SURVEILLANCE

Healthcare-associated infections: surgical site infections

Annual Epidemiological Report for 2023

Key facts

- Surgical site infections (SSIs) are among the most common healthcare-associated infections (HAIs). They are associated with longer post-operative hospital stays, additional surgical procedures, treatment in intensive care units and higher mortality.
- In 2023, 12 EU Member States and one EEA country reported 6 254 SSIs from a total of 421 397 surgical procedures for nine types of surgical procedures.
- The percentage of SSIs varied from 0.4% in laminectomies to 10.2% in open colon surgery, depending on the type of surgical procedure.
- The incidence density of in-hospital SSIs per 1 000 post-operative patient-days varied from 0.1 to 5.7, depending on the type of surgical procedure.
- In several procedure types, the number of reported procedures reached a new high in 2023, indicating in part improved surveillance participation.
- Meanwhile, for 2013–2023 long-term trends, the percentage of SSIs and the incidence density were decreasing or remained mostly stable. However, some slight increases were identified in visual inspection for the most recent surveillance years 2020-2023, especially in SSI incidence density for certain procedures.

Introduction

Surgical site infections (SSIs) are among the most common healthcare-associated infections (HAIs). SSIs are associated with longer post-operative hospital stays, may necessitate additional surgical procedures, may require intensive care, and result in higher attributable morbidity and mortality. SSIs are therefore an important target for the surveillance of healthcare-associated infections (HAI).

Methods

This report is based on data for 2023 retrieved on 8 April 2026 from The European Surveillance System (TESSy) and ECDC's decentralised data storage for antimicrobial resistance and healthcare-associated infections (ARHAI). TESSy is a system for the collection, analysis and dissemination of data on communicable diseases. EU/EEA countries contribute to the system by uploading infectious disease surveillance data at regular intervals. The ARHAI decentralised data storage is a system allowing EU/EEA countries to store their surveillance data on their national servers in TESSy data format.

Suggested citation: European Centre for Disease Prevention and Control. Healthcare-associated infections: surgical site infections. In: ECDC. Annual epidemiological report for 2023. Stockholm: ECDC; June 2026.

Stockholm, June 2026

For a detailed description of methods used to produce this report, please refer to the Methods chapter [1].

SSI surveillance data for 2023 were reported to ECDC by 13 countries (12 EU Member States and one EEA country).

Data on SSIs following surgical procedures that took place in 2023 were collected in hospitals participating in national or regional surveillance of SSIs across Europe. The surveillance protocol allowed these hospitals to opt for patient-based or unit-based reporting, but as in previous years, all countries provided patient-based data, with one country reporting both patient- and unit-based data (Belgium) [2,3]. Due to the limited use of the unit-based data, unit-based records were combined with the patient-based data, where relevant. SSI cases were classified according to the modified 2012 EU case definitions [4,5].

The SSI surveillance protocol includes nine types of surgical procedures: coronary artery bypass graft (CABG), open and laparoscopic cholecystectomy (CHOL), open and laparoscopic colon surgery (COLO), caesarean section (CSEC), hip prosthesis (HPRO), knee prosthesis (KPRO) and laminectomy (LAM). SSIs detected within a defined follow-up period were included in the analysis. The standardised follow-up period was 30 days. For deep or organ/space infections following orthopaedic operations with an implant in place (HPRO/KPRO/CABG), the follow-up period was extended to 90 days [3]. Laparoscopic/open procedures for CHOL and COLO only include the data for which the variable 'endoscopic procedure (yes/no)' was reported.

For all patients with an SSI, basic demographics, infection characteristics and outcome at hospital discharge were collected. In the patient-based surveillance option, these data were collected from all surgical patients. Furthermore, information on each surgical procedure was collected, including whether the operation was urgent (i.e. not planned at least 24 hours in advance). The United States National Healthcare Safety Network (NHSN) risk index, which is based on the presence of three major risk factors (duration of the operation, wound contamination class and the American Society of Anesthesiologists' physical status classification), was used to assign all surgical patients to one of four categories from low to high risk (0, 1, 2 and 3) [6,7]. In this analysis, categories 2 and 3 were combined because of the small number of operations in these categories. For the duration of the operation, instead of set cut-offs used in the SSI surveillance protocol v2.2, the 75th percentile was calculated from the surveillance data 2023 to classify procedures with long duration [3].

For each type of surgical procedure under surveillance, two main indicators were calculated:

- The percentage of SSIs per 100 operations: an indicator which includes the deepest reported SSI for each procedure, diagnosed during hospital stay or after discharge from the hospital (detected at hospital readmission or by post-discharge surveillance);
- The incidence density of in-hospital SSIs per 1 000 post-operative patient-days[1]: an indicator that only includes the deepest reported SSI for each procedure, diagnosed during hospital stay in patients with a known date of discharge from the hospital.

Both indicators were also calculated including only deep or organ/space SSIs[2] with positive microbiological findings and stratified by NHSN risk index categories (the latter is shown by type of surgical procedure in the annexed tables).

Data on structure and process indicators for SSI prevention, included in the protocol v2.2, were only provided by one country in 2023, and the results were not calculated for this report [3].

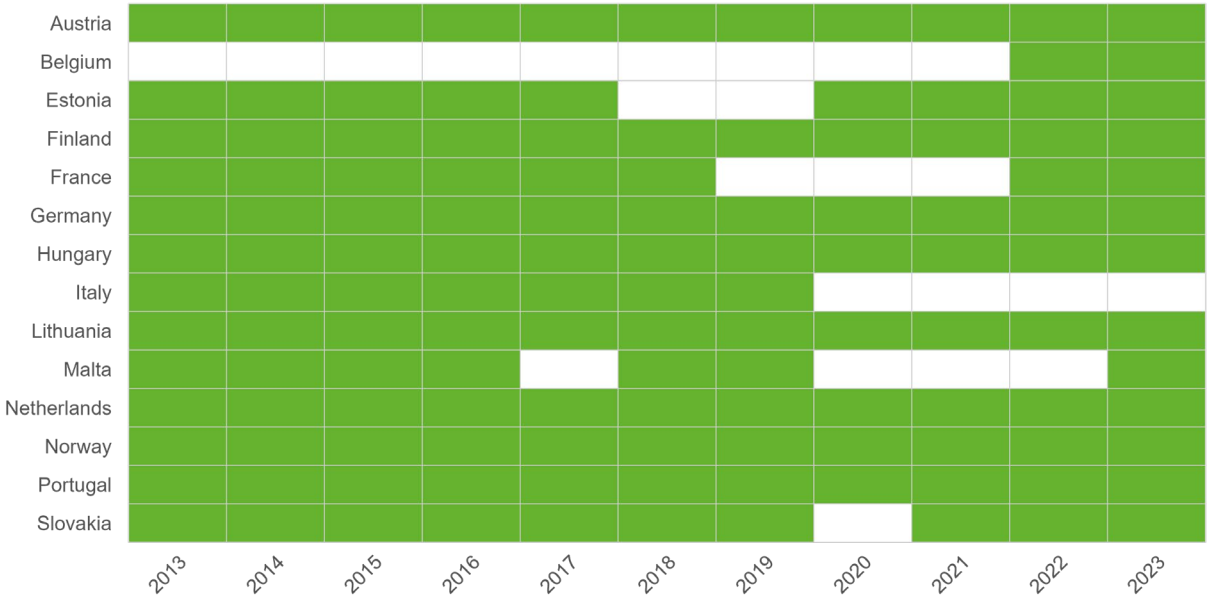
[1] Surveillance in Germany is prematurely ended for patients with revision surgery (i.e. another surgery in the same operative site as the procedure under surveillance). If a revision surgery is due to an SSI, this SSI is still recorded, but any SSI potentially occurring after a revision surgery is not.

[2] Surveillance in the Netherlands reported all combined deep and organ/space SSIs as deep SSIs; in addition, the electronic SSI surveillance system with increasing coverage only includes deep SSIs, excluding superficial SSIs.

Epidemiology

All 13 EU/EEA countries that participated in surveillance of SSIs in 2023 reported patient-based data, with one hospital in Belgium reporting unit-based data (Figure 1). The number of participating hospitals as well as country representativeness varied between countries, with noticeable differences in the national coverage of the surveillance systems (Table 1). Only six of the 13 EU/EEA countries reported any details on their methods used in post-discharge surveillance for SSIs; countries used different methods varying from SSIs being reported by the patients themselves to SSIs being reported by the surgeon or general practitioner, or at readmission.

Figure 1. Participation in the surveillance of surgical site infections (SSIs), EU/EEA, 2013-2023



Overall, 421 397 surgical procedures from 918 hospitals were reported in 2023 (Table 1). The most frequently reported types of surgical procedure were HPRO, followed by KPRO and CSEC.

Table 1. Number of reporting hospitals and reported surgical procedures by country/network and type of surgical procedure, EU/EEA, 2023

Country	Reporting hospitals	CABG	Laparoscopic CHOL	Open CHOL	Laparoscopic COLO	Open COLO	CSEC	HPRO	KPRO	LAM	Total
Austria	32	343	1 935	313	0	0	3 603	7 359	5 127	0	18 680
Belgium	10	0	0	0	0	0	0	1 335	930	0	2 265
Estonia	2	130	107	0	0	0	407	0	465	0	1 109
Finland	14	0	0	0	0	0	0	10 560	9 847	0	20 407
France	38	305	0	0	0	0	3 848	4 279	2 654	733	11 819
Germany	610	10 022	23 874	1 073	5 718	6 827	32 797	96 070	56 024	6 870	239 275
Hungary	32	0	1 283	144	86	118	1 756	948	392	0	4 727
Lithuania	31	712	666	74	118	159	747	1 974	1 186	0	5 636
Malta	1	88	0	0	0	0	0	405	531	0	1 024
Netherlands	65	0	7 272	0	2 054	571	4 995	26 977	26 255	1 599	69 723
Norway	60	1 031	7 287	174	2 236	1 150	7 793	15 437	0	0	35 108
Portugal	21	145	1 496	0	661	0	4 701	2 101	1 990	414	11 508
Slovakia	2	0	45	71	0	0	0	0	0	0	116
EU/EEA	**918**	**12 776**	**43 965**	**1 849**	**10 873**	**8 825**	**60 647**	**167 445**	**105 401**	**9 616**	**421 397**

CABG: coronary artery bypass graft; CHOL: cholecystectomy; COLO: colon surgery; CSEC: caesarean section; HPRO: hip prosthesis; KPRO: knee prosthesis; LAM: laminectomy.
Note: Table 1 includes both patient-based and unit-based data; unit-based data were only reported by Belgium for 3 procedures (2 KPRO, 1 HPRO).

Nine countries reported, at least partially, the ICD-9-CM codes corresponding to the procedures included in surveillance (Belgium, Finland and Hungary did not report any detailed coding; France reported codes from the Classification des Actes Médicaux (CCAM) in 2023). In total, 163 406 (38.7%) of the reported procedures, using patient-based protocol, had a specific ICD-9-CM code.

The ratio of male to female patients was the highest in CABG operations (4.6:1) and the lowest in HPRO and laparoscopic CHOL operations (0.6:1); this ratio was not reported for CSEC operations (Table 2). The median age of patients varied from 32 years in CSEC operations to 72 years in HPRO operations. Post-operative in-hospital case fatality (7.6%) as well as the proportion of contaminated or dirty operations (38.5%) were the highest among open COLO operations. The median duration of operation was the longest in CABG operations (212 minutes), and the median length of post-operative stay was the longest in open COLO operations (11 days). The proportion of urgent operations varied from only 1.1% in KPRO operations to 47.1% in CSEC operations. For most types of surgical procedures, 85% and up to 99% patients received antibiotic prophylaxis, with the exception of CHOL operations, for which 35% patients with a laparoscopic procedure and 54% patients with an open procedure received antibiotic prophylaxis.

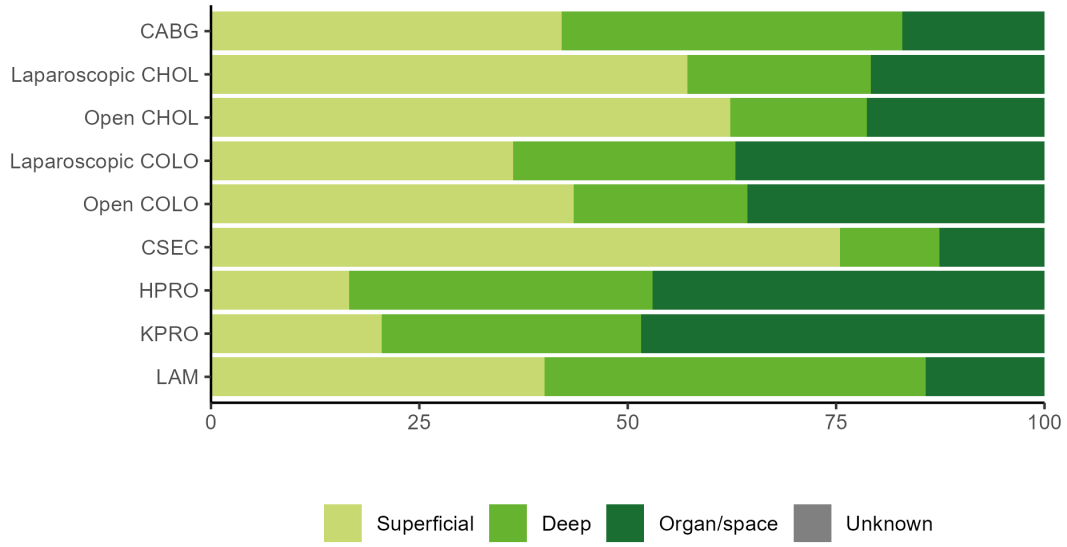
Table 2. Characteristics of patients by type of surgical procedure, patient-based data, EU/EEA, 2023

Characteristics	CABG (n=12 776)	Laparoscopic CHOL (n=43 965)	Open CHOL (n=1 849)	Laparoscopic COLO (n=10 873)	Open COLO (n=8 825)	CSEC (n=60 647)	HPRO (n=167 444)	KPRO (n=105 399)	LAM (n=9 616)
Sex ratio (male:female)	4.6	0.6	0.9	1	1	NA	0.6	0.7	1.2
Median age (years)	68	57	68	68	71	32	72	70	59
Post-operative in-hospit al case fatality (%)	2.2	0.1	0.9	2.2	7.6	0	1.5	0.1	0.3
Contaminated or dirty operations (%)	0.2	20.2	35.3	23.9	38.5	9.8	0.5	0.4	0.3
Median duration of operation (minutes)	212	58	84	148	135	39	65	70	64
75th percentile of the duration of operation (minutes)*	259	78	127	193	179	49	82	88	95
Median length of post-operative stay (days)	9	3	6	7	11	4	6	6	4
Urgent operations (%)	13.3	22.6	30.3	10.9	36.5	47.1	22.0	1.1	6.8
Antibiotic prophylaxis (%)	96.2	35	54	85.1	86.4	84.6	96.1	98.9	95.4

** CABG with both chest and donor site incisions: 257 minutes; CABG with only chest incision: 256 minutes.*
See Table 1 for reporting hospitals and reported surgical procedures in EU/EEA countries. Note that Table 2 includes only patient-based data.
CABG: coronary artery bypass graft; CHOL: cholecystectomy; COLO: colon surgery; CSEC: caesarean section; HPRO: hip prosthesis surgery; KPRO: knee prosthesis surgery; LAM: laminectomy.
NA: Not applicable.

In 2023, 6 254 SSIs were reported. Of these, 2 315 (37.0%) were superficial, 1 713 (27.4%) deep and 2 206 (35.3%) organ/space SSIs. In 20 (0.3%) SSIs, the type of SSI was unknown. The proportion of deep or organ/space SSIs was 24% in CSEC operations, 38% in open CHOL operations, 43% in laparoscopic CHOL operations, 46% in CABG operations, 56% in open COLO operations, 60% in LAM operations, 64% in laparoscopic COLO, 79% in KPRO operations and 83% in HPRO operations (Figure 2). Thirty-one per cent of all SSIs were diagnosed in hospitals, whereas 62% were detected after discharge. For 7% the discharge date was unknown. The proportion of SSIs diagnosed in-hospital varied from 77% (intercountry range: 65-79%) in open COLO operations to 8% (intercountry range: 0-37%) in KPRO operations.

Figure 2. Types of SSI by type of surgical procedure, EU/EEA, 2023



CABG: coronary artery bypass graft; CHOL: cholecystectomy; COLO: colon surgery; CSEC: caesarean section; HPRO: hip prosthesis surgery; KPRO: knee prosthesis surgery; LAM: laminectomy
Note: The Netherlands reported all combined deep and organ/space SSIs as deep SSIs.
See Table 1 for reporting hospitals and reported surgical procedures in EU/EEA countries.

The percentage of SSIs varied greatly by type of surgical procedure, from 0.4% in LAM operations to 10.2% in open COLO operations. Similarly, there were notable differences in the incidence density of in-hospital SSIs between different types of surgical procedure (Table 3). As expected, the percentage and incidence density of SSIs were mainly lower in laparoscopic than in open procedures for both CHOL and COLO operations. The percentage of deep or organ/space SSIs varied from 0.2% in LAM to 5.8% in open COLO procedures, and the incidence density of deep or organ/space in-hospital SSIs varied similarly from 0 in LAM procedures to 3.3 in open COLO procedures.

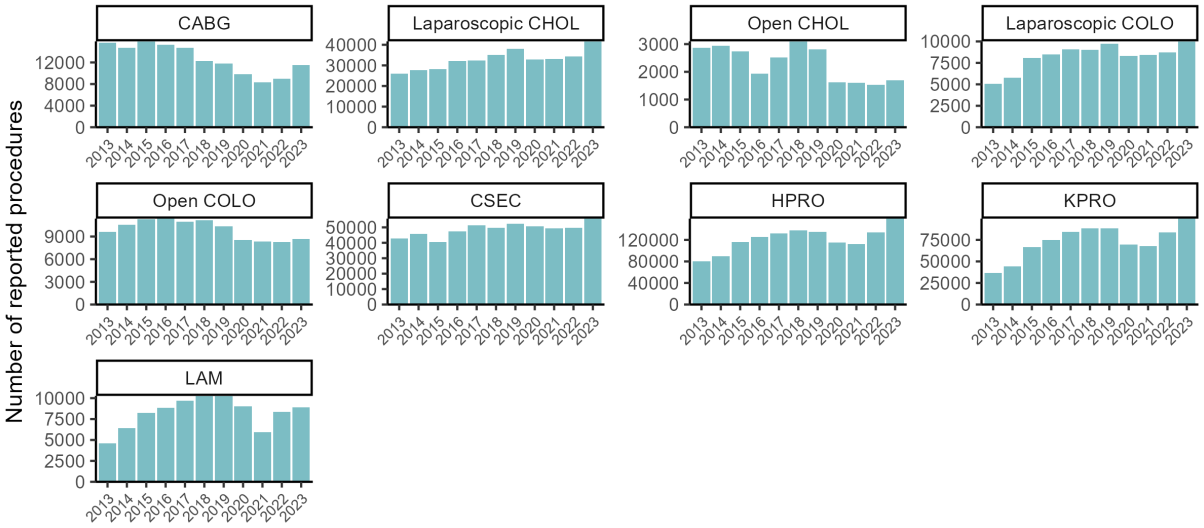
Table 3. Percentage of all SSIs and deep or organ/space SSIs and incidence density of all in-hospital SSIs and deep/organ space SSIs by type of surgical procedure, EU/EEA, 2023

Type of surgical procedure	Percentage of SSIs per 100 operations [intercountry range]	Percentage of deep or organ/space SSIs per 100 operations [intercountry range]	Incidence density of in-hospital SSIs per 1 000 post-operative patient-days [intercountry range]	Incidence density of deep or organ/space in-hospital SSIs per 1 000 post-operative patient-days [intercountry range]
CABG	2.1 [1.2-14.8]	1.0 [0-4.1]	0.9 [0.5-5.6]	0.4 [0-2.8]
Laparoscopic CHOL	1.5 [0-2.7]	0.6 [0-1.2]	0.9 [0.0-2.2]	0.6 [0-1.9]
Open CHOL	3.3 [0-13.2]	1.2 [0-6.9]	2.3 [0-6.9]	1.1 [0-4.8]
Laparoscopic COLO	5.7 [2.3-13.5]	3.6 [1.2-8.3]	4.3 [2.7-8.2]	3.2 [1.4-8.2]
Open COLO	10.2 [8.7-22.8]	5.8 [5.0-20.1]	5.7 [4.8-17.4]	3.3 [2.7-17.4]
CSEC	1.4 [0.2-3.8]	0.3 [0-1.1]	0.4 [0-1.3]	0.2 [0-0.8]
HPRO	1.3 [0.5-3.9]	1.1 [0.3-2.6]	0.4 [0.1-2.3]	0.3 [0.1-1.5]
KPRO	0.7 [0.3-1.7]	0.5 [0-1.5]	0.1 [0-0.7]	0.1 [0-0.3]
LAM	0.4 [0-1.4]	0.2 [0-1.2]	0.1 [0-0.5]	0 [0-0.3]

CABG: coronary artery bypass graft, CHOL: cholecystectomy, COLO: colon surgery, CSEC: caesarean section, HPRO: hip prosthesis surgery, KPRO: knee prosthesis surgery, LAM: laminectomy
See Table 1 for reporting hospitals and reported surgical procedures in EU/EEA countries.

For all types of surgical procedure, apart from open CHOL and COLO procedures, the total number of reported procedures increased in 2023 compared to 2020–2022 (Figure 3). For laparoscopic CHOL and COLO, CSEC, HPRO and KPRO the number of reported procedures reached a new high, with HPRO and KPRO being most commonly under surveillance among participating countries (Table 1).

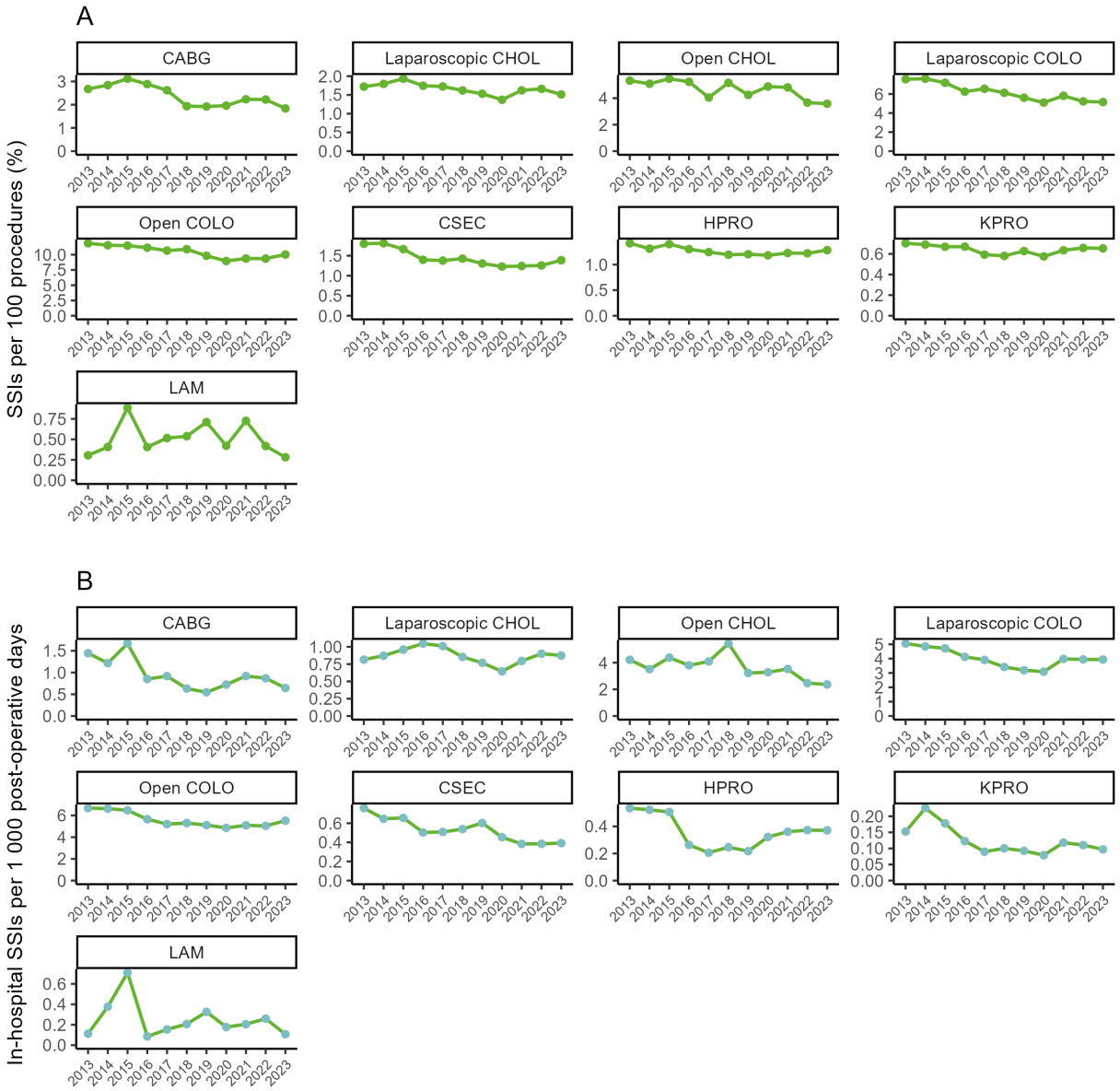
Figure 3. Number of reported procedures by year and type of surgical procedure, EU/EEA, 2013-2023



CABG: coronary artery bypass graft, CHOL: cholecystectomy, COLO: colon surgery, CSEC: caesarean section, HPRO: hip prosthesis surgery, KPRO: knee prosthesis surgery, LAM: laminectomy
See Table 1 for reporting countries and hospitals and reported surgical procedures in EU/EEA countries 2023.

Including only the types of surgical procedures that were consistently reported by participating countries (data reported continuously for 2013–2023), the percentage of SSIs remained mostly stable or decreased during the period (Figure 4). For certain procedure types, laparoscopic CHOL and COLO and HPRO and KPRO, the trends through 2013 to 2023 were not linear, but possibly increasing in years 2020–2023.

Figure 4. Trends of (A) percentage of SSIs and (B) incidence density of in-hospital SSIs by year and type of surgical procedure, EU/EEA, 2013–2023



CABG: coronary artery bypass graft, CHOL: cholecystectomy, COLO: colon surgery, CSEC: caesarean section, HPRO: hip prosthesis surgery, KPRO: knee prosthesis surgery, LAM: laminectomy
Data included only for countries reporting data on types of surgical procedure continuously 2013-2023: Austria, Finland, Germany, Hungary, Lithuania, the Netherlands, Norway and Portugal.

Data on microorganisms were reported for 4 989 microorganisms from nine countries. In these countries, 50% of superficial, 81% of deep and 77% of organ/space SSIs had a positive microbiological finding, varying by type of procedure (Table 4).

Table 4. Percentage of SSIs with a positive microbiological finding by type of SSI and type of surgical procedure, pooled data from nine EU/EEA countries, 2023

Type of surgical procedure	Percentage of SSIs with a positive microbiological finding		
	Superficial SSIs %	Deep SSIs %	Organ/Space SSIs %
CABG	57.0	73.1	75.0
Laparoscopic CHOL	33.3	71.3	57
Open CHOL	48.1	100	85.7
Laparoscopic COLO	54.7	65.0	67.3
Open COLO	56.5	69.1	70
CSEC	46.1	82.3	53.5
HPRO	58.1	85.7	83
KPRO	48.8	92.6	76
LAM	64.3	87.5	100
Total	**50.0**	**80.6**	**76.5**

CABG: coronary artery bypass graft, CHOL: cholecystectomy, COLO: colon surgery, CSEC: caesarean section, HPRO: hip prosthesis surgery, KPRO: knee prosthesis surgery, LAM: laminectomy.
See Table 1 for reporting hospitals and reported surgical procedures in EU/EEA countries.
Source: Country reports from Austria, Belgium, Estonia, France, Germany, Hungary, Lithuania, the Netherlands and Portugal.

Overall, *Staphylococcus aureus* (18%), coagulase-negative staphylococci (16.9%), *Escherichia coli* (12.6%) and *Enterococcus* species (12.4%) were the most frequently reported microorganisms (Table 5). The distribution of microorganisms varied by type of surgical procedure. Especially for COLO procedures, Enterobacterales were reported more commonly than gram-positive cocci. For most other types of surgical procedure, gram-positive cocci remained the most frequently reported microorganisms.

Table 5. Percentages of microorganisms identified in SSIs by type of surgical procedure, pooled data from nine EU/EEA countries, 2023 (n=4 989)

Microorganisms	CABG (n=200)	Laparoscopic CHOL (n=351)	Open CHOL (n=40)	Laparoscopic COLO (n=518)	Open COLO (n=837)	CSEC (n=400)	HPRO (n=1 952)	KPRO (n=629)	LAM (n=33)	Total (n=4 989)
Gram-positive cocci	57.5	39	45	33.8	33.5	55	66.8	76.9	66.7	55.4
Staphylococcus aureus	16.5	6.6	2.5	2.3	1.6	20	24.4	38.2	48.5	18
Coagulase-negative staphylococci	34	6.8	2.5	2.7	3	17.2	25.6	21.3	15.2	16.9
Enterococcus species	4	14.2	30	23.6	26.8	9.8	6.7	3.8	0	12.4
Streptococcus species	1.5	7.1	5	3.3	0.7	5.2	4	6.8	0	3.9
Other gram-positive cocci	1.5	4.3	5	1.9	1.4	2.8	6	6.8	3	4.3
Gram-positive bacilli	2	1.4	0	0.4	0.9	1.2	3.3	3.5	3	2.2
Gram-negative bacilli, Enterobacterales	30.5	34.8	45	47.7	46.1	27.3	18	12.1	15.2	27.8
Escherichia coli	5	18.2	7.5	28.2	26.1	14.2	5	3.5	6.1	12.6
Citrobacter species	3	2.6	2.5	2.3	1.4	0.5	0.7	0.5	0	1.2
Enterobacter species	5.5	4	7.5	3.9	3.7	2.5	3.7	2.7	3	3.6
Klebsiella species	10	8	20	6.9	8.5	3.5	2.9	1.7	0	5
Proteus species	4.5	0.3	5	1.9	2.7	4.5	3.8	2.4	0	3.1
Serratia species	2.5	0.9	0	0.6	0.7	1.2	1.1	0.8	3	1
Other Enterobacteriaceae	0	0.9	2.5	3.9	3	0.8	0.7	0.5	3	1.4
Gram-negative non-fermentative bacilli	4	2.6	5	6.6	6.9	5.5	4.6	3.2	0	4.9
Acinetobacter species	0.5	0	0	0	0	0.2	0.7	0.8	0	0.4
Haemophilus species	0	0.6	0	0.2	0	0.2	0.1	0.2	0	0.1
Pseudomonas aeruginosa	3	1.1	5	5.8	6.9	3.8	3.4	1.4	0	3.9
Pseudomonadaceae family, other	0	0	0	0.2	0	0	0.2	0	0	0.1
Stenotrophomonas maltophilia	0.5	0	0	0	0	0	0.1	0.5	0	0.1
Other gram-negative non-fermentative bacilli	0	0.9	0	0.4	0	1.2	0.1	0.3	0	0.3
Anaerobes	5.5	11.1	5	6.4	4.7	9.8	6	3	12.1	6.1
Bacteroides species	0	3.7	2.5	5	3	1.5	0.4	0.2	0	1.6
Other anaerobes	5.5	7.4	2.5	1.4	1.7	8.2	5.7	2.9	12.1	4.5
Other bacteria	0	10	0	2.1	1.8	1	0.7	1.1	3	1.8
Fungi, parasites	0.5	1.1	0	3.1	6	0.2	0.6	0.2	0	1.7
Candida species	0.5	1.1	0	3.1	6	0.2	0.6	0.2	0	1.7

CABG: coronary artery bypass graft, CHOL: cholecystectomy, COLO: colon surgery, CSEC: caesarean section, HPRO: hip prosthesis surgery, KPRO: knee prosthesis surgery, LAM: laminectomy
See Table 1 for reporting hospitals and reported surgical procedures in EU/EEA countries.
Source: Country reports from Austria, Belgium, Estonia, France, Germany, Hungary, Lithuania, the Netherlands and Portugal.

Discussion

The results in this report provide updated information on the incidence of surgical site infections (SSIs) in the EU/EEA. The number of reported procedures increased from 2021–2022 to 2023, indicating a further return towards pre-pandemic levels of HAI surveillance activity [8]. In several procedure types, 2023 was the year with the highest number of reported procedures. However, large intercountry variation and participation by less than half of EU/EEA countries limit representativeness at EU/EEA level and complicate interpretation of pooled results.

With surveillance participation returning towards pre-pandemic levels, data for 2013–2023 are included to describe longer-term patterns in SSI indicators among participating countries. Visual inspection suggests year-to-year variation in both the percentage of SSIs and the incidence density of in-hospital SSIs, with patterns differing by procedure type. For some procedures, the pattern in 2020–2023 appears different from earlier years, and trends do not appear well described by a simple linear change over time. Any assessment of longer-term changes should therefore consider potential non-linear patterns as well as changes in reporting, case ascertainment and healthcare delivery over the period.

The report includes two different SSI indicators. The percentage of SSIs per 100 operations reflects infections detected both during hospital stay and after discharge. It is therefore more sensitive to differences in post-discharge surveillance methods. In-hospital SSI incidence density per 1 000 post-operative patient-days includes only infections detected during the hospital stay and is therefore less affected by variation in post-discharge surveillance, shown by the limited reporting of post-discharge surveillance methods and the variation in proportion of SSIs diagnosed in hospital. Nevertheless, this indicator may also be affected by length of stay and in-hospital diagnostic practices, and only detects approximately one third of all SSIs.

Microbiological data, when available, may improve comparability for deep and organ/space infections. Deep and organ/space SSIs are more likely than superficial infections to have a reported positive microbiological finding, and microbiology-supported case identification may reduce variation due to clinical diagnostic thresholds. In settings with adequate microbiological reporting and comparable surveillance, the percentage of SSIs or the incidence density of deep/organ-space SSIs with an identified microorganism may therefore provide a more useful basis for epidemiological comparisons, particularly for common procedures such as hip and knee prosthesis surgery. However, differences in hospital activity, surveillance coverage, reporting practices and data completeness continue to limit comparisons between countries and over time, and not all countries participating in the surveillance report microbiological results.

Public health implications

Surveillance is a core component of preventing and controlling healthcare-associated infections, and supports the monitoring of the effect of preventive measures [9]. As additional post-pandemic data become available for 2024 and 2025, formal trend analyses for 2020–2025 could complement visual inspection and help determine whether recent patterns observed in some procedure types persist.

To strengthen SSI surveillance in the EU/EEA, wider participation and improved national representativeness remain important. Comparability would also benefit from greater alignment of post-discharge surveillance, reported procedure types and increased reporting of key data elements. Improving completeness of key surveillance variables would further support interpretation and stratified analyses.

ECDC began collecting structure and process indicators for SSI prevention following the 2017 protocol update, implemented in several systems in 2018. However, these indicator data have been rarely reported in recent years and are therefore not included in this report. Future options to capture such structure and process indicators, for example with periodic data collection, could help link preventive practices to SSI outcomes, if considered feasible within the network.

Finally, SSI surveillance data can inform development of more efficient surveillance approaches. The 2025 minor protocol update and the expanded reporting of SSIs with positive microbiological findings may support more standardised and potentially more automated surveillance for deep and organ/space SSIs, particularly in commonly included procedure types such as hip and knee prosthesis surgery [10].

References

1. European Centre for Disease Prevention and Control (ECDC). Introduction to the Annual epidemiological report. In: ECDC. Annual epidemiological report. Stockholm: ECDC; 2025. Available at: https://www.ecdc.europa.eu/en/surveillance-and-disease-data/annual-epidemiological-reports/introduction-annual
2. European Centre for Disease Prevention and Control (ECDC). Surveillance of surgical site infections in European hospitals – HAISSI protocol. Version 1.02. Stockholm: ECDC; 2012. Available at: http://ecdc.europa.eu/en/publications/Publications/120215_TED_SSI_protocol.pdf
3. European Centre for Disease Prevention and Control (ECDC). Surveillance of surgical site infections and prevention indicators in European hospitals – HAISSI protocol. Version 2.2. Stockholm: ECDC; 2017. Available at: https://www.ecdc.europa.eu/sites/default/files/documents/HAI-Net-SSI-protocol-v2.2.pdf
4. European Centre for Disease Prevention and Control (ECDC). EU case definitions [internet]. Stockholm: ECDC; 2017. Available at: http://ecdc.europa.eu/en/aboutus/what-we-do/surveillance/Pages/case_definitions.aspx
5. Commission Implementing Decision 2012/506/EU of 8 August 2012 amending Decision 2002/253/EC laying down case definitions for reporting communicable diseases to the Community network under Decision No 2119/98/EC of the European Parliament and of the Council OJ L 262/1; 27.9.2012. Available at: http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32012D0506&from=EN
6. Mangram AJ, Horan TC, Pearson ML, Silver LC, Jarvis WR. Guideline for prevention of surgical site infection, 1999. Hospital Infection Control Practices Advisory Committee. Infect Control Hosp Epidemiol. 1999 Apr;20(4):250-78; quiz 279-80.
7. National Nosocomial Infections Surveillance System. National Nosocomial Infections Surveillance (NNIS) System report, data summary from January 1992 through June 2004, issued October 2004. Am J Infect Control. 2004 Dec;32(8):470-85. Available at: http://www.cdc.gov/nhsn/pdfs/datastat/nnis_2004.pdf
8. European Centre for Disease Prevention and Control (ECDC). Healthcare-associated infections: surgical site infections. Annual Epidemiological Report for 2021-2022. Stockholm: ECDC; 2025. Available at: https://www.ecdc.europa.eu/sites/default/files/documents/AER-HAI-2021-2022.pdf
9. Zingg W, Holmes A, Dettenkofer M, Goetting T, Secci F, Clack L, et al. Hospital organisation, management, and structure for prevention of health-care-associated infection: a systematic review and expert consensus. Lancet Infect Dis. 2015 Feb;15(2):212-24.
10. European Centre for Disease Prevention and Control (ECDC). Protocol of the surveillance of surgical site infections and prevention indicators in European hospitals – HAI-Net SSI protocol. Version 2.3. Stockholm: ECDC; 2025. Available at: https://www.ecdc.europa.eu/sites/default/files/documents/surgical-site-infections-protocol-surveillance-2-3.pdf

Annex

Table A1. Percentage of unknown or missing values by TESSy variable and year, patient-based data, 2023

Variable	Name of TESSy variable	Unknown or missing values (%)*
Gender	Gender	0
In-hospital outcome	OutcomeHospital	79.9
Date of operation	DateOfOperation	0
Date of hospital admission	DateOfHospitalAdmission	61.5
Date of hospital discharge	DateOfHospitalDischarge	8.7
Operation code	OPCode	0
Wound class	WoundClass	1.9
Duration of operation	OperationDur	0.9
ASA score	ASAClassification	2.7
Urgent operation	UrgentOperation	59.8
Prophylaxis	Prophylaxis	79.6

** n = 421 394 procedures (patient-based data)*