50 = Abdominoperineal resection of rectum, not specified 48.51 = Laparoscopic abdominoperineal resection of the rectum 48.52 = Open abdominoperineal resection of the rectum 48.59 = Other abdominoperineal resection of the rectum 48.74 = Rectorectostomy

ICD-9-CM code list of surgical procedures for EU surveillance		Other allowed operation codes included in NHSN	
HPRO 81.5 = Joint replacement of lower extremity 81.51 = Total hip replacement 81.52 = Partial hip replacement 81.53 = Revision of hip replacement		HPRO 00.70 = Revision of hip replacement, both acetabular and femoral components 00.71 = Revision of hip replacement, acetabular component 00.72 = Revision of hip replacement, femoral components 00.73 = Revision of hip replacement, acetabular liner and/or femoral head only 00.85 = Resurfacing hip, total acetabulum, and femoral head 00.86 = Resurfacing hip, partial, femoral head 00.87 = Resurfacing hip, partial, acetabulum	
KPRO 00.80 = Revision of knee replacement, total (all components) 00.81 = Revision of knee replacement, tibial component 00.82 = Revision of knee replacement, femoral component 00.83 = Revision of knee replacement, patellar component 00.84 = Revision of knee replacement, tibial insert (liner) 81.54 = Total knee replacement 81.55 = Revision of knee replacement		KPRO <same>	
LAM 03.0 = Exploration and decompression of spinal canal structures 03.01 = Removal of foreign body from spinal canal 03.02 = Reopening of laminectomy site 03.09 = Other exploration and decompression of spinal canal 80.5 = Excision or destruction of intervertebral disc 80.50 = Excision or destruction of intervertebral disc, unspecified 80.51 = Excision of intervertebral disc fibrosis 80.59 = Other destruction of intervertebral disc		LAM 80.53 = Repair of the anulus fibrosus with graft or prosthesis 80.54 = Other and unspecified repair of the anulus fibrosus 84.60 = Insertion of spinal disc prosthesis, not otherwise specified 84.61 = Insertion of partial spinal disc prosthesis, cervical 84.62 = Insertion of total spinal disc prosthesis, cervical 84.63 = Insertion of spinal disc prosthesis, thoracic 84.64 = Insertion of partial spinal disc prosthesis, lumbosacral 84.65 = Insertion of total spinal disc prosthesis, lumbosacral 84.66 = Revision or replacement of artificial spinal disc prosthesis, cervical 84.67 = Revision or replacement of artificial spinal disc prosthesis, thoracic 84.68 = Revision or replacement of artificial spinal disc prosthesis, lumbosacral 84.69 = Revision or replacement of artificial spinal disc prosthesis, not otherwise 84.80 = Insertion or replacement of interspinous process device(s) 84.81 = Revision of interspinous process device(s) 84.82 = Insertion or replacement of pedicle-based dynamic stabilisation device(s) 84.83 = Revision of pedicle-based dynamic stabilisation device(s) 84.84 = Insertion or replacement of facet replacement device(s) 84.85 = Revision of facet replacement device(s)	
CBGB 36.1 = Bypass anastomosis for heart revascularisation 36.10 = Aortocoronary bypass for heart revascularisation 36.11 = Aortocoronary bypass of one coronary artery 36.12 = Aortocoronary bypass of two coronary arteries 36.13 = Aortocoronary bypass of three coronary arteries 36.14 = Aortocoronary bypass of four or more coronary arteries 36.19 = Other bypass anastomosis for heart revascularisation		CBGB <same>	CABG
CBGC 36.15 = Single internal mammary-coronary artery bypass 36.16 = Double internal mammary-coronary artery bypass 36.17 = Abdominal – coronary artery bypass 36.2 = Heart revascularisation by arterial implant		CBGC <same>	

ICD-9-CM code list of surgical procedures for EU surveillance	Other allowed operation codes included in NHSN
CHOL 51.0 = Cholecystotomy and cholecystostomy 51.03 = Other cholecystostomy 51.04 = Other cholecystotomy 51.2 = Cholecystectomy 51.21 = Other partial cholecystectomy 51.22 = Cholecystectomy 51.23 = Laparoscopic cholecystectomy 51.24 = Laparoscopic partial cholecystectomy	CHOL 51.13 = Open biopsy of gallbladder or bile ducts
CSEC 74.0 = Classical caesarean section 74.1 = Low cervical caesarean section 74.2 = Extraperitoneal caesarean section 74.4 = Caesarean section of other specified type 74.9 = Caesarean section of unspecified type 74.91 = Hysterotomy to terminate pregnancy 74.99 = Other caesarean section of unspecified type	CSEC <same>

Annex 3: Microorganisms code list

The code list is adapted from the original WHOCARE coding system. The current list is a selection of microorganisms based on their frequency of occurrence in healthcare-associated infections in different EU networks and infection types and/or on their public health importance. The minimal list represents the minimal level of detail that should be provided by every network.

Microorganism selection and minimal list

Microorganism	Code	Minimal list
Gram-positive cocci		STAAUR
<i>Staphylococcus aureus</i>	STAAUR	
<i>Staphylococcus epidermidis</i>	STAEPI	
<i>Staphylococcus haemolyticus</i>	STAHAE	
Coag-neg. staphylococci, not specified	STACNS	STACNS
Other coagulase-negative staphylococci (CNS)	STAOTH	
<i>Staphylococcus</i> sp., not specified	STANSP	GPCTOT
<i>Streptococcus pneumoniae</i>	STRPNE	
<i>Streptococcus agalactiae</i> (B)	STRAGA	
<i>Streptococcus pyogenes</i> (A)	STRPYO	STRSPP
Other haemol. Streptococcae (C, G)	STRHCG	
<i>Streptococcus</i> sp., other	STROTH	
<i>Streptococcus</i> sp., not specified	STRNSP	
<i>Enterococcus faecalis</i>	ENCFAE	
<i>Enterococcus faecium</i>	ENCFAI	ENCSP
<i>Enterococcus</i> sp., other	ENCOTH	
<i>Enterococcus</i> sp., not specified	ENCNSP	
Gram-positive cocci, not specified	GPCNSP	GPCTOT
Other Gram-positive cocci	GPCOTH	
Gram-negative cocci		
<i>Moraxella catharralis</i>	MORCAT	
<i>Moraxella</i> sp., other	MOROTH	
<i>Moraxella</i> sp., not specified	MORNSP	GNCTOT
<i>Neisseria meningitidis</i>	NEIMEN	
<i>Neisseria</i> sp., other	NEIOTH	
<i>Neisseria</i> sp., not specified	NEINSP	
Gram-negative cocci, not specified	GNCNSP	
Other Gram-negative cocci	GNCOTH	
Gram-positive bacilli		
<i>Corynebacterium</i> sp.	CORSPP	GPBTOT
<i>Bacillus</i> sp.	BACSP	
<i>Lactobacillus</i> sp.	LACSP	
<i>Listeria monocytogenes</i>	LISMON	
Gram-positive bacilli, not specified	GPBNSP	
Other Gram-positive bacilli	GPBOTH	
Enterobacteriaceae		
<i>Citrobacter freundii</i>	CITFRE	CITSPP
<i>Citrobacter koseri</i> (e.g. <i>diversus</i>)	CITDIV	
<i>Citrobacter</i> sp., other	CITOTH	
<i>Citrobacter</i> sp., not specified	CITNSP	
<i>Enterobacter cloacae</i>	ENBCLO	
<i>Enterobacter aerogenes</i>	ENBAER	ENBSPP
<i>Enterobacter agglomerans</i>	ENBAGG	
<i>Enterobacter sakazakii</i>	ENBSAK	
<i>Enterobacter gergoviae</i>	ENBGER	
<i>Enterobacter</i> sp., other	ENBOTH	
<i>Enterobacter</i> sp., not specified	ENBNSP	
<i>Escherichia coli</i>	ESCCOL	ESCCOL
<i>Klebsiella pneumoniae</i>	KLEPNE	
<i>Klebsiella oxytoca</i>	KLEOXY	KLESPP
<i>Klebsiella</i> sp., other	KLEOTH	
<i>Klebsiella</i> sp., not specified	KLENSP	
<i>Proteus mirabilis</i>	PRTMIR	
<i>Proteus vulgaris</i>	PRTVUL	PRTSPP
<i>Proteus</i> sp., other	PRTOTH	
<i>Proteus</i> sp., not specified	PRTNSP	
<i>Serratia marcescens</i>	SERMAR	
<i>Serratia liquefaciens</i>	SERLIQ	SERSPP
<i>Serratia</i> sp., other	SEROTH	
<i>Serratia</i> sp., not specified	SERNSP	
<i>Hafnia</i> sp.	HAFSPP	ETBTOT

	Microorganism	Code	Minimal list
	<i>Morganella</i> sp.	MOGSPP	
	<i>Providencia</i> sp.	PRVSPP	
	<i>Salmonella enteritidis</i>	SALENT	
	<i>Salmonella typhi</i> or <i>paratyphi</i>	SALTYP	
	<i>Salmonella typhimurium</i>	SALTYM	
	<i>Salmonella</i> sp., not specified	SALNSP	
	<i>Salmonella</i> sp., other	SALOTH	
	<i>Shigella</i> sp.	SHISPP	
	<i>Yersinia</i> sp.	YERSPP	
	Other enterobacteriaceae	ETBOTH	
	Enterobacteriaceae, not specified	ETBNSP	
Gram-negative bacilli	<i>Acinetobacter baumannii</i>	ACIBAU	ACISPP
	<i>Acinetobacter calcoaceticus</i>	ACICAL	
	<i>Acinetobacter haemolyticus</i>	ACIHAE	
	<i>Acinetobacter lwoffii</i>	ACILWO	
	<i>Acinetobacter</i> sp., other	ACIOTH	
	<i>Acinetobacter</i> sp., not specified	ACINSP	
	<i>Pseudomonas aeruginosa</i>	PSEAER	PSEAER
	<i>Stenotrophomonas maltophilia</i>	STEMAL	STEMAL
	<i>Burkholderia cepacia</i>	BURCEP	PSETOT
	<i>Pseudomonadaceae</i> family, other	PSEOTH	
	<i>Pseudomonadaceae</i> family, not specified	PSENSP	
	<i>Haemophilus influenzae</i>	HAEINF	HAESPP
	<i>Haemophilus parainfluenzae</i>	HAEPAI	
	<i>Haemophilus</i> sp., other	HAEOTH	
	<i>Haemophilus</i> sp., not specified	HAENSP	
	<i>Legionella</i> sp.	LEGSPP	LEGSPP
	<i>Achromobacter</i> sp.	ACHSPP	GNBTOT
	<i>Aeromonas</i> sp.	AEMSPP	
	<i>Agrobacterium</i> sp.	AGRSPP	
	<i>Alcaligenes</i> sp.	ALCSPP	
	<i>Campylobacter</i> sp.	CAMSPP	
	<i>Flavobacterium</i> sp.	FLASPP	
	<i>Gardnerella</i> sp.	GARSPP	
	<i>Helicobacter pylori</i>	HELPYL	
	<i>Pasteurella</i> sp.	PASSPP	
	<i>Gram-neg Bacilli</i> , not specified	GNBNSP	
Anaerobic bacilli	Other Gram-neg Bacilli, non enterobacteriaceae	GNBOTH	
	<i>Bacteroides fragilis</i>	BATFRA	BATSPP
	<i>Bacteroides</i> other	BATOTH	
	<i>Clostridium difficile</i>	CLODIF	ANATOT
	<i>Clostridium</i> other	CLOOTH	
	<i>Propionibacterium</i> sp.	PROSPP	
	<i>Prevotella</i> sp.	PRESPP	
	Anaerobes, not specified	ANANSP	
	Other anaerobes	ANAOTH	
Other bacteria	<i>Mycobacterium</i> , atypical	MYCATY	BCTTOT
	<i>Mycobacterium tuberculosis</i> complex	MYCTUB	
	<i>Chlamydia</i> sp.	CHLSPP	
	<i>Mycoplasma</i> sp.	MYPSP	
	<i>Actinomyces</i> sp.	ACTSPP	
	<i>Nocardia</i> sp.	NOCSP	
Fungi	Other bacteria	BCTOTH	
	<i>Candida albicans</i>	CANALB	CANSPP
	<i>Candida glabrata</i>	CANGLA	
	<i>Candida krusei</i>	CANKRU	
	<i>Candida tropicalis</i>	CANTRO	
	<i>Candida parapsilosis</i>	CANPAR	
	<i>Candida</i> sp., other	CANOTH	
	<i>Candida</i> sp., not specified	CANNSP	
	<i>Aspergillus fumigatus</i>	ASPFUM	ASPSPP
	<i>Aspergillus niger</i>	ASPNI	
	<i>Aspergillus</i> sp., other	ASPOTH	
	<i>Aspergillus</i> sp., not specified	ASPNSP	
	Other yeasts	YEAOTH	PARTOT
	Fungi other	FUNOTH	
	Filaments other	FILOTH	

	Microorganism	Code	Minimal list
	Other parasites	PAROTH	
Virus	Adenovirus	VIRADV	
	Cytomegalovirus (CMV)	VIRCMV	
	Enterovirus (polio, coxsackie, echo)	VIRENT	
	Hepatitis A virus	VIRHAV	
	Hepatitis B virus	VIRHBV	
	Hepatitis C virus	VIRHCV	
	Herpes simplex virus	VIRHSV	
	Human immunodeficiency virus (HIV)	VIRHIV	
	Influenza A virus	VIRINA	
	Influenza B virus	VIRINB	
	Influenza C virus	VIRINC	
	Norovirus	VIRNOR	
	Parainfluenzavirus	VIRPIV	
	Respiratory syncytial virus (RSV)	VIRRSV	
	Rhinovirus	VIRRHI	
	Rotavirus	VIRROT	
	SARS virus	VIRSAR	
	Varicella-zoster virus	VIRVZV	
	Virus, not specified	VIRNSP	
	Other virus	VIROTH	
Microorganism not identified or not found		_NONID	_NONID
Examination not done		_NOEXA	_NOEXA
Sterile examination		_STERI	_STERI
Result not (yet) available or missing		_NA	_NA

_NONID: evidence exists that a microbiological examination has been done, but the microorganism can not be correctly classified or the result of the examination can not be found; _NOEXA: no diagnostic sample taken, no microbiological examination done; _STERI: a microbiological examination has been done, but the result was negative (e.g. negative culture), _NA Result not (yet) available or missing.

Annex 4: Comparison of minimal and extended list of microorganisms

Microorganism	Code	Code (minimal list)
Gram-positive cocci		
<i>Staphylococcus aureus</i>	STAAUR	STAAUR
Coagulase-negative staphylococci (CNS)	STAEPI, STAHAE, STAOTH	STACNS
<i>Enterococcus</i> spp.	ENCFAE, ENCFAI, ENCOTH, ENCNSP	ENCSP
<i>Streptococcus</i> spp.	STRPNE, STRAGA, STRPYO, STRHCG, STROTH, STRNSP	STRSP
Other Gram-positive cocci	STANSP, GPCOTH	GPCOTH
Gram-negative cocci		
	MORCAT, MOROTH, MORNSP, NEIMEN, NEIOTH, NEINSP, GNCOTH	GNCOTH
Gram-positive bacilli		
	CORSPP, BACSPP, LACSPP, LISMON, GPBOTH	GPBTOT
Gram-negative bacilli, <i>Enterobacteriaceae</i>		
<i>Escherichia coli</i>	ESCCOL	ESCCOL
<i>Klebsiella</i> spp.	KLEPNE, KLEOXY, KLEOTH, KLENSP	KLESPP
<i>Enterobacter</i> spp.	ENBCLO, ENBAER, ENBAGG, ENBSAK, ENBGER, ENBOTH, ENBNSP	ENBSPP
<i>Proteus</i> spp.	PRTMIR, PRTVUL, PRTOTH, PRTNSP	PRTSPP
<i>Citrobacter</i> spp.	CITFRE, CITDIV, CITOTH, CITNSP	CITSPP
<i>Serratia</i> spp.	SERMAR, SERLIQ, SEOTH, SERNSP	SERSPP
Other enterobacteriaceae	HAFSPP, MOGSPP, PRVSPP, SALENT, SALTYP, SALTYP, SALOTH, SHISPP, YERSPP, ETBOTH, ETBNSP	ETBTOT
Gram-negative non-fermentative bacilli		
<i>Pseudomonas aeruginosa</i>	PSEAER	PSEAER
<i>Acinetobacter</i> spp.	ACIBAU, ACICAL, ACIAE, ACILWO, ACIOTH, ACINSP	ACISPP
<i>Stenotrophomonas maltophilia</i>	STEMAL	STEMAL
Other pseudomonaceae	BURCEP, PSEOTH, PSENSP	PSETOT
<i>Haemophilus</i> spp.	HAEIF, HAEPAL, HAEOTH, HAENSP	HAESPP
Other Gram-negative rods	LEGSPP, ACHSPP, AEMSPP, AGRSPP, ALCSP, CAMSPP, FLASPP, GARSPP, HELPYL, PASSPP, GNBOTH	LEGSPP, GNBTOT
Anaerobic bacilli		
<i>Bacteroides</i> spp.	BATFRA, BATOTH	BATSPP
Other anaerobes	CLODIF, CLOOTH, PROSPP, PRESPP, ANAOTH	ANATOT
Other bacteria		
	MYCATY, MYCTUB, CHLSPP, MYPSP, ACTSPP, NOCSPP, BCTOTH	BCTTOT
Fungi/parasites		
<i>Candida</i> spp.	CANALB, CANGLA, CANTRO, CANPAR, PANOTH, CANNSP	CANSPP
<i>Aspergillus</i> spp.	ASPFUM, ASPNIG, ASPOTH, ASPNSP	ASPSPP
Other fungi/parasites	YEAOTH, FILOTH, PAROTH	PARTOT

Annex 5: Antimicrobial resistance markers and codes

Microorganisms	0	1	2	9
<i>Staphylococcus</i> spp.	Oxa- S MSSA	Oxa R MRSA	Glyco- I GISA	Unknown
<i>Enterococcus</i> spp.	Glyco-S	Glyco-R VRE		Unknown
<i>Enterobacteriaceae</i> <i>Escherichia coli</i> , <i>Klebsiella</i> spp., <i>Enterobacter</i> spp., <i>Proteus</i> spp., <i>Citrobacter</i> spp., <i>Serratia</i> spp. <i>Morganella</i> sp. (see Annex 3 for microorganisms by category)	C3-S, Car-S	C3-R, Car-S	C3-R, Car-R	Unknown
<i>Pseudomonas</i> spp., <i>Acinetobacter</i> spp.	Car-S	Car-R		Unknown

Oxa = oxacillin; *Glyco* = glycopeptides (vancomycin, teicoplanin); *C3* = third-generation cephalosporins (cefotaxim or ceftriaxone);
Car = carbapenems (imipenem, meropenem, doripenem).

Annex 6: Antibiotic (antibiotic groups) tested for susceptibility list

_NOTEST = No antimicrobial susceptibility data available

C1G = Cephalosporins, first generation (cefalotin/cefazolin)

C2G = Cephalosporins, second generation (cefuroxim/cefamandole/cefotaxime)

C3G = Cephalosporins, third generation (cefotaxime/ceftriaxone)

C4G = Cephalosporins, fourth generation (cefepime/cefpirome)

CAR = Carbapenems (imipenem, meropenem, doripenem)

ESBL = ESBL (Extended beta-lactamase producer)

GLY = Glycopeptides (vancomycin/teicoplanin)

AMB = Amphotericin B

AMC = Amoxicillin/Clavulanic acid

AMK = Amikacin

AMP = Ampicillin

AMX = Amoxicillin

AZM = Azithromycin

CAS = Caspofungin

CAZ = Ceftazidime

CIP = Ciprofloxacin

CLI = Clindamycin

CLO = Cloxacillin

CLR = Clarithromycin

COL = Colistin

CRO = Ceftriaxone

CTX = Cefotaxime

DIC = Dicloxacillin

ERY = Erythromycin

FCT = Flucytosine (5-fluorocytosine)

FLC = Flucloxacillin

FLU = Fluconazole

FOS = Fosfomycin

FOX = Cefoxitin

FUS = Fusidic acid

GEH = Gentamicin-high

GEN = Gentamicin

IPM = Imipenem

ITR = Itraconazole

KET = Ketoconazole

LNZ = Linezolid

LVX = Levofloxacin

MEM = Meropenem

MET = Methicillin

MFX = Moxifloxacin

NAL = Nalidic acid

NET = Netilmicin

NOR = Norfloxacin

OFX = Ofloxacin

OXA = Oxacillin

PEN = Penicillin

PIP = Piperacillin

PIT = Piperacillin or ticarcillin

QDA = Quinupristin/Dalfopristin

RIF = Rifampin

SUL = Sulbactam

SXT = Trimethoprim/Sulfamethoxazole (cotrimoxazole)

TCY = Tetracyclin

TEC = Teicoplanin

TIG = Tigecyclin

TOB = Tobramycin

TZP = Piperacillin/Tazobactam

VAN = Vancomycin

Annex 7: Standard protocol

Variable names and attributes

HAISSI

Field (TransportLabel)	Name	Required	Repeatable
Technical fields			
RecordId	Record ID	True (Error)	No
RecordType	Record type	True (Error)	No
RecordTypeVersion	Record type version	No	No
Subject	Subject	True (Error)	No
DataSource	Data source	True (Error)	No
ReportingCountry	Reporting country	True (Error)	No
DateUsedForStatistics	Date used for statistics	True (Error)	No
Status	Status	No	No
Unit information			
NetworkId	Network identifier	No	No
HospitalId	Hospital ID	True (Error)	No
HospitalSize	Hospital size	True (Warning)	No
HospitalType	Hospital type	No	No
HospitalLocation	Region where hospital is located	No	No
UnitId	Unit ID	No	No
UnitSpeciality	Unit speciality	No	No
PostDischargeMethod	Method used for post-discharge surveillance	No	True

HAISSI\$OP

Field (TransportLabel)	Name	Required	Repeatable
Technical fields			
RecordId	Record ID	True (Error)	No
RecordType	Record type	True (Error)	No
ParentId	Parent ID	True (Error)	No
Patient information			
Age	Age	True (Warning)	No
Gender	Gender	True (Warning)	No
OutcomeHospital	Outcome form hospital	True (Warning)	No
Operation information			
OperationId	Operation ID	True (Error)	No
PatientCounter	Patient counter	No	No
DateOfOperation	Date of operation	True (Error)	No
DateOfHospitalAdmission	Date of hospital admission	True (Warning)	No
DateOfHospitalDischarge	Date of hospital discharge	True (Warning)	No
DateOfLastFollowup	Date of last follow-up post-discharge	No	No
OPCode	Operation code	True (Error)	No
ICD9CMCode	ICD-9-CM code	No	No
EndoscopicProc	Endoscopic procedure	True (Warning)	No
WoundClass	Wound contamination class	True (Warning)	No
OperationDur	Duration of operation	True (Warning)	No
UrgentOperation	Urgent operation	True (Warning)	No
ASAClassification	ASA classification	True (Warning)	No
Prophylaxis	Patient received surgical prophylaxis	No	No
SurgicalSiteInfection	Surgical site infection	True (Error)	No

HAISSI\$OP\$INF

Field (TransportLabel)	Name	Required	Repeatable
Technical fields			
RecordId	Record ID	True (Error)	No
RecordType	Record type	True (Error)	No
ParentId	Parent ID	True (Error)	No
Infection information			
DateOfOnset	Date of infection onset	True (Error)	No
SSIType	Type of infection	True (Error)	No
DateOfOnset	Date of infection onset	True (Error)	No

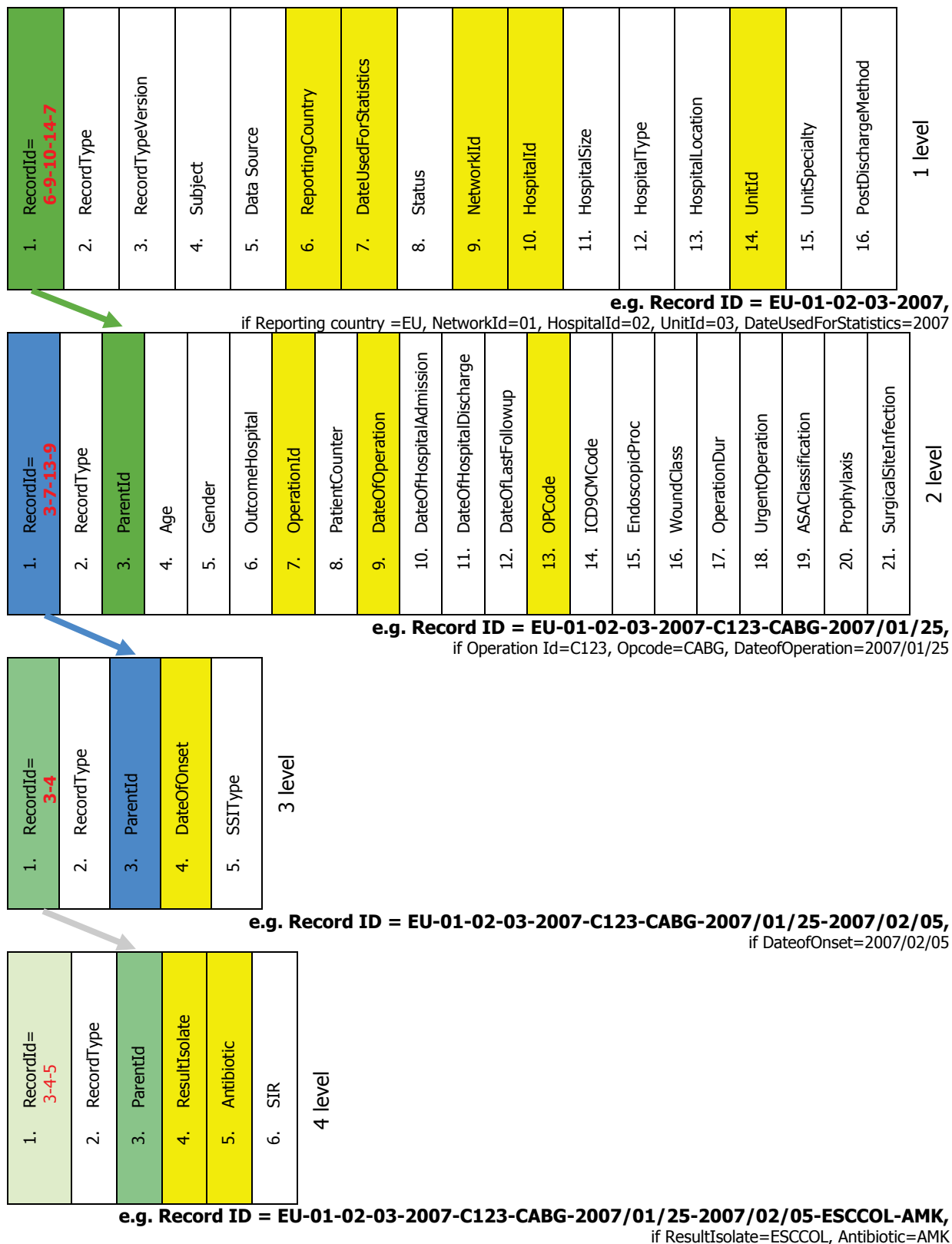
HAISSI\$OP\$INF\$RES

Field (TransportLabel)	Name	Required	Repeatable
Technical fields			
RecordId	Record ID	True (Error)	No
RecordType	Record type	True (Error)	No
ParentId	Parent ID	True (Error)	No
Infection information			
ResultIsolate	Isolate result	True (Error)	No
Antibiotic	Antibiotic code	True (Warning)	No
SIR	SIR	True (Warning)	No

HAISSICOVERAGE

Field (TransportLabel)	Name	Required	Repeatable
Technical fields			
RecordType	Record type	True (Error)	No
RecordTypeVersion	Record type version	No	No
Subject	Subject	True (Error)	No
DataSource	Data source	True (Error)	No
ReportingCountry	Reporting country	True (Error)	No
DateUsedForStatistics	Year covered	True (Error)	No
Unit information			
NoOfOperationsCABG	Number of operations for coronary artery bypass grafting	True (Warning)	No
NoOfOperationsCOLO	Number of operations for colon surgery	True (Warning)	No
NoOfOperationsCHOL	Number of operations for cholecystectomy	True (Warning)	No
NoOfOperationsCSEC	Number of operations for caesarean section	True (Warning)	No
NoOfOperationsHPRO	Number of operations for hip prosthesis	True (Warning)	No
NoOfOperationsKPRO	Number of operations for knee prosthesis	True (Warning)	No
NoOfOperationsLAM	Number of operations for laminectomy	True (Warning)	No
RecordType	Record type	True (Error)	No
RecordTypeVersion	Record type version	No	No
Subject	Subject	True (Error)	No

Links between Record ID and Parent ID in different data sets levels



Annex 8: Light protocol

Variable names and attributes

HAISSILIGHT

Field (TransportLabel)	Name	Required	Repeatable
Technical fields			
RecordId	Record ID	True (Error)	No
RecordType	Record type	True (Error)	No
RecordTypeVersion	Record type version	No	No
Subject	Subject	True (Error)	No
DataSource	Data source	True (Error)	No
ReportingCountry	Reporting country	True (Error)	No
DateUsedForStatistics	Date used for statistics	True (Error)	No
Status	Status	No	No
Unit information			
NetworkId	Network identifier	No	No
HospitalId	Hospital ID	True (Error)	No
HospitalSize	Hospital size	True (Warning)	No
HospitalType	Hospital type	No	No
HospitalLocation	Region where hospital is located	No	
UnitId	Unit ID	No	No
UnitSpeciality	Unit speciality	No	No
PostDischargeMethod	Method used for post-discharge surveillance	No	True

HAISSILIGHT\$OPCAT

Field (TransportLabel)	Name	Required	Repeatable
Technical fields			
RecordId	Record ID	True (Error)	No
RecordType	Record type	True (Error)	No
ParentId	Parent ID	True (Error)	No
Unit information			
PeriodStart	Start date of the time period covered by this denominator entry	True (Error)	No
PeriodEnd	End date of the time period covered by this denominator entry	True (Error)	No
OPCode	Operation code	True (Error)	No
ICD9CMCode	ICD-9-CM code	No	No
NumOperations	Number of operations	True (Error)	No
NumOperationsDisDate	Number of operations with known discharge date	True (Warning)	No
NumPatDaysHosp	Number of post-operation hospital patient days	True (Warning)	No

HAISSILIGHT\$OPCAT\$INF

Field (TransportLabel)	Name	Required	Repeatable
Technical fields			
RecordId	Record ID	True (Error)	No
RecordType	Record type	True (Error)	No
ParentId	Parent ID	True (Error)	No
Patient information			
Age	Age	True (Warning)	No
Gender	Gender	True (Warning)	No
OutcomeHospital	Outcome from hospital	True (Warning)	No
Infection information			
OperationId	Operation ID	True (Error)	No
DateOfOnset	Date of infection	True (Error)	No
SSIType	Type of infection	True (Error)	No
DateOfOperation	Date of operation	True (Warning)	No
DateOfHospitalDischarge	Date of hospital discharge	True (Warning)	No

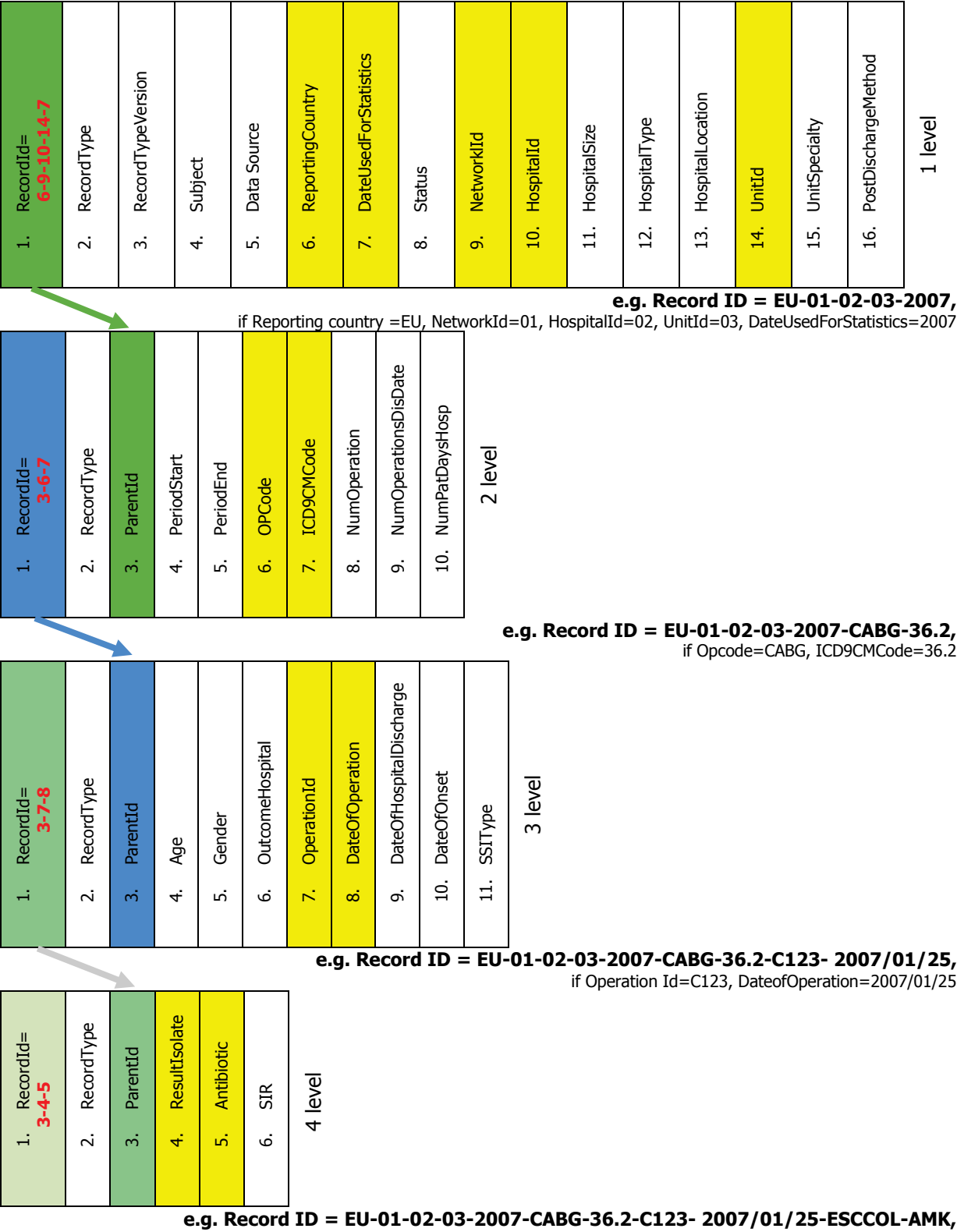
HAISSILIGHT\$OPCAT\$INF\$RES

Field (TransportLabel)	Name	Required	Repeatable
Technical fields			
RecordId	Record ID	True (Error)	No
RecordType	Record type	True (Error)	No
ParentId	Parent ID	True (Error)	No
Infection information			
ResultIsolate	Isolate result	True (Error)	No
Antibiotic	Antibiotic code	True (Warning)	No
SIR	SIR	True (Warning)	No

HAISSICOVERAGE

Field (TransportLabel)	Name	Required	Repeatable
Technical fields			
RecordType	Record type	True (Error)	No
RecordTypeVersion	Record type version	No	No
Subject	Subject	True (Error)	No
DataSource	Data source	True (Error)	No
ReportingCountry	Reporting country	True (Error)	No
DateUsedForStatistics	Year covered	True (Error)	No
Unit information			
NoOfOperationsCABG	Number of operations for coronary artery bypass grafting	True (Warning)	No
NoOfOperationsCOLO	Number of operations for colon surgery	True (Warning)	No
NoOfOperationsCHOL	Number of operations for cholecystectomy	True (Warning)	No
NoOfOperationsCSEC	Number of operations for caesarean section	True (Warning)	No
NoOfOperationsHPRO	Number of operations for hip prosthesis	True (Warning)	No
NoOfOperationsKPRO	Number of operations for knee prosthesis	True (Warning)	No
NoOfOperationsLAM	Number of operations for laminectomy	True (Warning)	No
RecordType	Record type	True (Error)	No
RecordTypeVersion	Record type version	No	No
Subject	Subject	True (Error)	No

Links between Record ID and Parent ID in different data sets levels (light protocol)



Annex 9: Data entry forms

	Surveillance of surgical site infections (HAI-Net-SSI) Hospital/unit data Please send data once a year, after the end of the surveillance period.	
Country code		
Network code		
Hospital ID	(The code provided by the national institution which is responsible for national surveillance.)	
Hospital Size (number of beds)		
Hospital Type	☐ Primary (=PRIM) ☐ Secondary (=SEC) ☐ Tertiary (=TERT) ☐ Specialized/Other (=SPEC)	
Hospital Location (Region, NUTS-1 code)		
Unit ID (optional)		
Surgical Unit Specialty (optional)	☐ General/abdominal (=CA) ☐ Cardiovascular (=CC) ☐ Mixed surgical/medical (=CM) ☐ Neurosurgery (=CN) ☐ Orthopedic surgery (=CO) ☐ Traumatology (=TR) ☐ Gynecology (=GY) ☐ Other surgical specialty (=OTH)	
Post discharge method	☐ Patients not followed up after discharge (=NONE) Patients followed-up after discharge and post-discharge follow-up method used: ☐ Detection at readmission (=READM) ☐ Reporting on surgeon's initiative (=REPSURG) ☐ Reporting on GP's initiative (=REPGP) ☐ Reporting on patient's initiative (=REPPAT) ☐ Obtained by Infection control staff from surgeon (=ICSURG) ☐ Obtained by Infection control staff from GP (=ICGP) ☐ Obtained by Infection control staff from patient (=ICPAT) ☐ Other _____	

	Surveillance of surgical site infections (HAI-Net-SSI) Standard protocol – patient/infection data Please fill out data for each patient who had surgery.					
Hospital ID						
Unit ID (optional)						
Operation ID						
Age at date of operation in years	_____ years					
Gender	☐ Male ☐ Female ☐ Other ☐ Unknown					
Outcome from hospital	☐ Alive ☐ Dead in hospital ☐ Unknown					
Date of Operation (YYYY-MM-DD)	____/____/____					
Date of Hospital admission (YYYY-MM-DD)	____/____/____					
Date of Hospital discharge (YYYY-MM-DD)	____/____/____					
Date of last follow-up post-discharge (YYYY-MM-DD)	____/____/____					
Operation Code	☐ CBGB ☐ CBGC ☐ CABG (not specified) ☐ CHOL ☐ COLO ☐ CSEC ☐ HPRO ☐ KPRO ☐ LAM					
Operation ICD-9-CM Code	_____.					
Endoscopic procedure	☐ YES (laparoscopic) ☐ NO ☐ Unknown					
Wound contamination class	☐ W1 Clean ☐ W2 Clean- contaminated ☐ W3 Contaminated ☐ W4 Dirty or infected ☐ Unknown					
Duration of operation in minutes	_____ minutes					
Urgent operation	☐ YES (Urgent) ☐ NO (Elective) ☐ Unknown					
ASA classification	☐ A1 Normally healthy patient ☐ A2 Patient with mild systemic disease ☐ A3 Patient with severe systemic disease ☐ A4 Patient with an incapacitating systemic disease that is constant threat ☐ A5 Moribund patient who is not expected to survive for 24 hours with or without operation ☐ Unknown					
Antibiotic prophylaxis	☐ YES ☐ NO ☐ Unknown					
Surgical Site Infection	☐ YES ☐ NO ☐ Unknown					
Date of Infection (YYYY-MM-DD)	____/____/____					
Type of Infection	☐ Superficial incisional (=S) ☐ Deep incisional (=D) ☐ Organ/space (=O) ☐ Unknown					
Isolate result	1.	R	2.	R	3.	R
Antibiotic code and resistance data*						

*e.g. STAAUR/0=MSSA, STAAUR/1=MRSA, STAAUR/9=S. aureus, oxacillin sensitivity unknown; see Annex 5.

	Surveillance of surgical site infections (HAI-Net-SSI) Light protocol – denominator data Please fill in data for each operation type which you have surveyed.	
Country code		
Network code		
Hospital ID	(The code provided by the national institution which is responsible for national surveillance.)	
Unit ID (optional)		
Operation type	☐ CBGB ☐ CBGC ☐ CABG (not specified) ☐ CHOL ☐ COLO ☐ CSEC ☐ HPRO ☐ KPRO ☐ LAM	
ICD9 code (optional)	___ . ___	
Surveillance period started*	__ __ / __ __ / __ __ __ __	
Surveillance period ended*	__ __ / __ __ / __ __ __ __	
Number of operations	_____	
Number of operations with known discharge date	_____	
Number of postoperative patient-days	_____	

* The minimum period between 'Surveillance period started' and 'Surveillance period ended' should be one month.

	Surveillance of surgical site infections (HAI-Net-SSI) Light protocol – infection data Please fill in data for each patient with surgical site infection.					
Hospital ID						
Unit ID						
Operation ID	_____					
Age at date of operation	_____ years					
Gender	☐ Male ☐ Female ☐ Other ☐ Unknown					
Outcome from hospital	☐ Alive ☐ Dead in hospital ☐ Unknown					
Date of Operation (YYYY-MM-DD)	__ __ / __ __ / __ __ __ __					
Date of Hospital discharge (YYYY-MM-DD)	__ __ / __ __ / __ __ __ __					
Operation Code	☐ CBGB ☐ CBGC ☐ CABG(not specified) ☐ CHOL ☐ COLO ☐ CSEC ☐ HPRO ☐ KPRO ☐ LAM					
Operation ICD-9-CM Code	_____.					
Surgical Site Infection	YES					
Date of Infection (YYYY-MM-DD)	__ __ / __ __ / __ __ __ __					
Type of Infection	☐ Superficial incisional (=S) ☐ Deep incisional (=D) ☐ Organ/space (=O) ☐ Unknown					
Isolate result	1.	R	2.	R	3.	R
Antibiotic code and resistance data*						

*e.g. STAAUR/0=MSSA, STAAUR/1=MRSA, STAAUR/9=S. aureus, oxacillin sensitivity unknown, see Annex 5.