



Surveillance of Surgical Site Infections

Protocol

Version 9.1

(Based on Version 9.0 including technical amendments)

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Surveillance of Surgical Site Infections: Master Protocol

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Main Changes since version 9.0

Version 9.0 of this document was produced in October 2003. Since then a series of technical changes have been applied to this document.

Summary of major changes:

- Country codes have been updated to include new EU member states as of 2004
- The code for unknown has consistently been set to –1 (used to be 9, 99 etc. in previous versions of this document); to avoid problems for networks using ASCII type data communication internally, the field length of those numeric variables was changed to minimum 2 positions
- Some typographical errors were corrected
- Consistency with ICU surveillance protocol was enhanced in the organisation of chapters and naming conventions
- The name of table **helics_n** was changed to **ssi_net** to avoid confusion with similar ICU table
- It was made clear (and consistent) that the Surgical Unit code is a mandatory variable in the surveillance but, the value unknown (-1) is allowed
- Missing ICD-9-CM codes for NNIS code CHOL in appendix 3 were added
- References to ‘ASA (risk) score’ where changed to ‘ASA physical status classification’
- References were updated

1 Rationale and objectives for surveillance of surgical site infections

Surgical site infections (SSI) are an important target for the surveillance of nosocomial infections (NI), and it is an official priority for surveillance in several European countries. A total of 16 European networks for the surveillance of surgical site infections were identified by the HELICS implementation phase I. By the beginning of 2003, sixteen networks were recognised as official networks (Austria, Belgium, Denmark, England, France, Finland, Germany, Italy, the Netherlands, Northern Ireland, Norway, Portugal, Scotland, Spain, Sweden and Wales). A preliminary survey by questionnaire and comments on earlier versions of this protocol indicated that the surveillance systems in a majority of the centres already recorded 80-100% of the variables defined by the current protocol, most of them using the NNIS concepts.(1) Therefore, it was considered that the most feasible approach would be to remain close to the NNIS codification for surgical procedures and risk factors, with centres specifying surgical procedures either using ICD-9-CM procedure codes or with specific national codes needing trans-codification. Such a protocol, building on existing experience in recognised official surveillance networks in the member states should be adaptable for the existing networks and facilitate the creation of new networks.

The **basic principle** underlying this HELICS protocol is the concept of quality assurance applied to SSI by means of epidemiological surveillance. The **main objective** 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 nosocomial infections and to improve the quality of care in a multicenter setting.

The **specific objectives** of the surveillance activities are:

a. 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;
- 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.

b. At the level of regional or national network coordination:

To provide to the units 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
- To improve the quality of data collection

c. At the EU (HELICS) 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 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 nosocomial infections
- To ensure communication of relevant data on nosocomial infections to the European Commission as a complement to the data transmission by the national Health authorities

- To facilitate the communication and the exchange of experience between national/regional networks for the surveillance of nosocomial 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 utilization
- 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 nosocomial infection control.

The following **methods** are proposed:

- 1) performance of *prospective surveillance* of the incidence of SSI,
with
- 2) *surgeon-oriented* feedback of their own results, expressed as incidence rates,
and
- 3) *comparison* of these results with their own previous results, with locally set targets, and with the results of their peers.

Important aspects of this surveillance are:

- 4) *Timeliness*.
- 5) *Continuous* surveillance, or performed at regular intervals of sufficient length to obtain meaningful figures and a good impression of the long-term trends;
- 6) Adjustment/control of potential *confounding factors* (case-mix, risk factors and duration of observation) in order to make the comparisons more meaningful: this protocol proposes a *minimum data set* comprising the most commonly used exposure, risk and outcome indicators.
- 7) Precise definition of the *target population*, with comparisons over time or between centres pertaining to similar patient groups. Particular care should be taken not to introduce selection bias due to the systematic exclusion of certain types of patients (e.g. during night shifts, weekends..).
- 8) Concentration on *severe/costly/frequent but preventable types of infections*.
- 9) Inclusion of the use/frequency/characteristics of selected *health-care practices* (i.e. process evaluation, in contrast to the outcome evaluation mentioned above). A typical example is antimicrobial prophylaxis use.
- 10) Guaranteed *quality of the data*, which implies evaluation and validation of the data collected.
- 11) Finally, the *quality of practice should be improved* and the problems identified should be corrected; the main tool is the power of information, by means of an effective method of *feedback*

A permanent database with data collected in the format of the protocol will be established under the responsibility of the HELICS Management Team. This database provides and secures the necessary conditions for producing comparative surveillance data and indicators on SSI following a selected number of surgical procedures recorded and reported by participating official surveillance networks in Europe. This analysis will be organised by the HELICS Management Team and relies on a close co-operation between scientists in Brussels (Belgium) and Lyon (France). Furthermore the EU database will be used for specific analyses on request from European and national public health structures and scientific bodies, creating an EU network of networks for the surveillance of SSI based on the HELICS protocol.

2 Elaboration of the HELICS protocol for the surveillance of surgical site infections

In 1995, the first stage of the HELICS co-operation produced a preliminary report on standardised surveillance of SSI based on a collaborative effort by twelve EU member states. The protocol was used for the development of several networks, but was never sufficiently tested in practise. The present protocol is the result of a new collaborative effort known as HELICS Implementation phase I by which it

became possible to continue the previous work done in HELICS I, and has been funded by a grant from the SANCO Directorate General of the Commission of the European Community. The surveillance of surgical site infections was developed by a working party (list of members in appendix 1) managed from Denmark (Dr. O. Jepsen) in collaboration with the Netherlands (Dr. A. De Boer). A number of European hospitals participated in a pilot data exchange and reported surveillance data in the format of the final draft protocol. The aim of this test was to check the feasibility of the protocol and the transmission, quality and comparability of the surveillance data.

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

The indicators produced by HELICS take into account the accepted risk factors for surgical patients. Prudent comparative analyses will be possible using rates of infection stratified by level of risk. Therefore, the NNIS risk index will be used in order to stratify the patients according to the main risk factors, and compare adjusted groups of patients.(3,4) This NNIS risk index is weighted by information on:

- Risk of contamination of the wound: Wound Contamination Class (see 4.2.1)
- Patient's physical condition: Anaesthesiologist ASA physical status classification (see 4.2.2)
- Duration of operation (operation lasting more than t hours, where t is the approximate 75th percentile of the duration of surgery for the operative procedure (see 4.2.3, table 3).

Four levels of risk are defined (levels 0 to 3) using a combination of these three items with cut-points presented in table 1. It should be noted that the cut-off values for the duration of operation given in table 3 will be used in the early stages of the European SSI database. When the European database is sufficiently large, data-driven cut-off values for the duration of operation will be generated for future use in Europe. For laparoscopic procedures for colon surgery and cholecystectomy the risk index will be reduced by one point. Risk index M (indicating minus 1) is used to indicate that no risk factors were present and the procedure was done laparoscopically.(5-7)

Table 1 - Stratification points for the three variables of the risk index

<i>Variables for stratification</i>	<i>Risk index</i>	<i>Stratification points</i>
ASA physical status classification	> 2	1
Duration of operation	> 75 percentile (see table 3)	1
Wound classification	Contamination Class > 2	1

For each procedure under surveillance and for each level of the NNIS 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 1000 patient-days in the hospital).

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.

The second indicator (number of in-hospital SSI / 1000 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.

4 Definitions for the surveillance of surgical site infections

4.1 Case definitions of surgical site infections

In the HELICS collaboration surgical site infections will be defined according to the NNIS definitions, although in an earlier phase (HELICS I) a slightly different set of definitions was made. However, as most official networks adhere to the NNIS definitions, the largest degree of standardisation can be achieved by choosing the NNIS definitions. Some official networks may not be totally compliant to these definitions of surgical site infections to start with, but it is foreseen that setting these standards will lead to an increasing level of compliance.

Table 2 – Case definitions of surgical site infections (8)

SURGICAL SITE INFECTION

SUPERFICIAL INCISIONAL

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

1. Purulent drainage with or without laboratory confirmation, from the superficial incision
2. Organisms isolated from an aseptically obtained culture of fluid or tissue from the superficial incision.
3. At least one of the following signs or symptoms of infection: pain or tenderness, localized swelling, redness, or heat and superficial incision is deliberately opened by surgeon, unless incision is culture-negative.
4. Diagnosis of superficial incisional SSI made by a surgeon or attending physician.

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:

1. Purulent drainage from the deep incision but not from the organ/space component of the surgical site.
2. 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° C), localized pain or tenderness, unless incision is culture-negative.
3. An abscess or other evidence of infection involving the deep incision is found on direct examination, during reoperation, or by histopathologic or radiologic examination.
4. Diagnosis of deep incisional SSI made by a surgeon or attending physician.

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 which was opened or manipulated during an operation and at least one of the following:

1. Purulent drainage from a drain that is placed through a stab wound into the organ/space .
2. Organisms isolated from an aseptically obtained culture of fluid or tissue in the organ/space.
3. 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.
4. Diagnosis of organ/space SSI made by a surgeon or attending physician.

4.2 Definition of key terms

4.2.1 The Wound Contamination Class

Wound contamination class as described by Altemeier et al.(9)

1. 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.
2. **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.
3. **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.
4. **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.

4.2.2 The ASA Physical status classification (ASA Score)

Physical status classification developed by the American Society of Anaesthesiology (ASA).(10)

1. **NORMALLY HEALTHY PATIENT.**
2. Patient with **MILD SYSTEMIC DISEASE.**
3. Patient with **SEVERE SYSTEMIC DISEASE** that is not incapacitating.
4. Patient with an **INCAPACITATING SYSTEMIC DISEASE** that is a constant threat to life.
5. **MORIBUND** patient who is not expected to survive for 24 hours with or without operation.

4.2.3 Duration of operation

Table 3 shows the 75th percentile cut-off values for the selected NNIS procedures. In case of a reintervention within 72 h after the primary procedure, the duration of the reintervention needs to be added to the duration of the primary procedure.

Table 3 - Cut-off values for duration of operative procedure categories

<i>Category</i>	<i>Description</i>	<i>75th percentile cut-off value, in hours</i>
COLO	Colon surgery. Incision, resection or anastomosis of the large bowel; includes large-to-small and small-to-large bowel anastomosis.	3
CHOL	Cholecystectomy. Removal of gallbladder; includes procedures performed using the laparoscope.	2
HPRO	Arthroplasty of hip.	2

LAM	Laminectomy. Exploration or decompression of spinal cord through excision or incision into vertebral structures.	2
CBGB	Coronary artery bypass graft with both chest and donor site incisions. Chest procedure to perform direct revascularization 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 vascularization of the heart using, for example, the internal mammary artery.	4
CSEC	Caesarean Section	1

4.2.4 Perioperative prophylactic antibiotics

This is defined as the perioperative systemic administration of antibiotic agent(s) at or within two hours prior of primary skin incision with the aim of preventing sepsis in the operative site. In case of a caesarean section: after clamping of umbilical cord.

4.2.5 Date of infection

This is defined as the 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.

4.2.6 Urgent/elective procedure

An urgent procedure is defined as a procedure that was not planned at least 24 hours in advance. An elective procedure is defined as a procedure that was planned at least 24 hours in advance.

5 Procedures for participation

The partners of the European network of networks will sign a convention with the HELICS cooperation. The conditions for a partnership are presented in the Operating Manual and include: existence of a network coordination team, agreement on the protocol, on the quality check procedures, on the management of national codes and on modalities of data transfer, official agreement by national health authorities and designation of official representatives to HELICS.

They are expected to report relevant data for one or several of the selected operative procedures, in the format described below. Only networks coordinated by officially mandated centres should participate. The institutions in charge of official networks and receiving data from the hospitals must validate the system and the quality of the data before data are transmitted to the EU database (see below). Data will not be transmitted directly from the hospitals to the project database (with the exception of temporary participation of pilot hospitals in the context of the creation of a new network).

6 Data collection

6.1 Population under surveillance

All data from participating hospitals (or specific wards within a hospital) that are eligible for inclusion in participating official networks are eligible for inclusion in the EU database. The participating networks will progressively harmonise their selection scheme to improve and secure representativeness of their data.

A minimum period of three months of collection of data on surgical site infections in the participating hospitals is recommended.

6.2 Type of surgery under surveillance

Basically the types and numbers of operations to be reported to the EU database by participating networks depend upon the individual partner's capacity and availability of surgical specialities within the official network database. However, in order to obtain sufficient numbers of records allowing statistically valid conclusions, the diversity of operations to be recorded should be limited and focus on relatively frequently registered procedures that are likely to be interpreted similarly in different settings.

Table 4 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.

Table 4 – Selected type of surgical procedures for surveillance

<i>NNIS Category</i>	<i>Description</i>	<i>ICD-9 CM ^a Codes included in the category</i>
COLO	Colon surgery. Incision, resection or anastomosis of the large bowel; includes large to small and small to large bowel anastomosis.	45.00, 45.03, 45.41, 45.49, 45.50, 45.52, 45.7-45.90, 45.92-45.95, 46.0, 46.03, 46.04, 46.1-46.14, 46.43, 46.52, 46.75, 46.76, 46.91, 46.92, 46.94, 48.5, 48.6-48.69
CHOL	Cholecystectomy. Removal of gallbladder, includes procedures performed using the laparoscope.	51.03, 51.04, 51.2-51.24
HPRO	Arthroplasty of hip	81.51-81.53
LAM	Laminectomy. Exploration or decompression of spinal cord through excision or incision into vertebral structures.	03.0-03.09, 80.50, 80.51, 80.59
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
CSEC	Caesarean Section	74.0-74.2, 74.4-74.99

^a ICD-9-CM Procedure Codes ver. 2001

6.3 Information to be collected (minimum data set)

The selection process of the minimum data set focused on the most significant variables for the analysis of the risk of surgical site infections, either the NNIS basic risk stratification or a more advanced analysis taking into account other factors such as endoscopic procedures or emergency intervention.

The variables are classified according to 3 levels:

- M=Mandatory:** data will be rejected if this variable is missing
- R=Required:** these variables are required for the correct interpretation of the results and/or for routine analysis
- O=Optional:** data used for additional analysis

6.3.1 Data at the Network level

Information at the level of the national or regional nosocomial infections surveillance network should be collected once a year.

A surveillance network is uniquely identified by three variables: the country code, a code for the surveillance network if different networks exist within a same country (if applicable, e.g. C.Clin networks in France or the different “countries” of the United Kingdom) and a code for the surveillance component, which is always 2 in the case of SSI surveillance. Obviously, these data are generated at the level of the surveillance network coordination and they should not be collected at the hospital level.

Data table ssi_net: Network data table (one record per network and per year)

Attr.*	Variable Label	Variable Name	Format	Length
M	¹ Country code	country_id	text	2
M	² Network code	net_id	text	2
M	³ Surveillance component code	sur_id	number	1
M	⁴ Year	net_year	number	4

* Attr.: field attribute: M=mandatory, R=required, O=optional

Unique key=country code + network code + surveillance component code + year

1. **Country code:** country codes based on EARSS protocol (EARSS manual 2004, www.earss.rivm.nl) and ISO codes (International Organization for Standardization ISO 3166-1-alpha-2-code elements); AT=Austria; BE=Belgium; BG=Bulgaria; HR=Croatia; CY=Cyprus; CZ=Czech Republic; DK=Denmark; EE=Estonia; FI=Finland; FR=France; DE=Germany; GR=Greece; HU=Hungary; IS=Iceland; IE=Ireland; IL=Israel; IT=Italy; LV=Latvia; LT=Lithuania; LU=Luxembourg; MT=Malta; NL=Netherlands; NO=Norway; PL=Poland; PT=Portugal; RO=Romania; RU=Russian Federation; SK=Slovakia; SI=Slovenia; ES=Spain; SE=Sweden; CH=Switzerland; UK=United Kingdom
2. **Network code:** internal code given by the national coordinator to each sub-network in the country, e.g. different C.Clin networks in France; 00 if not applicable; EN,SC,WA,NI designate respectively England, Scotland, Wales and Northern-Ireland
3. **Surveillance component code:** always 2 for SSI surveillance (1=ICU surveillance)
4. **Year:** year for which data apply (yyyy)

6.3.2 Data at the Hospital level

Data at the level of the hospital should be collected once a year.

Data table ssi_h: Hospital characteristics (one record per hospital and per year)

Attr.	Variable Label	Variable Name	Format	Length
M	¹ Country code	country_id	text	2
M	² Network code	net_id	text	2
M	³ Surveillance component code	sur_id	number	1
M	⁴ Year	net_year	number	4

M	⁵ Hospital code	h_code	number	4
R	⁶ Hospital size (n of beds in categories)	h_size	number	2
R	⁷ Hospital type	h_type	number	2
O	⁸ Hospital location	h_region	text	2

Unique key=country code + network code + surveillance component code + year + hospital code

1. **Country code:** see 6.3.1
2. **Network code:** see 6.3.1
3. **Surveillance component code:** see 6.3.1
4. **Year:** year for which data apply
5. **Hospital code:** hospital codes should be anonymized at the level of the surveillance network. Hospital names or codes used within a network should be converted to a new numeric code before sending data to Helics and the resulting code table (mapping of usual hospital ID's to new Helics hospital code) should be available at the level of the surveillance network only.
6. **Hospital size (n of beds, in categories):** 0=0-99, 1=100-199, 2=200-299, 3=300-399, 4=400-499,5=500-599,..., -1=unknown
7. **Hospital type:** 1=university hospital, 2=general hospital, teaching; 3=general hospital, non-teaching; 4=specialist or other hospital; -1=unknown
8. **Hospital location:** optional; region or area within a country where hospital is located; geographical code defined by the national coordination and used for mapping at EU level (e.g. pathogen-specific infection rates); may coincide with network code (e.g. C.Clin); 00 if not applicable

These hospital data represent the minimal data set that will be used for stratification of reference data. A more comprehensive questionnaire about structural and process indicators is developed elsewhere.

6.3.3 Data at the Surgical Unit level

Data at the surgical unit level (surgical unit type) are optional for SSI surveillance. They should be collected once a year and will be used for:

- reporting indicators by surgical unit/ward type (if available)
- linking outcome indicators with selected structure and process indicators (extended questionnaire, see elsewhere)

Data table ssi_u: Surgical unit characteristics (one record per unit and per year)

Attr.	Variable Label	Variable Name	Format	Length
M	¹ Country code	country_id	text	2
M	² Network code	net_id	text	2
M	³ Surveillance component code	sur_id	number	1
M	⁴ Year	net_year	number	4
M	⁵ Hospital code	h_code	number	4
M	⁶ Surgical unit code	su_id	text	3
R	⁷ Surgical unit type	su_type	text	2

Unique key=country code + network code + surveillance component code + year + hospital code + surgical unit code

1. **Country code:** see 6.3.1
2. **Network code:** see 6.3.1
3. **Surveillance component code:** see 6.3.1
4. **Year:** year for which data apply (yyyy)
5. **Hospital code:** unique hospital numeric code (see 6.3.2)
6. **Surgical unit/ward code:** code of surgical ward attributed by hospital; -1=unknown
7. **Surgical unit/ward type:** CA: general/abdominal surgery; CC: cardiovascular surgery; CM: mixed surgical/medical; CN: neurosurgery; CO: orthopedic surgery; TR: traumatology; GY: gynaecology; OT: other surgical specialty; -1=unknown

6.3.4 Operative procedure data

Data table ssi_o: Patient and operative procedure characteristics (one record per intervention)

Attr.	Variable Label	Variable Name	Format	Length
M	¹ Country code	country_id	text	2
M	² Network code	net_id	text	2
M	³ Surveillance component code	sur_id	number	1
M	⁴ Hospital code	h_code	number	4
M	⁵ Surgical unit code	su_id	text	3
M	⁶ Operative procedure ID	op_id	text	20
R	⁷ Age (years)	age	number	3
R	⁸ Gender	sex	text	1
O	⁹ Date of hospital admission	admdt	date	10
M	¹⁰ Date of operation	opdt	date	10
R	¹¹ Discharge date or date of last follow-up in the hospital	dis_dt	date	10
R	¹² Discharge status	dis_st	number	2
O	¹³ Date of last follow-up post-discharge	pd_dt	date	10
M	¹⁴ Primary operation code, NNIS category	opcode	text	4
O	¹⁵ Primary operation code, ICD-9-CM	icd9	text	5
R	¹⁶ Endoscopic procedure	endo	number	2
M	¹⁷ Wound contamination class	wocl	number	2
M	¹⁸ Duration of operation	opdur	number	4
R	¹⁹ Urgent/elective operation	emer	number	2
M	²⁰ ASA physical status classification	asa	number	2
O	²¹ Perioperative prophylactic antibiotics	abp	number	2
M	²² Surgical site infection	ssi	number	2

Unique key=country code + network code + surveillance component code + hospital code + surgical unit code + operative procedure ID

1. **Country code:** see 6.3.1
2. **Network code:** see 6.3.1
3. **Surveillance component code:** see 6.3.1
4. **Hospital code:** unique hospital numeric code (see 6.3.2)
5. **Surgical unit/ward code:** code of surgical ward attributed by hospital; -1=unknown
6. **Operative procedure ID:** unique code for this operative procedure (unique code for this procedure on a specific patient and on a specific day)
7. **Age:** age of the patient in years
8. **Gender:** gender of the patient (M/F/U)
9. **Date of hospital admission (dd/mm/yyyy):** date of admission in the hospital
10. **Date of operation (dd/mm/yyyy):** date this operative procedure was carried out
11. **Discharge date or date of last follow-up in the hospital (dd/mm/yyyy):** date patient was discharged from hospital (or date of in-hospital death); used to calculate the number of post-operative in-hospital patient-days; if follow-up ended before discharge from hospital (e.g. if patient stayed >30 days in hospital), report date last information was obtained;
12. **Discharge status:** patient status at hospital discharge or at end of follow-up in hospital; 1=alive; 2=dead in hospital; -1=unknown
13. **Date of last follow-up post-discharge (dd/mm/yyyy):** date last information on this patient was obtained after discharge, e.g. from surgeon (out-patient department or private practice) or general practitioner; used to calculate the total amount of follow-up days (in-hospital and post-discharge)
14. **Primary operation code:** NNIS operative procedure code; selected procedures in HELICS-SSI are: COLO: colon surgery; CHOL: cholecystectomy; HPRO: arthroplasty of the hip; LAM: laminectomy; CBGB, CBGC: coronary artery bypass grafting (CABG); CSEC: caesarean section; see table 4 and appendix 3 for ICD-9-CM codes included in NNIS operative procedure categories.
15. **Primary operation code, ICD-9-CM (optional):** ICD-9-CM code of primary operative procedure, see appendix 3; 4-digit code or 3-digit code if 4-digit code not available, e.g. 45.8=total intra-abdominal colectomy; ICD-9-CM registration is recommended for HPRO: 81.51: total hip replacement, 81.52: partial hip replacement, 81.53: revision of hip replacement
16. **Endoscopic procedure:** 1=yes; 0=no; -1=unknown; enter "yes" only if the entire operation was performed using an endoscopic/laparoscopic approach
17. **Wound contamination class:** 1=clean; 2=clean-contaminated; 3=contaminated; 4=dirty or infected;

- 1=unknown (see 4.2.1 for definitions)
18. **Duration of operation:** duration of operation (in minutes) from skin incision to skin closure; In case of reintervention within 72 h after the primary procedure, the duration of the reintervention is added to the duration of the primary procedure; -1=unknown (see 4.2.3)
 19. **Urgent/elective operation:** 1=urgent: operative procedure was not planned at least 24 hours in advance; 2=elective: operative procedure was planned at least 24 hours in advance; -1=unknown (see 4.2.6)
 20. **ASA physical status classification:** 1=Normally healthy patient; 2=Patient with mild systemic disease; 3=Patient with severe systemic disease that is not incapacitating; 4=Patient with an incapacitating systemic disease that is a constant threat to life; 5=Moribund patient who is not expected to survive for 24 hours with or without operation; -1=unknown (see 4.2.2)
 21. **Perioperative prophylactic antibiotics:** (optional) 1=yes; 0=no; -1=unknown; patient received perioperative systemic administration of antibiotic agent(s) at or within two hours prior of primary skin incision with the aim of preventing sepsis in the operative site. In case of a caesarean section: after clamping of umbilical cord (see 4.2.4)
 22. **Surgical site infection:** presence of a SSI for this operation: 1=yes; 0=no (see definitions table 2); for CBGB, only chest wound infections are to be reported

6.3.5 Infection data

Data table ssi_i: surgical site infection data (one record per infection)

Attr.	Variable Label	Variable Name	Format	Length
M	¹ Country code	country_id	text	2
M	² Network code	net_id	text	2
M	³ Surveillance component code	sur_id	number	1
M	⁴ Hospital code	h_code	number	4
M	⁵ Surgical unit code	su_id	text	3
M	⁶ Operative procedure ID	op_id	text	20
R	⁷ Type of SSI	ssi_type	text	2
M	⁸ Date of infection	ssi_dt	date	10
O	⁹ Micro-organism 1	mo1	text	6
O	¹⁰ Resistance micro-organism 1	res1	number	2
O	¹¹ Micro-organism 2	mo2	text	6
O	¹² Resistance micro-organism 2	res2	number	2
O	¹³ Micro-organism 3	mo3	text	6
O	¹⁴ Resistance micro-organism 3	res3	number	2

Unique key=country code + network code + surveillance component code + hospital code + surgical unit code + operative procedure ID + date of infection

1. **Country code:** see 6.3.1
2. **Network code:** see 6.3.1
3. **Surveillance component code:** see 6.3.1
4. **Hospital code:** unique hospital numeric code (see 6.3.2)
5. **Surgical unit/ward code:** code of surgical ward attributed by hospital; -1=unknown
6. **Operative procedure ID:** unique code for this operative procedure (unique code for this procedure on a specific patient and on a specific day)
7. **Type of SSI:** type of surgical site infection: S=superficial incisional; D=deep incisional; O=organ/space; -1=unknown (see 4.1 table 2)
8. **Date of infection (dd/mm/yyyy):** 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.
9. **Micro-organism1:** Optional. 6 character code list (WHOCARE-based) – see code list in appendix 2; if no micro-organism is available, specify either _NONID (Micro-organism not identified or not found), _NOEXA (examination not done) or _STERI (Sterile examination).
10. **Antimicrobial resistance1:** 1 digit (see code list of resistance phenotypes in appendix 2)
 - required: oxacillin resistance in *S. aureus* (0=MSSA 1=MRSA -1=unknown)
 - other micro-organisms: optional
11. **Micro-organism2:** Optional
12. **Antimicrobial resistance2:** Required for *S.aureus*, optional for other micro-organisms
13. **Micro-organism3:** Optional
14. **Antimicrobial resistance3:** Required for *S.aureus*, optional for other micro-organisms

7 Control of the quality and validation of data

7.1 Role of the official network

The official networks in the countries are responsible for the quality of the data, for validation and for data checks. They will be asked to provide an indication of the kind of selection in their data so that the European centre can judge its representativeness. The official centres will also be asked to describe their procedures to guarantee the quality of the data.

7.2 Identifying infections

Identification of surgical site infections may require several sources. Major sources are the clinical signs of infection observed by staff in the wards or during rounds possibly supported by laboratory reports. However, each unit must decide which sources are reliable.

7.3 Validating the quality of clinical surveillance data

Validation of sensitivity and specificity of the recordings are often done by conducting surveys in the wards comparing the patients record and other clinical information with the recordings in the surveillance system. In general more than one source should be involved in order to secure valid data. Transmission and feedback of data should be subject to validation procedures.

7.4 Role of the HELICS management team

When receiving the data, the HELICS data manager will realise a new check of the quality of data for completeness of information and consistency. The modalities of the consistency checks will be defined in the appropriate validation tools.

8 Confidentiality

8.1 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.

8.2 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.

8.3 Publication policy

The data will be used to generate European annual reports on SSI, scientific publications and reference tables on the internet. Official networks in the countries have to provide written consent with

any publication before publication. Authorships will be dealt with according to the authorship regulations used by the British Medical Journal; 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.

9 Data flow, accessibility and storage

Methods for data transfer to the HELICS management team are presented in the Operating Manual. These methods will evolve according to IT developments supporting the HELICS programme.

The data files to be exported and sent to the Helics coordination centre for the surveillance of surgical site infections are the following:

- **ssi_net**: country and network data
- **ssi_h**: hospital characteristics
- **ssi_u**: surgical unit/ward data
- **ssi_o**: operative procedure data
- **ssi_i**: infection data

10 References

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11 Appendices

11.1 Appendix 1. Working party that originally developed this surveillance protocol

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11.2 Appendix 2. Code list of Micro-organisms

Note: The code list is adapted from the original WHOCARE coding system. The current list is a selection of micro-organisms based on their frequency of occurrence in nosocomial 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. Networks/countries preferring to use the complete WHOCARE list may obtain the database from the HELICS coordination centre.

Micro-organism selection and minimal list

	Microorganism	Code	Minimal list
Gram + cocci	<i>Staphylococcus aureus</i>	STAAUR	STAAUR
	<i>Staphylococcus epidermidis</i>	STAEPI	STACNS
	<i>Staphylococcus haemolyticus</i>	STAHAE	
	Other coagulase-negative staphylococci (CNS)	STAOTH	
	<i>Staphylococcus sp.</i> , not specified	STANSP	GPCOTH
	<i>Streptococcus pneumoniae</i>	STRPNE	STRSPP
	<i>Streptococcus agalactiae</i> (B)	STRAGA	
	<i>Streptococcus pyogenes</i> (A)	STRPYO	
	Other haemol. Streptococci (C, G)	STRHCG	
	<i>Streptococcus sp.</i> , other	STROTH	
	<i>Streptococcus sp.</i> , not specified	STRNSP	
	<i>Enterococcus faecalis</i>	ENCFAE	ENCSP
	<i>Enterococcus faecium</i>	ENCFAC	
	<i>Enterococcus sp.</i> , other	ENCOTH	
	<i>Enterococcus sp.</i> , not specified	ENCNSP	
Other Gram-positive cocci	GPCOTH	GPCOTH	
Gram - cocci	<i>Moraxella catharralis</i>	MORCAT	GNCTOT
	<i>Moraxella sp.</i> , other	MOROTH	
	<i>Moraxella sp.</i> , not specified	MORNSP	
	<i>Neisseria meningitidis</i>	NEIMEN	
	<i>Neisseria sp.</i> , other	NEIOTH	
	<i>Neisseria sp.</i> , not specified	NEINSP	
	Other Gram-negative cocci	GNCOTH	
Gram + bacilli	<i>Corynebacterium sp.</i>	CORSPP	GPBTOT
	<i>Bacillus sp.</i>	BACSP	
	<i>Lactobacillus sp.</i>	LACSP	
	<i>Listeria monocytogenes</i>	LISMON	
	Other Gram-positive bacilli	GPBOTH	
Enterobacteriaceae	<i>Citrobacter freundii</i>	CITFRE	CITSP
	<i>Citrobacter koseri</i> (e.g. <i>diversus</i>)	CITDIV	
	<i>Citrobacter sp.</i> , other	CITOTH	
	<i>Citrobacter sp.</i> , not specified	CITNSP	
	<i>Enterobacter cloacae</i>	ENBCLO	
	<i>Enterobacter aerogenes</i>	ENBAER	
	<i>Enterobacter agglomerans</i>	ENBAGG	
	<i>Enterobacter sakazakii</i>	ENBSAK	
	<i>Enterobacter gergoviae</i>	ENBGER	
	<i>Enterobacter sp.</i> , other	ENBOTH	
	<i>Enterobacter sp.</i> , not specified	ENBNSP	
	<i>Escherichia coli</i>	ESCCOL	ESCCOL
	<i>Klebsiella pneumoniae</i>	KLEPNE	KLESPP
	<i>Klebsiella oxytoca</i>	KLEOXY	
	<i>Klebsiella sp.</i> , other	KLEOTH	

	<i>Klebsiella sp.</i> , not specified	KLENSP		
	<i>Proteus mirabilis</i>	PRTMIR	PRTSPP	
	<i>Proteus vulgaris</i>	PRTVUL		
	<i>Proteus sp.</i> , other	PRTOTH		
	<i>Proteus sp.</i> , not specified	PRTNSP		
	<i>Serratia marcescens</i>	SERMAR	SERSPP	
	<i>Serratia liquefaciens</i>	SERLIQ		
	<i>Serratia sp.</i> , other	SEROTH		
	<i>Serratia sp.</i> , not specified	SERNSP		
	<i>Hafnia sp.</i>	HAFSPP	ETBSPP	
	<i>Morganella sp.</i>	MOGSPP		
	<i>Providencia sp.</i>	PRVSPP		
	<i>Salmonella enteritidis</i>	SALENT		
	<i>Salmonella typhi</i> or <i>paratyphi</i>	SALTYP		
	<i>Salmonella typhimurium</i>	SALTYM		
	<i>Salmonella sp.</i> , not specified	SALSPP		
	<i>Salmonella sp.</i> , other	SALOTH		
	<i>Shigella sp.</i>	SHISPP		
	<i>Yersinia sp.</i>	YERSPP		
	Other enterobacteriaceae	ETBOTH		
	Enterobacteriaceae, not specified	ETBNSP		
Gram - bacilli	<i>Acinetobacter baumannii</i>	ACIBAU		ACISPP
	<i>Acinetobacter calcoaceticus</i>	ACICAL		
	<i>Acinetobacter haemolyticus</i>	ACIHAE		
	<i>Acinetobacter lwoffii</i>	ACILWO		
	<i>Acinetobacter sp.</i> , other	ACIOTH		
	<i>Acinetobacter sp.</i> , 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 sp.</i> , other	HAEOTH		
	<i>Haemophilus sp.</i> , not specified	HAENSP		
	<i>Legionella sp.</i>	LEGSPP	LEGSPP	
	<i>Achromobacter sp.</i>	ACHSPP	GNBTOT	
	<i>Aeromonas sp.</i>	AEMSPP		
	<i>Agrobacterium sp.</i>	AGRSPP		
	<i>Alcaligenes sp.</i>	ALCSPP		
<i>Campylobacter sp.</i>	CAMSPP			
<i>Flavobacterium sp.</i>	FLASPP			
<i>Gardnerella sp.</i>	GARSPP			
<i>Helicobacter pylori</i>	HELPYL			
<i>Pasteurella sp.</i>	PASSPP			
Other Gram-neg Bacilli, non enterobacteriaceae	GNBOTH			
Anaerobic bacilli	<i>Bacteroides fragilis</i>	BATFRA		BATSPP
	<i>Bacteroides</i> other	BATOTH		
	<i>Clostridium difficile</i>	CLODIF	ANATOT	
	<i>Clostridium</i> other	CLOOTH		
	<i>Propionibacterium sp.</i>	PROSPP		
	<i>Prevotella sp.</i>	PRESPP		
	Other anaerobes	ANAOTH		

Other bacteria	Mycobacterium, atypical <i>Mycobacterium tuberculosis</i> complex <i>Chlamydia sp.</i> <i>Mycoplasma sp.</i> <i>Actinomyces sp.</i> <i>Nocardia sp.</i> Other bacteria	MYCATY MYCTUB CHLSPP MYPSP ACTSPP NOCSP BCTOTH	BCTTOT
Fungi	<i>Candida albicans</i> <i>Candida glabrata</i> <i>Candida tropicalis</i> <i>Candida parapsilosis</i> <i>Candida sp.</i> , other <i>Candida sp.</i> , not specified	CANALB CANGLA CANTRO CANPAR CANOTH CANNSP	CANSPP
	<i>Aspergillus fumigatus</i> <i>Aspergillus niger</i> <i>Aspergillus sp.</i> , other <i>Aspergillus sp.</i> , not specified	ASPFUM ASPNIG ASPOTH ASPNSP	ASPSPP
	Other yeasts Filaments other Other parasites	YEAOTH FILOTH PAROTH	PARTOT
Virus	Adenovirus Cytomegalovirus (CMV) Enterovirus (polio, coxsackie, echo) Hepatitis A virus Hepatitis B virus Hepatitis C virus Herpes simplex virus Human immunodeficiency virus (HIV) Influenza A virus Influenza B virus Influenza C virus Parainfluenza virus Respiratory syncytial virus (RSV) Rhinovirus Rotavirus SARS virus Varicella-zoster virus Other virus	VIRADV VIRCMV VIRENT VIRHAV VIRHBV VIRHCV VIRHSV VIRHIV VIRINA VIRINB VIRINC VIRPIV VIRRSV VIRRHI VIRROT VIRSAR VIRVZV VIROTH	VIRTOT
Micro-organism not identified or not found Examination not done Sterile examination		_NONID _NOEXA _STERI	_NONID _NOEXA _STERI

_NONID: evidence exists that a microbiological examination has been done, but the micro-organism 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)

Antimicrobial resistance

Tracer antimicrobial resistance phenotypes for nosocomial pathogens

The surveillance of tracer antibiotic resistance phenotypes is optional and the proposed list is subject to adaptation in the future. Only for *S.aureus*, hospitals are requested to record resistance to methicillin/oxacillin.

	0	1	2	3	-1
<i>S. aureus</i> *	oxa-S	oxa-R		GISA	unknown
<i>Enterococcus faecalis</i> and <i>faecium</i>	ampi-S	ampi-R	vanco-R	-	unknown
Enterobacteriaceae	ampi-S	ampi-R & C3-S	C3-R	-	unknown
<i>Acinetobacter baumannii</i>	-	CAZ-S	CAZ-R	-	unknown
<i>Pseudomonas aeruginosa</i>	ticar-S	ticar-R & CAZ-S	CAZ-R	-	unknown

*minimal data=*S.aureus*, code STAAUR/0 for MSSA, STAAUR/1 for MRSA, STAAUR/ -1 if unknown

R = intermediate or resistant

Note : an I strain is coded as resistant (I = R)

S = sensitive

oxa = oxacillin

GISA = intermediate or resistant to glycopeptides (MIC vancomycin or teicoplanin)

vanco = vancomycin

ampi = penicillin A or amoxicillin

C3 = cefotaxim or ceftazidim

ESBL = Extended spectrum beta-lactamase producer

ticar = ticarcillin or piperacillin

CAZ = ceftazidime

Optional antibiogram

Instead of using a predefined list of antimicrobial resistance “tracer” phenotypes, networks may prefer to use complete or partial antibiogram data. An example of a complete up-to-date antibiogram is given in the appendix of the Helics-ICU protocol.

11.3 Appendix 3. HELICS selected operative procedure categories

The tabular list of procedures is based on NNIS operative procedure categories defined by ICD-9-CM procedure codes (Version 1997).

- NNIS operative procedure categories are from the paper by HORAN TC and EMORI TG (Definitions of key terms used in the NNIS System. Am J Infect Control 1997;25:112-6) and the NNIS Manual, version May 1999.
- ICD-9-CM procedure codes are from the 1997 version, downloaded from the CDC-website (<http://www.cdc.gov/nchs/about/otheract/icd9/abticd9.htm>)
- **Chapters (3 digit codes) of the ICD-9 CM procedure list are in bold characters**, 4 digit codes are in normal characters
- Selected procedure numbers are underlined, sometimes whole chapters (3 digits) are **selected**
- Abbreviations:
 - NOS: not otherwise specified
 - NEC: not elsewhere classified

Table prepared by Dr. Christian Brandt, KISS, Berlin, christian.brandt@medizin.fu-berlin.de

Code: CBGB

Operative procedure: Coronary artery bypass grafting with both chest and donor site incisions

Description: Open-chest procedure to perform direct revascularization of heart; includes obtaining suitable vein from donor site for grafting

36.1 Bypass anastomosis for heart revascularization

- 36.10 Aortocoronary bypass for heart revascularization, not otherwise specified
Direct revascularization:
- | | | |
|--------------|---|--|
| cardiac | } | with catheter stent, prosthesis, or vein graft |
| coronary | | |
| heart muscle | | |
| myocardial | | |

Heart revascularization NOS

- 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 revascularization

Code: CBGC

Operative procedure : Coronary artery bypass grafting with chest incision only

Description: Open-chest procedure to perform direct vascularization of heart using, for example, the internal mammary (thoracic) artery

36.1 Bypass anastomosis for heart revascularization

- 36.15 Single internal mammary-coronary artery bypass
Anastomosis (single):
 - mammary artery to coronary artery
 - thoracic artery to coronary artery
- 36.16 Double internal mammary-coronary artery bypass
Anastomosis, double:
 - mammary artery to coronary artery
 - thoracic artery to coronary artery
- 36.17 Abdominal - coronary artery bypass
Anastomosis:
 - gastroepiploic artery to coronary artery

36.2 Heart revascularization by arterial implant

Implantation of:
aortic branches [ascending aortic branches] into heart muscle

blood vessels into myocardium
internal mammary artery [internal thoracic artery] into:
heart muscle, myocardium, ventricle, ventricular wall
Indirect heart revascularization NOS

Code: CHOL

Operative procedure : Cholecystectomy

Description: Removal of gallbladder; includes procedures performed using the laparoscope

51.0 Cholecystotomy and cholecystostomy

51.03 Other cholecystostomy (=not trocar cholecystostomy)

51.04 Other cholecystostomy
Cholelithotomy NOS

51.2 Cholecystectomy

51.21 Other partial cholecystectomy
Revision of prior cholecystectomy

Excludes: that by laparoscope (51.24)

51.22 Cholecystectomy

Excludes: laparoscopic cholecystectomy (51.23)

51.23 Laparoscopic cholecystectomy

51.24 Laparoscopic partial cholecystectomy

Code: CSEC

Operative procedure : Cesarean section

Description: Obstetrical delivery by Cesarean section

74 Cesarean section and removal of fetus

Code also any synchronous:

hysterectomy (68.3-68.4, 68.6, 68.8)

myomectomy (68.29)

sterilization (66.31-66.39, 66.63)

74.0 Classical cesarean section

Transperitoneal classical cesarean section

74.1 Low cervical cesarean section

Lower uterine segment cesarean section

74.2 Extraperitoneal cesarean section

Supravesical cesarean section

74.4 Cesarean section of other specified type

Peritoneal exclusion cesarean section

Transperitoneal cesarean section NOS

Vaginal cesarean section

74.9 Cesarean section of unspecified type

74.91 Hysterotomy to terminate pregnancy

Therapeutic abortion by hysterotomy

74.99 Other cesarean section of unspecified type

Cesarean section NOS

Obstetrical abdominouterotomy

Obstetrical hysterotomy

Code: HPRO**Operative procedure :** Hip prosthesis**Description:** Arthroplasty of hip**81.5 Joint replacement of lower extremity**

Includes: arthroplasty of lower extremity with:
external traction or fixation
graft of bone (chips) or cartilage
internal fixation device or prosthesis
removal of cement spacer

- 81.51 Total hip replacement
Replacement of both femoral head and acetabulum by prosthesis
Total reconstruction of hip
- 81.52 Partial hip replacement
Bipolar endoprosthesis
- 81.53 Revision of hip replacement
Partial
Total

Code: LAM**Operative procedure :** Laminectomy**Description:** Exploration or decompression of spinal cord through excision or incision into vertebral structures**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
Decompression:
laminectomy
laminotomy
Exploration of spinal nerve root
Foraminotomy

Excludes: *drainage of spinal fluid by anastomosis (03.71-03.79)*
laminectomy with excision of intervertebral disc (80.51)
spinal tap (03.31)
that as operative approach - omit code

80.5 Excision or destruction of intervertebral disc

- 80.50 Excision or destruction of intervertebral disc, unspecified
Unspecified as to excision or destruction
- 80.51 Excision of intervertebral disc
Discectomy
Removal of herniated nucleus pulposus
Levels:
cervical
thoracic
lumbar (lumbosacral)
That by laminotomy or hemilaminectomy
That with decompression of spinal nerve root at same level
Requires additional code for any concomitant decompression of spinal nerve root at different level from excision site

Code also any concurrent spinal fusion (81.00 - 81.09)

Excludes: *intervertebral chemonucleolysis (80.52)*
laminectomy for exploration of intraspinal canal (03.09)
laminotomy for decompression of spinal nerve root only (03.09)

- 80.59 Other destruction of intervertebral disc
Destruction NEC
That by laser

Code: COLO**Operative procedure :** Colon surgery**Description:** Incision, resection, or anastomosis of large bowel; includes large-to-small and small-to-large bowel anastomoses**45.0 Enterotomy**

Excludes: duodenocholedochotomy (51.41-51.42, 51.51)
that for destruction of lesion (45.30-45.34)
that of exteriorized intestine (46.14, 46.24, 46.31)

45.00 Incision of intestine, not otherwise specified

45.03 Incision of large intestine
Excludes: proctotomy (48.0)

45.4 Local excision or destruction of lesion or tissue of large intestine

45.41 Excision of lesion or tissue of large intestine
Excision of redundant mucosa of colostomy
Excludes: biopsy of large intestine (45.25-45.27)
endoscopic polypectomy of large intestine (45.42)
fistulectomy (46.76)
multiple segmental resection (45.71)
that by endoscopic approach (45.42-45.43)

45.49 Other destruction of lesion of large intestine
Excludes: that by endoscopic approach (45.43)

45.5 Isolation of intestinal segment

Code also any synchronous:
anastomosis other than end-to-end (45.90-45.94)
enterostomy (46.10-46.39)

45.50 Isolation of intestinal segment, not otherwise specified
Isolation of intestinal pedicle flap
Reversal of intestinal segment

45.52 Isolation of segment of large intestine
Resection of colon for interposition

45.7 Partial excision of large intestine

Code also any synchronous:
anastomosis other than end-to-end (45.92-45.94)
enterostomy (46.10-46.39)

45.71 Multiple segmental resection of large intestine
Segmental resection for multiple traumatic lesions of large intestine

45.72 Cecectomy
Resection of cecum and terminal ileum

45.73 Right hemicolectomy
Ileocelectomy
Right radical colectomy

45.74 Resection of transverse colon

45.75 Left hemicolectomy
Excludes: proctosigmoidectomy (48.41-48.69)
second stage Mikulicz operation (46.04)

45.76 Sigmoidectomy

45.79 Other partial excision of large intestine
Enterocolectomy NEC

45.8 Total intra-abdominal colectomy

Excision of cecum, colon, and sigmoid
Excludes: coloproctectomy (48.41-48.69)

45.9 Intestinal anastomosis

Code also any synchronous resection (45.31-45.8, 48.41-48.69):

Excludes: end-to-end anastomosis - omit code

- 45.90 Intestinal anastomosis, not otherwise specified
- 45.92 Anastomosis of small intestine to rectal stump
Hampton procedure
- 45.93 Other small-to-large intestinal anastomosis
- 45.94 Large-to-large intestinal anastomosis
Excludes: rectorectostomy (48.74)
- 45.95 Anastomosis to anus
Formation of endorectal ileal pouch (H- pouch) (J-pouch) (S-pouch) with
anastomosis of small intestine to anus

46.0 Exteriorization of intestine

Includes: loop enterostomy
multiple stage resection of intestine

- 46.03 Exteriorization of large intestine
Exteriorization of intestine NOS
First stage Mikulicz exteriorization of intestine
Loop colostomy
- 46.04 Resection of exteriorized segment of large intestine
Resection of exteriorized segment of intestine NOS
Second stage Mikulicz operation

46.1 Colostomy

Code also any synchronous resection (45.49, 45.71-45.79, 45.8)

Excludes: loop colostomy (46.03)
that with abdominoperineal resection of rectum (48.5)
that with synchronous anterior rectal resection (48.62)

- 46.10 Colostomy, not otherwise specified
- 46.11 Temporary colostomy
- 46.13 Permanent colostomy
- 46.14 Delayed opening of colostomy

46.4 Revision of intestinal stoma

- 46.43 Other revision of stoma of large intestine
Excludes: excision of redundant mucosa (45.41)

46.5 Closure of intestinal stoma

Code also any synchronous resection (45.34, 45.49, 45.61-8)

- 46.52 Closure of stoma of large intestine
Closure or take-down of:
cecostomy
colostomy
sigmoidostomy

46.7 Other repair of intestine

Excludes: closure of:
ulcer of duodenum (44.42)
vesicoenteric fistula (57.83)

- 46.75 Suture of laceration of large intestine
- 46.76 Closure of fistula of large intestine
Excludes: closure of:
gastrocolic fistula (44.63)
rectal fistula (48.73)
sigmoidovesical fistula (57.83)
stoma (46.52)
vaginal fistula (70.72-70.73)

vesicocolic fistula (57.83)
vesicosigmoidovaginal fistula (57.83)

46.9 Other operations on intestines

- 46.91 Myotomy of sigmoid colon
- 46.92 Myotomy of other parts of colon
- 46.94 Revision of anastomosis of large intestine

48.5 Abdominoperineal resection of rectum

Combined abdominoendorectal resection

Complete proctectomy

Includes: with synchronous colostomy

Code also any synchronous anastomosis other than end-to-end (45.90, 45.92-45.95)

Excludes: *Duhamel abdominoperineal pull-through (48.65)*
that as part of pelvic exenteration (68.8)

48.6 Other resection of rectum

Code also any synchronous anastomosis other than end-to-end (45.90, 45.92-45.95)

- 48.61 Transsacral rectosigmoidectomy
- 48.62 Anterior resection of rectum with synchronous colostomy
- 48.63 Other anterior resection of rectum
Excludes: *that with synchronous colostomy (48.62)*
- 48.64 Posterior resection of rectum
- 48.65 Duhamel resection of rectum
Duhamel abdominoperineal pull-through
- 48.69 Other
 - Partial proctectomy
 - Rectal resection NOS

11.4 Appendix 4. Data collection form (model)

